



Dual N-Channel Enhancement Mode Power MOSFET **MXN3388L**

DESCRIPTION

The MXN3388L 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.

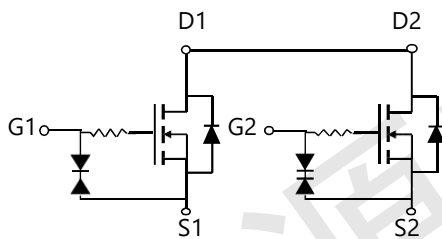
GENERAL FEATURES

- $V_{DS}=20V$, $I_D=8A$
 $R_{DS(ON)}(Typ.)=15.5m\Omega @ V_{GS}=2.5V$
 $R_{DS(ON)}(Typ.)=10.6m\Omega @ V_{GS}=3.8V$
 $R_{DS(ON)}(Typ.)=10m\Omega @ V_{GS}=4.5V$
 ESD Rating: 2000V HBM
- High density cell design for ultra low R_{dson}
- Fully characterized Avalanche voltage and current

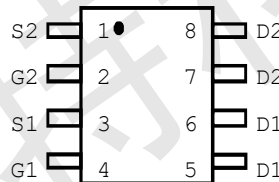
APPLICATION

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

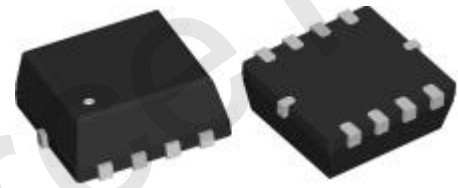
PINOUT



Schematic diagram



Pin Assignment



DFN3X3-8L top view

ORDERING INFORMATION

Part Number	Storage Temperature	Package	Devices Per Reel
MXN3388L	-55°C to 150°C	DFN3X3-8L	5000

ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ C$ 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 ^(Note1)	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 RESISTANCE

Thermal Resistance, Junction-to-Ambient ^(Note2)	$R_{\theta JA}$	50	$^\circ C/W$
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Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 2. Surface Mounted on FR4 Board, $t \leq 10$ sec.



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

Parameter	Symbol	Conditions	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
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 10	μA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.45	0.75	1.2	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=2.5V, I_D=4A$	-	15.5	22	$m\Omega$
		$V_{GS}=3.8V, I_D=6A$	-	10.6	15	$m\Omega$
		$V_{GS}=4.5V, I_D=6A$	-	10	13.5	$m\Omega$
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=8A$	-	15	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	735	-	pF
Output Capacitance	C_{oss}		-	83	-	pF
Reverse Transfer Capacitance (Note 4)	C_{rss}		-	81	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, I_D=1A$ $V_{GS}=5V, R_G=6\Omega$	-	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 3)	V_{SD}	$V_{GS}=0V, I_S=1A$	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	3.5	A

Note 2. Surface Mounted on FR4 Board, $t \leq 10$ sec.

Note 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

Note 4. Guaranteed by design, not subject to product.



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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Switching Test Circuit

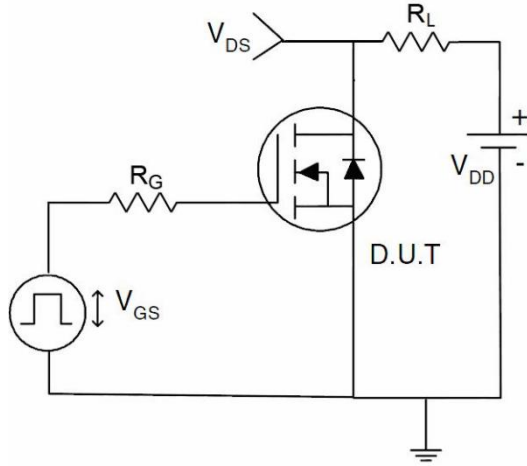


Figure 2. Switching Waveform

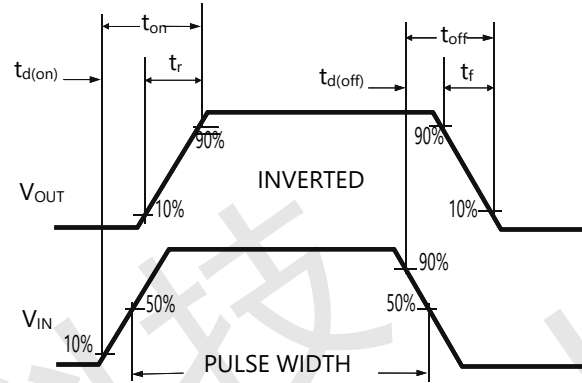


Figure 3. Power Dissipation

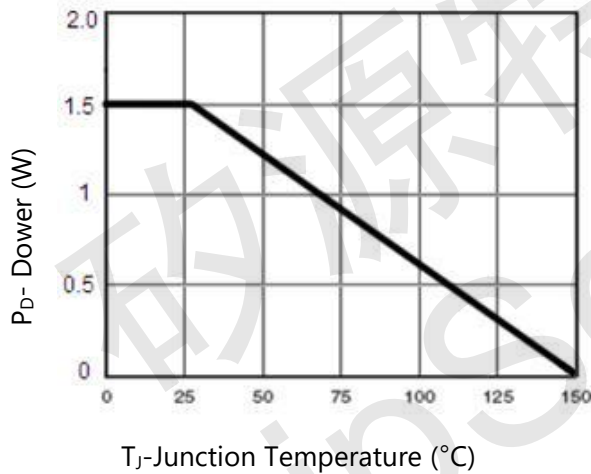


Figure 4. Drain Current

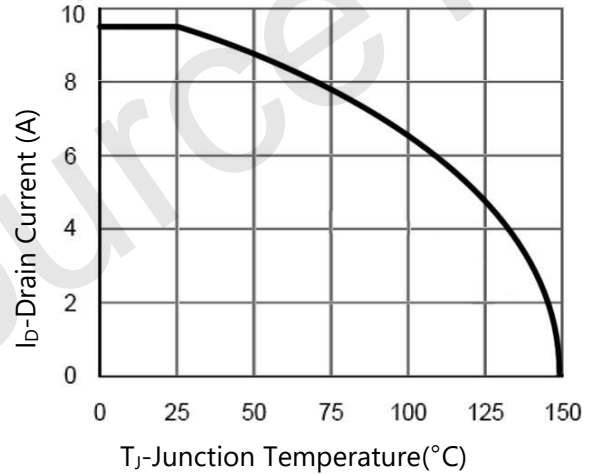


Figure 5. Output Characteristics

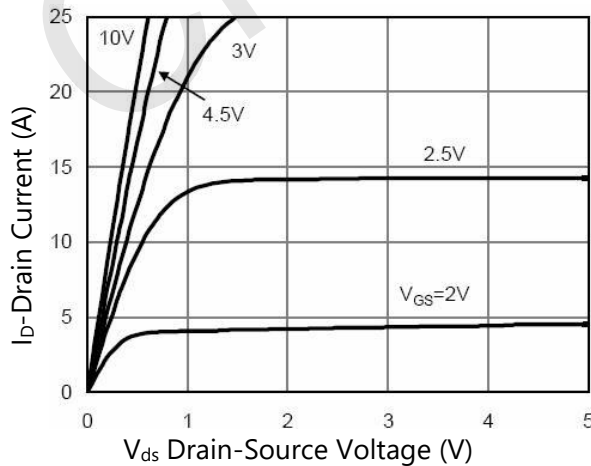
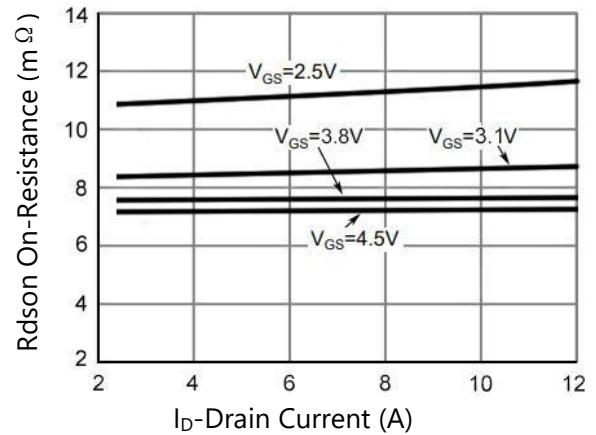


Figure 6. R_{dson} vs Drain Current





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Transfer Characteristics

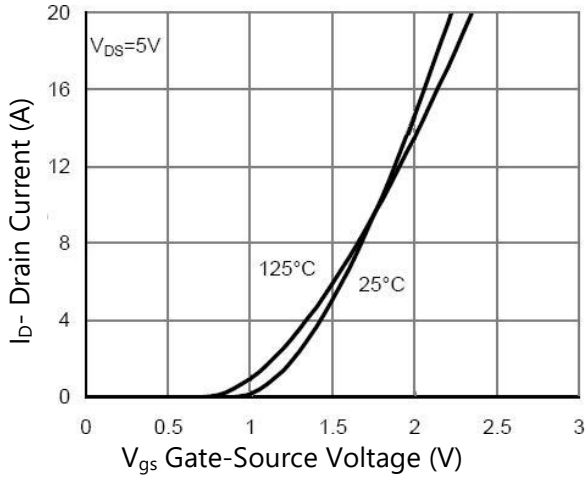


Figure 8. R_{dson} vs Junction Temperature

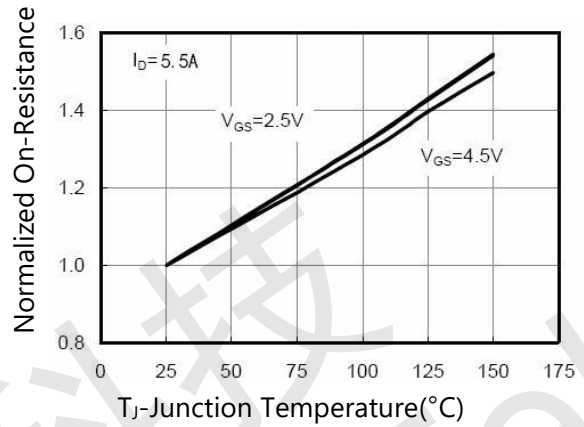


Figure 9. R_{dson} vs V_{GS}

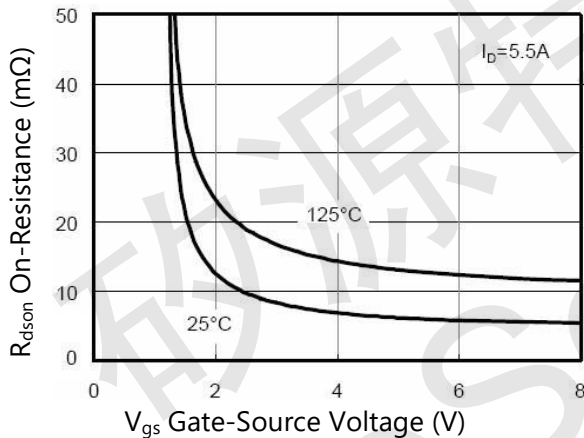


Figure 10. Capacitance vs V_{DS}

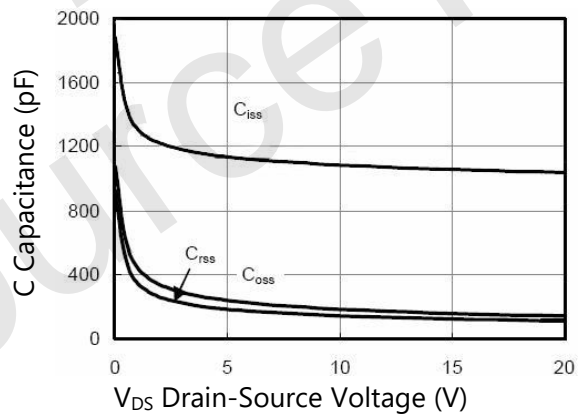


Figure 11. Gate Charge

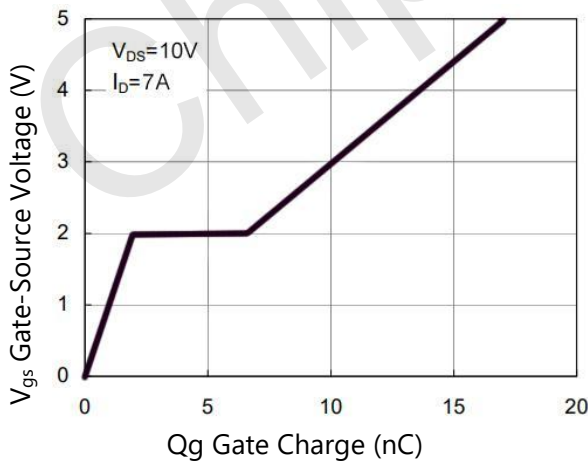
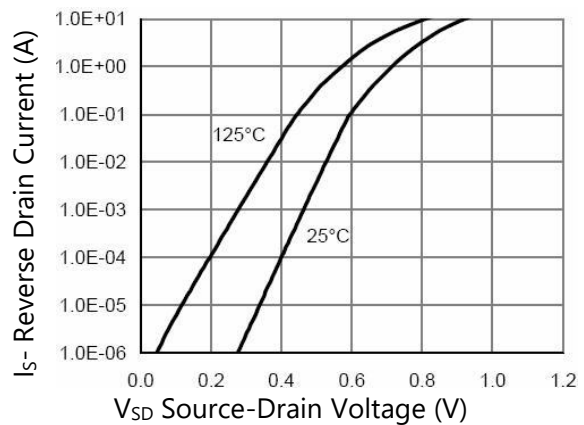


Figure 12. Source- Drain Diode Forward





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 13. Safe Operation Area

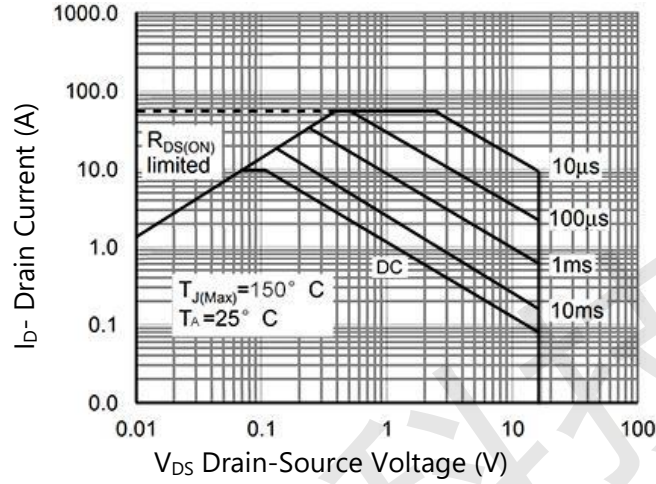
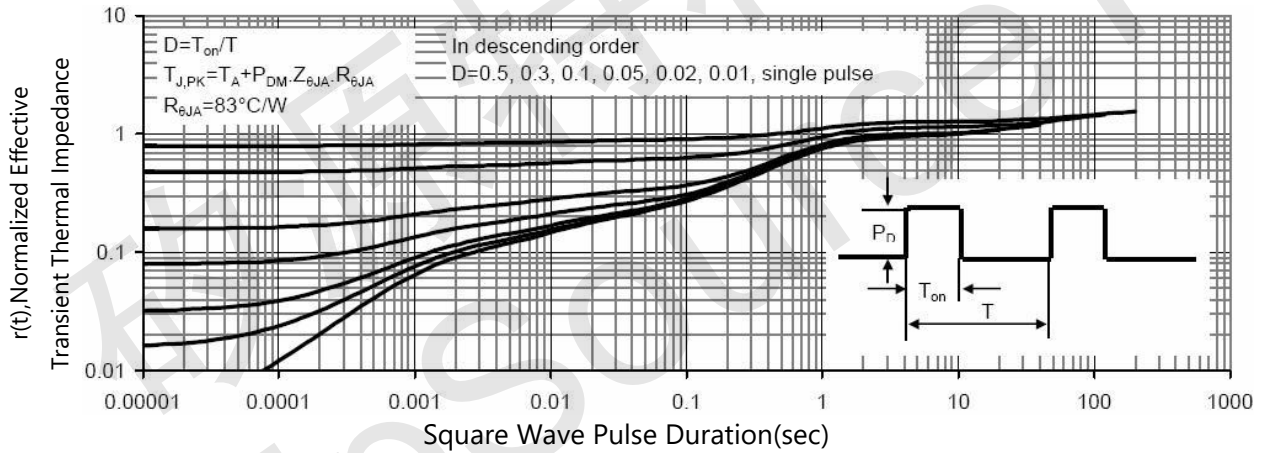


Figure 14. Normalized Maximum Transient Thermal Impedance

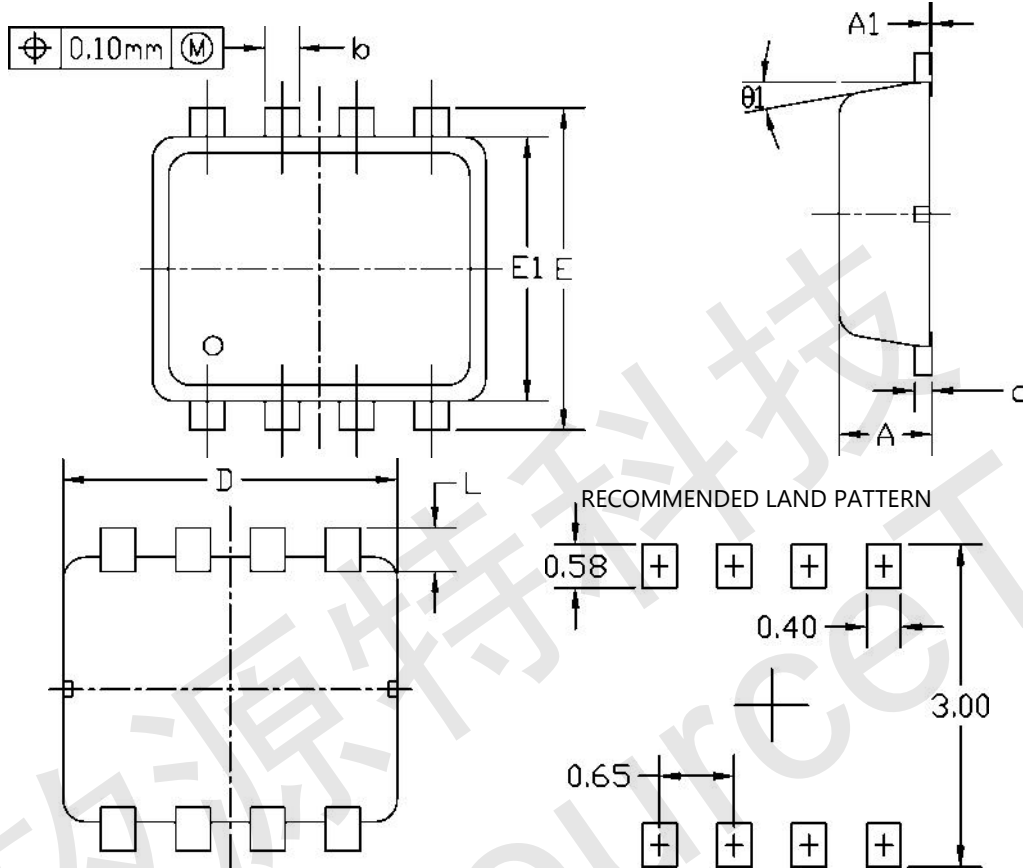




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PACKAGE INFORMATION

DFN3X3-8L



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.80	0.90	0.028	0.031	0.035
A1	0.00	-	0.05	0.000	-	0.002
b	0.24	0.30	0.35	0.009	0.012	0.014
c	0.08	0.15	0.25	0.003	0.006	0.010
D	2.80	2.90	3.00	0.110	0.114	0.118
E	2.70	2.80	2.90	0.106	0.110	0.114
E1	2.20	2.30	2.40	0.0087	0.091	0.095
e	0.65 BSC			0.026 BSC		
L	0.20	0.38	0.45	0.008	0.015	0.018
01	0°	10°	12°	0°	10°	12°