

P-channel 20 V, 0.087 Ω typ., 3 A STripFET™ H7 Power MOSFET in a SOT23-6L package

Datasheet - production data

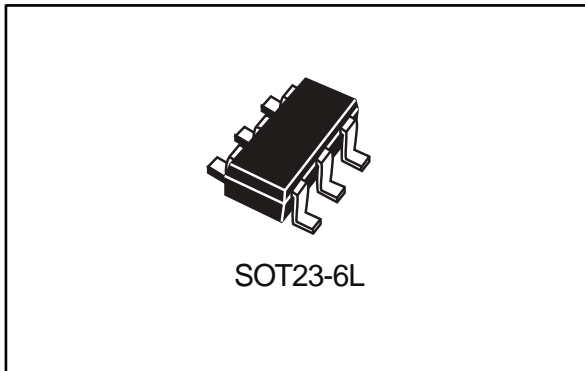
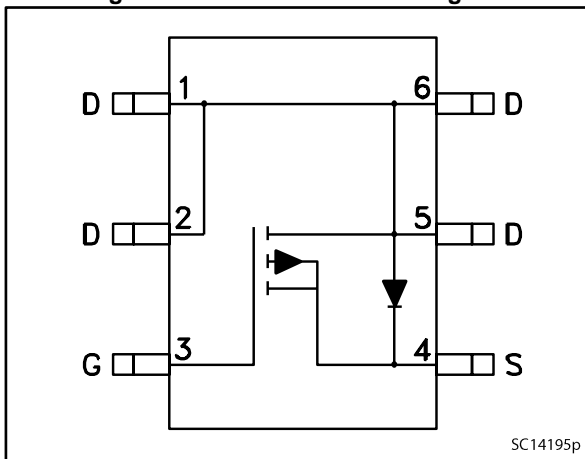


Figure 1: Internal schematic diagram



- Very low on-resistance
- Very low capacitance and gate charge
- High avalanche ruggedness

Applications


- Switching applications

Description

This P-channel Power MOSFET utilizes the STripFET H7 technology with a trench gate structure combined with extremely low on-resistance. The device also offers ultra-low capacitances for higher switching frequency operations.

Table 1: Device summary

Order code	Marking	Package	Packaging
STT3P2UH7	3L2U	SOT23-6L	Tape and reel

-  For the P-channel Power MOSFET the actual polarity of the voltages and the current must be reversed.

Features

Order code	V _{DS}	R _{DS(on)} max	I _D
STT3P2UH7	20 V	0.1 Ω @ 4.5	3 A

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1 Electrical ratings

Table 2: Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	30	V
V_{GS}	Gate-source voltage	± 8	V
I_D	Drain current (continuous) at $T_{pcb} = 25\text{ }^\circ\text{C}$	3	A
I_D	Drain current (continuous) at $T_{pcb} = 100\text{ }^\circ\text{C}$	1.9	A
$I_{DM}^{(1)}$	Drain current (pulsed)	12	A
P_{TOT}	Total dissipation at $T_{pcb} = 25\text{ }^\circ\text{C}$	1.6	W
T_{stg}	Storage temperature	- 55 to 150	$^\circ\text{C}$
T_j	Max. operating junction temperature	150	$^\circ\text{C}$

Notes:

⁽¹⁾Pulse width limited by safe operating area

Table 3: Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-pcb}^{(1)}$	Thermal resistance junction-pcb max, single operation	78	$^\circ\text{C/W}$

Notes:

⁽¹⁾When mounted on 1inch² FR-4 board, 2 oz Cu



For the P-channel Power MOSFET the actual polarity of the voltages and the current must be reversed.

2 Electrical characteristics

($T_C = 25\text{ }^\circ\text{C}$ unless otherwise specified)

Table 4: On /off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	$I_D = 250\text{ }\mu\text{A}$, $V_{GS} = 0$	20			V
I_{DSS}	Zero gate voltage drain current	$V_{DS} = 20\text{ V}$, $V_{GS} = 0$			1	μA
I_{GSS}	Gate-body leakage current	$V_{GS} = \pm 8\text{ V}$, $V_{DS} = 0$			10	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	0.4		1	V
$R_{DS(on)}$	Static drain-source on-resistance	$V_{GS} = 4.5\text{ V}$, $I_D = 1.5\text{ A}$		0.087	0.1	Ω
		$V_{GS} = 2.5\text{ V}$, $I_D = 1.5\text{ A}$		0.11	0.13	Ω
		$V_{GS} = 1.8\text{ V}$, $I_D = 1.5\text{ A}$		0.145	0.18	Ω

Table 5: Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input capacitance	$V_{DS} = 10\text{ V}$, $f = 1\text{ MHz}$, $V_{GS} = 0$	-	510	-	pF
C_{oss}	Output capacitance		-	66	-	pF
C_{rss}	Reverse transfer capacitance		-	44	-	pF
Q_g	Total gate charge	$V_{DD} = 10\text{ V}$, $I_D = 3\text{ A}$, $V_{GS} = 4.5\text{ V}$ (see Figure 14: "Gate charge test circuit")	-	4.8	-	nC
Q_{gs}	Gate-source charge		-	0.7	-	nC
Q_{gd}	Gate-drain charge		-	0.8	-	nC

Table 6: Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	$V_{DD} = 10\text{ V}$, $I_D = 1.5\text{ A}$, $R_G = 4.7\text{ }\Omega$, $V_{GS} = 4.5\text{ V}$ (see Figure 15: "Test circuit for inductive load switching and diode recovery times")	-	9	-	ns
t_r	Rise time		-	21	-	ns
$t_{d(off)}$	Turn-off delay time		-	40	-	ns
t_f	Fall time		-	19	-	ns



For the P-channel Power MOSFET the actual polarity of the voltages and the current must be reversed.

Table 7: Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{SD}^{(1)}$	Forward on voltage	$I_{SD} = 1 \text{ A}$, $V_{GS} = 0$	-	-	1	V
t_{rr}	Reverse recovery time	$V_{DD} = 10 \text{ V}$ $di/dt = 100 \text{ A}/\mu\text{s}$, $I_{SD} = 1 \text{ A}$	-	12.5		ns
Q_{rr}	Reverse recovery charge	$T_j = 150 \text{ }^\circ\text{C}$ (see Figure 15: "Test circuit for inductive load switching and diode recovery times")	-	5		nC
I_{RRM}	Reverse recovery current		-	0.8		A

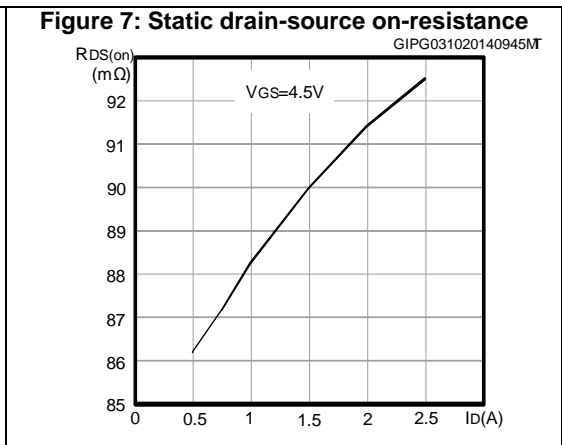
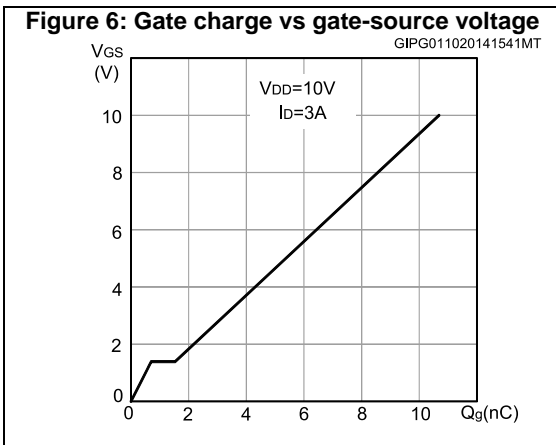
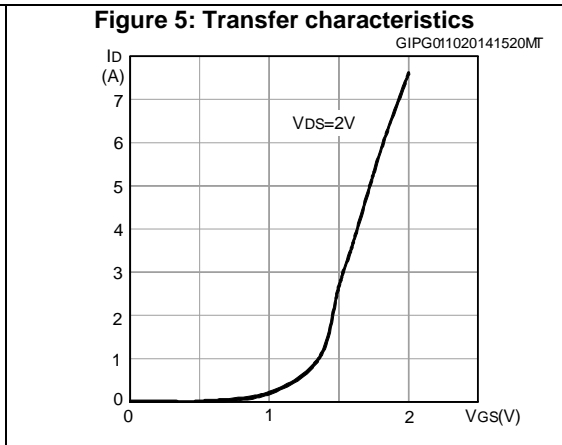
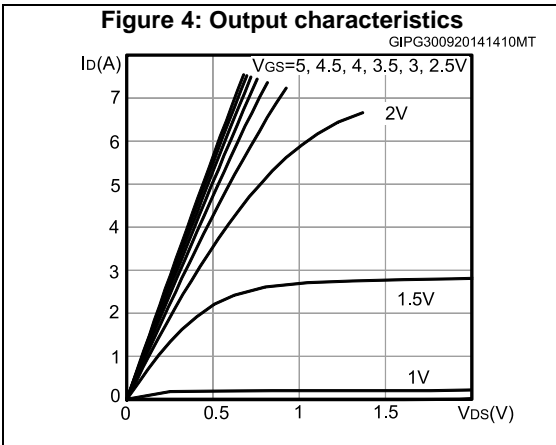
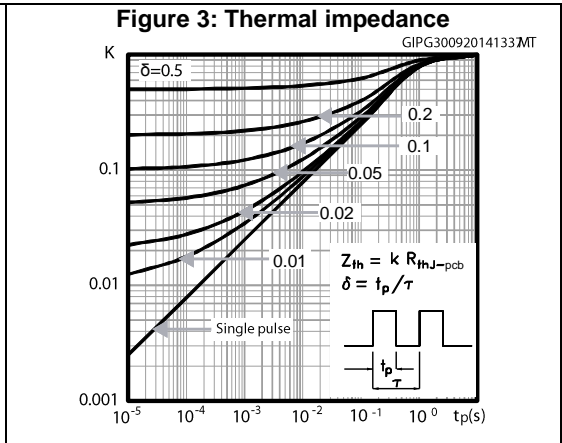
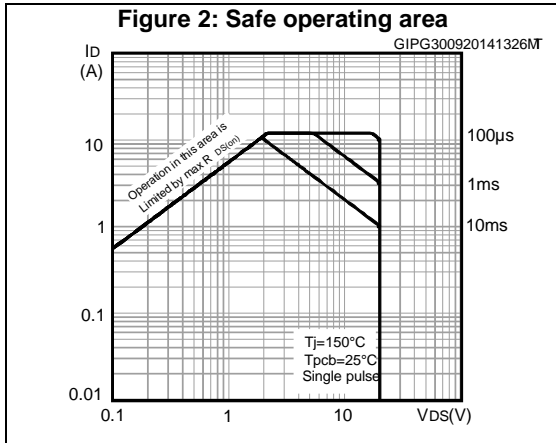
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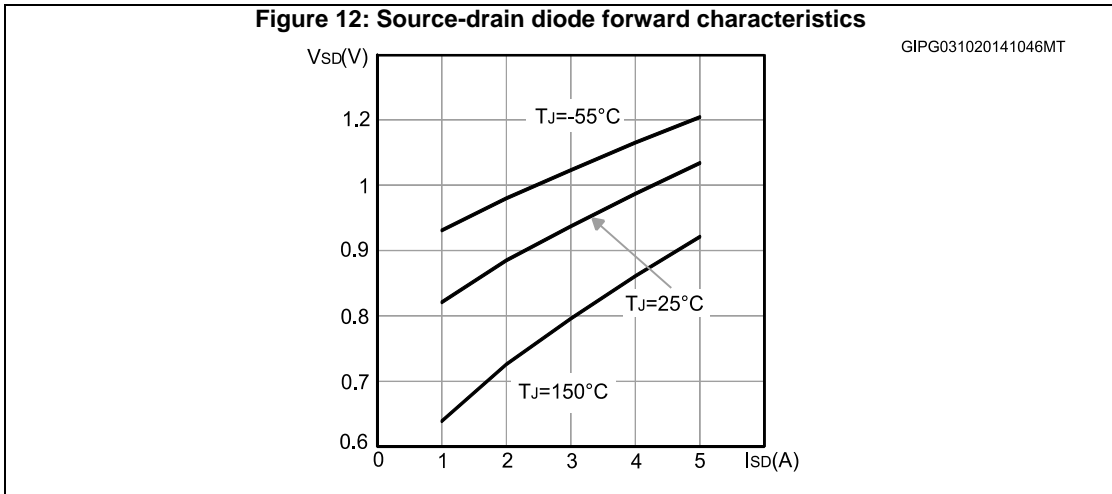
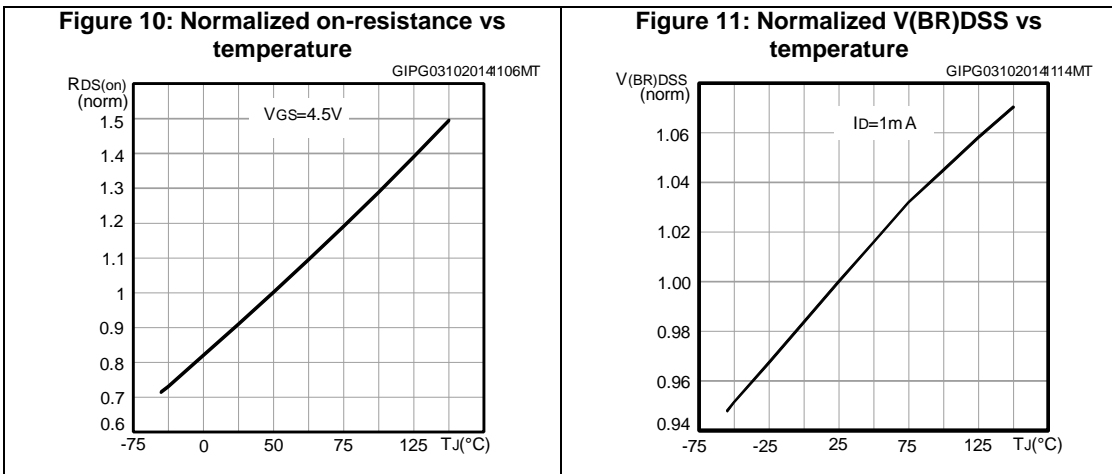
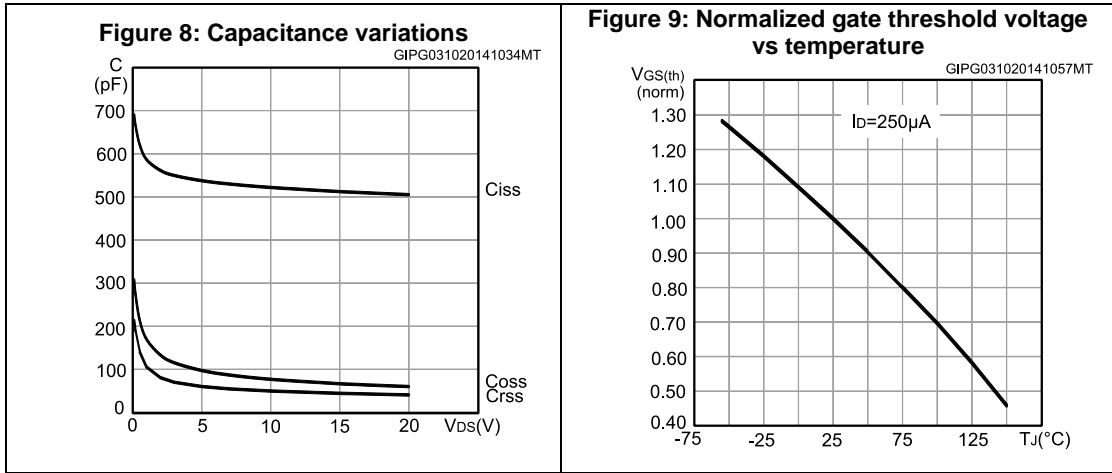
⁽¹⁾Pulsed: pulse duration = 300 μs , duty cycle 1.5%.



For the P-channel Power MOSFET the actual polarity of the voltages and the current must be reversed.

2.1 Electrical characteristics (curves)





3 Test circuits

Figure 13: Switching times test circuit for resistive load

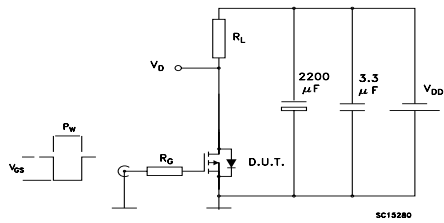


Figure 14: Gate charge test circuit

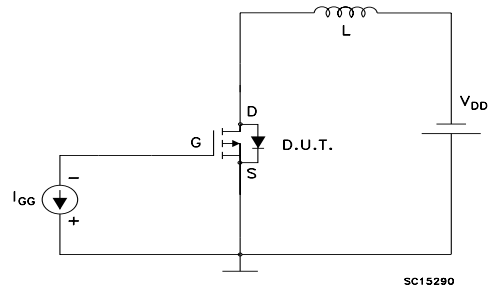
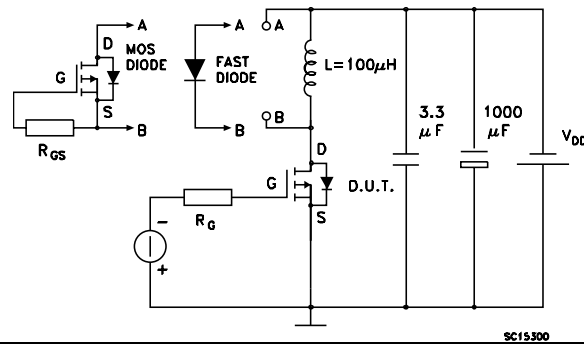


Figure 15: Test circuit for inductive load switching and diode recovery times



4 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

4.1 SOT23-6L package mechanical data

Figure 16: SOT23-6L package drawing

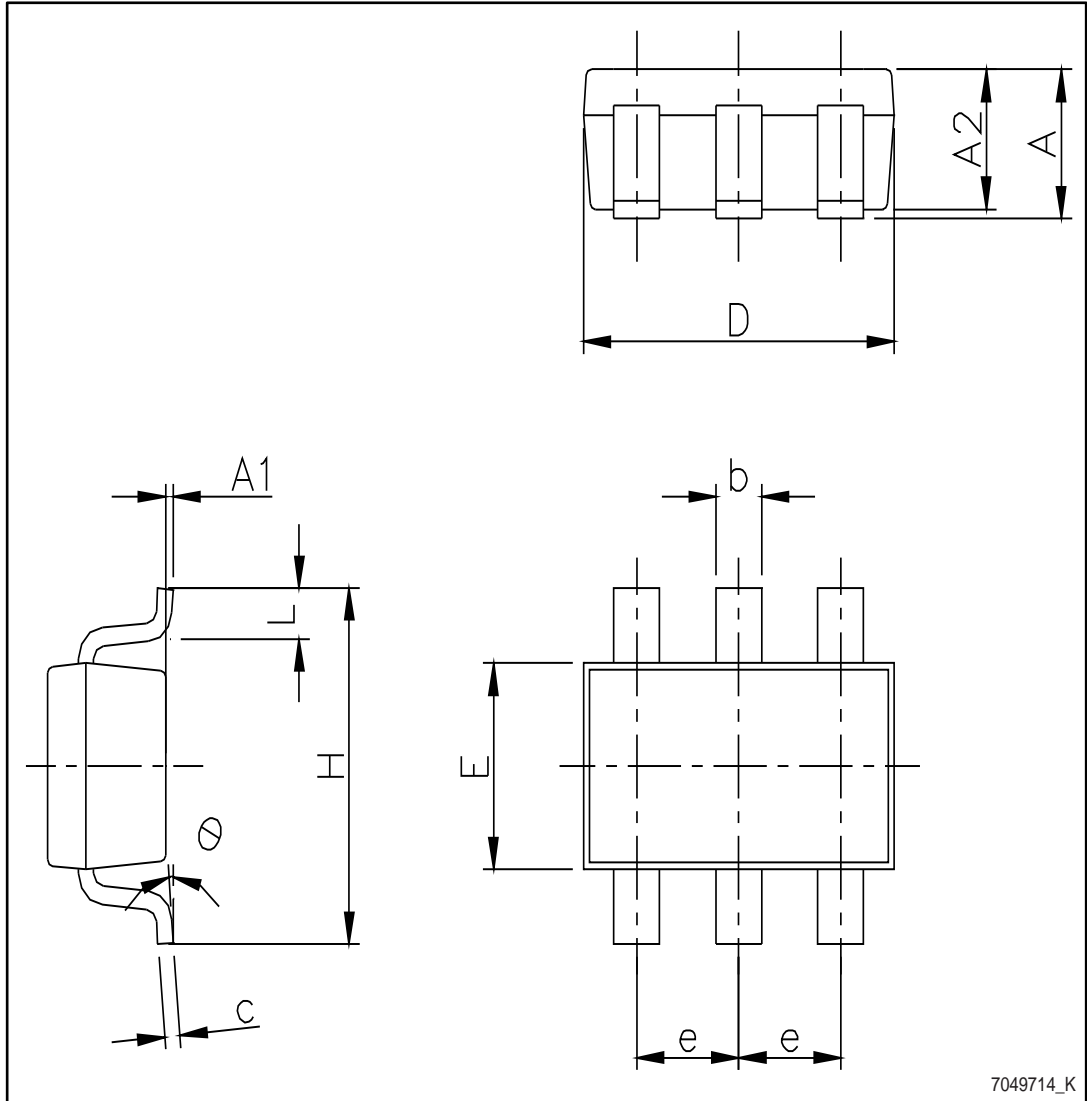
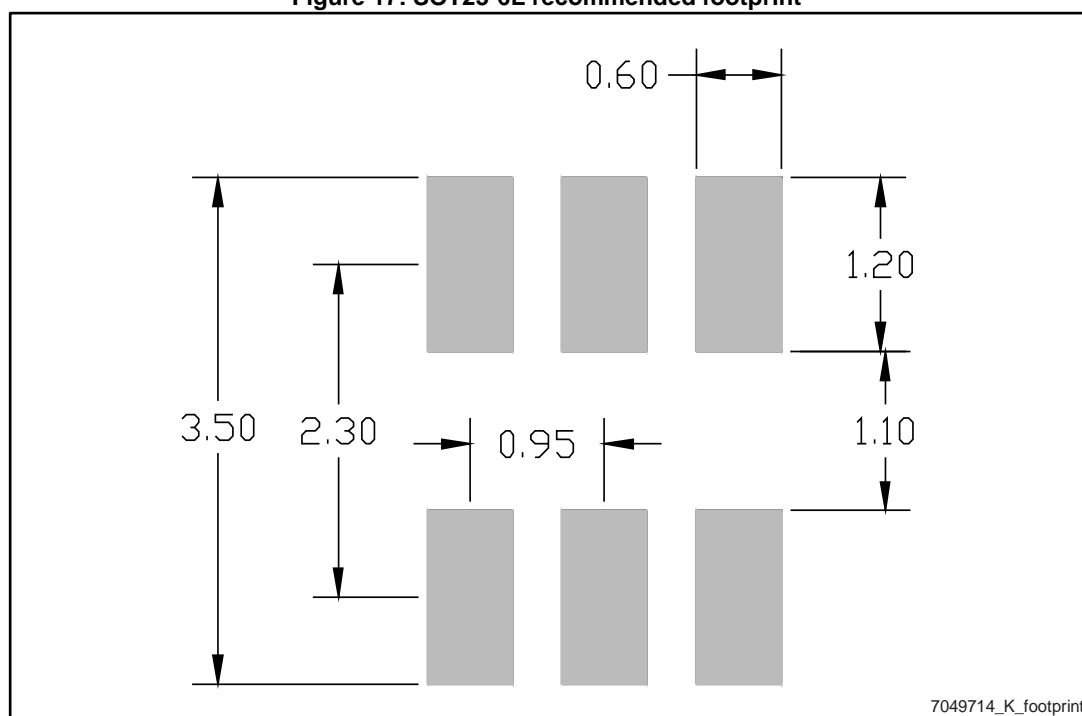


Table 8: SOT23-6L package mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A			1.25
A1	0.00		0.15
A2	1.00	1.10	1.20
b	0.36		0.50
C	0.14		0.20
D	2.826	2.926	3.026
E	1.526	1.626	1.726
e	0.90	0.95	1.00
H	2.60	2.80	3.00
L	0.35	0.45	0.60
θ	0 °C		8 °C

Figure 17: SOT23-6L recommended footprint



5 Revision history

Table 9: Document revision history

Date	Revision	Changes
18-Jul-2013	1	First release.
22-Oct-2014	2	Document status promoted from target data to production data. Updated title, features and description in cover page. Updated Section 2: "Electrical characteristics" and Section 4.1: "SOT23-6L package mechanical data" . Minor text changes.

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