DESCRIPTION

The MXN4010QD uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

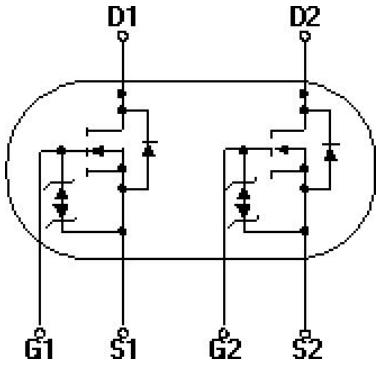
GENERAL FEATURES

- V_{DS}=40V, I_D=50A
  $R_{DS(ON)}$(Typ.)=10mΩ @ V_{GS}=10V
  $R_{DS(ON)}$(Typ.)=14.5mΩ @ V_{GS}=4.5V
- Low Thermal Resistance
- Advanced trench cell design

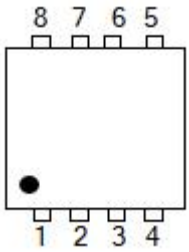
APPLICATION

- Motor drivers
- DC-DC Converter

PINOUT



Schematic diagram



PDFN3.3x3.3-8L Top View

Pin	Description
1	Source(S1)
2	Gate(G1)
3	Source(S2)
4	Gate(G2)
5,6	Drain(D2)
7,8	Drain(D1)

ORDERING INFORMATION

Part Number	StorageTemperature	Package	Devices Per Reel
MXN4010QD	-55°C to 150°C	PDFN3.3x3.3	5000

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current(V_{GS}=10V)(Note1)	I_D	50	A
Drain Current(T_C=100°C, V_{GS}=10V)(Note1)(Note3)	I_D	28	A
Pulsed Drain Current(V_{GS}=10V)(Note1)(Note2)(Note3)	I_{DM}	80	A
Total Power Dissipation	P_{tot}	35	W
Diode Forward Current	I_S	50	A
Single Pulsed Avalanche Energy(Note1)	E_{AS}	84.5	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

THERMAL RESISTANCE

Thermal Resistance, Junction-to-Ambient(Note1)	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction-to-Case(Note1)	$R_{\theta JC}$	3.5	°C/W

Note 1. Surface Mounted on 1 in^2 pad area, t ≤10sec
Note 2. Pulse width ≤300μs, duty cycle ≤2%
Note 3. Limited by bonding wire

ELECTRICAL CHARACTERISTICS(T_A=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	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=32V, V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1	-	2	V
Drain-Source On-State Resistance(Note1)	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	10	11	mΩ
		V_{GS}=4.5V, I_D=10A	-	14.5	18	mΩ
Dynamic Characteristics(Note2)						
Input Capacitance	C_{iss}	V_{DS}=20V, V_{GS}=0V, F=1.0MHz	-	1582	-	pF
Output Capacitance	C_{oss}		-	112	-	pF
Reverse Transfer Capacitance	C_{rss}		-	90	-	pF
Switching Characteristics(Note2)						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=20V, R_L=1Ω V_{GEN}=10V, R_G=3.9Ω I_{DS}=20A	-	8.1	-	nS
Turn-on Rise Time	t_r		-	46	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	nS
Turn-Off Fall Time	t_f		-	28	-	nS
Total Gate Charge	Q_g	V_{DS}=20V, I_{DS}=20A, V_{GS}=10V	-	29	-	nC
Gate-Source Charge	Q_{gs}		-	7.1	-	nC
Gate-Drain Charge	Q_{gd}		-	5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage(Note 1)	V_{SD}	V_{GS}=0V, I_{SD}=20A	-	-	1.3	V
Reverse Recovery Time	t_{rr}	I_{SD}=20A, dI_{SD}/dt=100A/μs	-	11	-	ns
Reverse Recovery Charge	Q_{rr}		-	6.4	-	nc

Note 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
Note 2. Guaranteed by design, not subject to product.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Power Capability

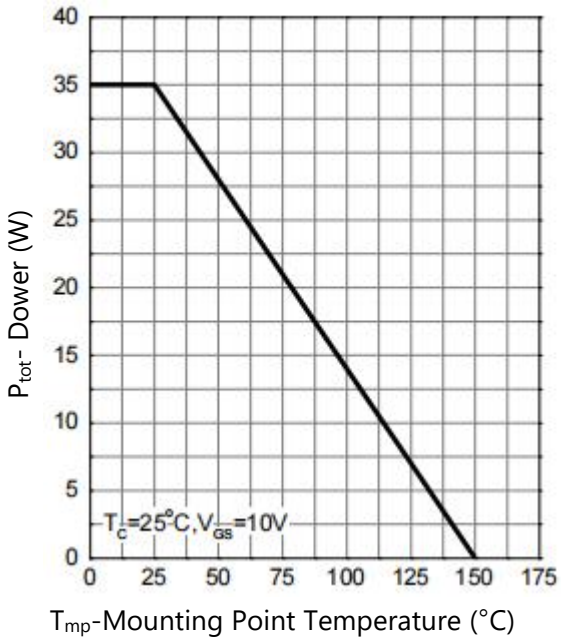


Figure 2. Current Capability

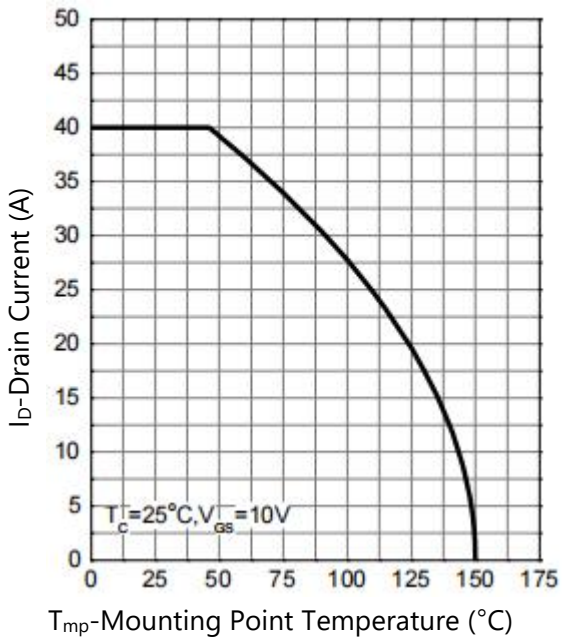


Figure 3. Safe Operating Area

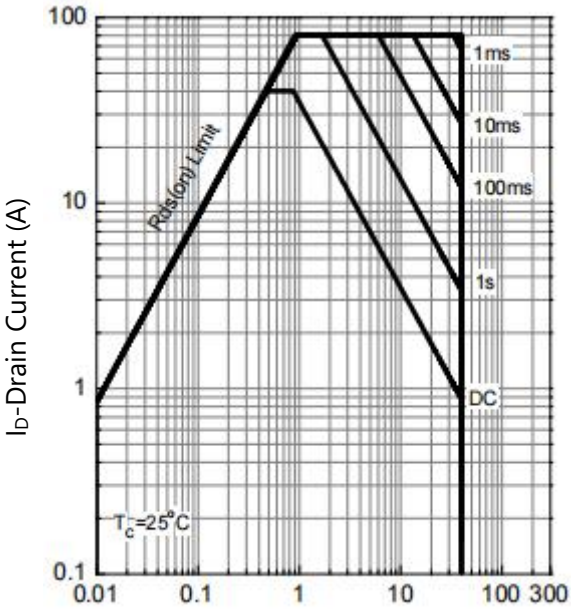
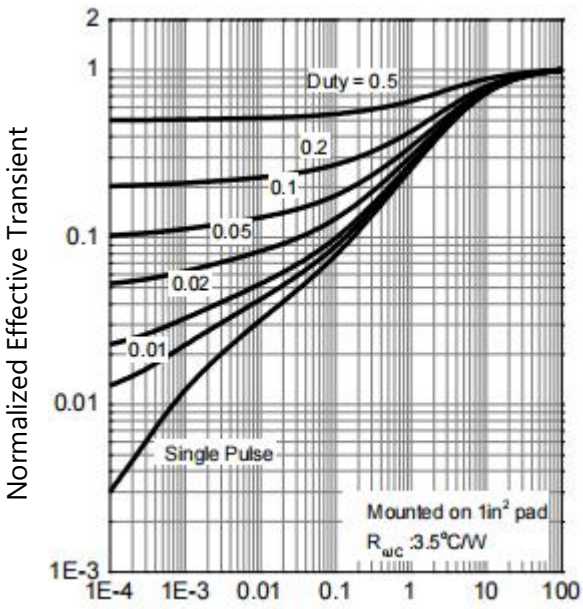


Figure 4. Transient Thermal Impedance



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 5. Output Characteristics

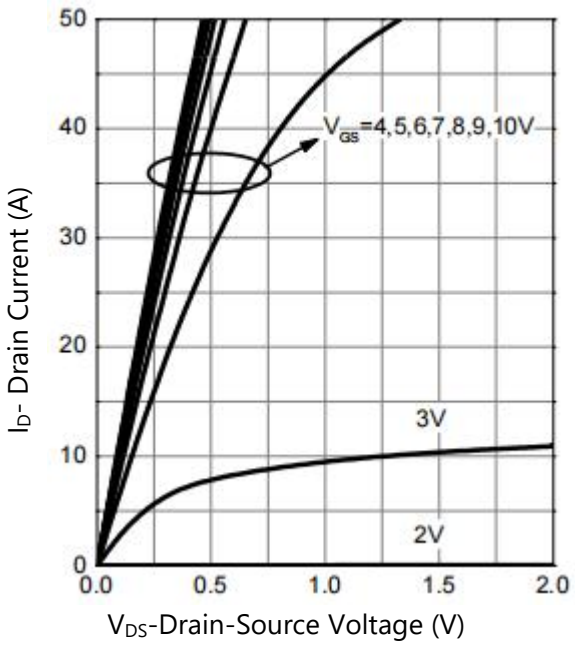


Figure 6. On Resistance

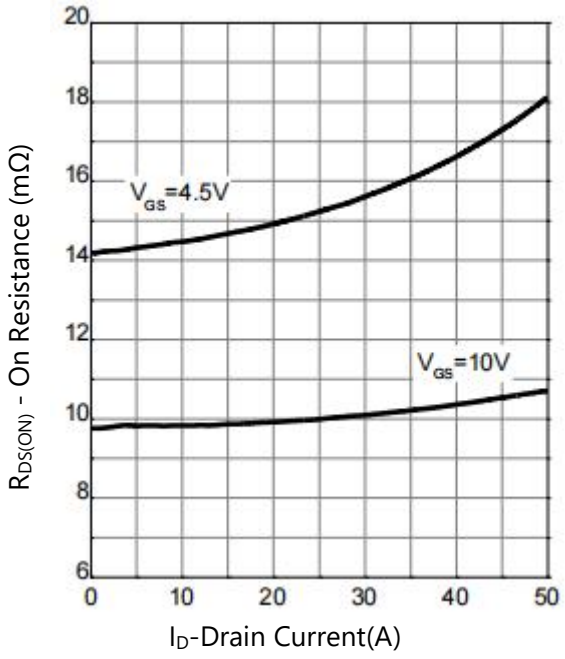


Figure 7. Transfer Characteristics

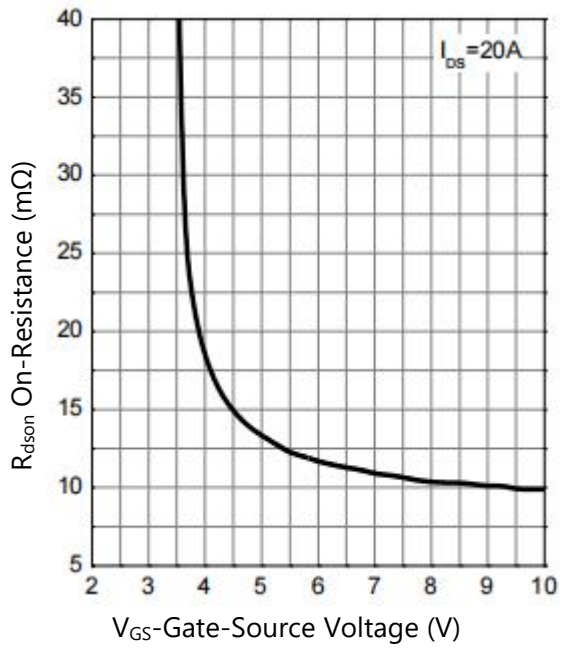
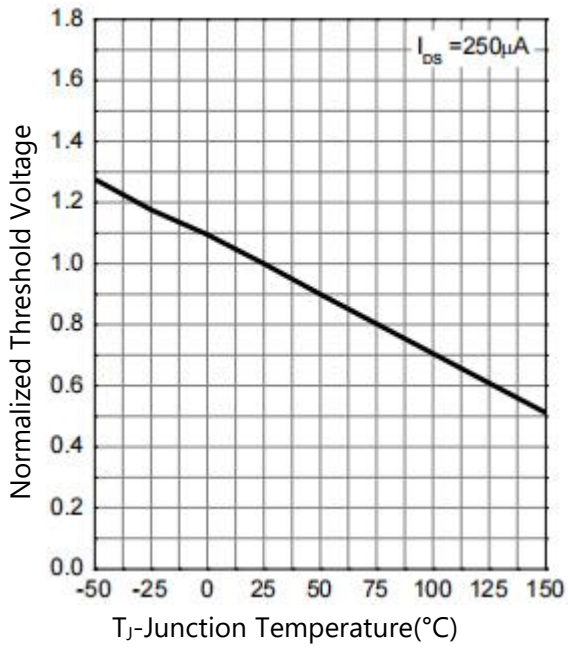


Figure 8. Normalized Threshold Voltage



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 9. Normalized On Resistance

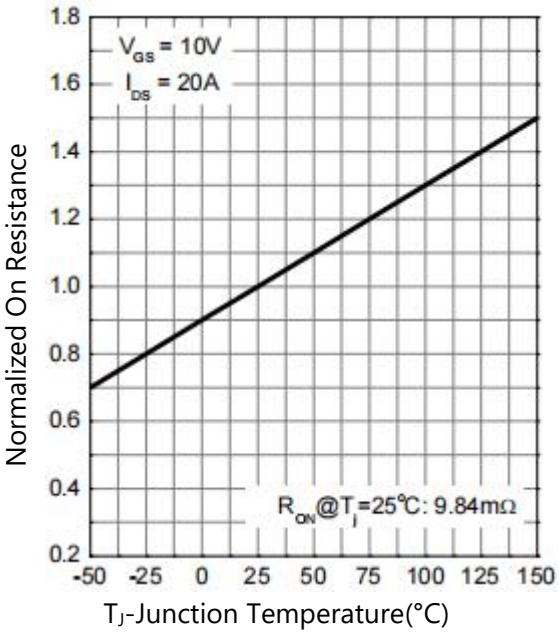


Figure 10. Diode Forward Current

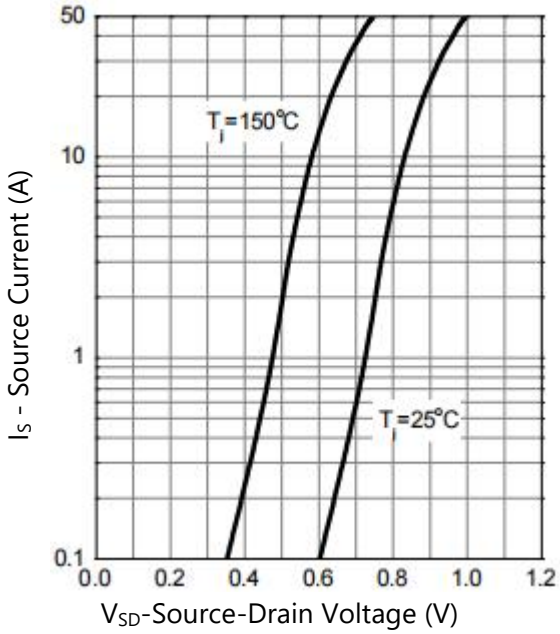


Figure 11. Capacitance

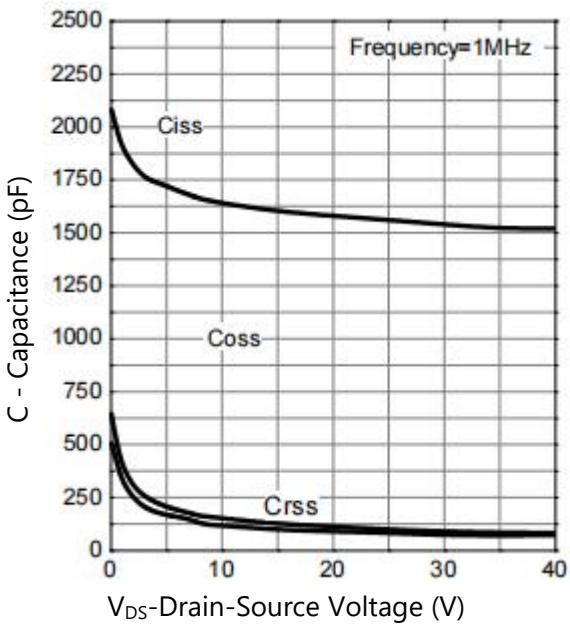
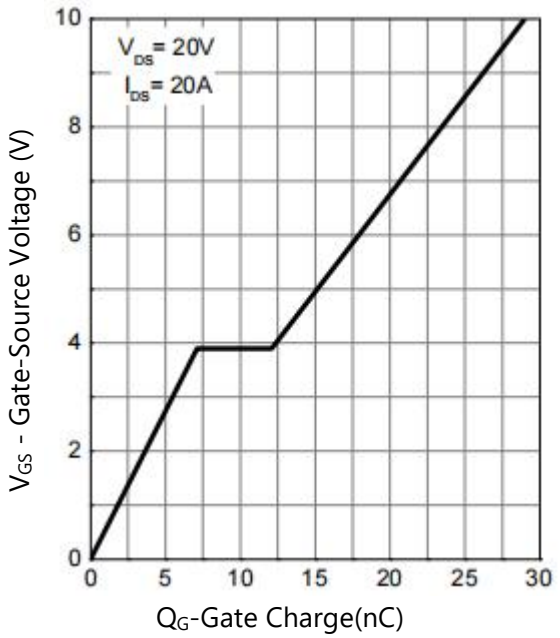
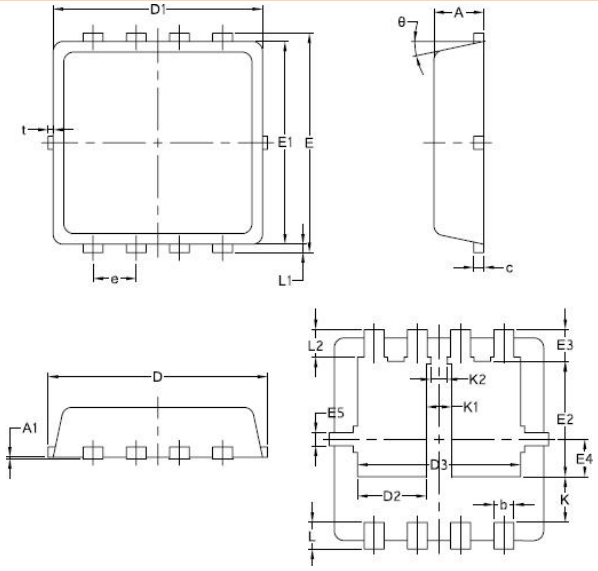


Figure 12. Gate Charge



PACKAGE INFORMATION

PDFN3.3x3.3-8L



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	0.70	0.85
A1	-	0.05
b	0.25	0.39
c	0.14	0.20
D	3.20	3.45
D1	3.05	3.25
D2	0.84	1.24
D3	2.30	2.60
E	3.20	3.40
E1	2.95	3.15
E2	1.60	1.90
E3	0.28	0.65
E4	0.37	0.77
E5	0.10	0.30
e	0.60	0.70
K	0.50	0.80
K1	0.30	0.53
K2	0.15	0.35
L	0.30	0.50
L1	0.06	0.20
L2	0.27	0.57
t	0	0.13
θ	10°	14°