

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

### ■ Features

- Low  $r_{DS(on)}$  Provides Higher Efficiency and Extends Battery Life
- Miniature SO-8 Surface Mount Package Saves Board Space
- High power and current handling capability
- Extended  $V_{GS}$  range ( $\pm 25$ ) for battery pack applications

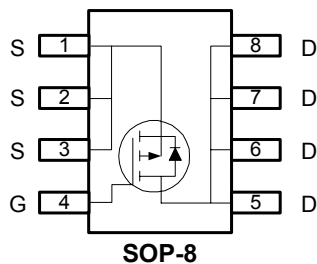
### ■ General Description

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 PWM DC-DC converters, power management in portable and battery-powered products such as computers, printers, battery charger, telecommunication power system, and telephones power system.

### ■ Product Summary

$V_{DS}$ (V)	$r_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
-30	9@ $V_{GS}=-10V$	-15
	13@ $V_{GS}=-4.5V$	-11

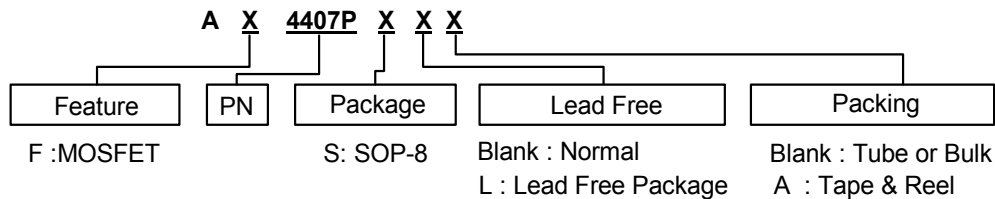
### ■ Pin Assignments



### ■ Pin Descriptions

Pin Name	Description
S	Source
G	Gate
D	Drain

### ■ Ordering information





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### ■ Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-30	V
$V_{GS}$	Gate-Source Voltage	$\pm 25$	V
$I_D$	Continuous Drain Current (Note 1)	$T_A=25^\circ\text{C}$	-15
		$T_A=70^\circ\text{C}$	-11
$I_{DM}$	Pulsed Drain Current (Note 2)	$\pm 50$	A
$I_S$	Continuous Source Current (Diode Conduction) (Note 1)	-2.1	A
$P_D$	Power Dissipation (Note 1)	$T_A=25^\circ\text{C}$	3.1
		$T_A=70^\circ\text{C}$	2.3
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to 150	$^\circ\text{C}$

### ■ Thermal Resistance Ratings

Symbol	Parameter	Maximum	Units
$R_{\theta JC}$	Maximum Junction-to-Case (Note 1)	25	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Maximum Junction-to-Ambient (Note 1)	50	$^\circ\text{C}/\text{W}$

Note 1: surface Mounted on 1"x 1" FR4 Board.

Note 2: Pulse width limited by maximum junction temperature

### ■ Specifications ( $T_A=25^\circ\text{C}$ unless otherwise noted)

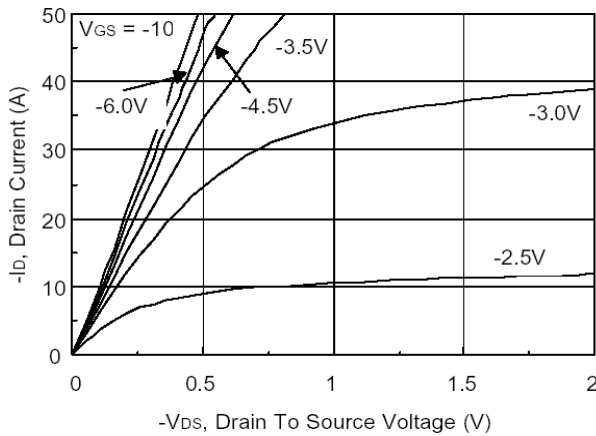
Symbol	Parameter	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
<b>Static</b>						
$V_{(BR)DSS}$	Drain-Source breakdown Voltage	$V_{GS}=0\text{V}, I_D=-250\mu\text{A}$	-30	-	-	V
$V_{GS(th)}$	Gate-Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-1	-1.6	-3	V
$I_{GSS}$	Gate-Body Leakage	$V_{DS}=0\text{V}, V_{GS}=\pm 25\text{V}$	-	-	$\pm 100$	nA
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-24\text{V}, V_{GS}=0\text{V}$	-	-	-1	$\mu\text{A}$
		$V_{DS}=-24\text{V}, V_{GS}=0\text{V}, T_J=55^\circ\text{C}$	-	-	-5	
$I_{D(on)}$	On-State Drain Current (Note 3)	$V_{GS}=-5\text{V}, V_{DS}=-10\text{V}$	-50	-	-	A
$r_{DS(on)}$	Drain-Source On-Resistance (Note 3)	$V_{GS}=-10\text{V}, I_D=-13\text{A}$	-	7.3	9	m $\Omega$
		$V_{GS}=-4.5\text{V}, I_D=-11\text{A}$	-	10	13	
		$V_{GS}=-10\text{V}, I_D=-13\text{A}, T_J=55^\circ\text{C}$	-	9	11	
$g_{fs}$	Forward Transconductance (Note 3)	$V_{GS}=-5\text{V}, I_D=-13\text{A}$	-	44	-	S
$V_{SD}$	Diode Forward Voltage	$I_S=2.1\text{A}, V_{GS}=0\text{V}$	-	-0.7	-1.2	V
<b>Dynamic (Note 4)</b>						
$Q_g$	Total Gate Charge	$V_{DS}=-15\text{V}, V_{GS}=-10\text{V}, I_D=-13\text{A}$	-	71	100	nC
$Q_{gs}$	Gate-Source Charge		-	12	-	
$Q_{gd}$	Gate-Drain Charge		-	15	-	
<b>Switching</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DD}=-15\text{V}, R_L=6\Omega, I_D=-1\text{A}, V_{GEN}=-10\text{V}$	-	19	36	nS
$t_r$	Rise Time		-	11	21	
$t_{d(off)}$	Turn-Off Delay Time		-	121	186	
$t_f$	Fall-Time		-	68	112	

Note 3: Pulse test:  $PW \leq 300\mu\text{s}$  duty cycle  $\leq 2\%$ .

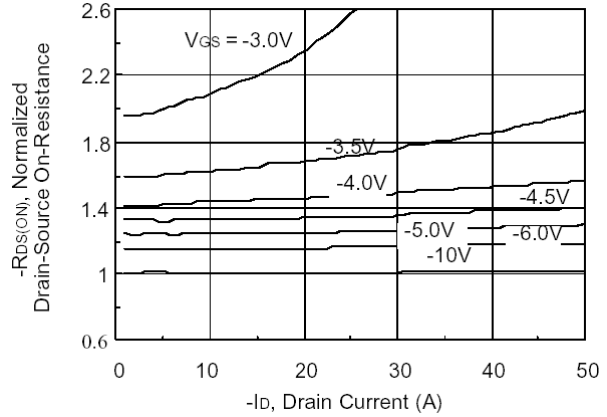
Note 4: Guaranteed by design, not subject to production testing.

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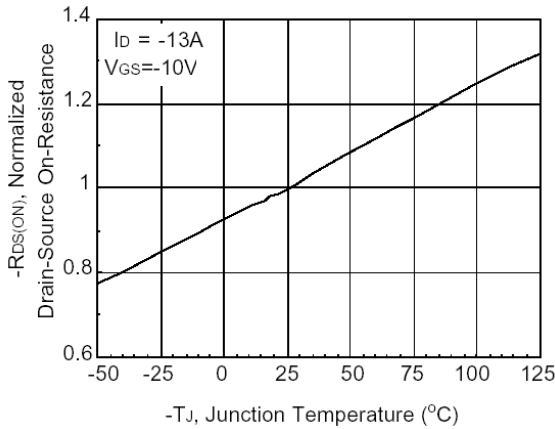
### Typical Performance Characteristics



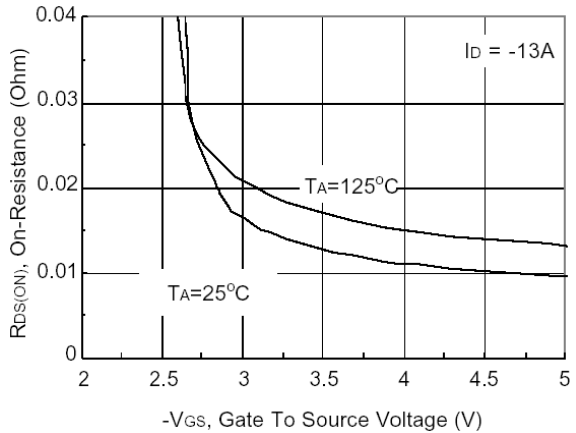
**Figure 1. On-Region Characteristics**



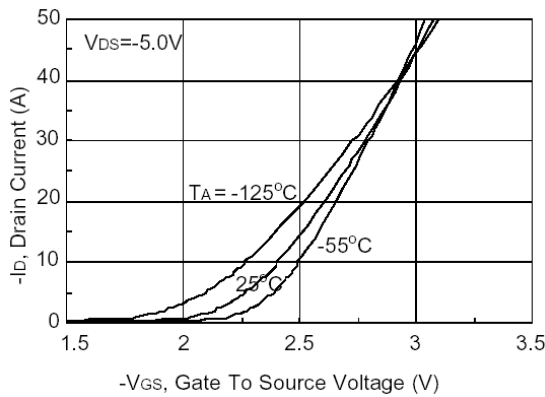
**Figure 2. On-Resistance Variation with Drain Current and Gate Voltage**



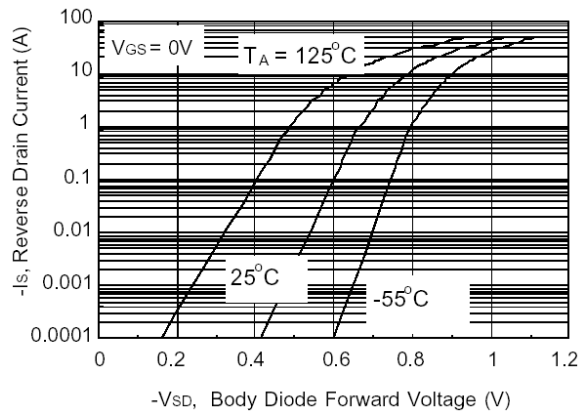
**Figure 3. On-Resistance Variation With Temperature**



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



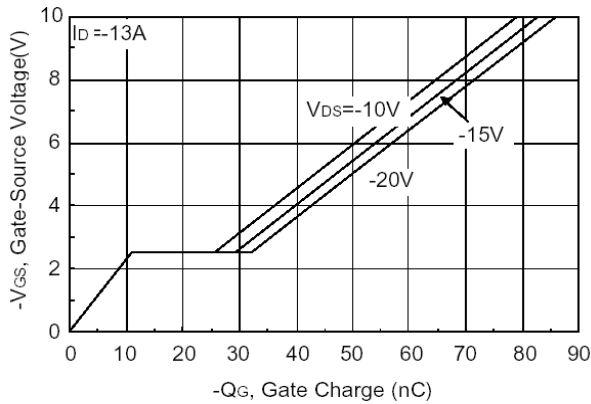
**Figure 5. Transfer Characteristics**



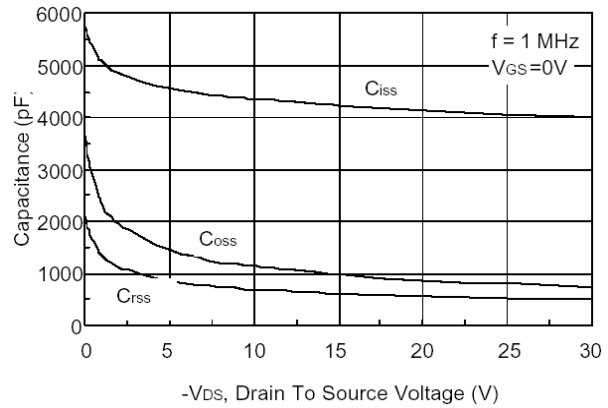
**Figure 6. Body Diode Forward Voltage Variation With Source Current and Temperature**

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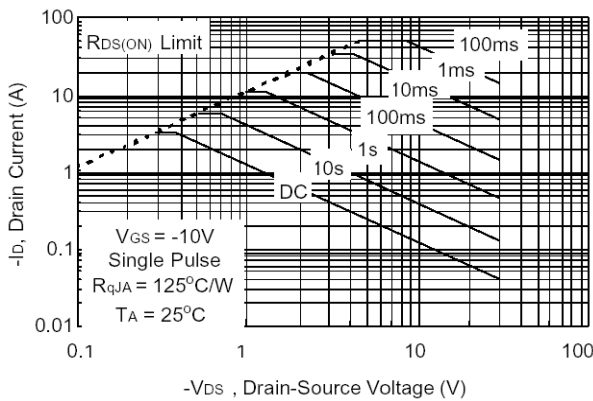
### ■ Typical Performance Characteristics (Continued)



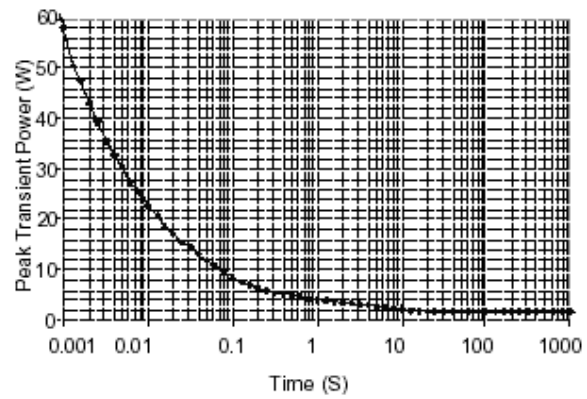
**Figure 7. Gate Charge Characteristics**



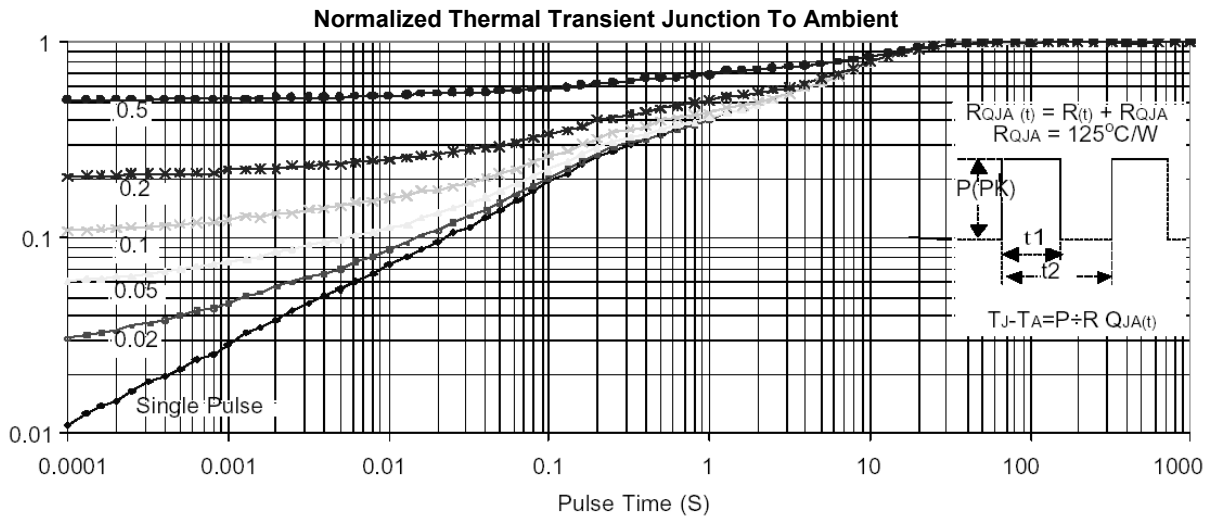
**Figure 8. Capacitance Characteristics**



**Figure 9. Maximum Safe Operating Area**



**Figure 10. Single Pulse Maximum Power Dissipation**

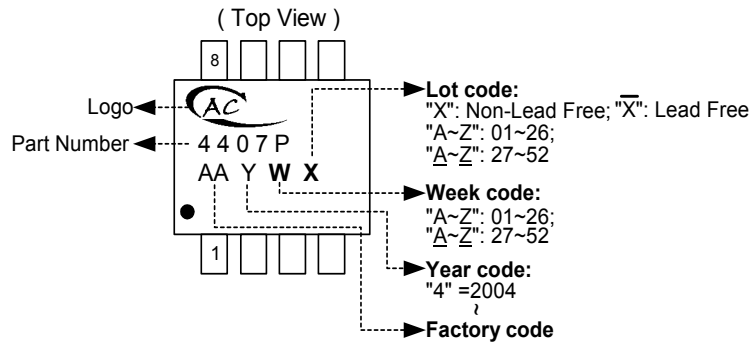


**Figure 11. Transient Thermal Response Curve**

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

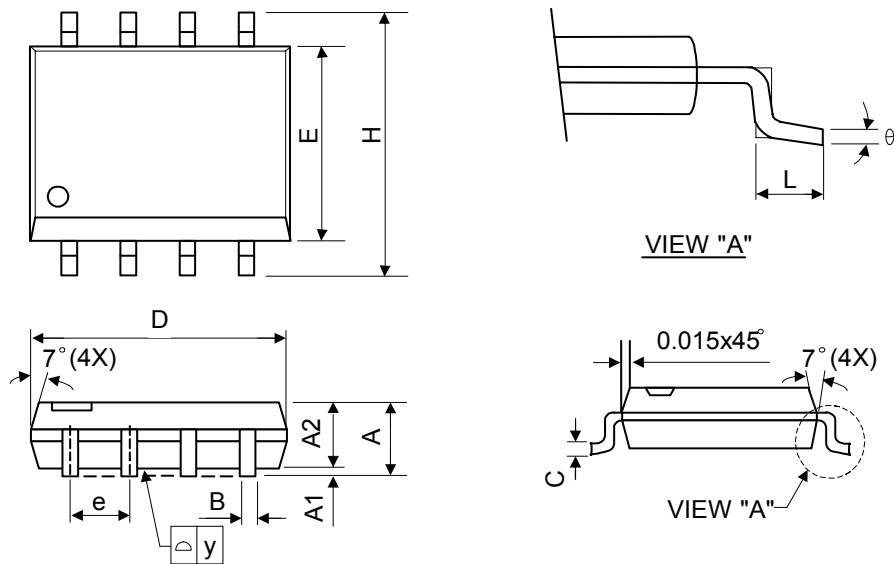
### ■ Marking Information

SOP-8L



### ■ Package Information

Package Type: SOP-8L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.40	1.60	1.75	0.055	0.063	0.069
A1	0.10	-	0.25	0.040	-	0.100
A2	1.30	1.45	1.50	0.051	0.057	0.059
B	0.33	0.41	0.51	0.013	0.016	0.020
C	0.19	0.20	0.25	0.0075	0.008	0.010
D	4.80	5.05	5.30	0.189	0.199	0.209
E	3.70	3.90	4.10	0.146	0.154	0.161
e	-	1.27	-	-	0.050	-
H	5.79	5.99	6.20	0.228	0.236	0.244
L	0.38	0.71	1.27	0.015	0.028	0.050
y	-	-	0.10	-	-	0.004
θ	0°	-	8°	0°	-	8°



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