

N-Channel Enhancement Mode Power MOSFET

Description

The PED3312M uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications. It is ESD protected.

General Features

- $V_{DS} = 18V$, $I_D = 22A$

$$R_{DS(ON)} < 4.3m\Omega @ V_{GS}=4.5V$$

$$R_{DS(ON)} < 4.6m\Omega @ V_{GS}=3.8V$$

$$R_{DS(ON)} < 5.0m\Omega @ V_{GS}=3.0V$$

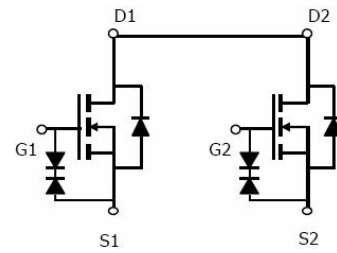
$$R_{DS(ON)} < 6.8m\Omega @ V_{GS}=2.5V$$

ESD Rating: 4000V HBM

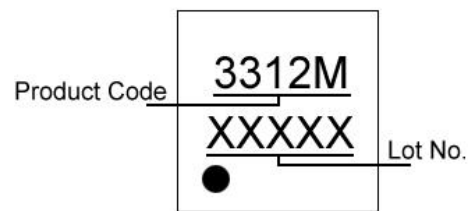
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

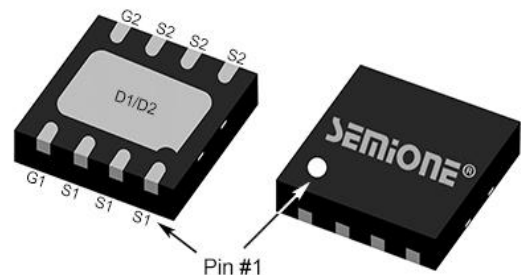
- PWM applications
- Load switch
- Power management



Schematic diagram



Marking



DFN3x3-8L

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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	18	V
Gate-Source Voltage		V_{GS}	± 12	V
Drain Current-Continuous	$T_A=25^\circ C$	I_D	22	A
	$T_A=70^\circ C$		16	
Pulsed Drain Current (Note 1)		I_{DM}	80	
Avalanche Current		I_{AS}	33	
Avalanche Energy	$L=0.1mH$	E_{AS}	54	mJ
Maximum Power Dissipation	$T_A=25^\circ C$	P_D	3.6	W
	$T_A=70^\circ C$		2.4	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	34.7	$^\circ C/W$
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Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	-	18	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =16V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±10V, V _{DS} =0V	-	-	±10	μA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.45	0.7	1.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =8A	2.8	3.4	4.3	mΩ
		V _{GS} =3.8V, I _D =7A	3.0	3.6	4.6	mΩ
		V _{GS} =3.0V, I _D =6A	3.2	4.0	5.0	mΩ
		V _{GS} =2.5V, I _D =6A	3.5	5.0	6.8	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =6A	25	-	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, F=1.0MHz	-	2600	-	pF
Output Capacitance	C _{oss}		-	600	-	pF
Reverse Transfer Capacitance (Note 4)	C _{rss}		-	580	-	pF
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =10V, I _D =2A, R _L =1Ω, V _{GS} =4.5V, R _G =3Ω	-	20	-	nS
Turn-on Rise Time	t _r		-	40	-	nS
Turn-Off Delay Time	t _{d(off)}		-	72	-	nS
Turn-Off Fall Time	t _f		-	16	-	nS
Total Gate Charge	Q _g	V _{DS} =10V, I _D =7A, V _{GS} =4.5V	-	35	-	nC
Gate-Source Charge	Q _{gs}		-	5	-	nC
Gate-Drain Charge	Q _{gd}		-	9	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =1A	-	-	1.2	V
Diode Forward Current (Note 2)	I _S		-	-	26	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to product.

Typical Electrical and Thermal Characteristics

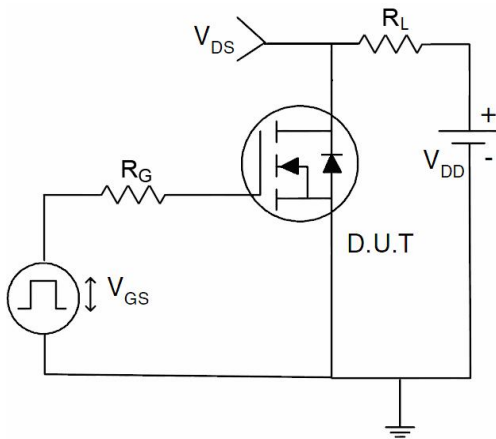


Figure 1 Switching Test Circuit

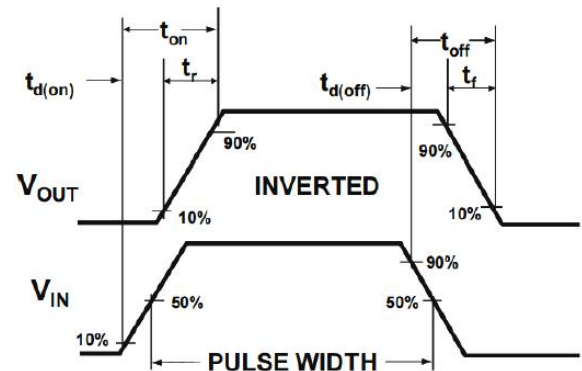


Figure 2 Switching Waveform

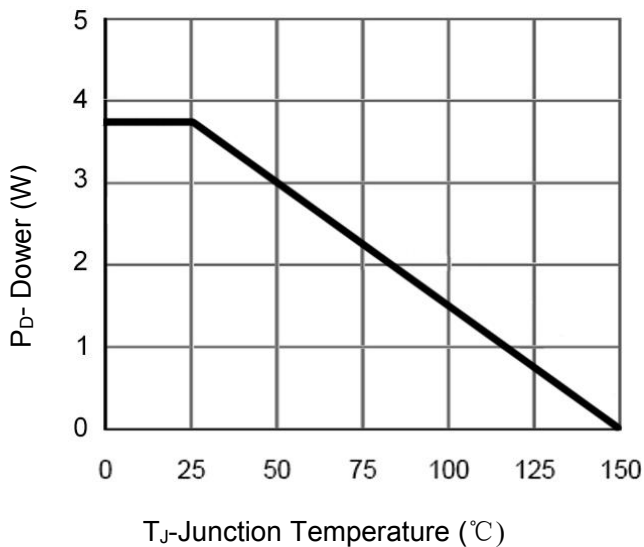


Figure 3 Power Dissipation

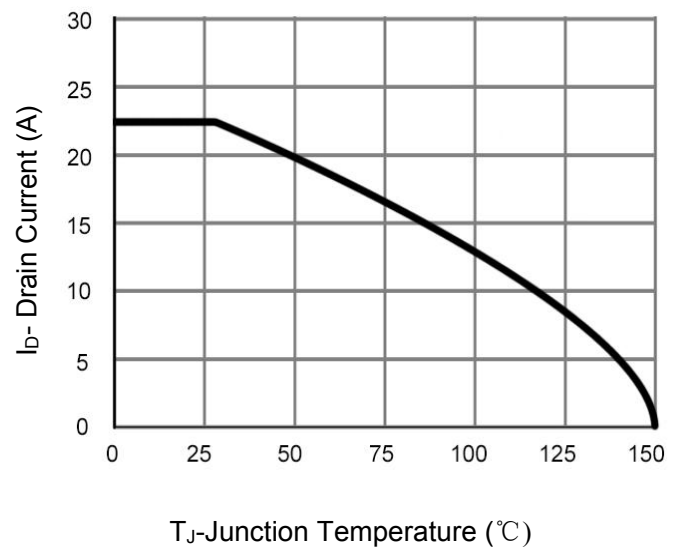


Figure 4 Drain Current

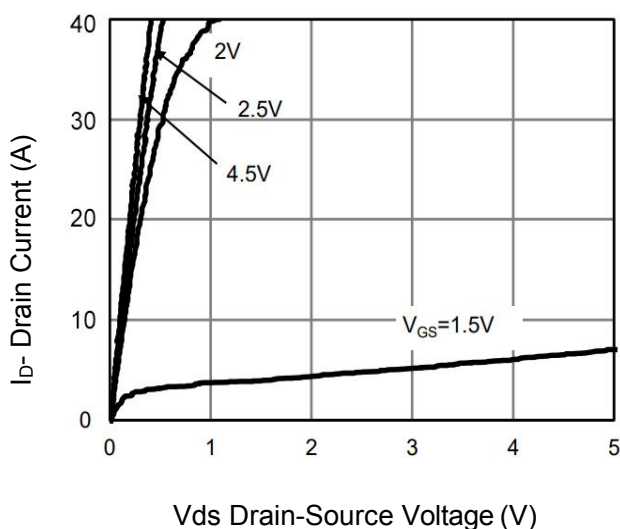


Figure 5 Output Characteristics

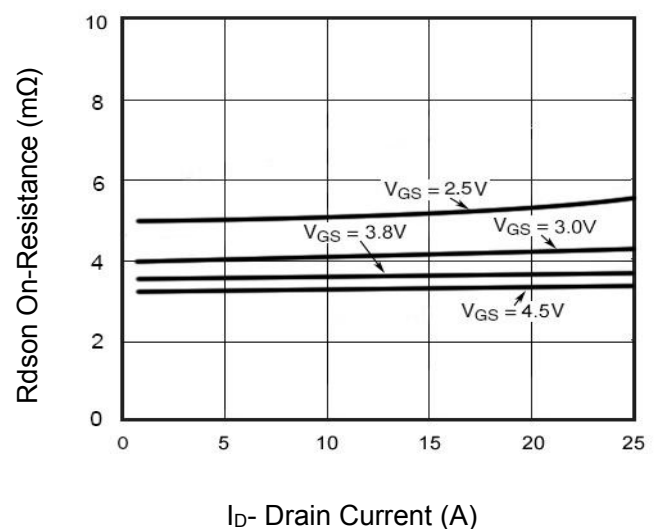


Figure 6 Rdson vs Drain Current

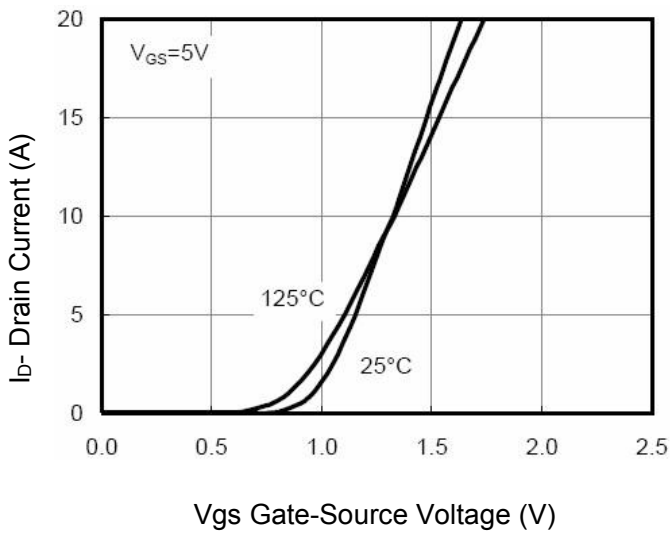


Figure 7 Transfer Characteristics

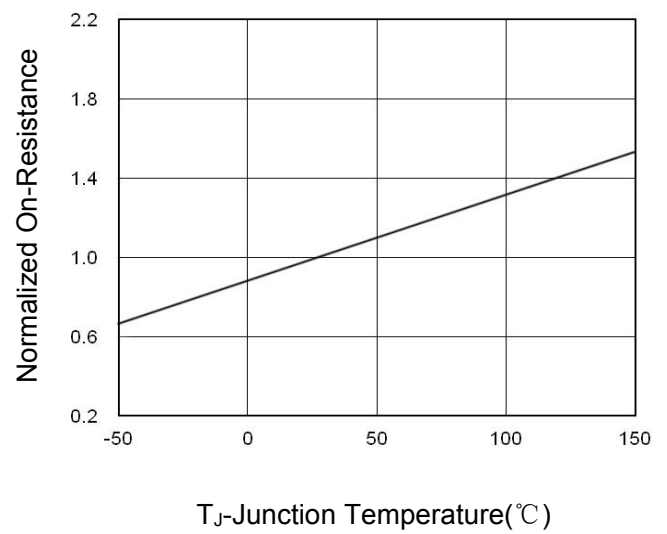


Figure 8 Rdson vs Junction Temperature

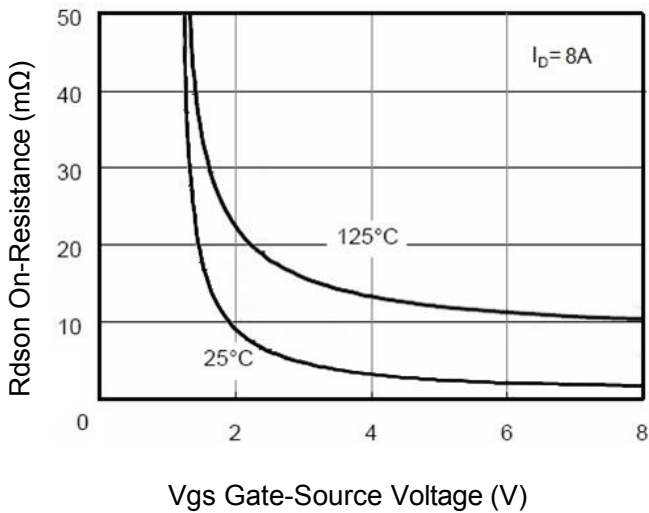


Figure 9 Rdson vs Vgs

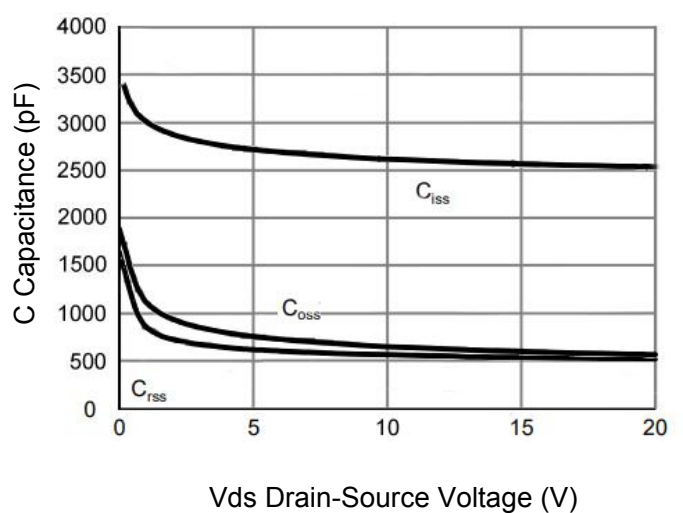


Figure 10 Capacitance vs Vds

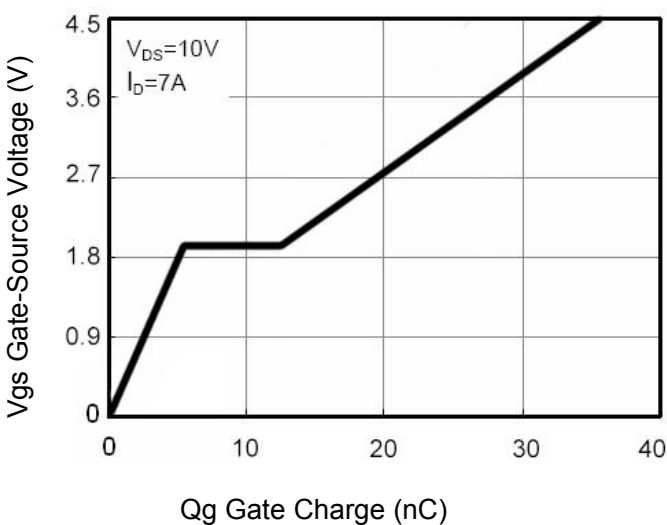


Figure 11 Gate Charge

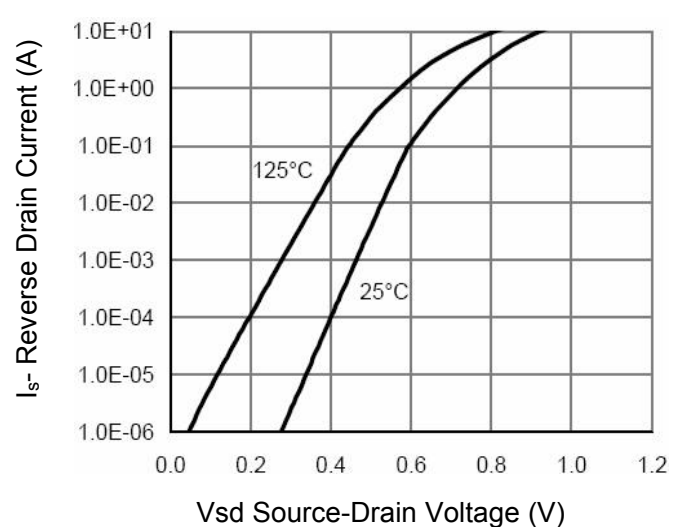


Figure 12 Source- Drain Diode Forward

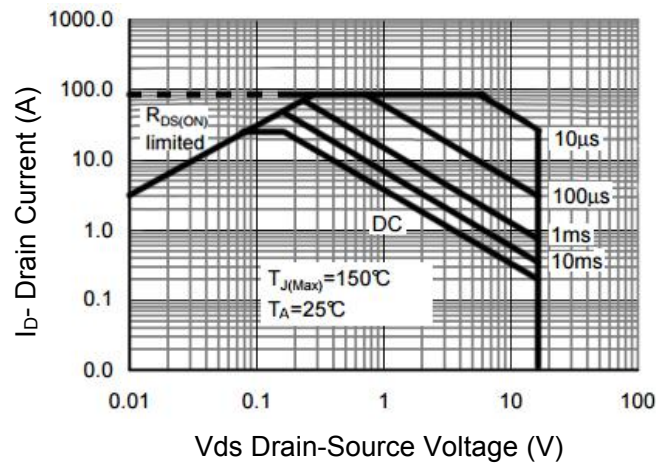


Figure 13 Safe Operation Area

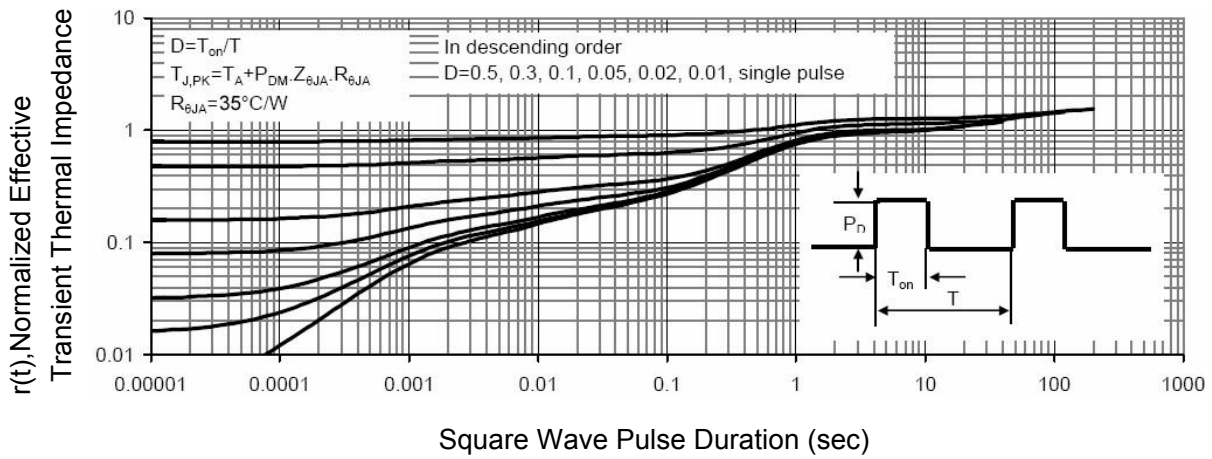
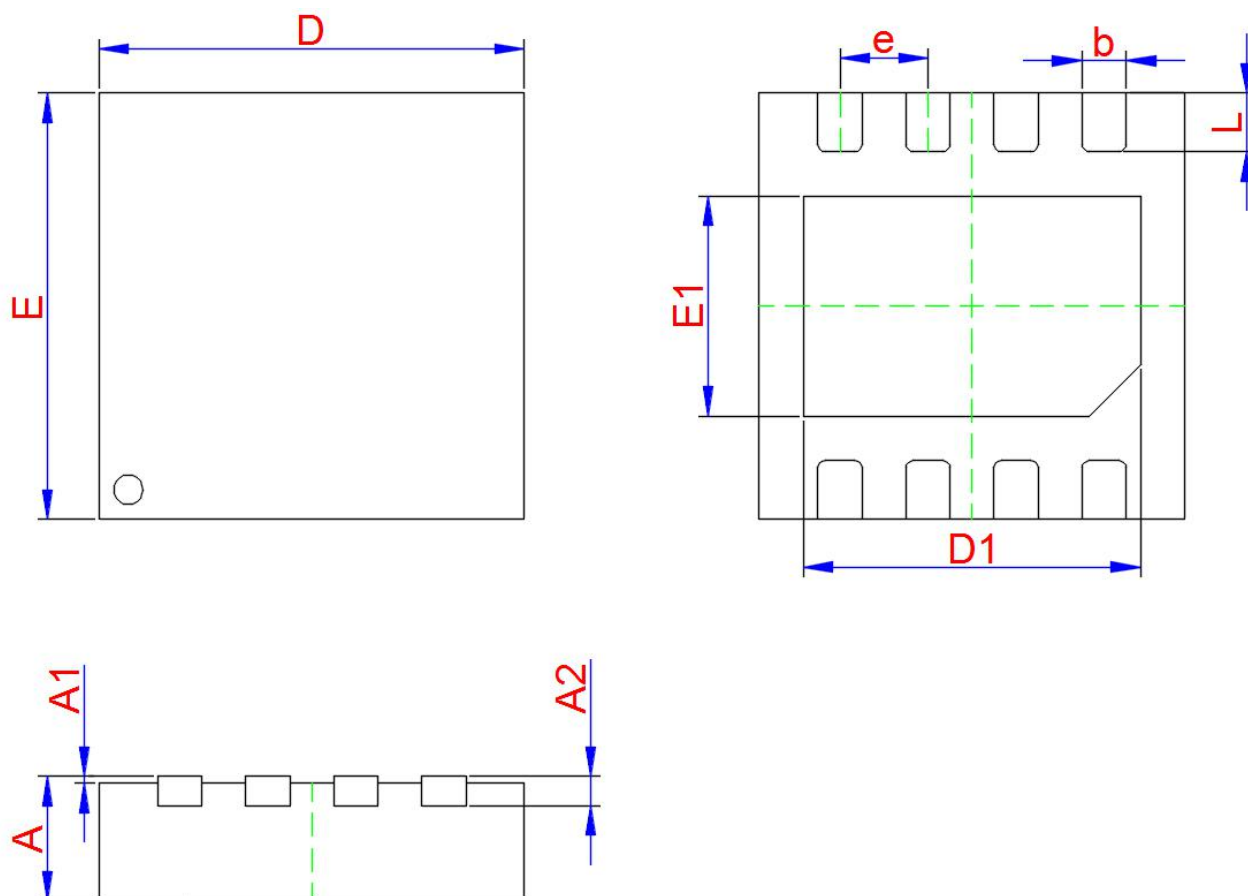


Figure 14 Normalized Maximum Transient Thermal Impedance

DFN3x3-8L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.700	0.750	0.800
A1	0.000	0.020	0.050
A2	0.203		
b	0.250	0.300	0.350
D	2.924	3.000	3.076
D1	2.200	2.300	2.400
E	2.924	3.000	3.076
E1	1.400	1.500	1.600
e	0.650 TYP.		
L	0.350	0.400	0.450