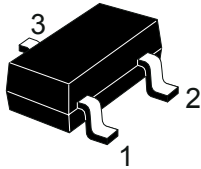
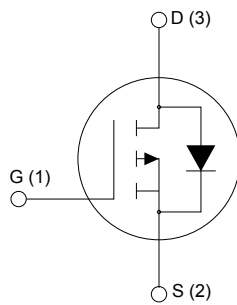


## P-channel -30 V, 48 mΩ typ., -2 A STripFET™ H6 Power MOSFET in a SOT-23 package



SOT-23



PG1D3S2


**Product status**

STR2P3LLH6

**Product summary**

<b>Order code</b>	STR2P3LLH6
<b>Marking</b>	2K3L
<b>Package</b>	SOT-23
<b>Packing</b>	Tape and reel

### Features

Order code	V <sub>DS</sub>	R <sub>DS(on)</sub> max.	I <sub>D</sub>
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<sub>DS(on)</sub> in all packages.

# 1 Electrical ratings

**Table 1. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-source voltage	-30	V
$V_{GS}$	Gate-source voltage	$\pm 20$	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 1inch<sup>2</sup>, 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	$V_{GS} = 0\text{ V}, V_{DS} = -30\text{ V}^{(1)}$			-1	$\mu\text{A}$
$I_{GSS}$	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	$\text{m}\Omega$

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 $\mu\text{s}$ , duty cycle 1.5%

## 2.1 Electrical characteristics (curves)

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

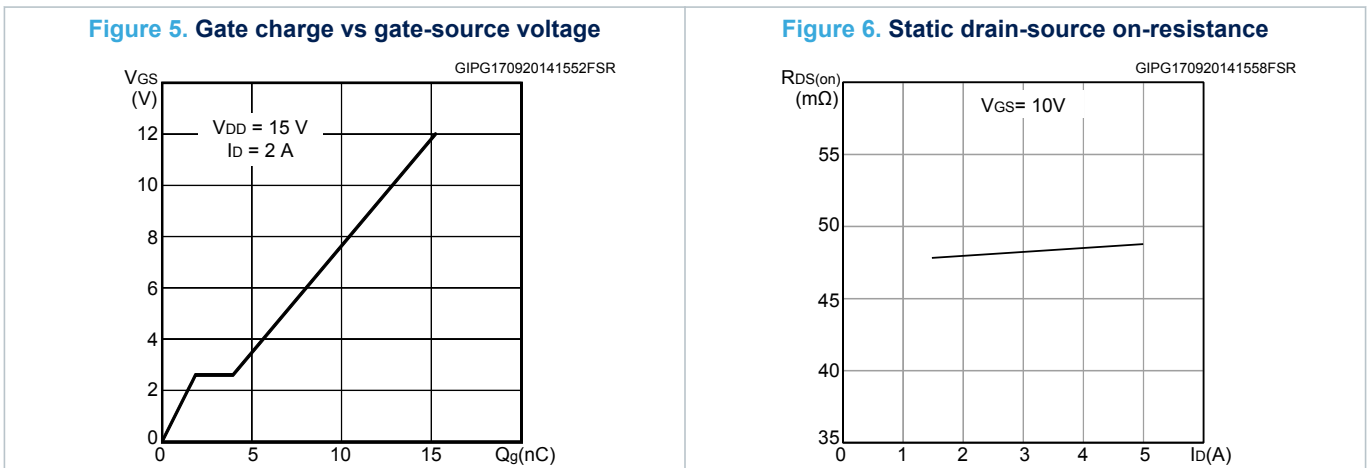
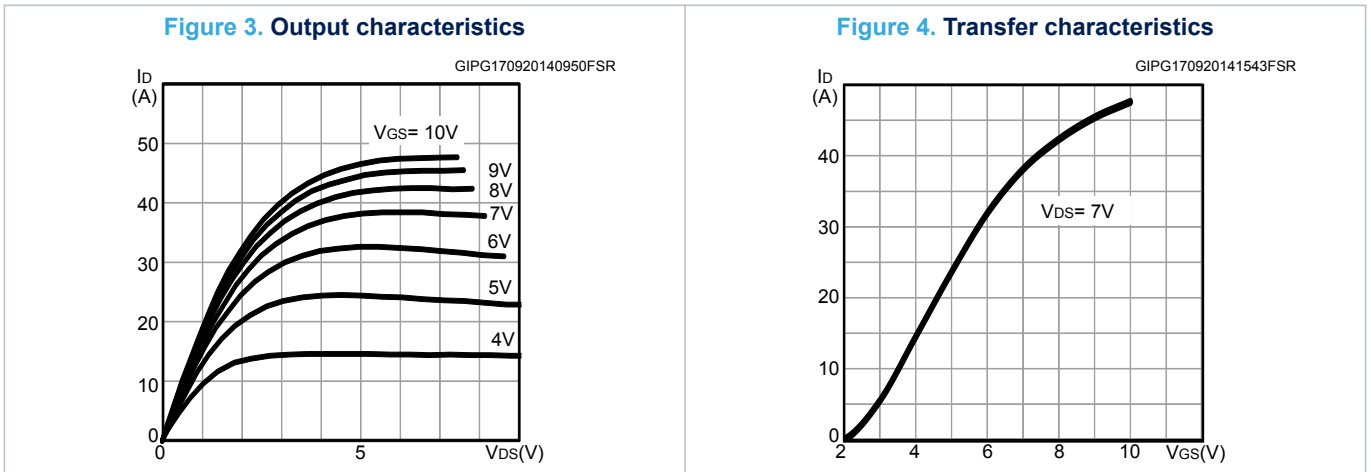
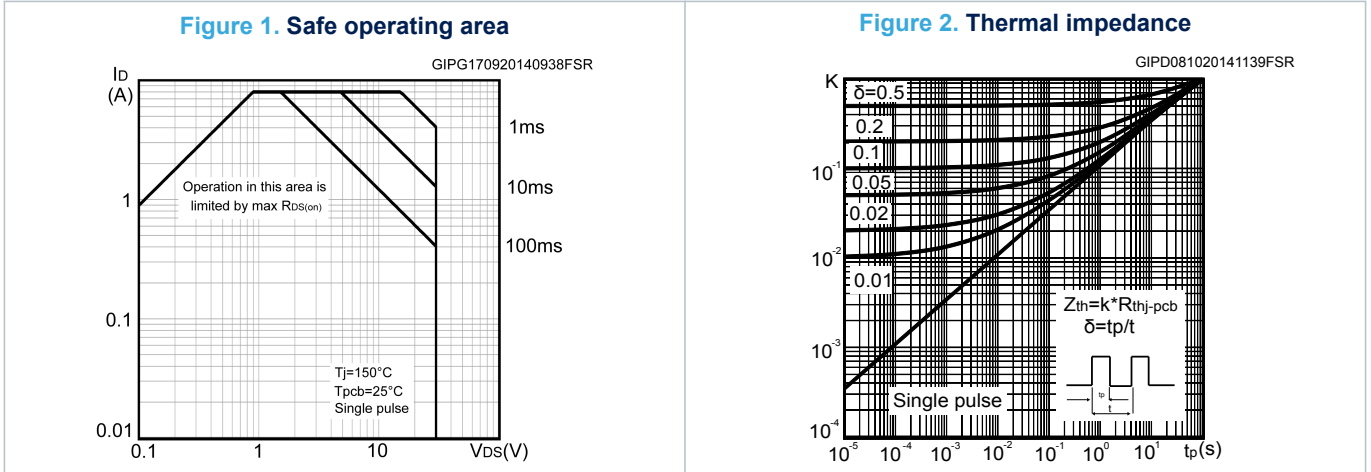


Figure 7. Normalized  $V_{(BR)DSS}$  vs temperature

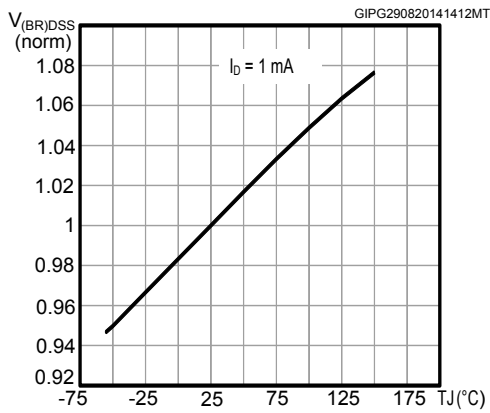


Figure 8. Capacitance variations

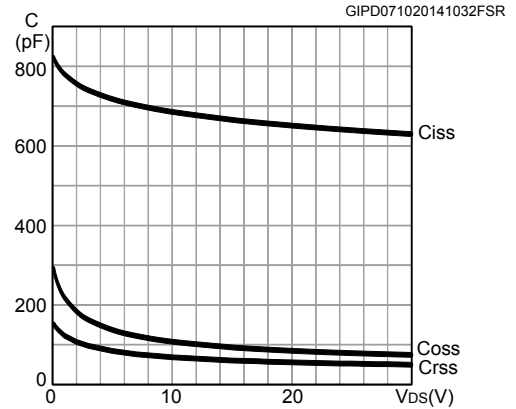


Figure 9. Normalized gate threshold voltage vs. temperature

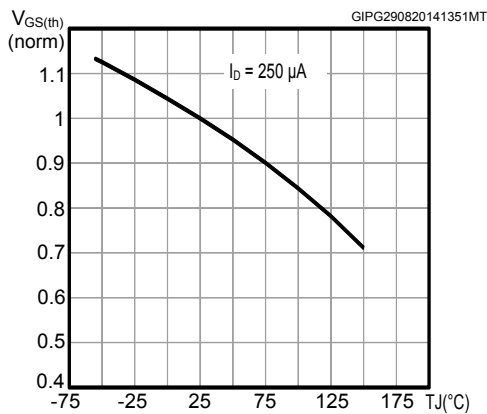


Figure 10. Normalized on-resistance vs. temperature

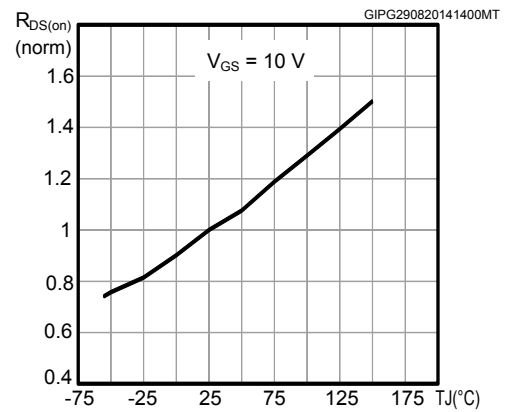
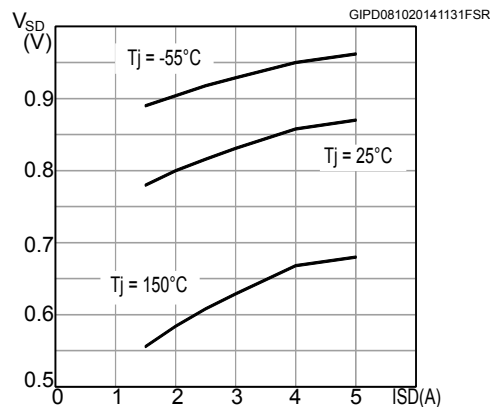
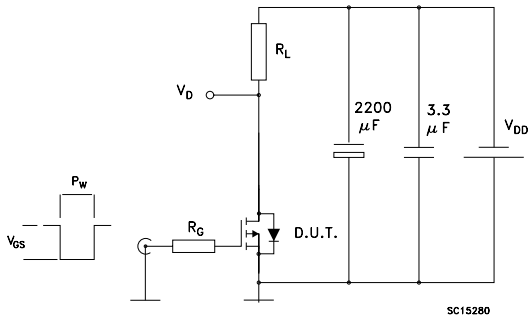


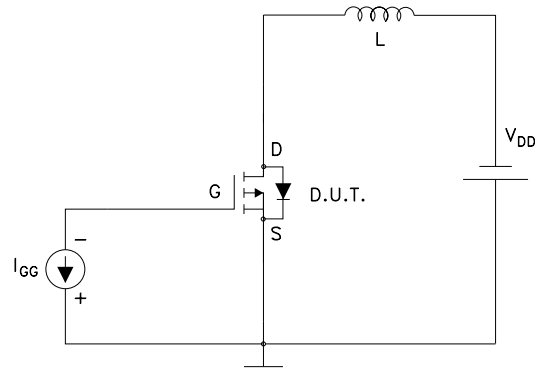
Figure 11. Source-drain diode forward characteristics



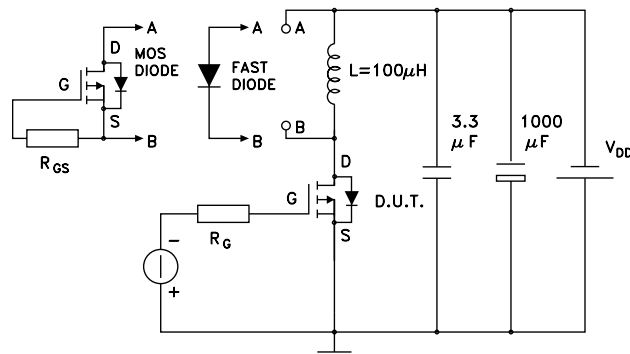
### 3 Test circuits

**Figure 12. Switching times test circuit for resistive load**


SC15280

**Figure 13. Gate charge test circuit**


SC15290

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


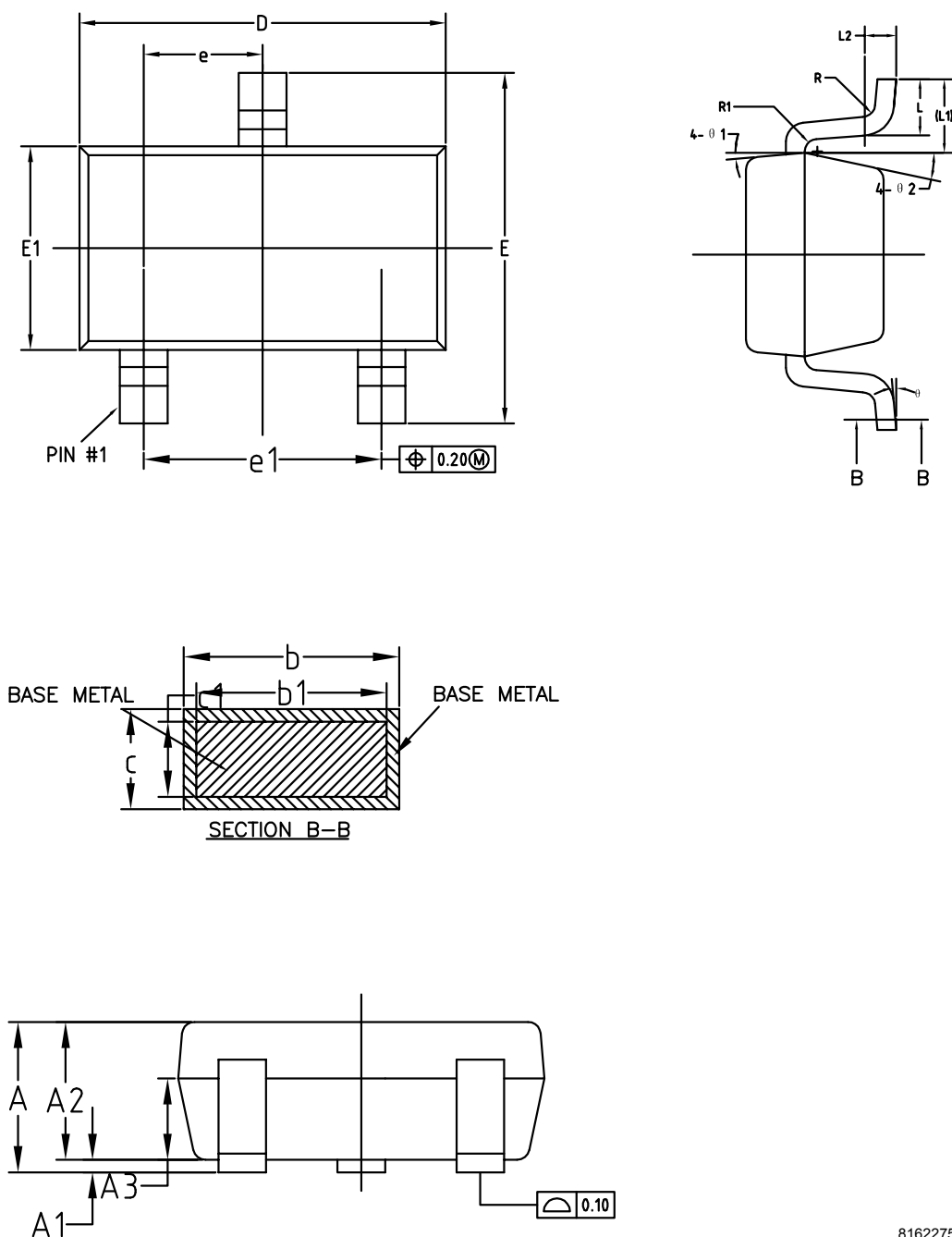
SC15300

## 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](http://www.st.com). ECOPACK is an ST trademark.

### 4.1 SOT-23 package information

Figure 15. SOT-23 package outline

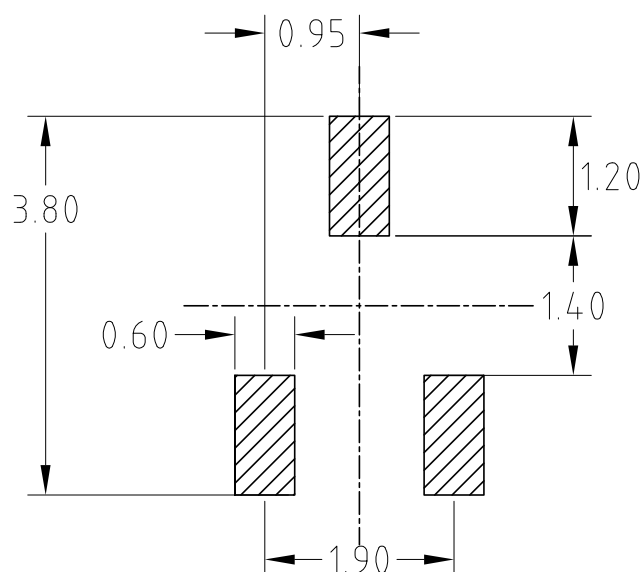


8162275\_998G\_3



**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		
$\theta$	0°		8°
$\theta_1$	3°	5°	7°
$\theta_2$	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 <i>Section 4.1 SOT-23 package information</i> . Minor text changes.
26-Mar-2019	5	Updated <a href="#">Table 3. On /off states</a> . Minor text changes.

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