

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

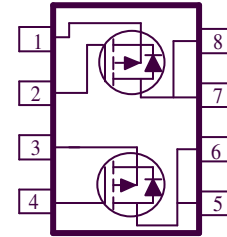
These miniature surface mount MOSFETs utilize a high cell density trench process to provide low  $r_{DS(on)}$  and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

PRODUCT SUMMARY		
V <sub>DS</sub> (V)	r <sub>DS(on)</sub> m(Ω)	I <sub>D</sub> (A)
-20	52 @ V <sub>GS</sub> = -4.5V	-4.9
	89 @ V <sub>GS</sub> = -2.5V	-4.0
	124 @ V <sub>GS</sub> = -1.8V	-3.6

- Low  $r_{DS(on)}$  provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe SOIC-8 saves board space
- Fast switching speed
- High performance trench technology



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**



ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)			
Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V <sub>DS</sub>	-20	V
Gate-Source Voltage	V <sub>GS</sub>	±12	
Continuous Drain Current <sup>a</sup>	T <sub>A</sub> =25°C	-5.2	A
	T <sub>A</sub> =70°C	-4.1	
Pulsed Drain Current <sup>b</sup>	I <sub>DM</sub>	±50	
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	-2.1	A
Power Dissipation <sup>a</sup>	T <sub>A</sub> =25°C	2.1	W
	T <sub>A</sub> =70°C	1.3	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 150	°C

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Maximum	Units
Maximum Junction-to-Case <sup>a</sup>	t ≤ 5 sec	R <sub>θJC</sub>	40 °C/W
Maximum Junction-to-Ambient <sup>a</sup>	t ≤ 5 sec	R <sub>θJA</sub>	60 °C/W

Notes

- a. Surface Mounted on 1" x 1" FR4 Board.
- b. Pulse width limited by maximum junction temperature

SPECIFICATIONS (T <sub>A</sub> = 25°C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
<b>Static</b>						
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 uA	-0.7			
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±12 V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V			-1	uA
		V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55°C			-5	
On-State Drain Current <sup>A</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = -4.5 V, V <sub>GS</sub> = -10 V	-20			A
Drain-Source On-Resistance <sup>A</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -4.9 A			52	mΩ
		V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -4.0 A			89	
		V <sub>GS</sub> = -1.8 V, I <sub>D</sub> = -3.6 A			124	
Forward Transconductance <sup>A</sup>	g <sub>fs</sub>	V <sub>DS</sub> = -15 V, I <sub>D</sub> = -4.9 A		20		S
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = 2.5 A, V <sub>GS</sub> = 0 V		-0.6		V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -10 V, V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -4.9 A		16.7		nC
Gate-Source Charge	Q <sub>gs</sub>			1.8		
Gate-Drain Charge	Q <sub>gd</sub>			1.9		
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = -10 V, R <sub>L</sub> = 6 Ω, I <sub>D</sub> = -1 A, V <sub>GEN</sub> = -4.5 V		7		nS
Rise Time	t <sub>r</sub>			13		
Turn-Off Delay Time	t <sub>d(off)</sub>			14		
Fall-Time	t <sub>f</sub>			9		

## Notes

- Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

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Typical Electrical Characteristics (P-Channel)

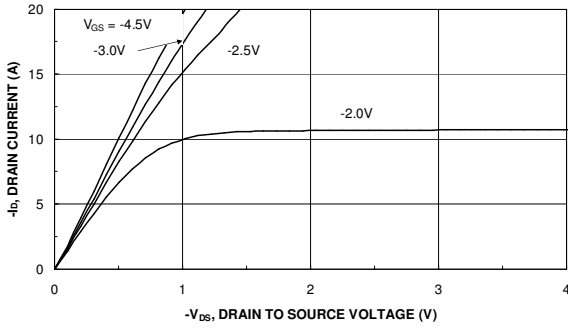


Figure 1. Output Characteristics

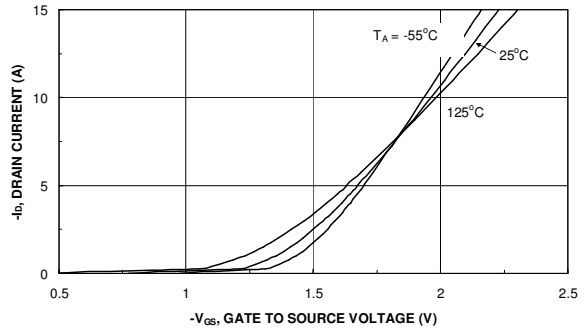


Figure 2. Transfer Characteristics

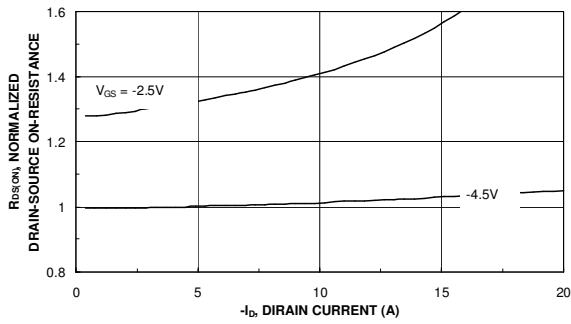


Figure 3. On-Resistance vs. Drain Current

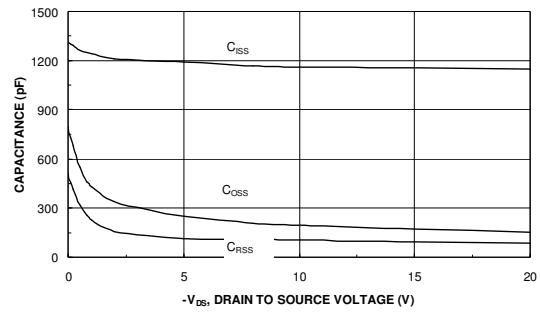


Figure 4. Capacitance

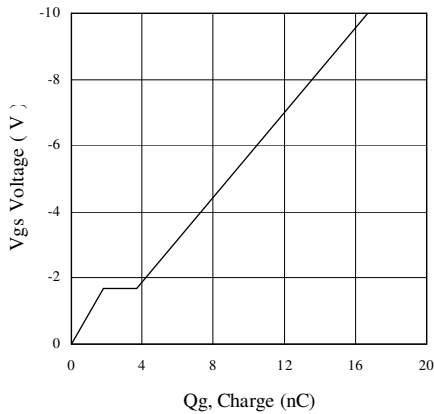


Figure 5. Gate Charge

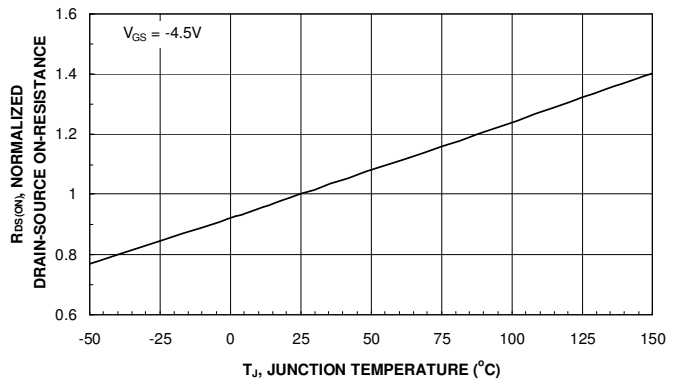


Figure 6. On-Resistance vs. Junction Temperature

Typical Electrical Characteristics (P-Channel)

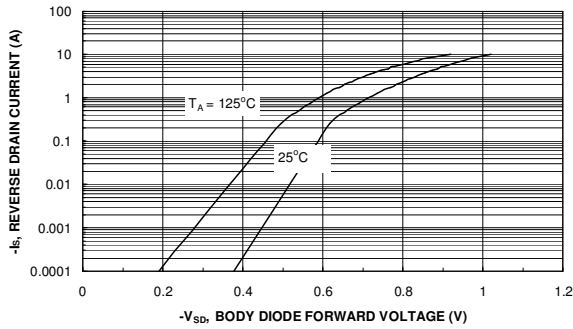


Figure 7. Source-Drain Diode Forward Voltage

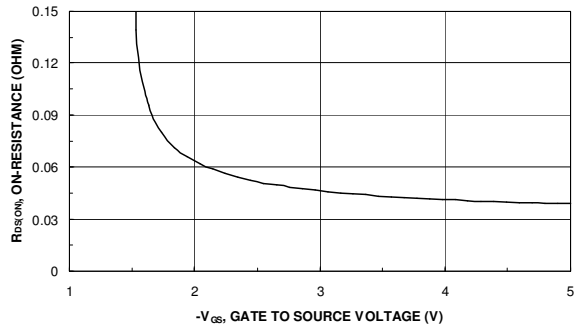


Figure 8. On-Resistance with Gate to Source Voltage

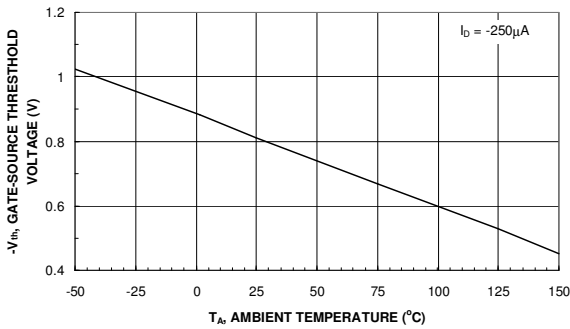


Figure 9. Vth Gate to Source Voltage Vs Temperature

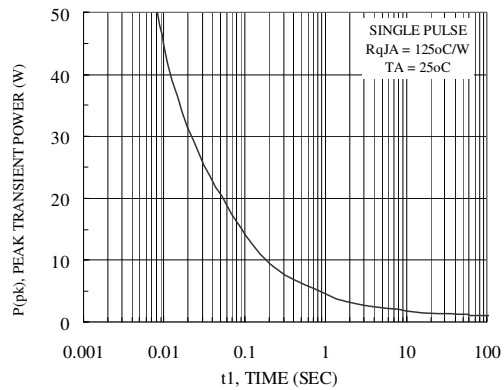


Figure 10. Single Pulse Maximum Power Dissipation

Normalized Thermal Transient Junction to Ambient

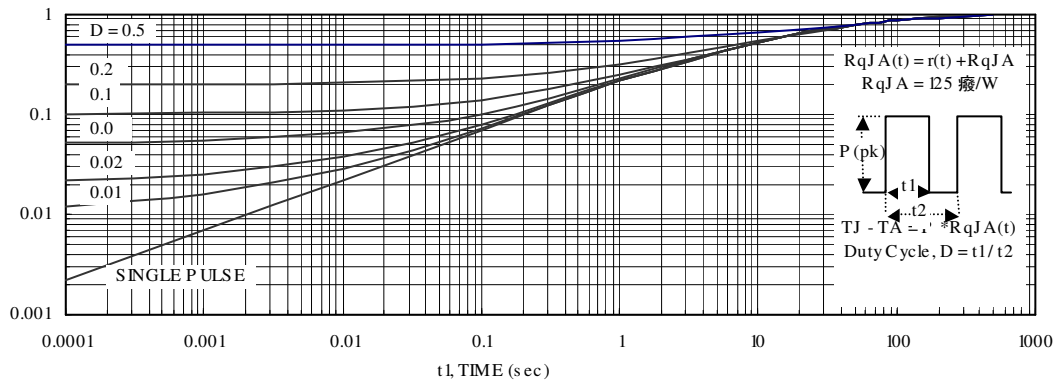
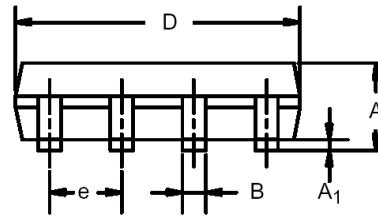
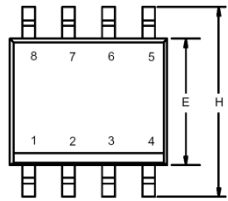


Figure 11. Transient Thermal Response Curve

Package Information

SO-8: 8LEAD



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A <sub>1</sub>	0.10	0.20	0.004	0.008
B	0.35	0.51	0.014	0.020
C	0.19	0.25	0.0075	0.010
D	4.80	5.00	0.189	0.196
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.020
L	0.50	0.93	0.020	0.037
q	0°	8°	0°	8°

