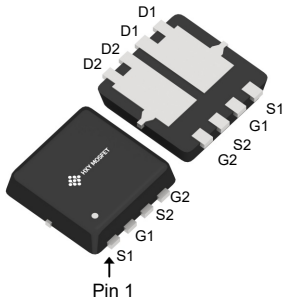
HXY30G25DF

Dual N+P-Channel Enhancement Mode MOSFET

Description

The HXY30G25DF uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



DFN3X3B-8L

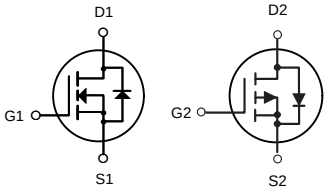
General Features

V_{DS} = 30V I_D = 22A

$R_{DS(ON)}$ < 15mΩ @ V_{GS}=10V

V_{DS} = -30V I_D =-17A

$R_{DS(ON)}$ < 27mΩ @ V_{GS}=10V



N-Channel P-Channel

Application

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
HXY30G25DF	DFN3X3B-8L	HXY MOSFET	5000

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

Symbol	Parameter	Rating		Units
		N-Channel	P-Channel	
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	22	-17	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	7.2	-6.7	A
I_{DM}	Pulsed Drain Current[2]	44	-44	A
EAS	Single Pulse Avalanche Energy[3]	20	25	mJ
P_D@T_C=25℃	Total Power Dissipation[4]	12.8	12.8	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	38	22	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	6	℃/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	30	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=30V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1	1.4	2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[note3]	V_{GS}=10V,I_D=10A	---	12	16	mΩ
		V_{GS}=4.5V,I_D=5A	---	18	25	
C_{iss}	Input Capacitance	V_{DS}=15V, V_{GS}=0V, f=1MHz	---	580	---	pF
C_{oss}	Output Capacitance		---	110	---	
C_{rss}	Reverse Transfer Capacitance		---	92	---	
Qg	Gate Charge	V_{GS}=10V V_{DS}=15V I_D=10A		13	---	nc
Qgs	Gate-Source Charge			4.5	---	
Qgd	Gate-Drain Charge			3.3	---	
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=30V, I_D= 10A, R_{REN} =3Ω,V_{GS}=10V	---	3	---	ns
t_r	Rise Time		---	6	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	19	---	ns
t_f	Fall Time		---	5	---	ns
I_S	Continuous Drain to Source Diode	---	---	----	11	A
I_{SM}	Pulsed Drain to Source Diode	---	---	---	44	A
V_{SD}	Source-Drain Diode Forward Voltage	V_{GS}=0V,I_S=11A	---	0.8	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	I_F=11A,dI/dt=100A/μs	---	7	---	ns
Q_{rr}	Body Diode Reverse Recovery		---	5.9	---	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition : T_J=25℃, V_{DD}=15V, V_G=10V, L=0.5mH, Rg=25Ω, I_{AS}=9A
   T_J=25℃, V_{DD}= -15V, V_G= -10V, L=0.5mH, Rg=25Ω, I_{AS}= -10A
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	-30	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=-30V	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	-1	-1.5	-2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[note3]	V_{GS}=-10V,I_D=-10A	---	21	27	mΩ
		V_{GS}=-4.5V,I_D=-5A	---	31	43	
C_{iss}	Input Capacitance	V_{DS}=-15V, V_{GS}=0V, f=1MHz	---	1150	---	pF
C_{oss}	Output Capacitance		---	150	---	
C_{rss}	Reverse Transfer Capacitance		---	135	---	
$t_{d(on)}$	Turn-On Delay Time	V_{DD}= -15V, I_D= --1A, V_{GS}= -10V, R_{GEN}=6Ω R_D=15Ω	---	12	---	ns
t_r	Rise Time		---	13	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	195	---	ns
t_f	Fall Time		---	95	---	ns
Q_g	Total Gate Charge	V_{GS}=-10V,V_{DS}=-15V, I_D=-8A	---	50	---	nC
Q_{gs}	Gate-Source Charge		---	9.5	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	8.3	---	nC
I_S	Continuous Drain to Source Diode	---	---	---	-11	A
I_{SM}	Pulsed Drain to Source Diode	---	---	---	-44	---
V_{SD}	Source-Drain Diode Forward Voltage	V_{GS}=0V,I_S=-11A	---	-0.8	-1.2	V
Trr	Reverse Recovery Time	T_J=25℃,I_F=-2A, dI/dt=-100A/μs	---	37	---	ns
Qrr	Reverse Recovery Charge		---	36	---	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition : T_J=25℃, V_{DD}=15V, V_G=10V, L=0.5mH, Rg=25Ω, I_{AS}=9A
   T_J=25℃, V_{DD}= -15V, V_G= -10V, L=0.5mH, Rg=25Ω, I_{AS}= -10A
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

N-Channel Typical Characteristics

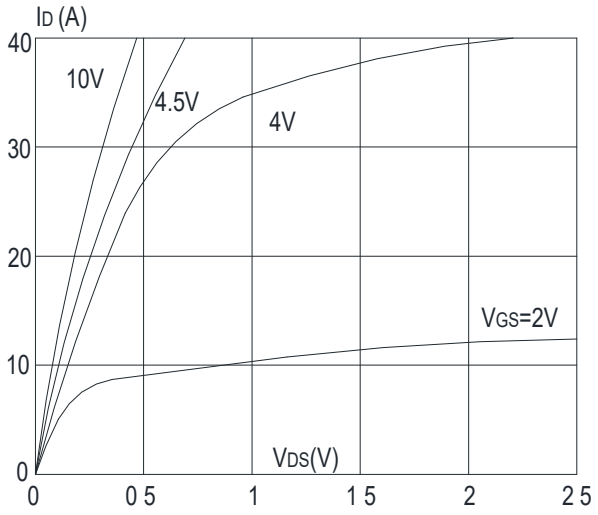


Figure1: Output Characteristics

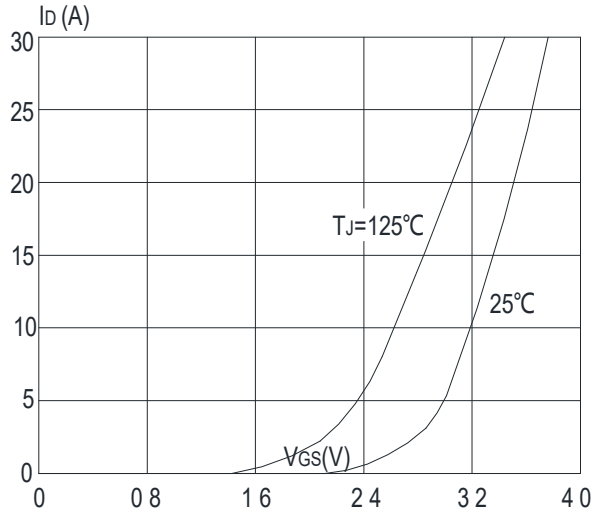
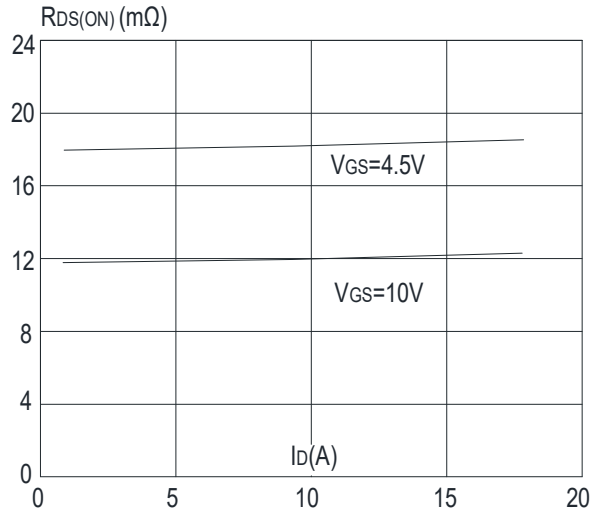


Figure 2: Typical Transfer Characteristics



Fiure 3: On-resistance vs. Drain Current

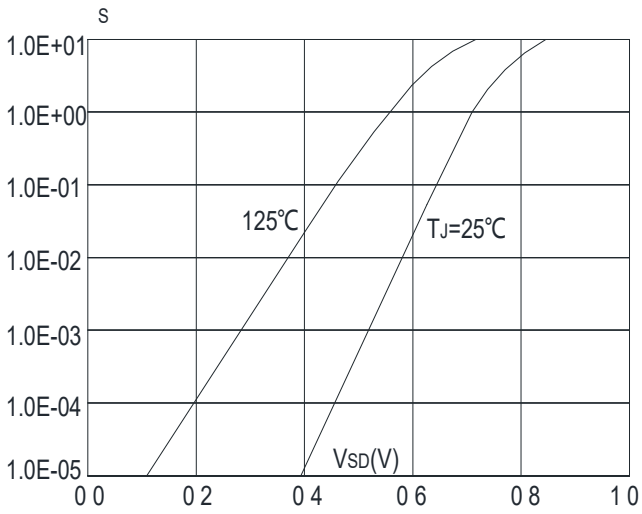


Figure 4: Body Diode Characteristics

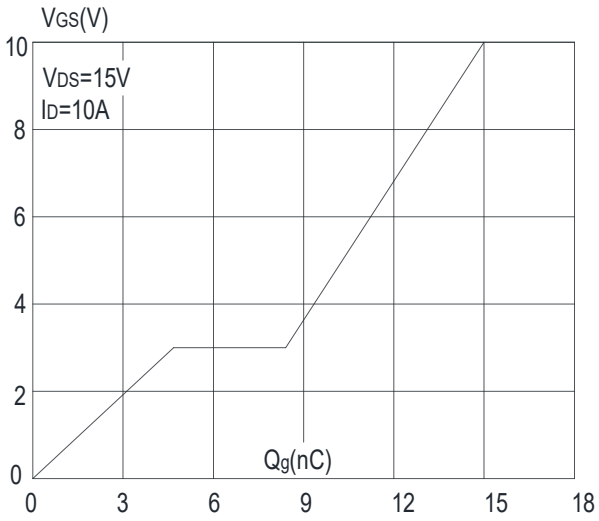


Figure 5: Gate Charge Characteristics

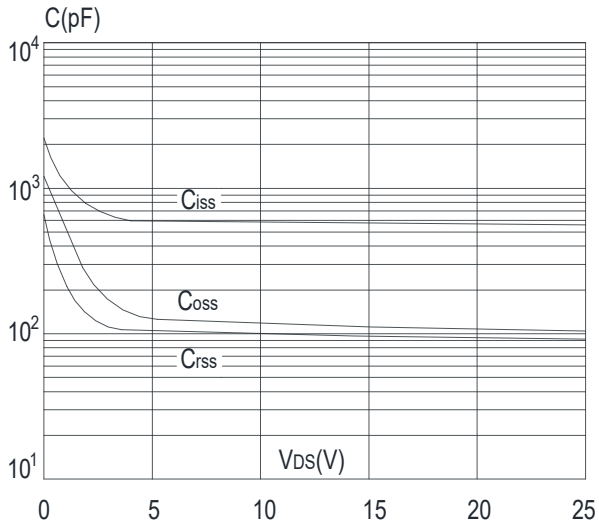


Figure 6: Capacitance Characteristics

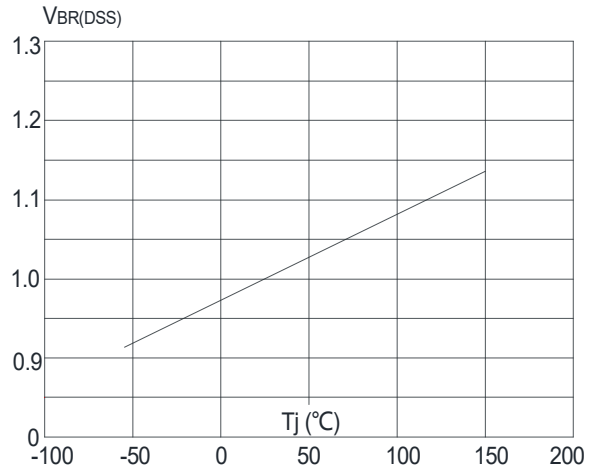


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

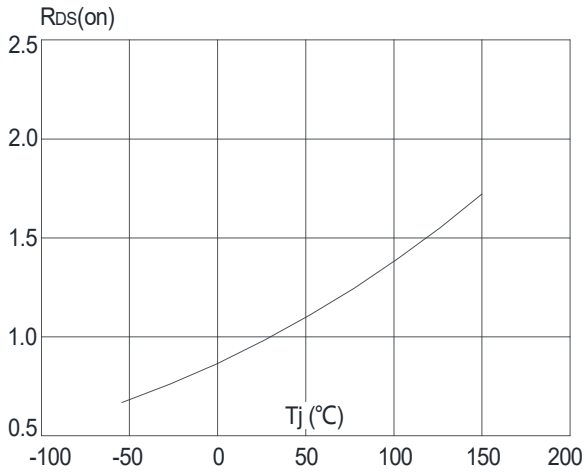


Figure 8: Normalized on Resistance vs. Junction Temperature

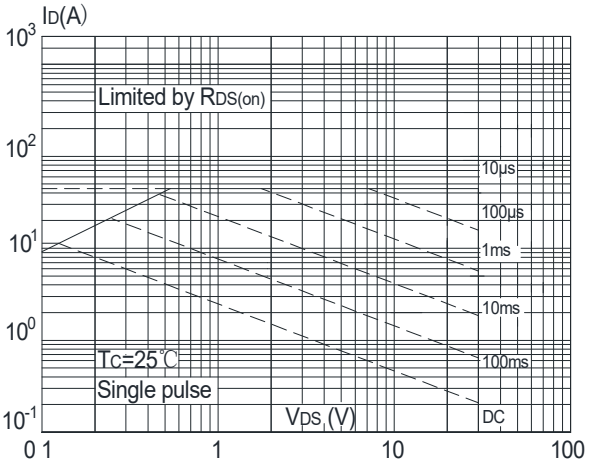


Figure 9: Maximum Safe Operating Area

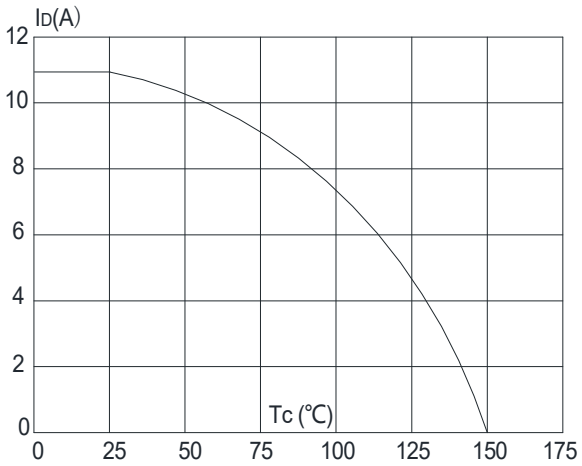


Figure 10: Maximum Continuous Drain Current vs Case Tem erature

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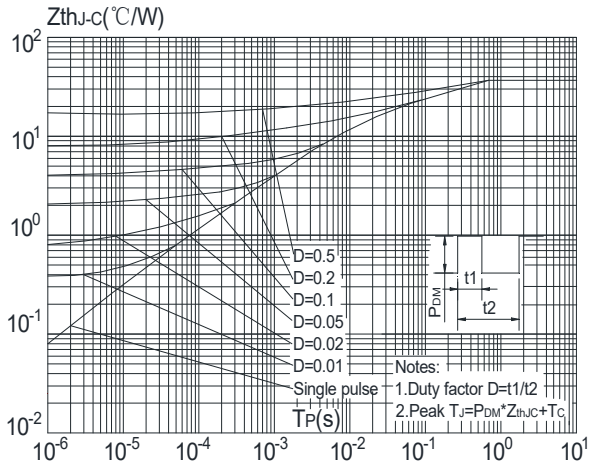


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

P-Channel Typical Characteristics

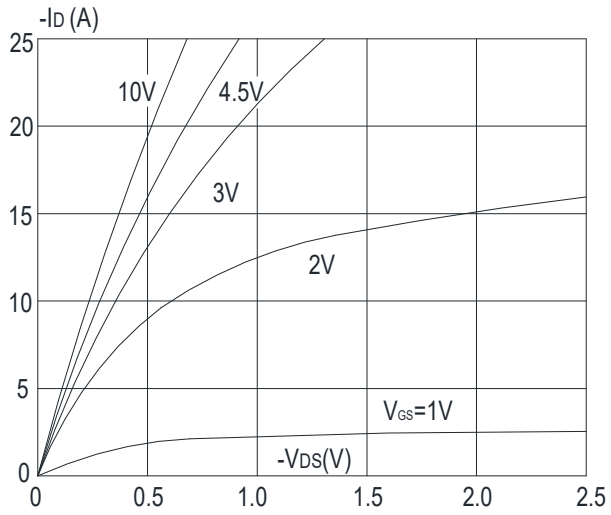


Figure1: Output Characteristics

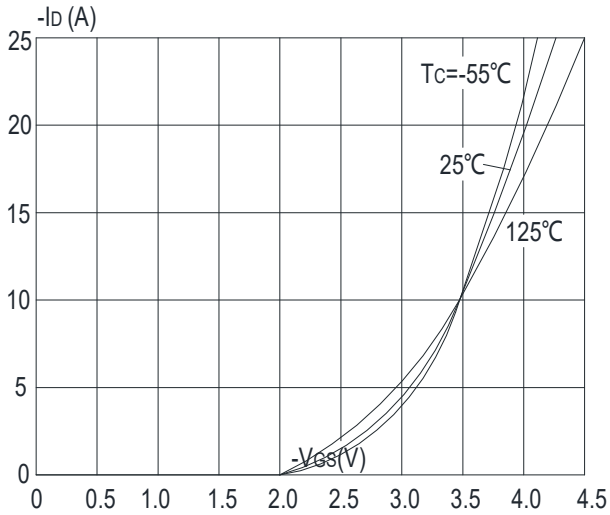


Figure 2: Typical Transfer Characteristics

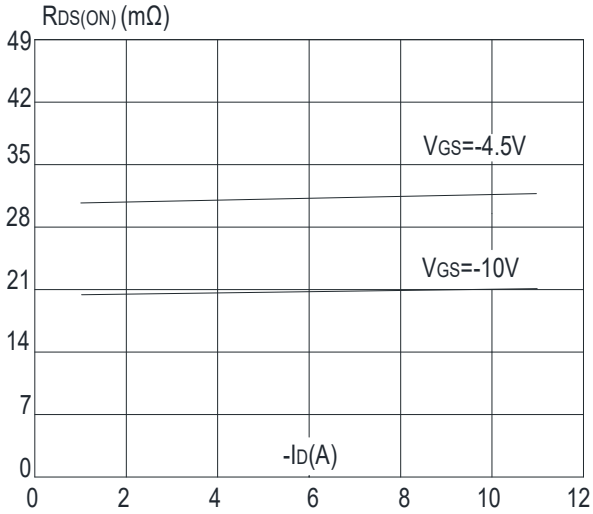


Figure 3: On-resistance vs. Drain Current

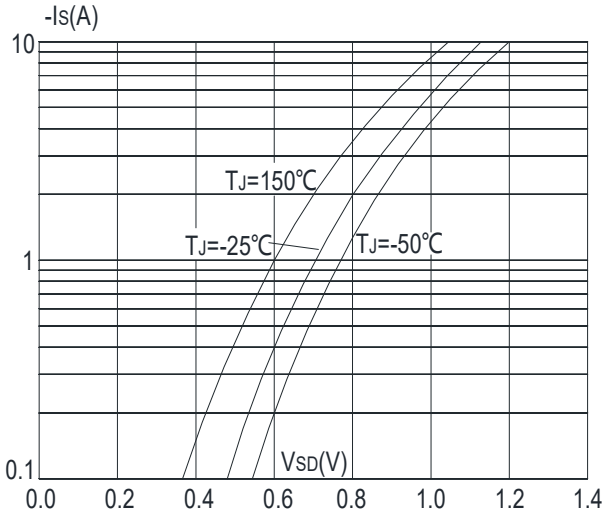


Figure 4: Body Diode Characteristics

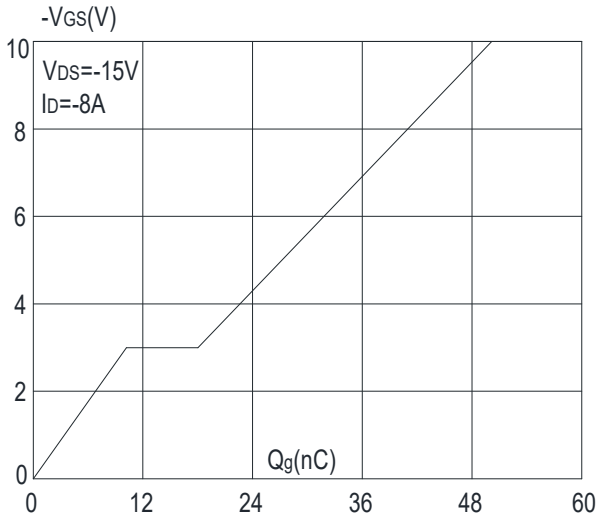


Figure 5: Gate Charge Characteristics

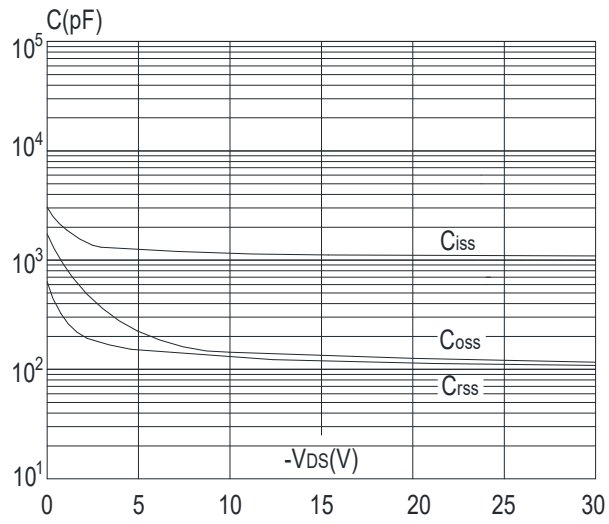


Figure 6: Capacitance Characteristics

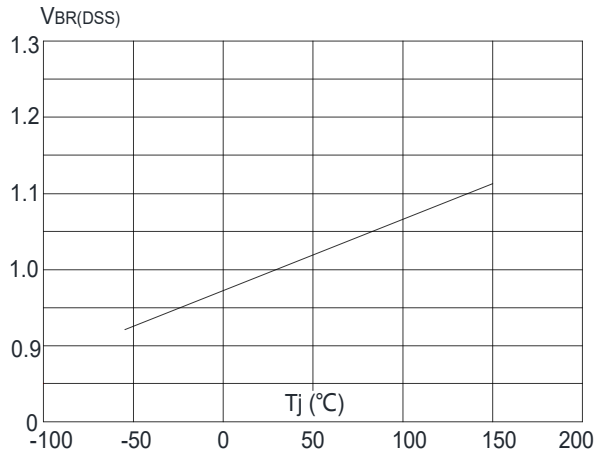


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

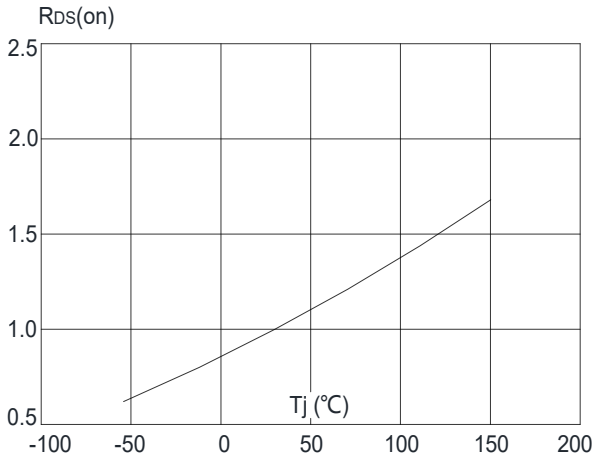


Figure 8: Normalized on Resistance vs. Junction Temperature

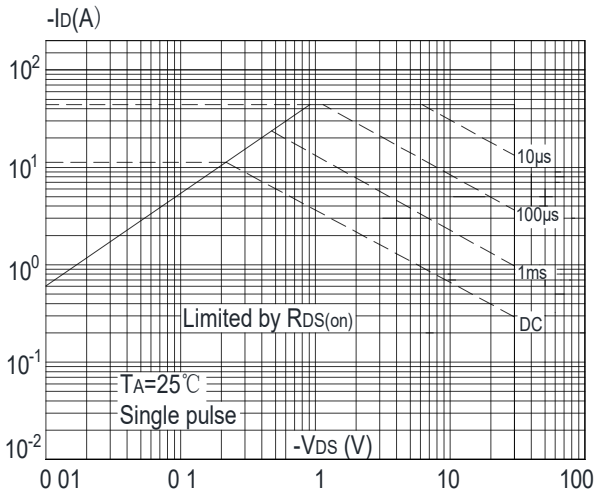


Figure 9: Maximum Safe Operating Area

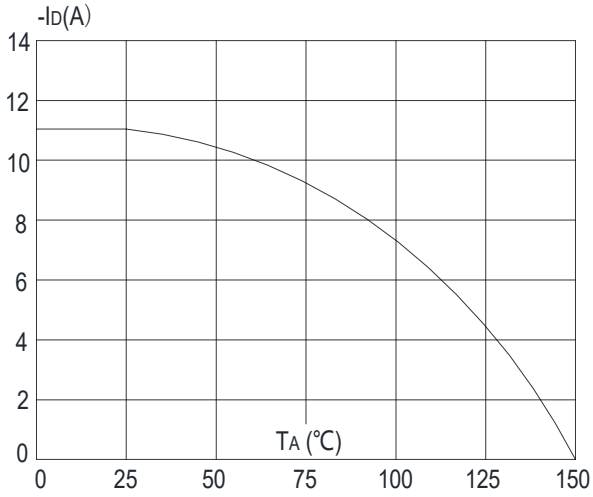


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

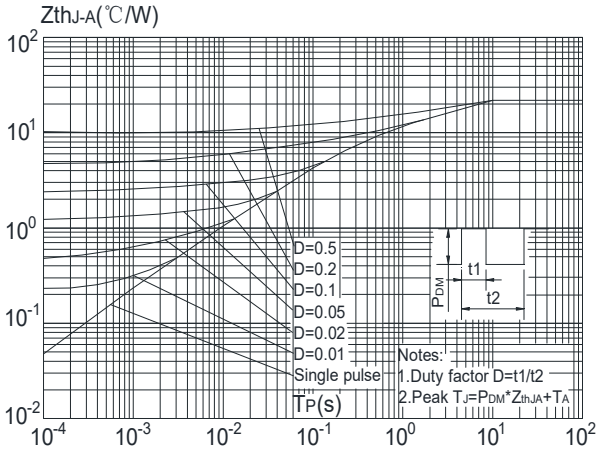
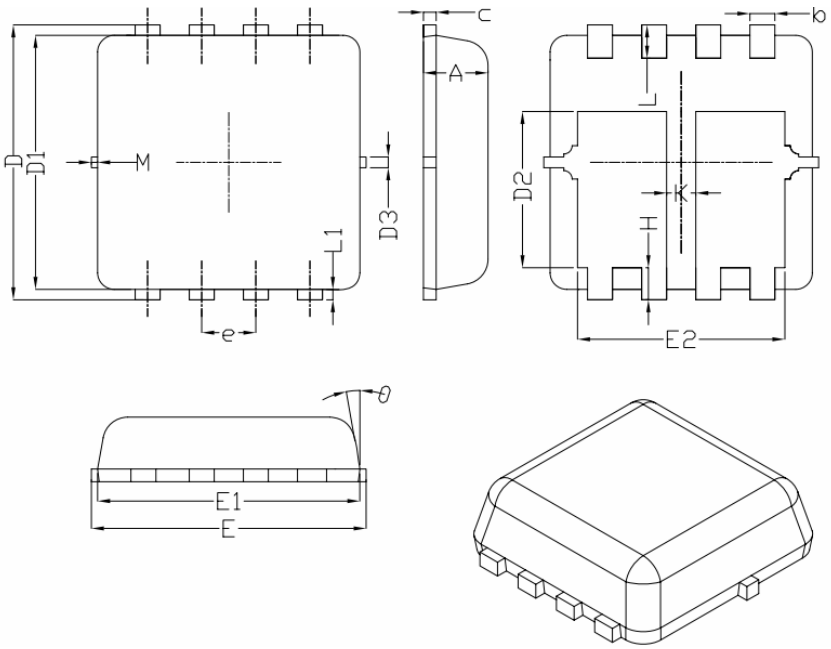
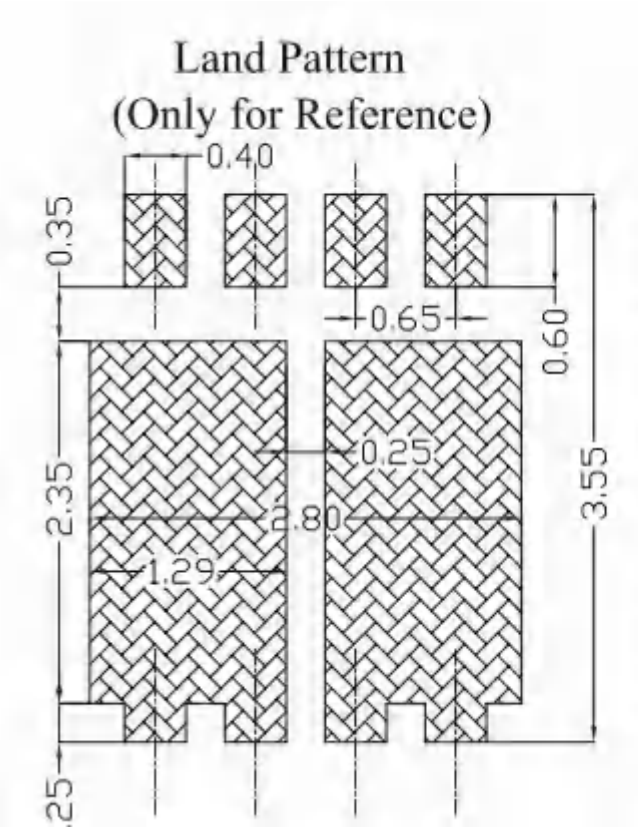


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

DFN3X3B-8L Package Information





SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	---	0.13	---
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	---	0.13	---
K	0.30	---	---
θ	---	10°	12°
M	*	*	0.15
* Not specified			

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