

DESCRIPTION

The MXN30D12M uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

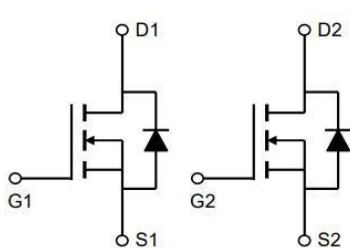
GENERAL FEATURES

- $V_{DS}=30V$, $I_D=12A$
 $R_{DS(ON)}(Typ.)=15.5m\Omega$ @ $V_{GS}=4.5V$
 $R_{DS(ON)}(Typ.)=12m\Omega$ @ $V_{GS}=10V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

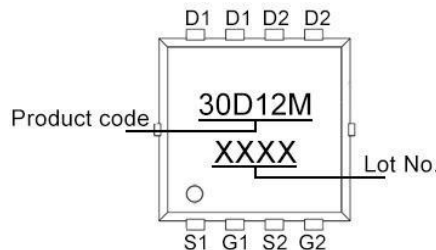
APPLICATION

- PWM applications
- Load switch
- Power management

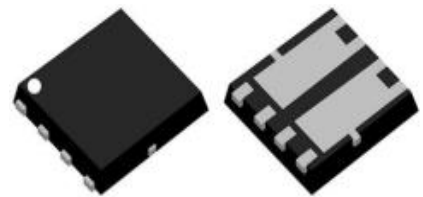
PINOUT



Schematic diagram



Marking and Pin Assignment



PDFN3.3X3.3-8L Top View

ORDERING INFORMATION

Part Number	Storage Temperature	Package	Devices Per Reel
MXN30D12M	-55°C to 150°C	PDFN3.3X3.3-8L	5000

ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	12	A
Drain Current-Continuous($T_C=70^\circ C$)	I_D	9	A
Pulsed Drain Current ^(Note 1)	I_{DM}	48	A
Single Pulse Avalanche Energy(L=0.1mH)	E_{AS}	24	mJ
Maximum Power Dissipation	P_D	20.5	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)	$R_{\theta JC}$	6	$^\circ C/W$
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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.



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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
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Off Characteristics

Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA

On Characteristics (Note 3)

Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.8	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=6A$	-	15.5	20	$m\Omega$
		$V_{GS}=10V, I_D=8A$	-	12	14	$m\Omega$
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=8A$	-	24	-	S

Dynamic Characteristics (Note 4)

Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, F=1.0MHz$	-	840	-	pF
Output Capacitance	C_{oss}		-	120	-	pF
Reverse Transfer Capacitance	C_{rss}		-	85	-	pF

Switching Characteristics (Note 4)

Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, I_D=2A, R_L=1\Omega, V_{GS}=10V, R_G=3\Omega$	-	4.2	-	nS
Turn-on Rise Time	t_r		-	8.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	31	-	nS
Turn-Off Fall Time	t_f		-	4	-	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=6A, V_{GS}=10V$	-	14	-	nC
Gate-Source Charge	Q_{gs}		-	2.4	-	nC
Gate-Drain Charge	Q_{gd}		-	3	-	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		-	-	8	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.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Switching Test Circuit

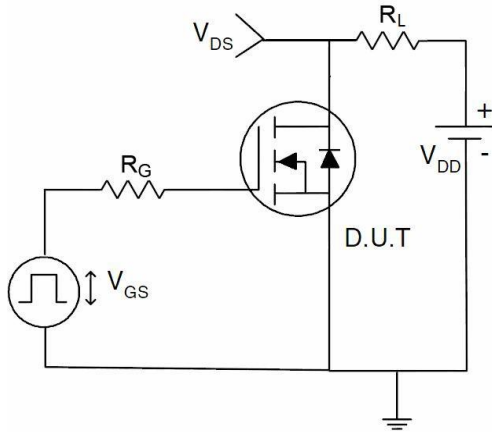


Figure 2. Switching Waveform

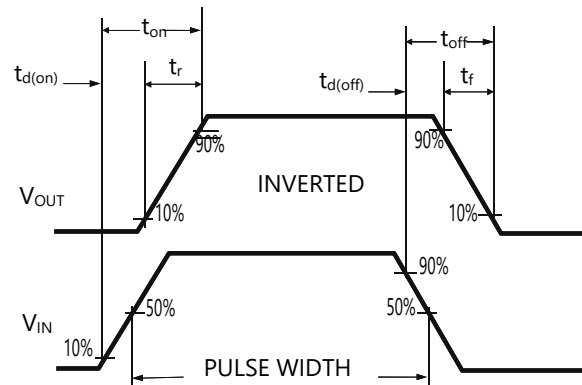


Figure 3. Power De-rating

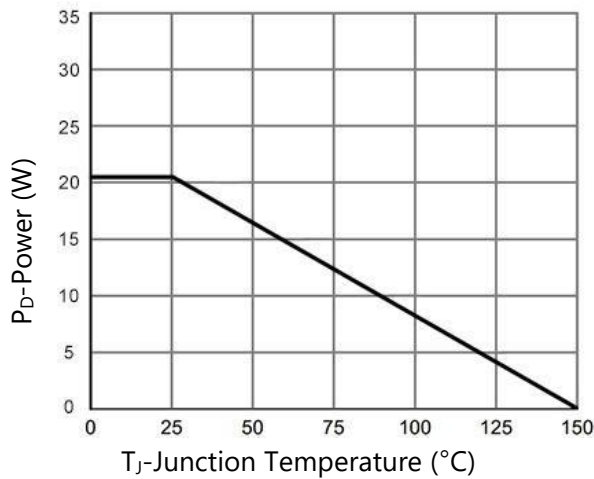


Figure 4. Drain Current

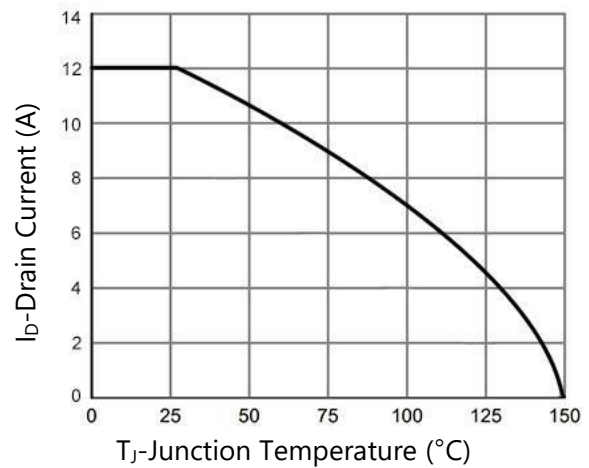


Figure 5. Output Characteristics

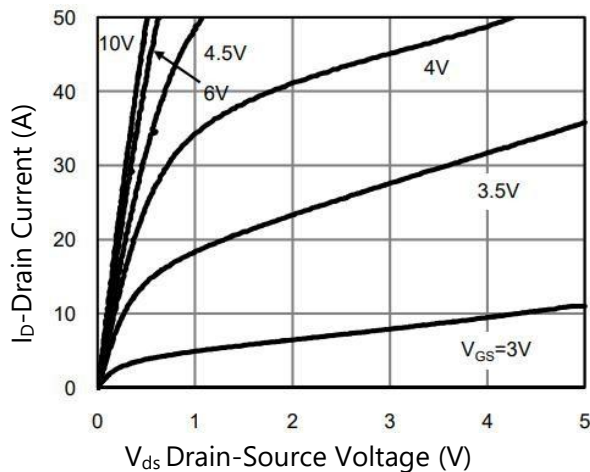
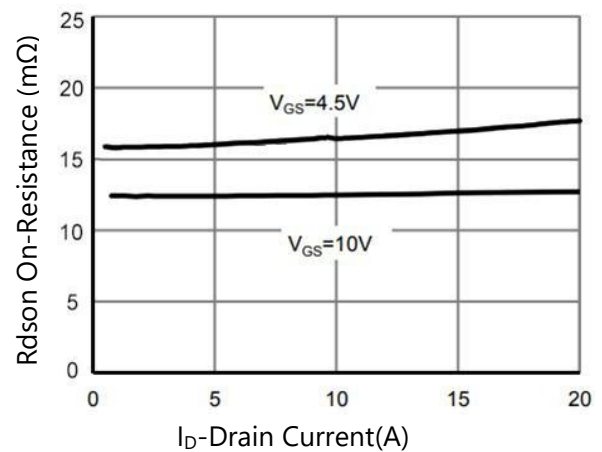


Figure 6. R_{dson} vs Drain Current



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Transfer Characteristics

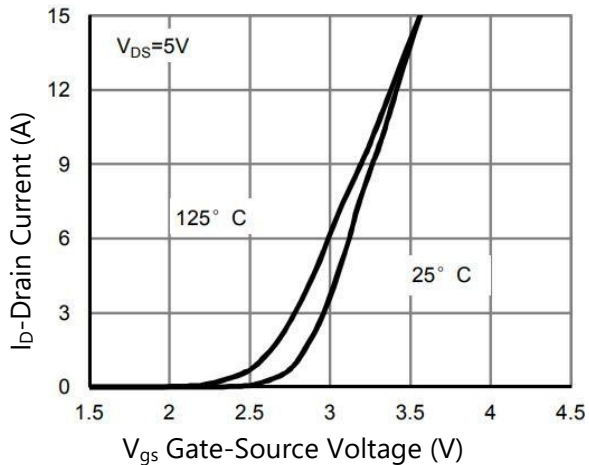


Figure 8. R_{ds(on)} vs Junction Temperature

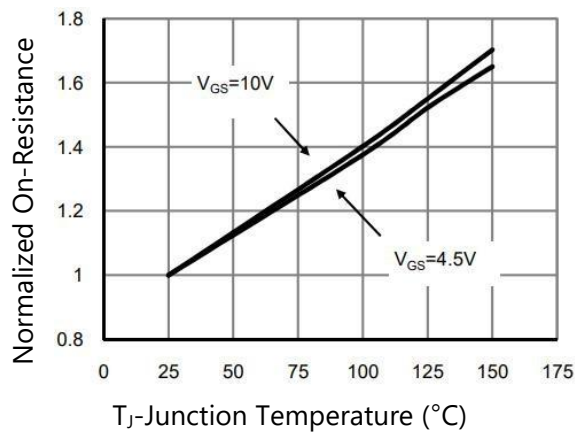


Figure 9. R_{ds(on)} vs V_{gs}

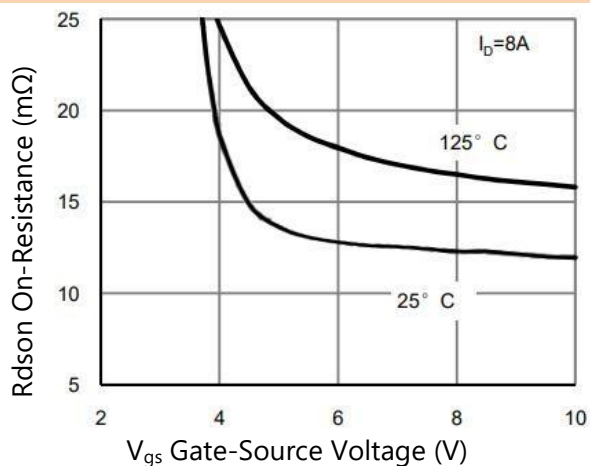


Figure 10. Capacitance vs V_{ds}

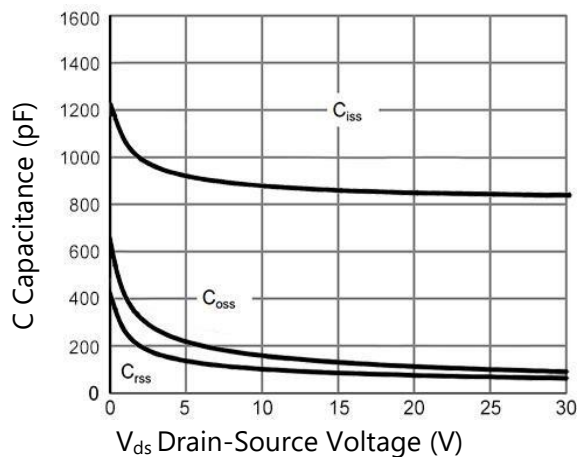


Figure 11. Gate Charge

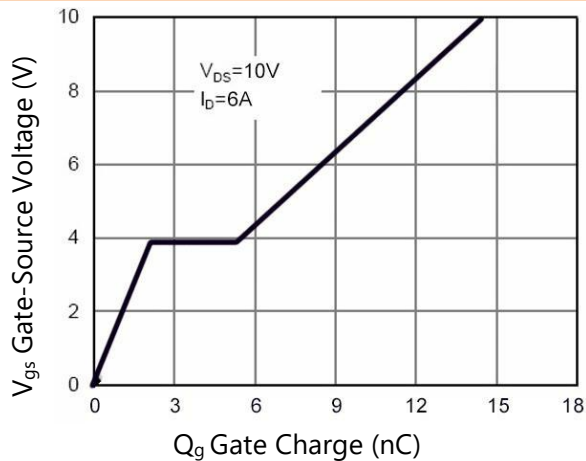
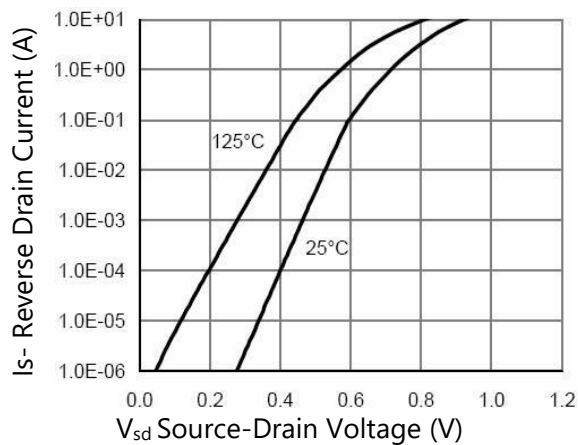


Figure 12. Source- Drain Diode Forward



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 13 Safe Operation Area

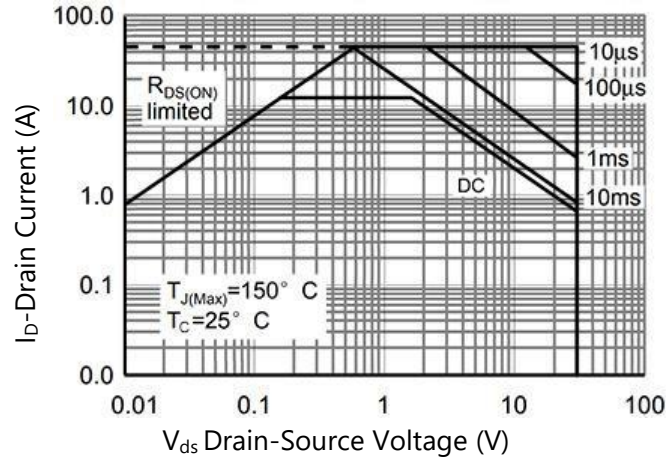
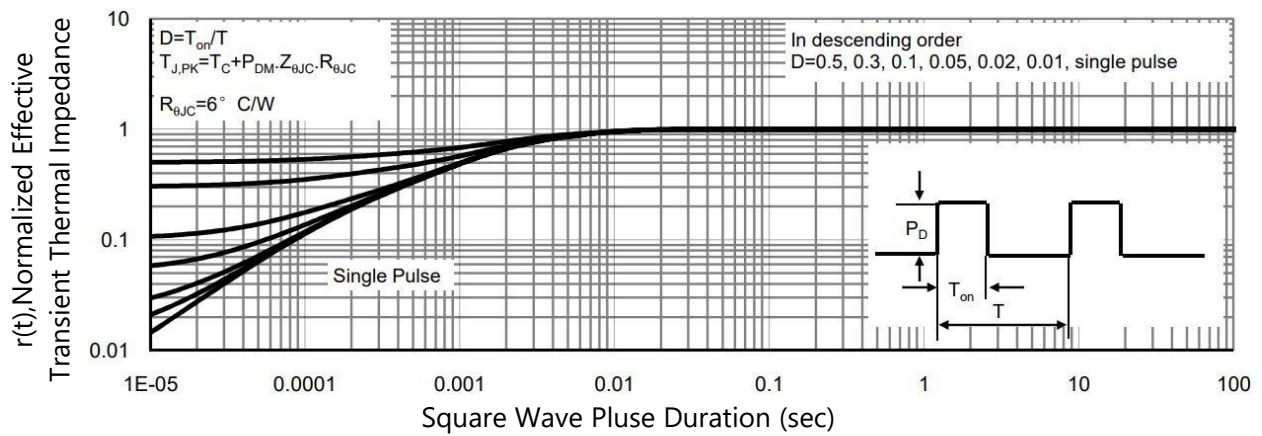
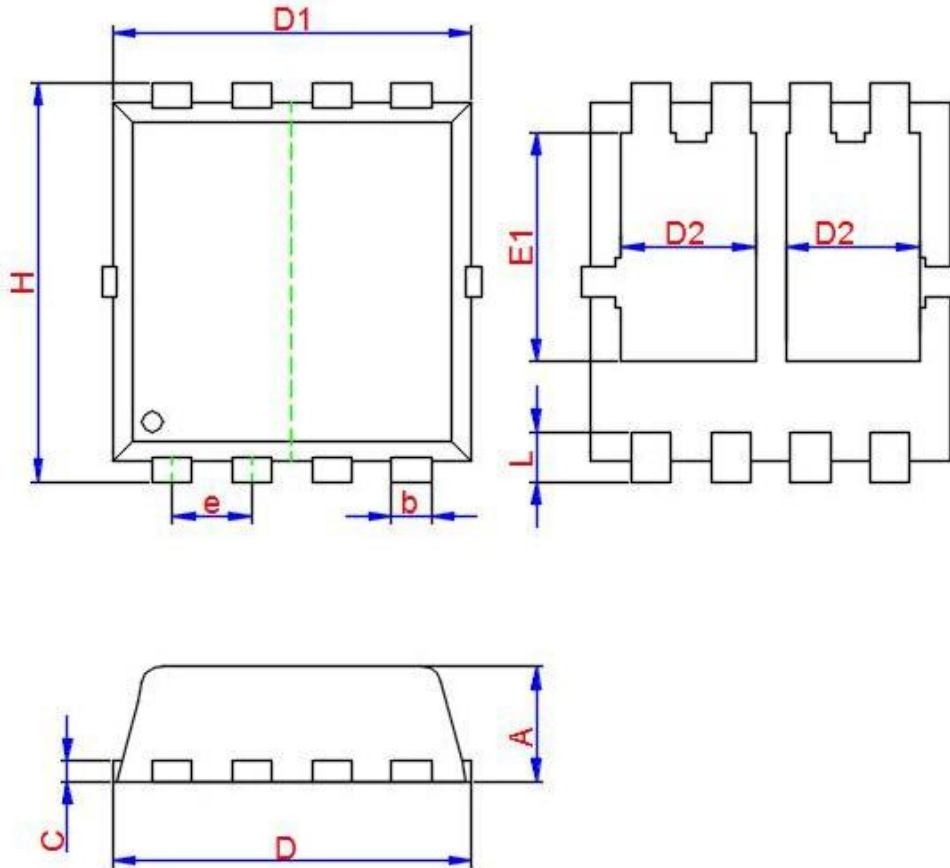


Figure 14. Normalized Maximum Transient Thermal Impedance



 **PACKAGE INFORMATION**

TSSOP-8



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	TYP	MAX
A	0.675	0.775	0.875
b	0.030(TYP)		
C	0.152(TYP)		
D	3.100	3.300	3.500
D1	3.050	3.150	3.250
D2	0.835	1.035	1.235
e	0.650(TYP)		
E1	1.530	1.730	1.930
H	3.150	3.350	3.550
L	0.280	0.380	0.480