

## P-Channel Enhancement Mode Power MOSFET

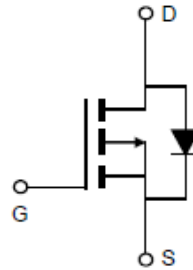
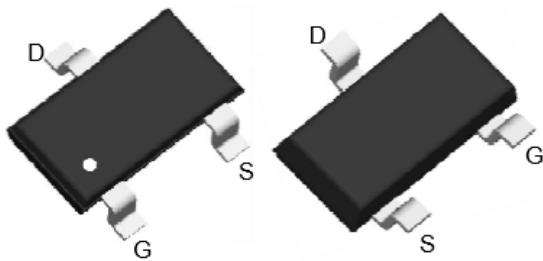
- **Features**

$V_{DS} = -30V,$   
 $I_D = -4A$   
 $R_{DS(ON)} @ V_{GS} = -10V, TYP 46m\Omega$   
 $R_{DS(ON)} @ V_{GS} = -4.5V, TYP 50m\Omega$   
 $R_{DS(ON)} @ V_{GS} = -2.5V, TYP 63m\Omega$

- **General Description**

- Load Switch
- PWM

- **Pin Configurations**



**SOT23-3L**

- **Absolute Maximum Ratings @ $T_A=25^\circ C$  unless otherwise noted**

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		$V_{DSS}$	-30	V
Gate-Source Voltage		$V_{GSS}$	$\pm 12$	V
Drain Current (Continuous) *AC	$T_A=25^\circ C$	$I_D$	-4	A
	$T_A=70^\circ C$		-3.2	
Drain Current (Pulse) *B		$I_{DM}$	-15	A
Power Dissipation	$T_A=25^\circ C$	$P_D$	1.25	W
Operating Temperature/ Storage Temperature		$T_J/T_{STG}$	-55~150	$^\circ C$

- **Thermal Resistance Ratings**

Parameter		Symbol	Maximum	Unit
Maximum Junction-to-Ambient	$t \leq 5S$	$R_{thJA}$	100	$^\circ C/W$

● **Electrical Characteristics** @ $T_A=25^{\circ}\text{C}$  unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-30	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -30V, V_{GS} = 0V$	--	--	-1	$\mu A$
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_{DS} = -250\mu A$	-0.5	-0.9	-1.5	V
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 12V, V_{DS} = 0V$	--	--	$\pm 100$	nA
Drain-Source On-state Resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -4A$	--	46	63	m $\Omega$
	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -3.5A$	--	50	75	m $\Omega$
	$R_{DS(on)}$	$V_{GS} = -2.5V, I_D = -1A$	--	63	120	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS} = -5V, I_D = -3A$	4	--	--	S
Diode Forward Voltage	$V_{SD}$	$I_{SD} = -1A, V_{GS} = 0V$	--	--	-1.2	V
Diode Forward Current	$I_S$	$T_A = 25^{\circ}\text{C}$	--	--	-2	A
<b>Switching</b>						
Total Gate Charge	$Q_g$	$V_{GS} = -4.5V, V_{DS} = -15V, I_D = -4A$	--	9	--	nC
Gate-Source Charge	$Q_{gs}$		--	1	--	nC
Gate-Drain Charge	$Q_{gd}$		--	3	--	nC
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = -15V, R_G = 6\Omega, I_D = -4A, V_{GS} = -10V$	--	9	--	ns
Turn-on Rise Time	$t_r$		--	3	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	66	--	ns
Turn-Off Fall Time	$t_f$		--	16	--	ns
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V, V_{DS} = -15V, f = 1.0\text{MHz}$	--	945	--	pF
Output Capacitance	$C_{oss}$		--	120	--	pF
Reverse Transfer Capacitance	$C_{rss}$		--	80	--	pF

A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^{\circ}\text{C}$ . The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the  $\leq 10\text{s}$  junction to ambient thermal resistance rating.

● Typical Performance Characteristics ((T<sub>J</sub> = 25 °C, unless otherwise noted))

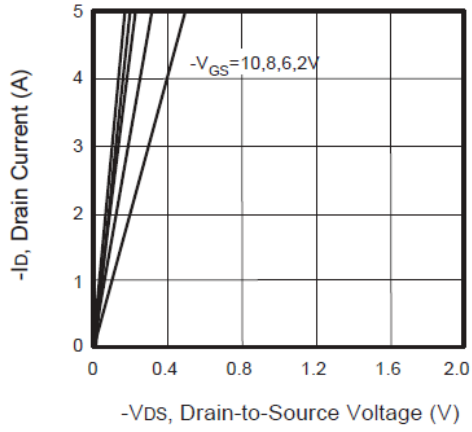


Figure 1. Output Characteristics

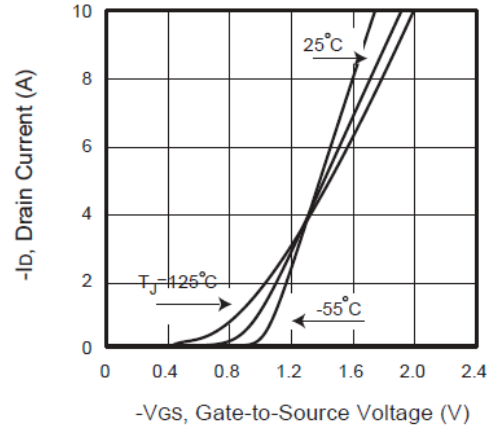


Figure 2. Transfer Characteristics

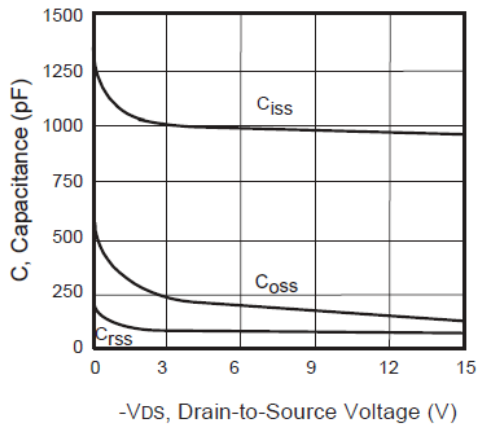


Figure 3. Capacitance

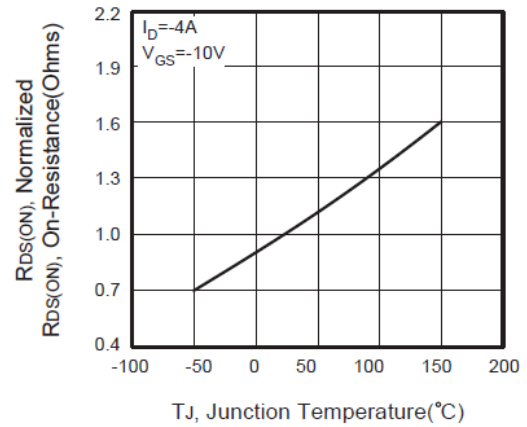


Figure 4. On-Resistance Variation with Temperature

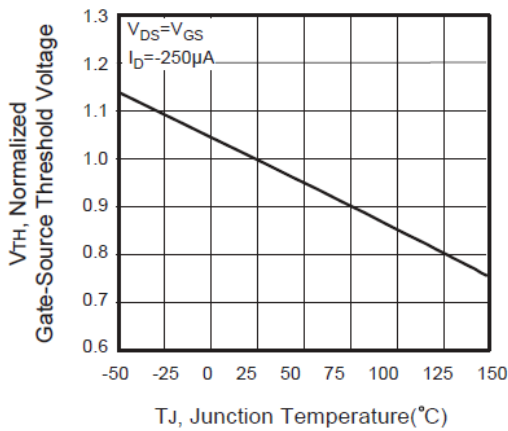


Figure 5. Gate Threshold Variation with Temperature

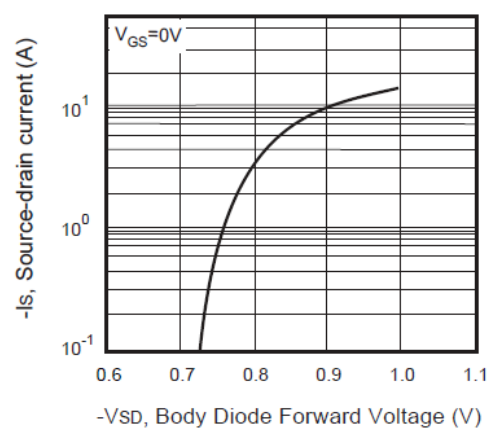


Figure 6. Body Diode Forward Voltage Variation with Source Current

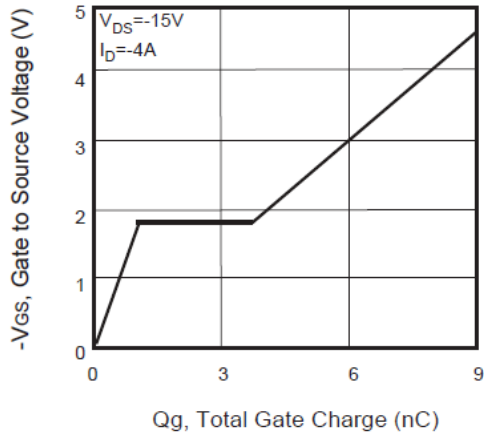


Figure 7. Gate Charge

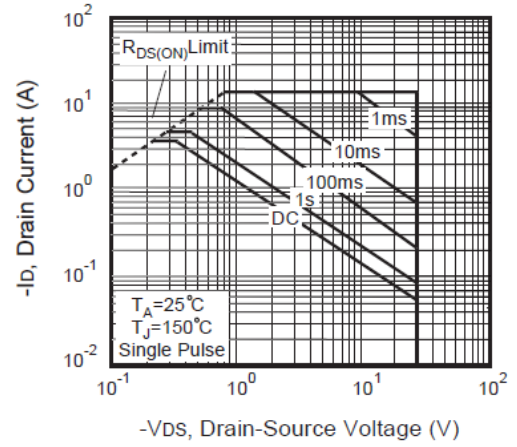


Figure 8. Maximum Safe Operating Area

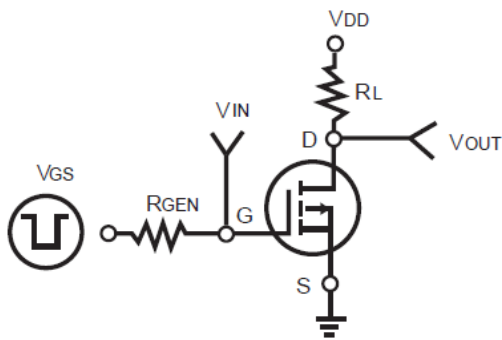


Figure 9. Switching Test Circuit

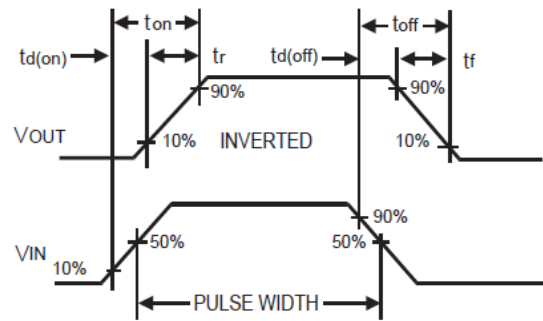


Figure 10. Switching Waveforms

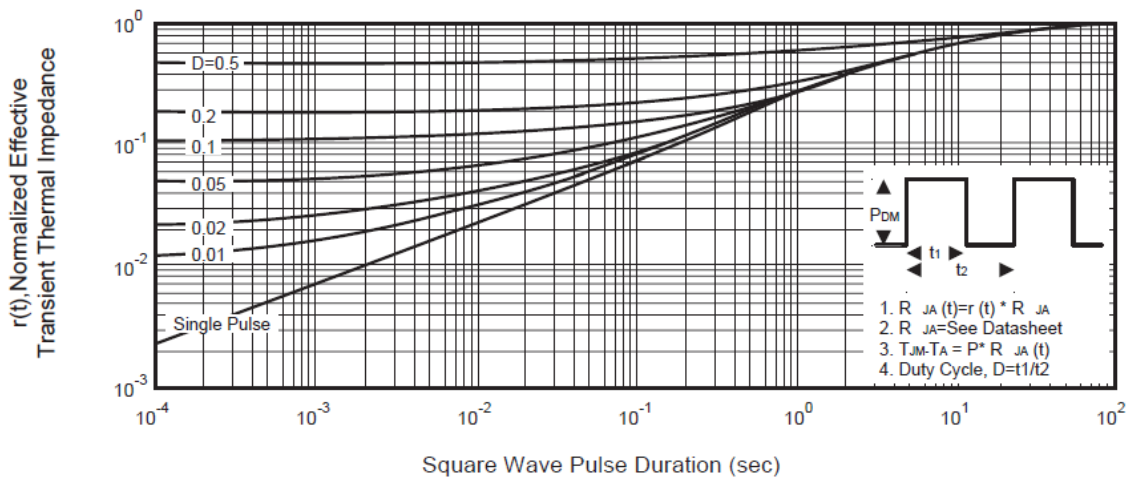
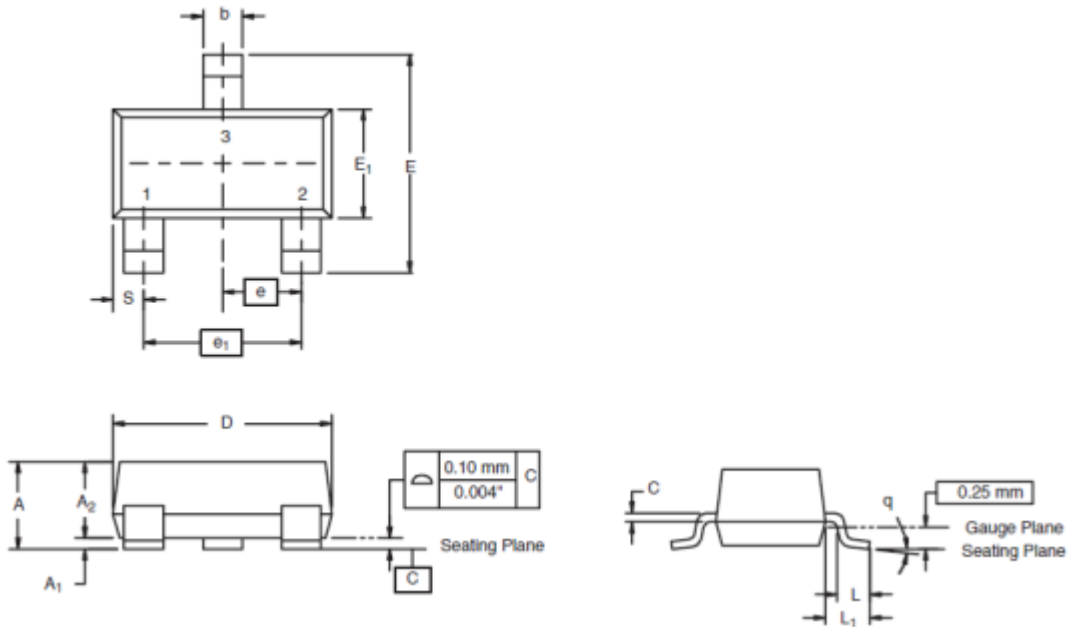


Figure 11. Normalized Thermal Transient Impedance Curve

● Package Information



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	0.89	1.12	0.035	0.044
A <sub>1</sub>	0.01	0.10	0.0004	0.004
A <sub>2</sub>	0.88	1.02	0.0346	0.040
b	0.35	0.50	0.014	0.020
c	0.085	0.18	0.003	0.007
D	2.80	3.04	0.110	0.120
E	2.60	3.00	0.102	0.118
E <sub>1</sub>	1.40	1.80	0.055	0.071
e	0.95 BSC		0.0374 Ref	
ø <sub>1</sub>	1.90 BSC		0.0748 Ref	
L	0.40	0.60	0.016	0.024
L <sub>1</sub>	0.64 Ref		0.025 Ref	
S	0.50 Ref		0.020 Ref	
q	3°	8°	3°	8°