

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

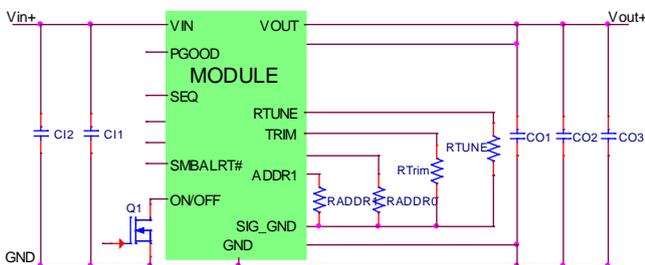
7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current



RoHS Compliant

## Applications

- Networking equipment
- Telecommunications equipment
- Servers and storage applications
- Distributed power architectures
- Intermediate bus voltage applications
- Industrial equipment



## Features

- Compliant to RoHS EU Directive 2002/95/EC (Z versions)
- Compliant to IPC-9592 (September 2008), Category 2, Class II
- Compatible in a Pb-free or SnPb reflow environment (Z versions)
- Wide Input voltage range (7Vdc-14 Vdc)
- Output voltage programmable from 0.1Vdc to 1.5Vdc via external resistor or PMBus™# commands
- Digital interface through the PMBus protocol
- Ability to parallel multiple modules (optional)
- Digital sequencing
- Fast digital loop control
- Power Good signal
- Fixed switching frequency with capability of external synchronization
- Output overcurrent protection (non-latching)
- Output overvoltage protection
- Over temperature protection
- Remote On/Off
- Ability to sink and source current
- Cost efficient open frame design
- Small size: 53.8 x 31.7 x 13.3 mm [ 2.118" x 1.248" x 0.524"]
- Wide operating temperature range [-40°C to 85°C]
- UL\* 60950-1 2<sup>nd</sup> Ed. Recognized, CSA† C22.2 No. 60950-1-07 Certified, and VDE‡ (EN60950-1 2<sup>nd</sup> Ed.) Licensed
- ISO\*\* 9001 and ISO 14001 certified manufacturing facilities

## Description

The 170A Digital TeraDlynx™ power modules are non-isolated dc-dc converters that can deliver up to 170A of output current. These modules operate over a 7 to 14Vdc input range and provide a precisely regulated output voltage from 0.1 to 1.5Vdc. The output voltage is programmable via an external resistor and/or PMBus control. Features include a digital interface using the PMBus protocol, remote On/Off, adjustable output voltage, Power Good signal and overcurrent, overvoltage and overtemperature protection. The PMBus interface supports a range of commands to both control and monitor the module. The module also includes a real time compensation loop that allows optimizing the dynamic response of the converter to match the load with reduced amount of output capacitance leading to savings on cost and PWB area.

\* UL is a registered trademark of Underwriters Laboratories, Inc.  
 † CSA is a registered trademark of Canadian Standards Association.  
 ‡ VDE is a trademark of Verband Deutscher Elektrotechniker e.V.  
 \*\* ISO is a registered trademark of the International Organization of Standards  
 # The PMBus name and logo are registered trademarks of the System Management Interface Forum (SMIF)



## 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

### Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only, functional operation of the device is not implied at these or any other conditions in excess of those given in the operations sections of the technical requirements. Exposure to absolute maximum ratings for extended periods can adversely affect the device reliability.

Parameter	Device	Symbol	Min	Max	Unit
Input Voltage - Continuous	All	$V_{IN}$	-0.3	15	V
SEQ, ADDR0, ADDR1, RTUNE, RTRIM, SYNC, VS+, ON/OFF	All		-0.3	3.8	V
CLK, DATA, SMBALERT#	All		-0.3	3.8	V
Operating Ambient Temperature (see Thermal Considerations section)	All	$T_A$	-40	85	°C
Storage Temperature	All	$T_{stg}$	-55	125	°C

### Electrical Specifications

Unless otherwise indicated, specifications apply over all operating input voltage, resistive load, and temperature conditions.

Parameter	Device	Symbol	Min	Typ	Max	Unit
Operating Input Voltage	All	$V_{IN}$	7	—	14	Vdc
Maximum Input Current ( $V_{IN}=7V$ to $14V$ , $I_o=I_{o,max}$ )	All	$I_{IN,max}$			40	Adc
Input No Load Current ( $V_{IN} = 12Vdc$ , $I_o = 0$ , module enabled)	$V_{O,set} = 0.6 Vdc$	$I_{IN,No load}$		160		mA
	$V_{O,set} = 1.5Vdc$	$I_{IN1No load}$		200		mA
Input Stand-by Current ( $V_{IN} = 12Vdc$ , module disabled)	All	$I_{IN,stand-by}$		62		mA
Inrush Transient	All	$I^2t$		TBD		A <sup>2</sup> s
Input Reflected Ripple Current, peak-to-peak (5Hz to 20MHz, 1 $\mu$ H source impedance; $V_{IN} = 0$ to $14V$ , $I_o = I_{o,max}$ ; See Test Configurations)	All	Input_ Reflected		5		mAp-p
Input Ripple Rejection (120Hz)	All	Input_ RR		-54		dB

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

## 7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

### Electrical Specifications (continued)

Parameter	Device	Symbol	Min	Typ	Max	Unit
Output Voltage Set-point (with 0.1% tolerance for external resistor used to set output voltage)						
-40 to 85°C	All	$V_{O, set}$	-1.0		+1.0	% $V_{O, set}$
0 to 85°C	All		-0.7		+0.7	% $V_{O, set}$
Output Voltage (Over all operating input voltage, resistive load, and temperature conditions until end of life)	All	$V_{O, set}$	-2.5		+2.5	% $V_{O, set}$
Adjustment Range (selected by an external resistor) (Some output voltages may not be possible depending on the input voltage – see Feature Descriptions Section)	All	$V_{OUT}$	0.1		1.5	Vdc
PMBus Adjustable Output Voltage Range	All	$V_{O, adj}$	0.1		1.5	% $V_{O, set}$
PMBus Output Voltage Adjustment Step Size	All			98		μV
Remote Sense Range	All				0.3	Vdc
Output Regulation						
Line ( $V_{IN}=V_{IN, min}$ to $V_{IN, max}$ )	All				5	mV
Load ( $I_O=I_{O, min}$ to $I_{O, max}$ )	All				5	mV
Temperature ( $T_{ref}=T_{A, min}$ to $T_{A, max}$ )	All				5	mV
Output Ripple and Noise on nominal output ( $V_{IN}=V_{IN, nom}$ and $I_O=I_{O, min}$ to $I_{O, max}$ $C_o = TBD$ , $C_{in} = TBD$ )						
Peak-to-Peak (Full bandwidth)					30	mV <sub>pk-pk</sub>
RMS (Full bandwidth)	All				12	mV <sub>rms</sub>
External Capacitance						
Minimum output capacitance	All	$C_{O, min}$	1500	—	—	μF
Maximum output capacitance	All	$C_{O, max}$	—	—	40000	μF
Output Current (in either sink or source mode)	All	$I_o$	0		170	A <sub>dc</sub>
Output Current Limit Inception (Hiccup Mode) (current limit does not operate in sink mode)	All	$I_{o, lim}$		110		% $I_{o, max}$
Output Short-Circuit Current ( $V_O \leq 250mV$ ) ( Hiccup Mode )	All	$I_{O1, s/c}$ , $I_{O1, s/c}$		40		Arms
Efficiency						
$V_{O, set} = 0.6Vdc$		$\eta$		85.9		%
$V_{O, set} = 0.8Vdc$		$\eta$		88.6		%
$V_{O, set} = 1.0Vdc$		$\eta$		90.3		%
$V_{O, set} = 1.2Vdc$		$\eta$		91.4		%
$V_{O, set} = 1.5Vdc$		$\eta$		92.6		%
$V_{IN} = 12Vdc$ , $T_A = 25^\circ C$ $I_O = I_{O, max}$ , $V_O = V_{O, set}$						
Switching Frequency	All	$f_{sw}$	-	400	-	kHz
Frequency Synchronization	All					
Synchronization Frequency Range	All		-15		+15	%
High-Level Input Voltage	All	$V_{IH, SYNC}$	2.5			V
Low-Level Input Voltage	All	$V_{IL, SYNC}$			1.1	V
Minimum Pulse Width, SYNC	All	$t_{SYNC}$	256			ns

## 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## General Specifications

Parameter	Device	Min	Typ	Max	Unit
Calculated MTBF ( $I_o=0.8I_{o,max}$ , $T_A=40^\circ\text{C}$ ) Telecordia Issue 2 Method 1 Case 3	All		11,556,226		Hours
Weight		—	TBD	—	g (oz.)

## Feature Specifications

Unless otherwise indicated, specifications apply over all operating input voltage, resistive load, and temperature conditions. See Feature Descriptions for additional information.

Parameter	Device	Symbol	Min	Typ	Max	Unit
On/Off Signal Interface ( $V_{IN}=V_{IN,min}$ to $V_{IN,max}$ ; open collector or equivalent, Signal referenced to GND)						
Device Code- XXXXXX Negative Logic (See Ordering Information) (On/OFF pin is open collector/drain logic input with external pull-up resistor; signal referenced to GND) Logic High (Module OFF) Input High Current Input High Voltage Logic Low (Module ON) Input low Current Input Low Voltage	All All All All	$I_{IH}$ $V_{IH}$ $I_{IL}$ $V_{IL}$	— 2 — -0.2	— — — —	1 $V_{IN,max}$ 10 0.4	mA Vdc $\mu\text{A}$ Vdc
Device Code- XXXXXX Positive Logic (See Ordering Information) (On/OFF pin is open collector/drain logic input with external pull-up resistor; signal referenced to GND) Logic High (Module OFF) Input High Current Input High Voltage Logic Low (Module ON) Input low Current Input Low Voltage	All All All All	$I_{IH}$ $V_{IH}$ $I_{IL}$ $V_{IL}$	— 2 — -0.2	— — — —	10 $V_{IN,max}$ 10 0.4	$\mu\text{A}$ Vdc $\mu\text{A}$ Vdc
Turn-On Delay and Rise Times						
( $V_{IN}=V_{IN,nom}$ , $I_o=I_{o,max}$ , $V_o$ to within $\pm 1\%$ of steady state) Case 1: On/Off input is enabled and then input power is applied (delay from instant at which $V_{IN} = V_{IN,min}$ until $V_o =$ 10% of $V_{o,set}$ )	All	Tdelay	—	10	—	ms
Case 2: Input power is applied for at least one second and then the On/Off input is enabled (delay from instant at which On/Off is enabled until $V_o = 10\%$ of $V_{o,set}$ )	All	Tdelay	—	2	—	ms
Output voltage Rise time (time for $V_o$ to rise from 10% of $V_{o,set}$ to 90% of $V_{o,set}$ )	All	Trise	—	5	—	msec
Output voltage overshoot ( $T_A = 25^\circ\text{C}$ $V_{IN} = V_{IN,min}$ to $V_{IN,max}$ , $I_o = I_{o,min}$ to $I_{o,max}$ ) With or without maximum external capacitance		Output			3.0	% $V_{o,set}$
Over Temperature Protection (See Thermal Considerations section)	All	$T_{ref}$		135		$^\circ\text{C}$
PMBus Over Temperature Warning Threshold*	All	$T_{WARN}$		125		$^\circ\text{C}$

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## Feature Specifications (cont.)

Parameter	Device	Symbol	Min	Typ	Max	Units
Tracking Accuracy (Power-Up: 0.5V/ms) (Power-Down: 0.5V/ms) ( $V_{IN, min}$ to $V_{IN, max}$ ; $I_{O, min}$ to $I_{O, max}$ $V_{SEQ} < V_o$ )	All	$V_{SEQ} - V_o$			100	mV
	All	$V_{SEQ} - V_o$			100	mV
Input Undervoltage Lockout						
Turn-on Threshold	All				7	Vdc
Turn-off Threshold	All		6.75			Vdc
Hysteresis	All			0.25		Vdc
PMBus Adjustable Input Under Voltage Lockout Thresholds	All		7		14	Vdc
Resolution of Adjustable Input Under Voltage Threshold	All				5.8	mV
PGOOD (Power Good)						
Signal Interface Open Drain, $V_{supply} \leq 5VDC$						
Overvoltage threshold for PGOOD ON	All			110		% $V_{O, set}$
Overvoltage threshold for PGOOD OFF	All			110		% $V_{O, set}$
Undervoltage threshold for PGOOD ON	All			90		% $V_{O, set}$
Undervoltage threshold for PGOOD OFF	All			90		% $V_{O, set}$
Pulldown resistance of PGOOD pin	All				2	$\Omega$
Sink current capability into PGOOD pin	All				50	mA

\* Over temperature Warning – Warning may not activate before alarm and unit may shutdown before warning.

## 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

8Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

### Digital Interface Specifications

Unless otherwise indicated, specifications apply over all operating input voltage, resistive load, and temperature conditions. See Feature Descriptions for additional information.

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>PMBus Signal Interface Characteristics</b>						
Input High Voltage (CLK, DATA)		V <sub>IH</sub>	2.1			V
Input Low Voltage (CLK, DATA)		V <sub>IL</sub>			1.1	V
Input high level current (CLK, DATA)		I <sub>IH</sub>	TBD		TBD	μA
Input low level current (CLK, DATA)		I <sub>IL</sub>	TBD		TBD	μA
Output Low Voltage (CLK, DATA, SMBALERT#)	I <sub>OUT</sub> =2mA	V <sub>OL</sub>			TBD	V
Output high level open drain leakage current (DATA, SMBALERT#)	V <sub>OUT</sub> =3.6V	I <sub>OH</sub>	TBD		TBD	μA
Pin capacitance		C <sub>o</sub>			10	pF
PMBus Operating frequency range	Slave Mode	F <sub>PMB</sub>	10		1000	kHz
Data hold time		t <sub>HD:DAT</sub>		0		ns
Data setup time		t <sub>SU:DAT</sub>		100		ns
<b>Measurement System Characteristics</b>						
Read delay time		t <sub>DLY</sub>	TBD	TBD	TBD	μs
Output current measurement range		I <sub>IRNG</sub>	0		TBD	A
Output current measurement resolution		I <sub>IRES</sub>	TBD			mA
Output current measurement gain accuracy	-40°C to +85°C	I <sub>IACC</sub>			±5	% of I <sub>o,max</sub>
Output current measurement offset		I <sub>IOfST</sub>			TBD	A
V <sub>OUT</sub> measurement range		V <sub>OUT</sub>	0		2.0	V
V <sub>OUT</sub> measurement accuracy		V <sub>OUT(gain)</sub>		±1		%
V <sub>OUT</sub> measurement resolution		V <sub>OUT(res)</sub>		0.61		mV
V <sub>IN</sub> measurement range		V <sub>IN</sub>	0		16	V
V <sub>IN</sub> measurement accuracy		V <sub>IN(gain)</sub>		±2		%
V <sub>IN</sub> measurement resolution		V <sub>IN(res)</sub>		5.8		mV
Temperature measurement range		T <sub>MEAS</sub>	-25		150	°C
Temperature measurement accuracy		T <sub>MEAS(gain)</sub>	-8		8	°C
Temperature measurement resolution		T <sub>MEAS(res)</sub>		0.08		°C

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc -14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## Characteristic Curves

The following figures provide typical characteristics for the 170A Digital TeraDlynx™ at 0.6V<sub>o</sub> and 25°C.

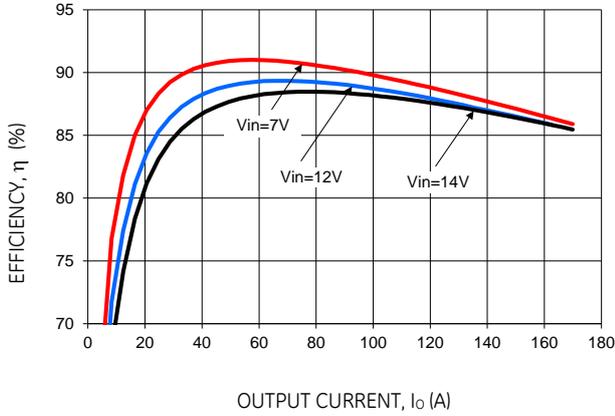


Figure 1. Converter Efficiency versus Output Current.

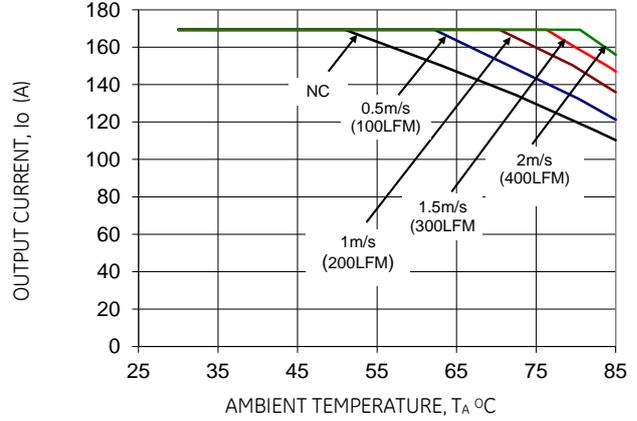


Figure 2. Derating Output Current versus Ambient Temperature and Airflow.

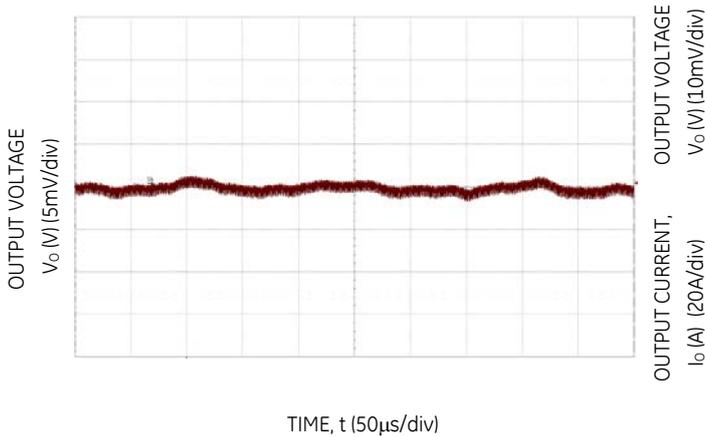


Figure 3. Typical output ripple and noise (C<sub>o</sub>=12x47µF ceramic + 10x470µF polymer, V<sub>IN</sub> = 12V, I<sub>o</sub> = I<sub>o,max</sub>).

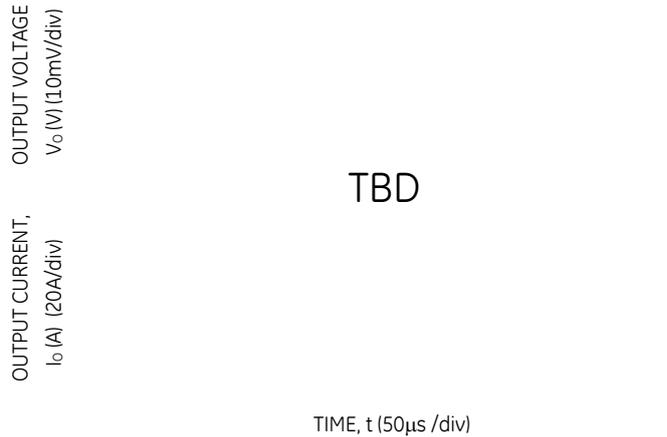


Figure 4. Transient Response to Dynamic Load Change from 25% to 75% at 12Vin, C<sub>o</sub>= TBD, R<sub>TUNE</sub> = TBD

TBD

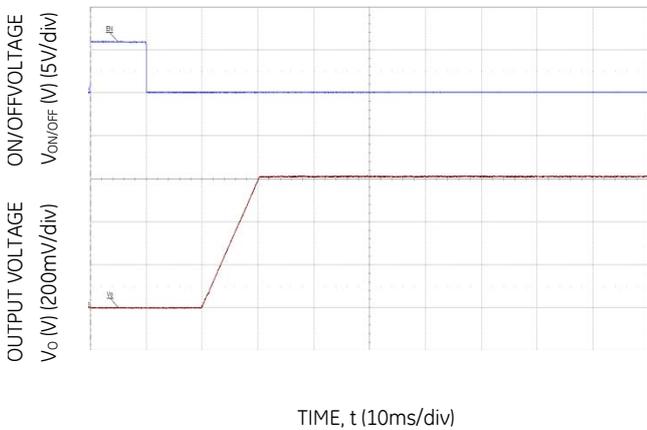


Figure 5. Typical Start-up Using On/Off Voltage (I<sub>o</sub> = I<sub>o,max</sub>).

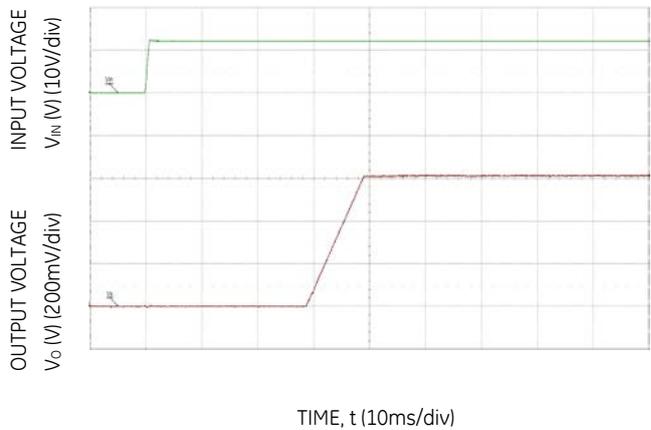


Figure 6. Typical Start-up Using Input Voltage (V<sub>IN</sub> = 12V, I<sub>o</sub> = I<sub>o,max</sub>).

# 170A TeraDLynx™: Non-Isolated DC-DC Power Modules

7Vdc -14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## Characteristic Curves

The following figures provide typical characteristics for the 170A TeraDLynx™ at 0.8Vo and 25°C

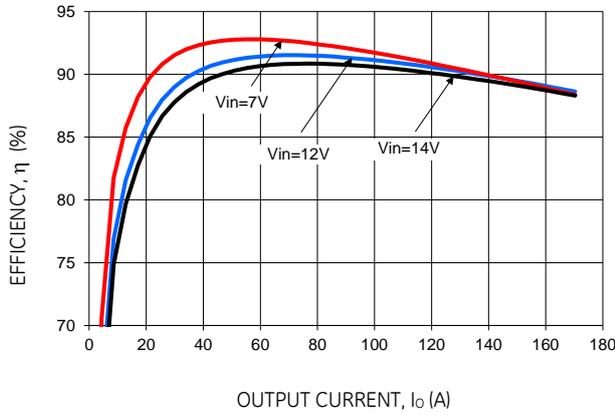


Figure 7. Converter Efficiency versus Output Current.

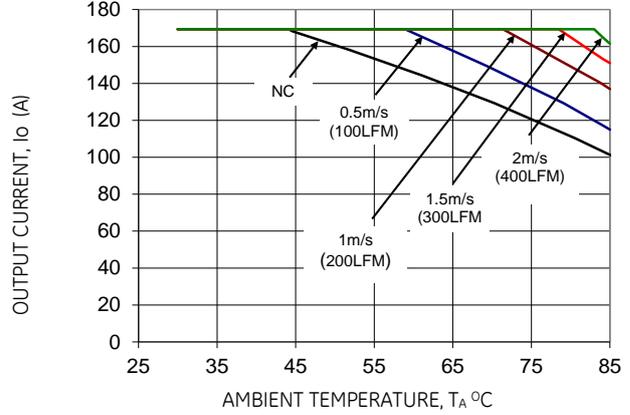


Figure 8. Derating Output Current versus Ambient Temperature and Airflow.

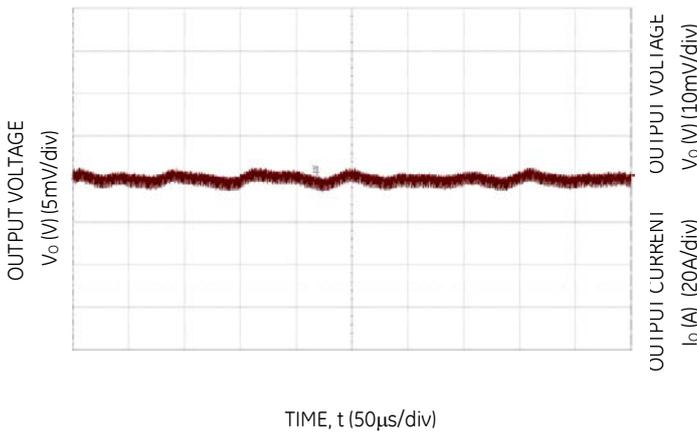


Figure 9. Typical output ripple and noise (Co=12x47µF ceramic + 10x470µF polymer, Vin = 12V, Io = Io,max.)

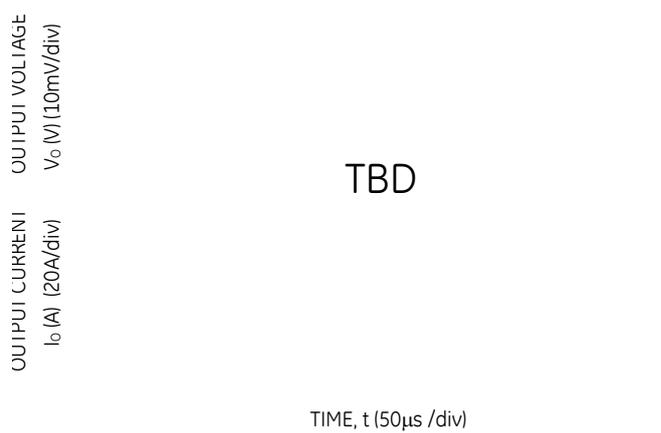


Figure 10. Transient Response to Dynamic Load Change from 25% to 75% at 12Vin, Co= 30x 47µF + 11x 1000µF, RTUNE = 3.74kΩ

TBD

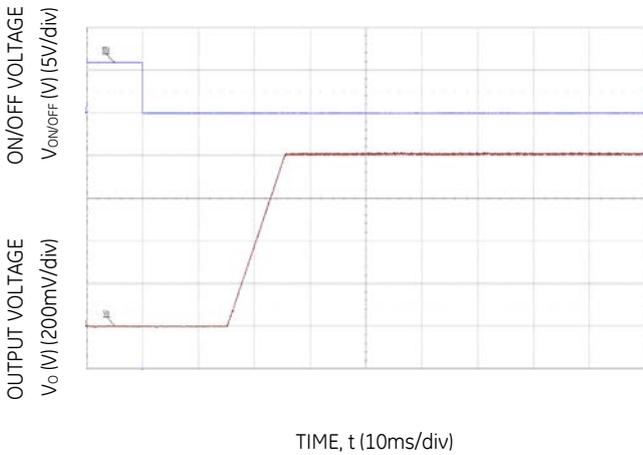


Figure 11. Typical Start-up Using On/Off Voltage (Io = Io,max).

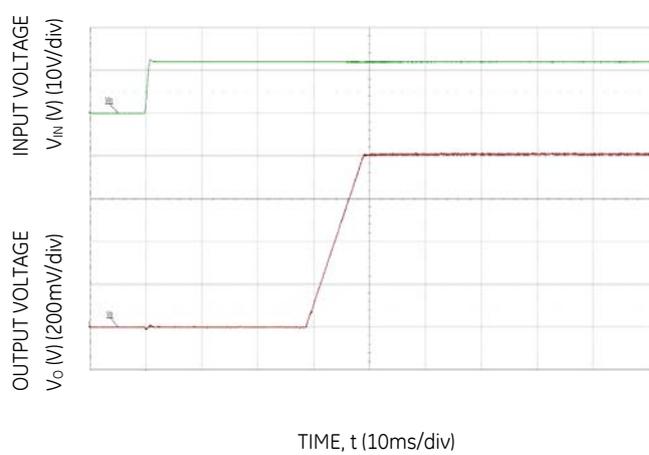


Figure 12. Typical Start-up Using Input Voltage (Vin = 12V, Io = Io,max).

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc -14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## Characteristic Curves

The following figures provide typical characteristics for the 170A Digital TeraDlynx™ at 1.0Vo and 25°C.

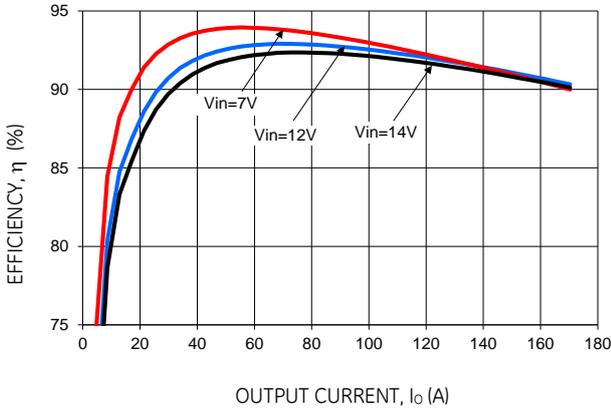


Figure 13. Converter Efficiency versus Output Current.

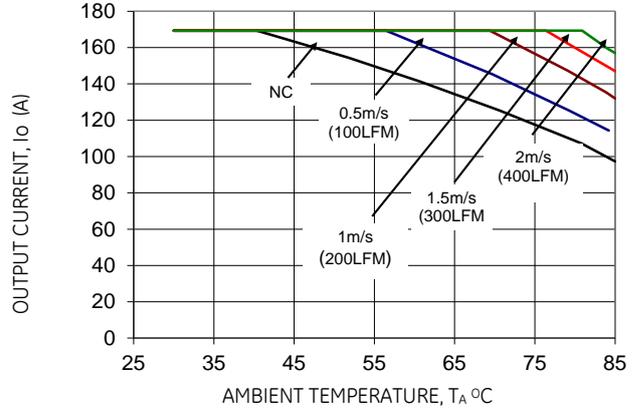


Figure 14. Derating Output Current versus Ambient Temperature and Airflow.

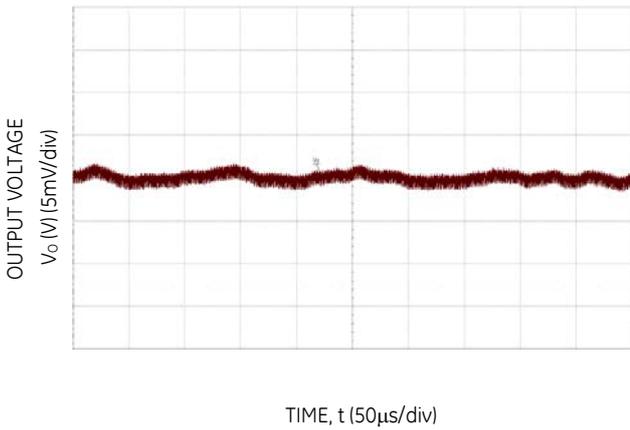


Figure 15. Typical output ripple and noise (Co=12x47µF ceramic + 10x470µF polymer, VIN = 12V, Io = Io,max,)

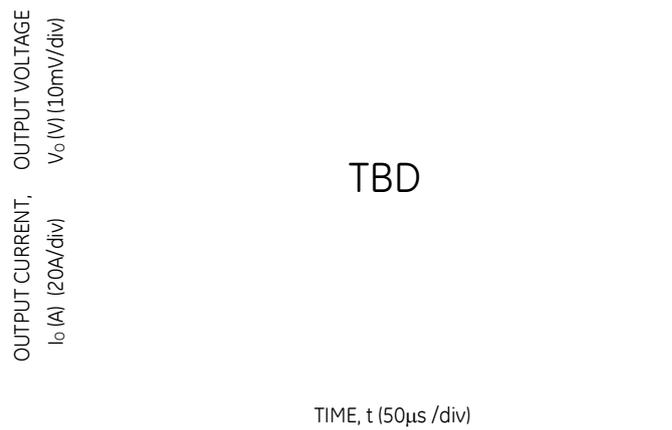


Figure 16. Transient Response to Dynamic Load Change from 25% to 75% at 12Vin, Co= 26x 47µF + 9x 1000µF, RTUNE = 3.24kΩ

TBD

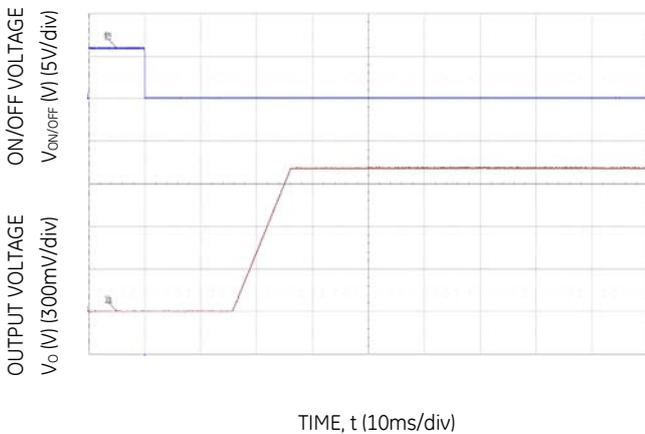


Figure 17. Typical Start-up Using On/Off Voltage (Io = Io,max).

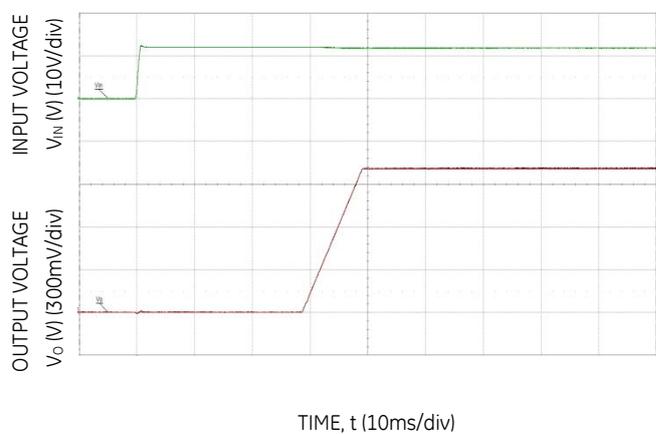


Figure 18. Typical Start-up Using Input Voltage (VIN = 12V, Io = Io,max).

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## Characteristic Curves

The following figures provide typical characteristics for the 170A Digital TeraDlynx™ at 1.2V<sub>o</sub> and 25°C.

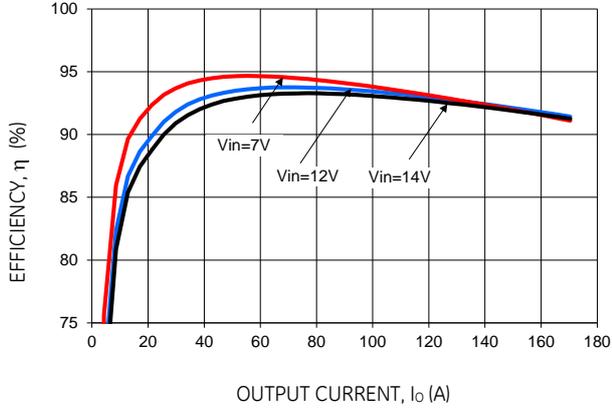


Figure 19. Converter Efficiency versus Output Current.

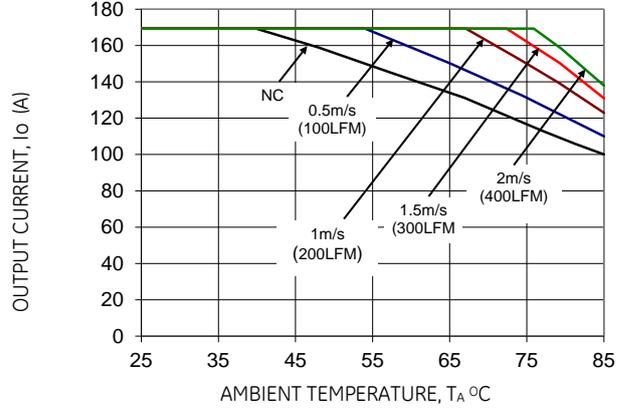


Figure 20. Derating Output Current versus Ambient Temperature and Airflow.

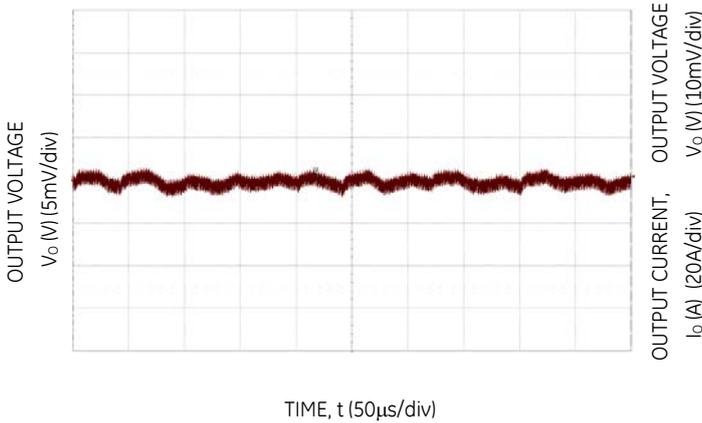


Figure 21. Typical output ripple and noise (C<sub>o</sub>=12x47µF ceramic + 10x470µF polymer, V<sub>IN</sub> = 12V, I<sub>o</sub> = I<sub>o,max</sub>.)



Figure 22. Transient Response to Dynamic Load Change from 25% to 75% at 12V<sub>in</sub>, C<sub>o</sub>= 25x 47µF + 8x 1000µF, R<sub>TUNE</sub> = 6.81kΩ

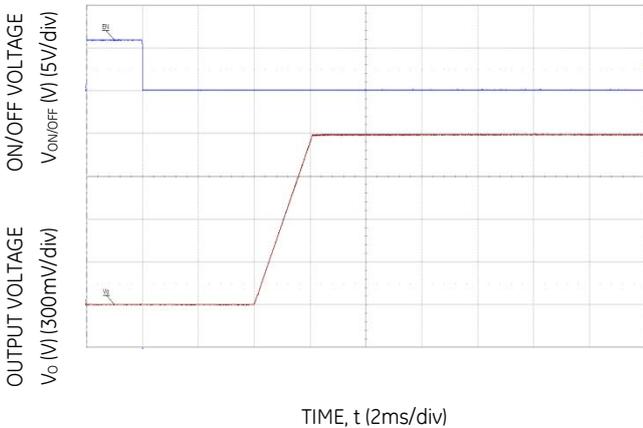


Figure 23. Typical Start-up Using On/Off Voltage (I<sub>o</sub> = I<sub>o,max</sub>).

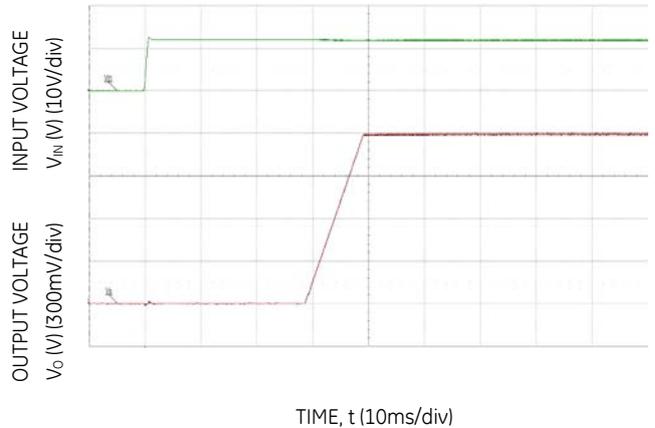


Figure 24. Typical Start-up Using Input Voltage (V<sub>IN</sub> = 12V, I<sub>o</sub> = I<sub>o,max</sub>).

TBD

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc -14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## Characteristic Curves

The following figures provide typical characteristics for the 170A Digital TeraDlynx™ at 1.5V<sub>o</sub> and 25°C.

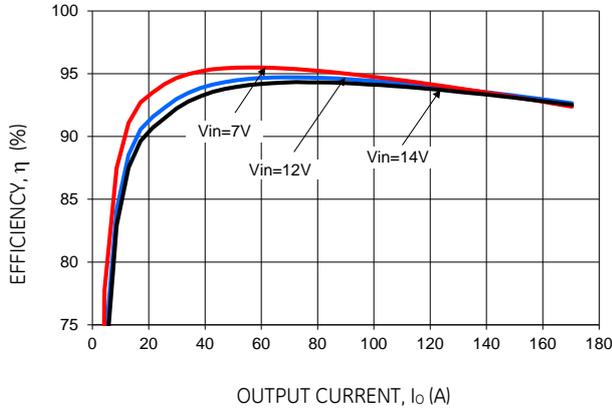


Figure 25. Converter Efficiency versus Output Current.

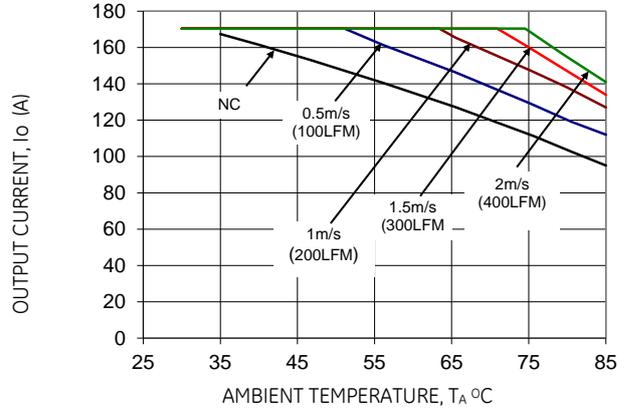


Figure 26. Derating Output Current versus Ambient Temperature and Airflow.

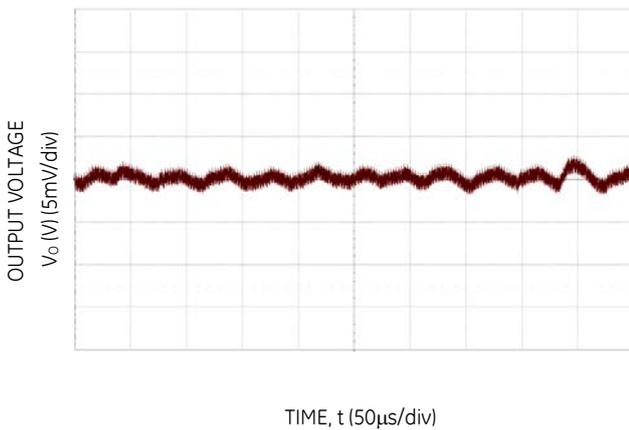


Figure 27. Typical output ripple and noise (C<sub>o</sub>=12x47µF ceramic + 10x470µF polymer, V<sub>IN</sub> = 12V, I<sub>o</sub> = I<sub>o,max</sub>.)



Figure 28. Transient Response to Dynamic Load Change from 25% to 75% at 12Vin, Co= TBD, R<sub>TUNE</sub> = 6.04KΩ

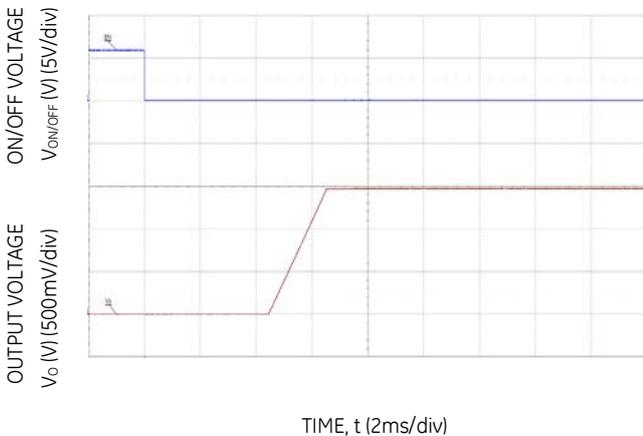


Figure 29. Typical Start-up Using On/Off Voltage (I<sub>o</sub> = I<sub>o,max</sub>).

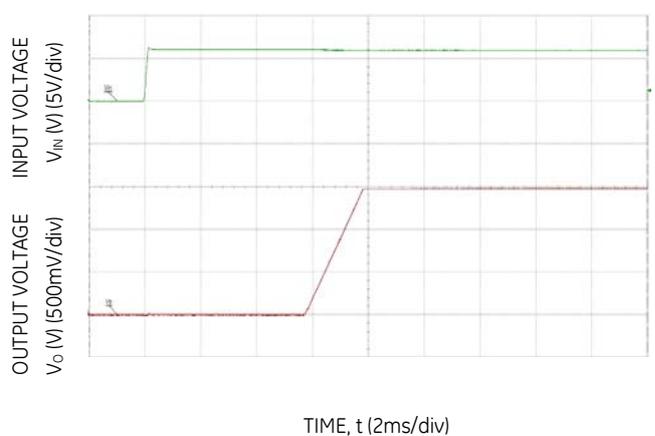


Figure 30. Typical Start-up Using Input Voltage (V<sub>IN</sub> = 12V, I<sub>o</sub> = I<sub>o,max</sub>).

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

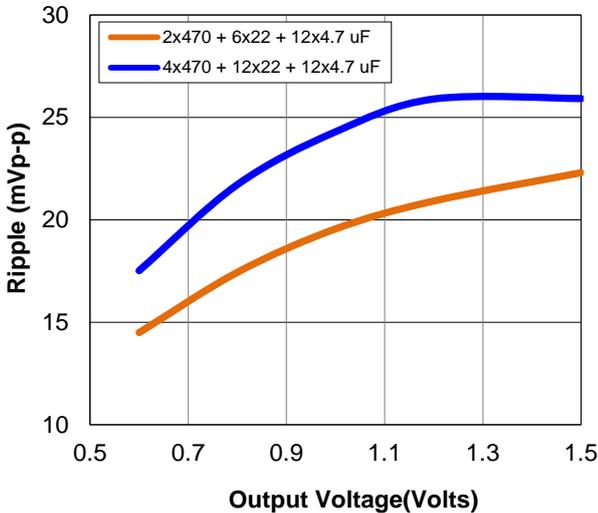
7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## Design Considerations

### Input Filtering

The 170A TeraDlynx™ module should be connected to a low ac-impedance source. A highly inductive source can affect the stability of the module. An input capacitance must be placed directly adjacent to the input pins of the module, to minimize input ripple voltage and ensure module stability.

To minimize input voltage ripple, ceramic capacitors are recommended at the input of the module. Figure 31 shows the input ripple voltage for various output voltages at 170A of load current with 4x470 + 12x22 + 12x4.7 uF and 2x470 + 6x22 + 12x4.7 uF input capacitor combinations.



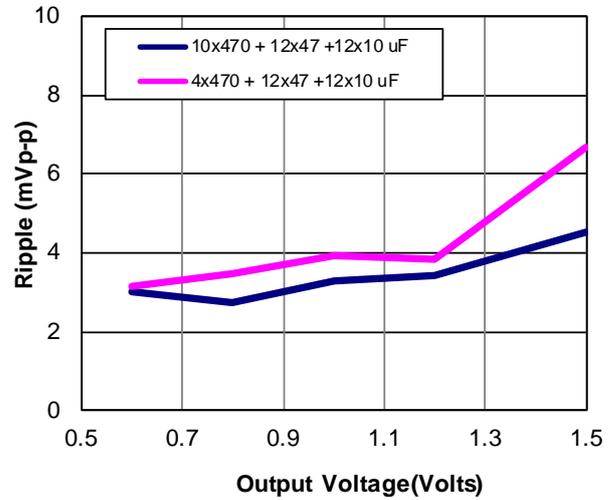
**Figure 31. Input ripple voltage for various output voltages with two input capacitor combinations at 170A load. Input voltage is 12V.**

### Output Filtering

These modules are designed for low output ripple voltage and will meet the maximum output ripple specification with minimum of TBD uF ceramic capacitors at the output of the module. However, additional output filtering may be required by the system designer for a number of reasons. First, there may be a need to further reduce the output ripple and noise of the module. Second, the dynamic response characteristics may need to be customized to a particular load step change.

To reduce the output ripple and improve the dynamic response to a step load change, additional capacitance at the output can be used. Low ESR polymer and ceramic capacitors are recommended to improve the dynamic response of the module. Figure 32 provides output ripple information for capacitance of ~3574uF (47uF (1210 ceramic) x 12 + 10uF (0805 ceramic) + 0.1uF (0402) x 4 + 1000uF (polymer) x 3) at various Vo and a full load current of 170A. For stable operation of the module, limit the capacitance to less than the maximum output capacitance as specified in the electrical specification table. Optimal

performance of the module can be achieved by using the Tunable Loop™ feature described later in this data sheet.



**Figure 32. Peak to peak output ripple voltage for various output voltages with external capacitors at the output (170A load). Input voltage is 12V.**

## Safety Considerations

For safety agency approval the power module must be installed in compliance with the spacing and separation requirements of the end-use safety agency standards, i.e., UL 60950-1 2nd, CSA C22.2 No. 60950-1-07, DIN EN 60950-1:2006 + A11 (VDE0805 Teil 1 + A11):2009-11; EN 60950-1:2006 + A11:2009-03.

For the converter output to be considered meeting the requirements of safety extra-low voltage (SELV), the input must meet SELV requirements. The power module has extra-low voltage (ELV) outputs when all inputs are ELV.

The input to these units is to be provided with a slow-blow fuse with a maximum rating of TBD in the positive lead of input.

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## Analog Feature Descriptions

### Remote On/Off

The TeraDlynx 170A module can be turned ON and OFF either by using the ON/OFF pin (Analog interface) or through the PMBus interface (Digital). The module can be configured in a number of ways through the PMBus interface to react to the ON/OFF input:

- Module ON/OFF can controlled only through the analog interface (digital interface ON/OFF commands are ignored)
- Module ON/OFF can controlled only through the PMBus interface (analog interface is ignored)
- Module ON/OFF can be controlled by either the analog or digital interface

The default state of the module (as shipped from the factory) is to be controlled by the analog interface only. If the digital interface is to be enabled, or the module is to be controlled only through the digital interface, this change must be made through the PMBus. These changes can be made and written to non-volatile memory on the module so that it is remembered for subsequent use.

### Analog On/Off

The 170A Digital TeraDlynx™ power modules feature an On/Off pin for remote On/Off operation. With the Negative Logic On/Off option, (see Ordering Information), the module turns OFF during logic High and ON during logic Low. The On/Off signal should be always referenced to ground. Leaving the On/Off pin disconnected will turn the module ON when input voltage is present. With the positive logic on/off option (device code xxxxx), the module turns ON during logic high and OFF during logic low.

### Digital On/Off

Please see the Digital Feature Descriptions section.

### Monotonic Start-up and Shutdown

The module has monotonic start-up and shutdown behavior on the output for any combination of rated input voltage, output current and operating temperature range.

### Startup into Pre-biased Output

The module will start into a pre biased output on output as long as the pre bias voltage is 0.5V less than the set output voltage.

### Analog Output Voltage Programming

The output voltage of the module is programmable to any voltage from 0dc to 1.5Vdc by connecting a resistor between the Trim and SIG\_GND pins of the module as shown in Fig 33.

Without an external resistor between the Trim pin and SIG\_GND pins, the output of the module will be 0.1 Vdc. The value of the trim resistor,  $R_{Trim}$  for a desired output voltage, should be selected as shown in Table 1.

To fully support setting the output voltage using RTrim, the value of RTrim is continuously read and the output voltage

adjusted. Please read the Digital Features section to understand how analog output voltage programming via RTrim can operate together with digital programming of the output voltage.

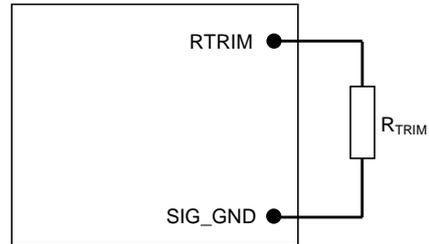


Figure 33. Circuit configuration for programming output voltage using an external resistor.

Table 1

$V_{O, set}$ (V)	Rtrim ( $\Omega$ )	$V_{O, set}$ (V)	Rtrim ( $\Omega$ )	$V_{O, set}$ (V)	Rtrim ( $\Omega$ )
0.100	167	0.580	1040	1.060	3480
0.120	196	0.600	1090	1.080	3700
0.140	226	0.620	1140	1.100	3920
0.160	255	0.640	1180	1.120	4220
0.180	287	0.660	1230	1.140	4530
0.200	316	0.680	1290	1.160	4990
0.220	352	0.700	1330	1.180	5360
0.240	383	0.720	1380	1.200	5900
0.260	417	0.740	1470	1.220	6420
0.280	448	0.760	1560	1.240	6980
0.300	487	0.780	1640	1.260	7680
0.320	517	0.800	1740	1.280	8450
0.340	556	0.820	1820	1.300	9420
0.360	590	0.840	1930	1.320	10400
0.380	626	0.860	2030	1.340	11700
0.400	665	0.880	2130	1.360	13500
0.420	706	0.900	2230	1.380	15800
0.440	741	0.920	2340	1.400	18900
0.460	787	0.940	2460	1.420	23200
0.480	825	0.960	2610	1.440	29800
0.500	866	0.980	2710	1.460	40200
0.520	909	1.000	2870	1.480	60400
0.540	953	1.020	3050	1.500	115000
0.560	1000	1.040	3240		

### Digital Output Voltage Adjustment

Please see the Digital Feature Descriptions section.

### Remote Sense

The power module has a differential Remote Sense feature to minimize the effects of distribution losses by regulating the voltage between the sense pins (VS+ and VS-) for the

## 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

output. The voltage drop between the sense pins and the VOUT and GND pins of the module should not exceed 0.4V.

### Digital Output Voltage Margining

Please see the Digital Feature Descriptions section.

### Overcurrent Protection (OCP)

To provide protection in a fault (output overload) condition, the unit is equipped with internal current-limiting circuitry on output and can endure current limiting continuously. The module overcurrent response is non-latching shutdown with automatic recovery. OCP response time is programmable through manufacturer specific commands. The unit operates normally once the output current is brought back into its specified range.

### Digital Sequencing

The module supports digital sequencing operation. Both Ratiometric and simultaneous sequencing are supported.

### Overtemperature Protection

To provide protection in a fault condition, the unit is equipped with a thermal shutdown circuit. The unit will shut down if the overtemperature threshold of TBD (typ) is exceeded at the thermal reference point  $T_{ref}$ . Once the unit goes into thermal shutdown it will then wait to cool before attempting to restart.

### Digital Temperature Status via PMBus

Please see the Digital Feature Descriptions section.

### Digitally Adjustable Output Over and Under Voltage Protection

Please see the Digital Feature Descriptions section.

### Input Undervoltage Lockout

At input voltages below the input undervoltage lockout limit, module operation for the associated output is disabled. The module will begin to operate at an input voltage above the undervoltage lockout turn-on threshold.

### Digitally Adjustable Input Undervoltage Lockout

Please see the Digital Feature Descriptions section.

### Digitally Adjustable Power Good Thresholds

Please see the Digital Feature Descriptions section.

### Synchronization

The module switching frequency is capable of being synchronized to an external signal frequency within a specified range. Synchronization is done by using the external signal applied to the SYNC pin of the module as shown in Fig. 34, with the converter being synchronized by the rising edge of the external signal. The Electrical Specifications table specifies the requirements of the external SYNC signal. If the SYNC pin is not used, the module should free run at the default switching frequency.

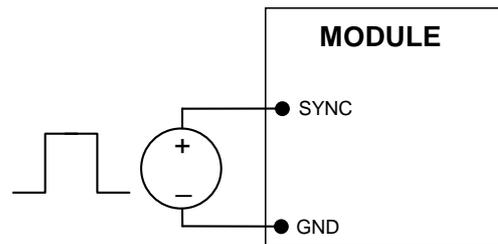


Figure 34. External source connections to synchronize switching frequency of the module.

### Measuring Output Current, Output Voltage and Input Voltage

Please see the Digital Feature Descriptions section.

### Digital Compensator

The TJT170 module uses digital control to regulate the output voltage. As with all POL modules, external capacitors are usually added to the output of the module for two reasons: to reduce output ripple and noise and to reduce output voltage deviations from the steady-state value in the presence of dynamic load current changes. Adding external capacitance however affects the voltage control loop of the module, typically causing the loop to slow down with sluggish response. Larger values of external capacitance could also cause the module to become unstable.

The TJT170 comes with default compensation values programmed into the non-volatile memory of the module. These digital compensation values can be adjusted externally to optimize transient response and also ensure stability for a wide range of external capacitance, as well as with different types of output capacitance. This can be done by two different methods.

1. By allowing the user to select among several pre-tuned compensation choices to select the one most suited to the transient response needs of the load. This selection is made via a resistor RTune connected between the RTUNE and SIG\_GND pins as shown in Fig. 35. Table 2 shows various pre-tuned compensation combinations recommended for various external capacitor combinations.
2. Using PMBus to change compensation parameters in the module.

Note that during initial startup of the module, compensation values that are stored in non-volatile memory are used. If a

## 170A TeraDLynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

resistor  $R_{TUNE}$  is connected to the module, then the compensation values are changed to ones that correspond to the value of  $R_{TUNE}$ . If  $R_{TUNE}$  is open however, no change in compensation values is made. Finally, if the user chooses to do so, they can overwrite the compensation values via PMBus commands.

Recommended values of  $R_{TUNE}$  for different output capacitor combinations are given in Table 2. If no  $R_{TUNE}$  is used, the default compensation values are used.

The TJT170 pre-tuned compensation can be divided into three different banks (COMP1, COMP2, COMP3) that are available to the user to compensate the control loop for various values and combinations of output capacitance and to obtain reliable and stable performance under different conditions. Each bank consists of 20 different sets of compensation coefficients pre-calculated for different values of output capacitance. The three banks are set up as follows:

- COMP1: Recommended for the case where all of the output capacitance is composed of only ceramic capacitors. The range of external output capacitance is from 1470  $\mu\text{F}$  to a maximum value of 17640  $\mu\text{F}$
- COMP2: For the most commonly used mix of ceramic and polymer type capacitors that have higher output capacitance in a smaller size. The range of output capacitance is from 2564  $\mu\text{F}$  to a maximum of 30564  $\mu\text{F}$ .
- This is the combination of output capacitance and compensation that can achieve the best transient response at lowest cost and smallest size. For example, with the maximum output capacitance of TBD  $\mu\text{F}$ , and selecting  $R_{TUNE} = 4.22\text{k}\Omega$ , transient deviation can be as low as TBD mV, for a 50% load step (0 to 85A).

- COMP3: Suitable for a mix of ceramic and higher ESR polymers or electrolytic capacitors, with output capacitance ranging from a minimum of 2204  $\mu\text{F}$  to a maximum of 30084  $\mu\text{F}$ .

Selecting  $R_{TUNE}$  according to Table 2 will ensure stable operation of the module with sufficient stability margin as well as yield optimal transient response.

In applications with tight output voltage limits in the presence of dynamic current loading, additional output capacitance will be required. Table 3 lists recommended values of  $R_{TUNE}$  in order to meet 2% output voltage deviation limits for some common output voltages in the presence of a **85A to 170A** step change (50% of full load), with an input voltage of 12V. Please contact your GE technical representative to obtain more details of this feature as well as for guidelines on how to select the right value of external  $R_{TUNE}$  to tune the module for best transient performance and stable operation for other output capacitance values. Simulation models are also available via the GE Power Module Wizard to predict stability characteristics and transient response.

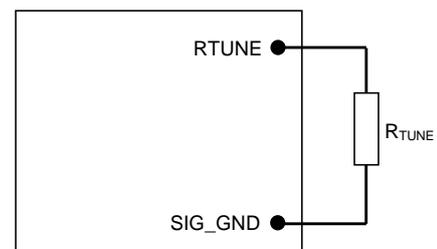


Figure 35. Circuit diagram showing connection of  $R_{TUNE}$  to tune the control loop of the module.

## 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

Table 2. Recommended  $R_{TUNE}$  Compensation.

Output Capacitance Type	Number of Output Capacitors**	Total Output Capacitance ( $\mu$ F)**	$R_{TUNE}$ resistor ( $\Omega$ )	KD	KI	KP	AP
<b>Default Compensation Values</b>			<b>OPEN</b>	<b>TBD</b>	<b>TBD</b>	<b>TBD</b>	<b>TBD</b>
Ceramic	10 x 47 $\mu$ F + 10 x 100 $\mu$ F	1398	29.1	375	2	37	150
Ceramic	12 x 47 $\mu$ F + 12 x 100 $\mu$ F	1644	88.7	441	3	44	150
Ceramic	14 x 47 $\mu$ F + 14 x 100 $\mu$ F	1890	150	506	3	51	150
Ceramic	16 x 47 $\mu$ F + 16 x 100 $\mu$ F	2136	213	572	3	57	150
Ceramic	19 x 47 $\mu$ F + 19 x 100 $\mu$ F	2505	280	671	3	67	150
Ceramic	22 x 47 $\mu$ F + 22 x 100 $\mu$ F	2874	348	770	4	77	150
Ceramic	25 x 47 $\mu$ F + 25 x 100 $\mu$ F	3243	417	869	4	87	150
Ceramic	28 x 47 $\mu$ F + 28 x 100 $\mu$ F	3612	493	968	4	97	150
Ceramic	31 x 47 $\mu$ F + 31 x 100 $\mu$ F	3981	569	1067	4	107	150
Ceramic	34 x 47 $\mu$ F + 34 x 100 $\mu$ F	4350	642	1166	4	117	150
Ceramic	38 x 47 $\mu$ F + 38 x 100 $\mu$ F	4842	723	1297	5	130	150
Ceramic	42 x 47 $\mu$ F + 42 x 100 $\mu$ F	5334	806	1429	5	143	150
Ceramic	48 x 47 $\mu$ F + 48 x 100 $\mu$ F	6072	898	1627	5	163	150
Ceramic	55 x 47 $\mu$ F + 55 x 100 $\mu$ F	6933	938	1858	5	186	150
Ceramic	63 x 47 $\mu$ F + 63 x 100 $\mu$ F	7917	1090	2121	6	212	150
Ceramic	72 x 47 $\mu$ F + 72 x 100 $\mu$ F	9024	1180	2418	6	242	150
Ceramic	82 x 47 $\mu$ F + 82 x 100 $\mu$ F	10254	1290	2748	7	275	150
Ceramic	93 x 47 $\mu$ F + 93 x 100 $\mu$ F	11607	1400	3110	7	311	150
Ceramic	105 x 47 $\mu$ F + 105 x 100 $\mu$ F	13083	1520	3506	7	351	150
Ceramic	120 x 47 $\mu$ F + 120 x 100 $\mu$ F	14928	1640	4000	8	400	150
Ceramic + Polymer	12 x 47 $\mu$ F + 2 x 1000 $\mu$ F	2672	1760	501	3	300	220
Ceramic + Polymer	12 x 47 $\mu$ F + 3 x 1000 $\mu$ F	3672	1890	688	3	413	220
Ceramic + Polymer	12 x 47 $\mu$ F + 4 x 1000 $\mu$ F	4672	2030	876	3	525	220
Ceramic + Polymer	12 x 47 $\mu$ F + 5 x 1000 $\mu$ F	5672	2150	1063	4	638	220
Ceramic + Polymer	12 x 47 $\mu$ F + 6 x 1000 $\mu$ F	6672	2320	1250	4	750	220
Ceramic + Polymer	12 x 47 $\mu$ F + 7 x 1000 $\mu$ F	7672	2460	1438	4	860	220
Ceramic + Polymer	12 x 47 $\mu$ F + 8 x 1000 $\mu$ F	8672	2640	1625	5	975	220
Ceramic + Polymer	12 x 47 $\mu$ F + 9 x 1000 $\mu$ F	9672	2840	1813	5	1088	220
Ceramic + Polymer	12 x 47 $\mu$ F + 10 x 1000 $\mu$ F	10672	3010	2000	5	1200	220
Ceramic + Polymer	12 x 47 $\mu$ F + 11 x 1000 $\mu$ F	11672	3200	2187	5	1312	220
Ceramic + Polymer	12 x 47 $\mu$ F + 12 x 1000 $\mu$ F	12672	3400	2375	5	1425	220
Ceramic + Polymer	12 x 47 $\mu$ F + 13 x 1000 $\mu$ F	13672	3650	2562	6	1537	220
Ceramic + Polymer	12 x 47 $\mu$ F + 15 x 1000 $\mu$ F	15672	3880	2937	6	1762	220
Ceramic + Polymer	12 x 47 $\mu$ F + 17 x 1000 $\mu$ F	17672	4120	3312	6	1987	220
Ceramic + Polymer	12 x 47 $\mu$ F + 19 x 1000 $\mu$ F	19672	4420	3687	7	2212	220
Ceramic + Polymer	12 x 47 $\mu$ F + 21 x 1000 $\mu$ F	21672	4700	4061	7	2437	220
Ceramic + Polymer	12 x 47 $\mu$ F + 23 x 1000 $\mu$ F	23672	5050	4436	7	2662	220
Ceramic + Polymer	12 x 47 $\mu$ F + 25 x 1000 $\mu$ F	25672	5360	4811	8	2887	220
Ceramic + Polymer	12 x 47 $\mu$ F + 27 x 1000 $\mu$ F	27672	5760	5186	8	3112	220
Ceramic + Polymer	12 x 47 $\mu$ F + 30 x 1000 $\mu$ F	30672	6120	5748	8	3449	220

\*\* Total output capacitance includes the capacitance inside the module is 4 x 47 $\mu$ F (3m $\Omega$  ESR).

Note: The capacitors used in the digital compensation Loop tables are 47 $\mu$ F/3 m $\Omega$  ESR ceramic, 100 $\mu$ F/3.2m $\Omega$  ceramic, 1000  $\mu$ F/6m $\Omega$  ESR polymer capacitor and 820 $\mu$ F/19m $\Omega$  ESR Polymer capacitor.

## 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

Table 2 (continued). R<sub>TUNE</sub> compensation table

Output Capacitance Type	Number of Output Capacitors**	Total Output Capacitance (μF)**	R <sub>TUNE</sub> resistor (Ω)	KD	KI	KP	AP
Ceramic + Electrolytic	12 × 47μF + 2 × 820μF	2312	6570	176	2	176	220
Ceramic + Electrolytic	12 × 47μF + 3 × 820μF	3312	7060	238	3	238	220
Ceramic + Electrolytic	12 × 47μF + 4 × 820μF	3952	7590	301	3	301	220
Ceramic + Electrolytic	12 × 47μF + 5 × 820μF	4772	8160	363	3	363	220
Ceramic + Electrolytic	12 × 47μF + 6 × 820μF	5592	8870	426	4	426	220
Ceramic + Electrolytic	12 × 47μF + 7 × 820μF	6412	9530	488	4	488	220
Ceramic + Electrolytic	12 × 47μF + 8 × 820μF	7312	10400	550	4	550	220
Ceramic + Electrolytic	12 × 47μF + 9 × 820μF	8052	11300	613	4	613	220
Ceramic + Electrolytic	12 × 47μF + 10 × 820μF	8872	12400	675	5	675	220
Ceramic + Electrolytic	12 × 47μF + 11 × 820μF	9692	13700	738	5	738	220
Ceramic + Electrolytic	12 × 47μF + 12 × 820μF	10512	15000	800	5	800	220
Ceramic + Electrolytic	12 × 47μF + 14 × 820μF	12152	16700	925	5	925	220
Ceramic + Electrolytic	12 × 47μF + 16 × 820μF	13792	18700	1050	6	1050	220
Ceramic + Electrolytic	12 × 47μF + 18 × 820μF	15432	21000	1174	6	1174	220
Ceramic + Electrolytic	12 × 47μF + 20 × 820μF	17072	24000	1299	6	1299	220
Ceramic + Electrolytic	12 × 47μF + 23 × 820μF	19532	28000	1486	7	1486	220
Ceramic + Electrolytic	12 × 47μF + 26 × 820μF	21992	33000	1674	7	1674	220
Ceramic + Electrolytic	12 × 47μF + 29 × 820μF	24452	40200	1861	8	1861	220
Ceramic + Electrolytic	12 × 47μF + 32 × 820μF	26912	50500	2048	8	2048	220
Ceramic + Electrolytic	12 × 47μF + 36 × 820μF	30192	68000	2298	8	2298	220

\*\* Total output capacitance includes the capacitance inside the module is 4 × 47μF (3mΩ ESR).

Note: The capacitors used in the digital compensation Loop tables are 47μF/3 mΩ ESR ceramic, 100μF/3.2mΩ ceramic, 1000 μF/6mΩ ESR polymer capacitor and 820μF/19mΩ ESR Polymer capacitor.

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## Digital Feature Descriptions

### PMBus Interface Capability

The 170A TeraDlynx power modules have a PMBus interface that supports both communication and control. The PMBus Power Management Protocol Specification can be obtained from [www.pmbus.org](http://www.pmbus.org). The modules support a subset of version 1.1 of the specification (see Table 4 for a list of the specific commands supported). Most module parameters can be programmed using PMBus and stored as defaults for later use.

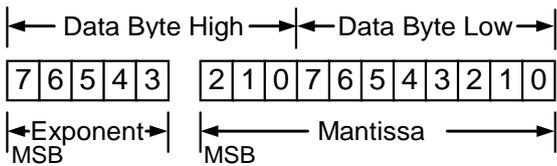
Communication over the module PMBus interface supports the Packet Error Checking (PEC) scheme. The PMBus master must generate the correct PEC byte for all transactions, and check the PEC byte returned by the module.

The module also supports the SMBALERT# response protocol whereby the module can alert the bus master if it wants to talk. For more information on the SMBus alert response protocol, see the System Management Bus (SMBus) specification.

The module has non-volatile memory that is used to store configuration settings. Not all settings programmed into the device are automatically saved into this non-volatile memory, only those specifically identified as capable of being stored can be saved (see Table 4 for which command parameters can be saved to non-volatile storage).

### PMBus Data Format

For commands that set thresholds, voltages or report such quantities, the module supports the “Linear” data format among the three data formats supported by PMBus. The Linear Data Format is a two byte value with an 11-bit, two’s complement mantissa and a 5-bit, two’s complement exponent. The format of the two data bytes is shown below:



The value is of the number is then given by

$$\text{Value} = \text{Mantissa} \times 2^{\text{Exponent}}$$

### PMBus Addressing

The power module is addressed through the PMBus using a device address. The module supports 128 possible addresses (0 to 127 in decimal) which can be set using resistors connected from the ADDR0 and ADDR1 pins to SIG\_GND. Note that some of these addresses (0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 40, 44, 45, 55 in decimal) are reserved according to the SMBus specification and may not be useable. The address is set in the form of two octal (0 to 7) digits, with each pin setting one digit. The ADDR1 pin sets the high order digit and ADDR0 sets the low order digit. The resistor values suggested for each digit are shown in Table 3 (E96 series resistors are recommended). Note that if either address resistor value is outside the range specified in Table 4, the module will respond to address 127.

The user must know which I<sup>2</sup>C addresses are reserved in a system for special functions and set the address of the module to avoid interfering with other system operations. Both 100kHz and 400kHz bus speeds are supported by the module. Connection for the PMBus interface should follow the High Power DC specifications given in section 3.1.3 in the SMBus specification V2.0 for the 400kHz bus speed or the

Low Power DC specifications in section 3.1.2. The complete SMBus specification is available from the SMBus web site, [smbus.org](http://smbus.org).

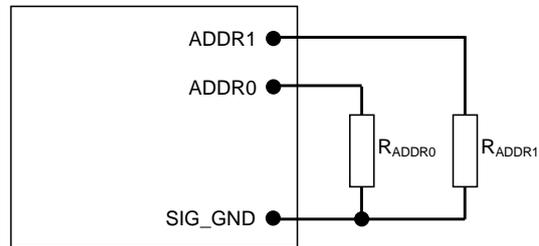


Figure 36. Circuit showing connection of resistors used to set the PMBus address of the module.

Table 3

PMBus Address Table											
ADDR0 Resistor Values	ADDR1 Resistor Values										
	19.6K	32.4k	45.3K	59.0K	75.0K	93.1K	113K	135K	158K	182K	210K
19.6K	1	13	25	37	49	61	73	85	97	109	121
32.4K	2	14	26	38	50	62	74	86	98	110	122
45.3K	3	15	27	39	51	63	75	87	99	111	123
59.0K	4	16	28	40	52	64	76	88	100	112	124
75.0K	5	17	29	41	53	65	77	89	101	113	125
93.1K	6	18	30	42	54	66	78	90	102	114	126
113K	7	19	31	43	55	67	79	91	103	115	127
135K	8	20	32	44	56	68	80	92	104	116	64
158K	9	21	33	45	57	69	81	93	105	117	64
182K	10	22	34	46	58	70	82	94	106	118	64
210K	11	23	35	47	59	71	83	95	107	119	64
249K	12	24	36	48	60	72	84	96	108	120	64

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## Operation (01h)

This is a paged register. The OPERATION command can be used to turn the module on or off in conjunction with the ON/OFF pin input. It is also used to margin up or margin down the output voltage

### PMBus Enabled On/Off

The module can also be turned on and off via the PMBus interface. The OPERATION command is used to actually turn the module on and off via the PMBus, while the ON\_OFF\_CONFIG command configures the combination of analog ON/OFF pin input and PMBus commands needed to turn the module on and off. Bit [7] in the OPERATION command data byte enables the module, with the following functions:

- 0 : Output is disabled
- 1 : Output is enabled

This module uses the lower five bits of the ON\_OFF\_CONFIG data byte to set various ON/OFF options as follows:

Bit Position	4	3	2	1	0
Access	r/w	r/w	r/w	r	r
Function	PU	CMD	CPR	POL	CPA
<b>Default Value</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>

PU: Sets the default to either operate any time input power is present or for the ON/OFF to be controlled by the analog ON/OFF input and the PMBus OPERATION command. This bit is used together with the CP, CMD and ON bits to determine startup.

Bit Value	Action
0	Module powers up any time power is present regardless of state of the analog ON/OFF pin
1	Module does not power up until commanded by the analog ON/OFF pin and the OPERATION command as programmed in bits [2:0] of the ON_OFF_CONFIG register.

CMD: The CMD bit controls how the device responds to the OPERATION command.

Bit Value	Action
0	Module ignores the ON bit in the OPERATION command
1	Module responds to the ON bit in the OPERATION command

CPR: Sets the response of the analog ON/OFF pin. This bit is used together with the CMD, PU and ON bits to determine startup.

Bit Value	Action
0	Module ignores the analog ON/OFF pin, i.e. ON/OFF is only controlled through the PMBUS via the OPERATION command
1	Module requires the analog ON/OFF pin to

	be asserted to start the unit
--	-------------------------------

CPA: Sets the action of the analog ON/OFF pin when turning the controller OFF. This bit is internally read and cannot be modified by the user

### PMBus Adjustable Soft Start Rise Time

The soft start rise time of module output is adjustable in the module via PMBus. The TON\_RISE command can set the rise time in ms, and allows choosing soft start times between 200µs and 14ms.

### Output Voltage Adjustment Using the PMBus

Two PMBus commands are available to change the output voltage setting. The first, VOUT\_COMMAND can set the output voltage directly. The second, VOUT\_TRIM is used to apply an offset to the commanded output voltage.

Since the output voltage can be set using an external RTrim resistor as well, an additional PMBus command MFR\_VOUT\_SET\_MODE is used to tell the module whether the VOUT\_COMMAND is used to directly set output voltage or whether RTrim is to be used. If MFR\_VOUT\_SET\_MODE is set to where bit position 7 is set at 1, then VOUT\_COMMAND is ignored and output voltage is set solely by RTrim. If bit 7 of MFR\_VOUT\_SET\_MODE is set to 0, then output voltage is set using VOUT\_COMMAND, and the value of RTrim is only used at startup to set the output voltage.

The second output voltage adjustment command VOUT\_TRIM works in either case to provide a fixed offset to the output voltage. This allows PMBus adjustment of the output voltage irrespective of how MFR\_VOUT\_SET\_MODE is set and allows digital adjustment of the output voltage setting even when RTrim is used.

For all digital commands used to set or adjust the output voltage via PMBus, the resolution is 1.56 mV.

### Output Voltage Margining Using the PMBus

The output voltage of the module can be margined via PMBus between 0 and 1.5V. The margining voltage can be adjusted in 1.56mV steps.

### PMBus Adjustable Overcurrent Warning

The module can provide an overcurrent warning via the PMBus. The threshold for the overcurrent warning can be set using the parameter IOUT\_OC\_WARN\_LIMIT. This command uses the "Linear" data format with a two byte data word where the upper five bits [7:3] of the high byte represent the exponent and the remaining three bits of the high byte [2:0] and the eight bits in the low byte represent the mantissa. The exponent is fixed at -1 (decimal). The upper five bits of the mantissa are fixed at 0 while the lower six bits are programmable with a default value of 19A (decimal). The resolution of this warning limit is 500mA. The value of the IOUT\_OC\_WARN\_LIMIT can be stored to non-volatile memory using the STORE\_DEFAULT\_ALL command.

### Temperature Status via PMBus

The module provides information related to temperature of the module through standardized PMBus commands.

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

Commands READ\_TEMPERATURE1, READ\_TEMPERATURE\_2 are mapped to module temperature (at TBD location) and internal temperature of the PWM controller, respectively. The temperature readings are returned in °C and in two bytes.

### PMBus Adjustable Output Over, Under Voltage Protection

The module has output over and under voltage protection capability. The PMBus command VOUT\_OV\_FAULT\_LIMIT is used to set the output over voltage threshold. The default value is configured to be 115% of the commanded output. The command VOUT\_UV\_FAULT\_LIMIT sets the threshold that detects an output under voltage fault. The default values are 85% of the commanded output voltage. Both commands use two data bytes formatted in the Linear format.

### PMBus Adjustable Input Undervoltage Lockout

The module allows adjustment of the input under voltage lockout and hysteresis. The command VIN\_ON allows setting the input voltage turn on threshold, while the VIN\_OFF command sets the input voltage turn off threshold. For both the VIN\_ON and VIN\_OFF commands, possible values are 4.5V to 14V. Both VIN\_ON and VIN\_OFF commands use the “Linear” format with two data bytes.

### Measurement of Output Current, Output Voltage and Input Voltage

The module can measure key module parameters such as output current, output voltage and input voltage and provide this information through the PMBus interface.

### Measuring Output Current Using the PMBus

The module measures output current by using the inductor winding resistance as a current sense element. The inductor winding resistance is then multiplied by the current gain factor that will be used to scale the measured voltage into a current reading. This gain factor is the argument of the IOUT\_CAL\_GAIN command, and consists of two bytes in the Linear data format. During manufacture, each module is calibrated by measuring and storing the current gain factor into non-volatile storage.

The current measurement accuracy is also improved by each module being calibrated during manufacture with the offset in the current reading. The IOUT\_CAL\_OFFSET command is used to store and read the current offset. The READ\_IOUT command provides module average output current information. This command only supports positive output current, i.e. current sourced from the module. If the converter is sinking current a reading of 0 is provided. The READ\_IOUT command returns two bytes of data in the Linear data format.

### Measuring Output Voltage Using the PMBus

The module provides output voltage information using the READ\_VOUT command. The command returns two bytes of data in Linear format.

### Measuring Input Voltage Using the PMBus

The module provides input voltage information using the READ\_VIN command. The command returns two bytes of data in the Linear format.

### Reading the Status of the Module using the PMBus

The module supports a number of status information commands implemented in PMBus. A 1 in the bit position indicates the fault that is flagged.

STATUS\_BYTE : Returns one byte of information with a summary of the most critical device faults.

Bit Position	Flag	Default Value
7	X	0
6	OFF	0
5	VOUT Overvoltage	0
4	IOUT Overcurrent	0
3	VIN Undervoltage	0
2	Temperature	0
1	CML (Comm. Memory Fault)	0
0	None of the above	0

STATUS\_WORD : Returns two bytes of information with a summary of the module’s fault/warning conditions.

#### Low Byte

Bit Position	Flag	Default Value
7	X	0
6	OFF	0
5	VOUT Overvoltage	0
4	IOUT Overcurrent	0
3	VIN Undervoltage	0
2	Temperature	0
1	CML (Comm. Memory Fault)	0
0	None of the above	0

#### High Byte

Bit Position	Flag	Default Value
7	VOUT fault or warning	0
6	IOUT fault or warning	0
5	X	0
4	MFR	0
3	POWER_GOOD# (is negated)	0
2	X	0
1	X	0
0	X	0

STATUS\_VOUT : Returns one byte of information relating to the status of the module’s output voltage related faults.

Bit Position	Flag	Default Value
7	VOUT OV Fault	0
6	X	0
5	X	0
4	VOUT UV Fault	0
3	X	0
2	X	0

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

1	X	0
0	X	0

STATUS\_IOUT : Returns one byte of information relating to the status of the module’s output voltage related faults.

Bit Position	Flag	Default Value
7	IOUT OC Fault	0
6	X	0
5	IOUT OC Warning	0
4	X	0
3	X	0
2	X	0
1	X	0
0	X	0

STATUS\_TEMPERATURE : Returns one byte of information relating to the status of the module’s temperature related faults.

Bit Position	Flag	Default Value
7	OT Fault	0
6	OT Warning	0
5	X	0
4	X	0
3	X	0
2	X	0
1	X	0
0	X	0

STATUS\_CML : Returns one byte of information relating to the status of the module’s communication related faults.

Bit Position	Flag	Default Value
7	Invalid/Unsupported Command	0
6	Invalid/Unsupported Command	0
5	Packet Error Check Failed	0
4	Memory Fault Detected	0
3	X	0
2	X	0
1	Other Communication Fault	0
0	X	0

MFR\_VIN\_MIN : Returns minimum input voltage as two data bytes of information in Linear format (upper five bits are exponent – fixed at -2, and lower 11 bits are mantissa in two’s complement format – fixed at 12)

MFR\_VOUT\_MIN : Returns minimum output voltage as two data bytes of information in Linear format (upper five bits are exponent – fixed at -10, and lower 11 bits are mantissa in two’s complement format – fixed at 614)

MFR\_SPECIFIC\_00 : Returns information related to the type of module and revision number. Bits [7:2] in the Low Byte

indicate the module type (xxxxxx corresponds to the UDXS1212 series of module), while bits [7:3] indicate the revision number of the module.

### Low Byte

Bit Position	Flag	Default Value
7:2	Module Name	000011
1:0	Reserved	10

### High Byte

Bit Position	Flag	Default Value
7:3	Module Revision Number	None
2:0	Reserved	000

## User-Programmable Compensation Coefficients

The output voltage control compensation coefficients can be changed by the user via PMBus commands. On startup, the module uses stored values of the four compensation parameters KD, KI, KP and ALPHA. If the module detects a valid value of RTUNE connected to the module, the values of KD, KI, KP and ALPHA are then changed to the appropriate values. Beyond this, the user can use the PMBus commands listed below to overwrite the values of KD, KP, KI and ALPHA.

MFR\_SPECIFIC\_KP : Allows the user to program the value of the KP compensation coefficient. The allowed range is - 32768 to 32767. The entire 16 bits are used to enter this range of integer values in two’s complement binary format.

MFR\_SPECIFIC\_KI : Allows the user to program the value of the KI compensation coefficient. The allowed range is - 32768 to 32767. The entire 16 bits are used to enter this range of integer values in two’s complement binary format.

MFR\_SPECIFIC\_KD : Allows the user to program the value of the KD compensation coefficient. The allowed range is - 32768 to 32767. The entire 16 bits are used to enter this range of integer values in two’s complement binary format.

MFR\_SPECIFIC\_ALPHA : Allows the user to program the value of the ALPHA compensation coefficient. The allowed range is -256 to 256. The entire 16 bits are used to enter this range of integer values in two’s complement binary format.

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## Summary of Supported PMBus Commands

Please refer to the PMBus 1.1 specification for more details of these commands.

**Table 4**

Hex Code	Command	Brief Description	Non-Volatile Memory Storage																																																																																	
01	OPERATION	Turn Module on or off. Also used to margin the output voltage <table border="1"> <tr> <th>Format</th> <td colspan="8">Unsigned Binary</td> </tr> <tr> <th>Bit Position</th> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <th>Access</th> <td>r/w</td><td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r</td><td>r</td> </tr> <tr> <th>Function</th> <td>On</td><td>X</td><td colspan="4">Margin</td><td>X</td><td>X</td> </tr> <tr> <th>Default Value</th> <td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>X</td><td>X</td> </tr> </table>	Format	Unsigned Binary								Bit Position	7	6	5	4	3	2	1	0	Access	r/w	r	r/w	r/w	r/w	r/w	r	r	Function	On	X	Margin				X	X	Default Value	1	0	0	0	0	0	X	X	YES																																				
Format	Unsigned Binary																																																																																			
Bit Position	7	6	5	4	3	2	1	0																																																																												
Access	r/w	r	r/w	r/w	r/w	r/w	r	r																																																																												
Function	On	X	Margin				X	X																																																																												
Default Value	1	0	0	0	0	0	X	X																																																																												
02	ON_OFF_CONFIG	Configures the ON/OFF functionality as a combination of analog ON/OFF pin and PMBus commands <table border="1"> <tr> <th>Format</th> <td colspan="8">Unsigned Binary</td> </tr> <tr> <th>Bit Position</th> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <th>Access</th> <td>r</td><td>r</td><td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r</td> </tr> <tr> <th>Function</th> <td>X</td><td>X</td><td>X</td><td>pu</td><td>cmd</td><td>cpr</td><td>pol</td><td>cpa</td> </tr> <tr> <th>Default Value</th> <td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td> </tr> </table>	Format	Unsigned Binary								Bit Position	7	6	5	4	3	2	1	0	Access	r	r	r	r/w	r/w	r/w	r/w	r	Function	X	X	X	pu	cmd	cpr	pol	cpa	Default Value	0	0	0	1	0	1	0	0	YES																																				
Format	Unsigned Binary																																																																																			
Bit Position	7	6	5	4	3	2	1	0																																																																												
Access	r	r	r	r/w	r/w	r/w	r/w	r																																																																												
Function	X	X	X	pu	cmd	cpr	pol	cpa																																																																												
Default Value	0	0	0	1	0	1	0	0																																																																												
03	CLEAR_FAULTS	Clear any fault bits that may have been set, also releases the SMBALERT# signal if the device has been asserting it.																																																																																		
10	WRITE_PROTECT	Used to control writing to the module via PMBus. Copies the current register setting in the module whose command code matches the value in the data byte into non-volatile memory (EEPROM) on the module <table border="1"> <tr> <th>Format</th> <td colspan="8">Unsigned Binary</td> </tr> <tr> <th>Bit Position</th> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <th>Access</th> <td>r/w</td><td>r/w</td><td>r/w</td><td>x</td><td>x</td><td>x</td><td>x</td><td>x</td> </tr> <tr> <th>Function</th> <td>bit7</td><td>bit6</td><td>bit5</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td> </tr> <tr> <th>Default Value</th> <td>0</td><td>0</td><td>0</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td> </tr> </table> <p>Bit5: 0 – Enables all writes as permitted in bit6 or bit7                      1 – Disables all writes except the WRITE_PROTECT, OPERATION and ON_OFF_CONFIG (bit 6 and bit7 must be 0)                      Bit 6: 0 – Enables all writes as permitted in bit5 or bit7                      1 – Disables all writes except for the WRITE_PROTECT and OPERATION commands (bit5 and bit7 must be 0)                      Bit7: 0 – Enables all writes as permitted in bit5 or bit6                      1 – Disables all writes except for the WRITE_PROTECT command (bit5 and bit6 must be 0)</p>	Format	Unsigned Binary								Bit Position	7	6	5	4	3	2	1	0	Access	r/w	r/w	r/w	x	x	x	x	x	Function	bit7	bit6	bit5	X	X	X	X	X	Default Value	0	0	0	X	X	X	X	X	YES																																				
Format	Unsigned Binary																																																																																			
Bit Position	7	6	5	4	3	2	1	0																																																																												
Access	r/w	r/w	r/w	x	x	x	x	x																																																																												
Function	bit7	bit6	bit5	X	X	X	X	X																																																																												
Default Value	0	0	0	X	X	X	X	X																																																																												
11	STORE_DEFAULT_ALL	Copies all current register settings in the module into non-volatile memory (EEPROM) on the module. Takes about 50ms for the command to execute.																																																																																		
12	RESTORE_DEFAULT_ALL	Restores all current register settings in the module from values in the module non-volatile memory (EEPROM)																																																																																		
20	VOUT_MODE	The module has MODE set to Linear and Exponent set to -14. These values cannot be changed <table border="1"> <tr> <th>Bit Position</th> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <th>Access</th> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <th>Function</th> <td colspan="4">Mode</td> <td colspan="4">2's complement Exponent</td> </tr> <tr> <th>Default Value</th> <td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td> </tr> </table>	Bit Position	7	6	5	4	3	2	1	0	Access	r	r	r	r	r	r	r	r	Function	Mode				2's complement Exponent				Default Value	0	0	0	1	0	0	1	0																																														
Bit Position	7	6	5	4	3	2	1	0																																																																												
Access	r	r	r	r	r	r	r	r																																																																												
Function	Mode				2's complement Exponent																																																																															
Default Value	0	0	0	1	0	0	1	0																																																																												
21	VOUT_COMMAND	Set desired output voltage. Only 16 bit unsigned mantissa – implied exponent of -14 per VOUT_MODE command. <table border="1"> <tr> <th>Format</th> <td colspan="8">Unsigned Mantissa</td> </tr> <tr> <th>Bit Position</th> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <th>Access</th> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <th>Function</th> <td colspan="8">High Byte</td> </tr> <tr> <th>Default Value</th> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <th>Bit Position</th> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <th>Access</th> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <th>Function</th> <td colspan="8">Low Byte</td> </tr> <tr> <th>Default Value</th> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table>	Format	Unsigned Mantissa								Bit Position	7	6	5	4	3	2	1	0	Access	r/w	r/w	r/w	r/w	r/w	r/w	r/w	r/w	Function	High Byte								Default Value	0	0	0	0	0	0	0	0	Bit Position	7	6	5	4	3	2	1	0	Access	r/w	Function	Low Byte								Default Value	0	0	0	0	0	0	0	0	YES							
Format	Unsigned Mantissa																																																																																			
Bit Position	7	6	5	4	3	2	1	0																																																																												
Access	r/w	r/w	r/w	r/w	r/w	r/w	r/w	r/w																																																																												
Function	High Byte																																																																																			
Default Value	0	0	0	0	0	0	0	0																																																																												
Bit Position	7	6	5	4	3	2	1	0																																																																												
Access	r/w	r/w	r/w	r/w	r/w	r/w	r/w	r/w																																																																												
Function	Low Byte																																																																																			
Default Value	0	0	0	0	0	0	0	0																																																																												

170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc -14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

Table 4 (continued)

Hex Code	Command	Brief Description	Non-Volatile Memory Storage																																																																																	
22	VOUT_TRIM	<p>Apply a fixed offset voltage to the set output voltage from either the RTrim resistor or the VOUT_COMMAND. Exponent is fixed at -14. Allowed range is ±300mV.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Mantissa</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">High Byte</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Low Byte</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table>	<b>Format</b>	Unsigned Mantissa								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	High Byte								<b>Default Value</b>	0	0	0	0	0	0	0	0	<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Low Byte								<b>Default Value</b>	0	0	0	0	0	0	0	0	YES														
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<b>Function</b>	High Byte																																																																																			
<b>Default Value</b>	0	0	0	0	0	0	0	0																																																																												
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<b>Access</b>	r/w	r/w	r/w	r/w	r/w	r/w	r/w	r/w																																																																												
<b>Function</b>	Low Byte																																																																																			
<b>Default Value</b>	0	0	0	0	0	0	0	0																																																																												
23	VOUT_CAL_OFFSET	<p>Applies an offset to the commanded output voltage to calibrate out errors in setting module output voltage (between -63mV and +62mV) and when output voltage is set via the PMBus command VOUT_COMMAND (21). Exponent is fixed at -14.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable based on factory calibration</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable based on factory calibration</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	r	r	r	r	r	r	r	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable based on factory calibration								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable based on factory calibration								YES						
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25	VOUT_MARGIN_HIGH	<p>Sets the target voltage for margining the output high. Exponent is fixed at -14. Allowed range is 0.1 to 1.5V.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">High Byte</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Low Byte</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r/w	<b>Function</b>	High Byte								<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Low Byte								<b>Default Value</b>	Variable								YES													
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<b>Function</b>	Low Byte																																																																																			
<b>Default Value</b>	Variable																																																																																			
26	VOUT_MARGIN_LOW	<p>Sets the target voltage for margining the output low. Exponent is fixed at -14. Allowed range is 0.1 to 1.5V.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">High Byte</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Low Byte</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r/w	<b>Function</b>	High Byte								<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Low Byte								<b>Default Value</b>	Variable								YES													
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<b>Default Value</b>	Variable																																																																																			
35	VIN_ON	<p>Sets the value of input voltage at which the module turns on. Exponent is fixed at -6. Allowed range is 7 to 14V.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	1	1	0	1	0	0	0	1	<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	1	0	1	1	0	0	0	0	YES						
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<b>Default Value</b>	1	0	1	1	0	0	0	0																																																																												

170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc -14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

Table 4 (continued)

Hex Code	Command	Brief Description	Non-Volatile Memory Storage																																																																																	
36	VIN_OFF	<p>Sets the value of input voltage at which the module turns off. Exponent is fixed at -6. Allowed range is 6.75 to 14V.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	1	1	0	1	0	0	0	1	<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	1	0	1	0	0	0	0	0	YES						
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<b>Default Value</b>	1	0	1	0	0	0	0	0																																																																												
38	IOUT_CAL_GAIN	<p>Returns the value of the gain correction term used to correct the measured output current</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>R</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable based on factory calibration</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	R	r	r	r	r	r	r	r/w	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>									<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable based on factory calibration								YES							
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39	IOUT_CAL_OFFSET	<p>Returns the value of the offset correction term used to correct the measured output current</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r/w</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable based on factory calibration</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r/w	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	1	1	1	0	0	1	1	1	<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r/w	r/w	r/w	r/w	r/w	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable based on factory calibration								YES
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<b>Function</b>	Mantissa																																																																																			
<b>Default Value</b>	Variable based on factory calibration																																																																																			
40	VOUT_OV_FAULT_LIMIT	<p>Sets the voltage level for an output overvoltage fault. Exponent is fixed at -14. Allowed range is 0.1 to 2V.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">High Byte</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Low Byte</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r/w	<b>Function</b>	High Byte								<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Low Byte								<b>Default Value</b>	Variable								YES													
<b>Format</b>	Linear, two's complement binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r	r/w	r/w	r/w	r/w	r/w	r/w	r/w																																																																												
<b>Function</b>	High Byte																																																																																			
<b>Default Value</b>	Variable																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r/w	r/w	r/w	r/w	r/w	r/w	r/w	r/w																																																																												
<b>Function</b>	Low Byte																																																																																			
<b>Default Value</b>	Variable																																																																																			
41	VOUT_OV_FAULT_RESPONSE	<p>Instructs the module on what action to take in response to a output overvoltage fault</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td>RSP [1]</td><td>RSP [0]</td><td>RS[2]</td><td>RS[1]</td><td>RS[0]</td><td>X</td><td>X</td><td>X</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td> </tr> </table>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	r/w	r/w	r/w	r/w	r	r	r	<b>Function</b>	RSP [1]	RSP [0]	RS[2]	RS[1]	RS[0]	X	X	X	<b>Default Value</b>	1	0	1	1	1	0	0	0	YES																																				
<b>Format</b>	Unsigned Binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r/w	r/w	r/w	r/w	r/w	r	r	r																																																																												
<b>Function</b>	RSP [1]	RSP [0]	RS[2]	RS[1]	RS[0]	X	X	X																																																																												
<b>Default Value</b>	1	0	1	1	1	0	0	0																																																																												

170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc -14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

Table 4 (continued)

Hex Code	Command	Brief Description	Non-Volatile Memory Storage																																																																																	
42	VOUT_OV_WARN_LIMIT	<p>Sets the value of output voltage at which the module generates warning for over-voltage. Exponent is fixed at -14. Allowed range is 0.1 to 2V.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>R</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>R</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	R	r	r	r	r	r	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	R	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable								YES						
<b>Format</b>	Linear, two's complement binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	R	r	r	r	r	r	r	r																																																																												
<b>Function</b>	Exponent				Mantissa																																																																															
<b>Default Value</b>	Variable																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	R	r/w	r/w	r/w	r/w	r/w	r/w	r/w																																																																												
<b>Function</b>	Mantissa																																																																																			
<b>Default Value</b>	Variable																																																																																			
43	VOUT_UV_WARN_LIMIT	<p>Sets the value of output voltage at which the module generates warning for under-voltage. Exponent is fixed at -14. Allowed range is 0.05 to 1.5V.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r/w	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable								YES							
<b>Format</b>	Linear, two's complement binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r	r	r	r	r	r	r	r/w																																																																												
<b>Function</b>	Exponent				Mantissa																																																																															
<b>Default Value</b>	Variable																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r/w	r/w	r/w	r/w	r/w	r/w	r/w	r/w																																																																												
<b>Function</b>	Mantissa																																																																																			
<b>Default Value</b>	Variable																																																																																			
44	VOUT_UV_FAULT_LIMIT	<p>Sets the voltage level for an output undervoltage fault. Exponent is fixed at -14. Allowed range is 0.05 to 2V.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r/w</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r/w	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r/w	r/w	r/w	r/w	r/w	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable								YES
<b>Format</b>	Linear, two's complement binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r	r	r	r	r	r/w	r	r																																																																												
<b>Function</b>	Exponent				Mantissa																																																																															
<b>Default Value</b>	Variable																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r	r	r/w	r/w	r/w	r/w	r/w	r/w																																																																												
<b>Function</b>	Mantissa																																																																																			
<b>Default Value</b>	Variable																																																																																			
45	VOUT_UV_FAULT_RESPONSE	<p>Instructs the module on what action to take in response to a output undervoltage fault</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td>RSP [1]</td><td>RSP [0]</td><td>RS[2]</td><td>RS[1]</td><td>RS[0]</td><td>X</td><td>X</td><td>X</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td> </tr> </table>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	r/w	r/w	r/w	r/w	r	r	r	<b>Function</b>	RSP [1]	RSP [0]	RS[2]	RS[1]	RS[0]	X	X	X	<b>Default Value</b>	1	0	1	1	1	0	0	0	YES																																				
<b>Format</b>	Unsigned Binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r/w	r/w	r/w	r/w	r/w	r	r	r																																																																												
<b>Function</b>	RSP [1]	RSP [0]	RS[2]	RS[1]	RS[0]	X	X	X																																																																												
<b>Default Value</b>	1	0	1	1	1	0	0	0																																																																												
46	IOUT_OC_FAULT_LIMIT	<p>Sets the current level for an output overcurrent fault (cannot be changed)</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r/w</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r/w	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	1	1	1	1	0	0	1	0	<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r/w	r/w	r/w	r/w	r/w	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	1	1	1	0	0	1	0	0	YES
<b>Format</b>	Linear, two's complement binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r	r	r	r	r	r/w	r	r																																																																												
<b>Function</b>	Exponent				Mantissa																																																																															
<b>Default Value</b>	1	1	1	1	0	0	1	0																																																																												
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r	r	r/w	r/w	r/w	r/w	r/w	r/w																																																																												
<b>Function</b>	Mantissa																																																																																			
<b>Default Value</b>	1	1	1	0	0	1	0	0																																																																												

170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc -14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

Table 4 (continued)

Hex Code	Command	Brief Description	Non-Volatile Memory Storage																																																																																	
4A	IOUT_OC_WARN_LIMIT	<p>Sets the value of current level at which the module generates warning for overcurrent. Allowed range is 0 to 170A.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r/w	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	1	1	1	1	0	0	1	0	<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	1	0	1	0	1	0	0	0	YES							
<b>Format</b>	Linear, two's complement binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
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<b>Function</b>	Exponent				Mantissa																																																																															
<b>Default Value</b>	1	1	1	1	0	0	1	0																																																																												
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r/w	r/w	r/w	r/w	r/w	r/w	r/w	r/w																																																																												
<b>Function</b>	Mantissa																																																																																			
<b>Default Value</b>	1	0	1	0	1	0	0	0																																																																												
4F	OT_FAULT_LIMIT	<p>Sets the temperature level above which over-temperature fault occurs. Allowed range is 35 to 130°C.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r/w</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r/w	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	0	0	0	0	0	0	0	0	<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r/w	r/w	r/w	r/w	r/w	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	1	0	0	0	1	0	1	0	YES
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50	OT_FAULT_RESPONSE	<p>Configures the over temperature fault response</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td>RSP [1]</td><td>RSP [0]</td><td>RS[2]</td><td>RS[1]</td><td>RS[0]</td><td>X</td><td>X</td><td>X</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td> </tr> </table>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	r/w	r/w	r/w	r/w	r	r	r	<b>Function</b>	RSP [1]	RSP [0]	RS[2]	RS[1]	RS[0]	X	X	X	<b>Default Value</b>	1	0	1	1	1	0	0	0	YES																																				
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<b>Default Value</b>	1	0	1	1	1	0	0	0																																																																												
51	OT_WARN_LIMIT	<p>Sets the over temperature warning level in °C. Allowed range is 35 to 130°C.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	0	0	0	0	0	0	0	0	<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	0	1	1	1	1	1	0	1	YES						
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55	VIN_OV_FAULT_LIMIT	<p>Sets the input overvoltage fault limit. Exponent is fixed at -6. Allowed range is 6.75 to 14V.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary.</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary.								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	1	1	0	1	0	0	1	1	<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	1	0	1	0	0	0	0	0	YES						
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56	VIN_OV_FAULT_RESPONSE	<p>Configures the VIN overvoltage fault response.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td>RSP [1]</td><td>RSP [0]</td><td>RS[2]</td><td>RS[1]</td><td>RS[0]</td><td>X</td><td>X</td><td>X</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	r/w	r/w	r/w	r/w	r	r	r	<b>Function</b>	RSP [1]	RSP [0]	RS[2]	RS[1]	RS[0]	X	X	X	<b>Default Value</b>	1	0	0	0	0	0	0	0	YES																																				
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170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

Table 4 (continued)

Hex Code	Command	Brief Description	Non-Volatile Memory Storage																																																																																	
57	VIN_OV_WARN_LIMIT	<p>Sets the value of the input voltage that causes input voltage low warning. Exponent fixed at -6. Allowed range is 6.75 to 14V.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	1	1	0	1	0	0	1	1	<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	1	0	0	0	0	0	0	0	YES						
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58	VIN_UV_WARN_LIMIT	<p>Sets the value of the input voltage that causes input voltage low warning. Exponent fixed at -6. Allowed range is 5 to 14V.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	1	1	0	1	0	0	0	1	<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	1	0	1	0	0	0	0	0	YES						
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<b>Function</b>	Mantissa																																																																																			
<b>Default Value</b>	1	0	1	0	0	0	0	0																																																																												
5A	VIN_UV_FAULT_RESPONSE	<p>Instructs the module on what action to take in response to an input undervoltage fault.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td>RSP [1]</td><td>RSP [0]</td><td>RS[2]</td><td>RS[1]</td><td>RS[0]</td><td>X</td><td>X</td><td>X</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td> </tr> </table>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	r/w	r/w	r/w	r/w	r	r	r	<b>Function</b>	RSP [1]	RSP [0]	RS[2]	RS[1]	RS[0]	X	X	X	<b>Default Value</b>	1	0	1	1	1	0	0	0	YES																																				
<b>Format</b>	Unsigned Binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r/w	r/w	r/w	r/w	r/w	r	r	r																																																																												
<b>Function</b>	RSP [1]	RSP [0]	RS[2]	RS[1]	RS[0]	X	X	X																																																																												
<b>Default Value</b>	1	0	1	1	1	0	0	0																																																																												
5E	POWER_GOOD_ON	<p>Sets the output voltage level at which the PGOOD pin is asserted high. Exponent is fixed at -14. Allowed range is 0.09 to 1.65V.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">High Byte</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Low Byte</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r/w	<b>Function</b>	High Byte								<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Low Byte								<b>Default Value</b>	Variable								YES													
<b>Format</b>	Linear, two's complement binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r	r/w	r/w	r/w	r/w	r/w	r/w	r/w																																																																												
<b>Function</b>	High Byte																																																																																			
<b>Default Value</b>	Variable																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r/w	r/w	r/w	r/w	r/w	r/w	r/w	r/w																																																																												
<b>Function</b>	Low Byte																																																																																			
<b>Default Value</b>	Variable																																																																																			

170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc -14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

Table 4 (continued)

Hex Code	Command	Brief Description	Non-Volatile Memory Storage	
5F	POWER_GOOD_OFF	Sets the output voltage level at which the PGOOD pin is de-asserted low. Exponent is fixed at -14. Allowed range is 0.06 to 1.63V.	YES	
		<b>Format</b>		Linear, two's complement binary
		<b>Bit Position</b>		7 6 5 4 3 2 1 0
		<b>Access</b>		r r/w r/w r/w r/w r/w r/w r/w
		<b>Function</b>		High Byte
		<b>Default Value</b>		Variable
		<b>Bit Position</b>		7 6 5 4 3 2 1 0
		<b>Access</b>		r/w r/w r/w r/w r/w r/w r/w r/w
60	TON_DELAY	Sets the delay time in ms of the output voltage during startup. Allowed range is 0 to 1s.	YES	
		<b>Format</b>		Linear, two's complement binary
		<b>Bit Position</b>		7 6 5 4 3 2 1 0
		<b>Access</b>		r r r r r r r r/w
		<b>Function</b>		Exponent Mantissa
		<b>Default Value</b>		0 0 0 0 0 0 0 0
		<b>Bit Position</b>		7 6 5 4 3 2 1 0
		<b>Access</b>		r/w r/w r/w r/w r/w r/w r/w r/w
61	TON_RISE	Sets the rise time in ms of the output voltage during startup. Allowed range is 0 to 1s.	YES	
		<b>Format</b>		Linear, two's complement binary
		<b>Bit Position</b>		7 6 5 4 3 2 1 0
		<b>Access</b>		r r R r r r r r/w
		<b>Function</b>		Exponent Mantissa
		<b>Default Value</b>		0 0 0 0 0 0 0 0
		<b>Bit Position</b>		7 6 5 4 3 2 1 0
		<b>Access</b>		r/w r/w r/w r/w r/w r/w r/w r/w
64	TOFF_DELAY	Sets the delay time in ms of the output voltage during turn-off. Allowed range is 0 to 1s.	YES	
		<b>Format</b>		Linear, two's complement binary
		<b>Bit Position</b>		7 6 5 4 3 2 1 0
		<b>Access</b>		r r R r r r r r/w
		<b>Function</b>		Exponent Mantissa
		<b>Default Value</b>		0 0 0 0 0 0 0 0
		<b>Bit Position</b>		7 6 5 4 3 2 1 0
		<b>Access</b>		r/w r/w r/w r/w r/w r/w r/w r/w
65	TOFF_FALL	Sets the fall time in ms of the output voltage during turn-off. Allowed range is 0 to 1s.	YES	
		<b>Format</b>		Linear, two's complement binary
		<b>Bit Position</b>		7 6 5 4 3 2 1 0
		<b>Access</b>		r r R r r r r r/w
		<b>Function</b>		Exponent Mantissa
		<b>Default Value</b>		0 0 0 0 0 0 0 0
		<b>Bit Position</b>		7 6 5 4 3 2 1 0
		<b>Access</b>		r/w r/w r/w r/w r/w r/w r/w r/w
78	STATUS_BYTE	Returns one byte of information with a summary of the most critical module faults		
		<b>Format</b>		Unsigned Binary
		<b>Bit Position</b>		7 6 5 4 3 2 1 0
		<b>Access</b>		r r R r r r r r
		<b>Flag</b>		X OFF VOUT_OV IOUT_OC VIN_UV TEMP CML OTHER
<b>Default Value</b>	0 0 0 0 0 0 0 0			

170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

Table 4 (Continued)

Hex Code	Command	Brief Description	Non-Volatile Memory Storage																																																																																	
79	STATUS_WORD	<p>Returns two bytes of information with a summary of the module's fault/warning conditions</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>R</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Flag</b></td> <td>VOUT</td> <td>IOUT_OC</td> <td>X</td> <td>X</td> <td>PGOOD</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>R</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Flag</b></td> <td>X</td> <td>OFF</td> <td>VOUT_OV</td> <td>IOUT_OC</td> <td>VIN_UV</td> <td>TEMP</td> <td>CML</td> <td>OTHER</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>	<b>Format</b>	Unsigned binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	R	r	r	r	r	r	<b>Flag</b>	VOUT	IOUT_OC	X	X	PGOOD	X	X	X	<b>Default Value</b>	0	0	0	0	0	0	0	0	<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	R	r	r	r	r	r	<b>Flag</b>	X	OFF	VOUT_OV	IOUT_OC	VIN_UV	TEMP	CML	OTHER	<b>Default Value</b>	0	0	0	0	0	0	0	0	
<b>Format</b>	Unsigned binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r	r	R	r	r	r	r	r																																																																												
<b>Flag</b>	VOUT	IOUT_OC	X	X	PGOOD	X	X	X																																																																												
<b>Default Value</b>	0	0	0	0	0	0	0	0																																																																												
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r	r	R	r	r	r	r	r																																																																												
<b>Flag</b>	X	OFF	VOUT_OV	IOUT_OC	VIN_UV	TEMP	CML	OTHER																																																																												
<b>Default Value</b>	0	0	0	0	0	0	0	0																																																																												
7A	STATUS_VOUT	<p>Returns one byte of information with the status of the module's output voltage related faults</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Flag</b></td> <td>VOUT_OV</td> <td>X</td> <td>X</td> <td>VOUT_UV</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Flag</b>	VOUT_OV	X	X	VOUT_UV	X	X	X	X	<b>Default Value</b>	0	0	0	0	0	0	0	0																																					
<b>Format</b>	Unsigned Binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r	r	r	r	r	r	r	r																																																																												
<b>Flag</b>	VOUT_OV	X	X	VOUT_UV	X	X	X	X																																																																												
<b>Default Value</b>	0	0	0	0	0	0	0	0																																																																												
7B	STATUS_IOUT	<p>Returns one byte of information with the status of the module's output current related faults</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Flag</b></td> <td>IOUT_OC</td> <td>X</td> <td>X</td> <td>X</td> <td>IOUT_OC_WARN</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Flag</b>	IOUT_OC	X	X	X	IOUT_OC_WARN	X	X	X	<b>Default Value</b>	0	0	0	0	0	0	0	0																																					
<b>Format</b>	Unsigned Binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r	r	r	r	r	r	r	r																																																																												
<b>Flag</b>	IOUT_OC	X	X	X	IOUT_OC_WARN	X	X	X																																																																												
<b>Default Value</b>	0	0	0	0	0	0	0	0																																																																												
7C	STATUS_INPUT	<p>Returns one byte of information with the status of the module's input related faults</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Flag</b></td> <td>VIN_OV_FAULT</td> <td>VIN_OV_W</td> <td>VIN_UV_</td> <td>VIN_UV_</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td></td> <td></td> <td>ARNING</td> <td>WARNING</td> <td>_FAULT</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Flag</b>	VIN_OV_FAULT	VIN_OV_W	VIN_UV_	VIN_UV_	X	X	X	X			ARNING	WARNING	_FAULT					<b>Default Value</b>	0	0	0	0	0	0	0	0																												
<b>Format</b>	Unsigned Binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r	r	r	r	r	r	r	r																																																																												
<b>Flag</b>	VIN_OV_FAULT	VIN_OV_W	VIN_UV_	VIN_UV_	X	X	X	X																																																																												
		ARNING	WARNING	_FAULT																																																																																
<b>Default Value</b>	0	0	0	0	0	0	0	0																																																																												
7D	STATUS_TEMPERATURE	<p>Returns one byte of information with the status of the module's temperature related faults</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Flag</b></td> <td>OT_FAULT</td> <td>OT_WARN</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Flag</b>	OT_FAULT	OT_WARN	X	X	X	X	X	X	<b>Default Value</b>	0	0	0	0	0	0	0	0																																					
<b>Format</b>	Unsigned Binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r	r	r	r	r	r	r	r																																																																												
<b>Flag</b>	OT_FAULT	OT_WARN	X	X	X	X	X	X																																																																												
<b>Default Value</b>	0	0	0	0	0	0	0	0																																																																												
7E	STATUS_CML	<p>Returns one byte of information with the status of the module's communication related faults</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Flag</b></td> <td>Invalid Command</td> <td>Invalid Data</td> <td>PEC Fail</td> <td>X</td> <td>X</td> <td>X</td> <td>Other Comm Fault</td> <td>X</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Flag</b>	Invalid Command	Invalid Data	PEC Fail	X	X	X	Other Comm Fault	X	<b>Default Value</b>	0	0	0	0	0	0	0	0																																					
<b>Format</b>	Unsigned Binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r	r	r	r	r	r	r	r																																																																												
<b>Flag</b>	Invalid Command	Invalid Data	PEC Fail	X	X	X	Other Comm Fault	X																																																																												
<b>Default Value</b>	0	0	0	0	0	0	0	0																																																																												

170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

Table 4 (Continued)

Hex Code	Command	Brief Description	Non-Volatile Memory Storage																																																																																	
88	READ_VIN	<p>Returns the value of the input voltage applied to the module. Exponent is fixed at -6</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Mantissa</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Mantissa				Mantissa				<b>Default Value</b>	Variable								
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<b>Default Value</b>	Variable																																																																																			
8B	READ_VOUT	<p>Returns the value of the output voltage of the module. Exponent is fixed at -14</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Mantissa</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Mantissa</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Mantissa				Mantissa				<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Mantissa				Mantissa				<b>Default Value</b>	Variable								
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<b>Default Value</b>	Variable																																																																																			
8C	READ_IOUT	<p>Returns the value of the output current of the module. Exponent is fixed at -2</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Mantissa</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Mantissa				Mantissa				<b>Default Value</b>	Variable								
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<b>Function</b>	Mantissa				Mantissa																																																																															
<b>Default Value</b>	Variable																																																																																			
8D	READ_TEMPERATURE_1	<p>Returns the module inductor temperature in °C. Exponent is fixed at 0</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Mantissa</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Mantissa				Mantissa				<b>Default Value</b>	Variable								
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<b>Function</b>	Mantissa				Mantissa																																																																															
<b>Default Value</b>	Variable																																																																																			
8E	READ_TEMPERATURE_2	<p>Returns the module PWM controller temperature in °C. Exponent is fixed at 0</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Mantissa</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Mantissa				Mantissa				<b>Default Value</b>	Variable								
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170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

Table 4 (Continued)

Hex Code	Command	Brief Description	Non-Volatile Memory Storage																																																																																	
95	READ_FREQUENCY	<p>Returns the switching Frequency of the converter. The Frequency is in Kilohertz and is read only, consisting of two bytes.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	0	0	0	0	0	0	0	1	<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Mantissa								<b>Default Value</b>	1	0	0	1	0	0	0	0	
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<b>Default Value</b>	0	0	0	0	0	0	0	1																																																																												
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<b>Access</b>	r	r	r	r	r	r	r	r																																																																												
<b>Function</b>	Mantissa																																																																																			
<b>Default Value</b>	1	0	0	1	0	0	0	0																																																																												
98	PMBUS_REVISION	<p>Returns one byte indicating the module is compliant to PMBus Spec. 1.1 (read only)</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td> </tr> </table>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Default Value</b>	0	0	0	1	0	0	0	1	YES																																													
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<b>Default Value</b>	0	0	0	1	0	0	0	1																																																																												
B0	MFR_SPECIFIC_KP	<p>Value used to program specific proportional coefficient of the PID compensation Block.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable								YES														
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B1	MFR_SPECIFIC_KI	<p>Value used to program specific integral coefficient of the PID compensation Block</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable								YES														
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<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r/w	r/w	r/w	r/w	r/w	r/w	r/w	r/w																																																																												
<b>Function</b>	Mantissa																																																																																			
<b>Default Value</b>	Variable																																																																																			
B2	MFR_SPECIFIC_KD	<p>Value used to program specific differential coefficient of the PID compensation</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable								YES														
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<b>Function</b>	Mantissa																																																																																			
<b>Default Value</b>	Variable																																																																																			
B3	MFR_SPECIFIC_ALPHA	<p>Value used to program specific alpha value of the PID compensation block</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable								YES														
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170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

Table 4 (Continued)

Hex Code	Command	Brief Description	Non-Volatile Memory Storage																																																																																																																																																																																													
D0	MFR_SPECIFIC_00	<p>Returns module name information (read only)</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Reserved</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="6">Module Name</td> <td colspan="2">Reserved</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td> </tr> </table>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Reserved								<b>Default Value</b>	0	0	0	0	0	0	0	0	<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Module Name						Reserved		<b>Default Value</b>	0	0	1	1	1	0	0	0	YES																																																																																																												
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<b>Default Value</b>	0	0	1	1	1	0	0	0																																																																																																																																																																																								
D1	MFR_SPECIFIC_01	<p>Returns module information (read only)</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Module Name</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Module Name</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Module Name</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Module Name</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Module Name</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Module Name								<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Module Name								<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Module Name								<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Module Name								<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Module Name								<b>Default Value</b>	Variable								YES
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D4	MFR_READ_VOUT_CAL_OFFSET	<p>Applies an offset to the READ_VOUT command results to calibrate out offset errors in module measurements of the output voltage (between -125mV and +124mV). Exponent is fixed at -14.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable based on factory calibration</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable based on factory calibration</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	r	r	r	r	r	r	r	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable based on factory calibration								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable based on factory calibration								YES																																																																																																																		
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D5	MFR_READ_VOUT_CAL_GAIN	<p>Applies a gain correction to the READ_VOUT command results to calibrate out gain errors in module measurements of the output voltage (between -0.125 and 0.121)</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r</td><td>r</td><td>r/w</td><td>r</td><td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="4">Exponent</td> <td colspan="4">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable based on factory calibration</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td><td>r</td><td>r</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td><td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable based on factory calibration</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r/w	r	r	<b>Function</b>	Exponent				Mantissa				<b>Default Value</b>	Variable based on factory calibration								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r/w	r/w	r/w	r/w	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable based on factory calibration								YES																																																																																																												
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170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

Table 4 (Continued)

Hex Code	Command	Brief Description	Non-Volatile Memory Storage																																																																																	
D7	MFR_VOUT_CAL_OFFSET	<p>Applies an offset to the commanded output voltage to calibrate out errors in setting module output voltage (between -63mV and +62mV) when using Trim resistor. Exponent is fixed at -14.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable based on factory calibration</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable based on factory calibration</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	r	r	r	r	r	r	r	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable based on factory calibration								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable based on factory calibration								YES						
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<b>Function</b>	Mantissa																																																																																			
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D8	MFR_VOUT_SET_MODE	<p>Bit 7 used to determine whether output voltage is set using RTrim or the VOUT_COMMAND.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> </tr> <tr> <td><b>Flag</b></td> <td>VOUT_SET_MODE</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td><b>Default Value</b></td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table> <p>Bit 7: 1 – Output voltage is solely set by RTrim value and can be adjusted from set value using the VOUT_TRIM command                      Bit 7: 0 – Output voltage is solely set by VOUT_COMMAND and can be adjusted from set value using the VOUT_TRIM command.</p>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Flag</b>	VOUT_SET_MODE	X	X	X	X	X	X	X	<b>Default Value</b>	1	0	0	0	0	0	0	0	YES																																											
<b>Format</b>	Unsigned Binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
<b>Access</b>	r/w	r/w	r/w	r/w	r/w	r/w	r/w	r/w																																																																												
<b>Flag</b>	VOUT_SET_MODE	X	X	X	X	X	X	X																																																																												
<b>Default Value</b>	1	0	0	0	0	0	0	0																																																																												
DB	MFR_FW_REVISION	<p>Value used to program the firmware revision</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Linear, two's complement binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> <td>r/w</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Mantissa</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Linear, two's complement binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r/w	<b>Function</b>	Mantissa								<b>Default Value</b>	Variable																						
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<b>Function</b>	Mantissa																																																																																			
<b>Default Value</b>	Variable																																																																																			
DD	MFR_RTUNE_INDEX	<p>Returns the index derived from the resistor strapped to the RTUNE pin of the module.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Reserved</td> </tr> <tr> <td><b>Default Value</b></td> <td colspan="8">Variable</td> </tr> </table>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Reserved								<b>Default Value</b>	Variable								YES																																				
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<b>Function</b>	Reserved																																																																																			
<b>Default Value</b>	Variable																																																																																			
DF	MFR_WRITE_PROTECT	<p>Gets or sets the write protection status of various PMBus commands. When a bit is set, the corresponding PMBus command is write protected and can only be read.</p> <table border="1"> <tr> <td><b>Format</b></td> <td colspan="8">Unsigned Binary</td> </tr> <tr> <td><b>Bit Position</b></td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="8">Reserved</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td><b>Bit Position</b></td> <td>15</td> <td>14</td> <td>13</td> <td>12</td> <td>11</td> <td>10</td> <td>9</td> <td>8</td> </tr> <tr> <td><b>Access</b></td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> <td>r</td> </tr> <tr> <td><b>Function</b></td> <td colspan="6">Module Name</td> <td colspan="2">Reserved</td> </tr> <tr> <td><b>Default Value</b></td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table> <p>Bit 0: ON_OFF_CONFIG                      Bit 1: IOUT_CAL command comprising both IOUT_CAL_GAIN and IOUT_CAL_OFFSET                      Bit 2: IOUT_OC_FAULT_LIMIT                      Bit 3: IOUT_OC_FAULT_RESPONSE                      Bit 4: OT_FAULT_LIMIT                      Bit 5: OT_FAULT_RESPONSE                      Bit 6: TOFF_MAX_WARN_LIMIT                      Bit 7: MFR_EXT_TEMP_CAL_OFFSET                      Bit 8: MFR_PHASE_CONTROL                      Bit 9: MFR_SPECIFIC_01</p>	<b>Format</b>	Unsigned Binary								<b>Bit Position</b>	7	6	5	4	3	2	1	0	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Reserved								<b>Default Value</b>	0	0	0	0	0	0	0	0	<b>Bit Position</b>	15	14	13	12	11	10	9	8	<b>Access</b>	r	r	r	r	r	r	r	r	<b>Function</b>	Module Name						Reserved		<b>Default Value</b>	0	0	0	1	0	0	0	0	YES
<b>Format</b>	Unsigned Binary																																																																																			
<b>Bit Position</b>	7	6	5	4	3	2	1	0																																																																												
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# 170A TeraDLynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## Thermal Considerations

Power modules operate in a variety of thermal environments; however, sufficient cooling should always be provided to help ensure reliable operation.

Considerations include ambient temperature, airflow, module power dissipation, and the need for increased reliability. A reduction in the operating temperature of the module will result in an increase in reliability. The thermal data presented here is based on physical measurements taken in a wind tunnel. The test set-up is shown in Figure 37. The preferred airflow direction for the module is in Figure 38.

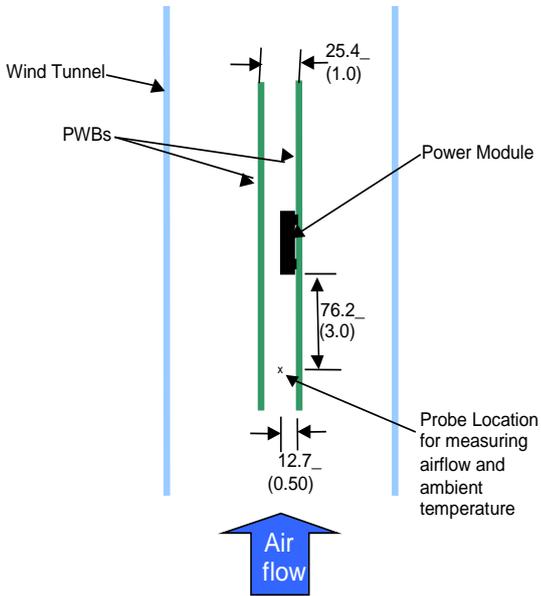


Figure 37. Thermal Test Setup.

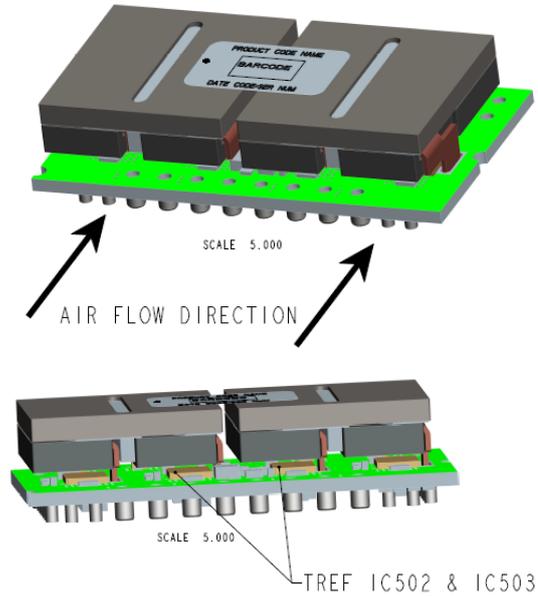


Figure 38. Preferred airflow direction and location of hot-spots of the module (Tref).

The thermal reference points,  $T_{ref}$  used in the specifications are also shown in Figure 37. For reliable operation the temperatures at these points should not exceed 120°C. The output power of the module should not exceed the rated power of the module ( $V_{o,set} \times I_{o,max}$ ).

Please refer to the Application Note “Thermal Characterization Process For Open-Frame Board-Mounted Power Modules” for a detailed discussion of thermal aspects including maximum device temperatures.

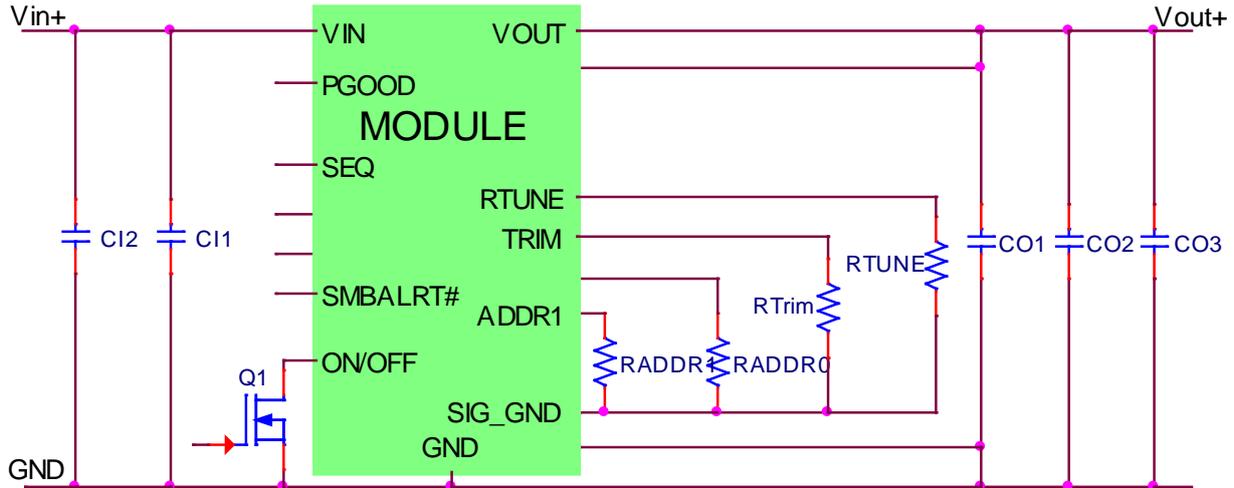
# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc -14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## Example Application Circuit

### Requirements:

- Vin: 12V
- Vout: 1.2V
- Iout: 170A max., worst case load transient is from 40A to 125A
- ΔVout: 1.5% of Vout (18mV) for worst case load transient
- Vin, ripple: 2% of Vin (240mV p-p)



CI1	TBD
CI2	TBD
CI3	TBD
CO1	TBD
CO2	TBD
CO3	TBD
RTune	TBD
RTrim	TBD

**Note:** The DATA, CLK and SMBALRT pins do not have any pull-up resistors inside the module. Typically, the PMBus master controller will have pull-up resistors as well as provide the driving source for these signals.

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

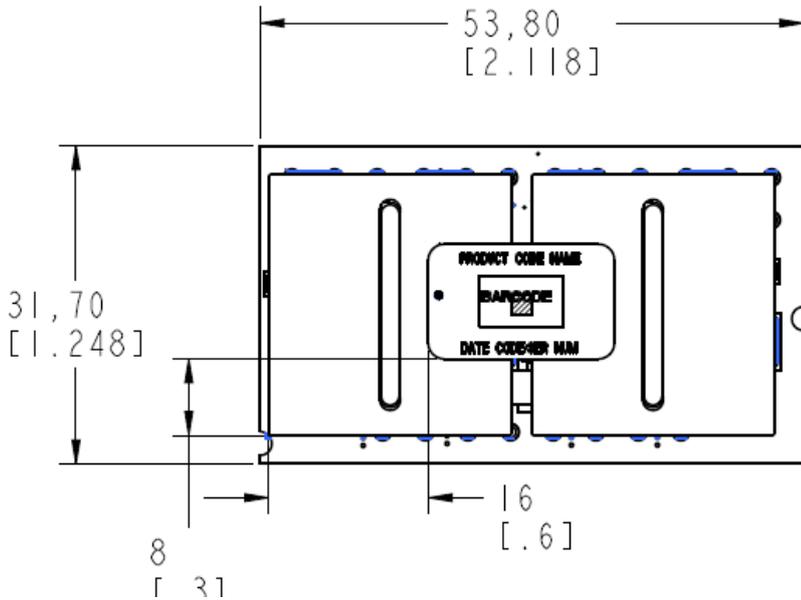
4.5Vdc –14Vdc input; 0.1Vdc to 2.0Vdc output; 170A Output Current

## Mechanical Outline

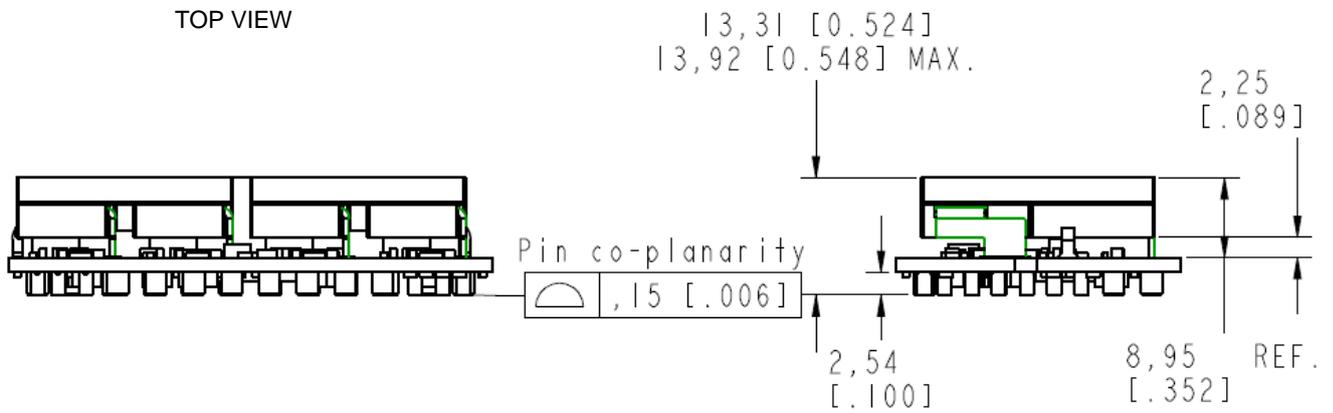
Dimensions are in millimeters and (inches).

Tolerances: x.x mm ± 0.5 mm (x.xx in. ± 0.02 in.) [unless otherwise indicated]

x.xx mm ± 0.25 mm (x.xxx in ± 0.010 in.)

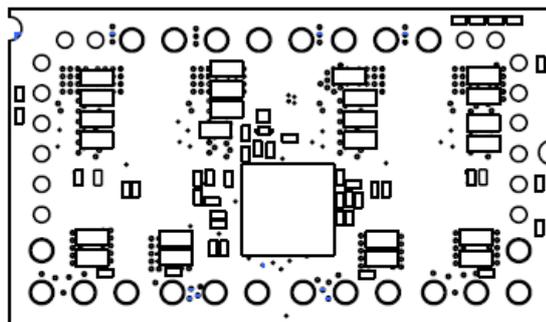


TOP VIEW



FRONT VIEW

SIDE VIEW



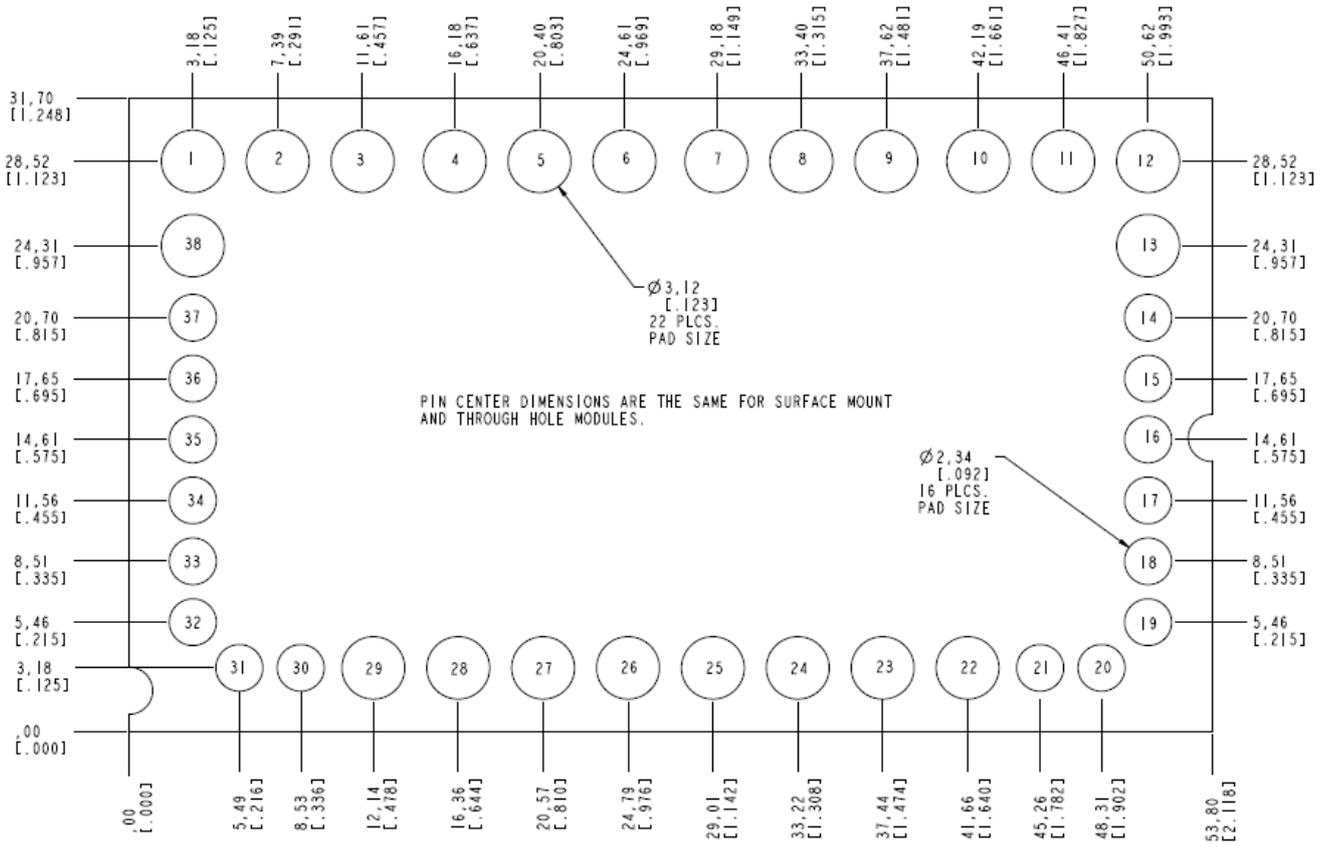
BOTTOM VIEW

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

7Vdc -14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## Recommended SMT Pad Layout

RECOMMENDED SMT FOOTPRINT  
- THROUGH BOARD VIEW -



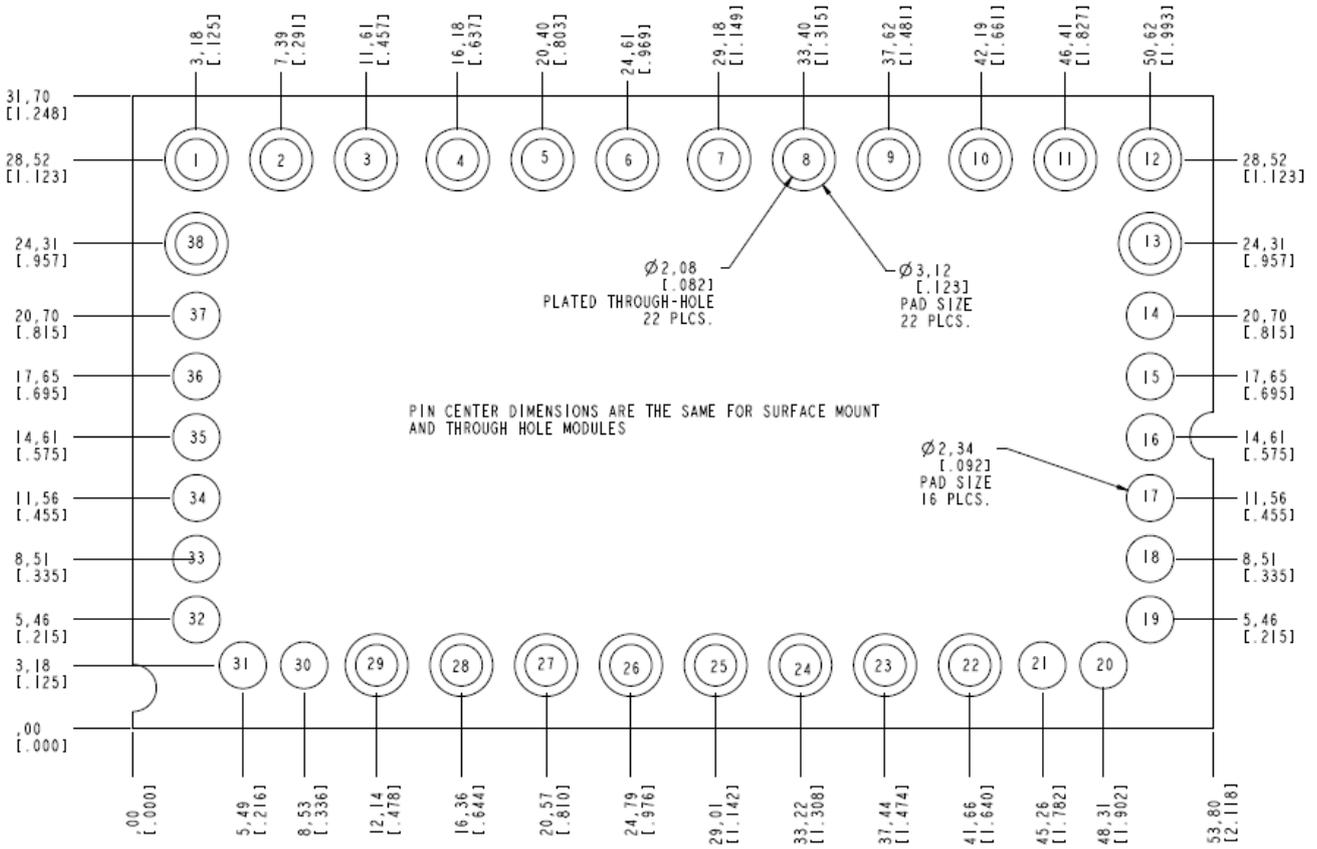
PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
1	VOUT	15	PWR_GOOD	29	VIN
2	VOUT	16	RTUNE	30	N/A
3	GND	17	TRIM	31	SHARE
4	VOUT	18	SEQ	32	ON/OFF
5	VOUT	19	SIG_GND	33	SMBALERT#
6	GND	20	VS+	34	DATA
7	VOUT	21	VS-	35	CLK
8	VOUT	22	GND	36	ADDR0
9	GND	23	VIN	37	ADDR1
10	VOUT	24	GND	38	GND
11	VOUT	25	VIN		
12	GND	26	GND		
13	GND	27	VIN		
14	SYNC	28	GND		

# 170A TeraDlynx™: Non-Isolated DC-DC Power Modules

4.5Vdc -14Vdc input; 0.1Vdc to 2.0Vdc output; 170A Output Current

## Recommended Through-hole Layout

RECOMMENDED THROUGH-HOLE FOOTPRINT  
- THROUGH BOARD VIEW -



PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
1	VOUT	15	PWR_GOOD	29	VIN
2	VOUT	16	RTUNE	30	N/A
3	GND	17	TRIM	31	SHARE
4	VOUT	18	SEQ	32	ON/OFF
5	VOUT	19	SIG_GND	33	SMBALERT#
6	GND	20	VS+	34	DATA
7	VOUT	21	VS-	35	CLK
8	VOUT	22	GND	36	ADDR0
9	GND	23	VIN	37	ADDR1
10	VOUT	24	GND	38	GND
11	VOUT	25	VIN		
12	GND	26	GND		
13	GND	27	VIN		
14	SYNC	28	GND		

# 170A TeraDLynx™: Non-Isolated DC-DC Power Modules

7Vdc –14Vdc input; 0.1Vdc to 1.5Vdc output; 170A Output Current

## Ordering Information

Please contact your GE Sales Representative for pricing, availability and optional features.

**Table 5. Device Codes**

Device Code	Input Voltage Range	Output Voltage	Output Current	On/Off Logic	Sequencing	Comcodes
TJT170A0X3Z	7 – 14Vdc	0.1 – 1.5 Vdc	170A	Negative	Yes	150043981
TJT170A0X43Z	7 – 14Vdc	0.1 – 1.5 Vdc	170A	Positive	Yes	150049605
TJT170A0X3-SZ	7 – 14Vdc	0.1 – 1.5 Vdc	170A	Negative	Yes	150041744
TJT170A0X43-SZ	7 – 14Vdc	0.1 – 1.5 Vdc	170A	Positive	Yes	150049607

-Z refers to RoHS compliant parts

**Table 6. Coding Scheme**

Package Identifier	Family	Sequencing Option	Output current	Output voltage	On/Off logic	Remote Sense	Options		ROHS Compliance
<b>T</b>	<b>J</b>	<b>T</b>	<b>170A0</b>	<b>X</b>		<b>3</b>	<b>-SR</b>	<b>-H</b>	<b>Z</b>
P=Pico U=Micro M=Mega G=Giga T=Tera	J = DLynx II	T=with EZ Sequence  X=without sequencing	170A	X = programmable output	4 = positive  No entry = negative	3 = Remote Sense	S = Surface Mount  R = Tape & Reel  No entry = Through hole	Extra Ground Pins	Z = ROHS6

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## Contact Us

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