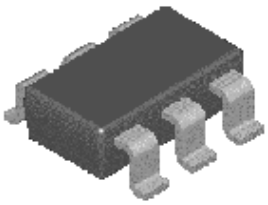
P-Channel 20-V (D-S) MOSFET

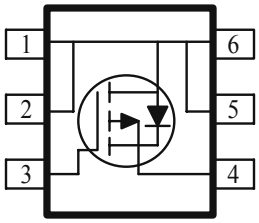
These miniature surface mount MOSFETs utilize High Cell Density process. Low $r_{DS(on)}$ assures minimal power loss and conserves energy, making this device ideal for use in power management circuitry. Typical applications are DC-DC converters, power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

- Low $r_{DS(on)}$ Provides Higher Efficiency and Extends Battery Life
- Miniature Super SOT-6 Surface Mount Package Saves Board Space

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
-20	0.048 @ V_{GS} = -4.5V	-4.6
	0.065 @ V_{GS} = -2.5V	-3.8

2.5 V Rated





ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±8	
Continuous Drain Current[a]	T_A=25°C	I_D	-4.6	A
	T_A=70°C		-3.8	
Pulsed Drain Current[b]		I_{DM}	±20	
Continuous Source Current (Diode Conduction)[a]		I_S	-1.7	A
Power Dissipation[a]	T_A=25°C	P_D	1.6	W
	T_A=70°C		1.1	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS				
Parameter		Symbol	Maximum	Units
Maximum Junction-to-Ambient[a]	t <= 5 sec	R_{THJA}	78.0	°C/W

Notes

a. Surface Mounted on 1” x 1” FR4 Board.

b. Pulse width limited by maximum junction temperature

SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = -250 uA	-20			V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 uA	-0.45	0.8	1.5	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -16 V, V_{GS} = 0 V			-1	uA
		V_{DS} = -20 V, V_{GS} = 0 V, T_J = 55°C			-5	uA
On-State Drain Current[A]	$I_{D(on)}$	V_{DS} = -5 V, V_{GS} = -4.5 V	-20			A
Drain-Source On-Resistance[A]	$r_{DS(on)}$	V_{GS} = -4.5 V, I_D = -4.6 A		39	48	mΩ
		V_{GS} = -2.5 V, I_D = -3.8 A		51	64	mΩ
		V_{GS} = -4.5 V, I_D = -4.6 A, T_J = 55°C		42	52	mΩ
Forward Tranconductance[A]	g_{fs}	V_{DS} = -10 V, I_D = -4.6 A		16		S
Diode Forward Voltage	V_{SD}	I_S = 1.3 A, V_{GS} = 0 V		-0.70	-1.20	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = -10 V, V_{GS} = -2.5 V, I_D = -3.5 A		10.0	14	nC
Gate-Source Charge	Q_{gs}			2.2		nC
Gate-Drain Charge	Q_{gd}			1.5		nC
Switching						
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = -10 V, R_L = 6 Ω , I_D = -1 A, V_{GEN} = -4.5 V		13	24	ns
Rise Time	t_r			9	19	ns
Turn-Off Delay Time	$t_{d(off)}$			33	53	ns
Fall-Time	t_f			12	22	ns

Notes

a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing.

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Typical Electrical Characteristics (P-Channel)

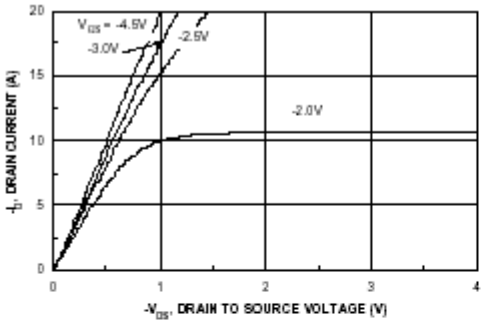


Figure 1. On-Region Characteristics.

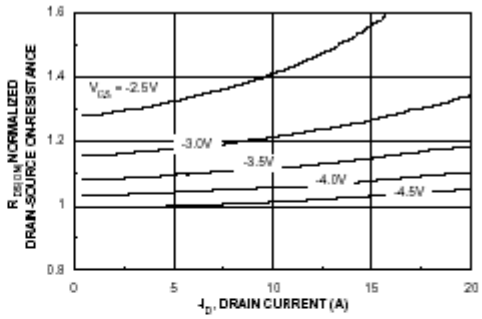


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

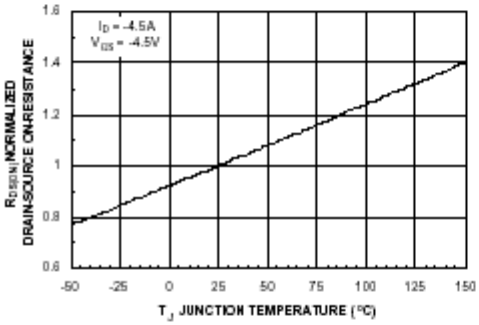


Figure 3. On-Resistance Variation with Temperature.

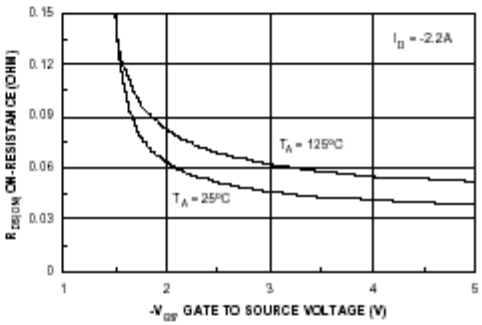


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

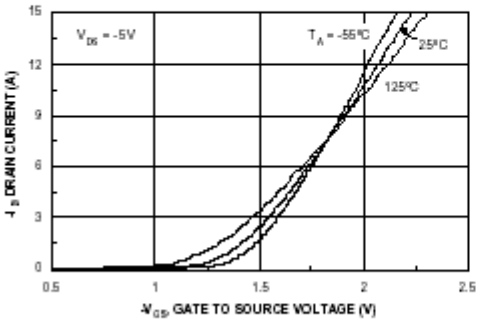


Figure 5. Transfer Characteristics.

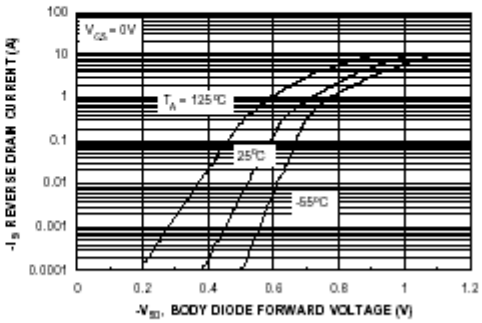


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Electrical Characteristics (P-Channel)

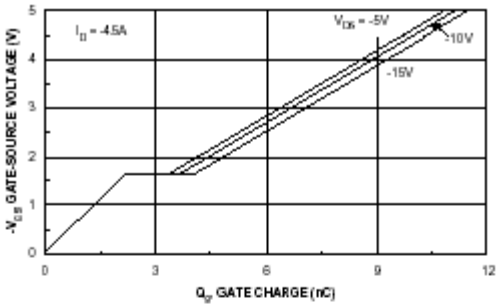


Figure 7. Gate Charge Characteristics.

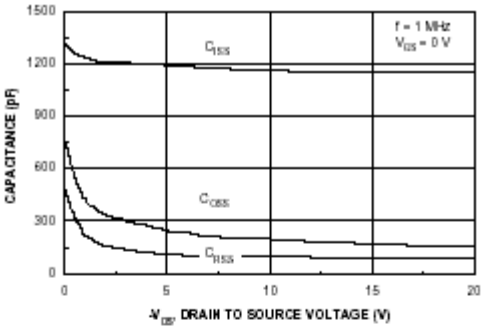


Figure 8. Capacitance Characteristics.

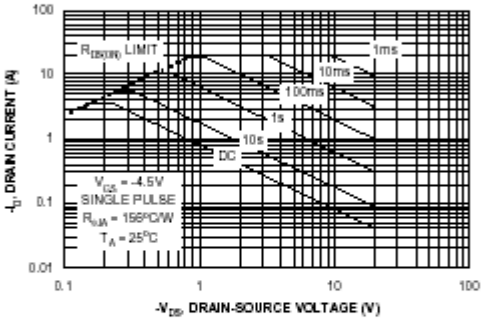


Figure 9. Maximum Safe Operating Area.

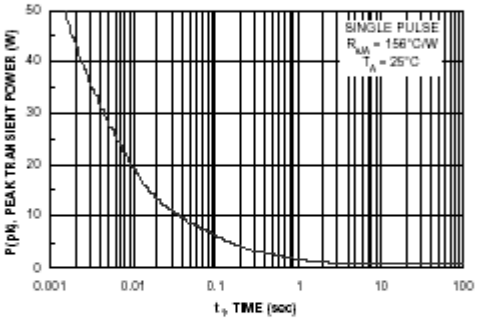


Figure 10. Single Pulse Maximum Power Dissipation.

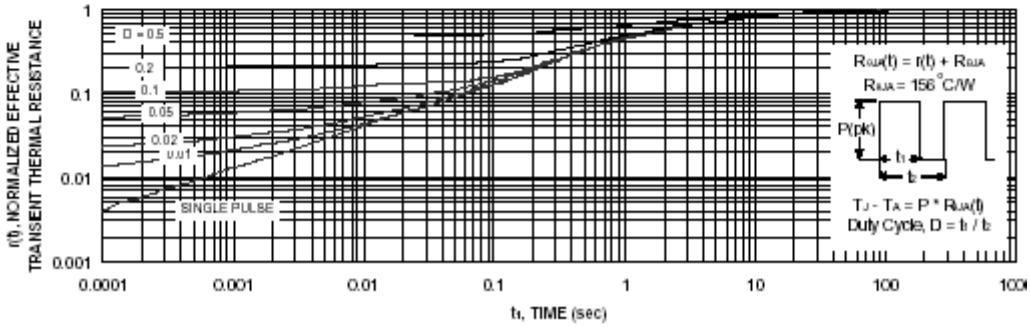
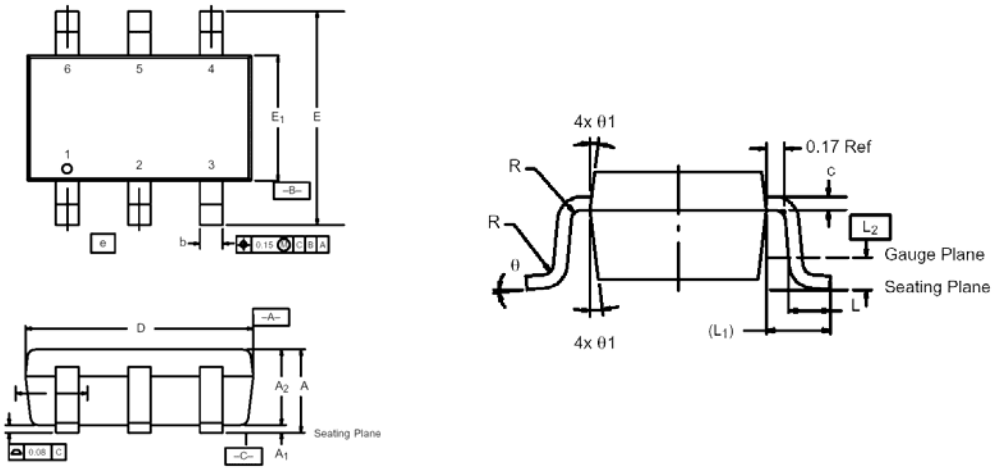


Figure 11. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in Note 1b
Transient thermal response will change depending on the circuit board design.

Package Information

TSOP-6: 6LEAD



Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.91	–	1.10	0.036	–	0.043
A_1	0.01	–	0.10	0.0004	–	0.004
A_2	0.84	–	1.00	0.033	0.038	0.039
b	0.30	0.32	0.45	0.012	0.013	0.018
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.95	3.05	3.10	0.116	0.120	0.122
E	2.70	2.85	2.98	0.106	0.112	0.117
E_1	1.55	1.65	1.70	0.061	0.065	0.067
e	1.00 BSC			0.0394 BSC		
L	0.35	–	0.50	0.014	–	0.020
L_1	0.60 Ref			0.024 Ref		
L_2	0.25 BSC			0.010 BSC		
R	0.10	–	–	0.004	–	–
θ	0°	4°	8°	0°	4°	8°
θ_1	7° Nom			7° Nom		