TM15G02BF6

N+P-Channel Enhancement Mode Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

General Features

N Channel

V_{DS} = 20V,I_D = 15A

$R_{DS(ON)}$ = 13mΩ(typ.) @ V_{GS}=4.5V

P Channel

V_{DS} = -20V,I_D = -15 A

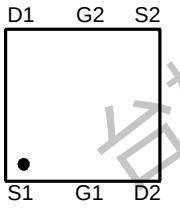
$R_{DS(ON)}$=25mΩ(typ.)@ V_{GS}=-4.5V

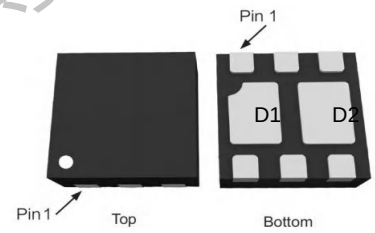
100% UIS Tested

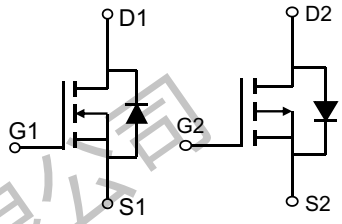
100% R_g Tested

Green Product

BF6: PDFN2*2-6L







Marking:15G02

Absolute Maximum Ratings: (T_C=25℃ unless otherwise noted)

Symbol	Parameter		N-Channel Value	P-Channel Value	Units
V_{DS}	Drain-to-Source Voltage		20	-20	V
V_{GS}	Gate-to-Source Voltage		±12	±12	V
I_D	Continuous Drain Current	T_A = 25°C	15	-15	A
		T_A = 100°C	9	-9	
I_{DM}	Pulsed Drain Current (1)		24	-24	A
P_D	Power Dissipation	T_A = 25°C	2.1	2.5	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		60	50	°C/W
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 175		°C

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N-Channel Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 20V, V_{GS} = 0V	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±12V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	0.4	0.75	1.0	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} = 4.5V, I_D = 3A	-	13	18	mΩ
		V_{GS} = 2.5V, I_D = 2A	-	17	22	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 10V, f = 1MHz	-	671	-	pF
C_{oss}	Output Capacitance		-	90	-	pF
C_{rss}	Reverse Transfer Capacitance		-	76	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 4.5V V_{DS} = 10V, I_D = 2A	-	6	-	nC
Q_{gs}	Gate Source Charge		-	1	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	1.5	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 4.5V, V_{DD} = 10V I_D= 2A, R_{GEN} = 3Ω	-	4	-	ns
t_r	Turn-On Rise Time		-	13	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	65	-	ns
t_f	Turn-Off Fall Time		-	33	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	15	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	24	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 4A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F = 5A, di/dt = 100A/us	-	23	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	17	-	nC

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P-Channel Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = -250μA, V_{GS} = 0V	-20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -20V, V_{GS} = 0V	-	-	-1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±12V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-0.4	-0.65	-1.0	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} = -4.5V, I_D = -3A	-	25	36	mΩ
		V_{GS} = -2.5V, I_D = -2A	-	34	41	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = -10V, f = 1MHz	-	677	-	pF
C_{oss}	Output Capacitance		-	96	-	pF
C_{rss}	Reverse Transfer Capacitance		-	81	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to -4.5V V_{DS} = -10V, I_D = -3A	-	4.3	-	nC
Q_{gs}	Gate Source Charge		-	0.8	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	1.1	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = -4.5V, V_{DD} = -10V I_D= -3A, R_{GEN} = 3Ω	-	12	-	ns
t_r	Turn-On Rise Time		-	54	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	15	-	ns
t_f	Turn-Off Fall Time		-	9	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-15	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-24	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = -5A	-	-	-1.2	V
trr	Body Diode Reverse Recovery Time	I_F = -3.8A, di/dt = 100A/us	-	4	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	24.5	-	nC

N-Channel Typical Characteristics

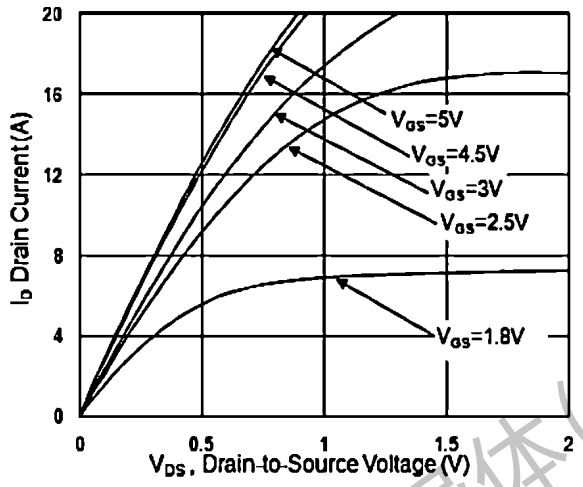

Fig.1 Typical Output Characteristics

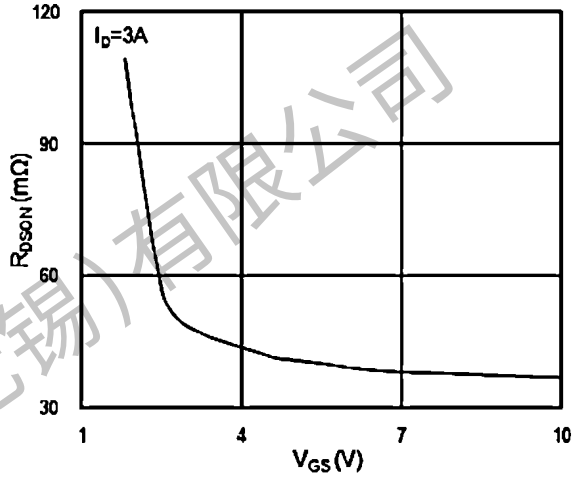

Fig.2 On-Resistance vs. G-S Voltage

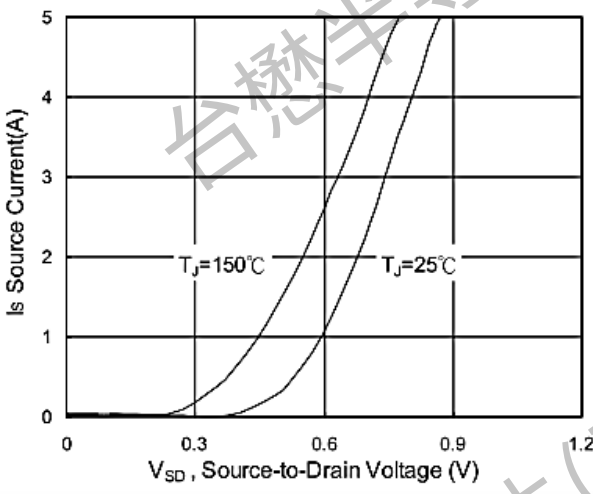

Fig.3 Source Drain Forward Characteristics

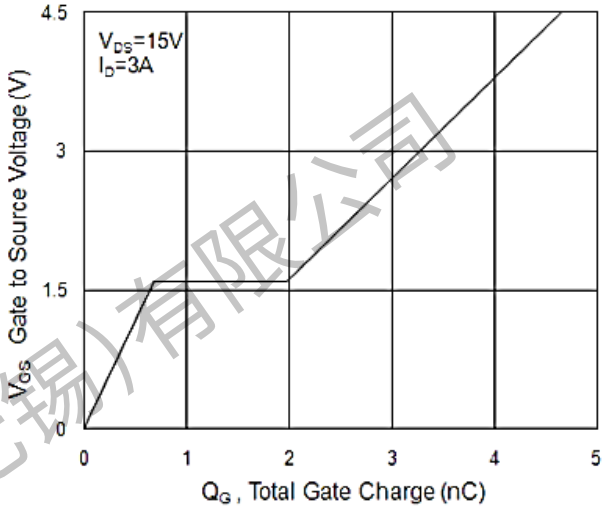

Fig.4 Gate-Charge Characteristics

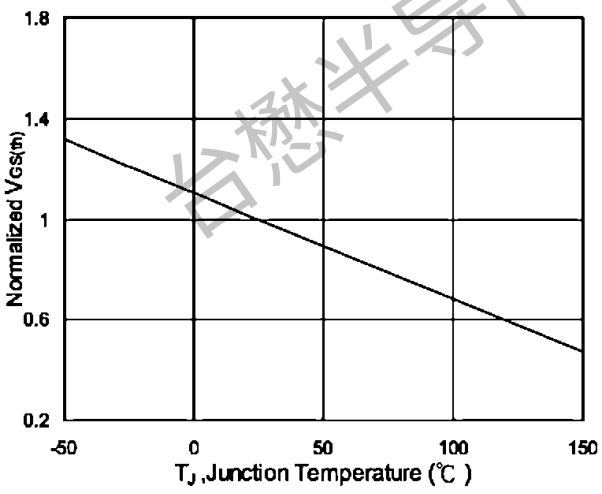

Fig.5 Normalized $V_{GS(th)}$ vs. T_J

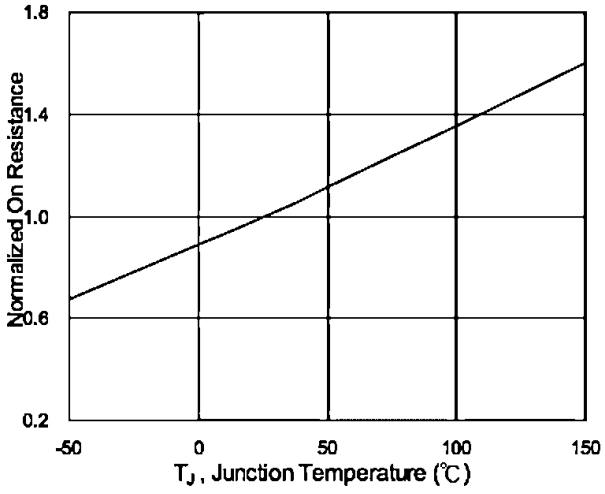

Fig.6 Normalized R_{DSON} vs. T_J

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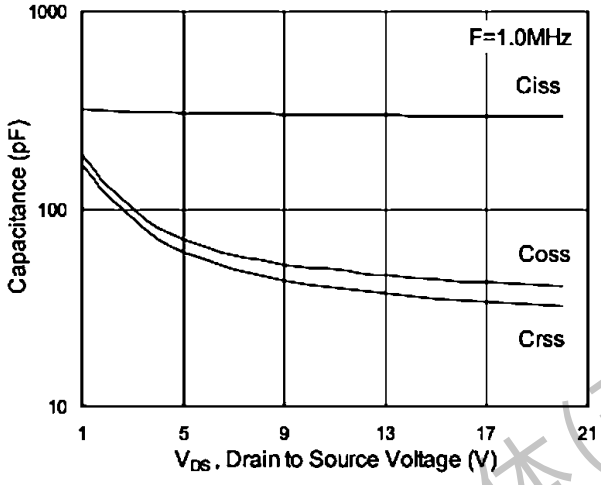


Fig.7 Capacitance

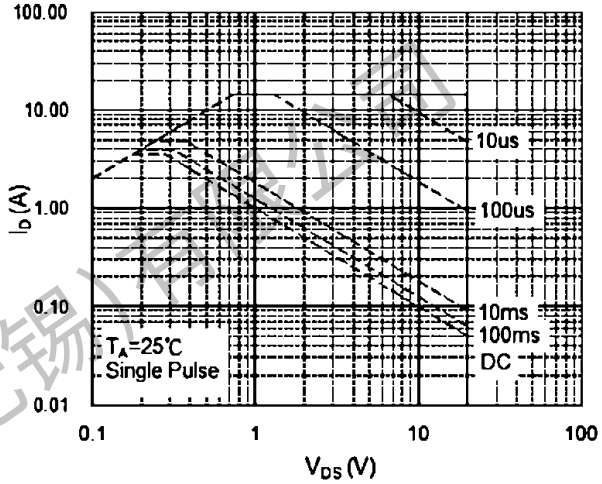


Fig.8 Safe Operating Area

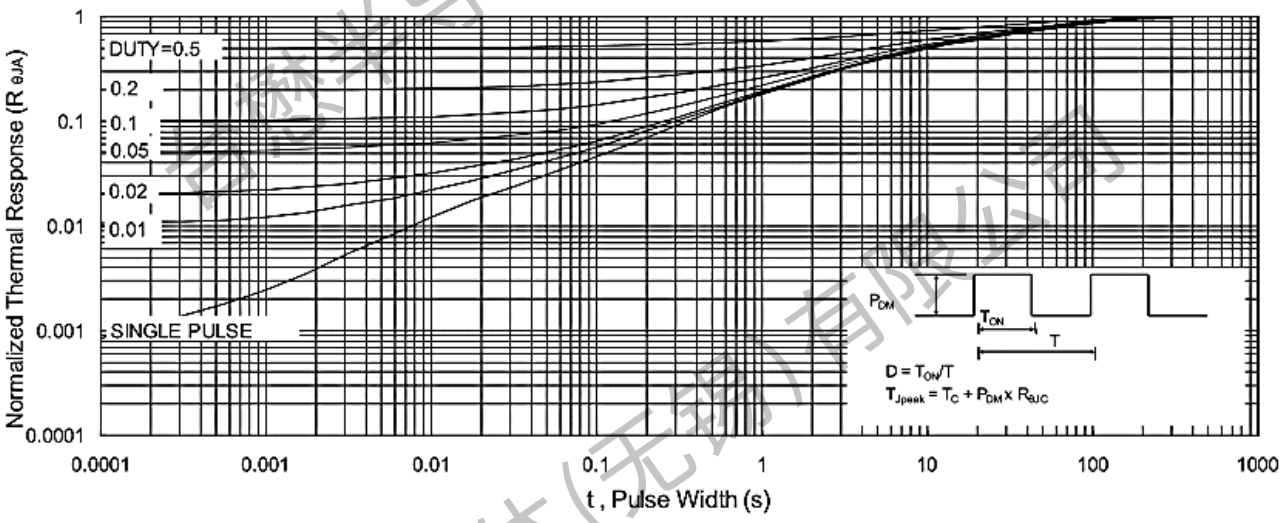


Fig.9 Normalized Maximum Transient Thermal Impedance

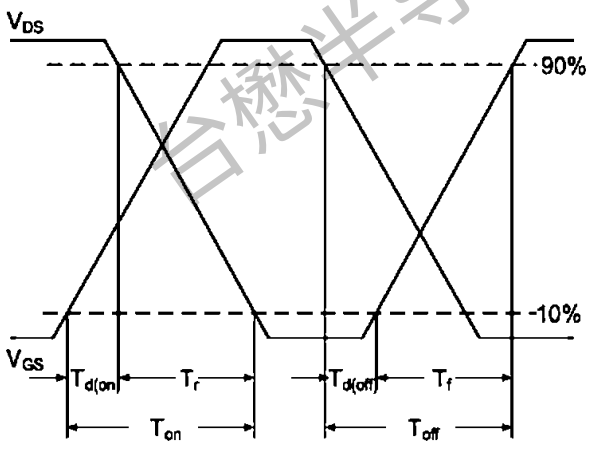


Fig.10 Switching Time Waveform

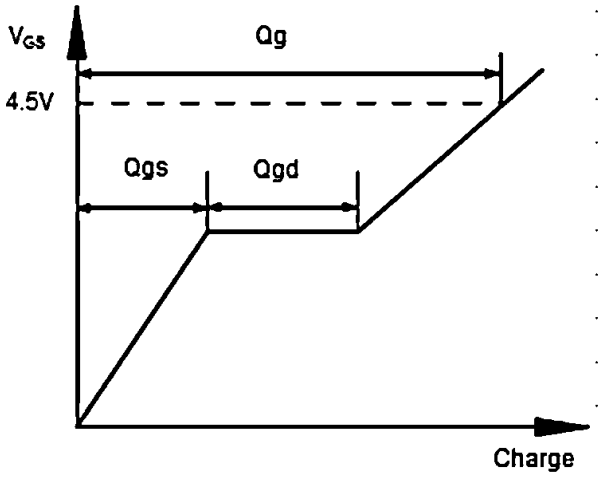


Fig.11 Gate Charge Waveform

P-Channel Typical Characteristics

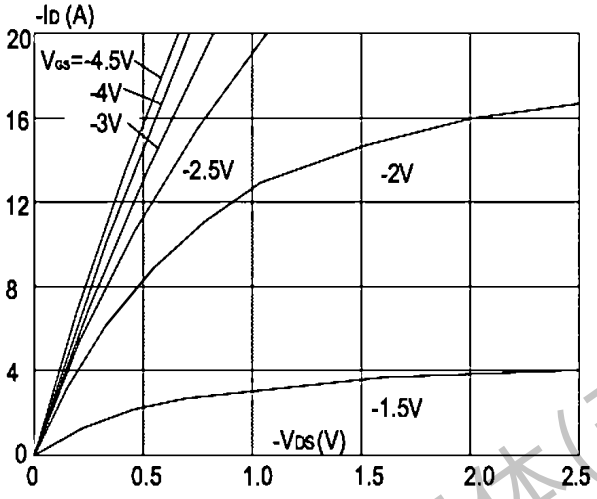


Figure1: Output Characteristics

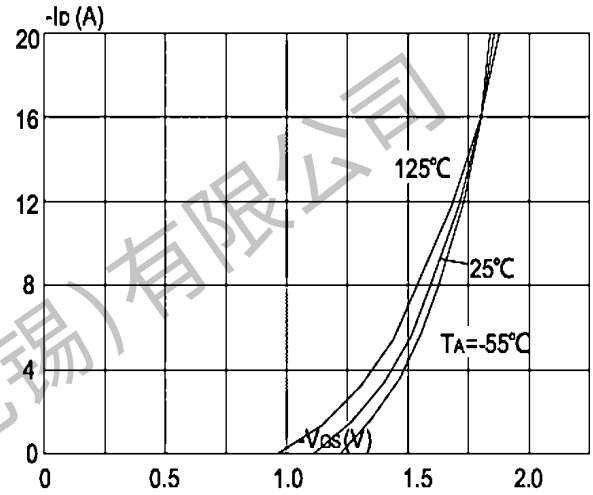


Figure 2: Typical Transfer Characteristics

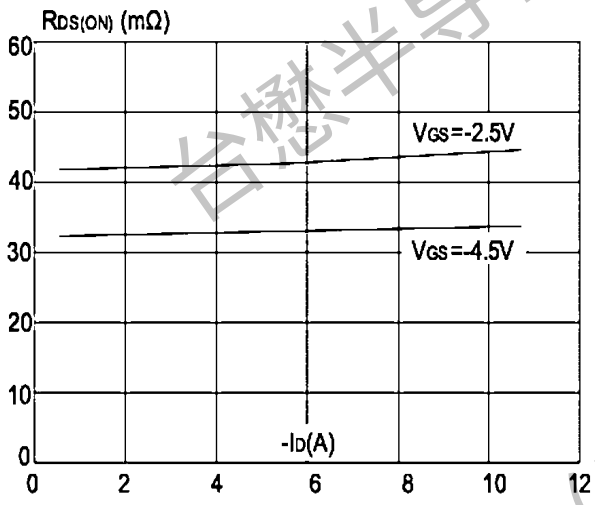


Figure 3:On-resistance vs. Drain Current

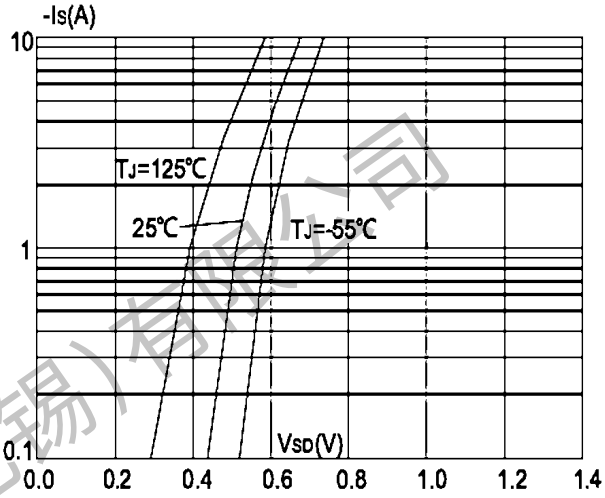


Figure 4: Body Diode Characteristics

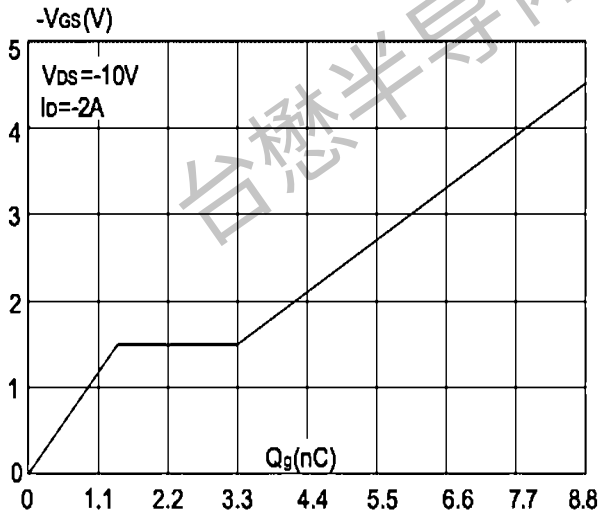


Figure 5: Gate Charge Characteristics

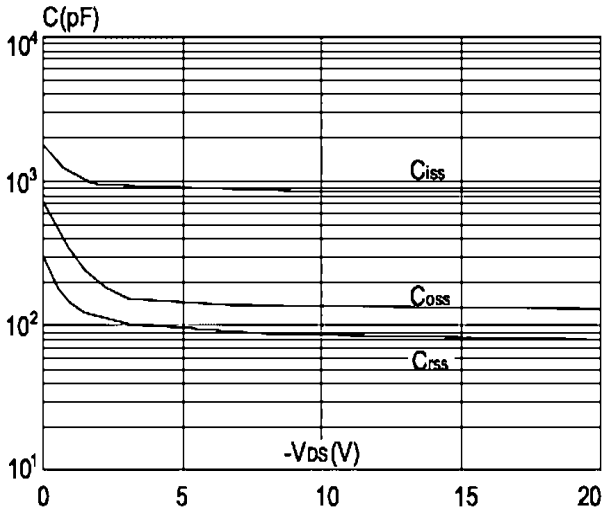


Figure 6: Capacitance Characteristics

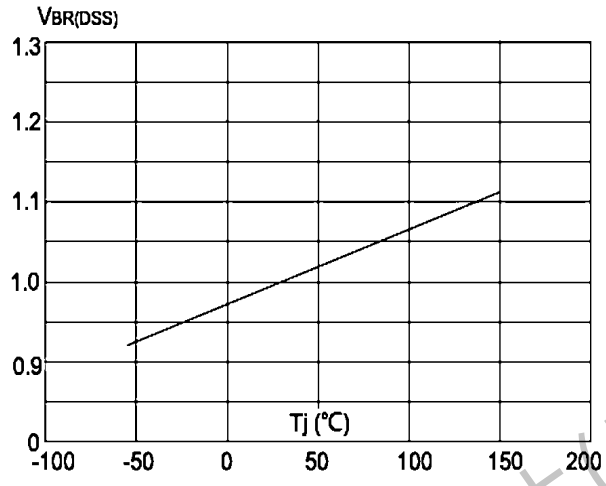


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

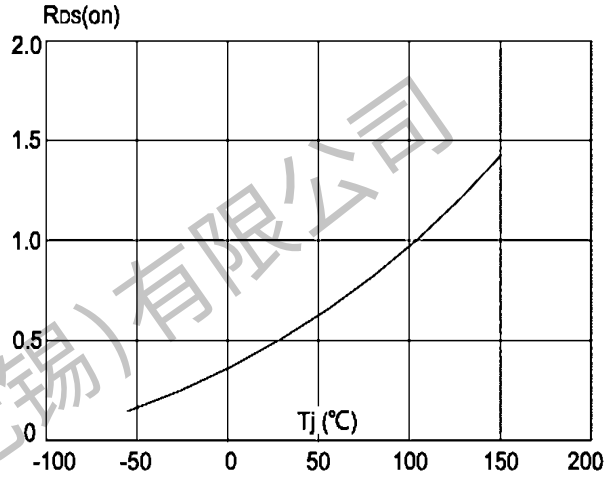


Figure 8: Normalized on Resistance vs. Junction Temperature

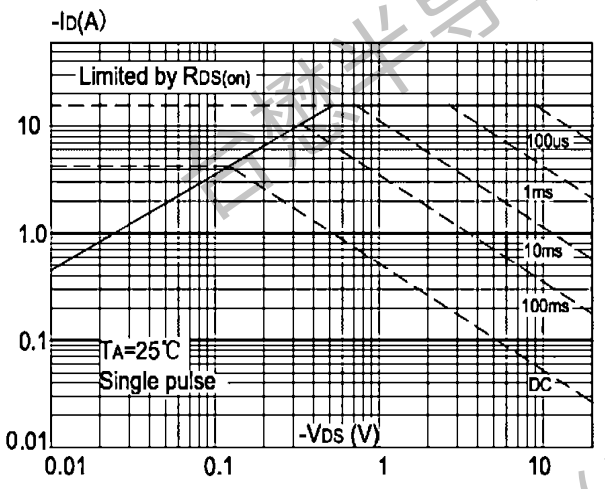


Figure 9: Maximum Safe Operating Area

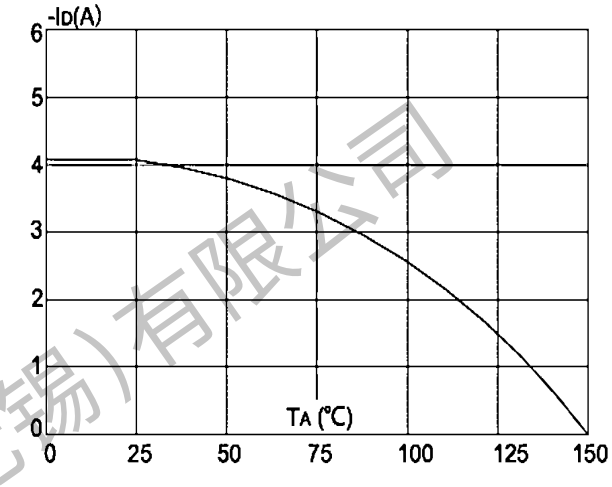


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

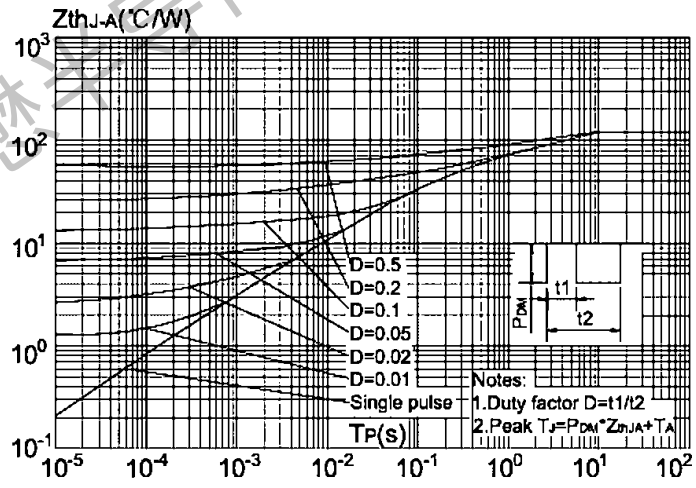
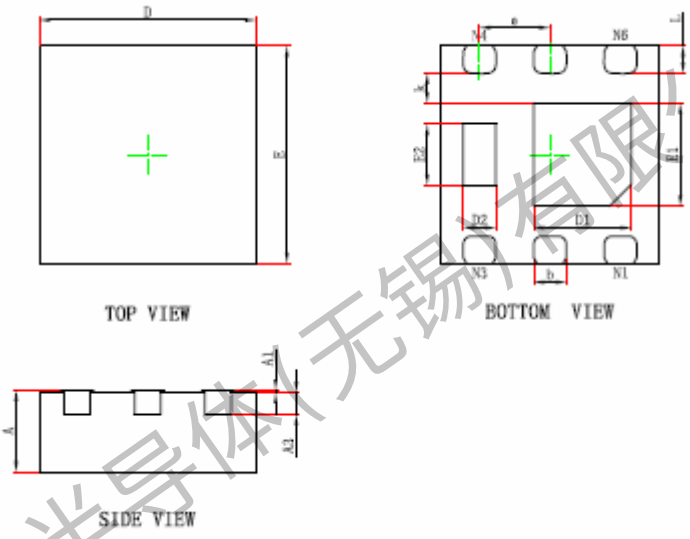


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Package Mechanical Data: PDFN2*2-6L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	1.924	2.076	0.076	0.082
E	1.924	2.076	0.076	0.082
D1	0.800	1.000	0.031	0.039
E1	0.850	1.050	0.033	0.041
D2	0.200	0.400	0.008	0.016
E2	0.460	0.660	0.018	0.026
k	0.200MIN.		0.008MIN.	
b	0.250	0.350	0.010	0.014
e	0.650TYP.		0.026TYP.	
L	0.174	0.326	0.007	0.013

Notes

1. All dimensions are in millimeters.
2. Tolerance ±0.10mm (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

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Revision history:

Date	Rev	Description	Page
2023.07.21	23.07	Original	