

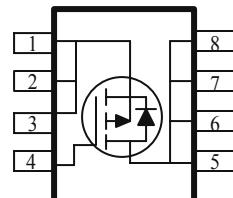
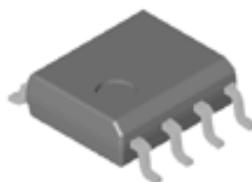
## P-Channel 30-V (D-S) MOSFET

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.

- 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

### PRODUCT SUMMARY

$V_{DS}$ (V)	$r_{DS(on)}$ m( $\Omega$ )	$I_D$ (A)
-30	13 @ $V_{GS} = -10V$	-11.5
	19 @ $V_{GS} = -4.5V$	-9.3



### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 25$	
Continuous Drain Current <sup>a</sup>	$I_D$	-11.5	A
		-9.3	
Pulsed Drain Current <sup>b</sup>	$I_{DM}$	$\pm 50$	
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	-2.1	A
Power Dissipation <sup>a</sup>	$P_D$	3.1	W
		2.3	
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-Case <sup>a</sup>	$R_{\theta JC}$	25	$^\circ C/W$
Maximum Junction-to-Ambient <sup>a</sup>	$R_{\theta JA}$	50	$^\circ C/W$

Notes

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

SPECIFICATIONS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}} = 0 \text{ V}$ , $I_D = -250 \mu\text{A}$	-30			V
Gate-Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}} = V_{\text{GS}}$ , $I_D = -250 \mu\text{A}$	-1			
Gate-Body Leakage	$I_{\text{GSS}}$	$V_{\text{DS}} = 0 \text{ V}$ , $V_{\text{GS}} = \pm 25 \text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{\text{DSS}}$	$V_{\text{DS}} = -24 \text{ V}$ , $V_{\text{GS}} = 0 \text{ V}$			-1	uA
		$V_{\text{DS}} = -24 \text{ V}$ , $V_{\text{GS}} = 0 \text{ V}$ , $T_J = 55^\circ\text{C}$			-5	
On-State Drain Current <sup>A</sup>	$I_{\text{D}(\text{on})}$	$V_{\text{DS}} = -5 \text{ V}$ , $V_{\text{GS}} = -10 \text{ V}$	-50			A
Drain-Source On-Resistance <sup>A</sup>	$r_{\text{DS}(\text{on})}$	$V_{\text{GS}} = -10 \text{ V}$ , $I_D = -11.5 \text{ A}$			13	mΩ
		$V_{\text{GS}} = -4.5 \text{ V}$ , $I_D = -9.3 \text{ A}$			19.0	
Forward Tranconductance <sup>A</sup>	$g_{\text{fs}}$	$V_{\text{DS}} = -15 \text{ V}$ , $I_D = -11.5 \text{ A}$		29		S
Diode Forward Voltage	$V_{\text{SD}}$	$I_S = 2.5 \text{ A}$ , $V_{\text{GS}} = 0 \text{ V}$		-0.8		V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{\text{DS}} = -15 \text{ V}$ , $V_{\text{GS}} = -5 \text{ V}$ , $I_D = -11.5 \text{ A}$		25		nC
Gate-Source Charge	$Q_{\text{gs}}$			11		
Gate-Drain Charge	$Q_{\text{gd}}$			17		
Input Capacitance	$C_{\text{iss}}$	$V_{\text{DS}} = -15 \text{ V}$ , $V_{\text{GS}} = 0 \text{ V}$ , $f = 1 \text{ MHz}$		2300		pF
Output Capacitance	$C_{\text{oss}}$			600		
Reverse Transfer Capacitance	$C_{\text{rss}}$			300		
Turn-On Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{DD}} = -15 \text{ V}$ , $R_L = 6 \Omega$ , $I_D = -1 \text{ A}$ , $V_{\text{GEN}} = -10 \text{ V}$		15		nS
Rise Time	$t_r$			13		
Turn-Off Delay Time	$t_{\text{d}(\text{off})}$			100		
Fall-Time	$t_f$			54		

## 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)

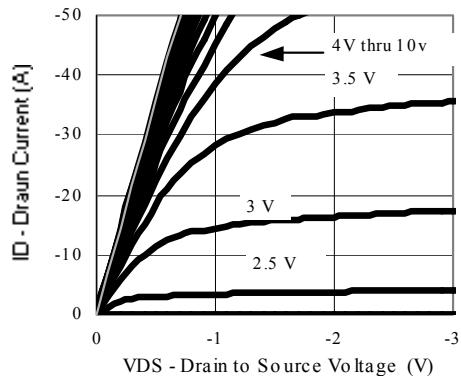


Figure 1. On-Region Characteristics

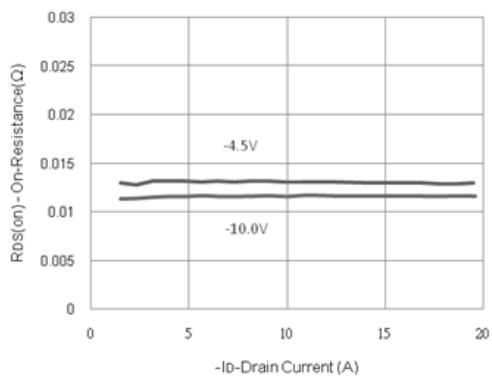


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

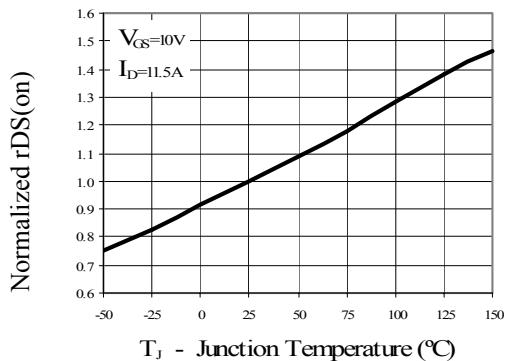


Figure 3. On-Resistance Variation with Temperature

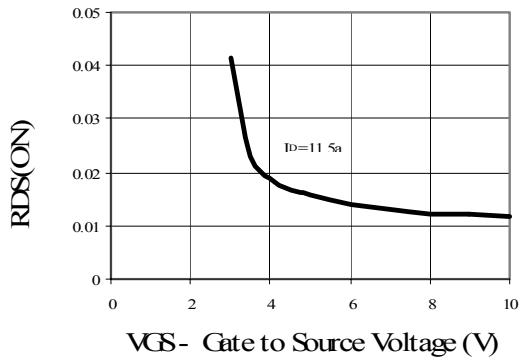


Figure 4. On-Resistance with Gate to Source Voltage

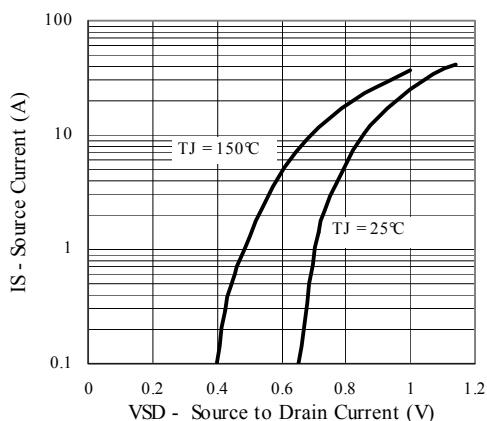


Figure 5. Transfer Characteristics

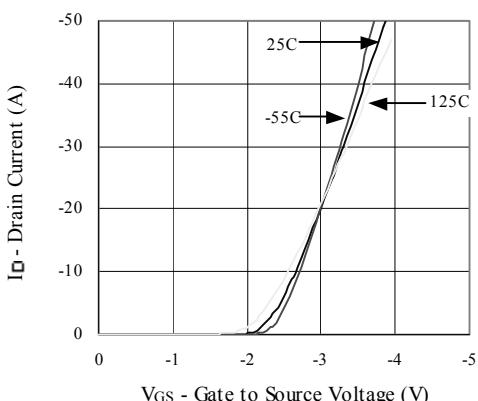


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

## Typical Electrical Characteristics (P-Channel)

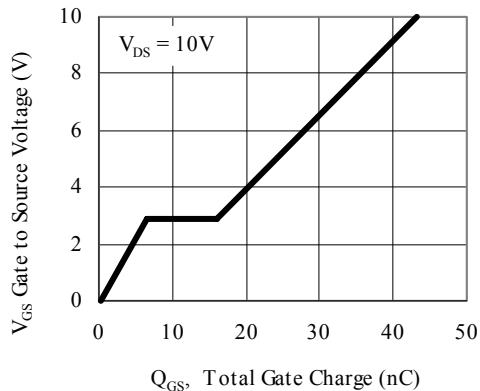


Figure 7. Gate Charge Characteristics

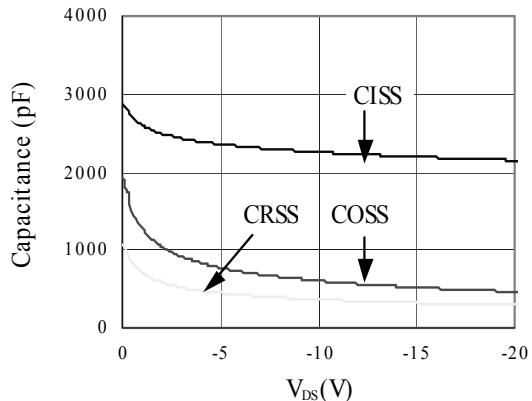


Figure 8. Capacitance Characteristics

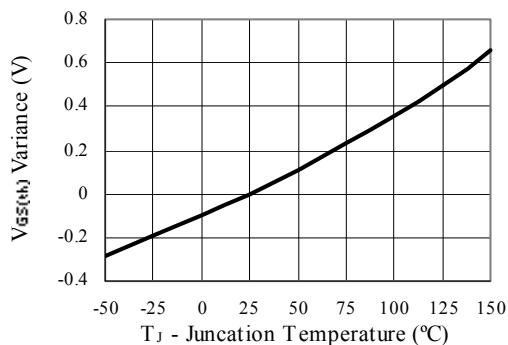


Figure 9. Maximum Safe Operating Area

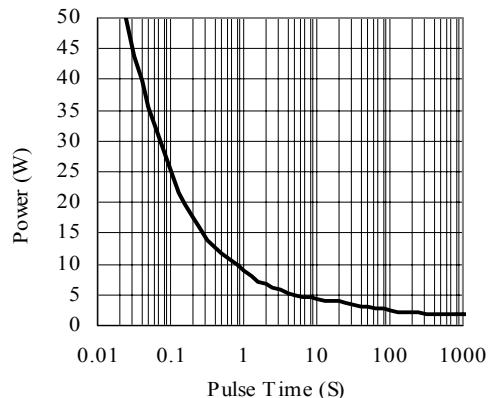


Figure 10. Single Pulse Maximum Power Dissipation

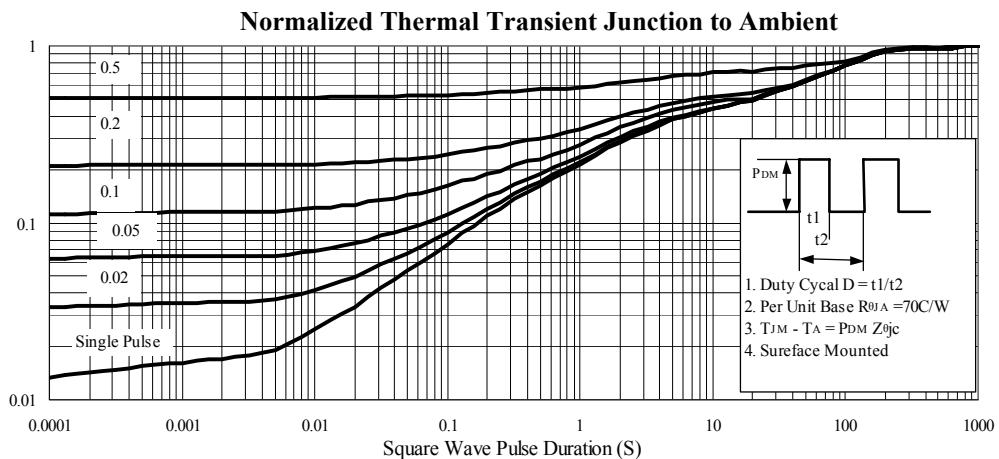
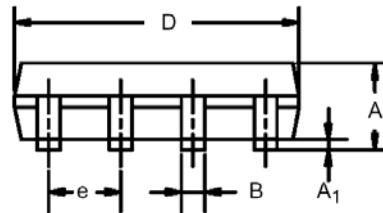
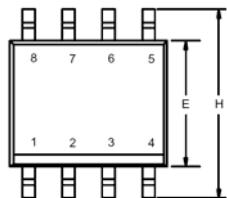


Figure 11. Transient Thermal Response Curve

## Package Information

## SO-8: 8LEAD



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

