

MOSFET

150A,40V,2.2mΩ N-CHANNEL MOSFET

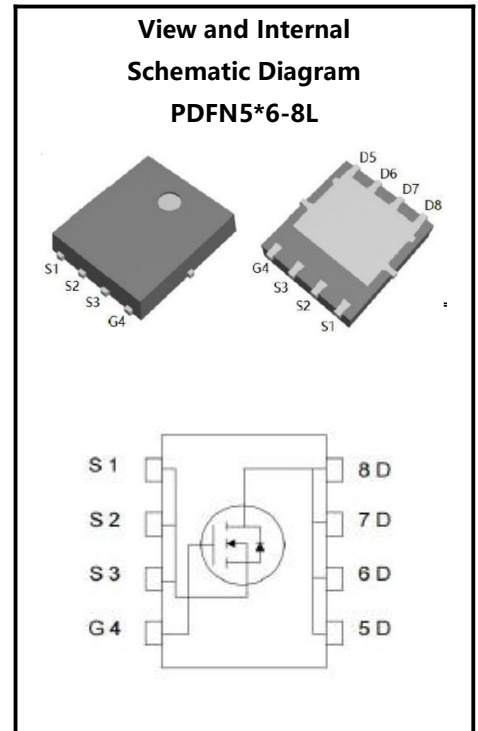
Features

- ◆ Low gate charge
- ◆ Low Ciss
- ◆ Fast switching
- ◆ 100% avalanche tested

Applications

- ◆ Synchronous Rectification for AC/DC Quick Charger
- ◆ Battery management
- ◆ UPS(Uninterruptible Power Supplies)

Parameter	Values	Unit
BV_{DSS}	40	V
I_D	150	A
$R_{Dson(max)}$	2.2	mΩ
$V_{GS(th)}(Typ)$	1.8	V



Ordering Code	Marking	Package	Packaging
X2P2N040GLV8	X2P2N040GLV8	PDFN5*6-8L	Tape&reel

Absolute Maximum Ratings($T_C=25^{\circ}C$, unless otherwise noted)

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Drain-Source Voltage	V_{DSS}	-	-	40	V	-
Gate-Source Voltage	V_{GS}	-20	-	20	V	-
Continuous Drain Current(Note 1)	I_D	-	-	150	A	$T_C=25^{\circ}C$
		-	-	95	A	$T_C=100^{\circ}C$
Pulsed Drain Current(Note 2)	I_{DM}	-	-	600	A	-
Single Pulse Avalanche Energy	E_{AS}	-	-	100	mJ	$L=0.5mH, V_D=32V, T_C=25^{\circ}C$
Maximum Power Dissipation	P_D	-	-	83	W	$T_C=25^{\circ}C$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55	-	150	$^{\circ}C$	-

Thermal Characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Thermal resistance , Channel to Case	$R_{th(ch-c)}$	-	-	1.5	$^{\circ}C/W$	-

Electrical Characteristics ($T_j=25^{\circ}\text{C}$, unless otherwise noted)

Static characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Drain-Source Breakdown Voltage	BV_{DSS}	40	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	$V_{DS}=40V, V_{GS}=0V$
Gate-Body Leakage Current, Forward	I_{GSSF}	-	-	100	nA	$V_{GS}=20V, V_{DS}=0V$
Gate-Body Leakage Current, Reverse	I_{GSSR}	-	-	-100	nA	$V_{GS}=-20V, V_{DS}=0V$
Gate-Source Threshold Voltage	$V_{GS(th)}$	1.2	-	2.4	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Drain-Source On-State Resistance	$R_{DS(on)}$	-	1.7	2.2	m Ω	$V_{GS}=10V, I_D=20A$
		-	2.5	3.0	m Ω	$V_{GS}=4.5V, I_D=20A$
Gate Resistance	R_g	-	2.1	-	Ω	$V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$
Forward Transconductance	g_{fs}	-	44.6	-	S	$V_{DS}=5V, I_D=20A$

Dynamic characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Input Capacitance	C_{iss}	-	3855	-	pF	$V_{DS}=25V, V_{GS}=0V, f=1.0\text{MHz}$
Output Capacitance	C_{oss}	-	2937	-		
Reverse Transfer Capacitance	C_{rss}	-	555	-		
Turn-On Delay Time	$t_{d(on)}$	-	16	-	ns	$V_{DD}=20V, I_D=50A, V_{GS}=10V, R_G=2.7\Omega$
Turn-On Rise Time	t_r	-	104	-		
Turn-Off Delay Time	$t_{d(off)}$	-	86	-		
Turn-Off Fall Time	t_f	-	105	-		

Gate charge characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Total Gate Charge	Q_g	-	66.3	-	nC	$V_{DS}=32V, I_D=10A, V_{GS}=10V$
Gate-Source Charge	Q_{gs}	-	13.5	-		
Gate-Drain Charge	Q_{gd}	-	12.2	-		

Reverse diode

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Continuous Diode Forward Current	I_S	-	-	150	A	-
Pulsed Diode Forward Current	I_{SM}	-	-	600	A	-
Diode Forward Voltage	V_{SD}	-	-	1.2	V	$I_S=20A, V_{GS}=0V$
Reverse Recovery Time	t_{rr}	-	56	-	ns	$V_{DS}=30V, V_{GS}=0V, I_S=50A$
Reverse Recovery Charge	Q_{rr}	-	76	-	nC	$di/dt=100A/\mu s$

Notes

1. Computed continuous current assumes the condition of T_{j_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under $T_{j_Max} = 150^{\circ}\text{C}$.

RATING AND CHARACTERISTIC CURVES



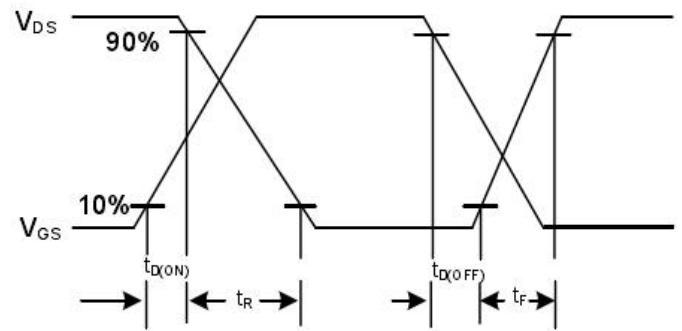
Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms



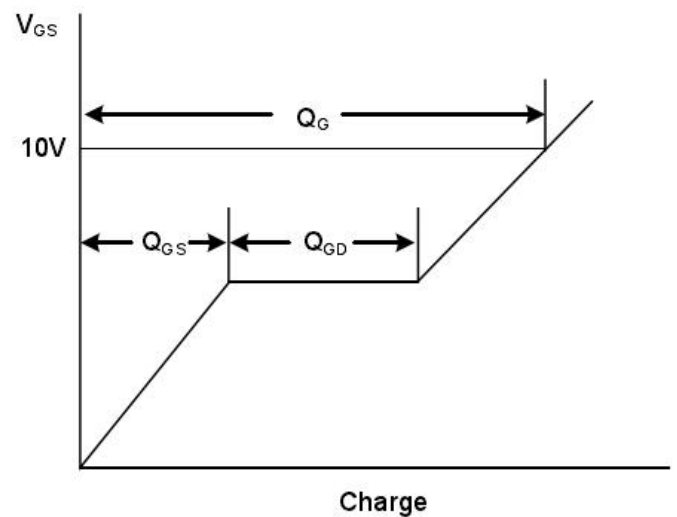
Switching Test Circuit



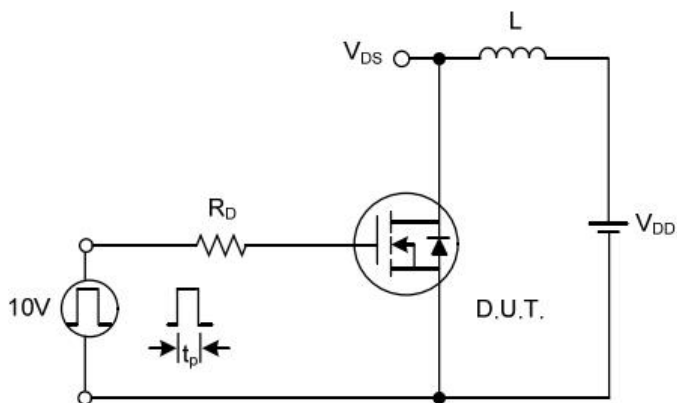
Switching Waveforms



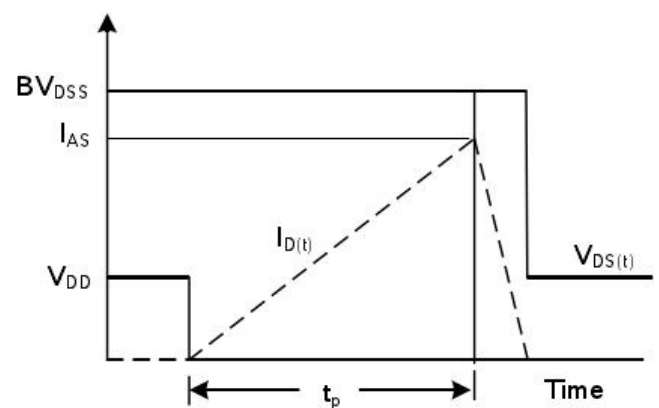
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

RATING AND CHARACTERISTIC CURVES

Figure.1 Typical Output Characteristics

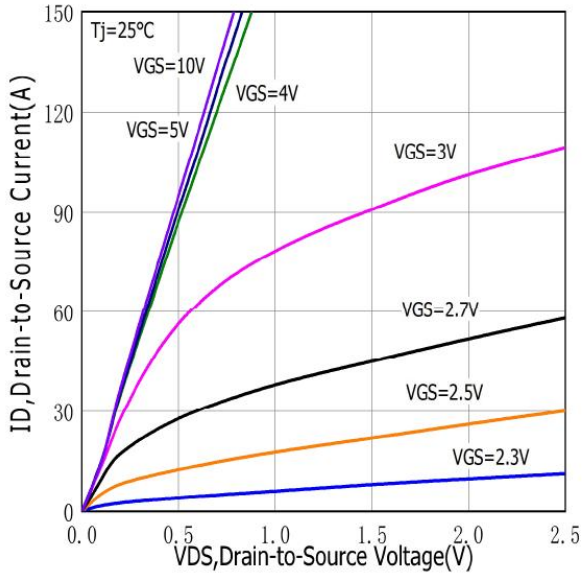


Figure.2 Typical Gate Charge vs Gate to Source Voltage

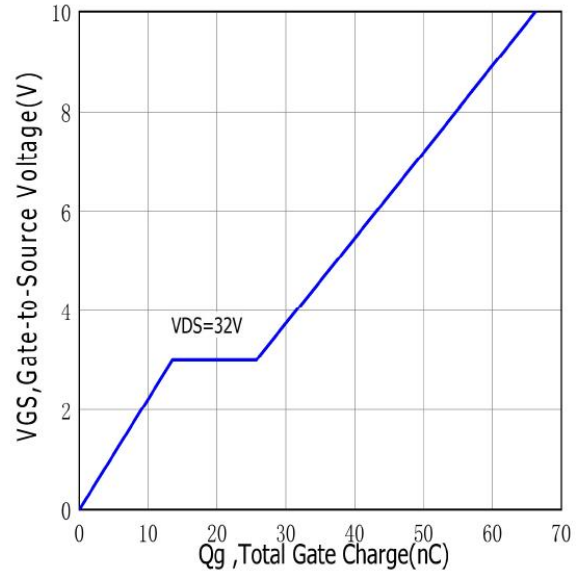


Figure.3 Typical Body Diode Transfer Characteristics

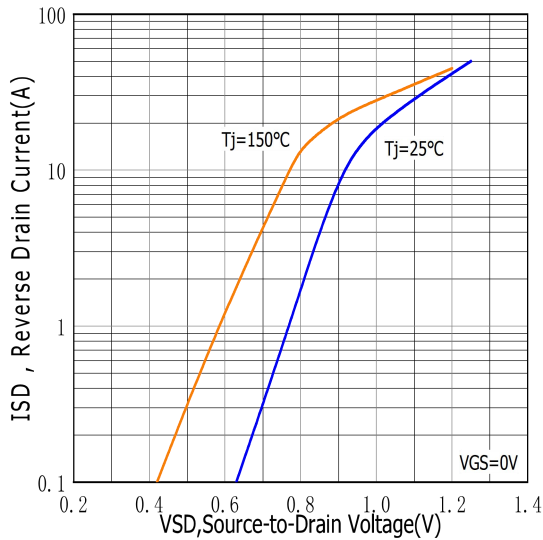


Figure.4 Typical Capacitance vs Drain to Source Voltage

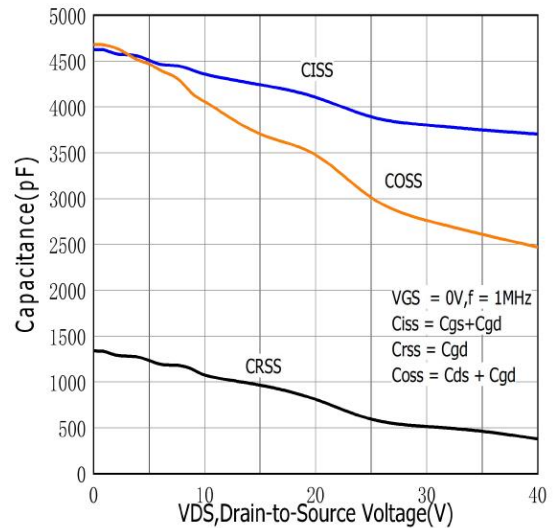


Figure.5 Typical Breakdown Voltage vs Junction Temperature

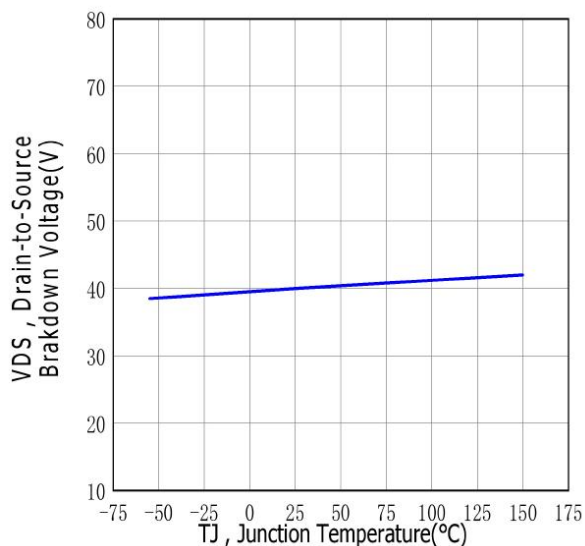


Figure.6 Typical Drain to Source on Resistance vs Junction Temperature

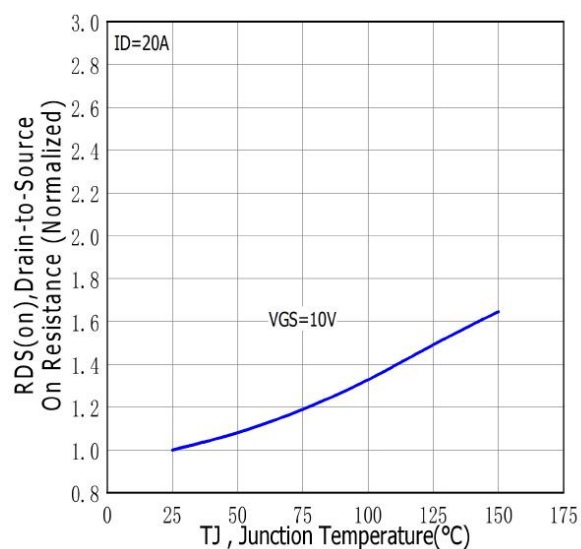


Figure.7 Drain Current Derating

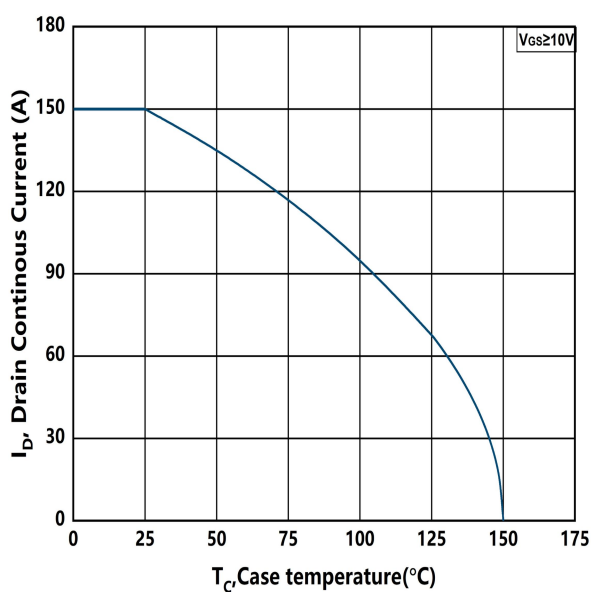


Figure.8 Typical Drain to Source ON Resistance vs Drain Current

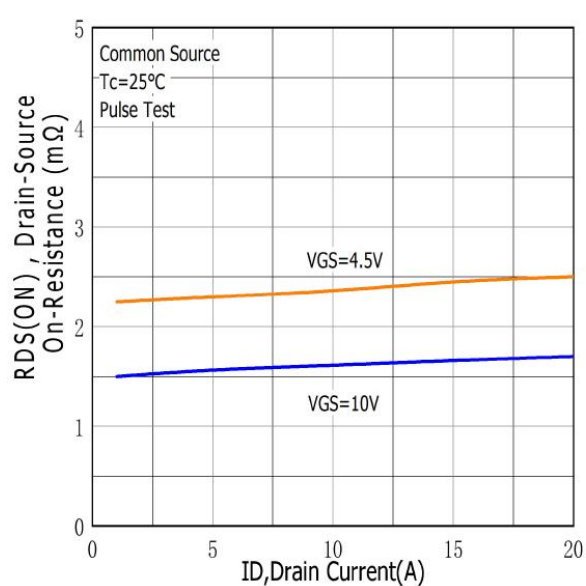


Figure.9 Maximum EAS vs Channel Temperature

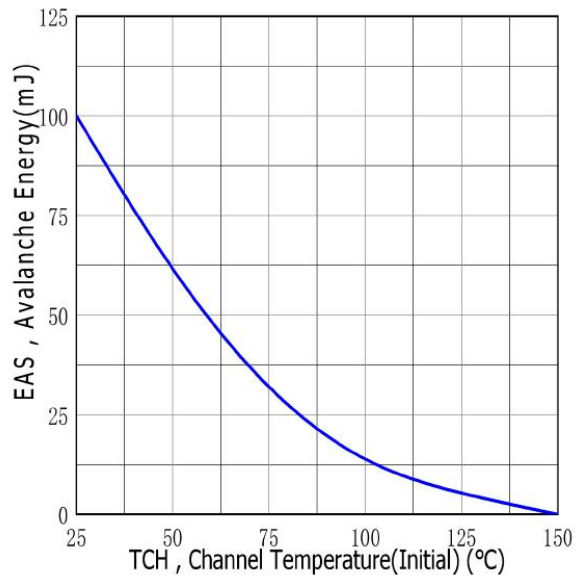


Figure.10 Typical Threshold Voltage vs Case Temperature

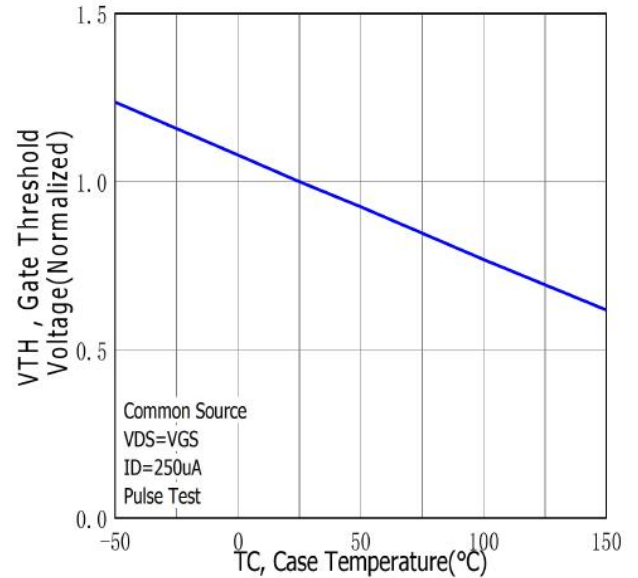


Figure.11 Typical Transfer Characteristics

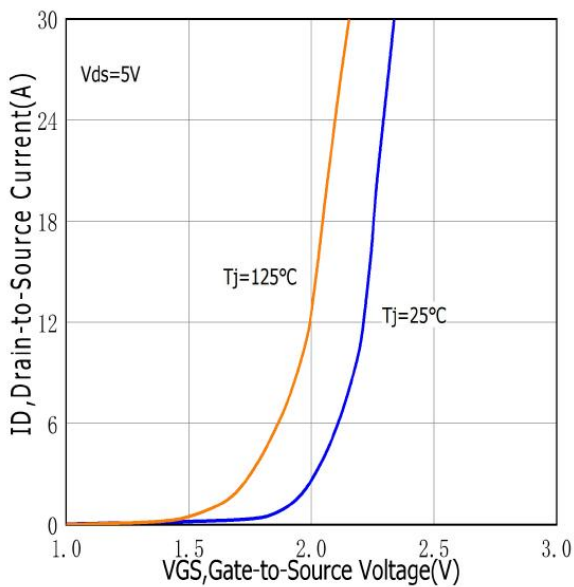


Figure.12 Maximum Power Dissipation vs Case Temperature

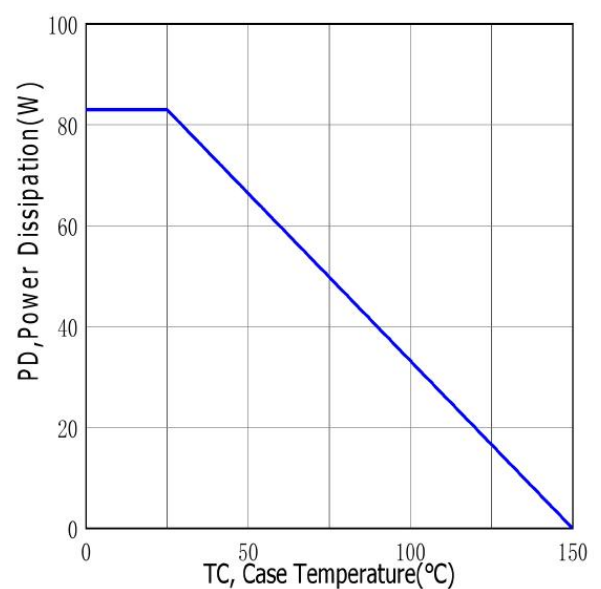


Figure.13 Safe Operating Area

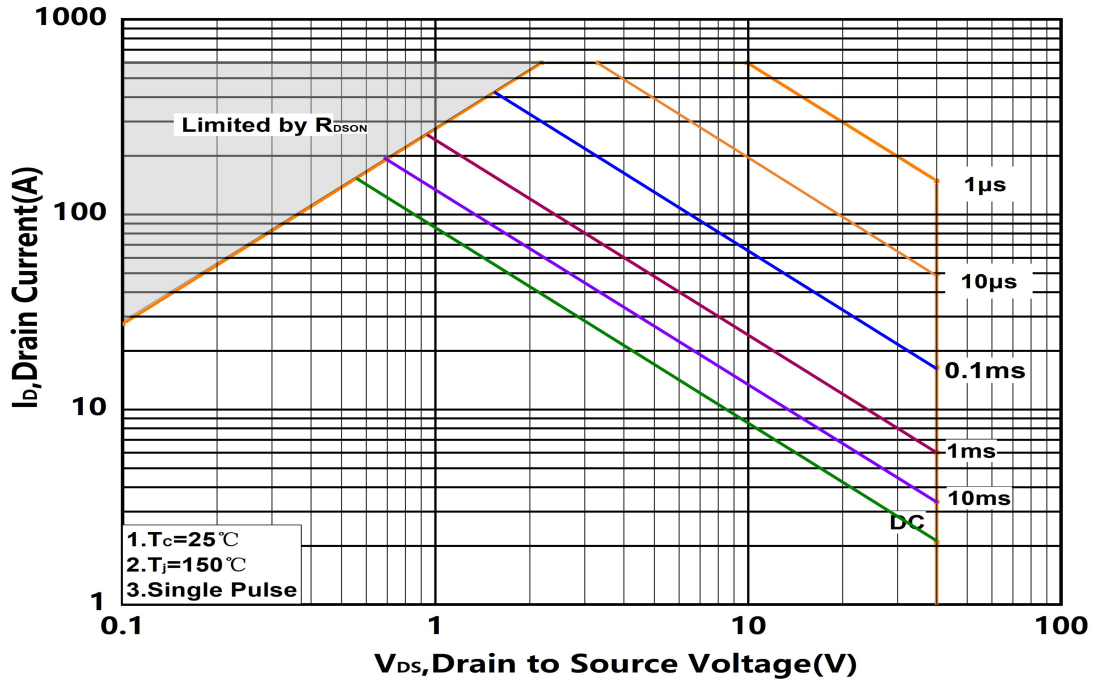
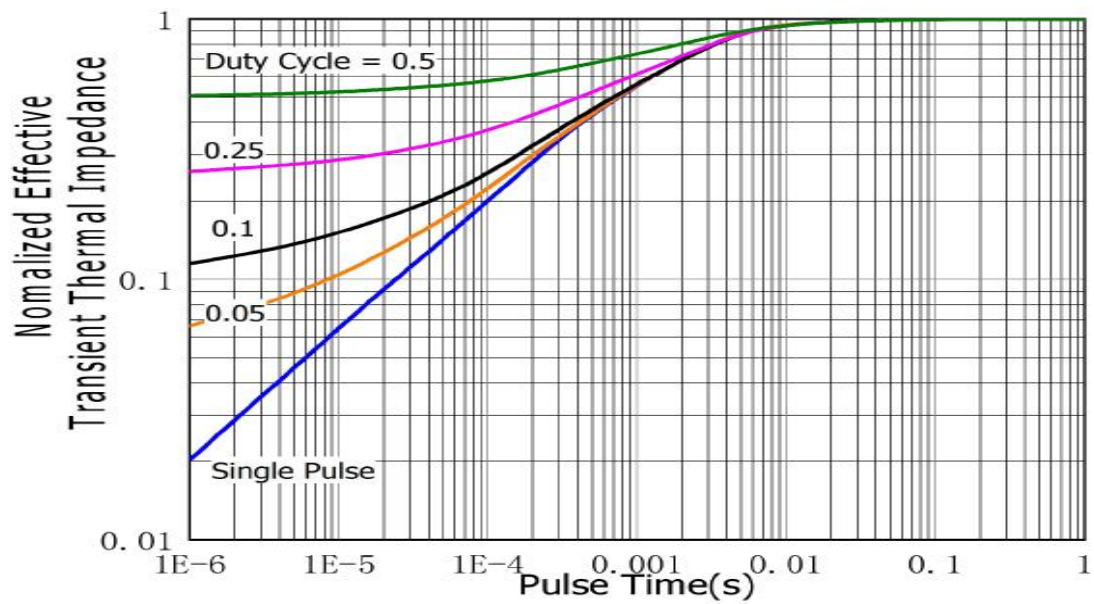
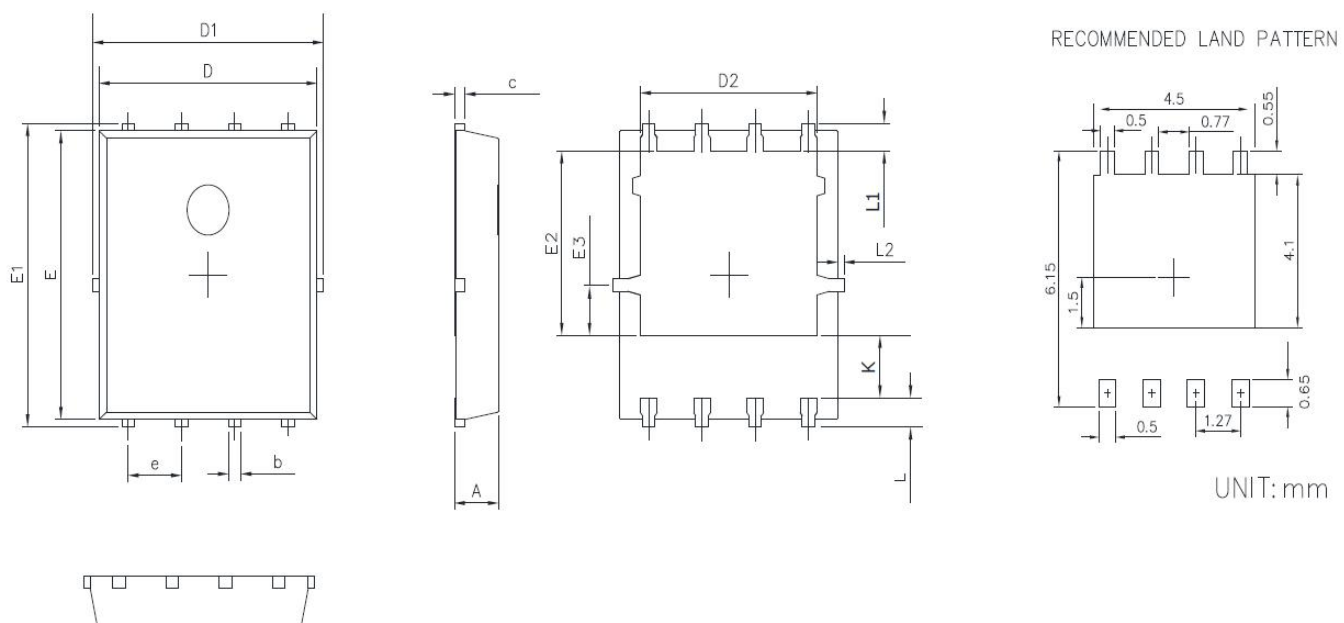


Figure.14 Maximum Effective Thermal Impedance , Junction to Case



Package Outline: PDFN5*6-8L



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.90	1.10	0.035	0.043
b	0.25	0.50	0.010	0.020
c	0.10	0.30	0.004	0.012
D	4.80	5.30	0.189	0.209
D1	4.90	5.50	0.193	0.217
D2	3.92	4.20	0.154	0.165
E	5.65	5.85	0.222	0.230
E1	5.90	6.20	0.232	0.244
E2	3.33	3.78	0.131	0.149
E3	0.80	1.00	0.031	0.039
e	1.27		0.050	
L	0.40	0.70	0.016	0.028
L1	0.65		0.026	
L2	0.00	0.15	0.000	0.006
K	1.00	1.50	0.039	0.059