

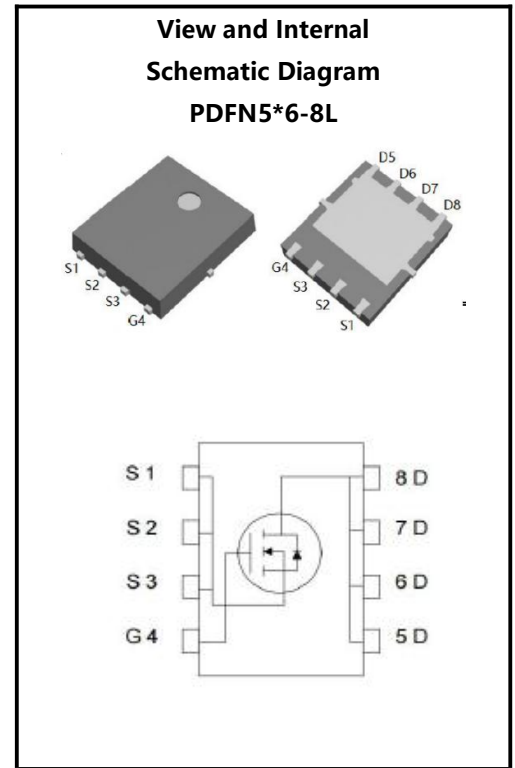
**Features**

- ◆ Extremely low on-resistance  $R_{DS(on)}$
- ◆ Excellent  $Q_g \times R_{DS(on)}$  product(FOM)
- ◆ Excellent Low Ciss
- ◆ High robustness and reliability
- ◆ Increases maximum current capability
- ◆ Low power loss, high power density
- ◆ Easy paralleling

**Applications**

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

Parameter	Values	Unit
$BV_{DSS}$	45	V
$I_D$	216	A
$R_{Dson(max)}$	1.6	m $\Omega$
$V_{GS(th)}$ (Typ)	3.0	V

**MOSFET**216A,45V,1.6m $\Omega$  N-CHANNEL MOSFET

Ordering Code	Marking	Package	Packaging
XC1P6N045GHV8	XC1P6N045GHV8	PDFN5*6-8L	Tape&Reel

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

Parameter	Symbol	Values	Unit	Note/Test Conditions
Drain-Source Voltage	$V_{DSS}$	45	V	-
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V	-
Continuous Drain Current(Note 1)	$I_D$	216	A	$T_C=25^\circ\text{C}$
		137		$T_C=100^\circ\text{C}$
Pulsed Drain Current(Note 2)	$I_{DM}$	865	A	-
Single Pulse Avalanche Energy	$E_{AS}$	121	mJ	$L=0.5\text{mH}, V_D=32\text{V}, T_C=25^\circ\text{C}$
Power Dissipation	$P_D$	125	W	$T_C=25^\circ\text{C}$
		1.5		$T_a=25^\circ\text{C}$
Operating Junction and Storage Temperature Range	$T_j, T_{STG}$	-55~150	$^\circ\text{C}$	-

**Thermal Characteristics**

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Thermal resistance , Junction to Case	$R_{th(j-c)}$	-	-	1.0	$^\circ\text{C}/\text{W}$	-
Thermal resistance , Junction to Ambient	$R_{th(j-a)}$	-	-	81		-

## 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	$BV_{DSS}$	45	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	0.05	1	$\mu A$	$V_{DS}=45V, V_{GS}=0V, T_j=25^{\circ}\text{C}$
		-	-	100		$V_{DS}=45V, V_{GS}=0V, T_j=150^{\circ}\text{C}$
Gate-Body Leakage Current	$I_{GSS}$	-	$\pm 10$	$\pm 100$	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Gate-Source Threshold Voltage	$V_{GS(th)}$	2.0	-	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Drain-Source On-State Resistance	$R_{DS(on)}$	-	1.3	1.6	m $\Omega$	$V_{GS}=10V, I_D=20A$
Gate Resistance	$R_g$	-	2.5	-	$\Omega$	$V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$
Forward Transconductance	$g_{fs}$	-	43	-	S	$V_{DS}=5V, I_D=20A$

### Dynamic characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Input Capacitance	$C_{iss}$	-	4196	-	pF	$V_{DS}=20V, V_{GS}=0V, f=1.0\text{MHz}$
Output Capacitance	$C_{oss}$	-	1383	-		
Reverse Transfer Capacitance	$C_{rss}$	-	113	-		
Turn-On Delay Time	$t_{d(on)}$	-	17	-	ns	$V_{DD}=7V, I_D=30A, V_{GS}=10V, R_g=2.2\Omega$
Turn-On Rise Time	$t_r$	-	18.2	-		
Turn-Off Delay Time	$t_{d(off)}$	-	45	-		
Turn-Off Fall Time	$t_f$	-	11.6	-		

### Gate charge characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Total Gate Charge	$Q_g$	-	62	-	nC	$V_{DS}=20V, I_D=50A, V_{GS}=10V$
Gate-Source Charge	$Q_{gs}$	-	20	-		
Gate-Drain Charge	$Q_{gd}$	-	9	-		

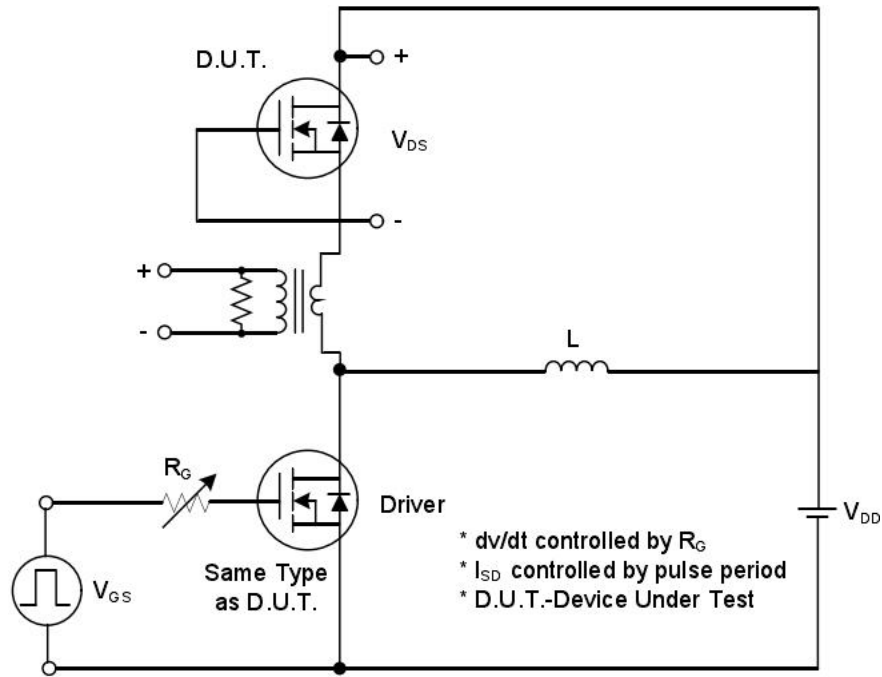
### Diode Characteristic

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Continuous Diode Forward Current	$I_S$	-	-	216	A	-
Pulsed Diode Forward Current	$I_{SM}$	-	-	865	A	-
Diode Forward Voltage	$V_{SD}$	-	0.78	1.2	V	$I_S=20A, V_{GS}=0V$
Reverse Recovery Time	$t_{rr}$	-	98	-	ns	$V_{DS}=30V, V_{GS}=0V, I_S=35A$
Reverse Recovery Charge	$Q_{rr}$	-	199	-	nC	$di/dt=100A/\mu s$

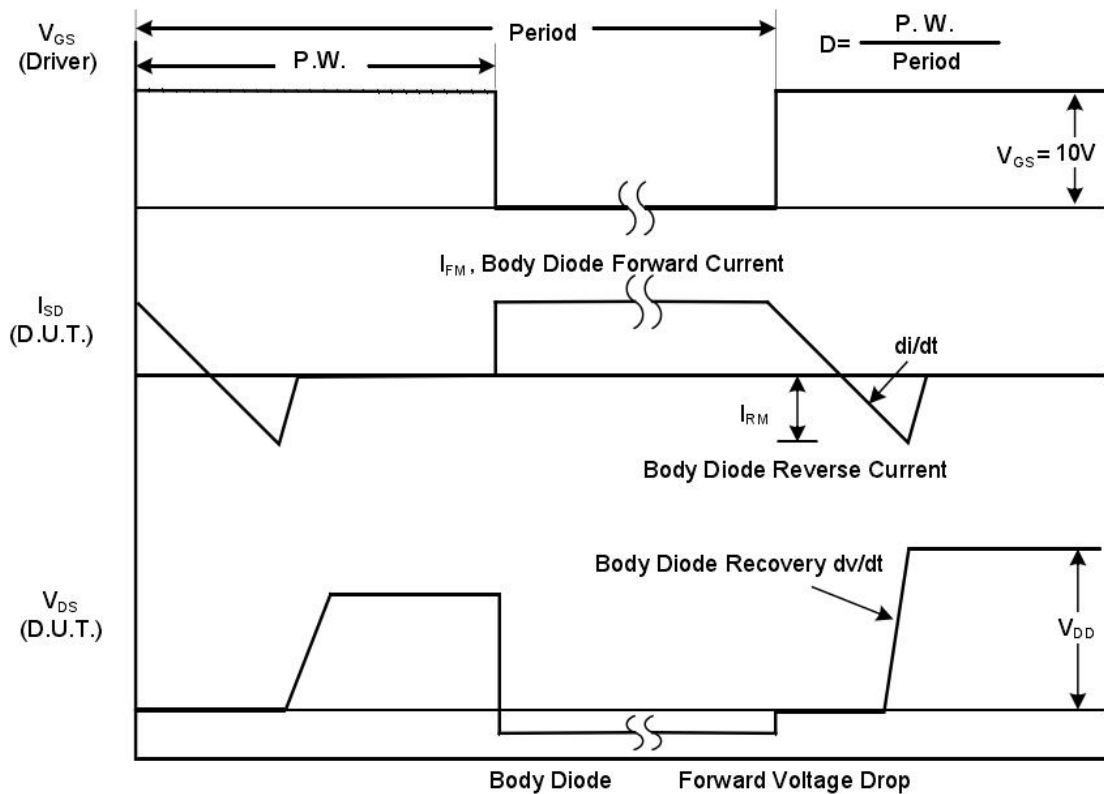
#### Notes

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  $T_{j\_Max} = 150^{\circ}\text{C}$ .

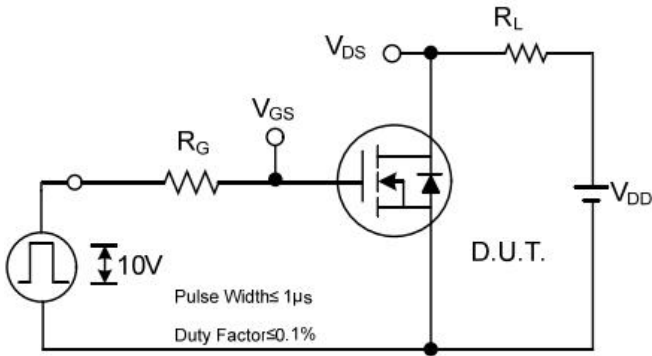
RATING AND CHARACTERISTIC CURVES



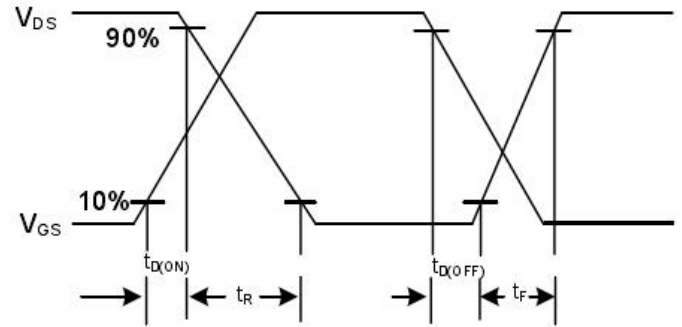
Peak Diode Recovery dv/dt Test Circuit



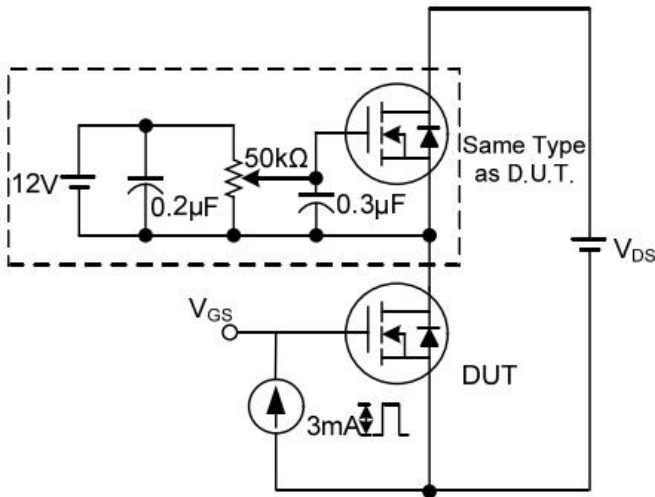
Peak Diode Recovery dv/dt Waveforms



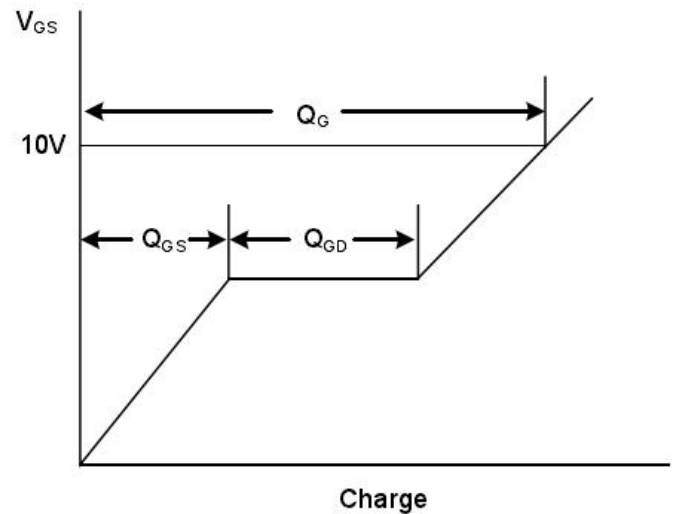
Switching Test Circuit



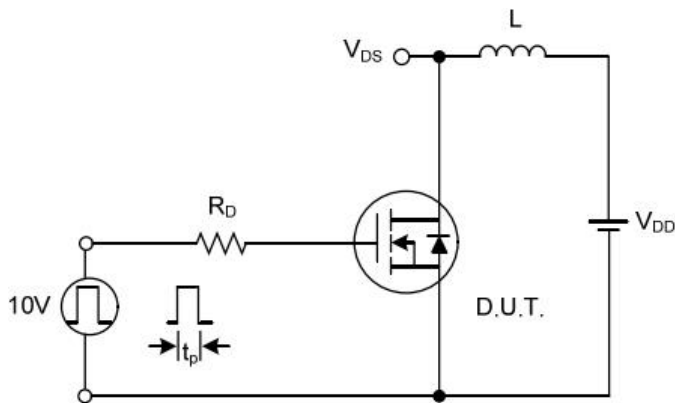
Switching Waveforms



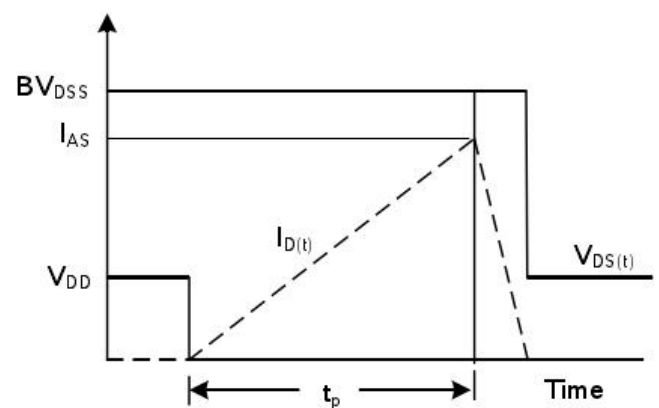
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



### RATING AND CHARACTERISTIC CURVES

Figure.1 Typical Output Characteristics

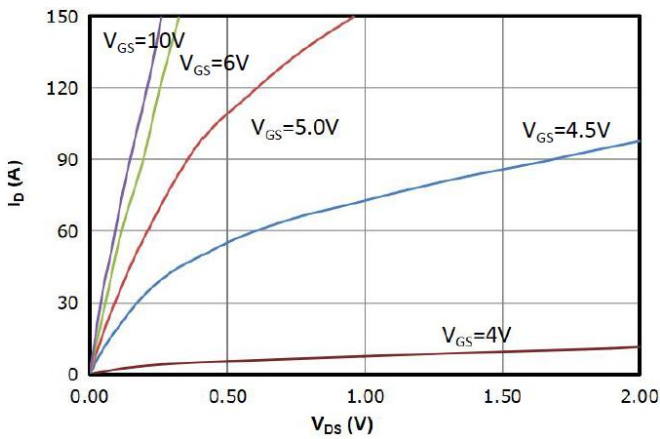


Figure.2 Transfer Characteristics

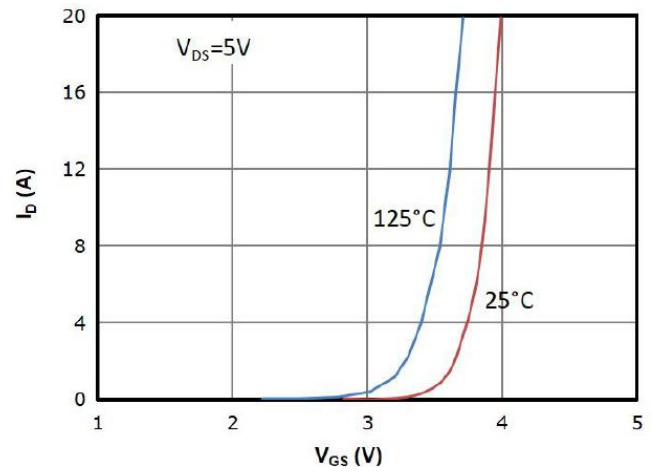


Figure.3 Rds(on) vs Drain Current and Gate Voltage

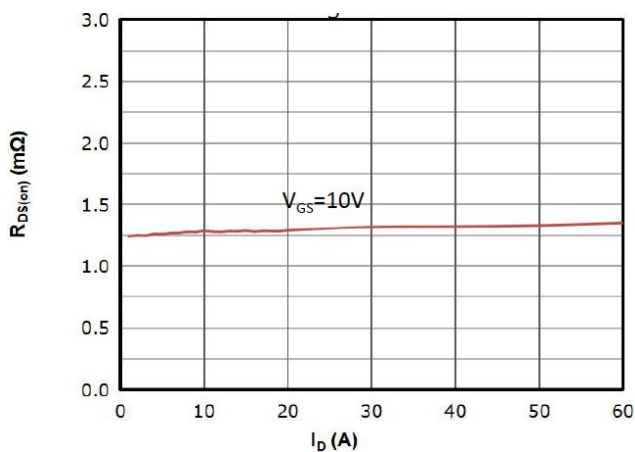
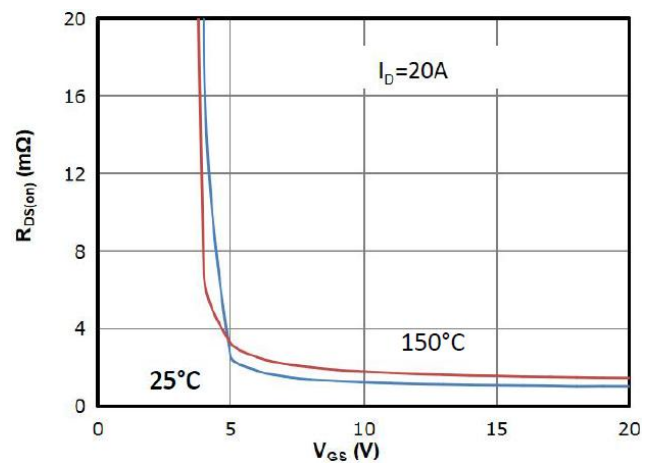


Figure.4 Rds(on) vs Gate Voltage



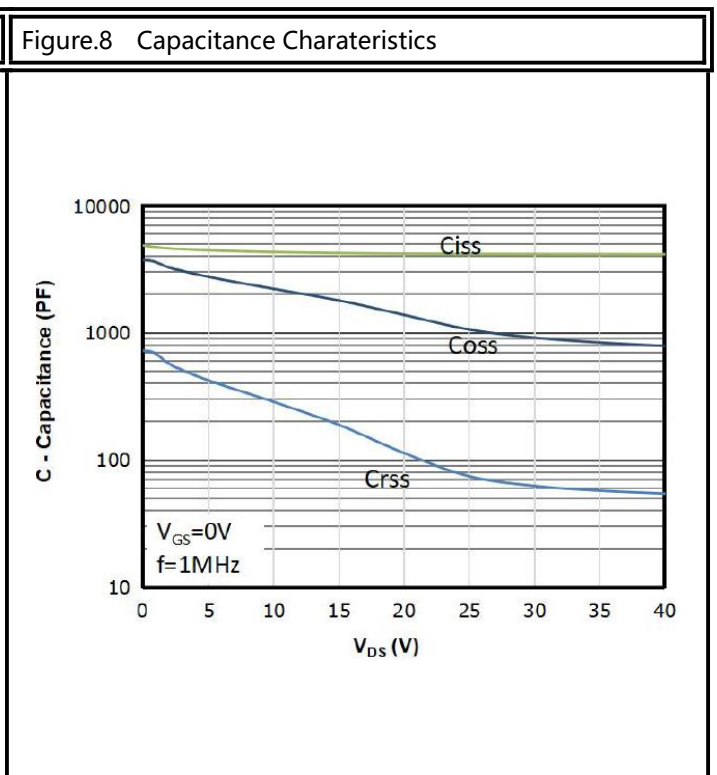
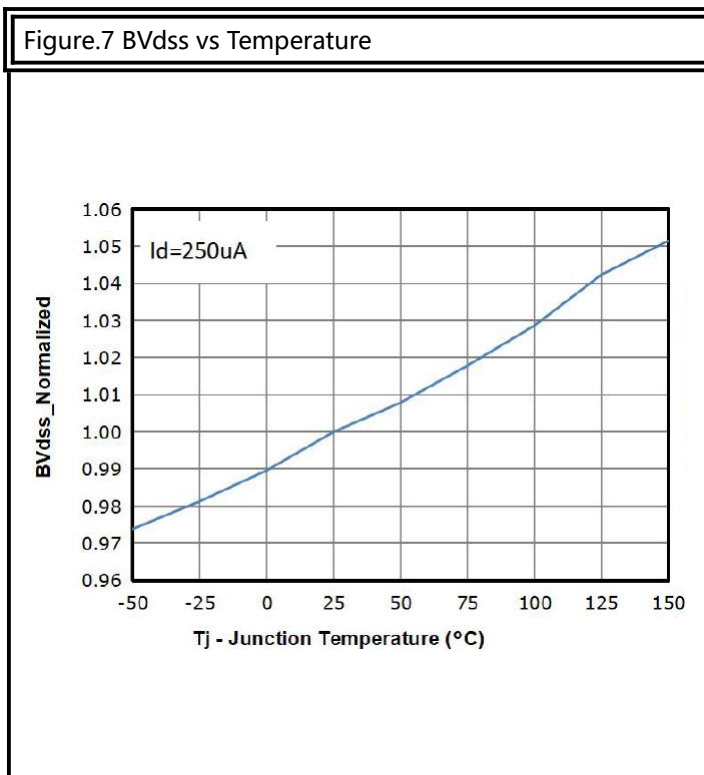
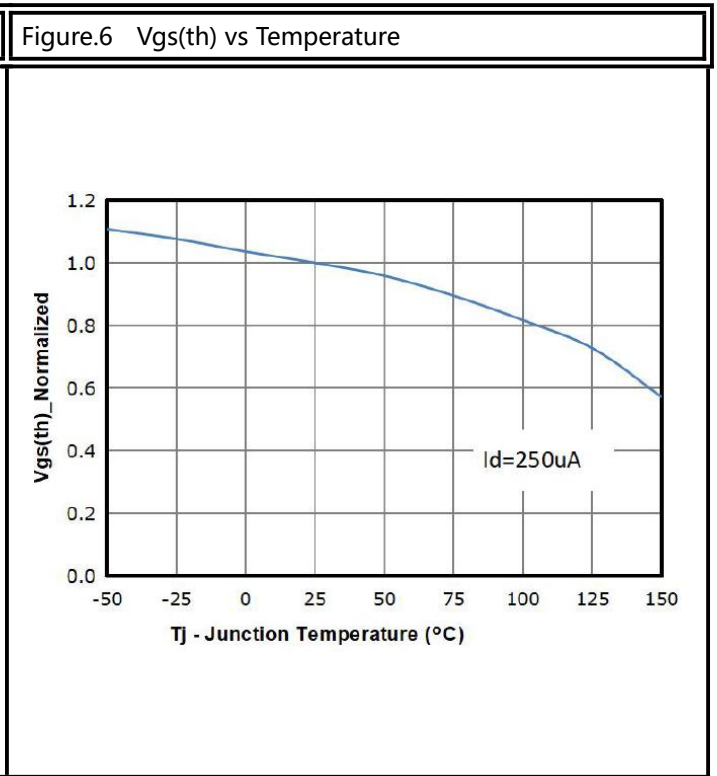
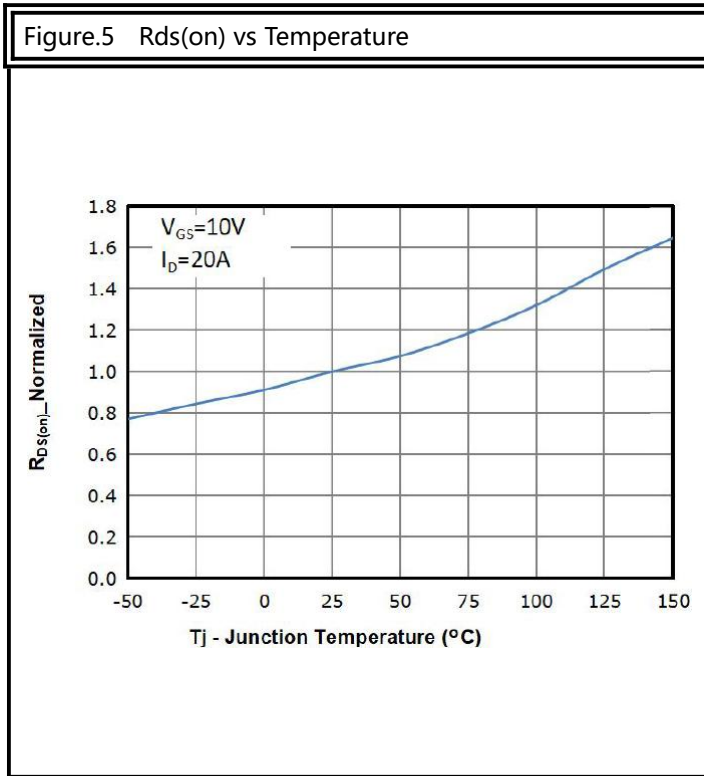




Figure.9 Gate Charge characteristics

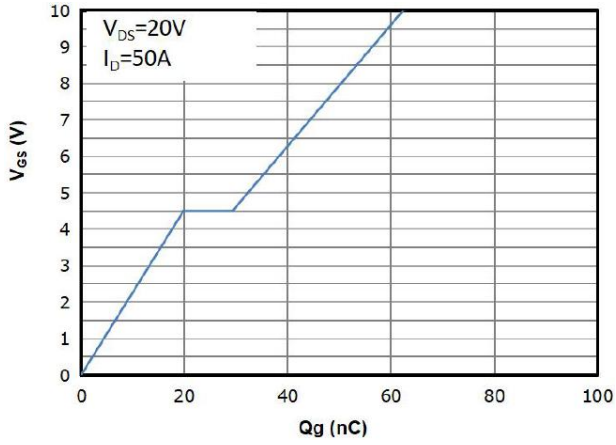


Figure.10 Body-Diode Forward Characteristics

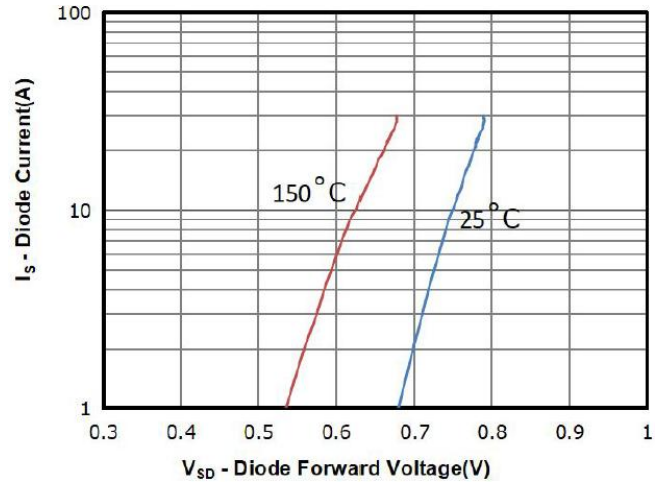


Figure.11 Power Dissipation

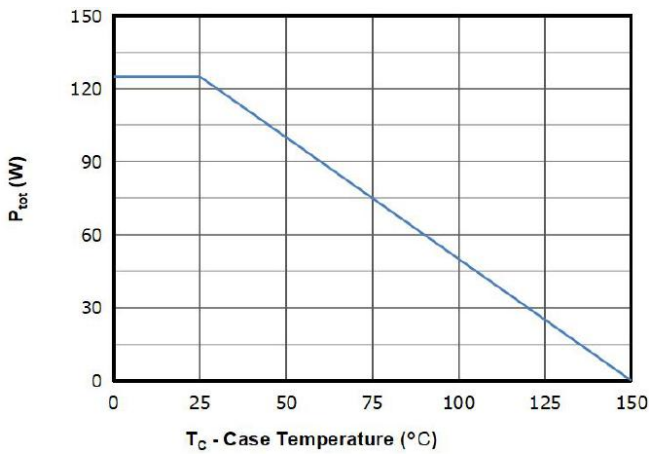


Figure.12 Drain Current Derating

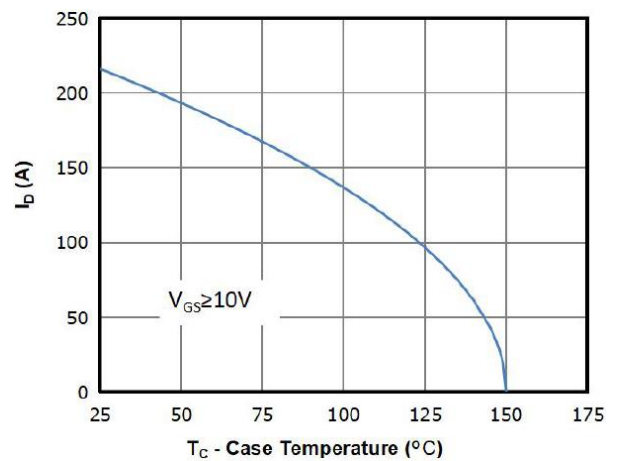


Figure.13 Safe Operating Area

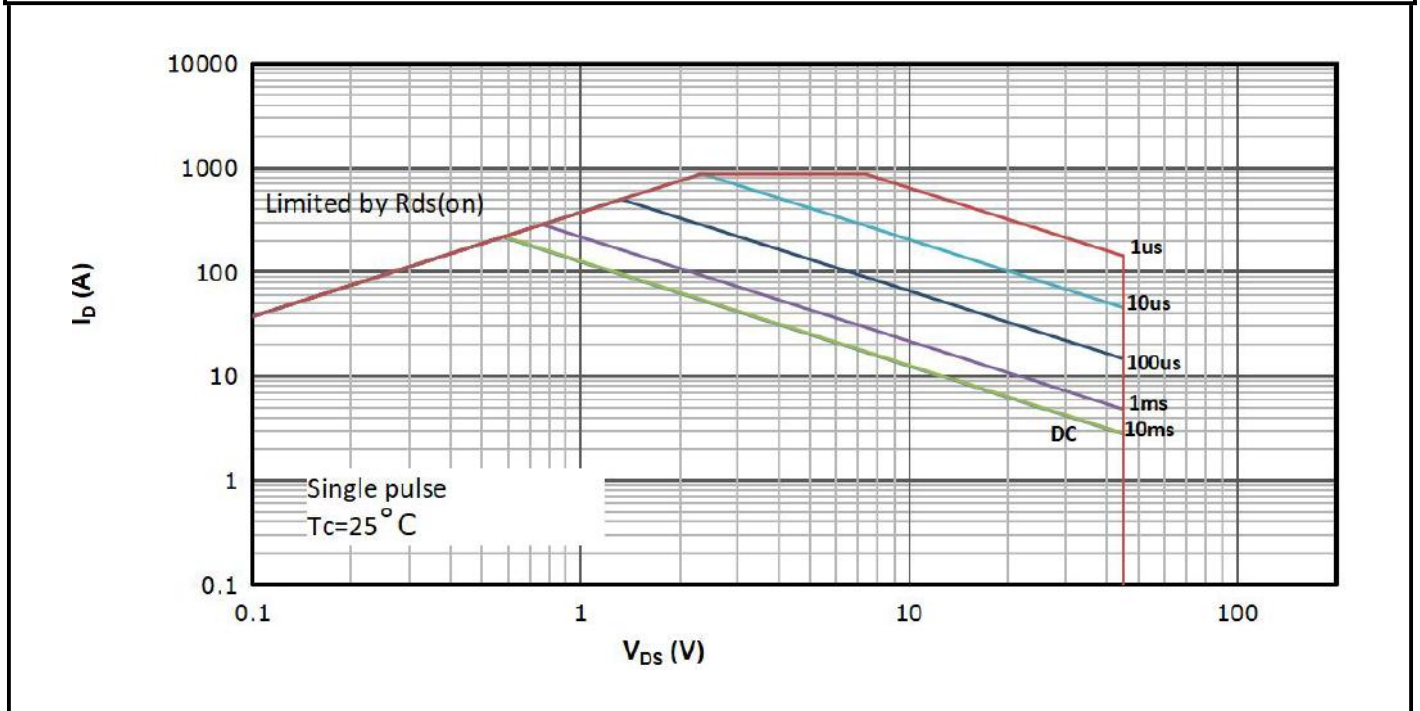
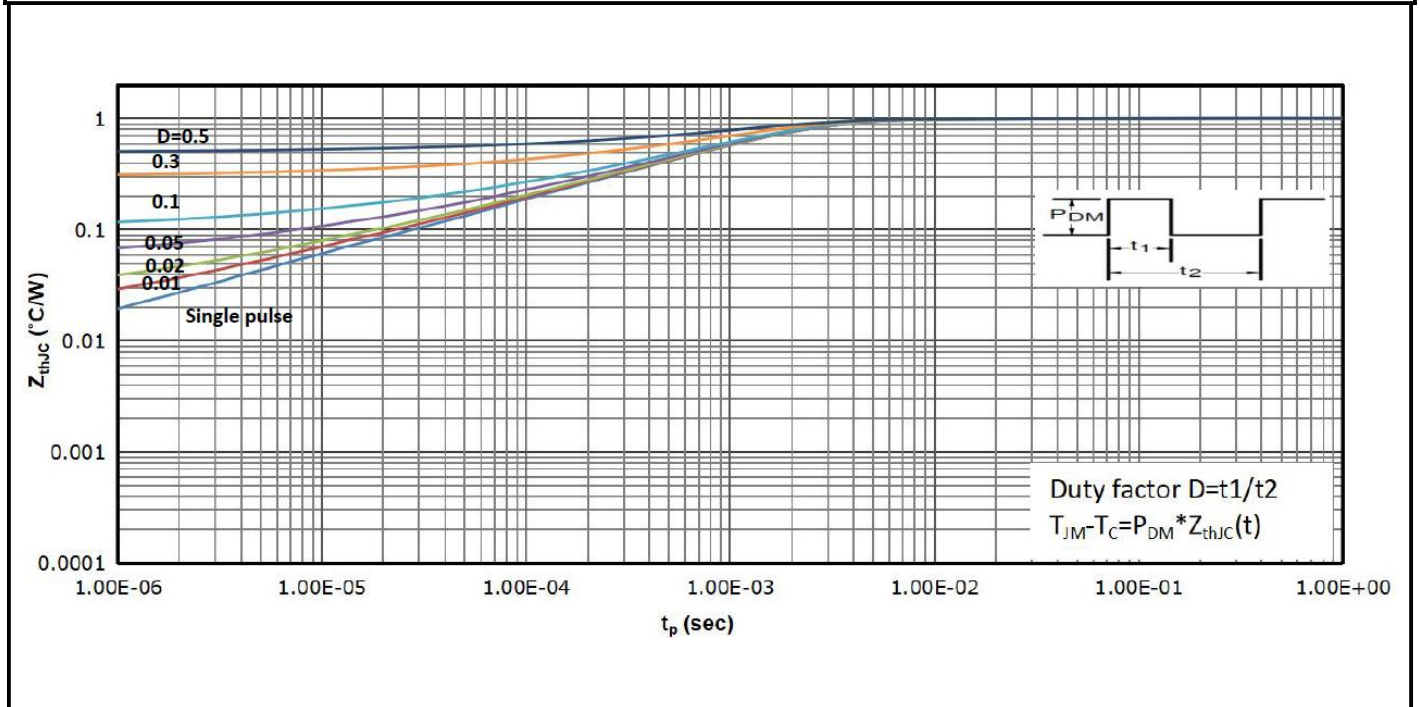
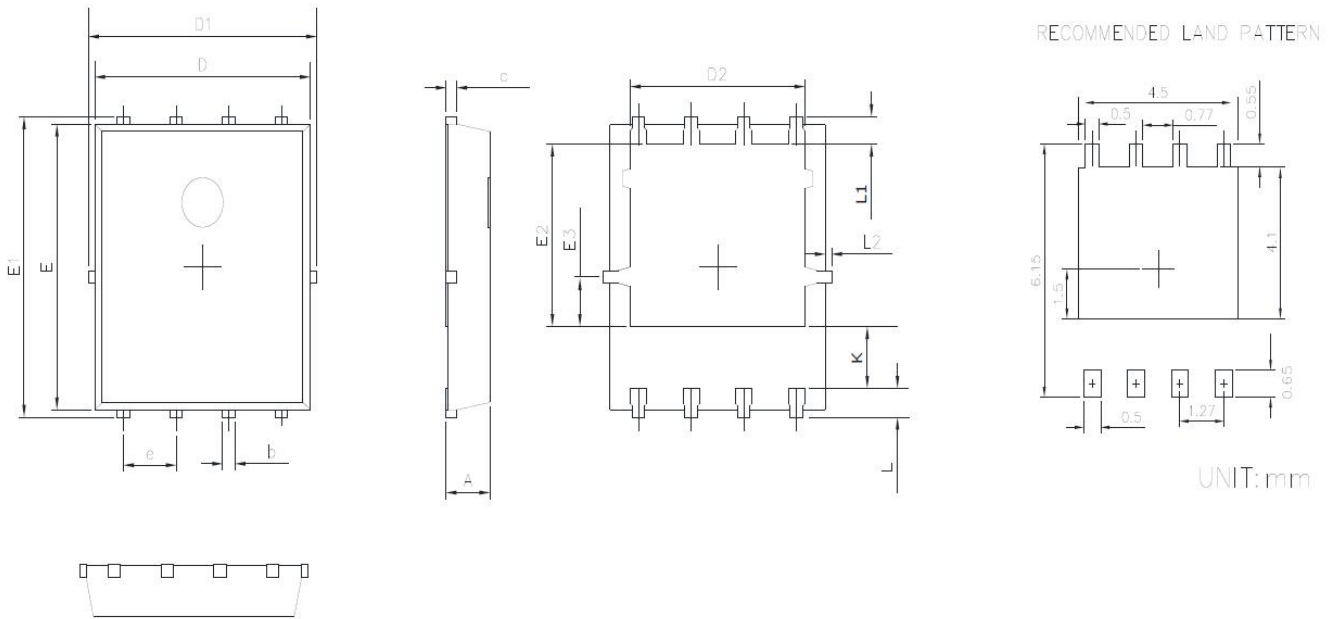


Figure.14 Max. Transient Thermal Impedance





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