TN30C30DL

Product Summary

N and P-Channel Complementary Power MOSFET

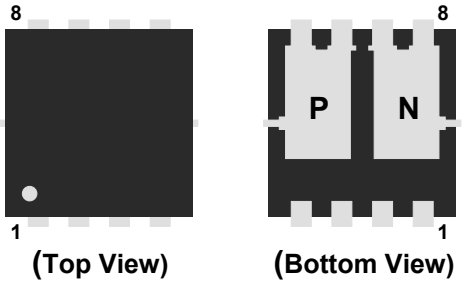
N-Channel

- V_{DS}= 30V,I_D= 35A
- $R_{DS(on)}$< 11mΩ @V_{GS}= 10V
- $R_{DS(on)}$< 16mΩ @V_{GS}= 4.5V

P-Channel

- V_{DS}= -30V,I_D= -30A
- $R_{DS(on)}$< 18mΩ @V_{GS}= -10V
- $R_{DS(on)}$< 25mΩ @V_{GS}= -4.5V

PDFN3x3A-8L



(Top View) (Bottom View)

Features

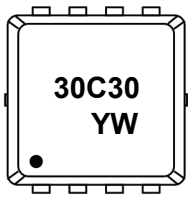
- Advanced Trench Technology
- 100% Avalanche Tested
- RoHS Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3

Application

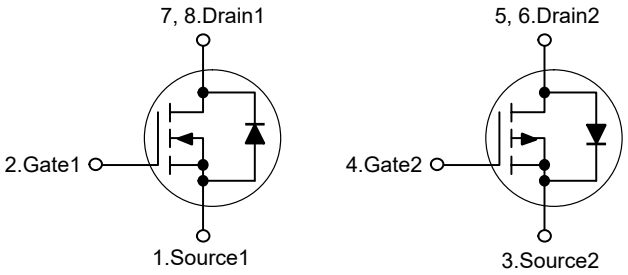
- Boost driver
- Wireless charging
- Brushless motor

Pin	Description	Pin	Description
1	Source1	4	Gate2
2	Gate1	5,6	Drain2
3	Source2	7,8	Drain1

Marking Code



Schematic Diagram



N-Channel **P-Channel**

Absolute Maximum Ratings

Ratings at 25℃ case temperature unless otherwise specified.

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D	Continuous Drain Current- Tc=25℃	35	-30	A
	Continuous Drain Current-Tc=100℃	21.5	-18.2	
I_{DM}	Pulsed Drain Current note1	122	-104	A
E_{AS}	Single Pulsed Avalanche Energy note2	20	25	mJ
P_D	Power Dissipation - Tc=25℃	3.3	5.6	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		℃

Thermal Characteristics

Symbol	Parameter	N-CH	P-CH	Units
$R_{\Theta JA}$	Thermal Resistance,Junction to Ambient	38	22	℃/W

N-Channel

Electrical Characteristics

(T_a=25℃ unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
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
On Characteristics[3]						
$V_{GS(th)}$	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	---	10	11	mΩ
		V_{GS}=4.5V,I_D=5A	---	15	17	
Dynamic Characteristics[4]						
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	---	
Switching Characteristics[4]						
$t_{d(on)}$	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
Drain-Source Diode Characteristics						
I_S	Continuous Drain to Source Diode	---	---	----	33	A
I_{SM}	Pulsed Drain to Source Diode	---	---	---	121	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_a=25℃ unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
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
On Characteristics[3]						
$V_{GS(th)}$	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	---	18	25	mΩ
		V_{GS}=-4.5V,I_D=-5A	---	25	38	
Dynamic Characteristics						
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	---	
Switching Characteristics[4]						
$t_{d(on)}$	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
Drain-Source Diode Characteristics						
I_S	Continuous Drain to Source Diode	---	---	---	-28	A
I_{SM}	Pulsed Drain to Source Diode	---	---	---	-104	A
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

N-Channel

Typical Characteristics Curves

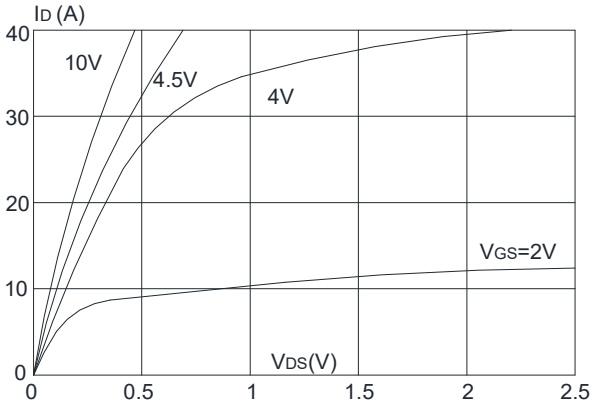


Figure1: Output Characteristics

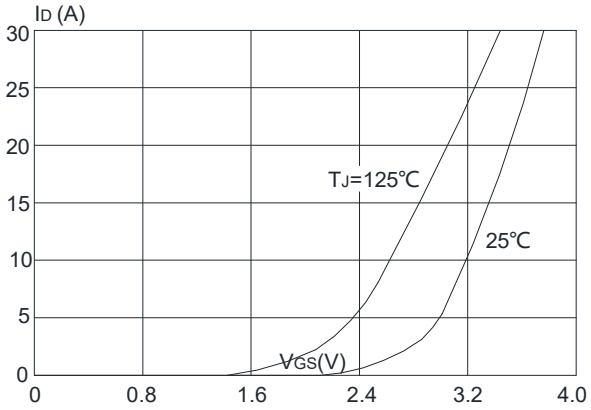
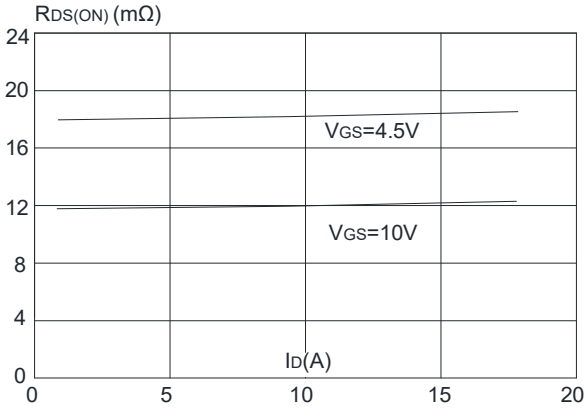


Figure 2: Typical Transfer Characteristics



Fi ure 3: On-resistance vs. Drain Current

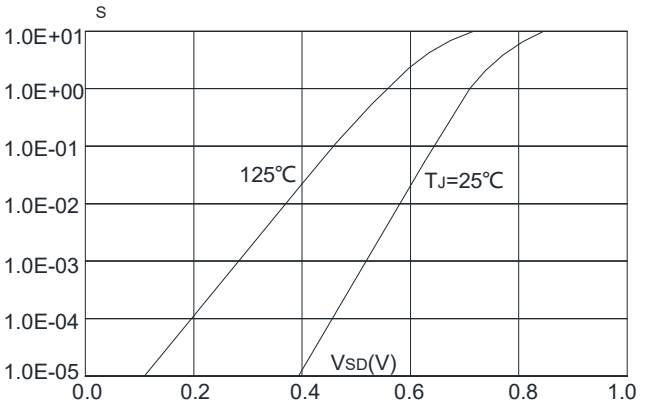


Figure 4: Body Diode Characteristics

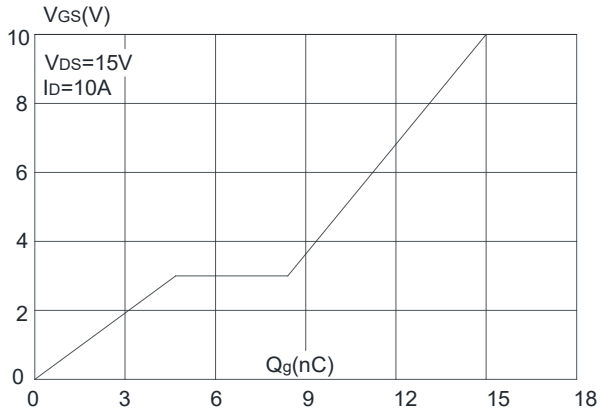


Figure 5: Gate Charge Characteristics

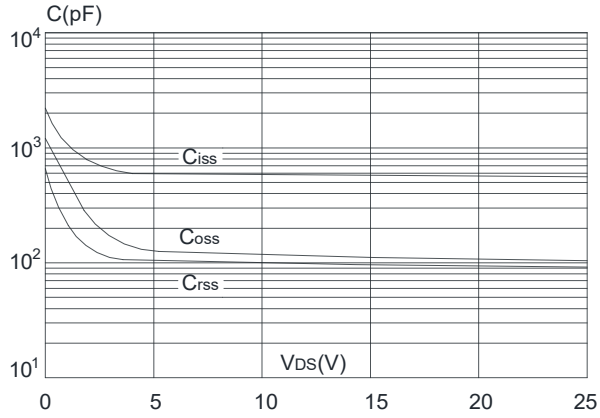


Figure 6: Capacitance Characteristics

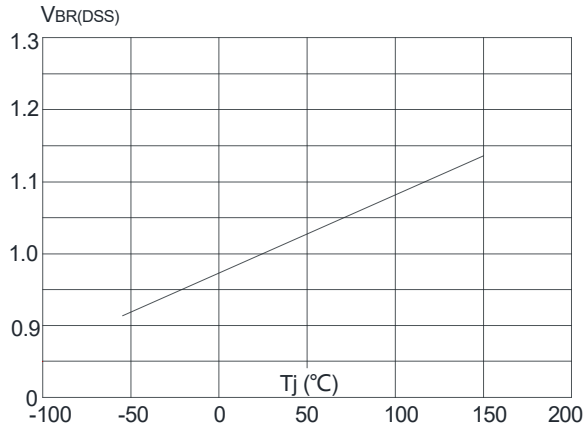


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

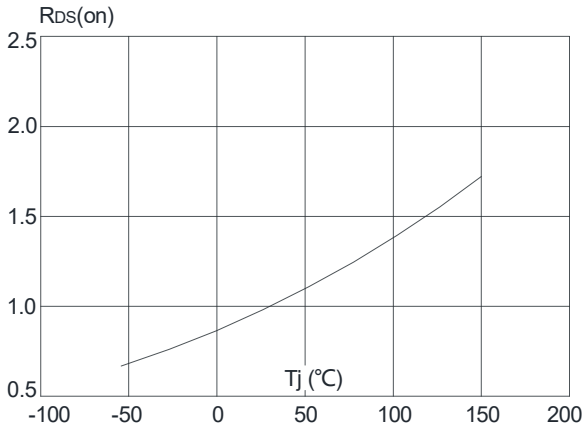


Figure 8: Normalized on Resistance vs. Junction Temperature

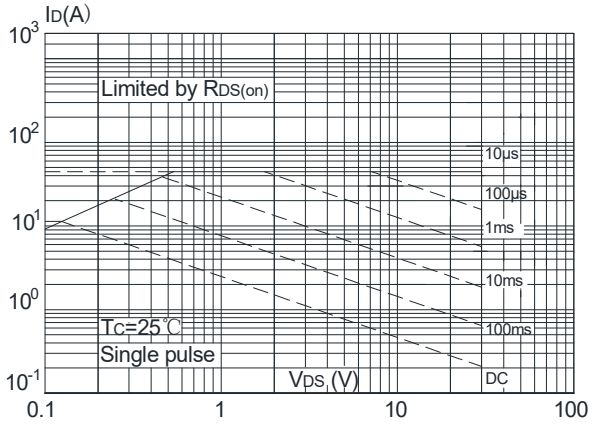


Figure 9: Maximum Safe Operating Area

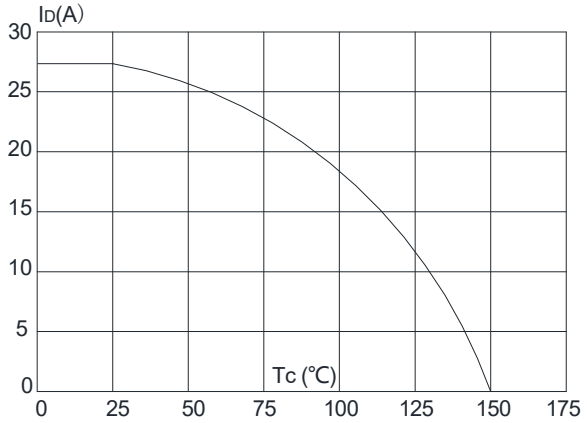


Figure 10: Maximum Continuous Drain Current vs Case Tem erature

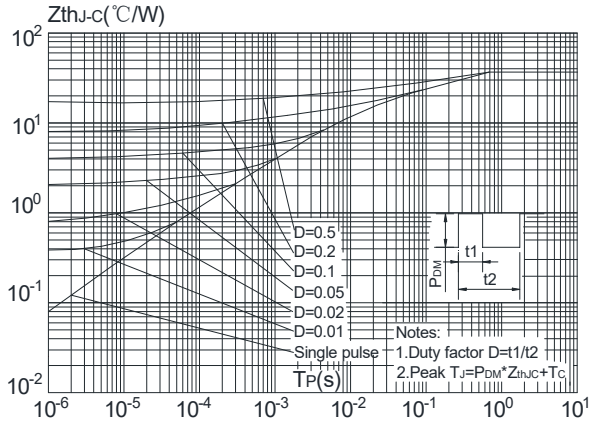


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

P-Channel

Typical Characteristics Curves

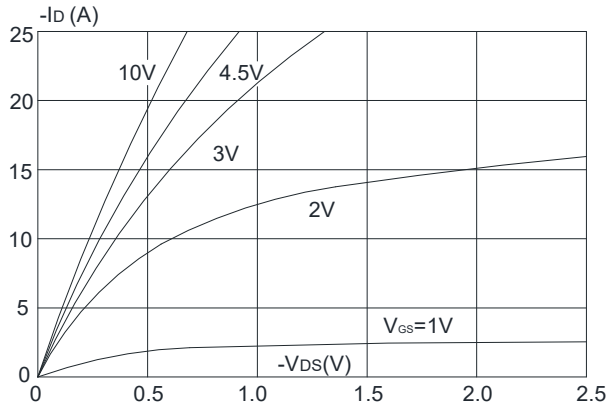


Figure1: Output Characteristics

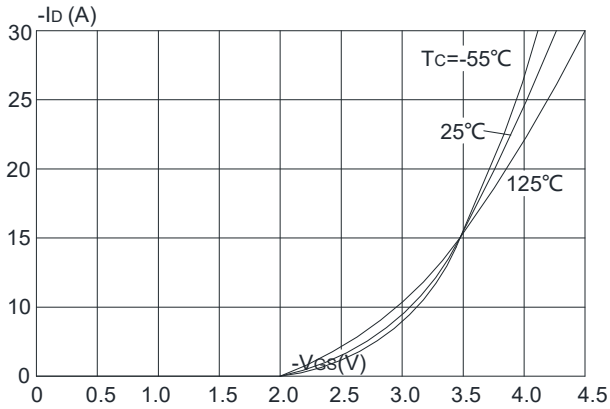


Figure 2: Typical Transfer Characteristics

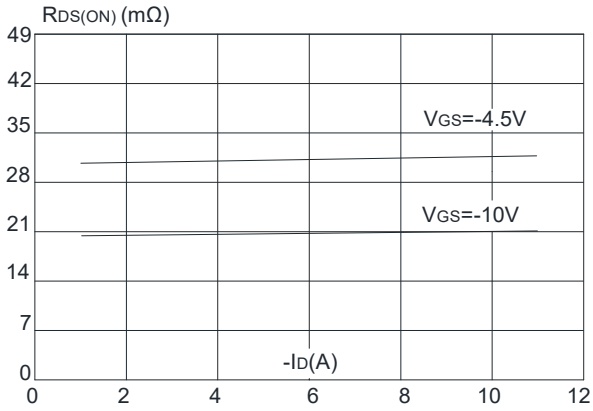


Figure 3: On-resistance vs. Drain Current

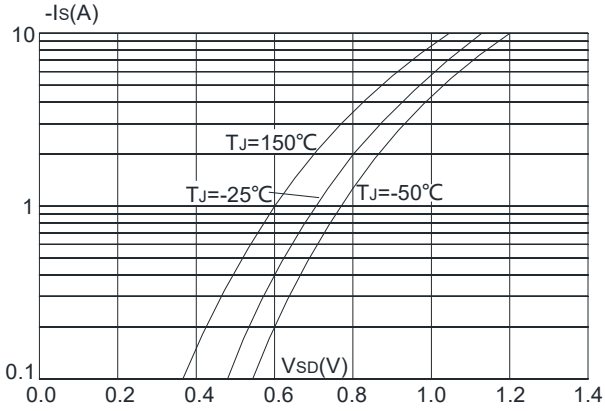


Figure 4: Body Diode Characteristics

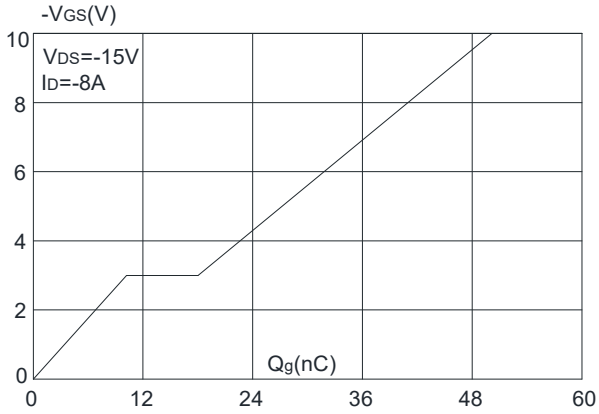


Figure 5: Gate Charge Characteristics

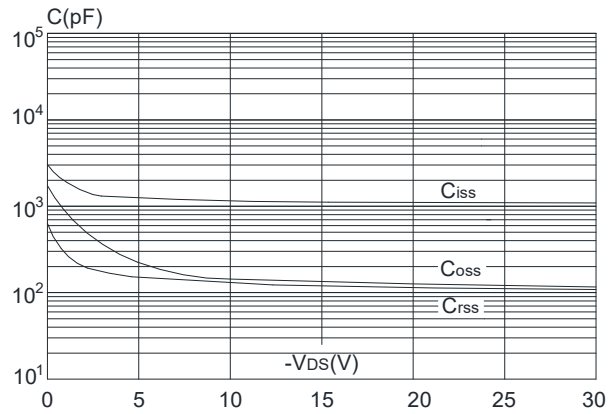


Figure 6: Capacitance Characteristics

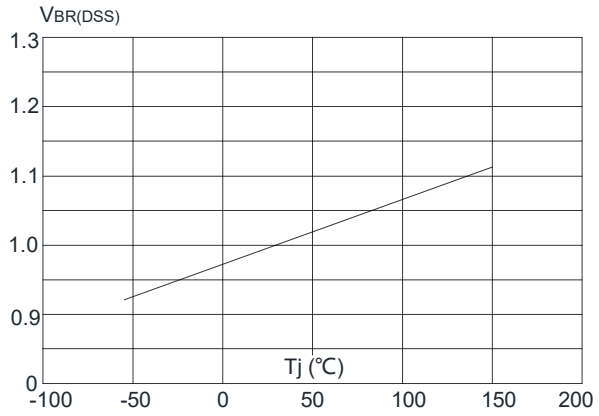


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

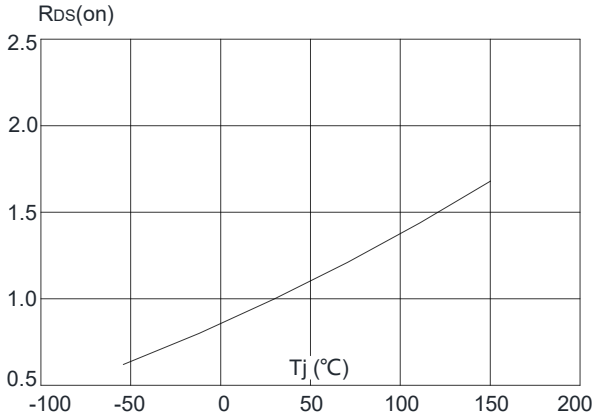


Figure 8: Normalized on Resistance vs. Junction Temperature

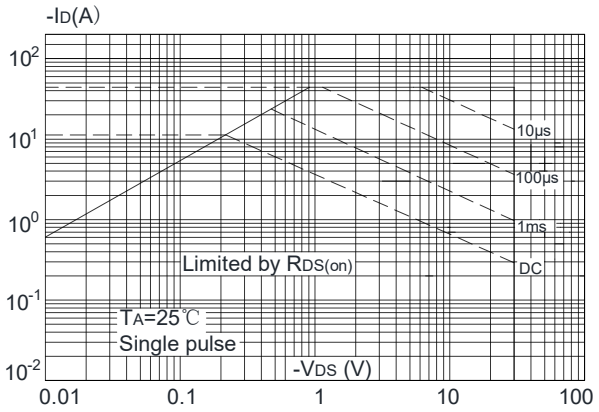


Figure 9: Maximum Safe Operating Area

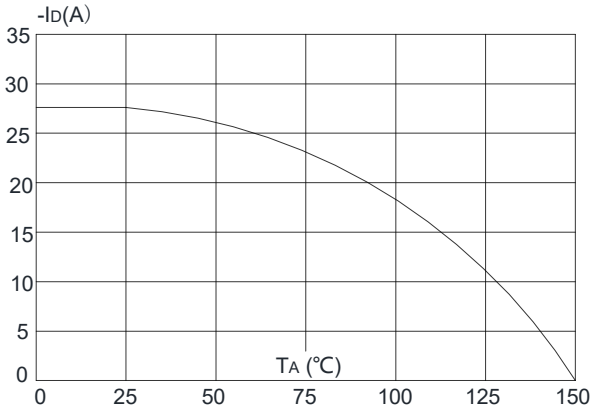


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

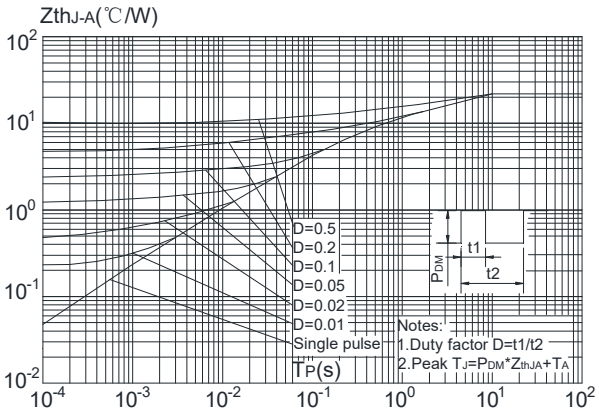
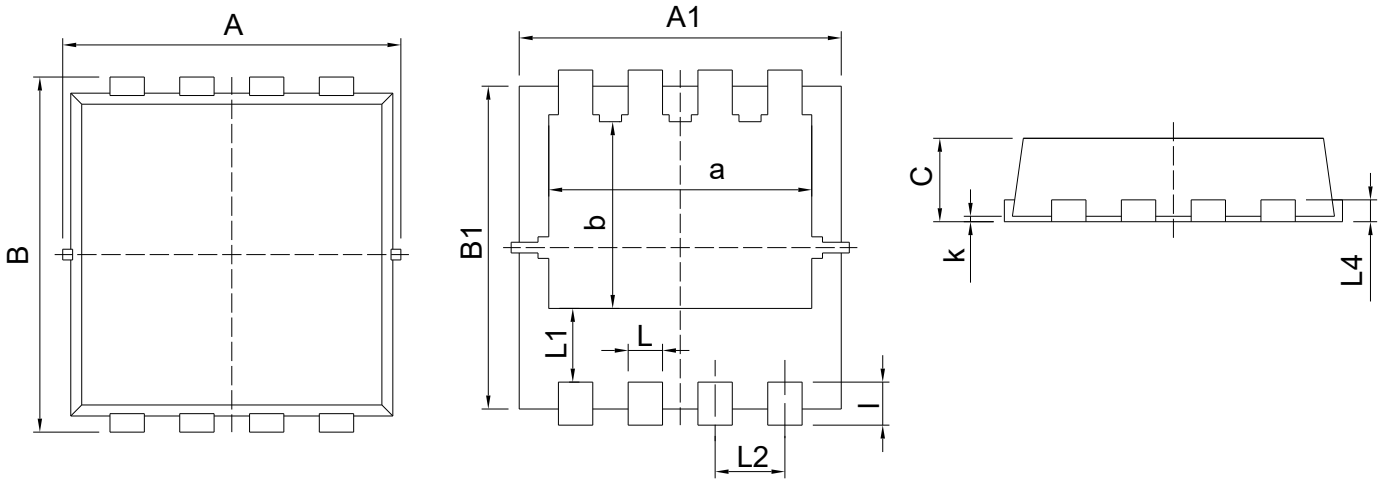


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Package Outline

PDFN3x3-8L Dimensions in mm



Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
A	3.2	3.4	L2	0.55	0.75
A1	3.1	3.2	L4	0.14	0.20
B	3.2	3.4	a	2.35	2.55
B1	2.95	3.05	b	1.635	1.835
C	0.75	0.85	k	0.0	0.05
L	0.25	0.35	l	0.3	0.5
L1	-	0.75			

Contact Information

TANI website: **http://www.tanisemi.com** Email:tani@tanisemi.com

For additional information, please contact your local Sales Representative.

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