

TM30G03DF

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

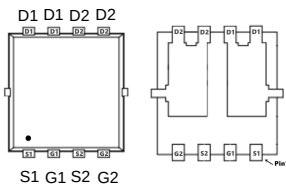
$V_{DS} = 30V$, $I_D = 33A$
 $R_{DS(ON)} = 9m\Omega @ V_{GS} = 10V$

P Channel

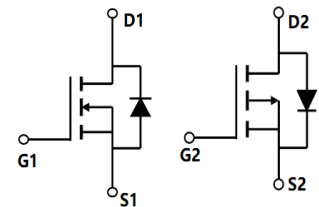
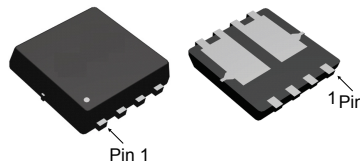
$V_{DS} = -30V$, $I_D = -28A$
 $R_{DS(ON)} = 19m\Omega @ V_{GS} = -10V$

100% UIS Tested

100% R_g Tested



DF:DFN3x3-8L



Marking :30G03 OR 4616

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

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- $T_C = 25^\circ C$	33	-28	A
	Continuous Drain Current- $T_C = 100^\circ C$	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 - $T_C = 25^\circ C$	3.3	5.6	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		$^\circ C$

Thermal Characteristics:

Symbol	Parameter	N-CH	P-CH	Units
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	38	22	$^\circ C/W$

TM30G03DF

N+P-Channel Enhancement Mode Mosfet

N-Channel Electrical Characteristics: ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Sourtce Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	30	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =30V	---	---	1	μ A
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 =250 μ A	1	1.4	2.5	V
R _{DS(ON)}	Drain-Source On Resistance ^{note3}	V _{GS} =10V, I _D =10A	---	9	15	m Ω
		V _{GS} =4.5V, I _D =5A	---	16	22	
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	---	
Q _g	Gate Charge	V _{GS} =10V V _{DS} =15V I _D =10A		13	---	nC
Q _{gs}	Gate-Source Charge			4.5	---	
Q _{gd}	Gate-Drain Charge			3.3	---	
Switching Characteristics ⁴						
t _{d(on)}	Turn-On Delay Time	V _{DS} =30V, I _D = 10A, R _{REN} =3 Ω ,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/ μ s	---	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 : $T_J=25^\circ\text{C}$, $V_{DD}=15V$, $V_G=10V$, $L=0.5mH$, $R_g=25\Omega$, $I_{AS}=9A$
 $T_J=25^\circ\text{C}$, $V_{DD}=-15V$, $V_G=-10V$, $L=0.5mH$, $R_g=25\Omega$, $I_{AS}=-10A$
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Performance Characteristics-N

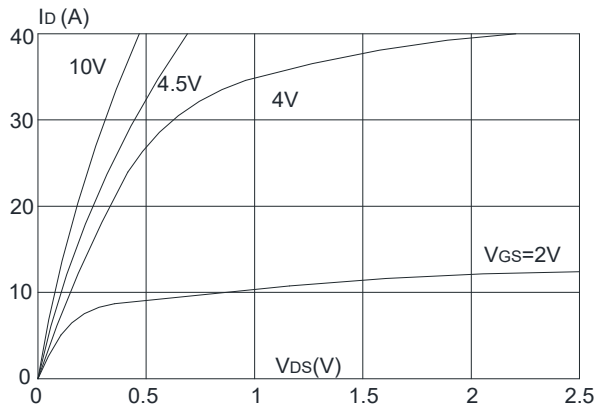


Figure1: Output Characteristics

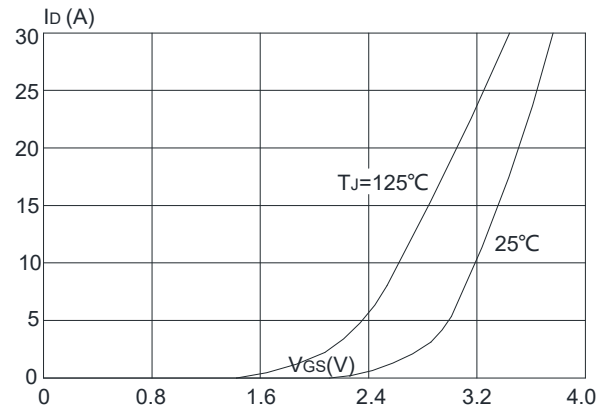


Figure 2: Typical Transfer Characteristics

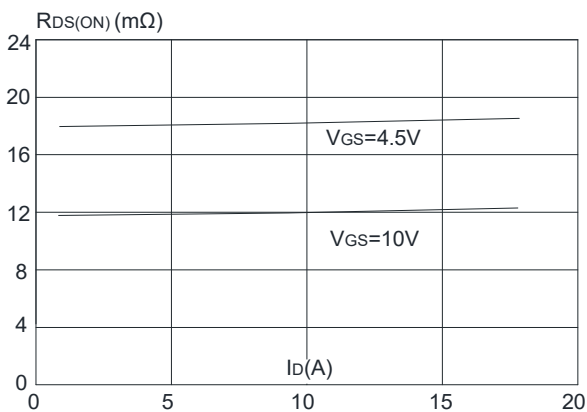


Figure 3: On-resistance vs. Drain Current

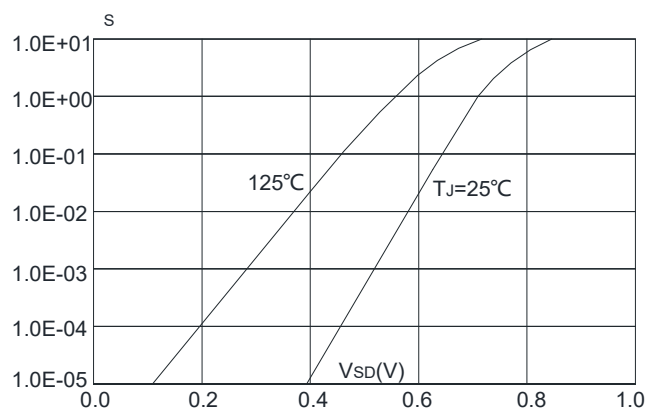


Figure 4: Body Diode Characteristics

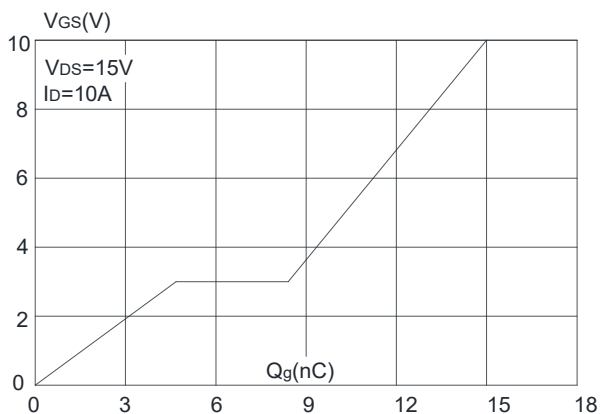


Figure 5: Gate Charge Characteristics

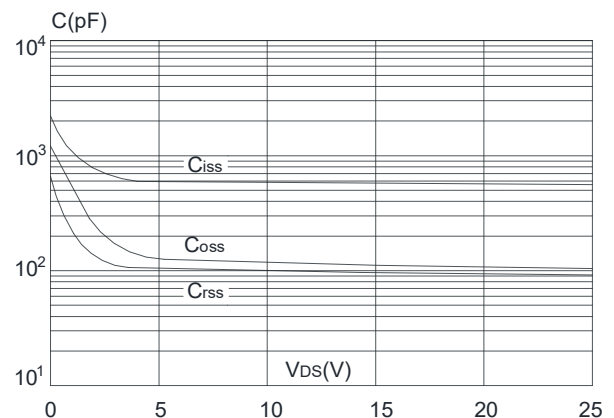


Figure 6: Capacitance Characteristics

TM30G03DF

N+P-Channel Enhancement Mode Mosfet

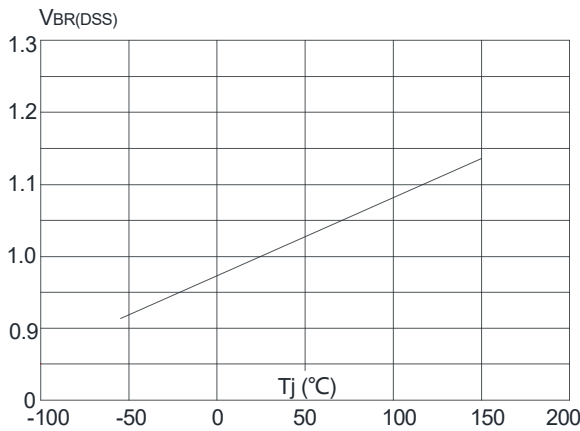


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

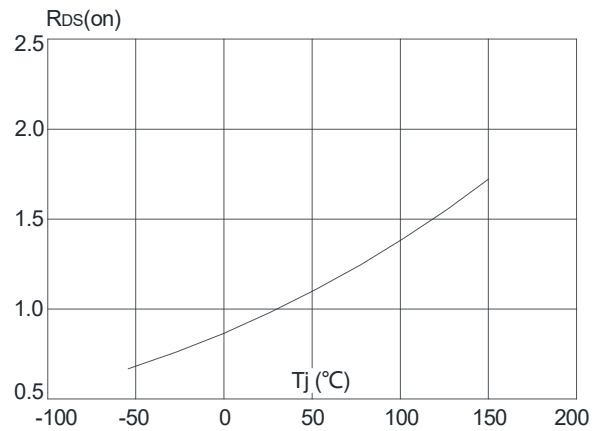


Figure 8: Normalized on Resistance vs. Junction Temperature

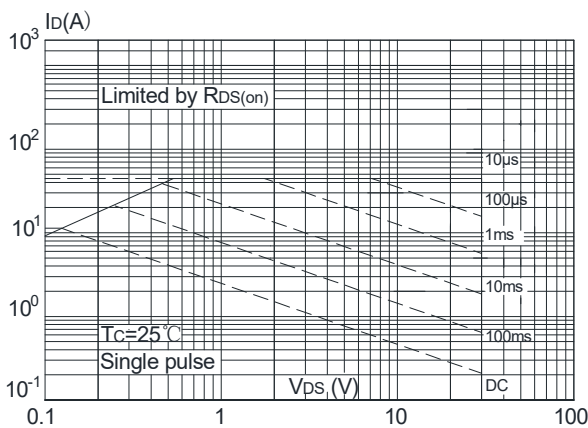


Figure 9: Maximum Safe Operating Area

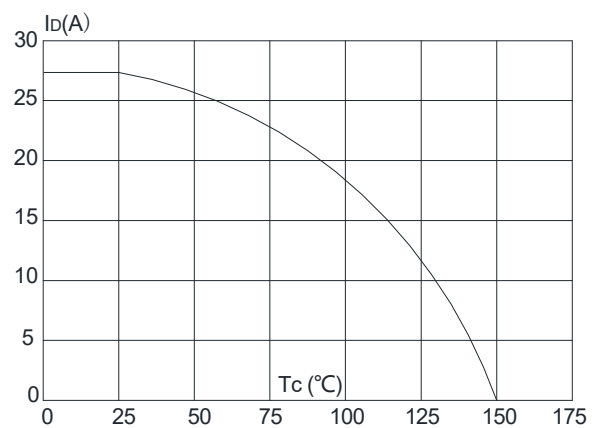


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

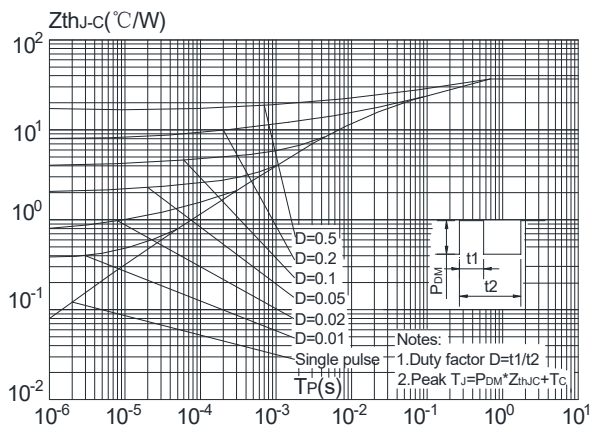


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



TM30G03DF

N+P-Channel Enhancement Mode Mosfet

P-Channel Electrical Characteristics: ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Sourtce Breakdown Voltage	V _{GS} =0V,I _D =250 μ A	-30	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =-30V	---	---	-1	μ A
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 =250 μ A	-1	-1.5	-2.5	V
R _{DS(ON)}	Drain-Source On Resistance ^{note3}	V _{GS} =-10V,I _D =-10A	---	19	25	m Ω
		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} =6 Ω R _D =15 Ω	---	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
T _{rr}	Reverse Recovery Time	T _J =25 °C ,	---	37	---	ns
Q _{rr}	Reverse Recovery Charge	I _F =-2A,dI/dt=-100A/ μ s	---	36	---	nC

Typical Performance Characteristics-P

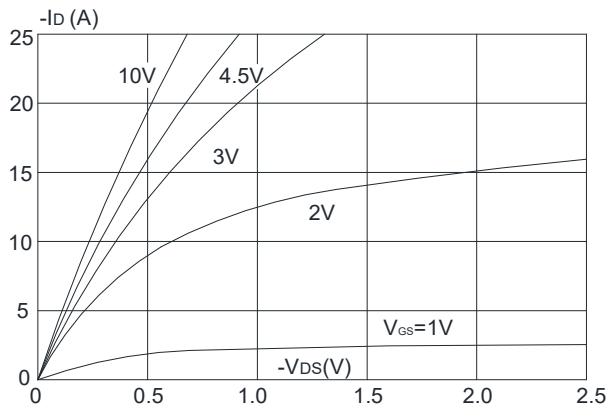


Figure1: Output Characteristics

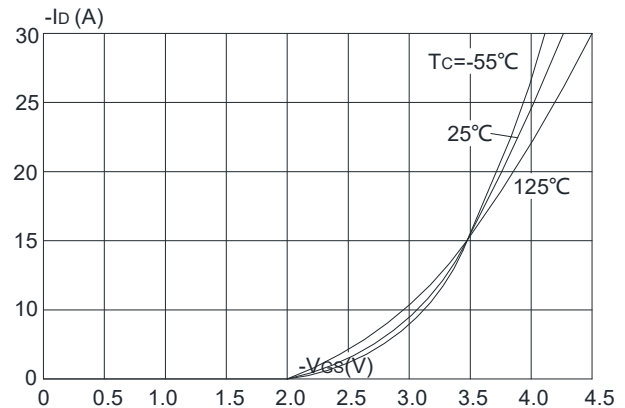


Figure 2: Typical Transfer Characteristics

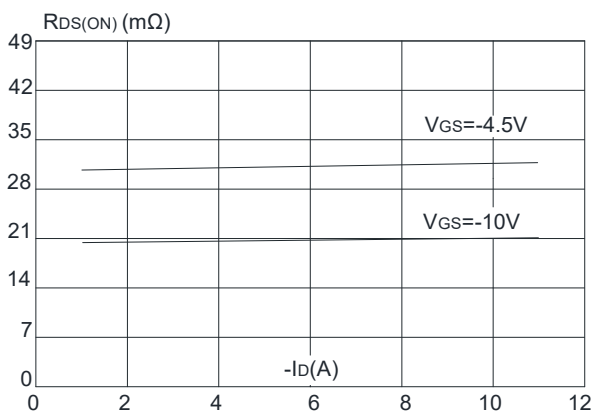


Figure 3: On-resistance vs. Drain Current

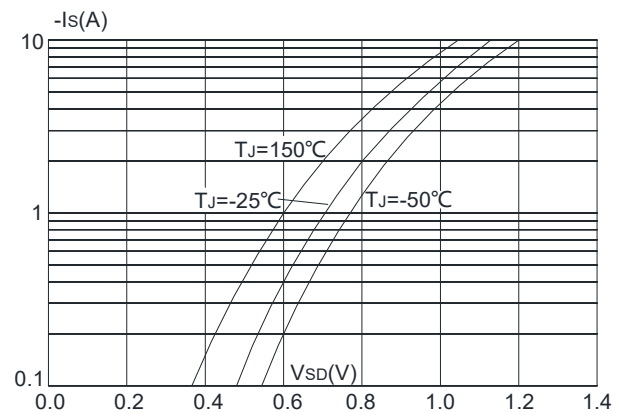


Figure 4: Body Diode Characteristics

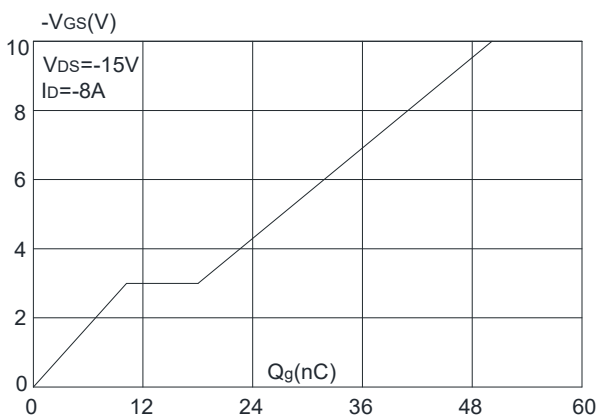


Figure 5: Gate Charge Characteristics

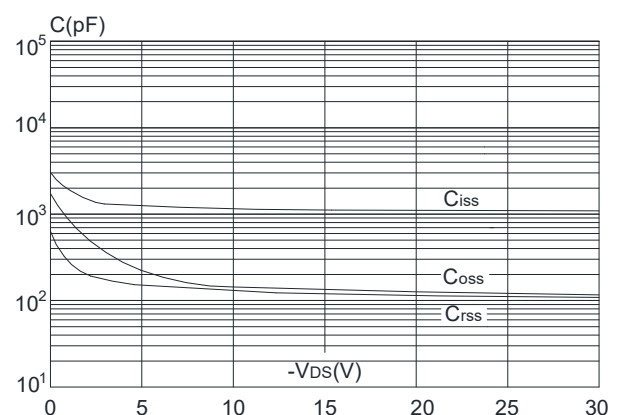


Figure 6: Capacitance Characteristics

TM30G03DF

N+P-Channel Enhancement Mode Mosfet

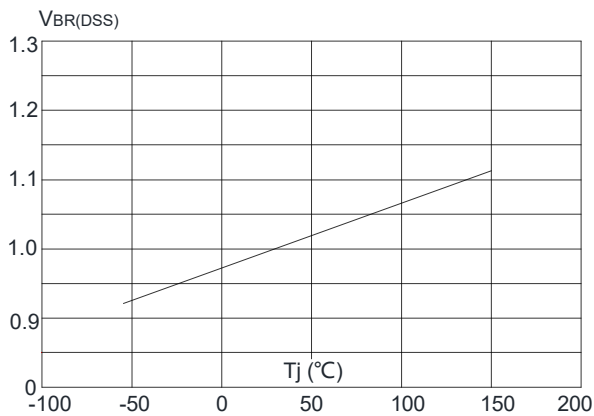


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

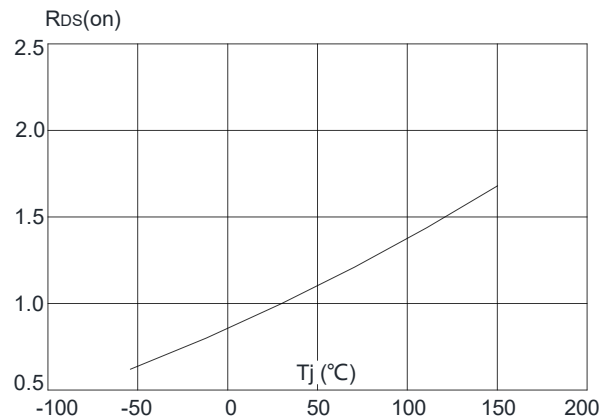


Figure 8: Normalized on Resistance vs. Junction Temperature

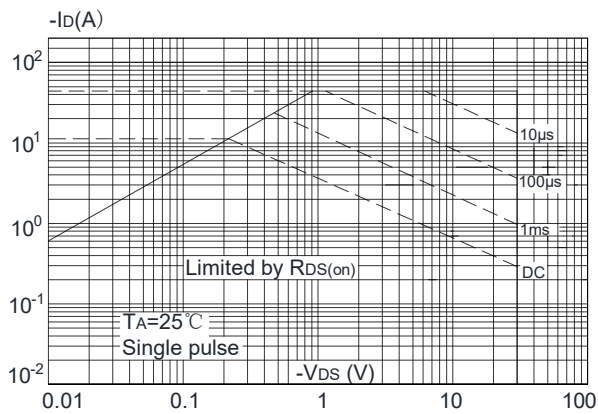


Figure 9: Maximum Safe Operating Area

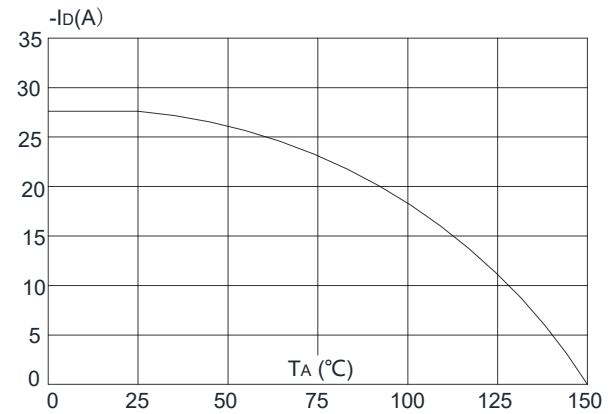


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

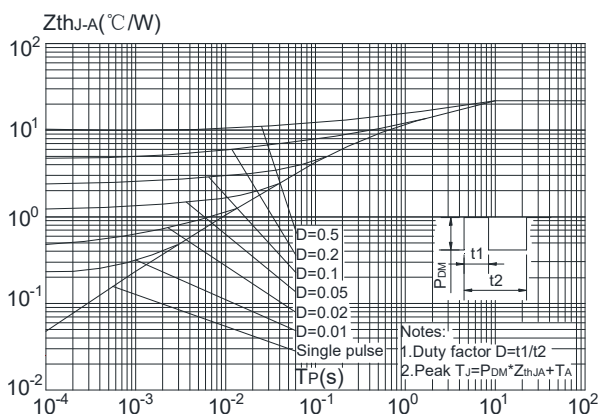
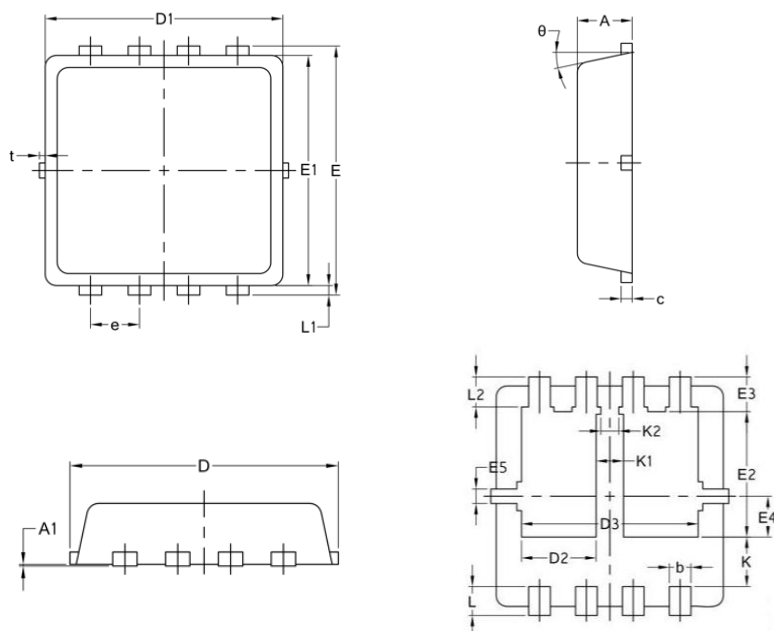


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Package Mechanical Data:DFN3x3-8L



Symbol	Common		
	Mm		
	Min	Nom	Max
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.25	0.30	0.39
c	0.14	0.152	0.20
D	3.20	3.30	3.45
D1	3.05	3.15	3.25
D2	0.84	1.04	1.24
D3	2.30	2.45	2.60
E	3.20	3.30	3.40
E1	2.95	3.05	3.15
E2	1.60	1.74	1.90
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.50	0.69	0.80
K1	0.30	0.38	0.53
K2	0.15	0.25	0.35
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
L2	0.27	0.42	0.57
t	0	0.075	0.13
Φ	10°	12°	14°