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 = 22 A

  $R_{DS(ON)}$ < 4.3mΩ @ V_{GS}=4.5V

  $R_{DS(ON)}$ < 4.6mΩ @ V_{GS}=3.8V

  $R_{DS(ON)}$ < 5.0mΩ @ V_{GS}=3.0V

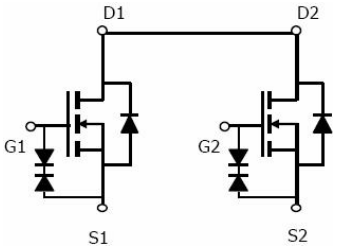
  $R_{DS(ON)}$ < 6.8mΩ @ V_{GS}=2.5V

  ESD Rating: 4000V HBM

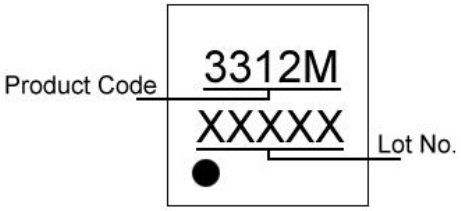
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

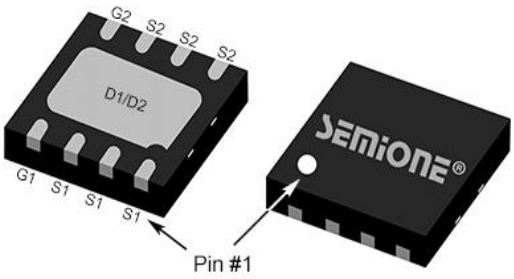
- PWM applications
- Load switch
- Power management



Schematic diagram



Marking



DFN3x3-8L

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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	18	V
Gate-Source Voltage		V_{GS}	±12	V
Drain Current-Continuous	TA=25℃	I_D	22	A
	TA=70℃		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	TA=25℃	P_D	3.6	W
	TA=70℃		2.4	
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	34.7	℃/W

Electrical Characteristics (TA=25℃ 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 ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to product.

Typical Electrical and Thermal Characteristics

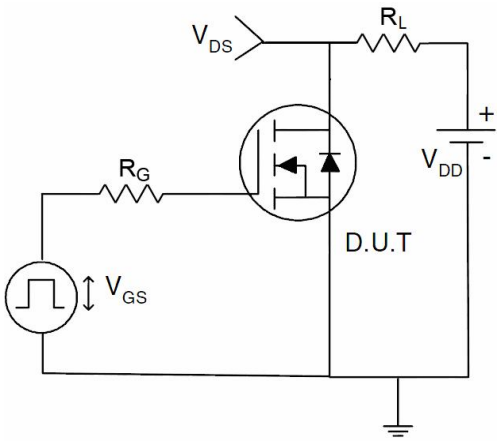


Figure 1 Switching Test Circuit

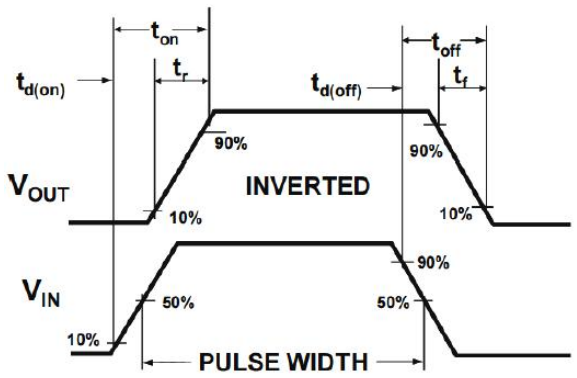


Figure 2 Switching Waveform

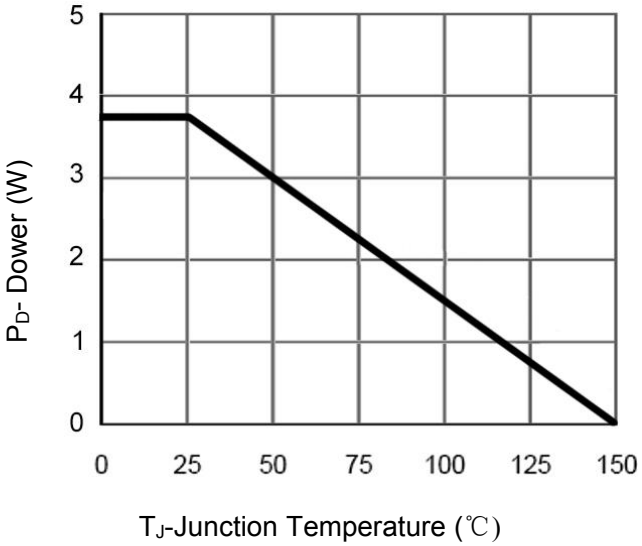


Figure 3 Power Dissipation

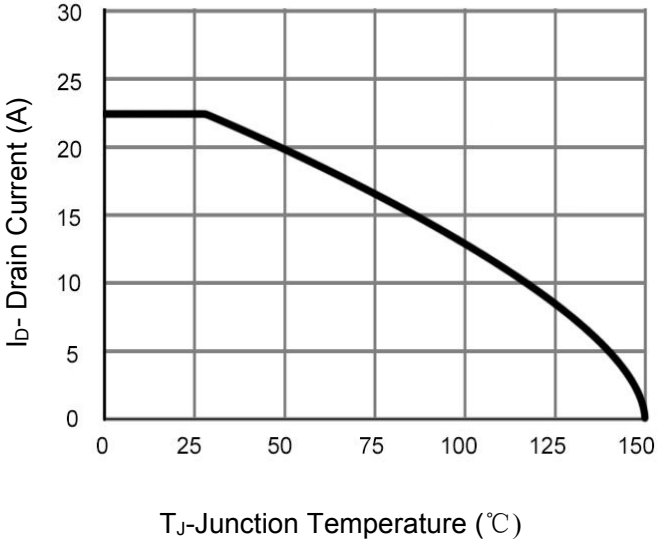


Figure 4 Drain Current

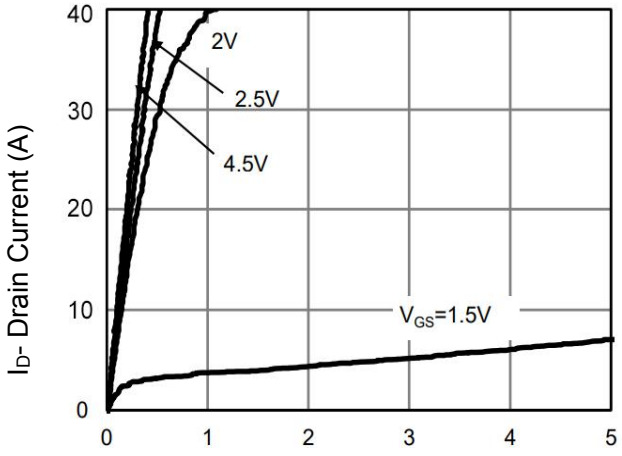


Figure 5 Output Characteristics

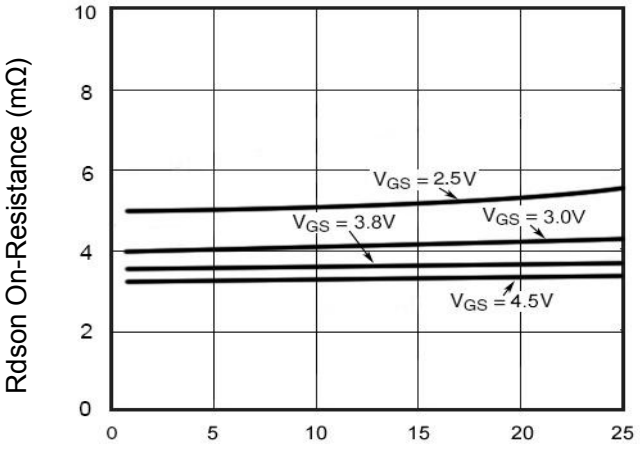


Figure 6 Rdson vs Drain Current

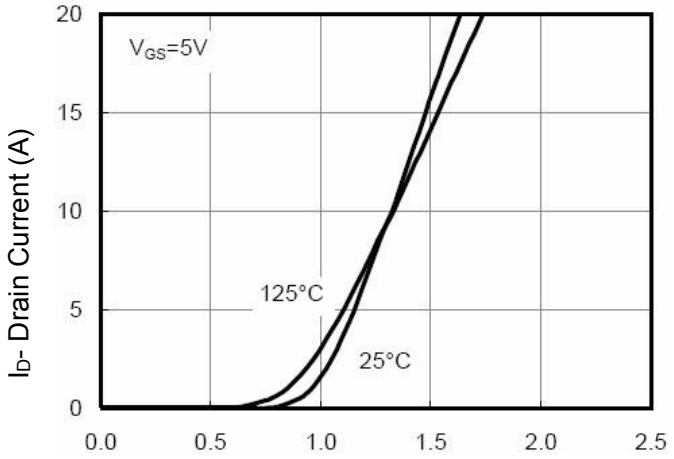


Figure 7 Transfer Characteristics

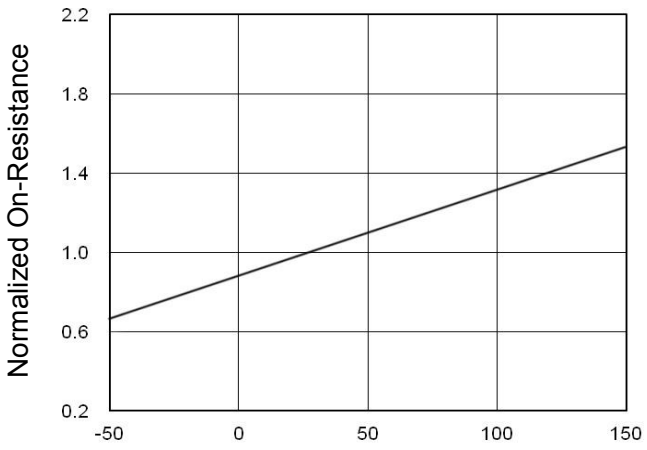


Figure 8 Rdson vs Junction Temperature

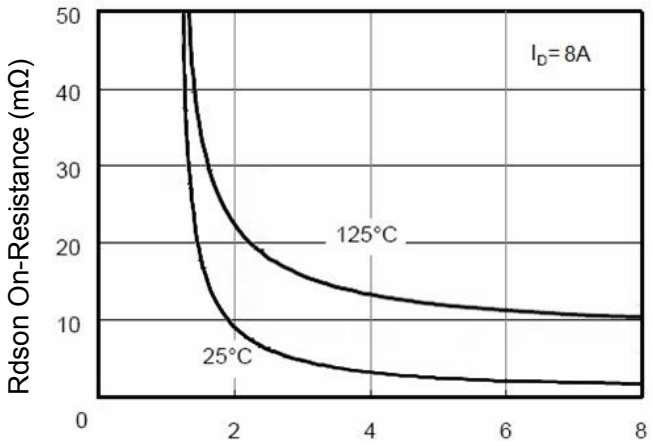


Figure 9 Rdson vs Vgs

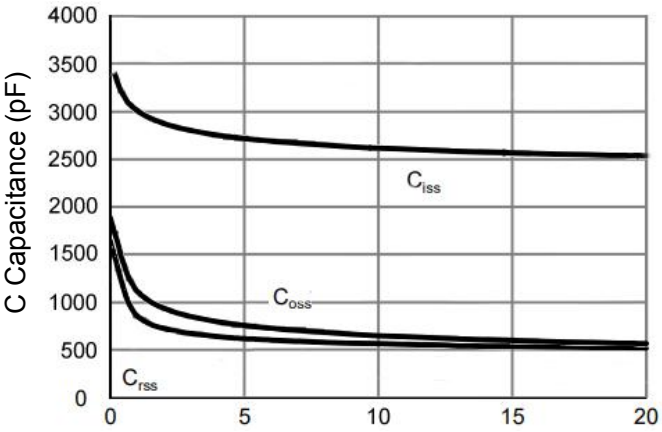


Figure 10 Capacitance vs Vds

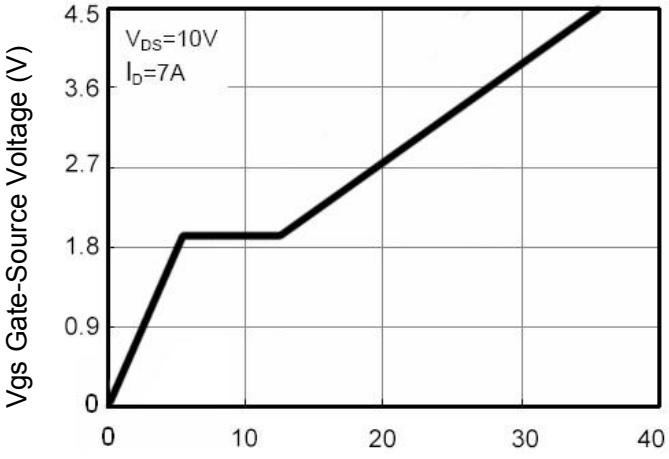


Figure 11 Gate Charge

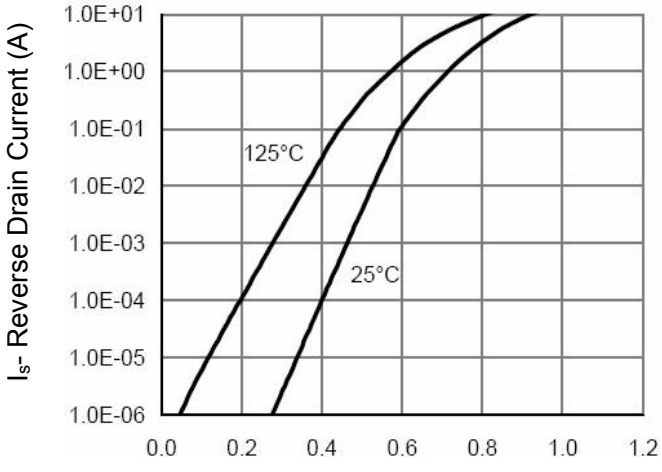


Figure 12 Source- Drain Diode Forward

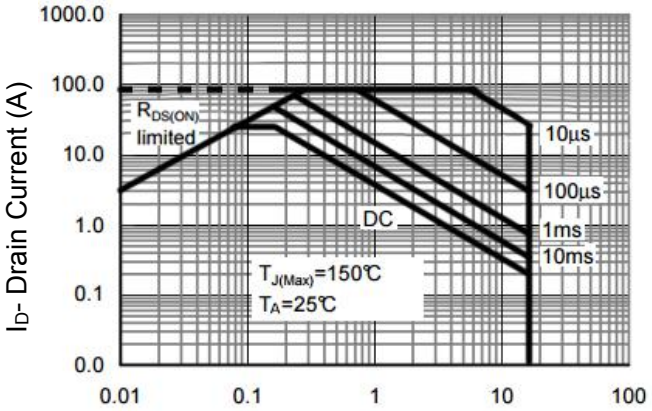


Figure 13 Safe Operation Area

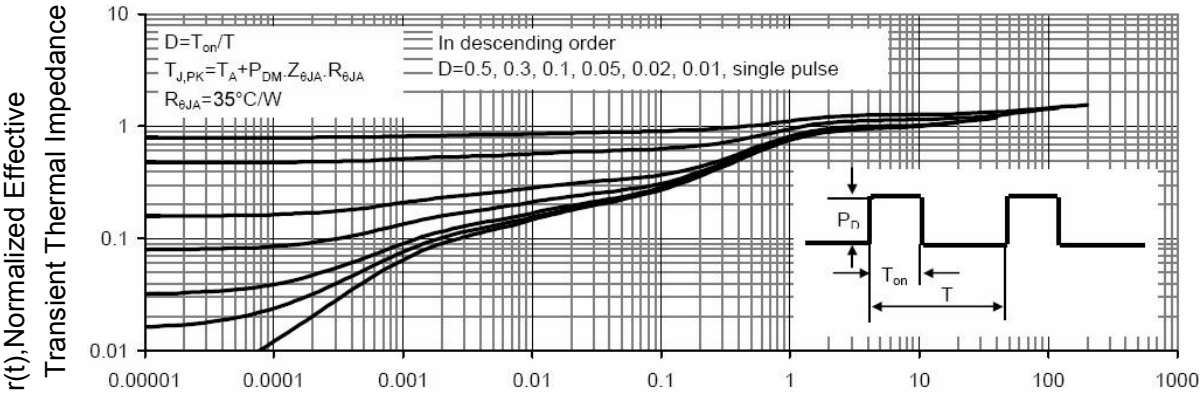
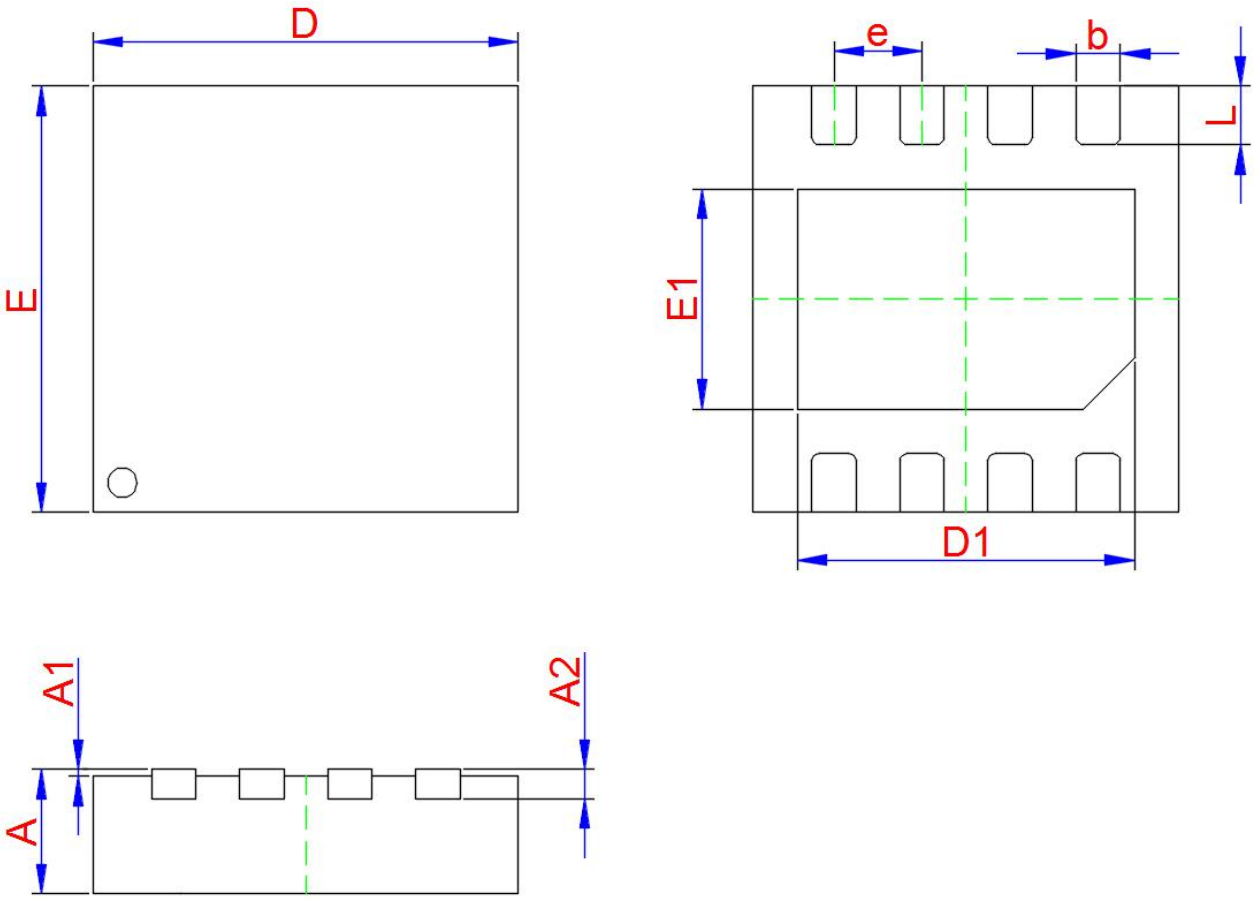


Figure 14 Normalized Maximum Transient Thermal Impedance

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