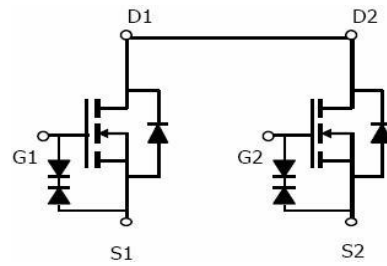


Dual N-Channel Enhancement Mode Power MOSFET

Description

The MX3388 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications. It is ESD protected.

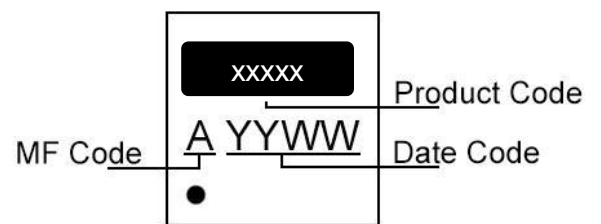


Schematic diagram

General Features

- ◆ $V_{DS} = 20V$, $I_D = 8A$
 - ◆ @ $V_{GS} = 4.5V$ $R_{DS(ON)}(Typ.) = 10m\Omega$
 - ◆ @ $V_{GS} = 3.8V$ $R_{DS(ON)}(Typ.) = 10.6m\Omega$
 - ◆ @ $V_{GS} = 2.5V$ $R_{DS(ON)}(Typ.) = 15.5m\Omega$
- ESD Rating: 2000V HBM

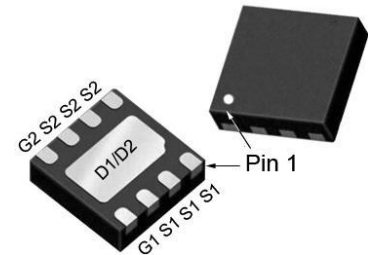
High density cell design for ultra low Rds on
Fully characterized Avalanche voltage and current



Marking Description

Application

PWM Power switching application
Hard Switched and High Frequency Circuits
Uninterruptible Power Supply



DFN3X3-8L top view

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current-Continuous	I_D	8	A
Drain Current-Continuous($T_A=100^\circ C$)	$I_D(100^\circ C)$	6	A
Pulsed Drain Current	I_{DM}	32	A
Maximum Power Dissipation	P_D	2.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	50	$^{\circ}\text{C}/\text{W}$
--	-----------------	----	-----------------------------

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 $T_A = 25^{\circ}\text{C}$.

Electrical Characteristics ($T_A = 25^{\circ}\text{C}$ unless otherwise noted)

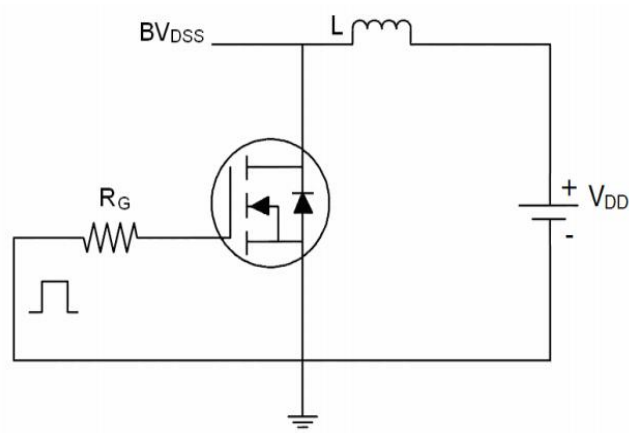
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=20V, V_{GS}=0V$	-	-	1	μA
Parameter						
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 100	μA
On Characteristics (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4	0.75	1.2	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=8A$	-	10	13.5	$m\Omega$
		$V_{GS}=3.8V, I_D=6A$	-	10.6	15	$m\Omega$
		$V_{GS}=2.5V, I_D=4A$	-	15.5	21	$m\Omega$
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=8A$	-	15	-	S
Dynamic Characteristics (Note 3)						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	735	-	PF
Output Capacitance	C_{oss}		-	83	-	PF
Reverse Transfer Capacitance	C_{rss}		-	81	-	PF
Switching Characteristics (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, R_L=1A$ $V_{GS}=5V, R_{GEN}=6\Omega$	-	7.2	-	nS
Turn-on Rise Time	t_r		-	36	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	45	-	nS
Turn-Off Fall Time	t_f		-	15	-	nS
Total Gate Charge	Q_g	$V_{DS}=10V, I_D=6A,$ $V_{GS}=4.5V$	-	11	-	nC
Gate-Source Charge	Q_{gs}		-	2.2	-	nC
Gate-Drain Charge	Q_{gd}		-	4.1	-	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		-	-	3.5	A

Notes:

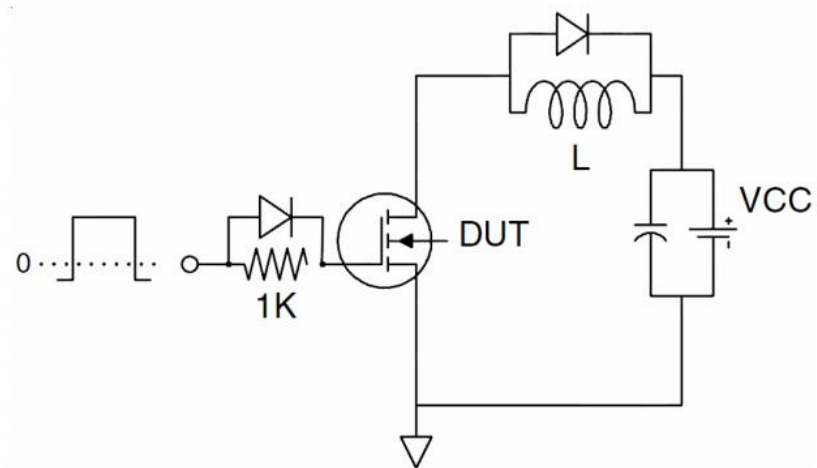
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. Surface Mounted on FR4 Board, $t \leq 10$ sec.
4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
5. Guaranteed by design, not subject to production

Test Circuit

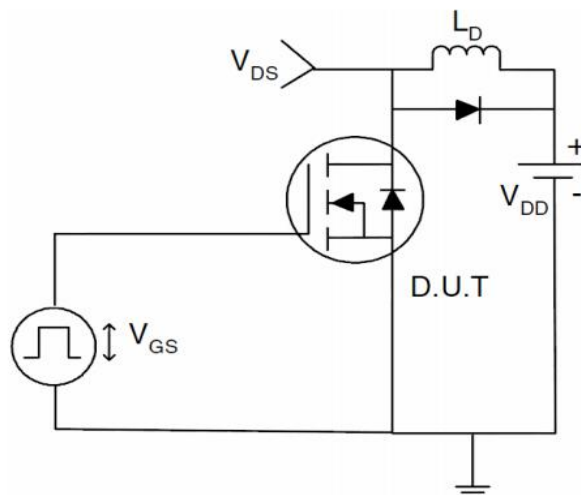
1) E_{AS} Test Circuits

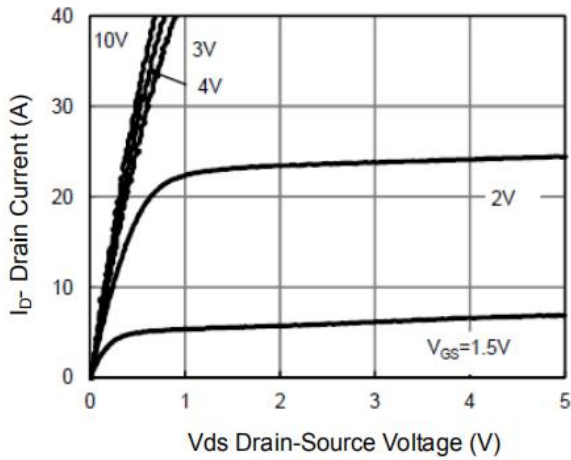
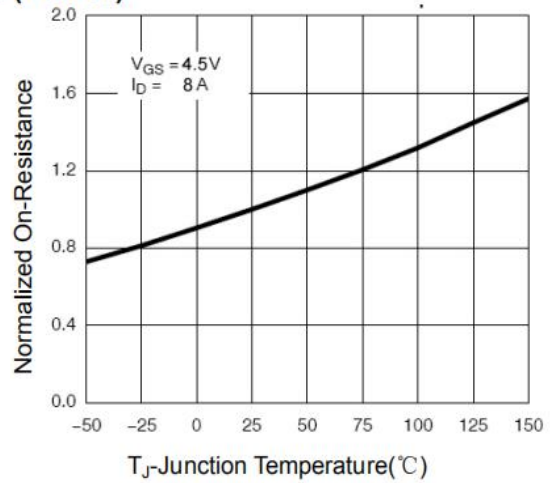
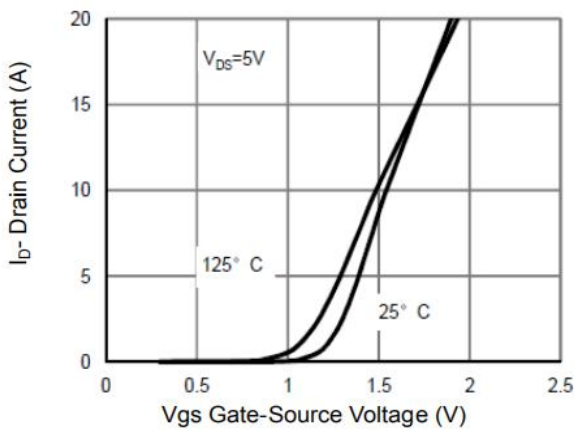
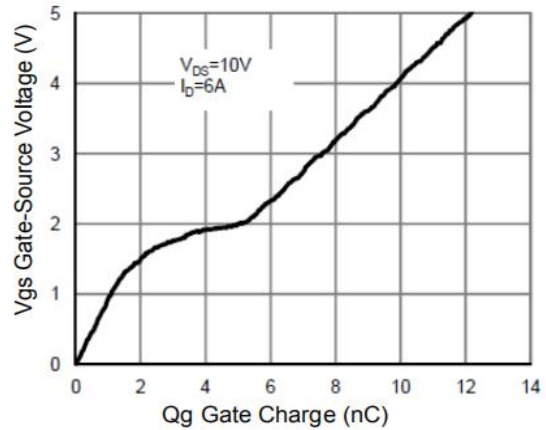
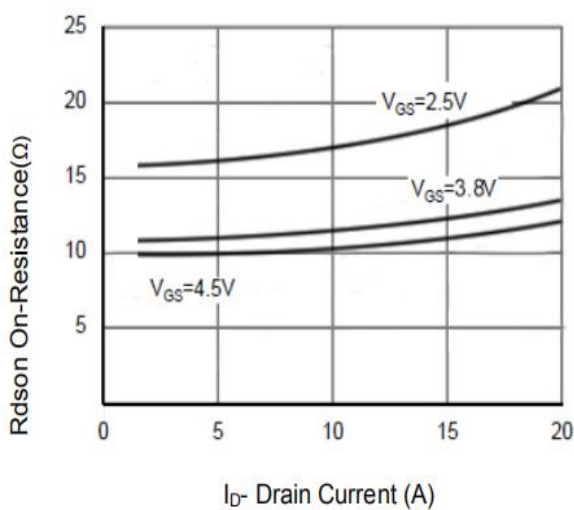
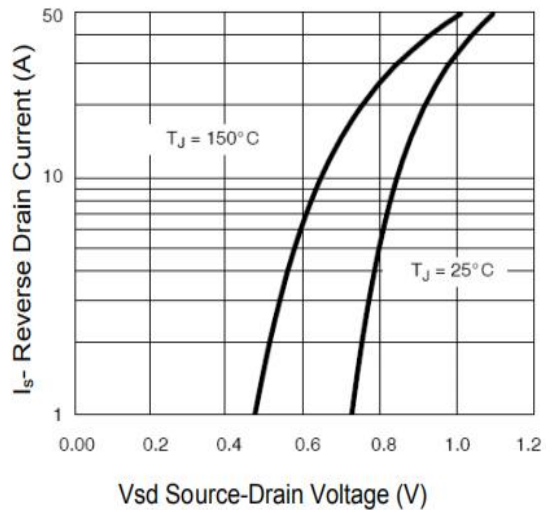


2) Gate Charge Test Circuit:



3) Switch Time Test Circuit:



Typical Electrical and Thermal Characteristics (Curves)

Figure 1 Output Characteristics

Figure 4 Rdson-Junction Temperature

Figure 2 Transfer Characteristics

Figure 5 Gate Charge

Figure 3 Rdson- Drain Current

Figure 6 Source- Drain Diode Forward

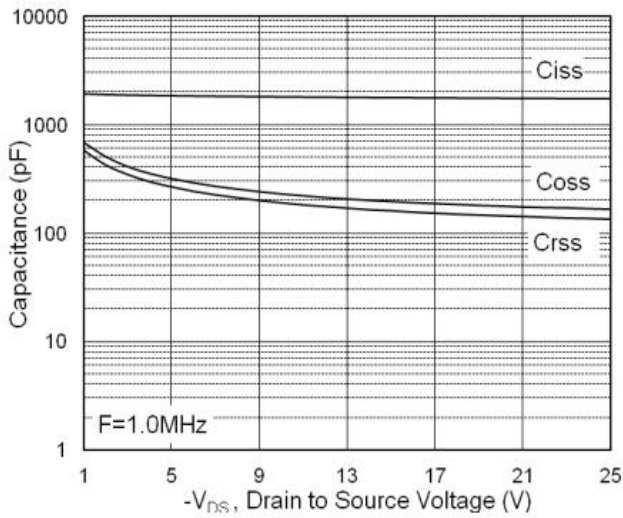


Figure 7 Capacitance vs Vds

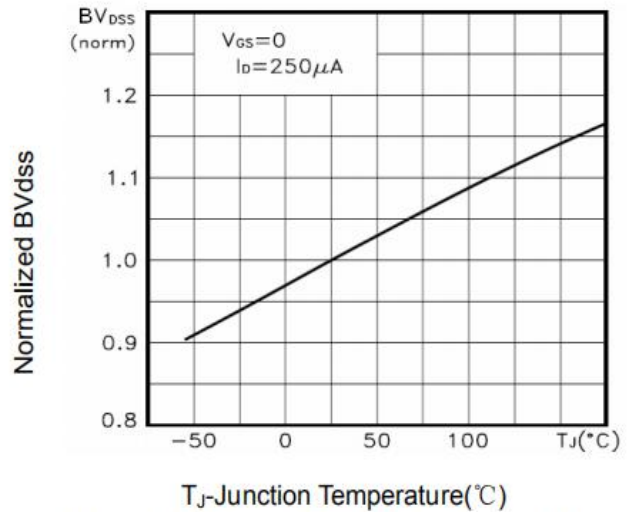


Figure 9 BV_{DSS} vs Junction Temperature

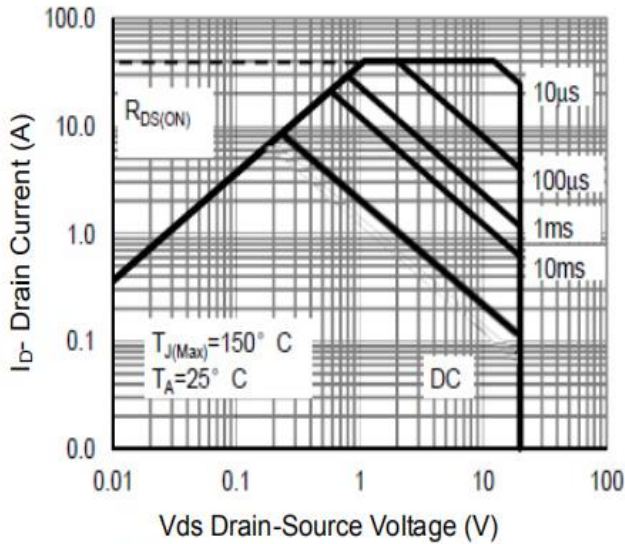


Figure 8 Safe Operation Area

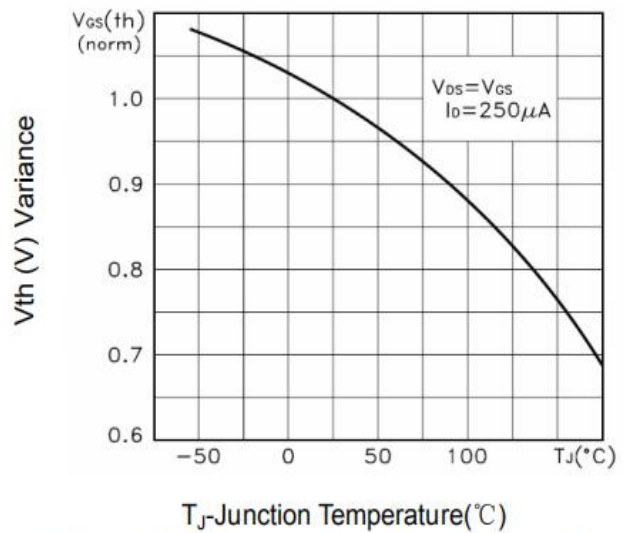


Figure 10 $V_{GS(th)}$ vs Junction Temperature

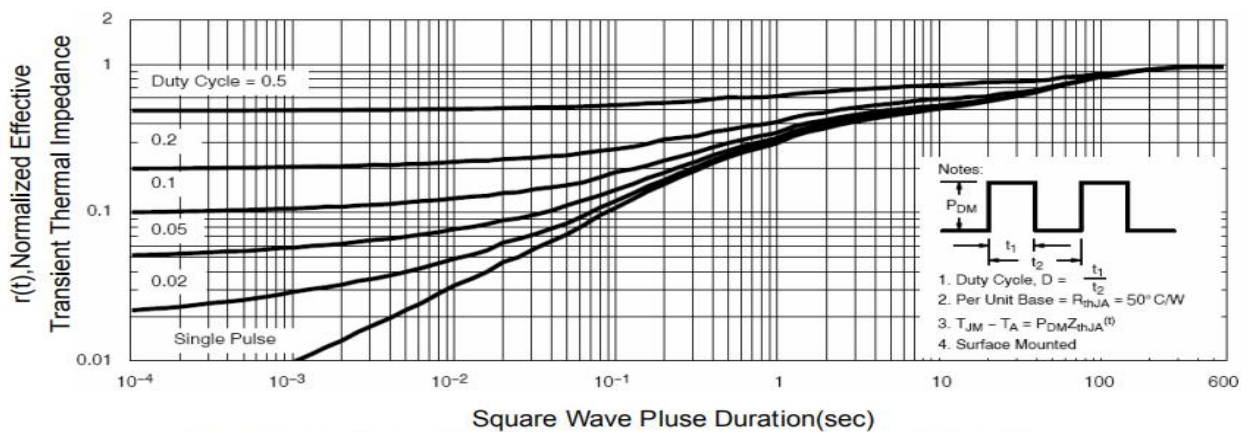


Figure 11 Normalized Maximum Transient Thermal Impedance

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				

