AF4407P

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 (±25) for battery pack applications

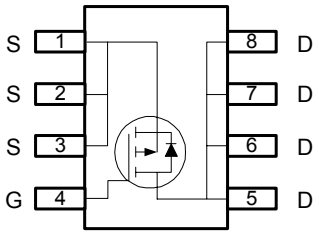
■ General Description

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

■ Pin Assignments

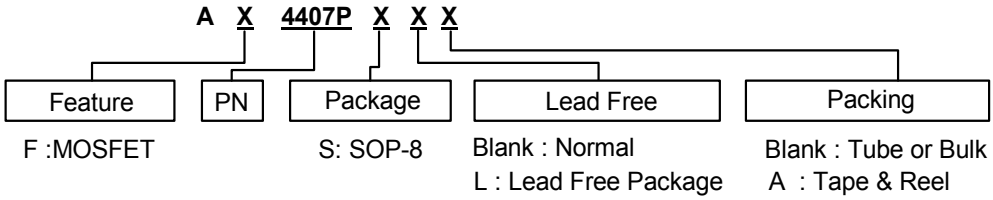


SOP-8

■ Pin Descriptions

Pin Name	Description
S	Source
G	Gate
D	Drain

■ Ordering information



■ Absolute Maximum Ratings (T_A=25ºC unless otherwise noted)

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

■ Thermal Resistance Ratings

Symbol	Parameter		Maximum	Units
$R_{\theta JC}$	Maximum Junction-to-Case **(Note 1)**	t < = 5 sec	25	ºC/W
$R_{\theta JA}$	Maximum Junction-to-Ambient **(Note 1)**	t < = 5 sec	50	ºC/W

Note 1: surface Mounted on 1"x 1" FR4 Board.
Note 2: Pulse width limited by maximum junction temperature

■ Specifications (T_A=25ºC unless otherwise noted)

Symbol	Parameter	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Static						
$V_{(BR)DSS}$	Drain-Source breakdown Voltage	V_{GS}=0V, I_D=-250uA	-30	-	-	V
$V_{GS(th)}$	Gate-Threshold Voltage	V_{DS}= V_{GS}, I_D=-250uA	-1	-1.6	-3	V
I_{GSS}	Gate-Body Leakage	V_{DS}=0V, V_{GS}=±25V	-	-	±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-24V, V_{GS}=0V	-	-	-1	uA
		V_{DS}=-24V, V_{GS}=0V, T_J=55ºC	-	-	-5	
$I_{D(on)}$	On-State Drain Current **(Note 3)**	V_{GS}=-5V, V_{DS}=-10V	-50	-	-	A
$r_{DS(on)}$	Drain-Source On-Resistance **(Note 3)**	V_{GS}=-10V, I_D=-13A	-	7.3	9	mΩ
		V_{GS}=-4.5V, I_D=-11A	-	10	13	
		V_{GS}=-10V, I_D=-13A, T_J=55ºC	-	9	11	
g_{fs}	Forward Tranconductance **(Note 3)**	V_{GS}=-5V, I_D=-13A	-	44	-	S
V_{SD}	Diode Forward Voltage	I_S=2.1A, V_{GS}=0V	-	-0.7	-1.2	V
Dynamic **(Note 4)**						
Q_g	Total Gate Charge	V_{DS}=-15V, V_{GS}=-10V, I_D=-13A	-	71	100	nC
Q_{gs}	Gate-Source Charge		-	12	-	
Q_{gd}	Gate-Drain Charge		-	15	-	
Switching						
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=-15V, R_L=6Ω, ID=-1A, VGEN=-10V	-	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 ≤ 300us duty cycle ≤ 2%.
Note 4: Guaranteed by design, not subject to production testing.

■ Typical Performance Characteristics

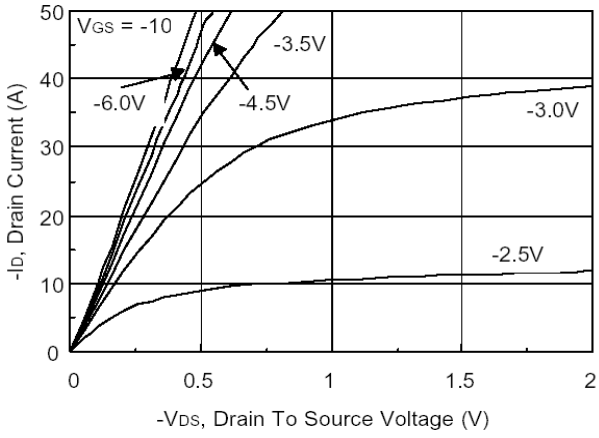


Figure 1. On-Region Characteristics

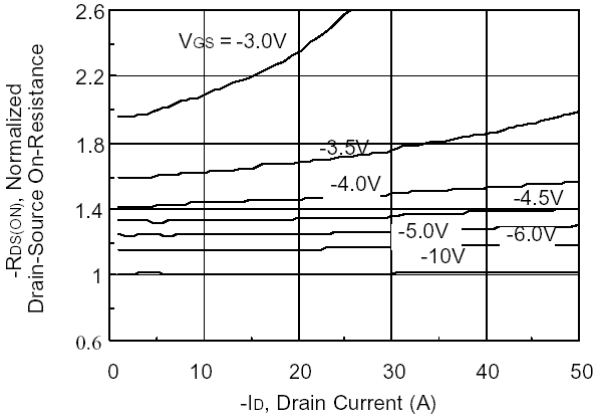


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

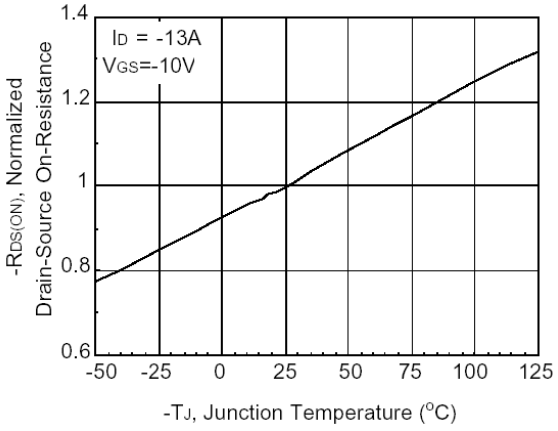


Figure 3. On-Resistance Variation With Temperature

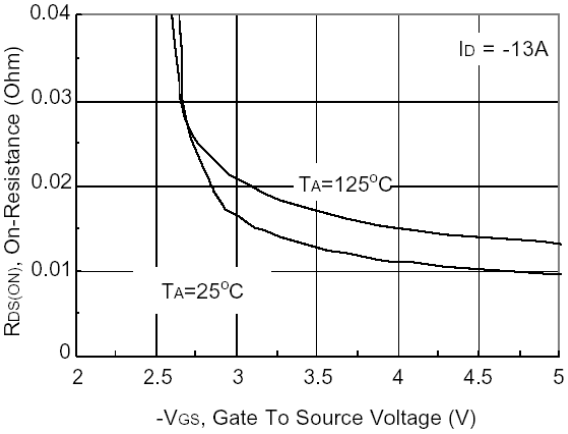


Figure 4. On-Resistance Variation with Gate to Source Voltage

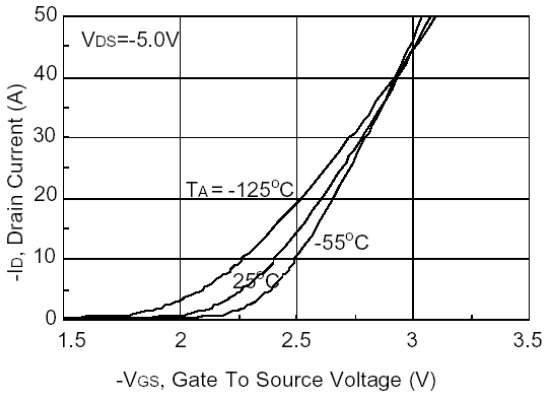


Figure 5. Transfer Characteristics

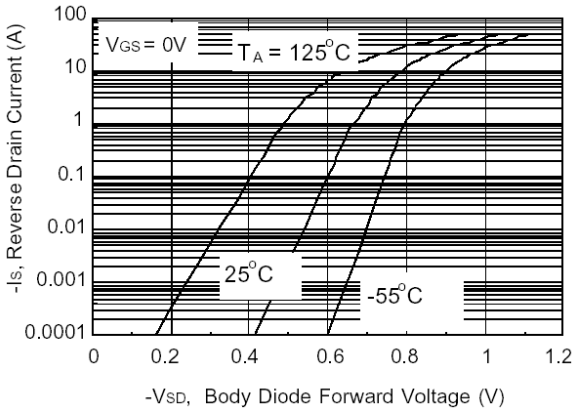


Figure 6. Body Diode Forward Voltage Variation With Source Current and Temperature

■ Typical Performance Characteristics (Continued)

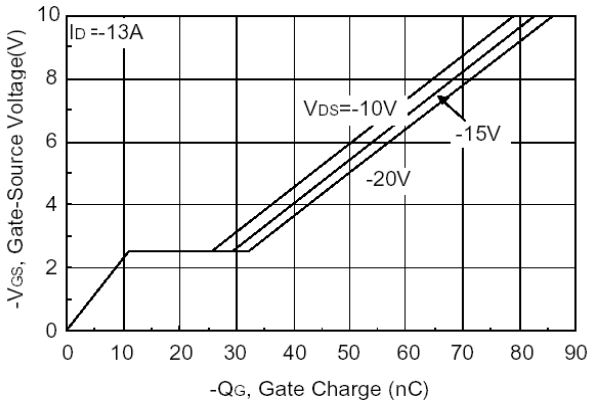


Figure 7. Gate Charge Characteristics

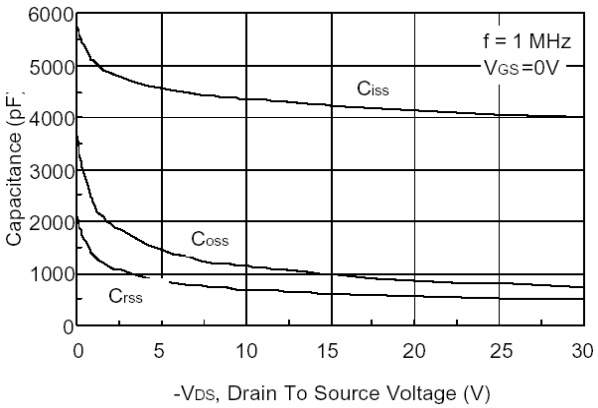


Figure 8. Capacitance Characteristics

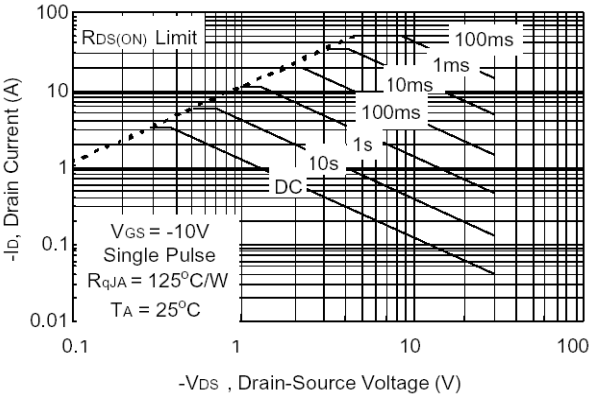


Figure 9. Maximum Safe Operating Area

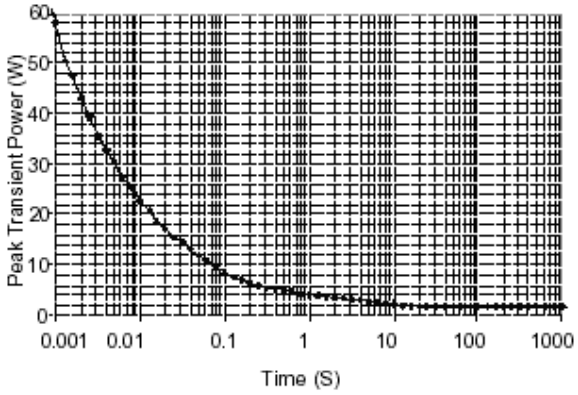


Figure 10. Single Pulse Maximum Power Dissipation

Normalized Thermal Transient Junction To Ambient

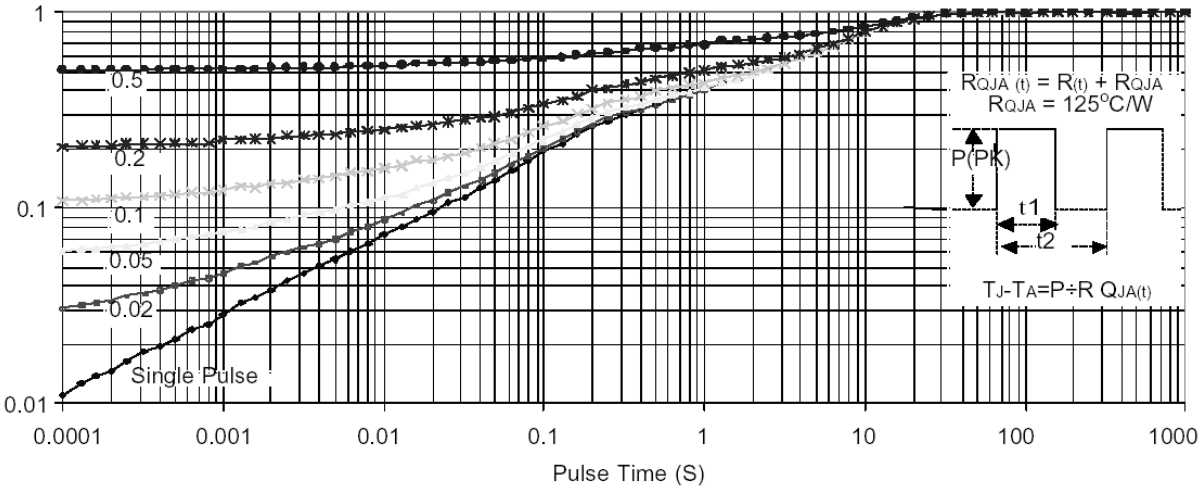
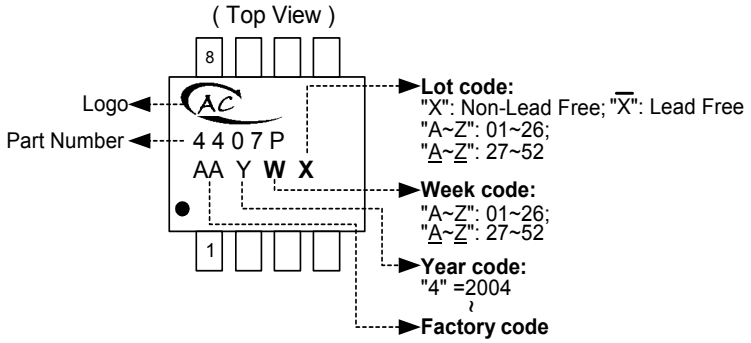


Figure 11. Transient Thermal Response Curve

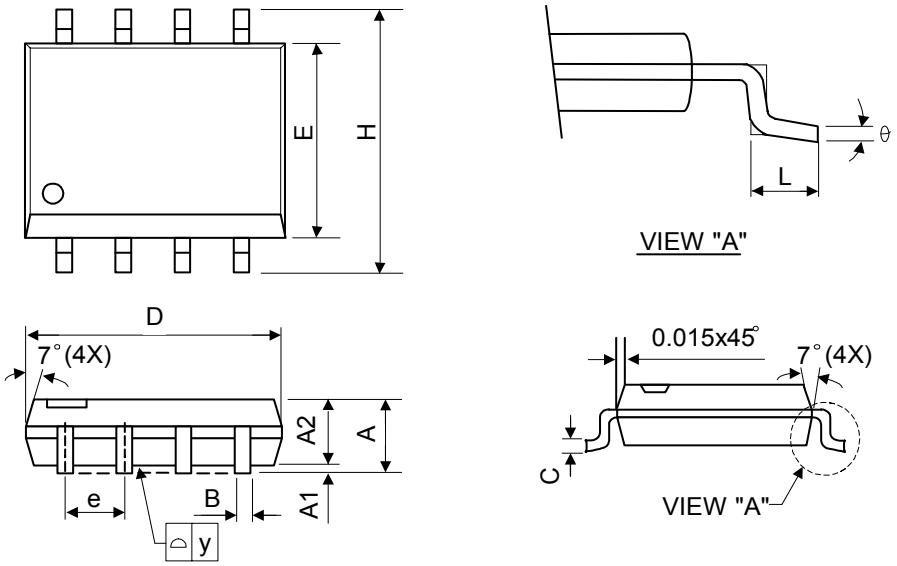
■ Marking Information

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^{O}	-	8^{O}	0^{O}	-	8^{O}