DESCRIPTION

The MXN2050M uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

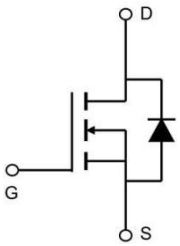
GENERAL FEATURES

- V_{DS}=18V, I_D=40A
  $R_{DS(ON)}$(Typ.)=4.5mΩ @ V_{GS}=4.5V
  $R_{DS(ON)}$(Typ.)=6.3mΩ @ V_{GS}=2.5V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

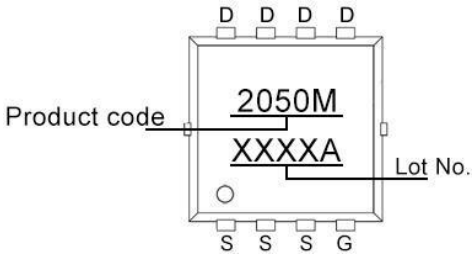
APPLICATION

- PWM applications
- Load switch

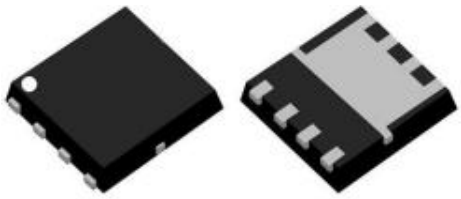
PINOUT



Schematic diagram



Marking and pin Assignment



PDFN3.3X3.3-8L top & bottom view

ORDERING INFORMATION

Part Number	StorageTemperature	Package	Devices Per Reel
MXN2050M	-55°C to 150°C	PDFN3.3X3.3-8L	-

ABSOLUTE MAXIMUM RATINGS(T_C=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	18	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	40	A
Drain Current-Continuous(T_C=100°C)	I_D	24	A
Pulsed Drain Current(Note1)	I_{DM}	180	A
Maximum Power Dissipation	P_D	42	W
Avalanche Current	I_{AS}	40	A
Avalanche Energy(L=0.5mH)	E_{AS}	80	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

THERMAL RESISTANCE

Thermal Resistance, Junction-to-Case(Note2)	$R_{\theta JC}$	3	°C/W

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.
Note 2. Surface Mounted on FR4 Board, t ≤ 10 sec.

ELECTRICAL CHARACTERISTICS(T_C=25°C unless otherwise noted)

Parameter	Symbol	Conditions	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}=±12V, V_{DS}=0V	-	-	±100	nA
On Characteristics(Note2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.45	0.7	1.1	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=20A	-	4.5	5.5	mΩ
		V_{GS}=2.5V, I_D=15A	-	6.3	9	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=20A	-	100	-	S
Dynamic Characteristics(Note3)						
Input Capacitance	C_{iss}	V_{DS}=10V, V_{GS}=0V, F=1.0MHz	-	1910	-	pF
Output Capacitance	C_{oss}		-	240	-	pF
Reverse Transfer Capacitance	C_{rss}		-	220	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=10V, R_L=1.35Ω, V_{GS}=5V, R_G=3Ω	-	7.5	-	nS
Turn-on Rise Time	t_r		-	15	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	72	-	nS
Turn-Off Fall Time	t_f		-	21	-	nS
Total Gate Charge	Q_g	V_{DS}=10V, I_D=7A, V_{GS}=4.5V	-	31	-	nC
Gate-Source Charge	Q_{gs}		-	5.2	-	nC
Gate-Drain Charge	Q_{gd}		-	8	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage(Note2)	V_{SD}	V_{GS}=0V, I_S=1A	-	-	1.2	V
Diode Forward Current(Note1)	I_S		-	-	40	A

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

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Switching Test Circuit

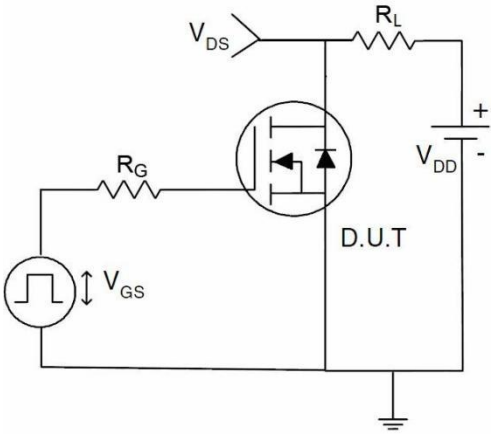


Figure 2. Switching Waveform

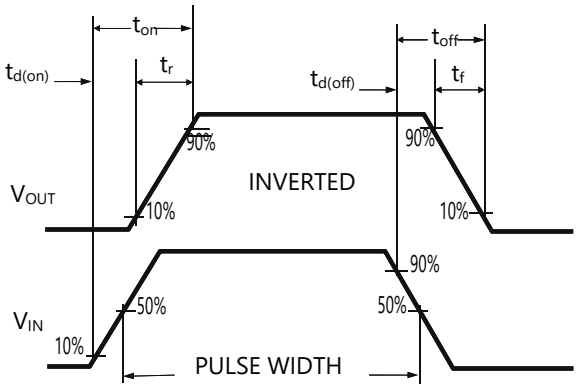


Figure 3. Power De-rating

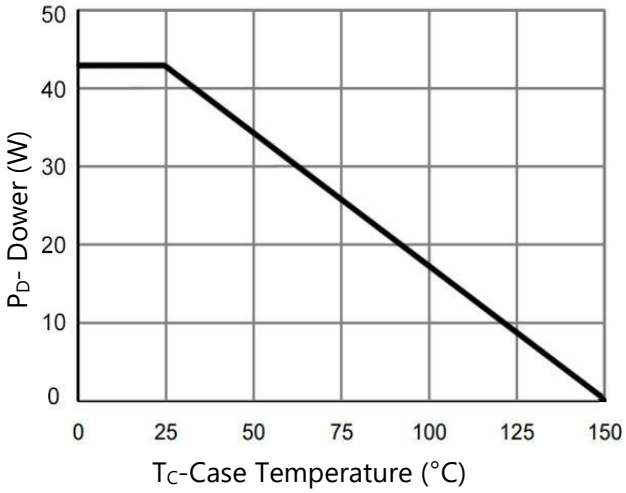


Figure 4. Drain Current

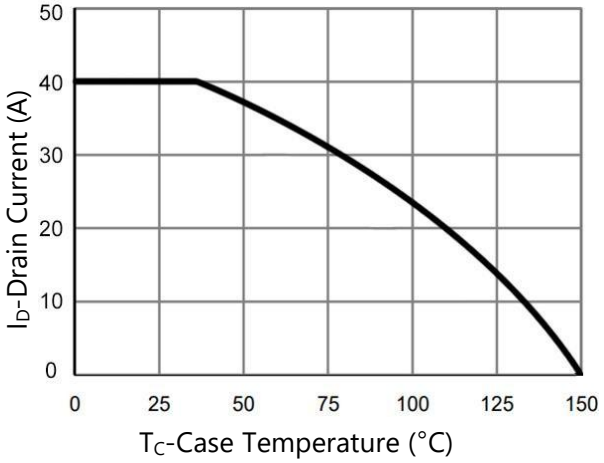


Figure 5. Output Characteristics

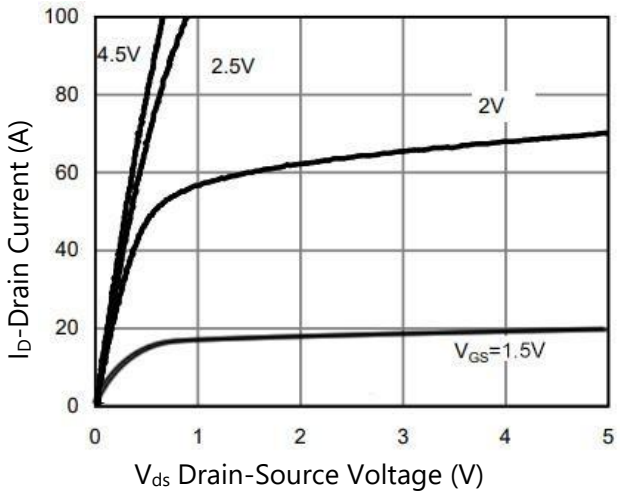
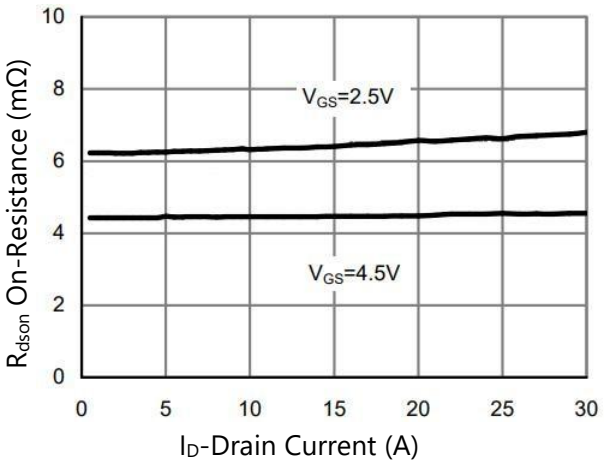


Figure 6. R_{dson} vs Drain Current



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Transfer Characteristics

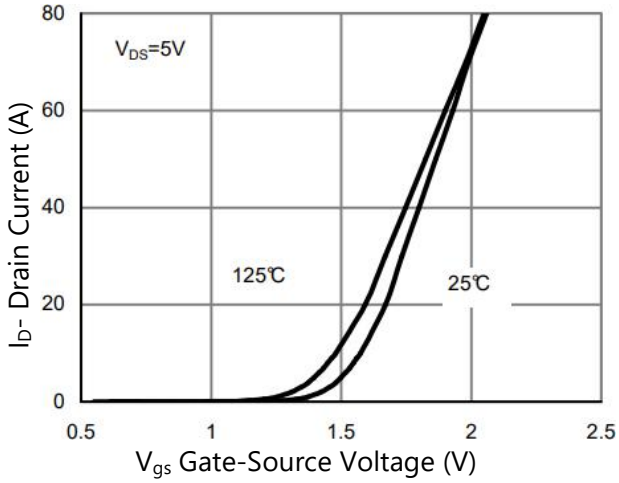


Figure 8. R_{dson} vs Case Temperature

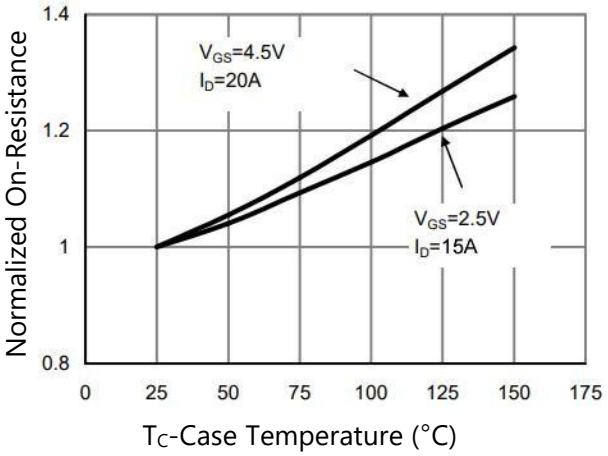


Figure 9. Rdson vs V_{gs}

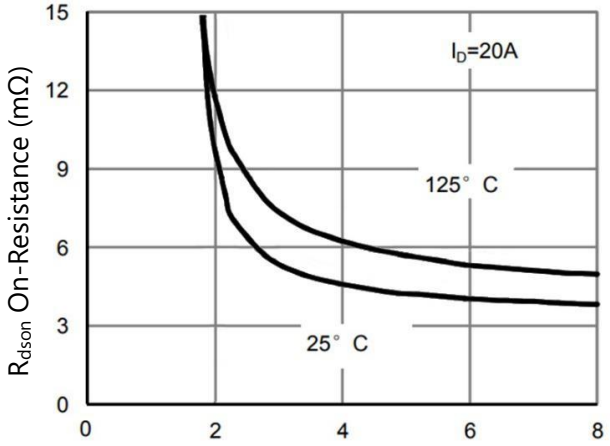


Figure 10. Capacitance vs V_{DS}

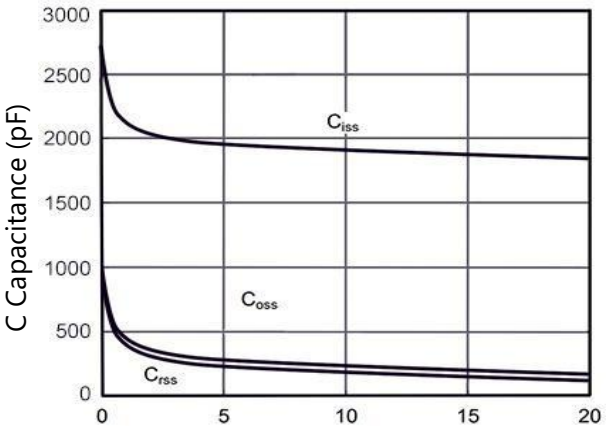


Figure 11. Gate Charge

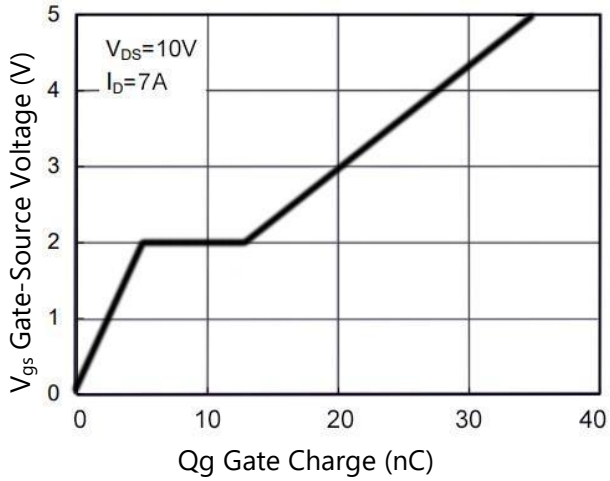
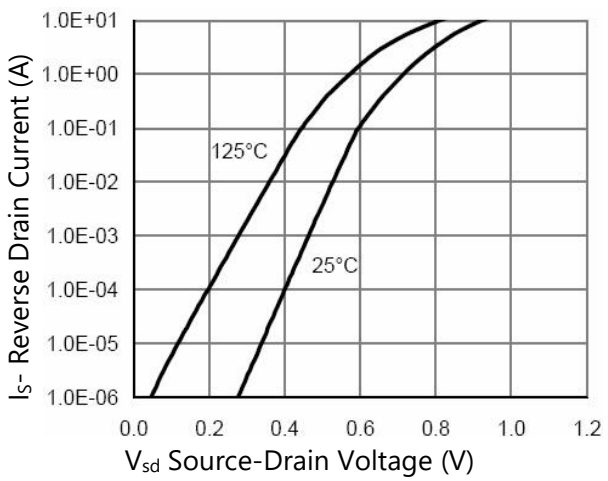


Figure 12. Source- Drain Diode Forward



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 13. Safe Operation Area

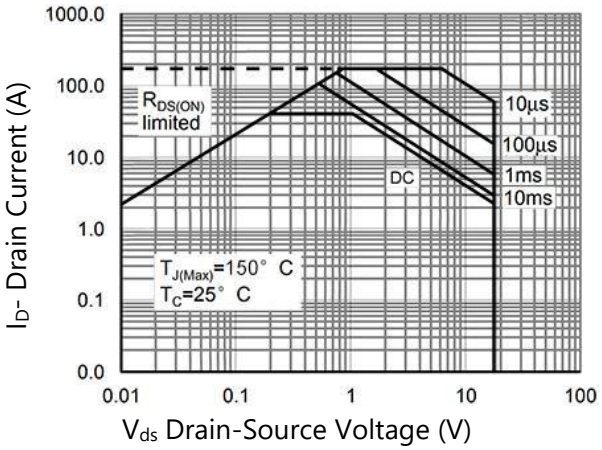
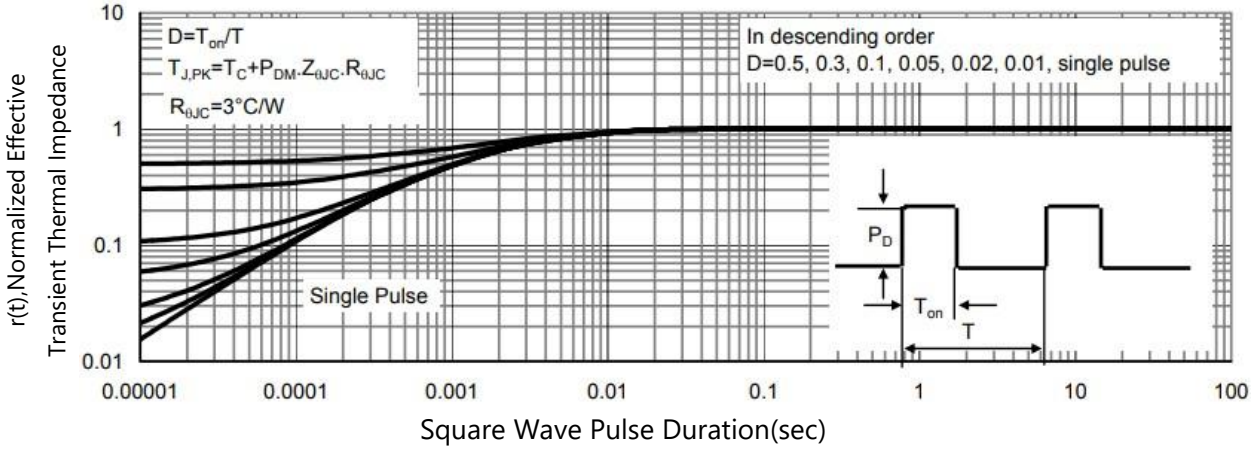
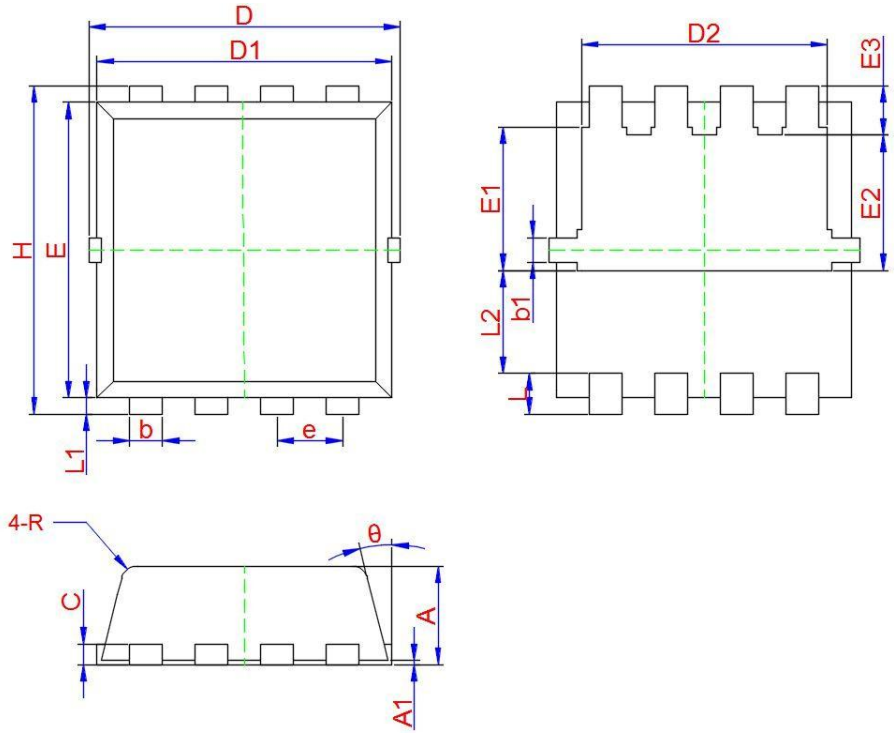


Figure 14. Normalized Maximum Transient Thermal Impedance



PACKAGE INFORMATION

PDFN3.3X3.3-8L



Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.700	0.800	0.900
A1	0.000	0.030	0.050
b	0.240	0.300	0.350
b1	0.080	0.130	0.180
c		0.152 TYP.	
D	3.250	3.320	3.400
D1	3.050	3.150	3.250
D2	2.400	2.500	2.600
E	3.000	3.100	3.200
E1	1.350	1.450	1.550
E2	1.200	1.300	1.400
E3	0.400	0.500	0.600
e		0.650 TYP.	
H	3.200	3.300	3.400
L	0.300	0.400	0.500
L1	0.100	0.150	0.200
L2		1.130 TYP.	
R		0.200 TYP.	
θ	6°	10°	14°