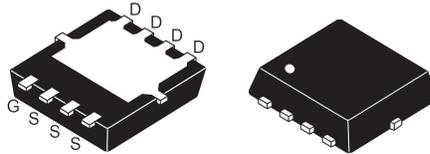
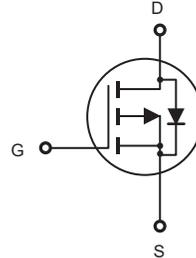


## P-Channel Enhancement Mode Field Effect Transistor

### FEATURES

- -20V, -47A,  $R_{DS(ON)} = 7m\Omega$  @ $V_{GS} = -10V$ .  
 $R_{DS(ON)} = 8.7m\Omega$  @ $V_{GS} = -4.5V$ .  
 $R_{DS(ON)} = 11m\Omega$  @ $V_{GS} = -2.5V$ .  
 $R_{DS(ON)} = 16m\Omega$  @ $V_{GS} = -1.8V$ .
- Super High dense cell design for extremely low  $R_{DS(ON)}$ .
- High power and current handling capability.
- RoHS compliant.



P-PAK 3X3

### ABSOLUTE MAXIMUM RATINGS $T_C = 25^\circ\text{C}$ unless otherwise noted

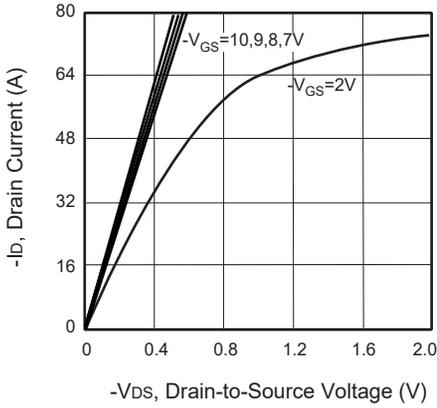
Parameter	Symbol	Limit	Units
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous	$I_D@R_{\theta Jc}$	-47	A
	$I_D@R_{\theta JA}$	-15	A
Drain Current-Pulsed <sup>a</sup>	$I_{DM}@R_{\theta Jc}$	-188	A
	$I_{DM}@R_{\theta JA}$	-60	A
Maximum Power Dissipation	$P_D$	25	W
Operating and Store Temperature Range	$T_J, T_{stg}$	-55 to 150	$^\circ\text{C}$

### Thermal Characteristics

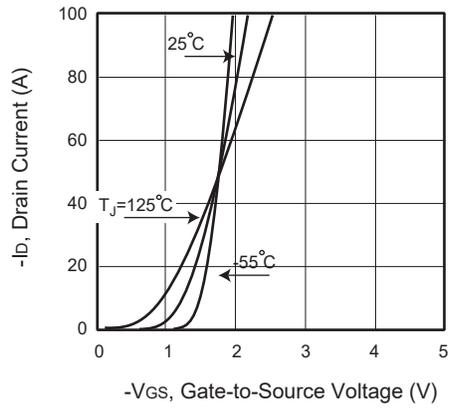
Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case	$R_{\theta Jc}$	5	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient <sup>b</sup>	$R_{\theta JA}$	50	$^\circ\text{C/W}$

## Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

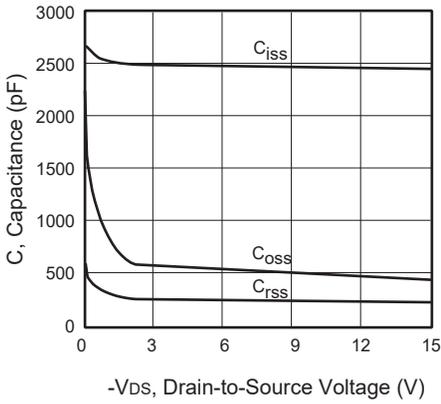
Parameter	Symbol	Test Condition	Min	Typ	Max	Units
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -20V, V_{GS} = 0V$			-1	$\mu A$
Gate Body Leakage Current, Forward	$I_{GSSF}$	$V_{GS} = 12V, V_{DS} = 0V$			100	nA
Gate Body Leakage Current, Reverse	$I_{GSSR}$	$V_{GS} = -12V, V_{DS} = 0V$			-100	nA
<b>On Characteristics <sup>c</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = -250\mu A$	-0.4		-1	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -10A$		5.8	7	$m\Omega$
		$V_{GS} = -4.5V, I_D = -5A$		6.7	8.7	$m\Omega$
		$V_{GS} = -2.5V, I_D = -3A$		8	11	$m\Omega$
		$V_{GS} = -1.8V, I_D = -2A$		11	16	$m\Omega$
<b>Dynamic Characteristics <sup>d</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -15V, V_{GS} = 0V,$ $f = 1.0\text{ MHz}$		2470		pF
Output Capacitance	$C_{oss}$			490		pF
Reverse Transfer Capacitance	$C_{rss}$			210		pF
<b>Switching Characteristics <sup>d</sup></b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -16V, I_D = -1A,$ $V_{GS} = -4.5V, R_{GEN} = 6\Omega$		36		ns
Turn-On Rise Time	$t_r$			21		ns
Turn-Off Delay Time	$t_{d(off)}$			323		ns
Turn-Off Fall Time	$t_f$			159		ns
Total Gate Charge	$Q_g$			50		nC
Gate-Source Charge	$Q_{gs}$	$V_{DS} = -16V, I_D = -1A,$ $V_{GS} = -4.5V$		6		nC
Gate-Drain Charge	$Q_{gd}$			13		nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Drain-Source Diode Forward Current	$I_S$				-19	A
Drain-Source Diode Forward Voltage <sup>c</sup>	$V_{SD}$	$V_{GS} = 0V, I_S = -1A$			-1.3	V
<b>Notes :</b> a.Repetitive Rating : Pulse width limited by maximum junction temperature b.Surface Mounted on FR4 Board, $t \leq 10\text{ sec.}$ c.Pulse Test : Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$ . d.Guaranteed by design, not subject to production testing.						



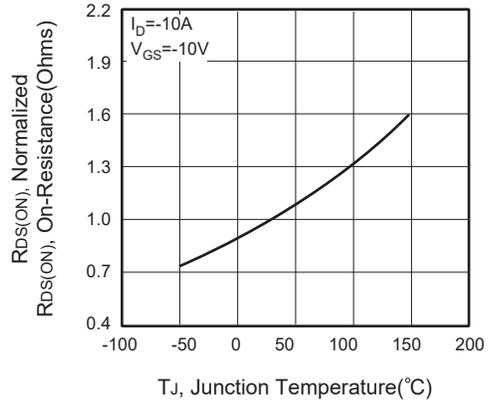
**Figure 1. Output Characteristics**



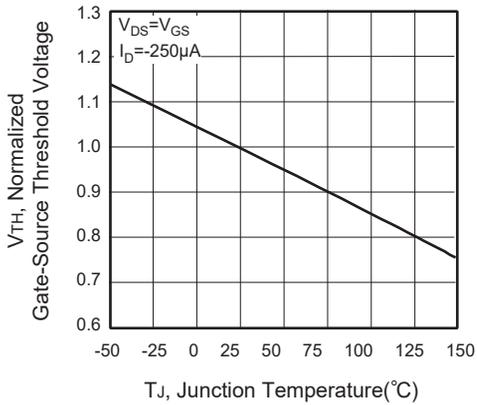
**Figure 2. Transfer Characteristics**



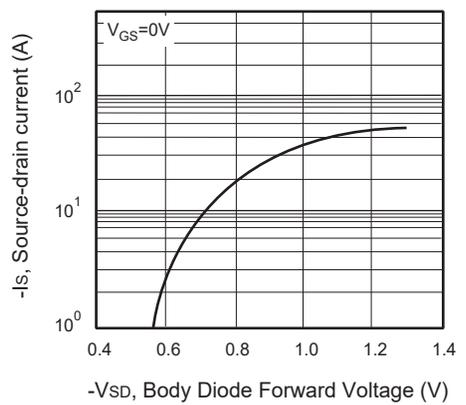
**Figure 3. Capacitance**



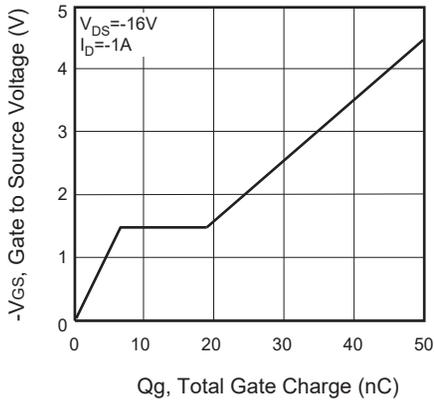
**Figure 4. On-Resistance Variation with Temperature**



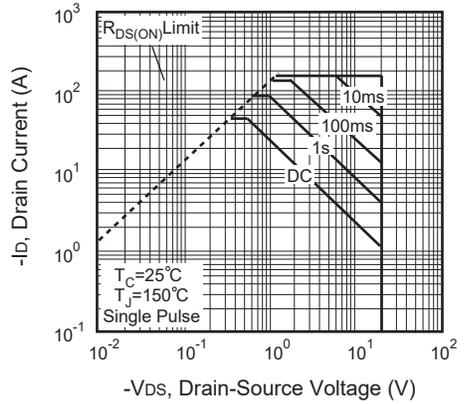
**Figure 5. Gate Threshold Variation with Temperature**



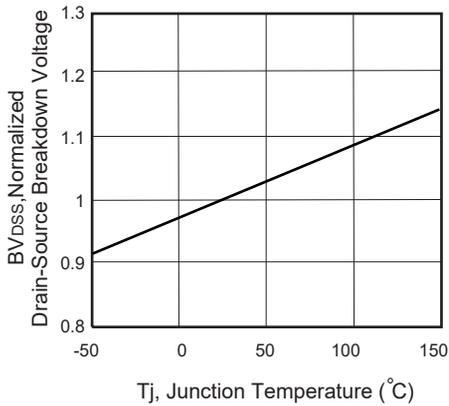
**Figure 6. Body Diode Forward Voltage Variation with Source Current**



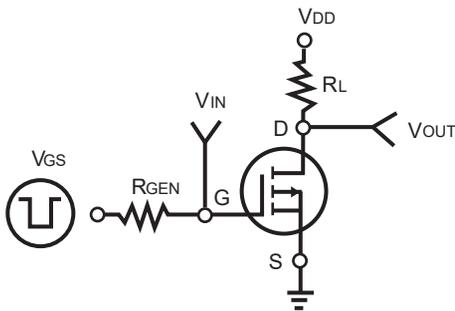
**Figure 7. Gate Charge**



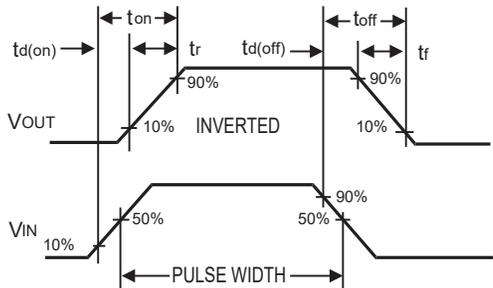
**Figure 8. Maximum Safe Operating Area**



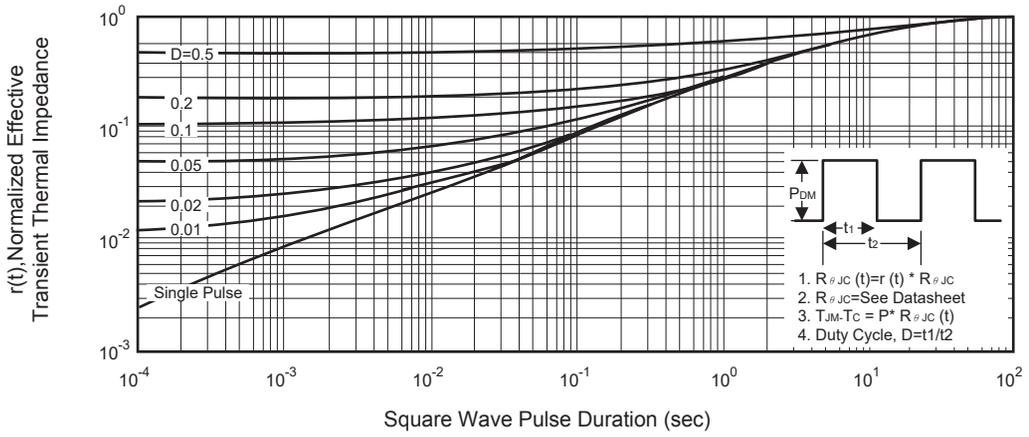
**Figure 9. Breakdown Voltage Variation VS Temperature**



**Figure 10. Switching Test Circuit**



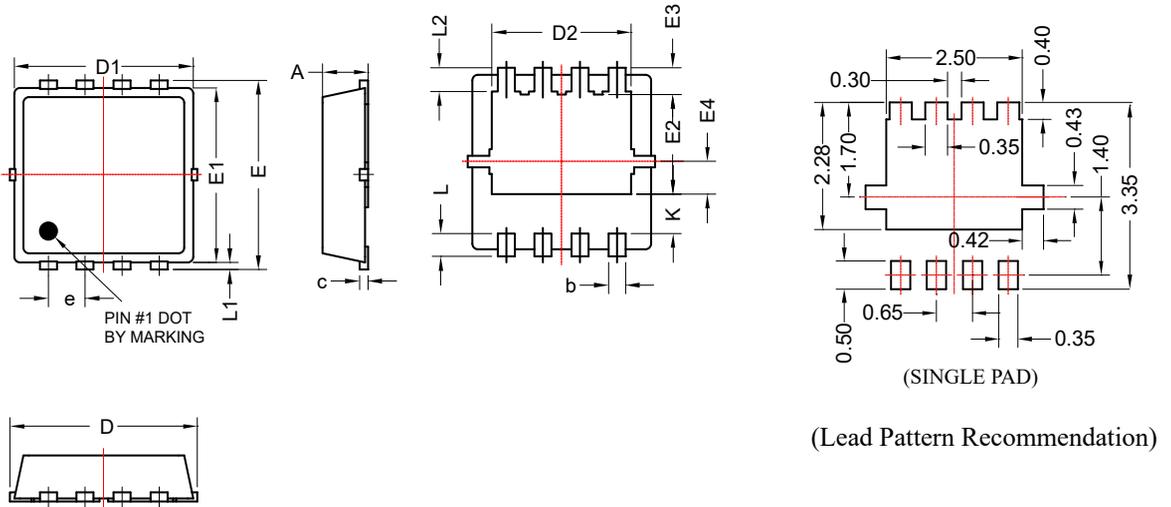
**Figure 11. Switching Waveforms**



**Figure 12. Normalized Thermal Transient Impedance Curve**

## P-PAK 3X3 產品外觀尺寸圖 (Product Outline Dimension)

### SINGLE PAD 尺寸圖



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.7	0.85	0.028	0.033
b	0.20	0.40	0.008	0.016
c	0.10	0.25	0.004	0.010
D	3.15	3.45	0.124	0.136
D1	3.00	3.25	0.118	0.128
D2	2.29	2.65	0.090	0.104
E	3.15	3.45	0.124	0.136
E1	2.90	3.20	0.114	0.126
E2	1.54	1.94	0.061	0.076
E3	0.28	0.65	0.011	0.026
E4	0.37	0.77	0.015	0.030
e	0.65(BSC)		0.026(BSC)	
K	0.50	0.89	0.02	0.035
L	0.30	0.50	0.012	0.020
L1	0.06	0.20	0.002	0.008
L2	0.27	0.57	0.011	0.022