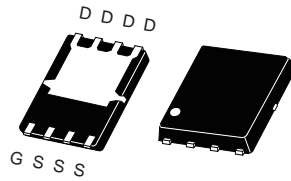


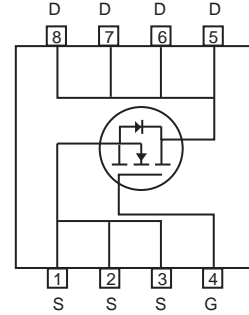
## N-Channel Enhancement Mode Field Effect Transistor

### FEATURES

- 40V, 121A,  $R_{DS(ON)} = 2.4\text{ m}\Omega$  @  $V_{GS} = 10V$ .  
 $R_{DS(ON)} = 3.5\text{ m}\Omega$  @  $V_{GS} = 4.5V$ .
- Super high dense cell design for extremely low  $R_{DS(ON)}$ .
- High power and current handling capability.
- Pb-free lead plating ; RoHS compliant.
- Halogen Free.
- Surface mount Package.



P-PAK 5X6



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

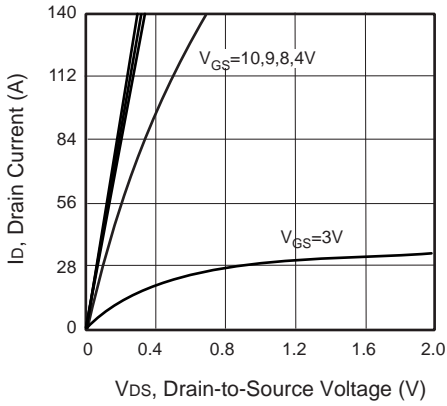
Parameter	Symbol	Limit	Units
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D @ R_{qJC}$	121	A
Drain Current-Continuous	$I_D @ R_{qJA}$	40	A
Drain Current-Pulsed <sup>a</sup>	$I_{DM} @ R_{qJC}$	484	A
Drain Current-Pulsed <sup>a</sup>	$I_{DM} @ R_{qJA}$	160	A
Maximum Power Dissipation	$P_D$	56	W
Single Pulsed Avalanche Energy <sup>d</sup>	$E_{AS}$	312.5	mJ
Single Pulsed Avalanche Current <sup>d</sup>	$I_{AS}$	25	A
Operating and Store Temperature Range	$T_J, T_{stg}$	-55 to 150	$^\circ\text{C}$

### Thermal Characteristics

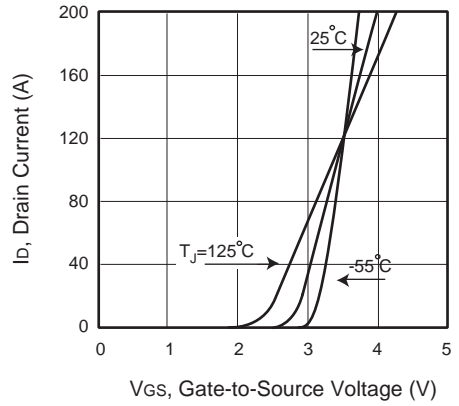
Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case	$R_{qJC}$	2.2	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{qJA}$	20	$^\circ\text{C/W}$

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

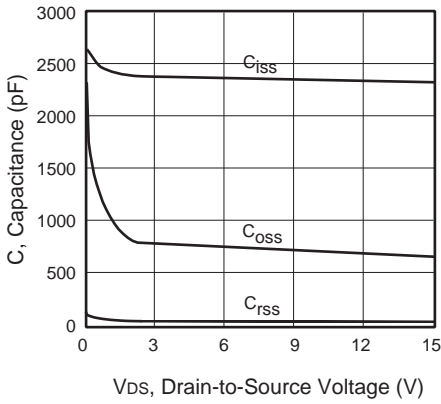
Parameter	Symbol	Test Condition	Min	Typ	Max	Units
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	40			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 40V, V_{GS} = 0V$			1	$\mu A$
Gate Body Leakage Current, Forward	$I_{GSSF}$	$V_{GS} = 20V, V_{DS} = 0V$			100	nA
Gate Body Leakage Current, Reverse	$I_{GSSR}$	$V_{GS} = -20V, V_{DS} = 0V$			-100	nA
<b>On Characteristics<sup>b</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	1		3	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 10A$		2.0	2.4	$m\Omega$
		$V_{GS} = 4.5V, I_D = 5A$		2.7	3.5	$m\Omega$
<b>Dynamic Characteristics<sup>c</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 15V, V_{GS} = 0V,$ $f = 1.0\text{ MHz}$		2325		pF
Output Capacitance	$C_{oss}$			675		pF
Reverse Transfer Capacitance	$C_{rss}$			35		pF
<b>Switching Characteristics<sup>c</sup></b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15V, I_D = 1A,$ $V_{GS} = 10V, R_{GEN} = 6\Omega$		29		ns
Turn-On Rise Time	$t_r$			5		ns
Turn-Off Delay Time	$t_{d(off)}$			67		ns
Turn-Off Fall Time	$t_f$			19		ns
Total Gate Charge	$Q_g$	$V_{DS} = 15V, I_D = 16A,$ $V_{GS} = 4.5V$		17		nC
Gate-Source Charge	$Q_{gs}$			6		nC
Gate-Drain Charge	$Q_{gd}$			9		nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Drain-Source Diode Forward Current	$I_S$				46	A
Drain-Source Diode Forward Voltage <sup>b</sup>	$V_{SD}$	$V_{GS} = 0V, I_S = 10A$			1.2	V
<b>Notes :</b> a.Repetitive Rating : Pulse width limited by maximum junction temperature. b.Pulse Test : Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$ . c.Guaranteed by design, not subject to production testing. d.L = 1mH, $I_{AS} = 25A$ , $V_{DD} = 24V$ , $R_G = 25\Omega$ , Starting $T_J = 25^\circ\text{C}$ .						



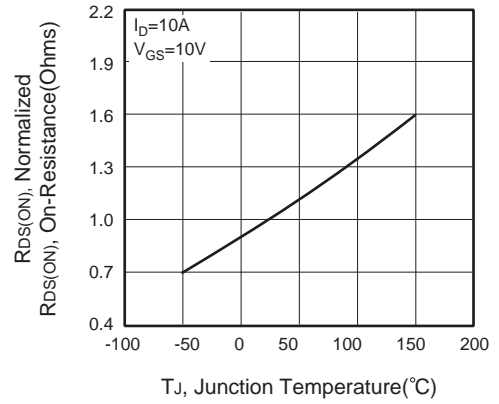
**Figure 1. Output Characteristics**



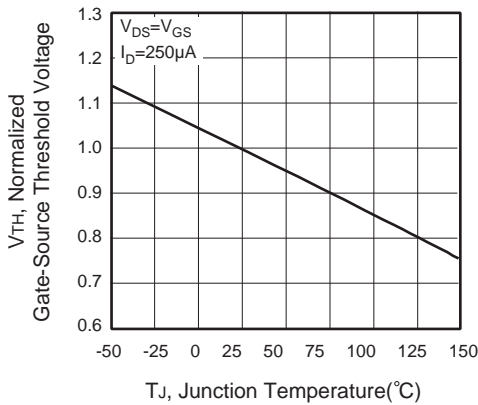
**Figure 2. Transfer Characteristics**



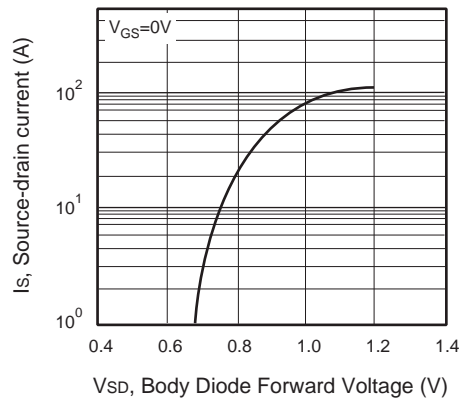
**Figure 3. Capacitance**



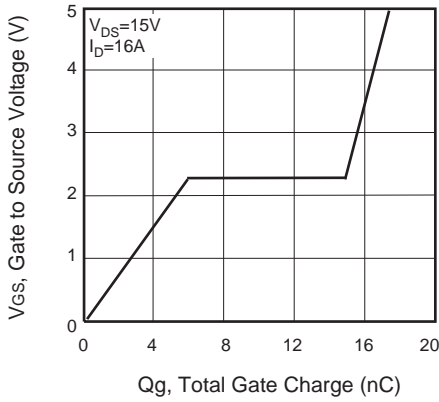
**Figure 4. On-Resistance Variation with Temperature**



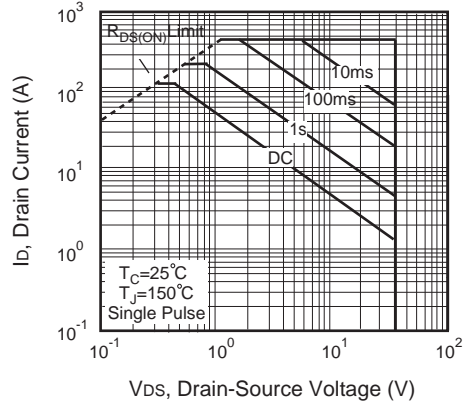
**Figure 5. Gate Threshold Variation with Temperature**



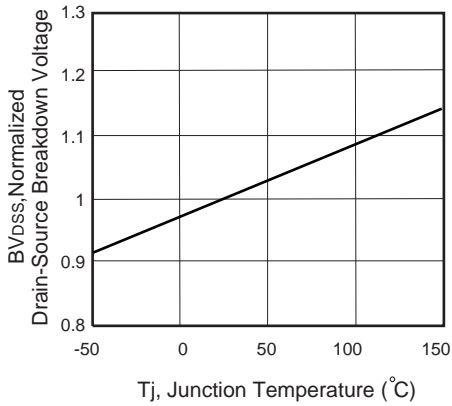
**Figure 6. Body Diode Forward Voltage Variation with Source Current**



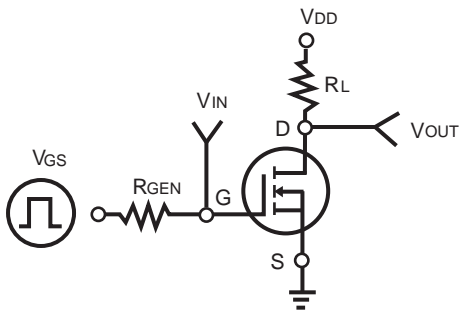
**Figure 7. Gate Charge**



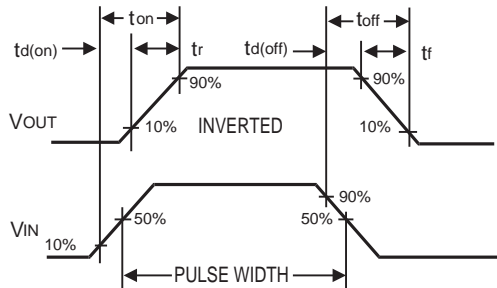
**Figure 8. Maximum Safe Operating Area**



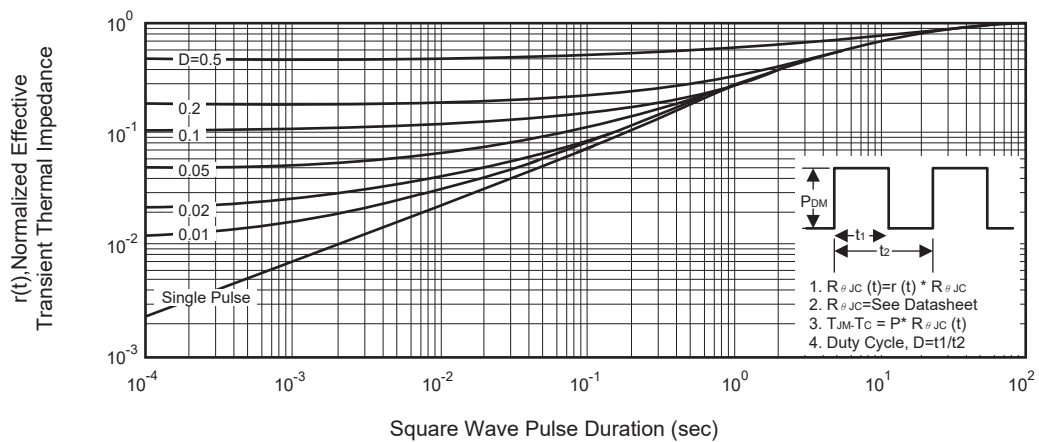
**Figure 9. Breakdown Voltage Variation VS Temperature**



**Figure 10. Switching Test Circuit**



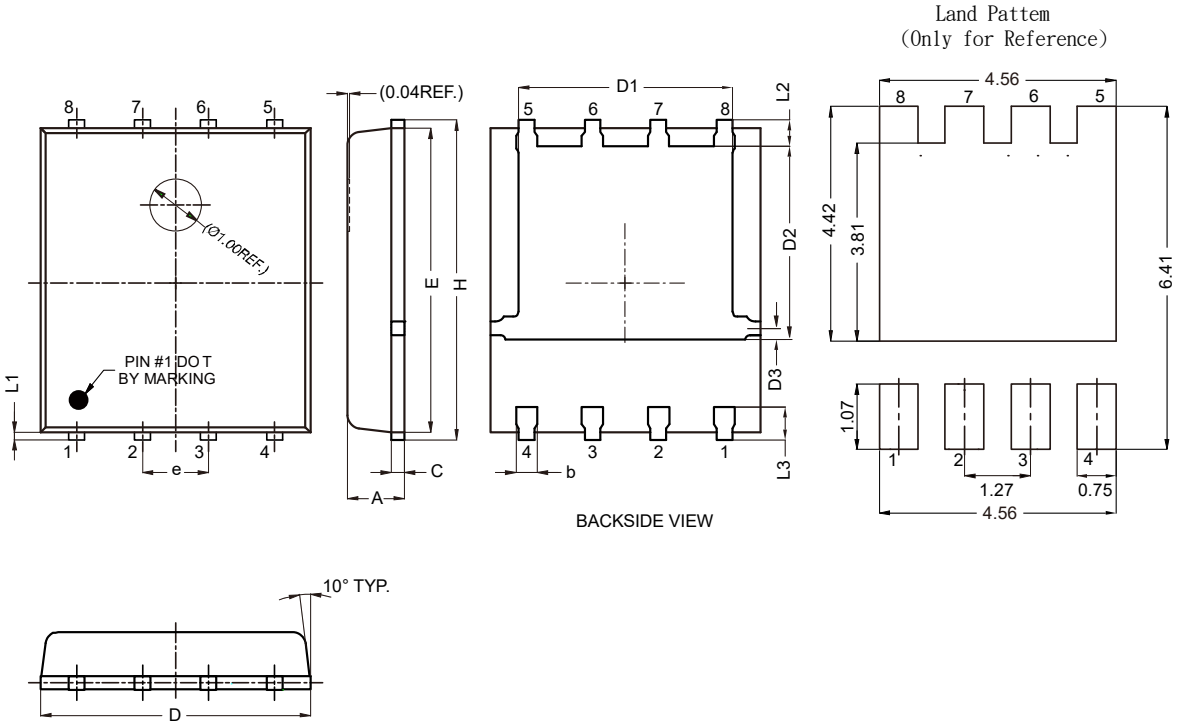
**Figure 11. Switching Waveforms**



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

## P-PAK5X6 產品外觀尺寸圖 (Product Outline Dimension)

### SINGLE PAD 尺寸圖



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.000	1.200	0.039	0.047
b	0.330	0.500	0.013	0.020
c	0.200	0.300	0.008	0.012
D	5.000	5.400	0.197	0.213
D1	3.800	4.250	0.150	0.167
D2	3.520	3.920	0.139	0.154
D3	0.396	0.436	0.016	0.017
E	5.760	5.960	0.227	0.235
e	1.270 TYP		0.050 TYP	
H	6.050	6.250	0.238	0.246
L1	0.080	0.220	0.003	0.009
L2	0.400	0.600	0.016	0.024
L3	0.500	0.700	0.020	0.028