

N-Channel Enhancement Mode Power MOSFET

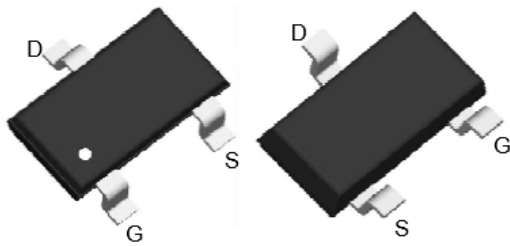
● Features

V_{DS}	$R_{DS(ON)TYP}$	I_D
20V	12.8 m Ω @4.5V	6.8A
	15 m Ω @2.5V	

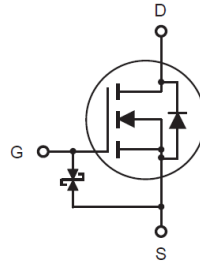
● General Description

- Power Management
- ESD Protection

● Pin Configurations



SOT23



● Absolute Maximum Ratings @ $T_A=25^\circ\text{C}$ unless otherwise noted

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	± 12	V
Drain Current (Continuous) *AC	$T_A=25^\circ\text{C}$	I_D	6.8	A
	$T_A=70^\circ\text{C}$		5.4	
Drain Current (Pulse) *B		I_{DM}	22	A
Power Dissipation	$T_A=25^\circ\text{C}$	P_D	1.25	W
Operating Temperature/ Storage Temperature		T_J/T_{STG}	-55~150	$^\circ\text{C}$

● Thermal Resistance Ratings

Parameter	Symbol	Limit	Unit
Maximum Junction-to-Ambient	R_{thJA}	100	$^\circ\text{C/W}$

Electrical Characteristics

$T_A=25^{\circ}\text{C}$ unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	20	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20V, V_{GS} = 0V$	--	--	1	μA
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_{DS} = 250\mu A$	0.4	0.63	1	V
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 10V, V_{DS} = 0V$	--	--	± 10	μA
Drain-Source On-state Resistance	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 6A$	--	12.8	17	m Ω
	$R_{DS(on)}$	$V_{GS} = 2.5V, I_D = 4A$	--	15	19	m Ω
	$R_{DS(on)}$	$V_{GS} = 1.8V, I_D = 2A$	--	20	26	m Ω
Diode Forward Voltage	V_{SD}	$I_{SD} = 1A, V_{GS} = 0V$	--	--	1	V
Diode Forward Current	I_S	$T_A = 25^{\circ}\text{C}$	--	--	6.8	A
Switching						
Total Gate Charge	Q_g	$V_{DS} = 10V, I_D = 5.4A,$ $V_{GS} = 4.5V$	--	4.3	--	nC
Gate-Source Charge	Q_{gs}		--	1.1	--	nC
Gate-Drain Charge	Q_{gd}		--	2.5	--	nC
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 10V, I_D = 1A,$ $V_{GS} = 4.5V, R_{GEN} = 6\Omega$	--	0.35	--	μs
Turn-on Rise Time	t_r		--	0.87	--	μs
Turn-off Delay Time	$t_{d(off)}$		--	3.6	--	μs
Turn-Off Fall Time	t_f		--	2.01	--	μs
Dynamic						
Input Capacitance	C_{iss}	$V_{DS} = 10V, V_{GS} = 0V, f = 1.0\text{MHz}$	--	590	--	pF
Output Capacitance	C_{oss}		--	125	--	pF
Reverse Transfer Capacitance	C_{rss}		--	90	--	pF

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² 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 $t \leq 10s$ junction to ambient thermal resistance rating.

Typical Electrical and Thermal Characteristics

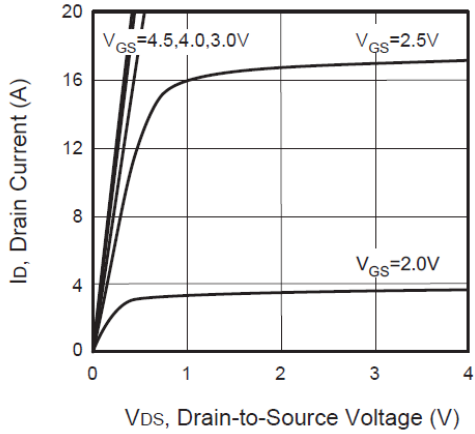


Figure 1. Output Characteristics

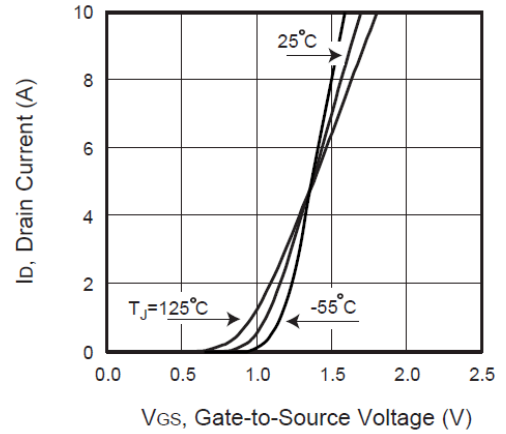


Figure 2. Transfer Characteristics

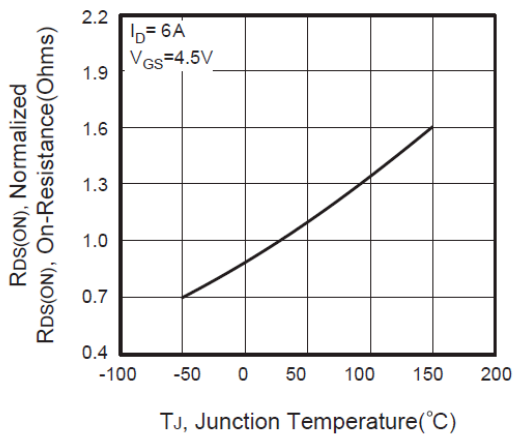


Figure 3. On-Resistance Variation with Temperature

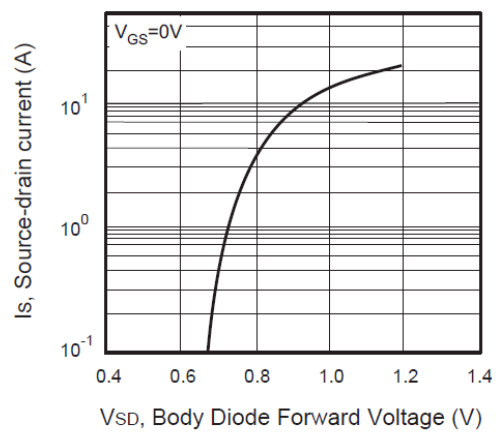


Figure 4. Body Diode Forward Voltage Variation with Source Current

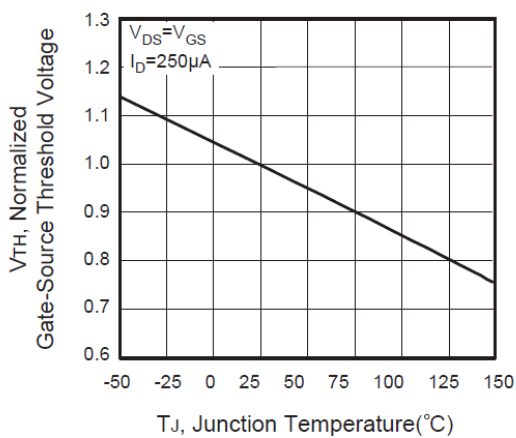


Figure 5. Gate Threshold Variation with Temperature

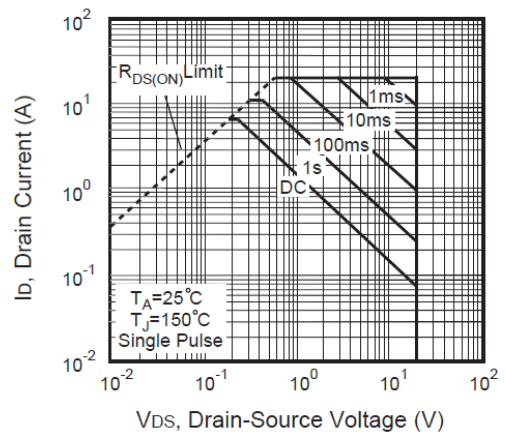


Figure 6. Maximum Safe Operating Area

Typical Electrical and Thermal Characteristics

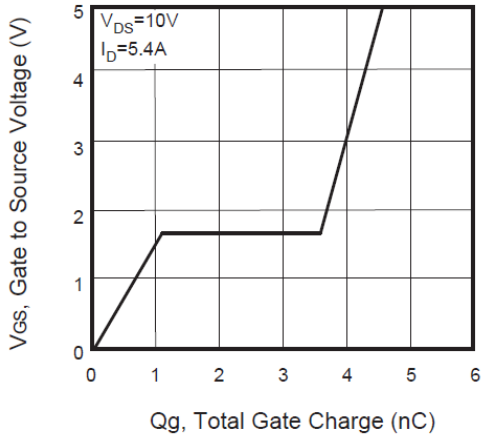


Figure 7. Gate Charge

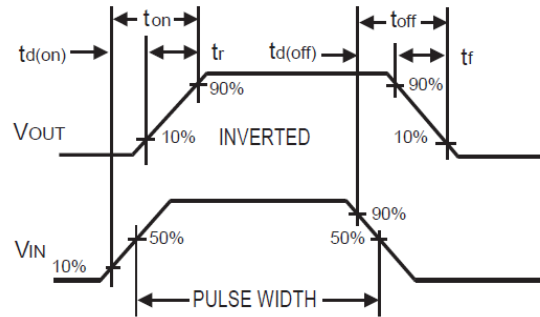


Figure 8. Switching Waveforms

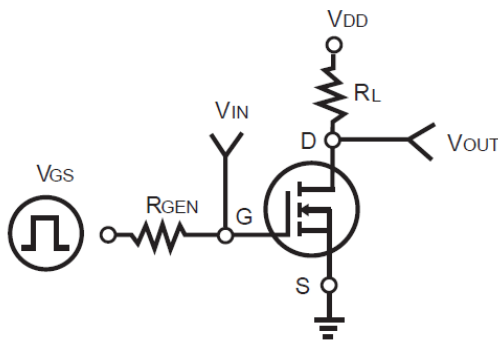


Figure 9. Switching Test Circuit

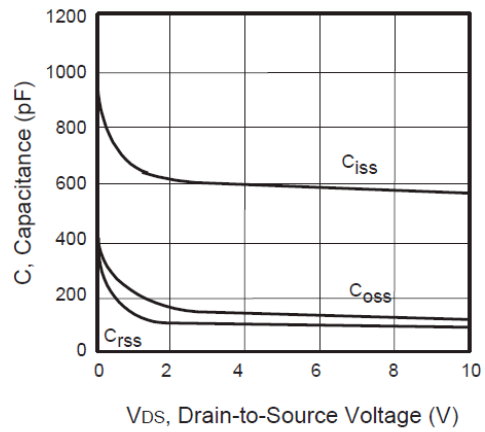


Figure 10. Capacitance

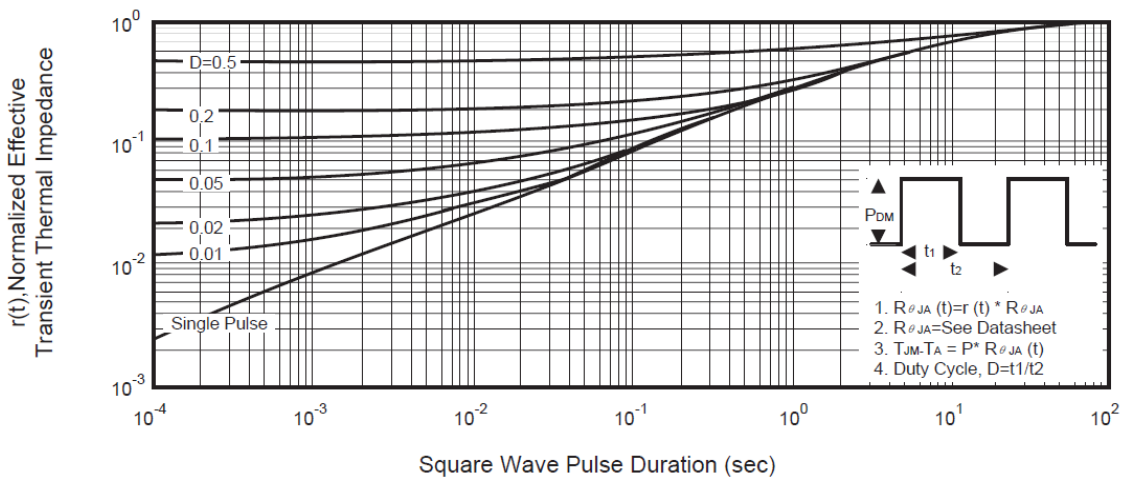
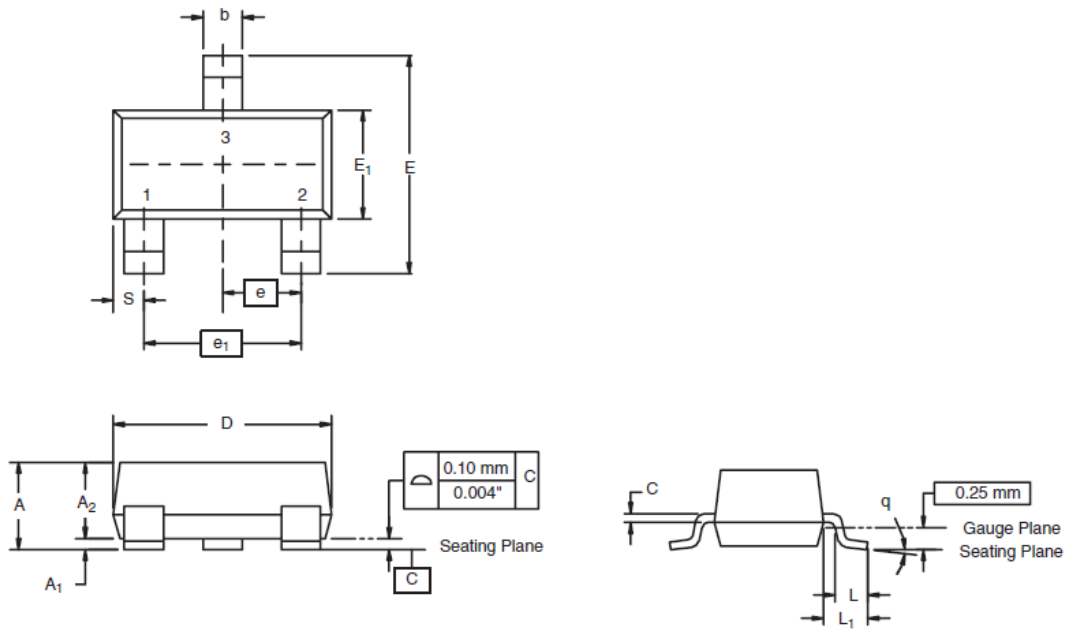


Figure 11. Normalized Thermal Transient Impedance Curve

Package Information



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	0.89	1.12	0.035	0.044
A ₁	0.01	0.10	0.0004	0.004
A ₂	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	2.10	2.64	0.083	0.104
E ₁	1.20	1.40	0.047	0.055
e	0.95 BSC		0.0374 Ref	
e ₁	1.90 BSC		0.0748 Ref	
L	0.40	0.60	0.016	0.024
L ₁	0.64 Ref		0.025 Ref	
S	0.50 Ref		0.020 Ref	
q	3°	8°	3°	8°