

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

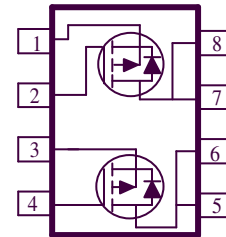
These miniature surface mount MOSFETs utilize a high cell density trench process to provide low  $r_{DS(on)}$  and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA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



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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>	I <sub>D</sub>	T <sub>A</sub> =25°C	-5.2
		T <sub>A</sub> =70°C	-4.1
Pulsed Drain Current <sup>b</sup>	I <sub>DM</sub>	±50	A
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	-2.1	A
Power Dissipation <sup>a</sup>	P <sub>D</sub>	T <sub>A</sub> =25°C	2.1
		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>	R <sub>θJC</sub>	40	°C/W
Maximum Junction-to-Ambient <sup>a</sup>	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)

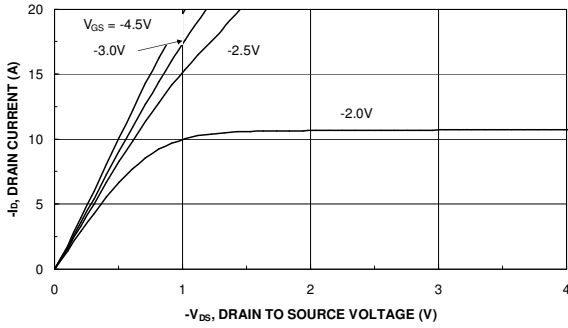


Figure 1. Output Characteristics

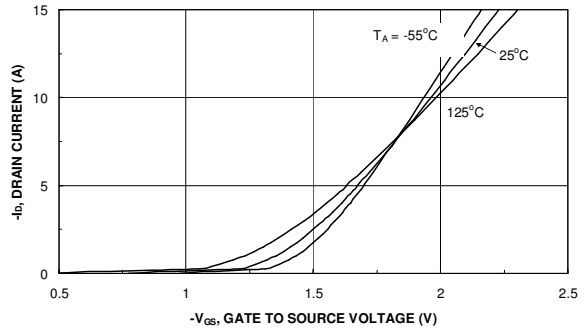


Figure 2. Transfer Characteristics

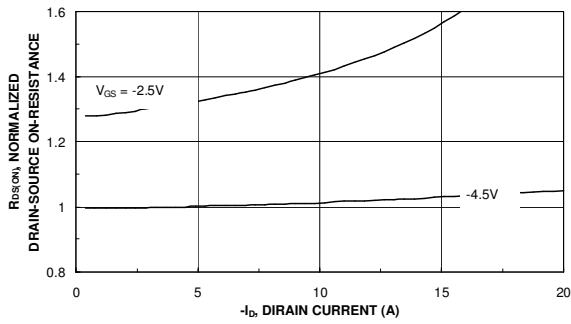


Figure 3. On-Resistance vs. Drain Current

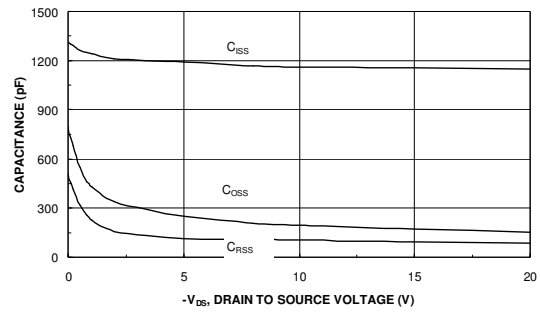


Figure 4. Capacitance

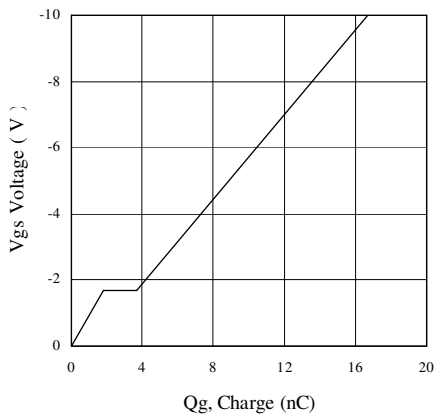


Figure 5. Gate Charge

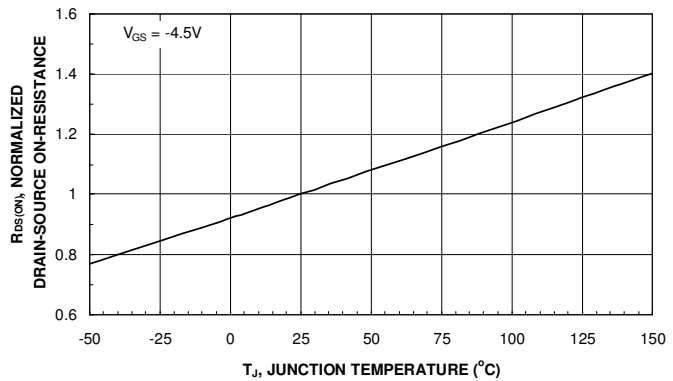


Figure 6. On-Resistance vs. Junction Temperature

### Typical Electrical Characteristics (P-Channel)

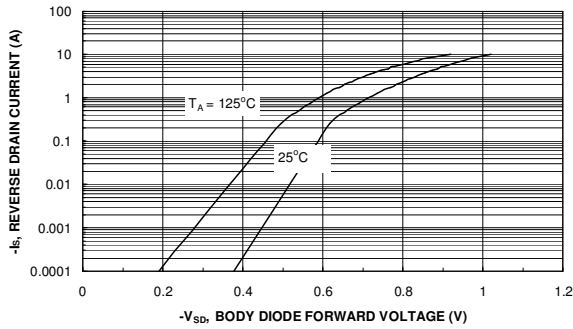


Figure 7. Source-Drain Diode Forward Voltage

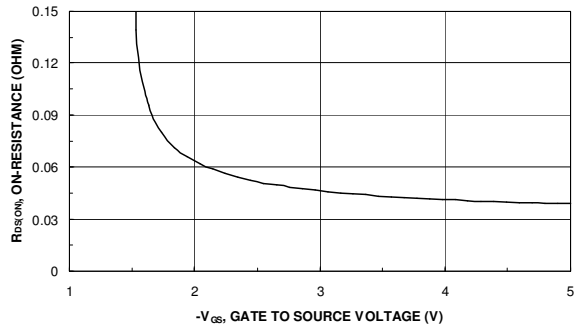


Figure 8. On-Resistance with Gate to Source Voltage

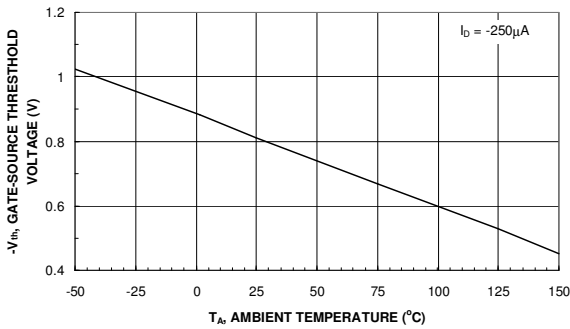


Figure 9. Vth Gate to Source Voltage Vs Temperature

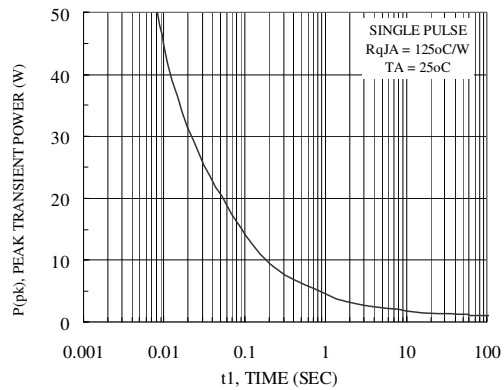


Figure 10. Single Pulse Maximum Power Dissipation

#### Normalized Thermal Transient Junction to Ambient

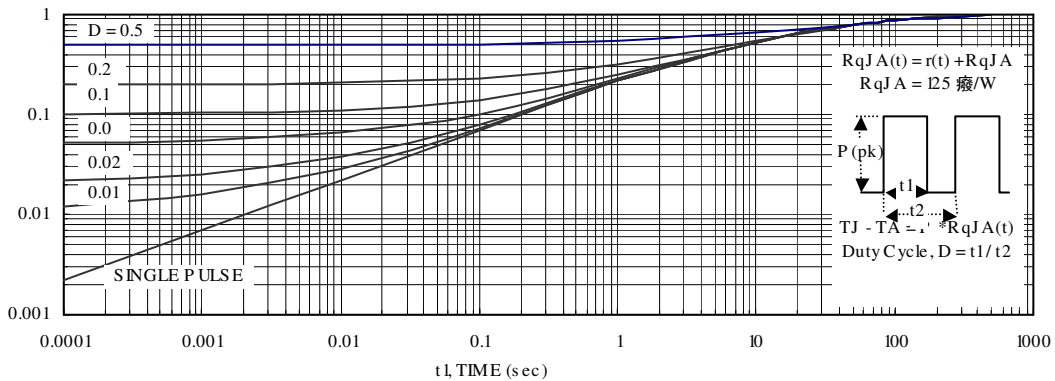
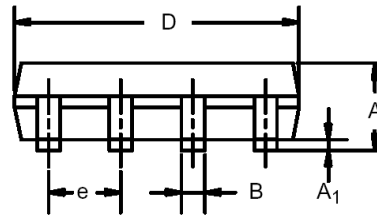
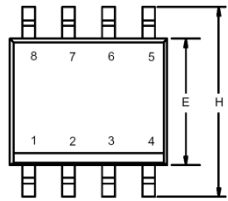


Figure 11. Transient Thermal Response Curve

### 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°

