

DESCRIPTION

The MXN1504QD uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

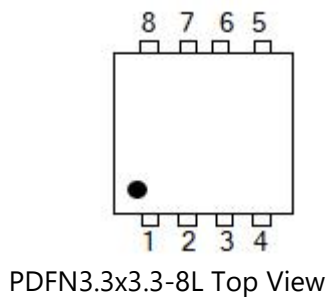
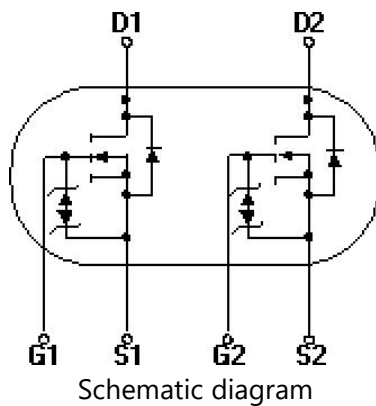
GENERAL FEATURES

- $V_{DS}=40V$, $I_D=37A$
 $R_{DS(ON)}(Typ.)=13.5m\Omega$ @ $V_{GS}=10V$
 $R_{DS(ON)}(Typ.)=23m\Omega$ @ $V_{GS}=4.5V$
- Surface-mounted package
- Advanced trench cell design

APPLICATION

- MB and NB
- Motor drivers
- Half-bridge Drivers

PINOUT



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
MXN1504QD	-55°C to 150°C	PDFN3.3x3.3	5000

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous($V_{GS}=10V$) ^(Note1)	I_D	37	A
Pulsed Drain Current($V_{GS}=10V$) ^{(Note1)(Note2)(Note3)}	I_{DM}	80	A
Drain Power Dissipation	P_{tot}	35	W
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 in² pad area, $t \leq 10sec$

Note 2. Pulse width $\leq 10\mu s$, duty cycle $\leq 1\%$

Note 3. Limited by bonding wire



Dual N-Channel Enhancement Mode Power MOSFET **MXN1504QD**



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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
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Off Characteristics

Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=32V, V_{GS}=0V$	-	-	1	μA
		$V_{DS}=32V, V_{GS}=0V, T_J=85^\circ C$	-	-	30	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA

On Characteristics

Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	-	2	V
Drain-Source On-State Resistance ^(Note1)	$R_{DS(ON)}$	$V_{GS}=10V, I_D=20A$	-	13.5	15	m Ω
		$V_{GS}=4.5V, I_D=10A$	-	23	25	m Ω

Dynamic Characteristics

Input Capacitance	C_{iss}	$V_{DS}=20V, V_{GS}=0V, F=1.0MHz$	-	303	-	pF
Output Capacitance	C_{oss}		-	58	-	pF
Reverse Transfer Capacitance	C_{rss}		-	32	-	pF

Switching Characteristics^(Note2)

Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=20V, R_L=1\Omega, V_{GEN}=10V, R_G=4.5\Omega, I_D=20A$	-	7	-	nS
Turn-on Rise Time	t_r		-	45	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	17	-	nS
Turn-Off Fall Time	t_f		-	23	-	nS
Total Gate Charge	Q_g	$V_{DS}=20V, I_{DS}=20A, V_{GS}=10V$	-	20	-	nC
Gate-Source Charge	Q_{gs}		-	4.1	-	nC
Gate-Drain Charge	Q_{gd}		-	3.4	-	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}	$I_{SD}=20A, di_{SD}/dt=100A/\mu s$	-	11	-	ns
Reverse Recovery Charge	Q_{rr}		-	5.5	-	nc

Note 1. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

Note 2. Guaranteed by design, not subject to product.



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Power Capability

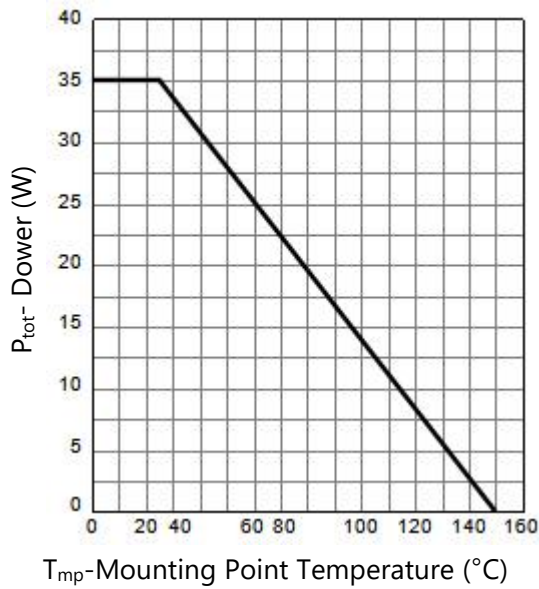


Figure 2. Current Capability

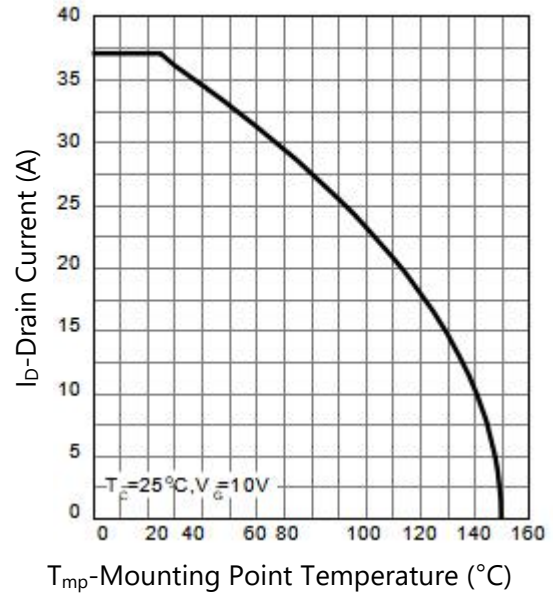


Figure 3. Safe Operating Area

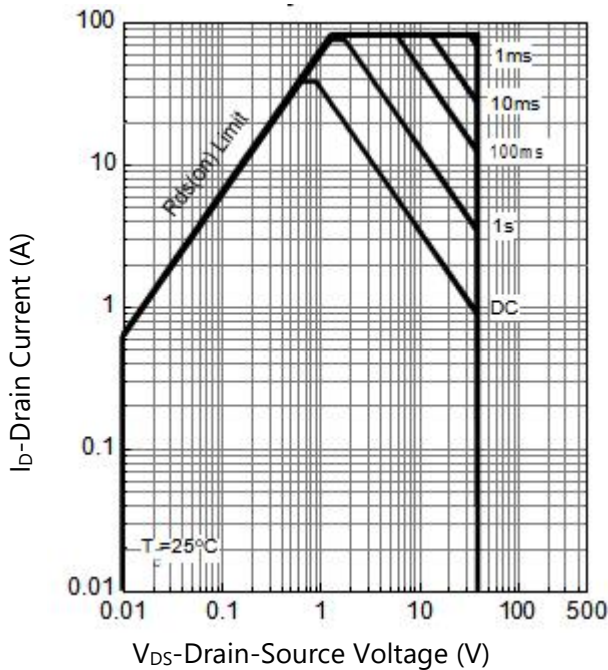
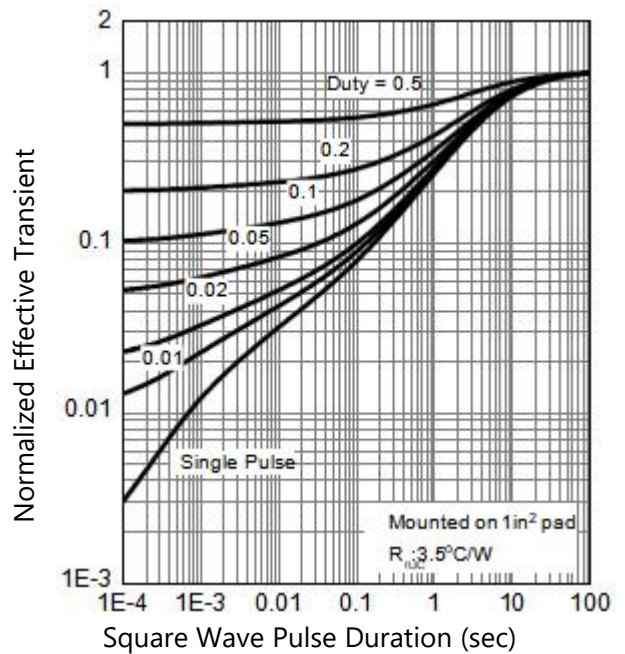


Figure 4. Transient Thermal Impedance





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 5. Output Characteristics

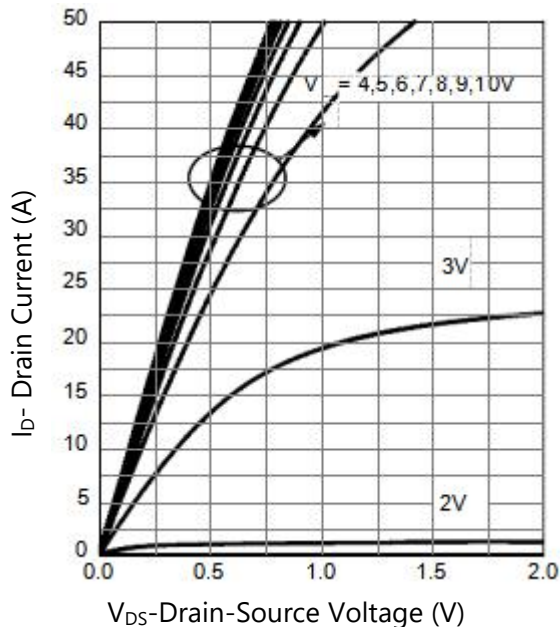


Figure 6. On Resistance

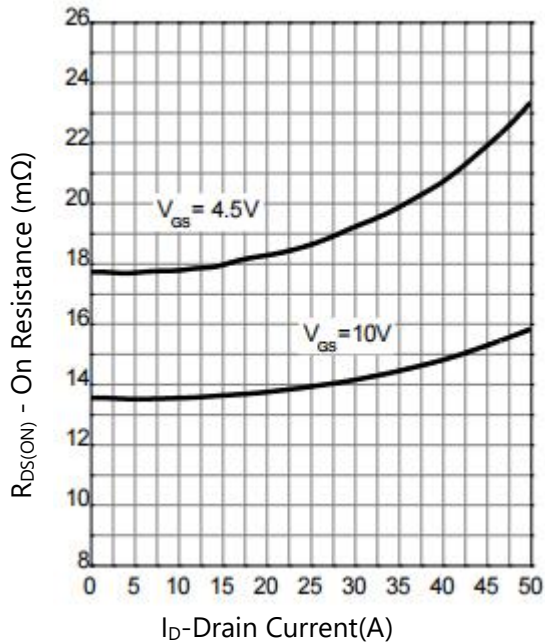


Figure 7. Transfer Characteristics

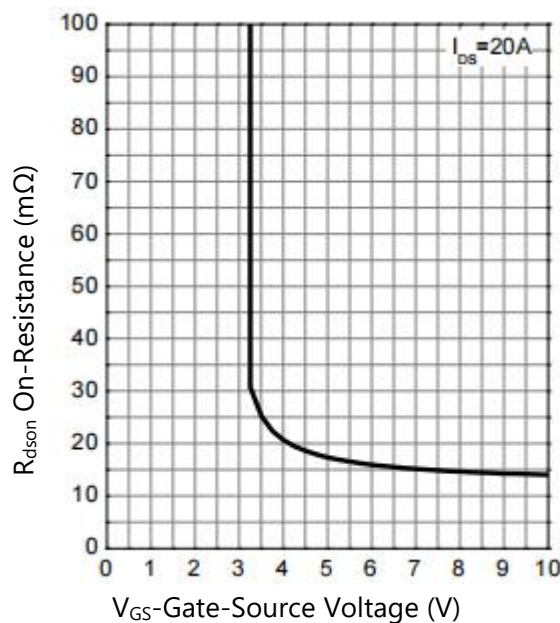
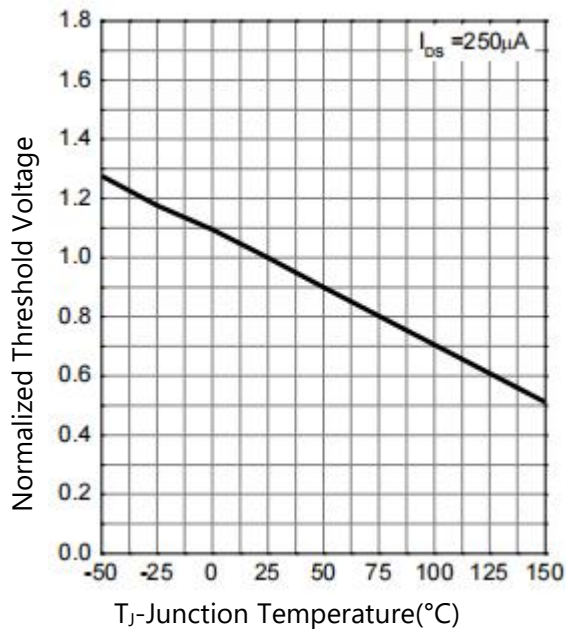


Figure 8. Normalized Threshold Voltage





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 9. Normalized On Resistance

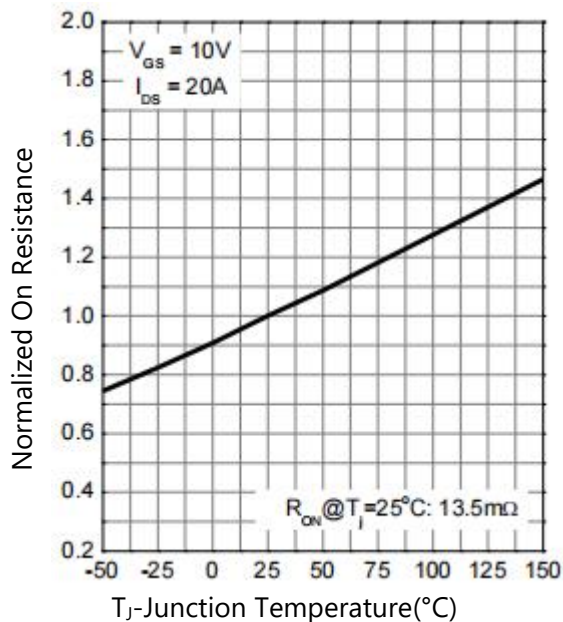


Figure 10. Diode Forward Current

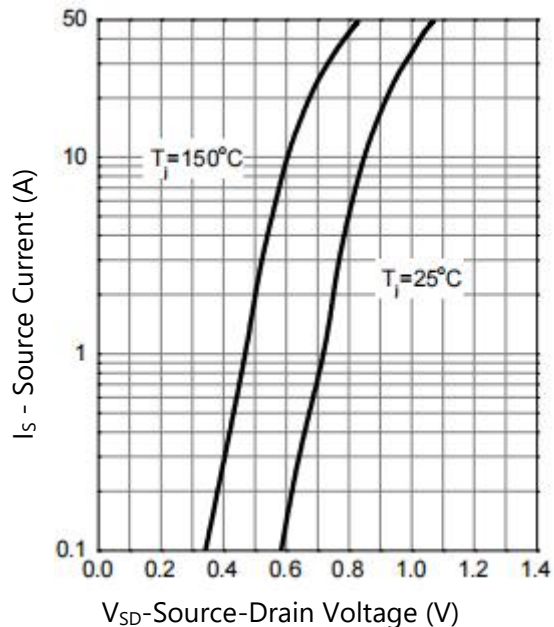


Figure 11. Capacitance

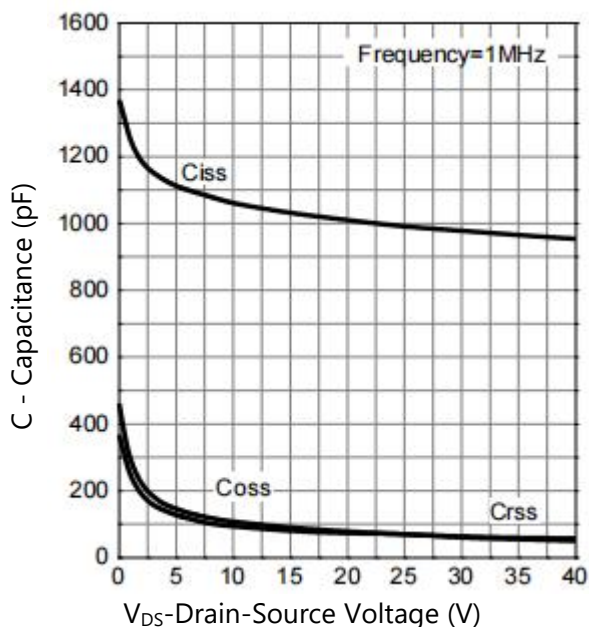
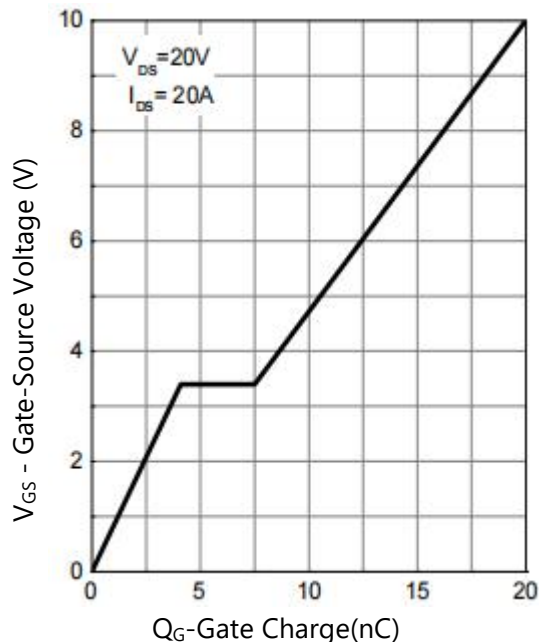
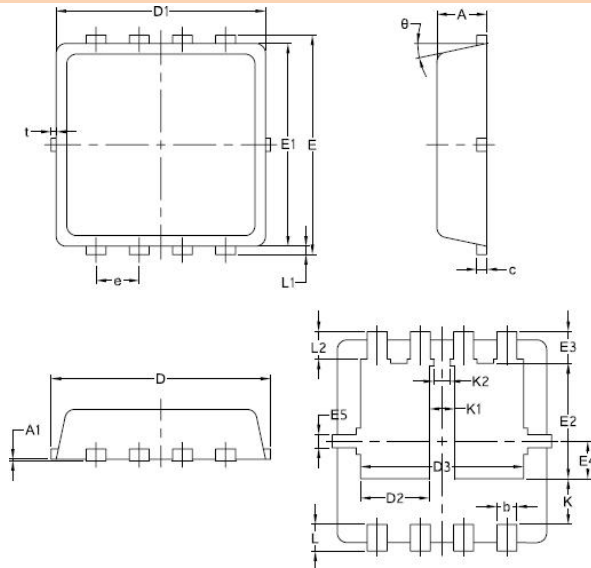


Figure 12. Gate Charge



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°