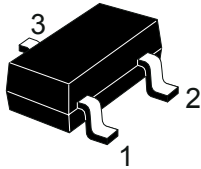
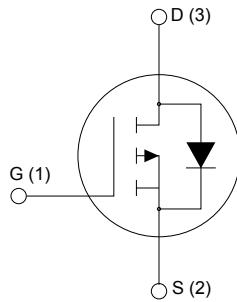


P-channel -30 V, 48 mΩ typ., -2 A STripFET™ H6 Power MOSFET in a SOT-23 package



SOT-23



PG1D3S2

Features

Order code	V_{DS}	$R_{DS(on)}$ max.	I_D
STR2P3LLH6	-30 V	56 mΩ	-2 A

- Very low on-resistance
- Very low gate charge
- High avalanche ruggedness
- Low gate drive power loss

Applications

- Switching applications

Description

This device is a P-channel Power MOSFET developed using the STripFET™ H6 technology with a new trench gate structure. The resulting Power MOSFET exhibits very low $R_{DS(on)}$ in all packages.

Product status	
STR2P3LLH6	
Product summary	
Order code	STR2P3LLH6
Marking	2K3L
Package	SOT-23
Packing	Tape and reel

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	-30	V
V_{GS}	Gate-source voltage	± 20	V
I_D	Drain current (continuous) at $T_{pcb} = 25\text{ }^\circ\text{C}$	-2	A
I_D	Drain current (continuous) at $T_{pcb} = 100\text{ }^\circ\text{C}$	-1.2	A
$I_{DM}^{(1)}$	Drain current (pulsed)	-8	A
P_{TOT}	Total dissipation at $T_{pcb} = 25\text{ }^\circ\text{C}$	0.35	W
T_J	Operating junction temperature range	-55 to 150	$^\circ\text{C}$
T_{stg}	Storage temperature range		$^\circ\text{C}$

1. Pulse width limited by safe operating area

Table 2. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{thj-pcb}^{(1)}$	Thermal resistance junction-pcb, single operation	357	$^\circ\text{C/W}$

1. When mounted on FR-4 board of 1inch², 2oz Cu, $t < 10\text{ s}$

2 Electrical characteristics

($T_C = 25\text{ °C}$ unless otherwise specified).

Table 3. On /off states

Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0\text{ V}$, $I_D = -250\text{ }\mu\text{A}$	-30			V
I_{DSS}	Zero gate voltage drain current	$V_{GS} = 0\text{ V}$, $V_{DS} = -30\text{ V}$, $T_J = 125\text{ °C}$ ⁽¹⁾			-1	μA
I_{GSS}	Gate body leakage current	$V_{GS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$			-100	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}$, $I_D = -250\text{ }\mu\text{A}$	-1		-2.5	V
$R_{DS(on)}$	Static drain-source on-resistance	$V_{GS} = -10\text{ V}$, $I_D = -1\text{ A}$ $V_{GS} = -4.5\text{ V}$, $I_D = -1\text{ A}$		48 75	56 90	m Ω

1. Defined by design, not subject to production test.

Table 4. Dynamic

Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
C_{iss}	Input capacitance	$V_{DS} = -25\text{ V}$, $f = 1\text{ MHz}$ $V_{GS} = 0\text{ V}$	-	639	-	pF
C_{oss}	Output capacitance		-	79	-	
C_{rSS}	Reverse transfer capacitance		-	52	-	
Q_g	Total gate charge	$V_{DD} = -15\text{ V}$, $I_D = -2\text{ A}$	-	6	-	nC
Q_{gs}	Gate-source charge	$V_{GS} = -4.5\text{ to }0\text{ V}$	-	1.9	-	
Q_{gd}	Gate-drain charge	(see Figure 13. Gate charge test circuit)	-	2.1	-	

Table 5. Switching times

Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
$t_{d(on)}$	Turn-on delay time	$V_{DD} = -15\text{ V}$, $I_D = -2\text{ A}$, $R_G = 4.7\text{ }\Omega$, $V_{GS} = -10\text{ V}$ (see Figure 12. Switching times test circuit for resistive load)	-	5.4	-	ns
t_r	Rise time		-	5	-	
$t_{d(off)}$	Turn-off delay time		-	19.2	-	
t_f	Fall time		-	3.4	-	

Table 6. Source drain diode

Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
$V_{SD}^{(1)}$	Forward on voltage	$I_{SD} = -2\text{ A}$, $V_{GS} = 0\text{ V}$	-	-	-1.1	V

Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	$I_{SD} = -2 \text{ A}$, $di/dt = 100 \text{ A}/\mu\text{s}$, $V_{DD} = 24 \text{ V}$, $T_J = 150 \text{ }^\circ\text{C}$ (see Figure 14. Test circuit for inductive load switching and diode recovery times)	-	-	11.2	ns
Q_{rr}	Reverse recovery charge		-	-	3.5	nC
I_{RRM}	Reverse recovery current		-	-	-0.6	A

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

2.1 Electrical characteristics (curves)

Note: For the P-channel Power MOSFET, current and voltage polarities are reversed.

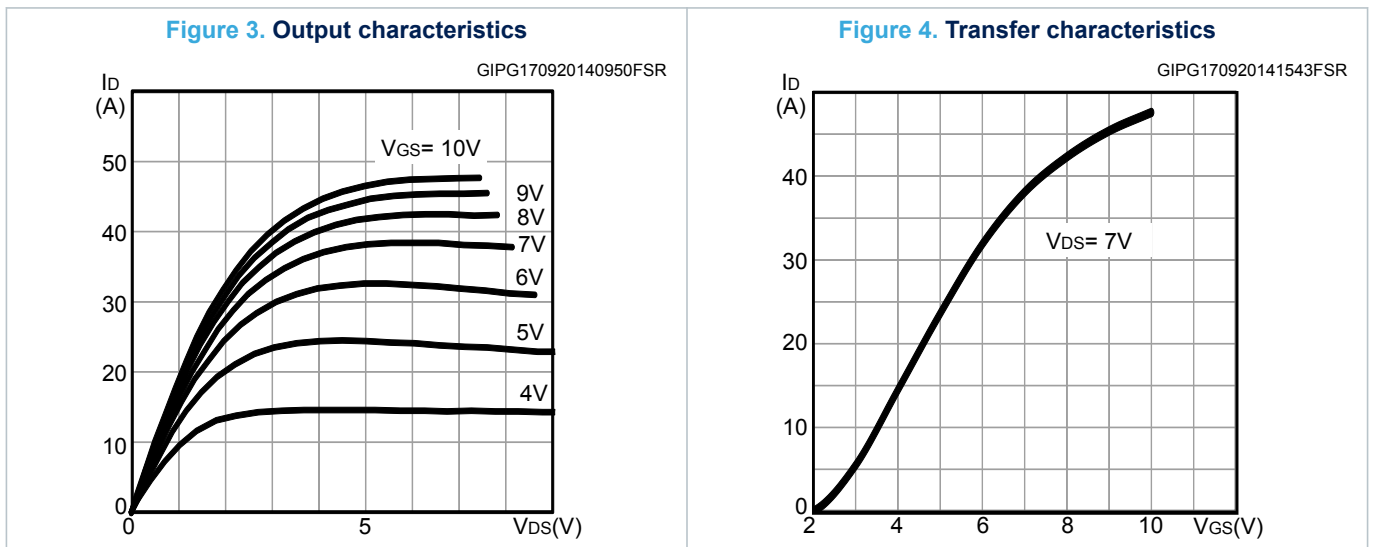
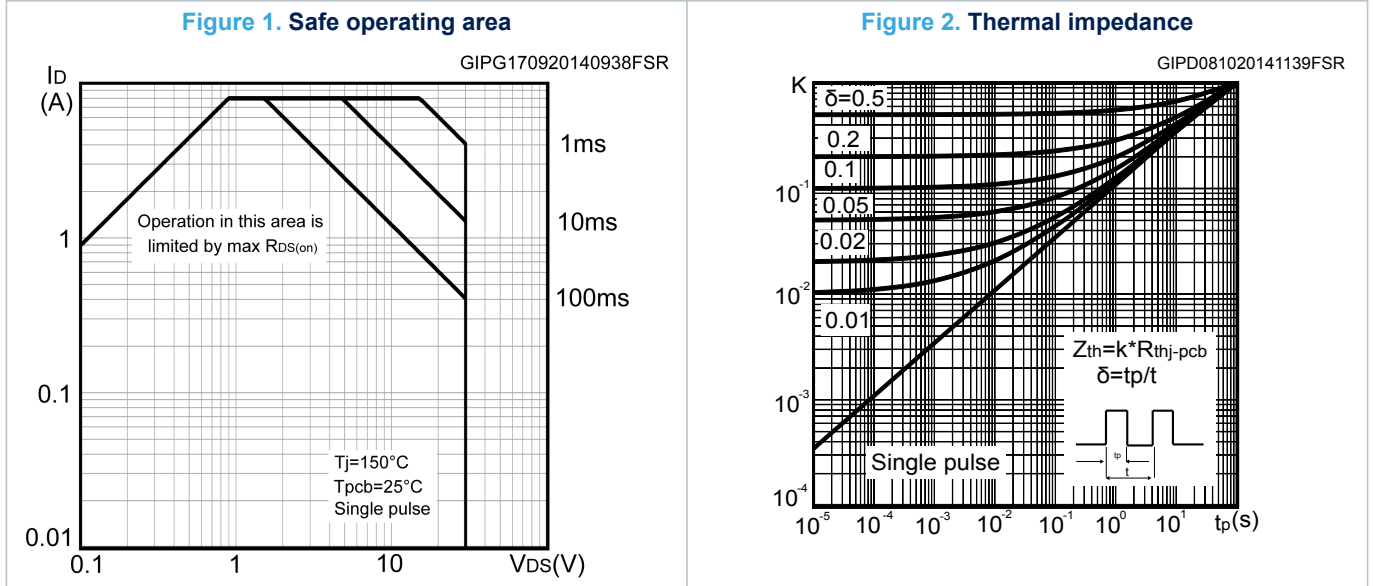


Figure 5. Gate charge vs gate-source voltage

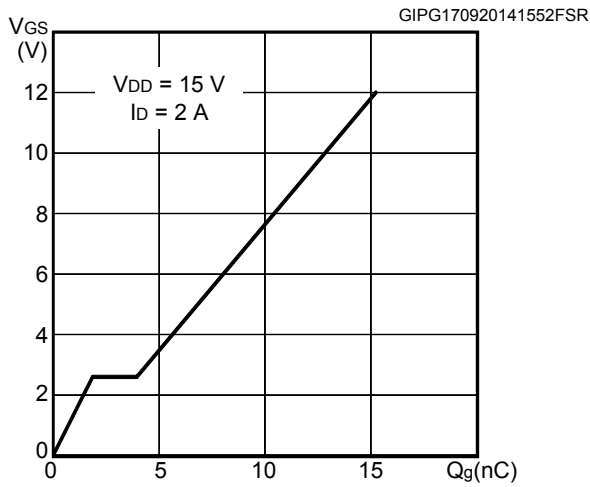


Figure 6. Static drain-source on-resistance

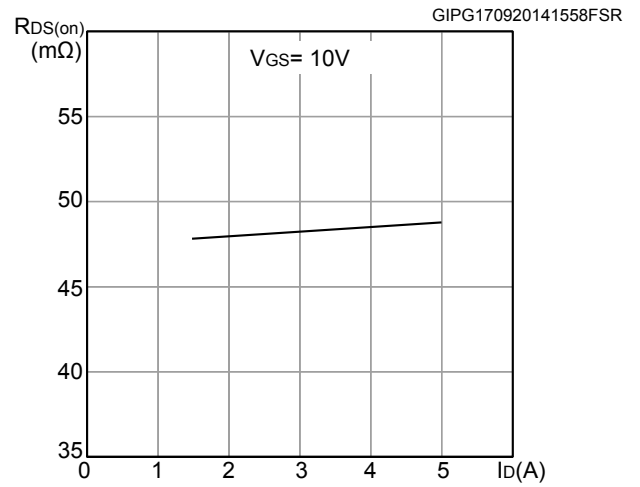


Figure 7. Normalized $V_{(BR)DSS}$ vs temperature

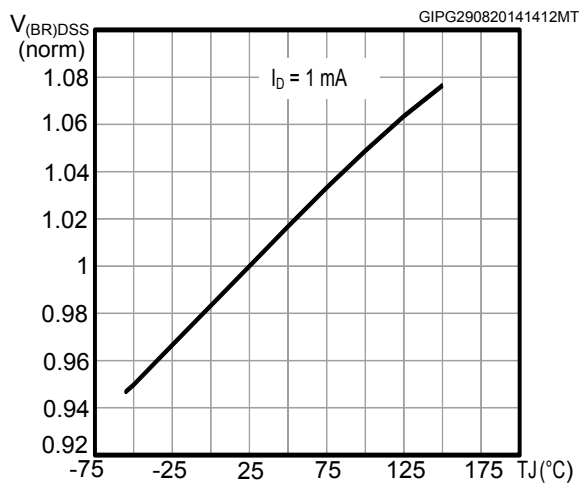


Figure 8. Capacitance variations

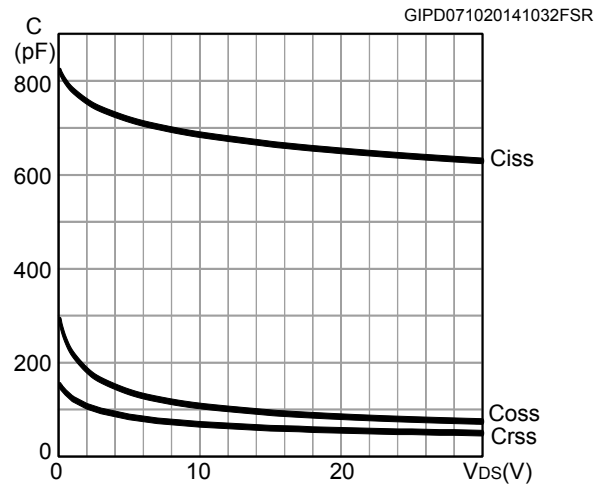


Figure 9. Normalized gate threshold voltage vs. temperature

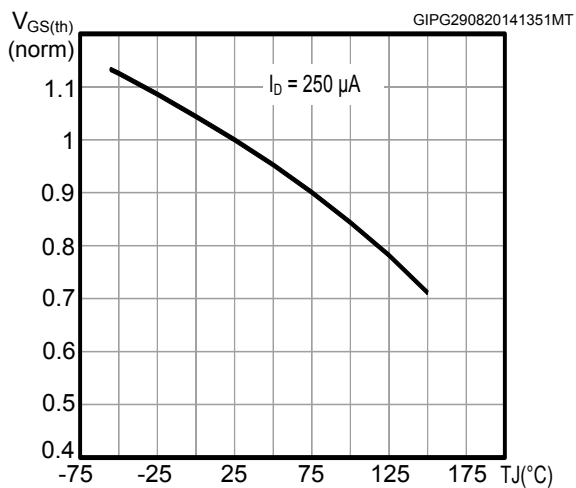


Figure 10. Normalized on-resistance vs. temperature

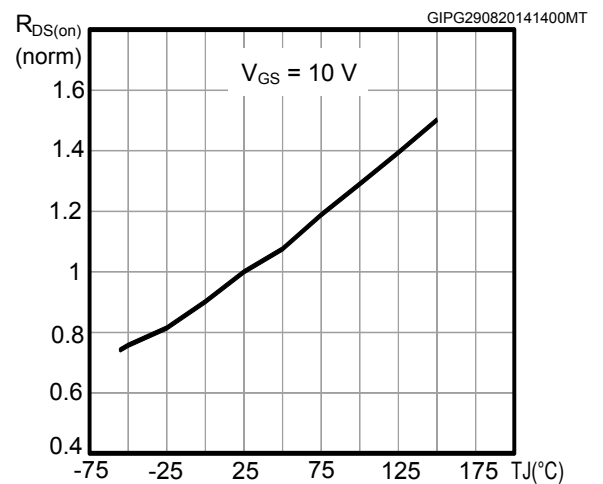
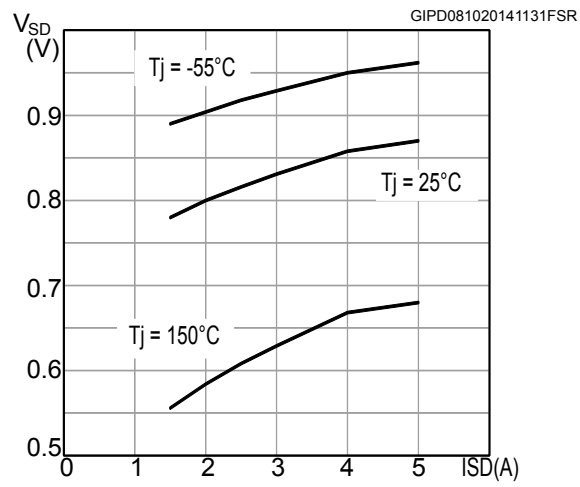
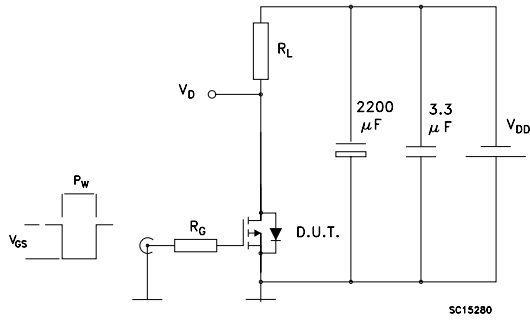
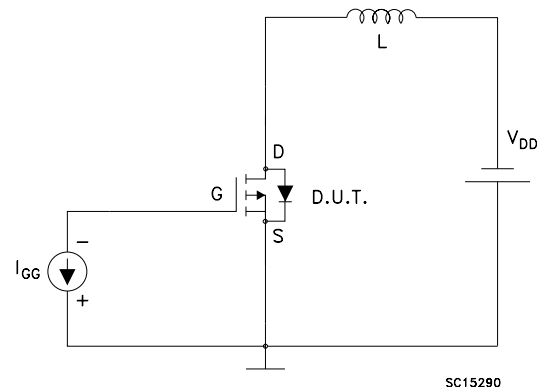
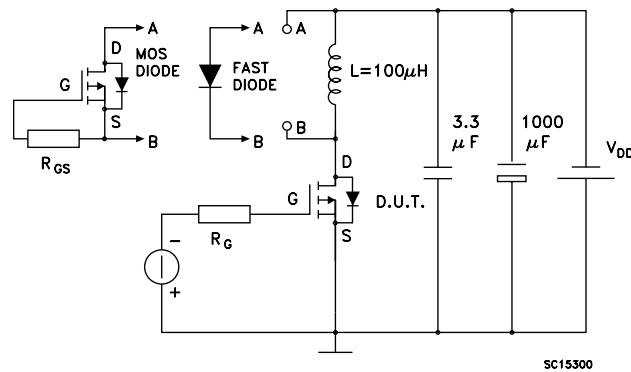


Figure 11. Source-drain diode forward characteristics



3 Test circuits

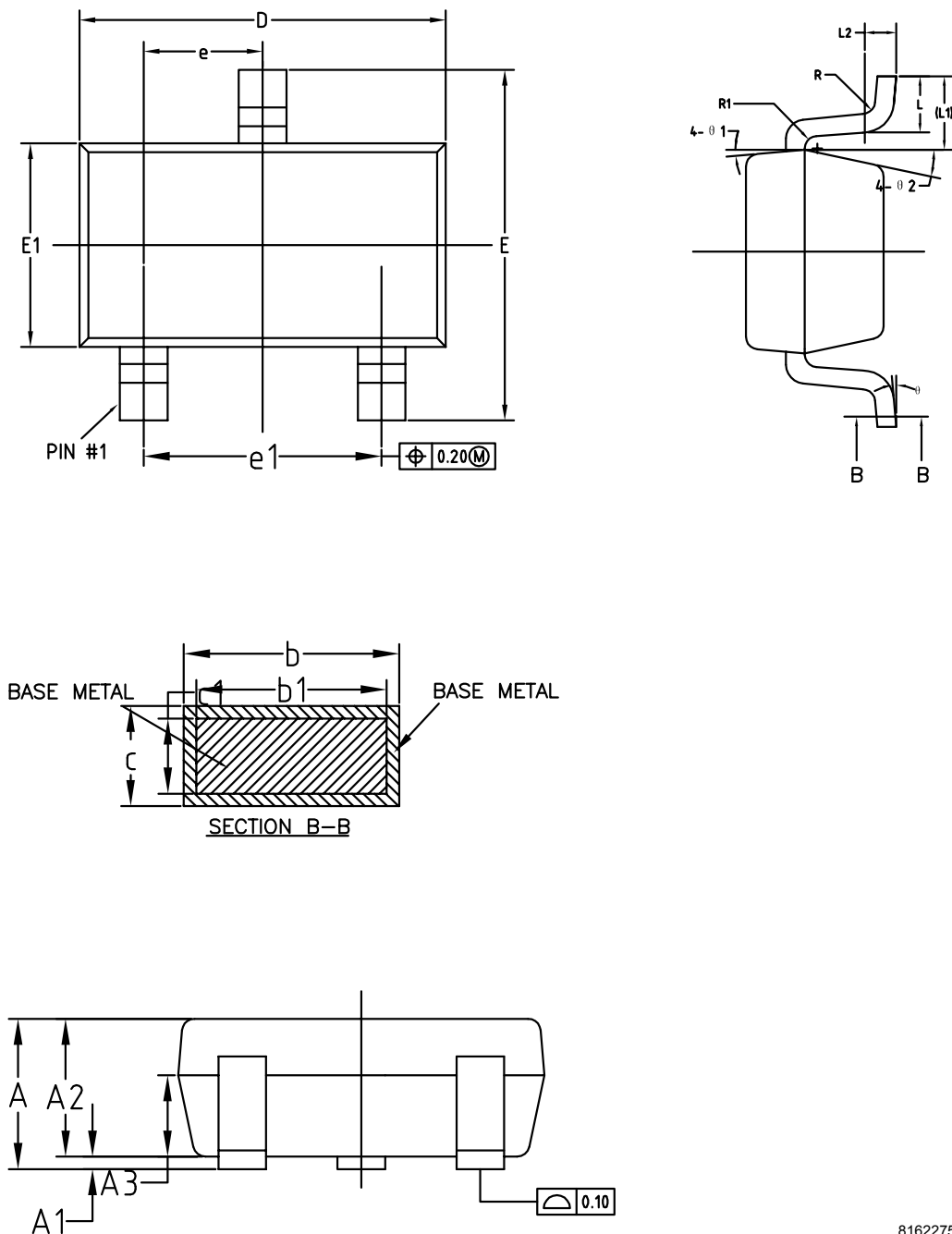
Figure 12. Switching times test circuit for resistive load

Figure 13. Gate charge test circuit

Figure 14. Test circuit for inductive load switching and diode recovery times


4 Package information

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 SOT-23 package information

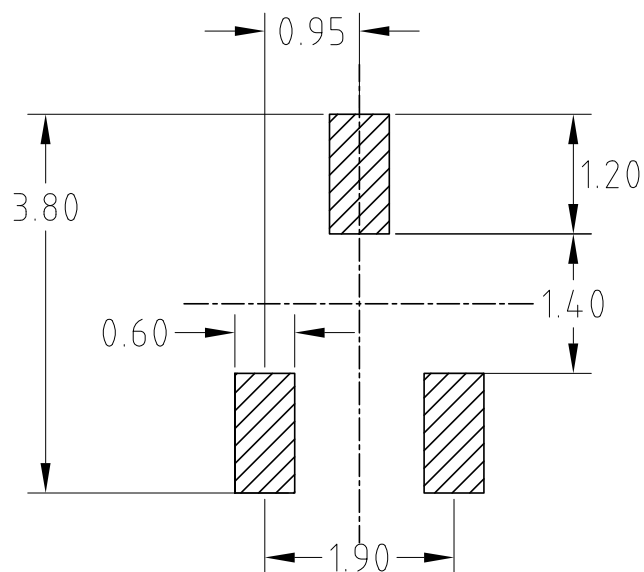
Figure 15. SOT-23 package outline



8162275_998G_3

Table 7. SOT-23 package mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A			1.25
A1	0.00		0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.36		0.50
b1	0.36	0.38	0.45
c	0.14		0.20
c1	0.14	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.59 REF		
L2	0.25 BSC		
R	0.05		
R1	0.05		
θ	0°		8°
θ_1	3°	5°	7°
θ_2	6°		14°

Figure 16. SOT-23 recommended footprint (dimensions are in mm)


Revision history

Table 8. Document revision history

Date	Revision	Changes
09-May-2013	1	Initial release.
03-Nov-2014	2	Document status promoted from preliminary to production data. Added Section 2.1: "Electrical characteristics (curves)". Minor text changes.
05-Nov-2015	3	Updated title and features in cover page. Updated <i>Table 2: "Absolute maximum ratings"</i> , <i>Table 4: "On /off states"</i> , <i>Table 5: "Dynamic"</i> , <i>Table 6: "Switching times"</i> , <i>Table 7: "Source drain diode"</i> and <i>Section 2.1: "Electrical characteristics (curves)"</i> . Minor text changes.
21-Feb-2018	4	Removed maturity status indication from cover page. The document status is production data. Updated Section 4.1 SOT-23 package information . Minor text changes.

Contents

1	Electrical ratings	2
2	Electrical characteristics	3
2.1	Electrical characteristics (curves)	5
3	Test circuits	8
4	Package information	9
4.1	SOT-23 package information	9
	Revision history	11
	Contents	12
	Disclaimer	13

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