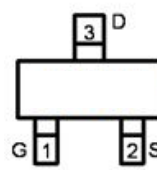


### Main Product Characteristics:

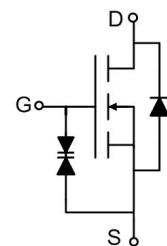
$V_{DSS}$	30V
$R_{DS(on)}$	1ohm(typ.)
$I_D$	0.5A <sup>①</sup>



SOT23



Marking and pin  
Assignment



Schematic diagram

### Features and Benefits:

- Advanced trench MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150°C operating temperature
- ESD Protected, HBM 1KV



### Description:

It utilizes the latest trench processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching applications and a wide variety of other applications.

### Absolute max Rating:

Symbol	Parameter	Max.	Units
$I_D @ TC = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	0.5 <sup>①</sup>	A
$I_D @ TC = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	0.3 <sup>①</sup>	
$I_{DM}$	Pulsed Drain Current <sup>②</sup>	3	
$P_D @ TC = 25^\circ C$	Power Dissipation	0.7	W
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$T_J$	Operating Junction	-55 to + 150	°C
$T_{STG}$	Storage Temperature Range		

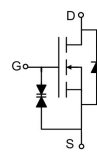
### Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-ambient ( $t \leq 10s$ ) <sup>③</sup>	—	180	°C/W

**Electrical Characterizes @ $T_A=25^{\circ}\text{C}$  unless otherwise specified**

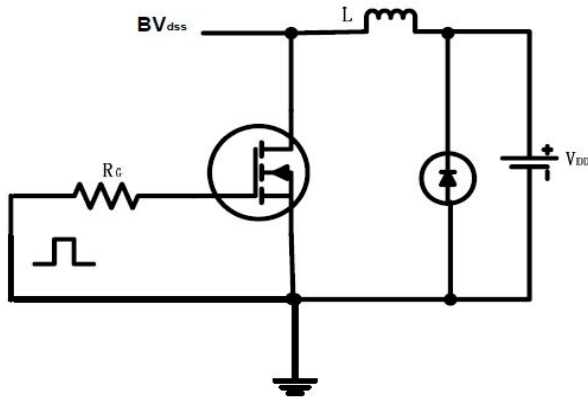
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	1	1.5	$\Omega$	$V_{GS}=4.5V, I_D = 0.2A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	2	3	$\Omega$	$V_{GS}=2.5V, I_D=0.2A$
$V_{GS(th)}$	Gate threshold voltage	0.7	—	1.4	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
		—	0.63	—		$T_J = 125^{\circ}\text{C}$
$I_{DSS}$	Drain-to-Source leakage current	—	—	1	$\mu A$	$V_{DS} = 30V, V_{GS} = 0V$
		—	—	50		$T_J = 125^{\circ}\text{C}$
$I_{GSS}$	Gate-to-Source forward leakage	—	—	10	$\mu A$	$V_{GS} = 20V$
		—	—	-10		$V_{GS} = -20V$
$Q_g$	Total gate charge	—	1.15	—	nC	$I_D = 0.1A,$ $V_{DS}=20V,$ $V_{GS} = 4.5V$
$Q_{gs}$	Gate-to-Source charge	—	0.35	—		
$Q_{gd}$	Gate-to-Drain("Miller") charge	—	0.25	—		
$t_{d(on)}$	Turn-on delay time	—	15	—	ns	$V_{GS}=4.5V, V_{DS} = 5V,$ $R_{GEN}=50\Omega, I_D = 0.1A,$
$t_r$	Rise time	—	45	—		
$t_{d(off)}$	Turn-Off delay time	—	65	—		
$t_f$	Fall time	—	65	—		
$C_{iss}$	Input capacitance	—	20	—	pF	$V_{GS} = 0V,$ $V_{DS} = 15V,$ $f = 1\text{MHz}$
$C_{oss}$	Output capacitance	—	18	—		
$C_{riss}$	Reverse transfer capacitance	—	7	—		

**Source-Drain Ratings and Characteristics**

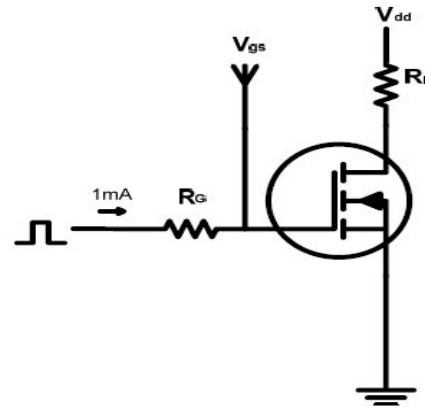
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	0.5 ①	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode)	—	—	3	A	
$V_{SD}$	Diode Forward Voltage	—	0.72	1.2	V	

## Test circuits and Waveforms

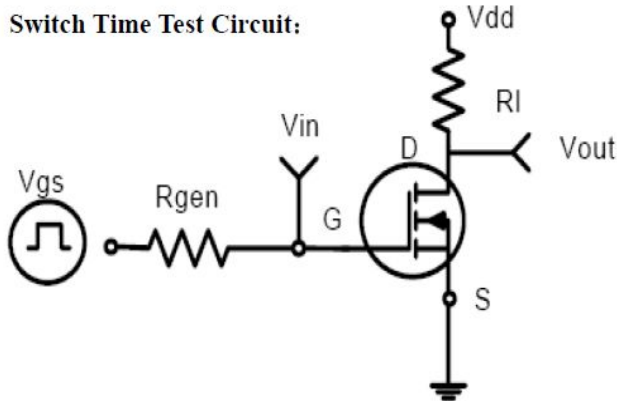
EAS test circuits:



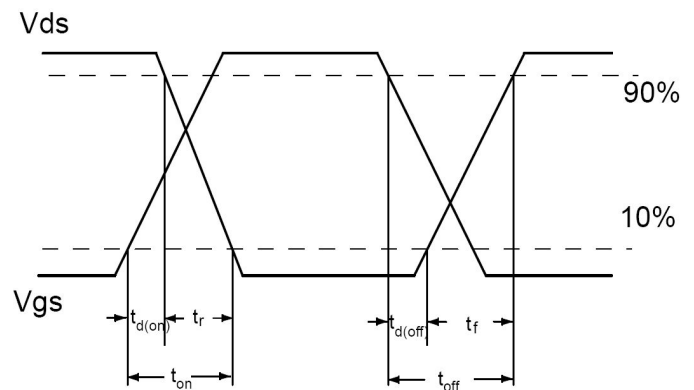
Gate charge test circuit:



Switch Time Test Circuit:



Switch Waveforms:



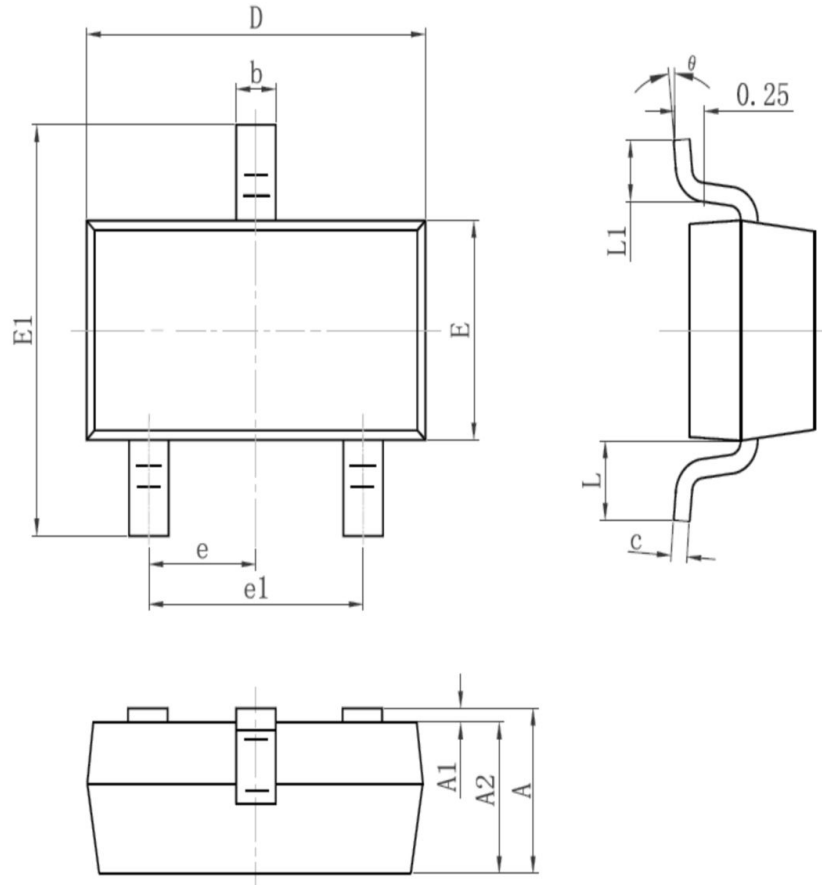
### Notes:

- ① Calculated continuous current based on maximum allowable junction temperature.
- ② Repetitive rating; pulse width limited by max junction temperature.
- ③ The value of  $R_{\theta JA}$  is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$
- ④ These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of  $T_{J(MAX)} = 150^\circ\text{C}$ .



**Mechanical Data:**

SOT-23 PACKAGE OUTLINE DIMENSION



Symbol	Dimension In Millimeters		Dimension In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.95TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.55REF		0.022REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

**Ordering and Marking Information**

**Device Marking: 3002**

**Package (Available)**  
**SOT-23**  
**Operating Temperature Range**  
**C : -55 to 150 °C**

**Devices per Unit**

<b>Package Type</b>	<b>Units/Tube</b>	<b>Tubes/Inner Box</b>	<b>Units/Inner Box</b>	<b>Inner Boxes/ Carton Box</b>	<b>Units/ Carton Box</b>
<b>SOT23</b>	<b>3000</b>	<b>10</b>	<b>30000</b>	<b>4</b>	<b>120000</b>

**Reliability Test Program**

<b>Test Item</b>	<b>Conditions</b>	<b>Duration</b>	<b>Sample Size</b>
<b>High Temperature Reverse Bias(HTRB)</b>	<b>T<sub>j</sub>= 150°C @ 80% of Max V<sub>DSS</sub>/V<sub>CES</sub>/V<sub>R</sub></b>	<b>168 hours 500 hours 1000 hours</b>	<b>3 lots x 77 devices</b>
<b>High Temperature Gate Bias(HTGB)</b>	<b>T<sub>j</sub>=150°C @ 100% of Max V<sub>GSS</sub></b>	<b>168 hours 500 hours 1000 hours</b>	<b>3 lots x 77 devices</b>

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