N-Channel Enhancement Mode Power MOSFET

Description

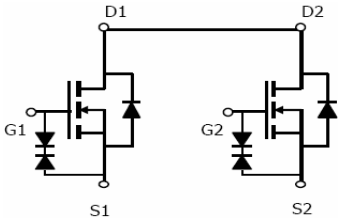
The PED3312M uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications. It is ESD protected.

General Features

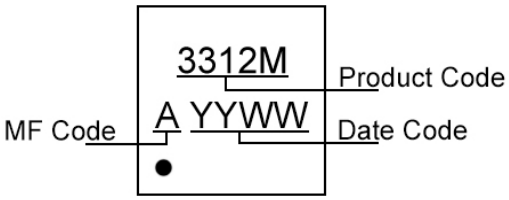
- V_{DS} = 18V,I_D =22A
  $R_{DS(ON)}$ < 4.5mΩ@ V_{GS}=4.5V
  $R_{DS(ON)}$ < 4.7mΩ@ V_{GS}=3.8V
  $R_{DS(ON)}$ < 6mΩ@ V_{GS}=2.5V
  ESD Rating: 2000V HBM
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

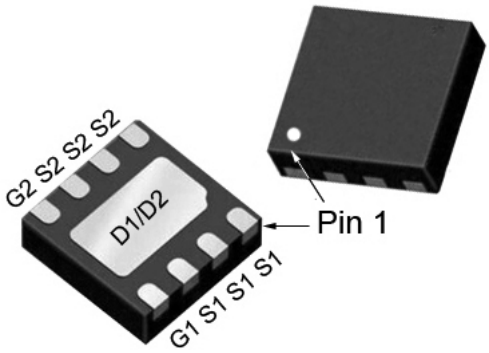
- PWM application
- Load switch



Schematic diagram



Marking and pin Assignment



DFN3x3-8L top view

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	18	V
Gate-Source Voltage		V_{GS}	±10	
Continuous Drain Current	T_A = 25 °C	I_D	22	A
	T_A = 70 °C		16	
Pulsed Drain Current (Note 1)		I_{DM}	80	
Avalanche Current		I_{AS}	20	
Avalanche Energy	L = 0.1mH	E_{AS}	26	mJ
Power Dissipation	T_A = 25 °C	P_D	3.6	W
	T_A = 70 °C		2.4	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C

Thermal Characteristic

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

Notes:

1. Pulse width limited by maximum junction temperature.
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.

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	20	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V,V_{GS}=0V	-	-	1	μA
Parameter	**Symbol**	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±10V,V_{DS}=0V	-	-	±10	μA
On Characteristics (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.45	0.8	1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=8A	-	3.4	4.5	mΩ
		V_{GS}=3.8V, I_D=7A	-	3.5	4.7	mΩ
		V_{GS}=2.5V, I_D=6A	-	4.4	6	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=5A	-	40	-	S
Dynamic Characteristics (Note 3)						
Input Capacitance	C_{lss}	V_{DS}=10V,V_{GS}=0V, F=1.0MHz	-	3140	-	PF
Output Capacitance	C_{oss}		-	352	-	PF
Reverse Transfer Capacitance	C_{rss}		-	320	-	PF
Switching Characteristics (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V,R_L=1.35Ω V_{GS}=5V,R_{GEN}=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}		-	3	-	nC
Gate-Drain Charge	Q_{gd}		-	10	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 2)	V_{SD}	V_{GS}=0V,I_S=1A	-	-	1.2	V
Diode Forward Current (Note 1)	I_S		-	-	26	A

Notes:

1. Surface Mounted on FR4 Board, t ≤ 10 sec.
2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
3. Guaranteed by design, not subject to production

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

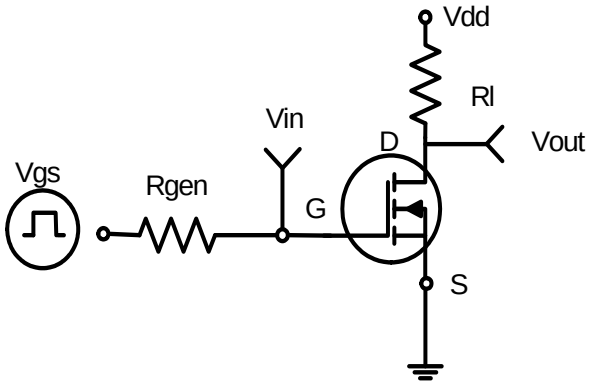


Figure 1:Switching Test Circuit

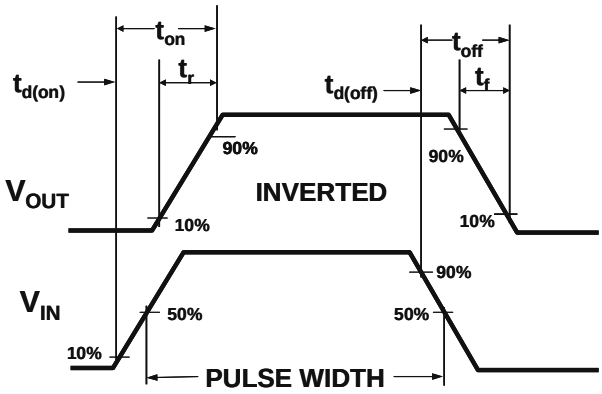


Figure 2:Switching Waveforms

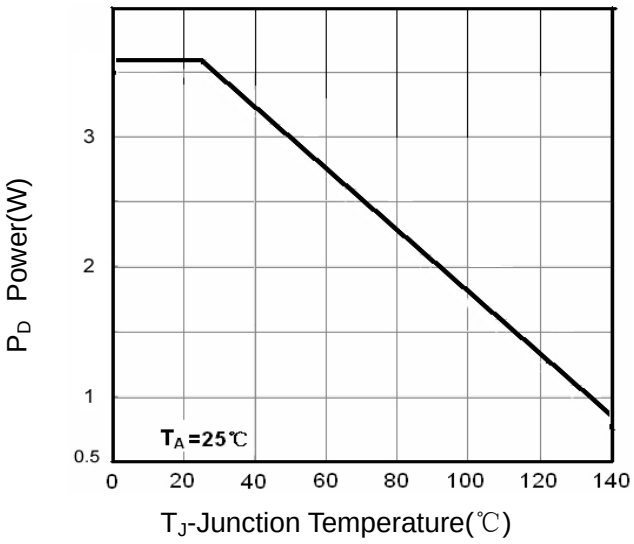


Figure 3 Power Dissipation

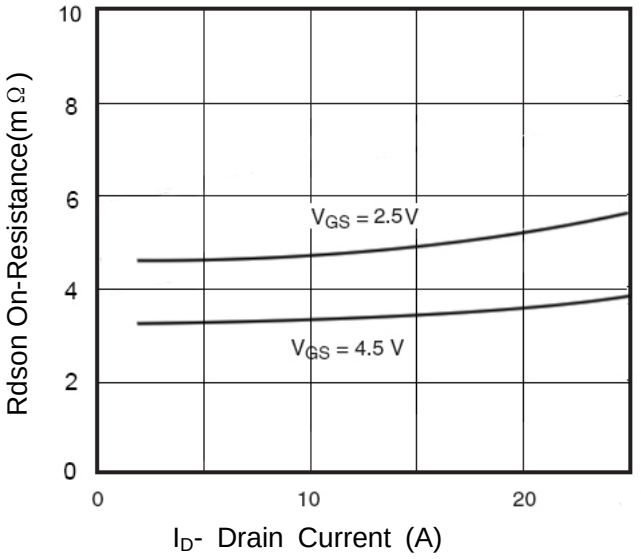


Figure 4 Drain-Source On-Resistance

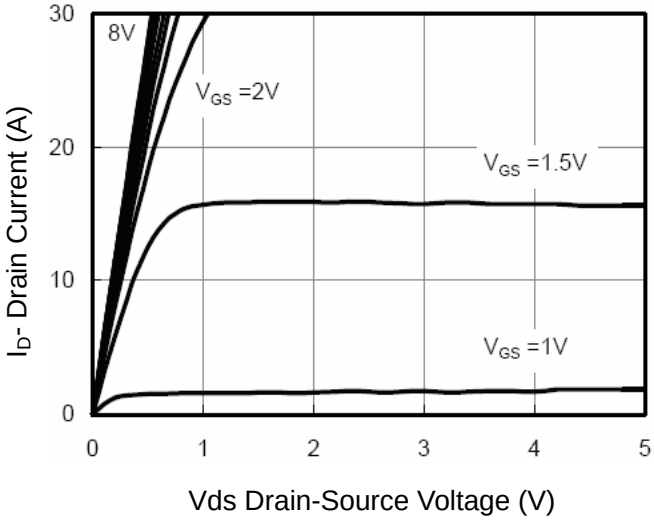


Figure 5 Output CHARACTERISTICS

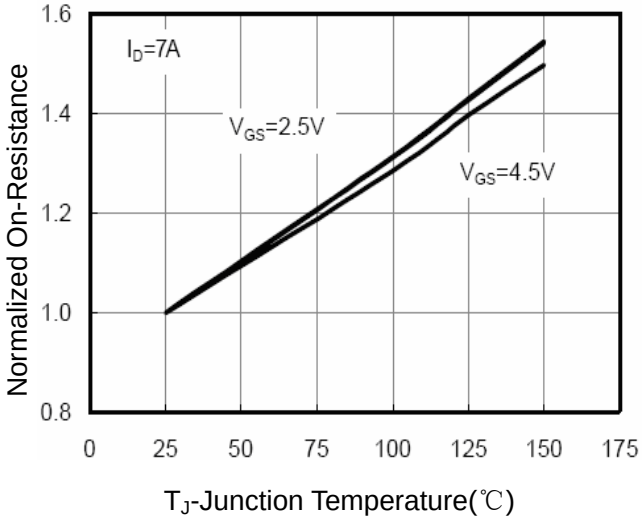


Figure 6 Drain-Source On-Resistance

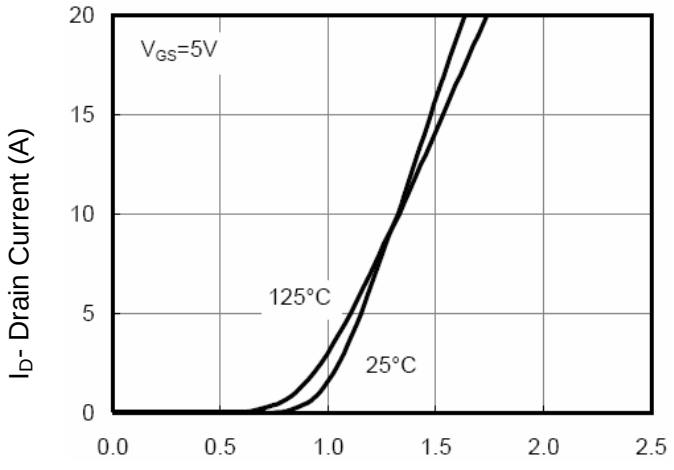


Figure 7 Transfer Characteristics

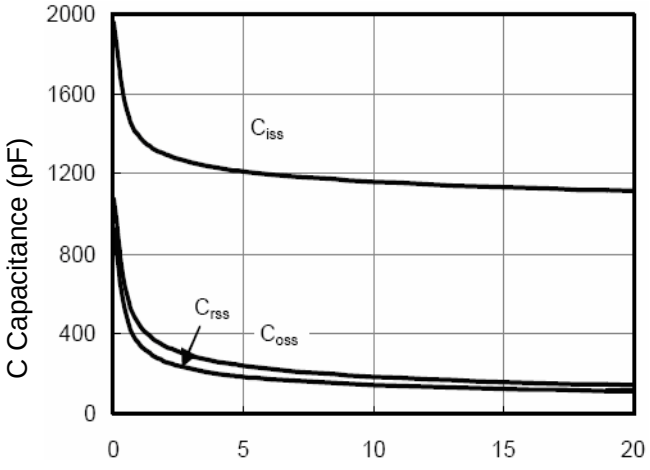


Figure 8 Capacitance vs Vds

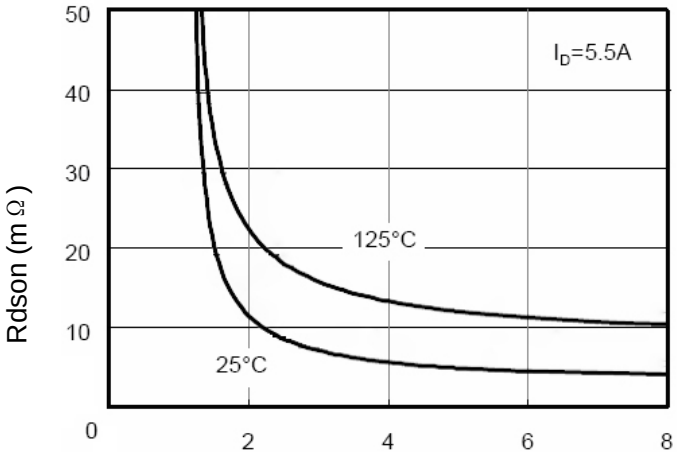


Figure 9 Rdson vs Vgs

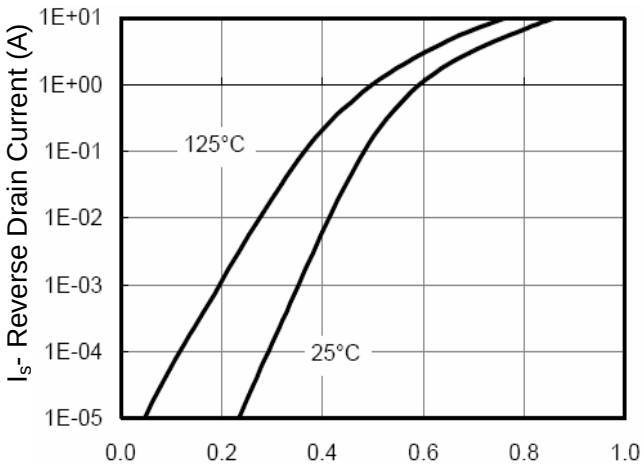


Figure 10 Capacitance vs Vds

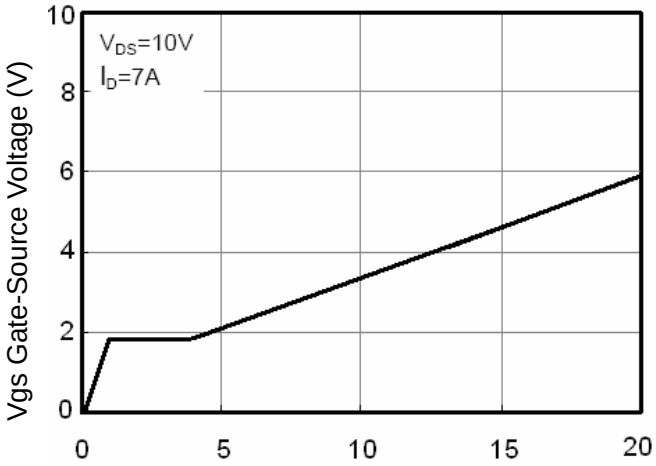


Figure 11 Gate Charge

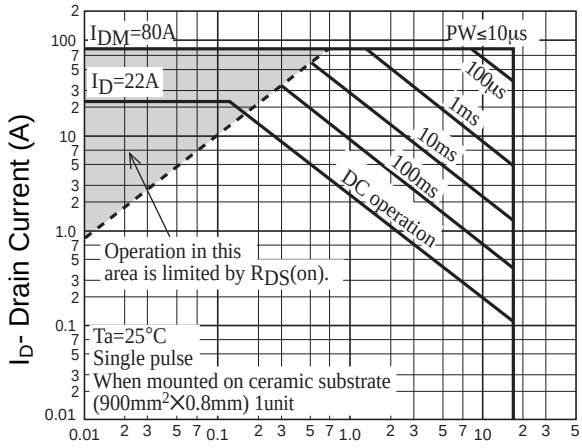


Figure 12 Safe Operation Area

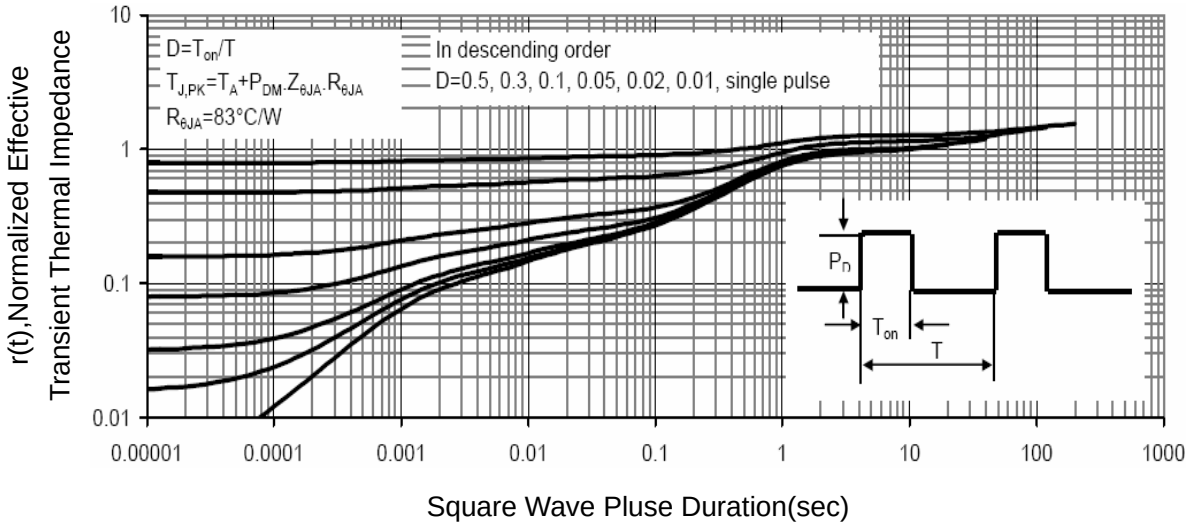


Figure 13 Normalized Maximum Transient Thermal Impedance

Package Dimension

DFN 3x3 MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	0.7		0.8	I		0.203	
B	0.25		0.35	J	2.2		2.4
C	0.2			K	1.4		1.6
D	2.924		3.076				
E	2.924		3.076				
F	0.324		0.476				
G		0.65					
H	0		0.05