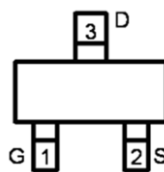
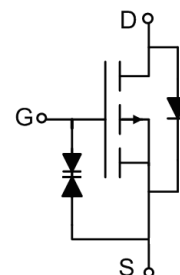


**Main Product Characteristics:**

$V_{DSS}$	-20V
$R_{DS(on)}$	31m $\Omega$ (typ.)
$I_D$	-4A ①


**SOT-23**

**Pin Assignments**

**Schematic Diagram**
**Features and Benefits:**

- Advanced 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


**Description:**

It utilizes the latest 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 application and a wide variety of other applications.

**Absolute Max Rating: @ $T_A=25^\circ\text{C}$  unless otherwise specified**

Symbol	Parameter	Max.	Units
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ①	-4	A
$I_D @ T_C = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ①	-2.4	
$I_{DM}$	Pulsed Drain Current ②	-30	
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation ③	1.4	W
$V_{DS}$	Drain-Source Voltage	-20	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 8$	V
$T_J \quad T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

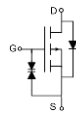
**Thermal Resistance**

Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-ambient ( $t \leq 10\text{s}$ ) ④	—	90	$^\circ\text{C} / \text{W}$

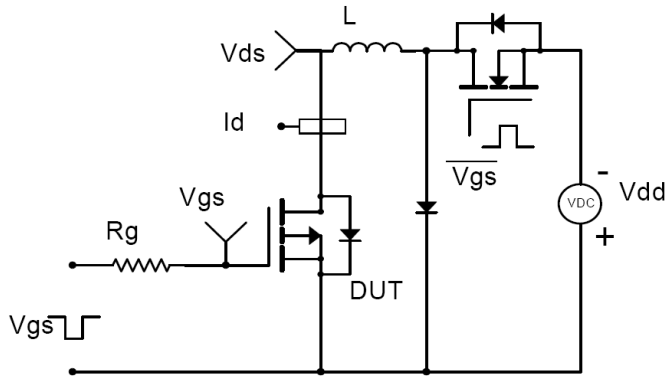
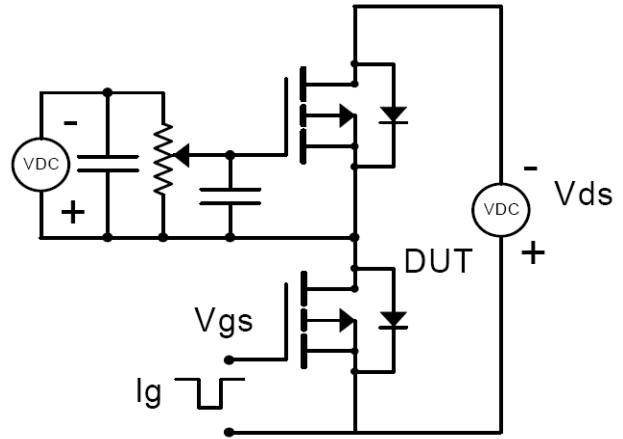
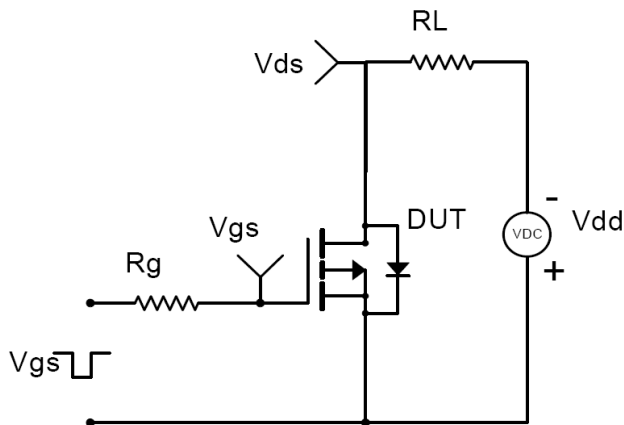
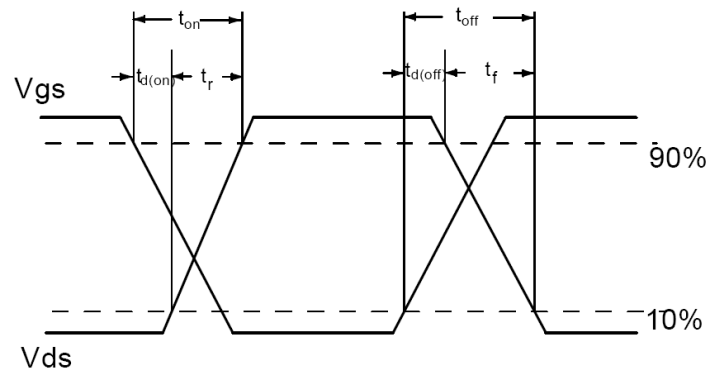
**Electrical Characterizes @ $T_A=25^{\circ}\text{C}$  unless otherwise specified**

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	-20	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	31	38	m $\Omega$	$V_{GS}=-4.5V, I_D = -4A$
		—	37	48		$V_{GS}=-2.5V, I_D = -4A$
$V_{GS(th)}$	Gate threshold voltage	-0.3	—	-0.9	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
$I_{DSS}$	Drain-to-Source leakage current	—	—	-1	$\mu A$	$V_{DS} = -20V, V_{GS} = 0V$
$I_{GSS}$	Gate-to-Source forward leakage	—	—	10	$\mu A$	$V_{GS} = 8V$
		—	—	-10		$V_{GS} = -8V$
$Q_g$	Total gate charge	—	9.8	—	nC	$I_D = -4A,$ $V_{DS}=-10V,$ $V_{GS} = -4.5V$
$Q_{gs}$	Gate-to-Source charge	—	0.72	—		
$Q_{gd}$	Gate-to-Drain("Miller") charge	—	3.3	—		
$t_{d(on)}$	Turn-on delay time	—	9.7	—	ns	$V_{GS}=-4.5V,$ $V_{DS} = -10V,$ $R_{GEN}=3\Omega,$
$t_r$	Rise time	—	8.4	—		
$t_{d(off)}$	Turn-Off delay time	—	27	—		
$t_f$	Fall time	—	12	—		
$C_{iss}$	Input capacitance	—	837	—	pF	$V_{GS} = 0V,$ $V_{DS} = -10V,$ $f = 1\text{MHz}$
$C_{oss}$	Output capacitance	—	117	—		
$C_{rss}$	Reverse transfer capacitance	—	86	—		

**Source-Drain Ratings and Characteristics**

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode) ①	—	—	-4	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode)	—	—	-30	A	
$V_{SD}$	Diode Forward Voltage	—	-0.76	-1.0	V	$I_S=-1A, V_{GS}=0V$
$t_{rr}$	Reverse Recovery Time	—	8.7	—	ns	$T_J = 25^{\circ}\text{C}, I_F = -4A,$
$Q_{rr}$	Reverse Recovery Charge	—	2.3	—	nC	$di/dt = 100A/\mu s$

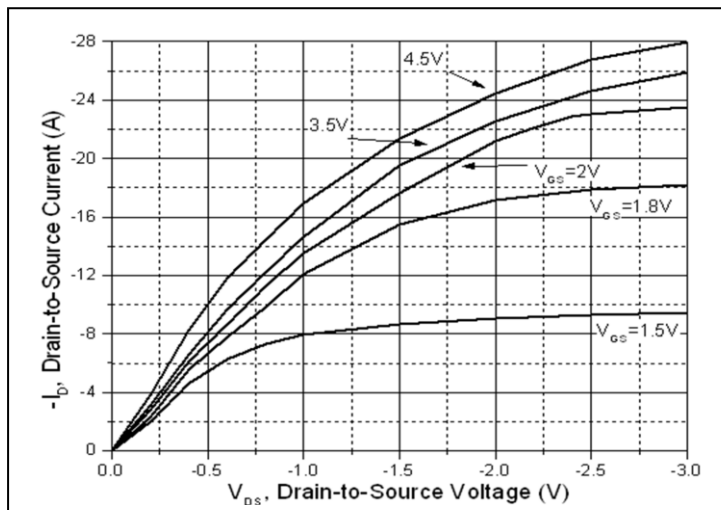
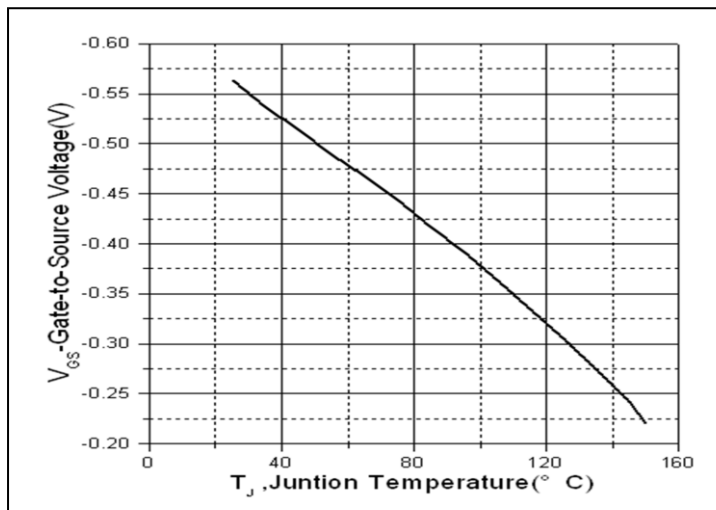
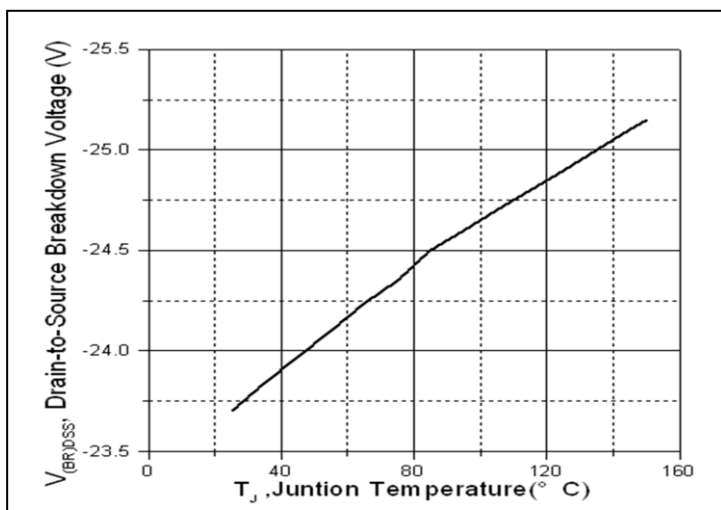
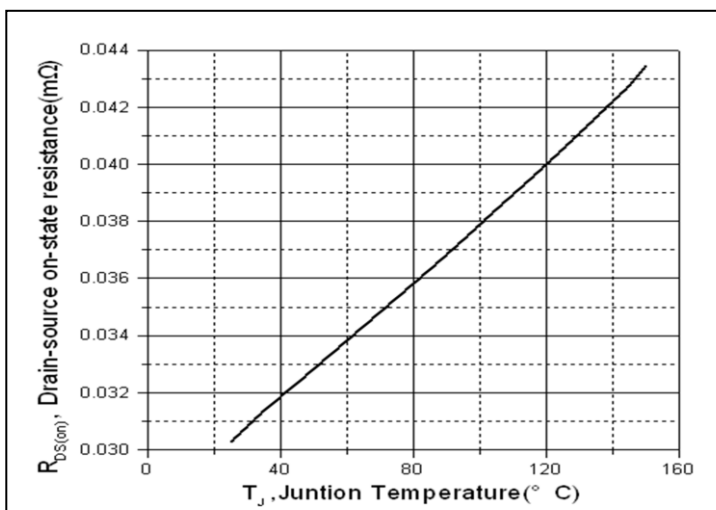
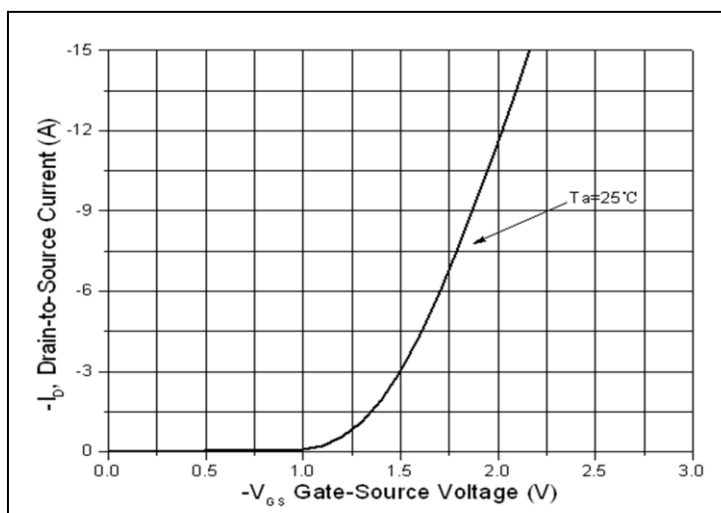
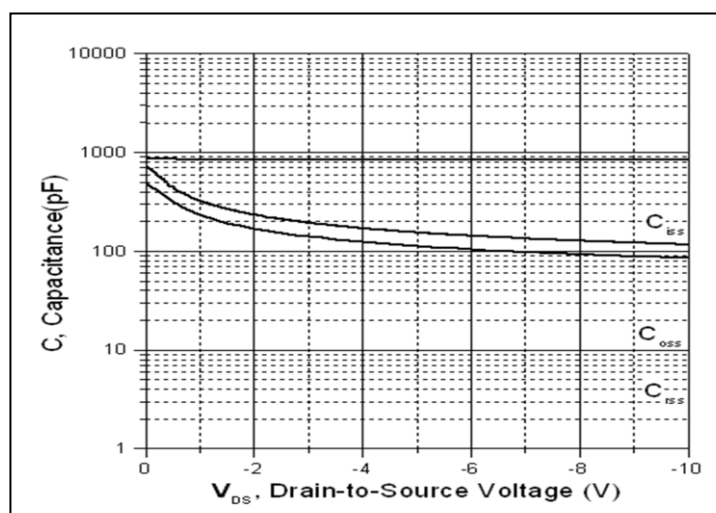
## Test Circuits and Waveforms

**EAS Test Circuit:**

**Gate Charge Test Circuit:**

**Switching 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 power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.
- ④ The value of R<sub>θJA</sub> is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub> = 25°C

### Typical Electrical and Thermal Characteristics


**Figure1. Typical Output Characteristics**

**Figure2.  $V_{th}$  vs. Junction Temperature**

**Figure3. Drain-to-Source Breakdown Voltage vs. Junction Temperature**

**Figure4.  $R_{DS(on)}$  vs. Junction Temperature**

**Figure5. Transfer Characteristics**

**Figure6. Capacitance**

Typical Electrical and Thermal Characteristics

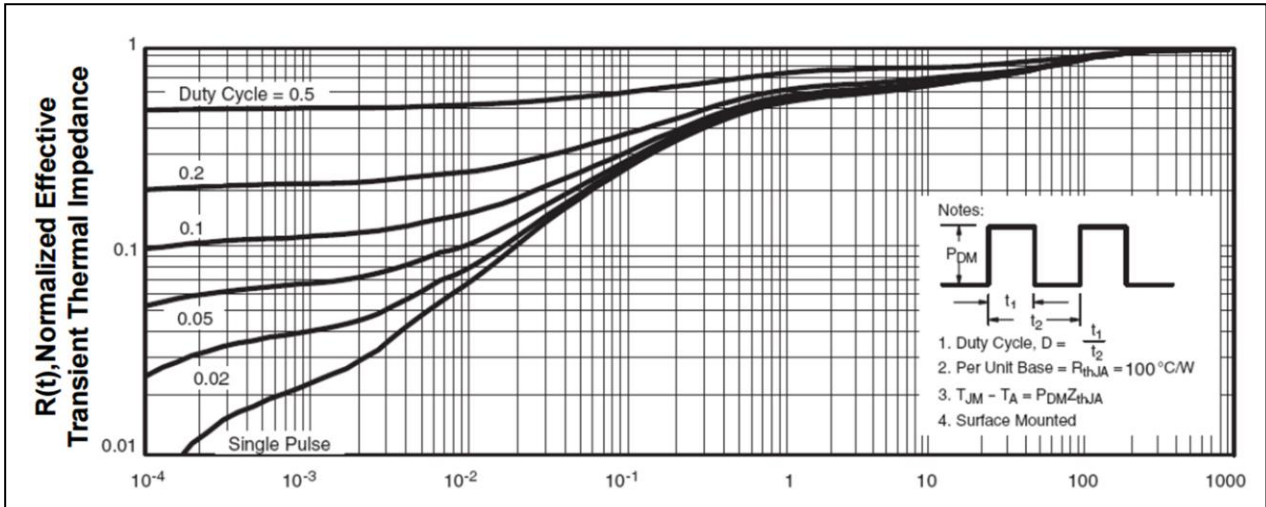
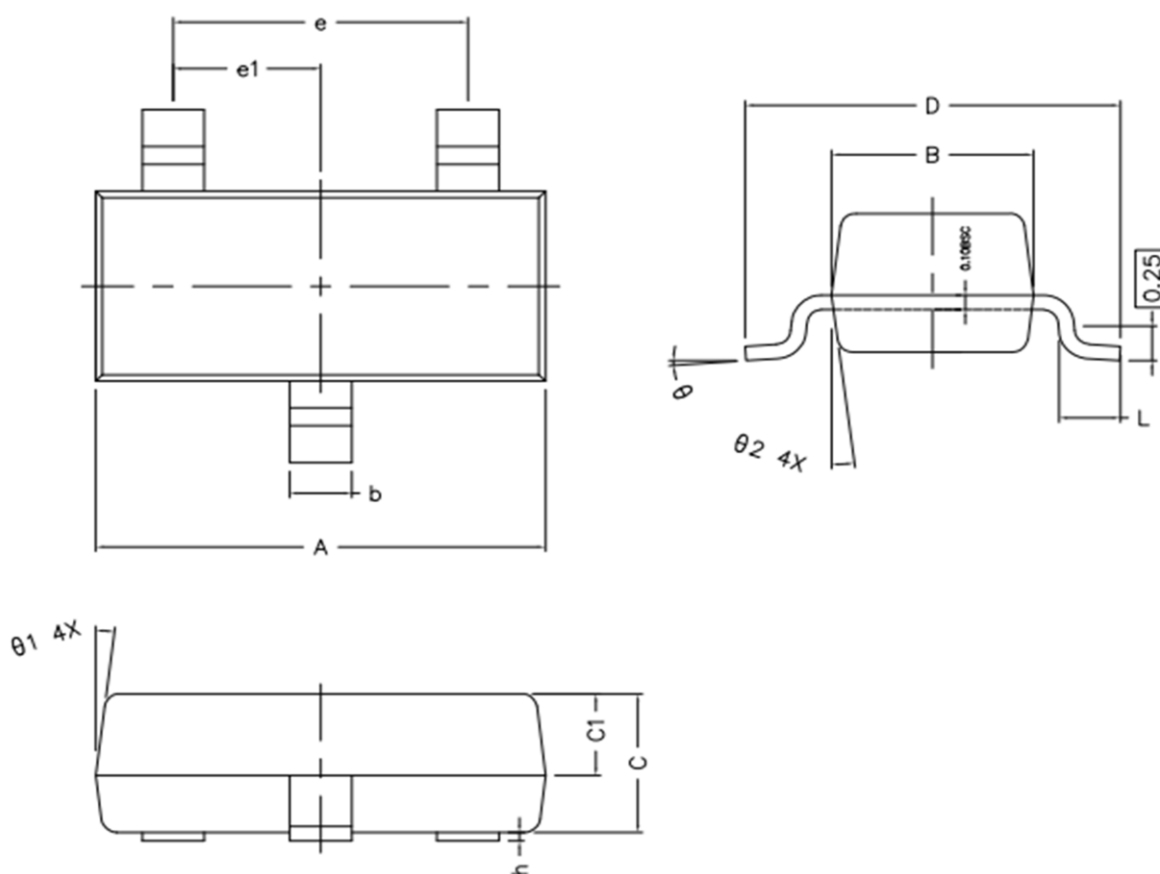


Figure7. Normalized Maximum Transient Thermal Impedance

**Mechanical Data:**


COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A	2.800	2.900	3.000
B	1.200	1.300	1.400
C	0.900	1.000	1.100
C1	0.500	0.550	0.600
D	2.300	2.400	2.500
L	0.300	0.400	0.500
h	0.010	0.050	0.100
b	0.350	0.400	0.450
e	1.90 TYPE		
e1	0.95 TYPE		
$\theta_1$	7° TYPE		
$\theta_2$	7° TYPE		
$\theta$	0° ~ 7°		

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