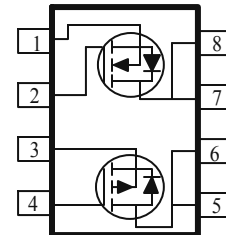


**P & N-Channel 40-V (D-S) MOSFET**

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		
$V_{DS}$ (V)	$r_{DS(on)}$ m( $\Omega$ )	$I_D$ (A)
40	27 @ $V_{GS} = 4.5V$	7.3
	22 @ $V_{GS} = 10V$	8.3
-40	40 @ $V_{GS} = -4.5V$	-6.2
	30 @ $V_{GS} = -10V$	-7.6

- 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



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ UNLESS OTHERWISE NOTED)					
Parameter	Symbol	N-Channel	P-Channel	Units	
Drain-Source Voltage	$V_{DS}$	40	-40	V	
Gate-Source Voltage	$V_{GS}$	20	-20		
Continuous Drain Current <sup>a</sup>	$I_D$	$T_A=25^\circ C$	8.3	-7.6	A
		$T_A=70^\circ C$	6.8	-6.3	
Pulsed Drain Current <sup>b</sup>	$I_{DM}$	$\pm 50$	$\pm 50$		
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	2.3	-2.1	A	
Power Dissipation <sup>a</sup>	$P_D$	$T_A=25^\circ C$	2.1	2.1	W
		$T_A=70^\circ C$	1.3	1.3	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150		$^\circ C$	

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Maximum	Units
Maximum Junction-to-Ambient <sup>a</sup>	$t \leq 10$ sec	62.5	$^\circ C/W$
	Steady-State	110	$^\circ C/W$

Notes

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

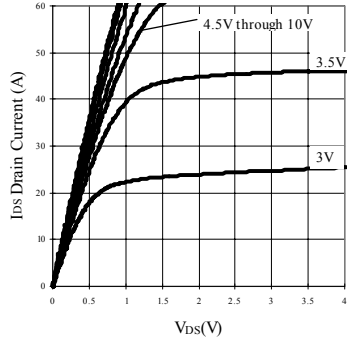
SPECIFICATIONS (T <sub>A</sub> = 25°C UNLESS OTHERWISE NOTED)								
Parameter	Symbol	Test Conditions	Limits				Unit	
			Ch	Min	Typ	Max		
<b>Static</b>								
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250 uA	N	1	1.5	3	V	
		V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = -250 uA	P	-1	-1.4	-3		
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> = -20 V, V <sub>DS</sub> = 0 V	P		7	±100	nA	
		V <sub>GS</sub> = 20 V, V <sub>DS</sub> = 0 V	N		6	±100		
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = -32 V, V <sub>GS</sub> = 0 V	P		12nA	-1	uA	
		V <sub>DS</sub> = 32 V, V <sub>GS</sub> = 0 V	N		2nA	1		
On-State Drain Current <sup>A</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V	N	25			A	
		V <sub>DS</sub> = -5 V, V <sub>GS</sub> = -10 V	P	-50				
Drain-Source On-Resistance <sup>A</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 8.3 A	N		14	22	mΩ	
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 7.3 A			17	27		
		V <sub>GS</sub> = -10 V, I <sub>D</sub> = -7.6 A	P		28	30		
		V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -6.2 A			35	40		
Forward Transconductance <sup>A</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 8.3 A	N		40		S	
		V <sub>DS</sub> = -15 V, I <sub>D</sub> = -7.6 A	P		31			
<b>Dynamic</b>								
Total Gate Charge	Q <sub>g</sub>	N-Channel V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =8.3A P-Channel V <sub>DS</sub> =-15V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-7.6A	N		13	30	nC	
Gate-Source Charge	Q <sub>gs</sub>		P		14	30		
			N		3.3	7		
Gate-Drain Charge	Q <sub>gd</sub>		P		5.8	12		
			N		4.5	10		
Input Capacitance	C <sub>iss</sub>		P		1317	3000		
		N		1583	4000			
Output Capacitance	C <sub>oss</sub>	N		272	600	pF		
		P		278	600			
Reverse Transfer Capacitance	C <sub>rss</sub>	N		169	400			
		P		183	400			
Turn-On Delay Time	t <sub>d(on)</sub>	N-Chaneel V <sub>DD</sub> =15V, V <sub>GS</sub> =10V, I <sub>D</sub> =1A , R <sub>GEN</sub> =25Ω, P-Channel V <sub>DD</sub> =-15V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-1A R <sub>GEN</sub> =15Ω	N		20		40	nS
Rise Time	t <sub>r</sub>		P		15		30	
			N		9	20		
Turn-Off Delay Time	t <sub>d(off)</sub>		P		16	40		
			N		70	200		
Fall-Time	t <sub>f</sub>		P		62	200		
			N		20	40		
			P		46	100		

Notes

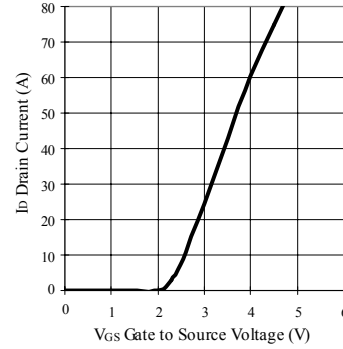
- a. Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

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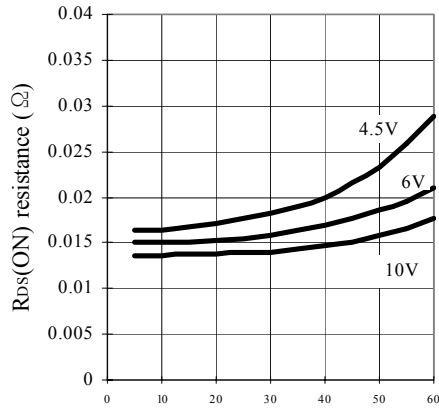
### Typical Electrical Characteristics (N-Channel)



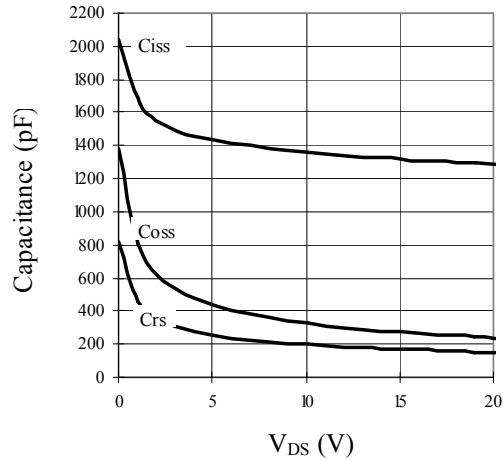
Output Characteristics



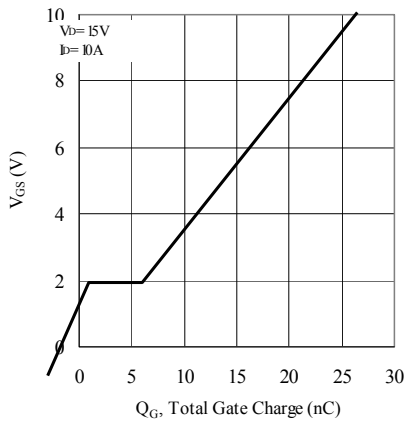
Transfer Characteristics



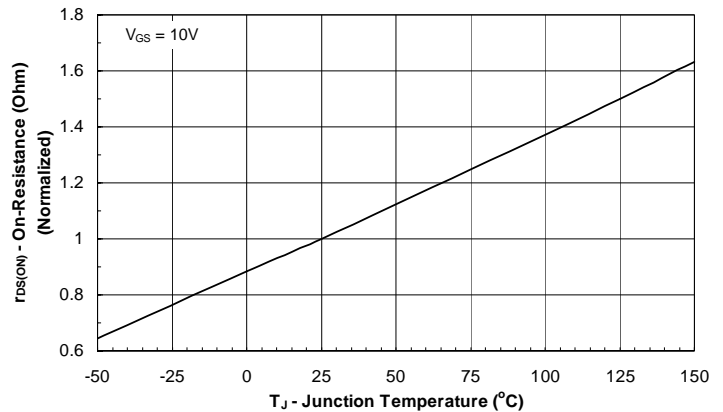
On Resistance vs. Drain Current



Capacitance

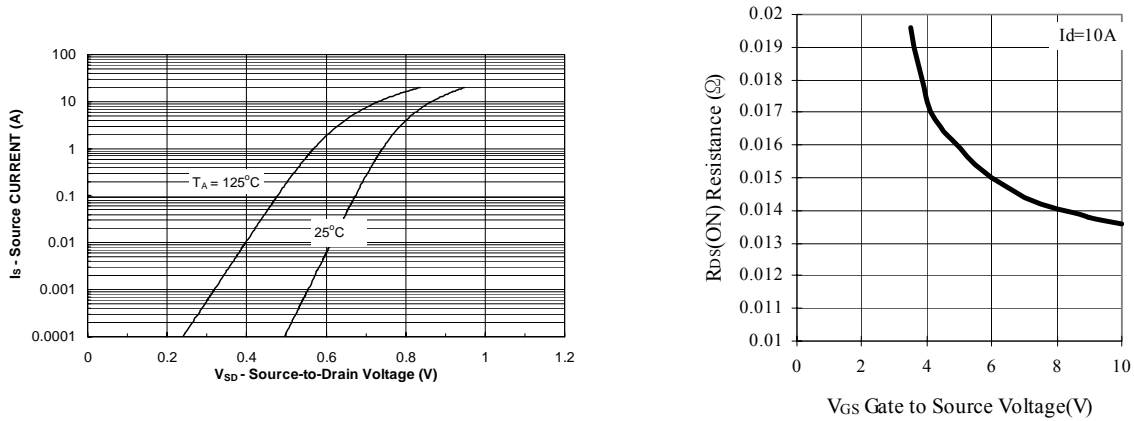


Gate Charge



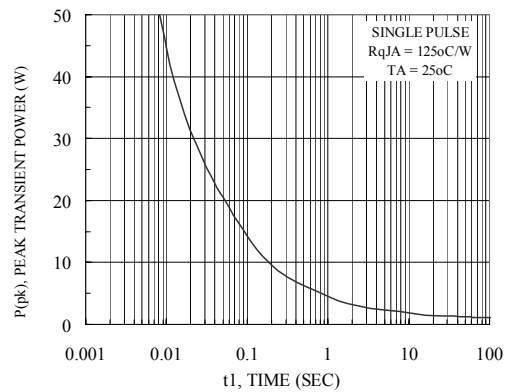
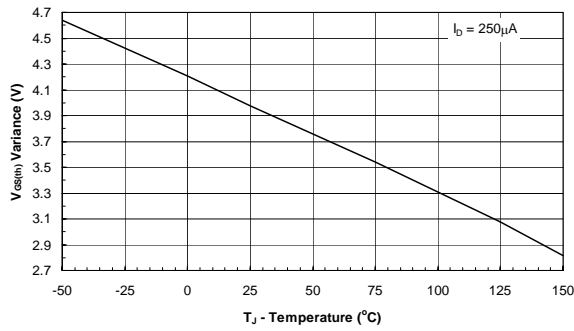
On-Resistance vs. Junction Temperature

### Typical Electrical Characteristics (N-Channel)



Source-Drain Diode Forward Voltage

On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

Figure 10. Single Pulse Maximum Power Dissipation

### Normalized Thermal Transient Junction to Ambient

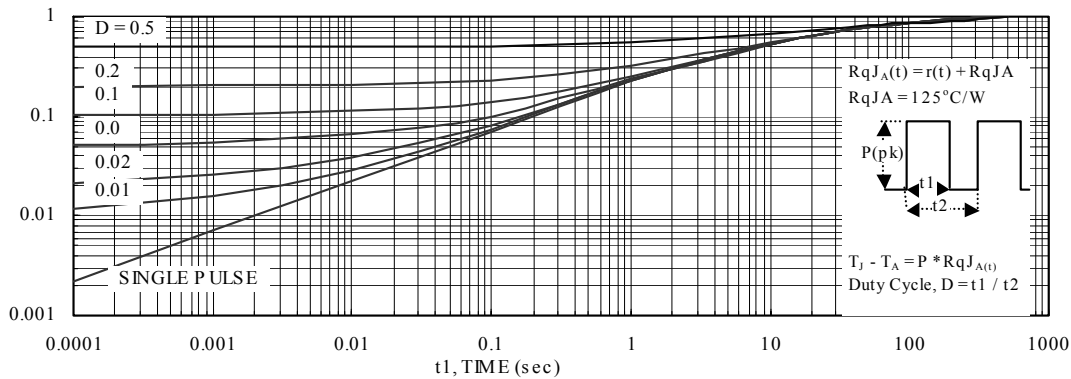
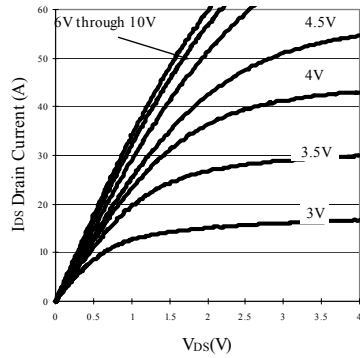
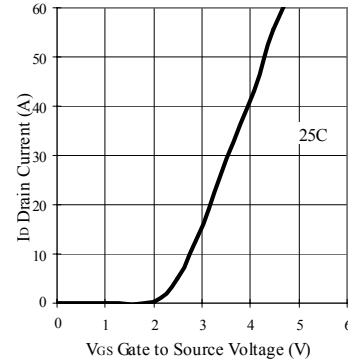


Figure 11. Transient Thermal Response Curve

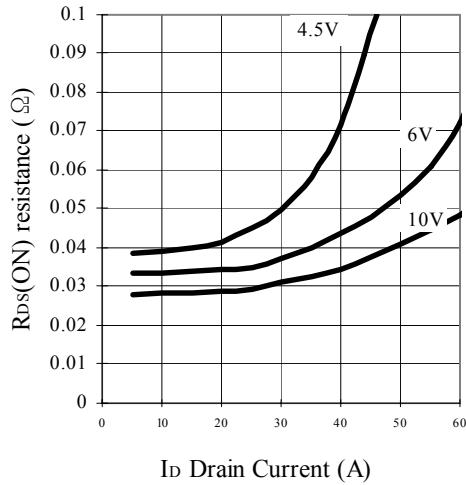
### Typical Electrical Characteristics (P-Channel)



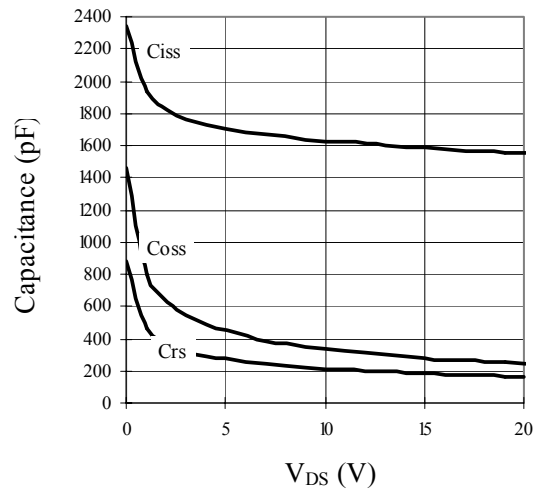
Output Characteristics



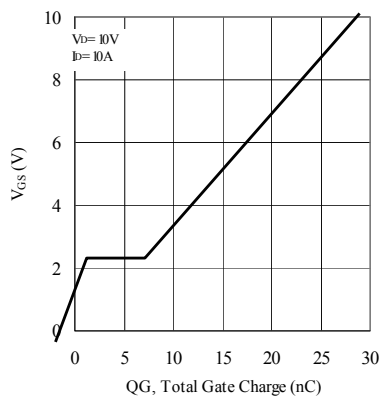
Transfer Characteristics



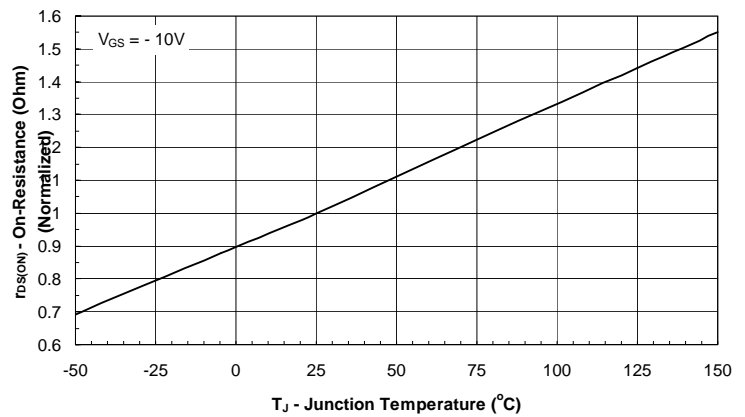
On Resistance Vs Vgs Voltage



Capacitance

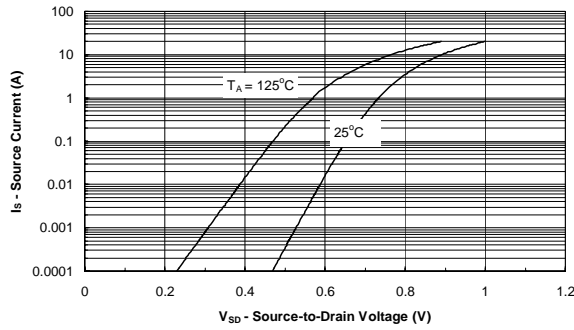


Gate Charge

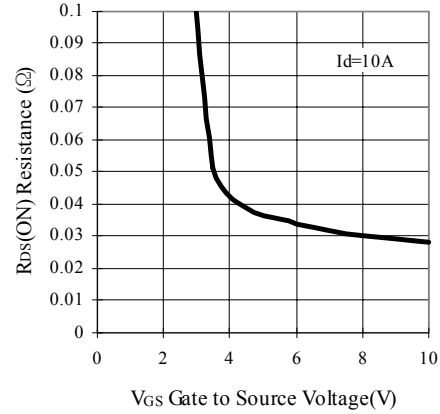


On-Resistance vs. Junction Temperature

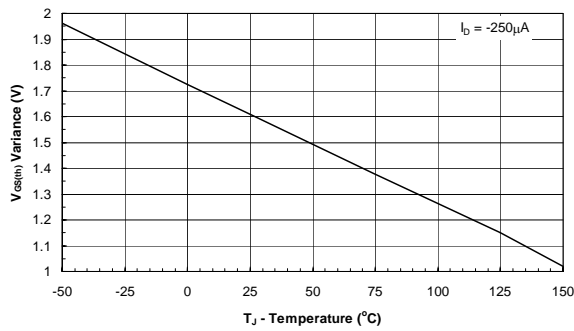
Typical Electrical Characteristics (P-Channel)



Source-Drain Diode Forward Voltage



On-Resistance with Gate to Source Voltage



Threshold Voltage

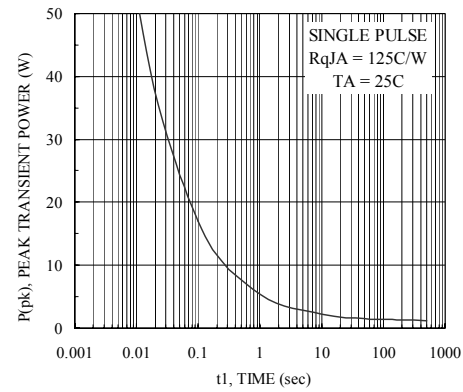


Figure 10. Single Pulse Maximum Power Dissipation

Normalized Thermal Transient Junction to Ambient

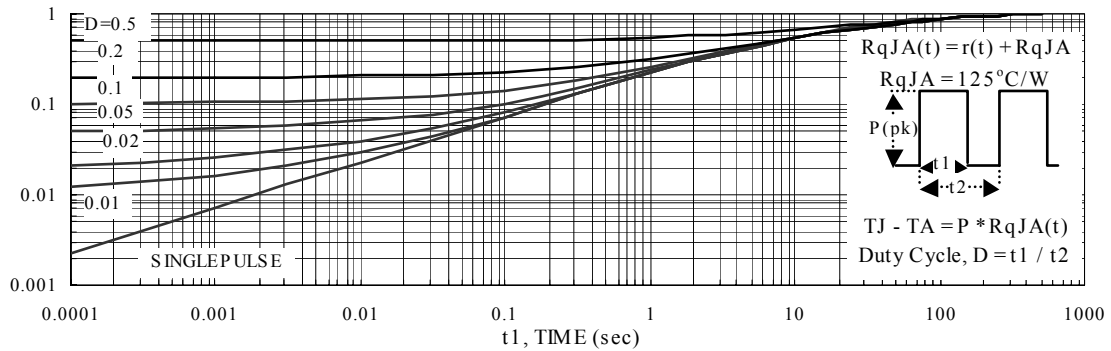
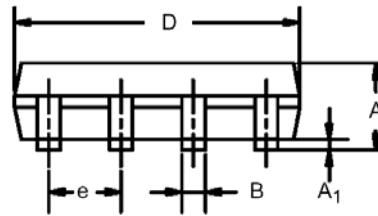
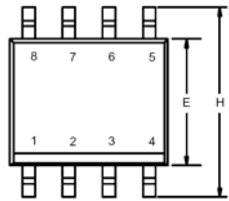


Figure 11. Transient Thermal Response Curve

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°

