

N-Channel Enhancement Mode Field Effect Transistor

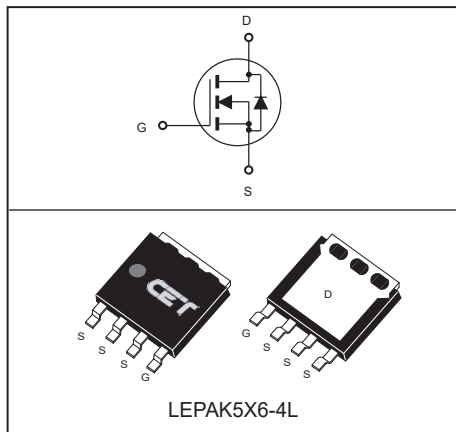
FEATURES

- High power and current handling capability.
- Reliable and rugged.
- Pb-free lead plating ; RoHS compliant.
- Halogen Free.
- Surface mount Package.

APPLICATIONS

- DC to DC converter.
- Motor drive control.
- SMPS.

V_{DS}	$R_{DS(ON)}$ typ @ V_{GS}	I_D
45V	$0.58m\Omega @ V_{GS} = 10V$	292A
45V	$0.85m\Omega @ V_{GS} = 4.5V$	233A



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

Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	45	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current-Continuous	$I_D @ R_{\theta JC}$	$T_C = 25^\circ\text{C}$	292	A
		$T_C = 70^\circ\text{C}$	244	A
	$I_D @ R_{\theta JA}$	$T_A = 25^\circ\text{C}$	77	A
		$T_A = 70^\circ\text{C}$	65	A
Drain Current-Pulsed ^a	$I_{DM} @ R_{\theta JC}$	$T_C = 25^\circ\text{C}$	1168	A
	$I_{DM} @ R_{\theta JA}$	$T_A = 25^\circ\text{C}$	308	A
Maximum Power Dissipation		P_D	107	W
Single Pulsed Avalanche Energy ^d		E_{AS}	140	mJ
Single Pulsed Avalanche Current ^d		I_{AS}	53	A
Operating and Store Temperature Range		T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.4	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	20	$^\circ\text{C/W}$

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	45			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 40V, V_{GS} = 0V$			1	μA
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
On Characteristics [ⓑ]						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	1		3	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$		0.58	0.7	m Ω
		$V_{GS} = 4.5V, I_D = 15A$		0.85	1.1	m Ω
Gate input resistance	R_g	f=1MHz,open Drain		2		Ω
Dynamic Characteristics [ⓒ]						
Input Capacitance	C_{iss}	$V_{DS} = 20V, V_{GS} = 0V, f = 1.0 MHz$		5495		pF
Output Capacitance	C_{oss}			2825		pF
Reverse Transfer Capacitance	C_{rss}			210		pF
Switching Characteristics [ⓒ]						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 20V, I_D = 20A, V_{GS} = 10V, R_{GEN} = 4.5\Omega$		24		ns
Turn-On Rise Time	t_r			11		ns
Turn-Off Delay Time	$t_{d(off)}$			76		ns
Turn-Off Fall Time	t_f			27		ns
Total Gate Charge	Q_g	$V_{DS} = 20V, I_D = 20A, V_{GS} = 10V$		80		nC
Total Gate Charge	Q_g	$V_{DS} = 20V, I_D = 20A, V_{GS} = 4.5V$		43		nC
Gate-Source Charge	Q_{gs}			11		nC
Gate-Drain Charge	Q_{gd}			17		nC
Drain-Source Diode Characteristics and Maximun Ratings						
Drain-Source Diode Forward Current	I_S				89	A
Drain-Source Diode Forward Voltage [ⓑ]	V_{SD}	$V_{GS} = 0V, I_S = 1A$			1.2	V
Reverse Recovery Time	T_{rr}	$I_F = 20A, di/dt = 100A/us$		65		ns
Reverse Recovery Charge	Q_{rr}			97		nC
Notes :						
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 = 0.1mH, $I_{AS} = 53A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^\circ C$.						

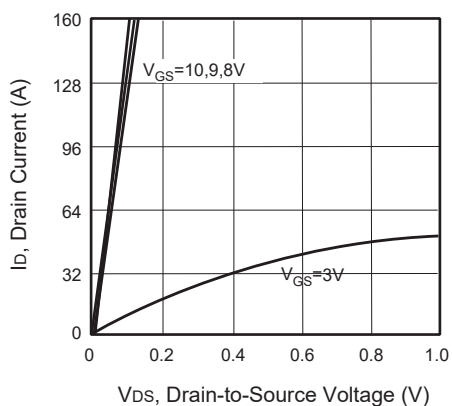


Figure 1. Output Characteristics

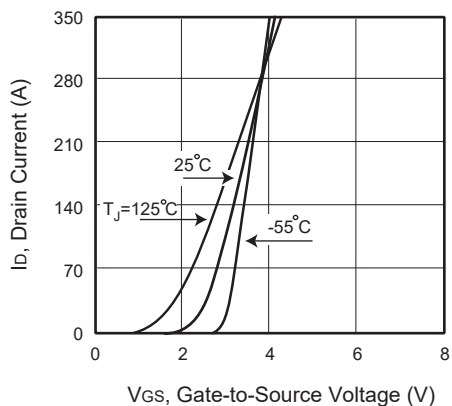


Figure 2. Transfer Characteristics

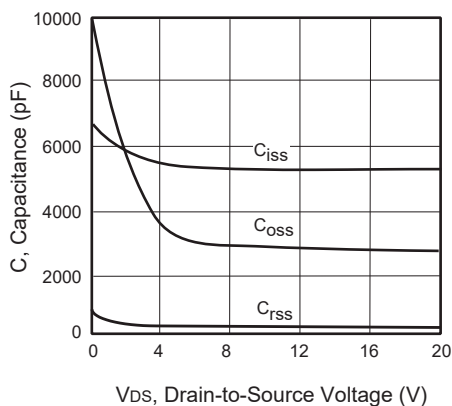


Figure 3. Capacitance

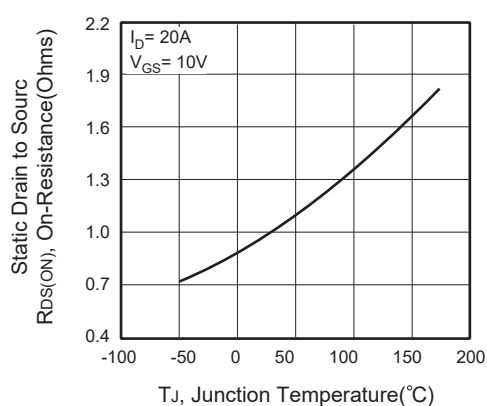


Figure 4. On-Resistance Variation with Temperature

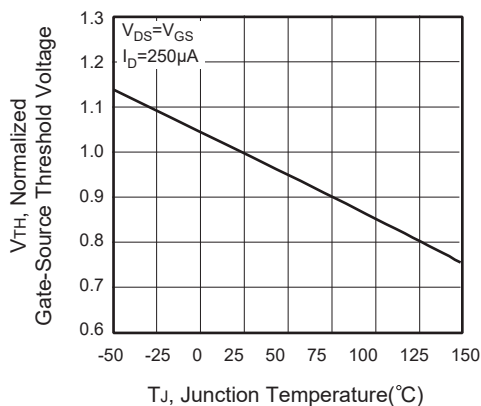


Figure 5. Gate Threshold Variation with Temperature

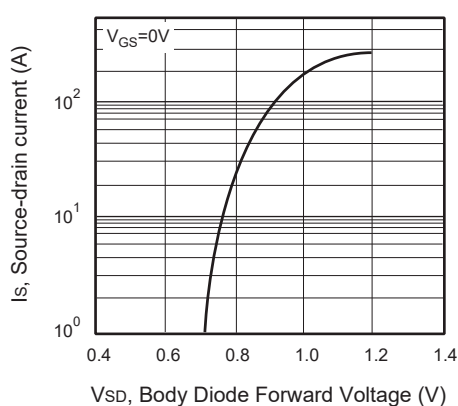


Figure 6. Body Diode Forward Voltage Variation with Source Current

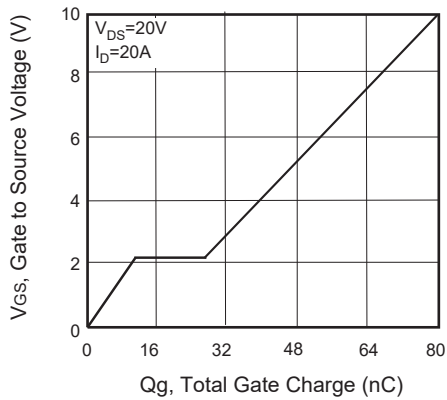


Figure 7. Gate Charge

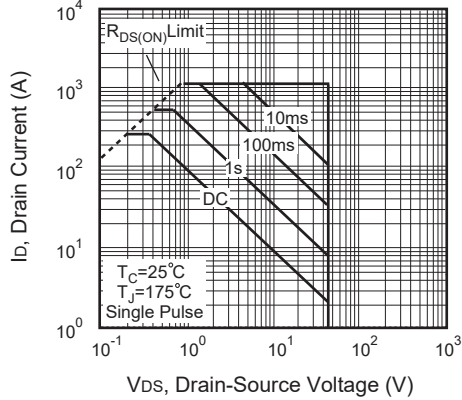


Figure 8. Maximum Safe Operating Area

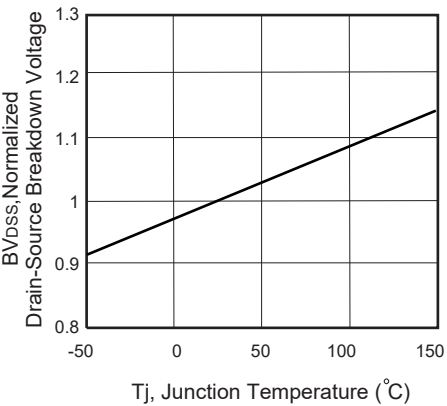


Figure 9. Breakdown Voltage Variation VS Temperature

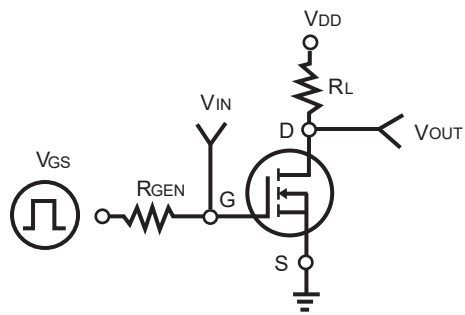


Figure 10. Switching Test Circuit

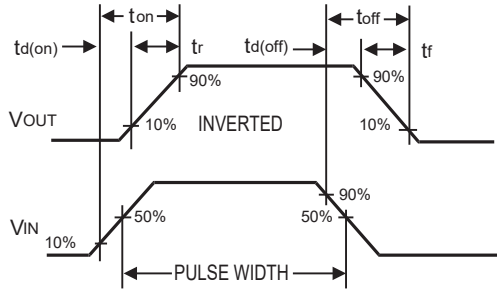


Figure 11. Switching Waveforms

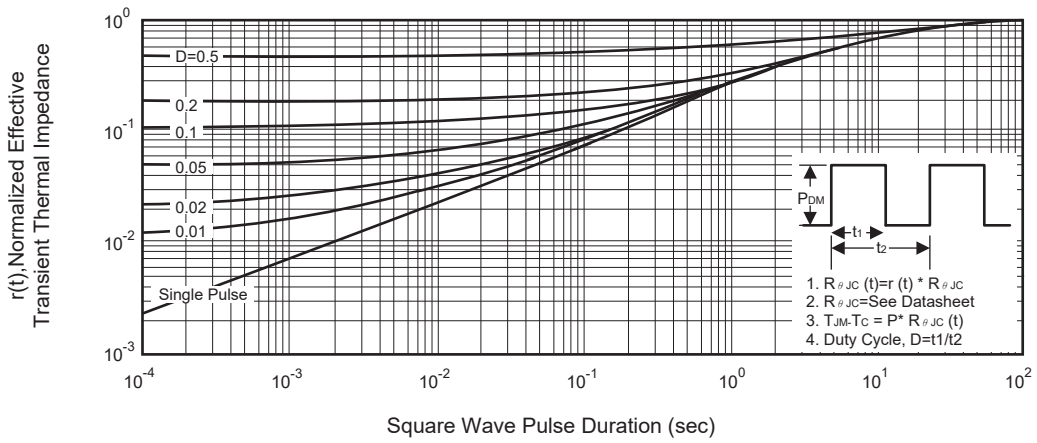
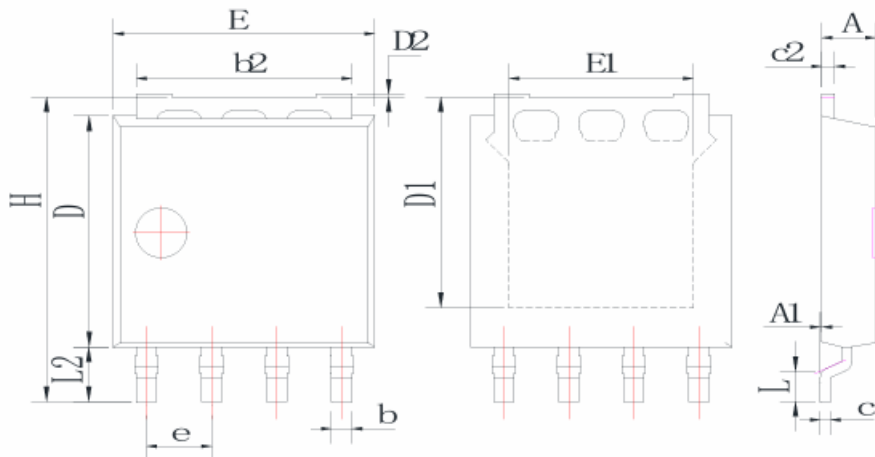


Figure 12. Normalized Thermal Transient Impedance Curve

LFPAK 5X6 產品外觀尺寸圖 (Product Outline Dimension)



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.000	1.100	0.039	0.043
A1	0.000	0.150	0.000	0.006
b	0.350	0.500	0.014	0.020
b2	4.010	4.410	0.158	0.174
c	0.180	0.250	0.007	0.010
c2	0.230	0.300	0.009	0.012
D	4.440	4.700	0.175	0.185
D1	4.100	4.400	0.161	0.173
D2	~	0.200	0.000	0.008
e	1.220	1.320	0.048	0.052
E	5.000	5.250	0.197	0.207
E1	3.500	3.700	0.138	0.146
H	6.050	6.250	0.238	0.246
L	0.400	0.800	0.016	0.031
L2	0.900	0.130	0.035	0.005