

DESCRIPTION

The MXN008N04G uses deep trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

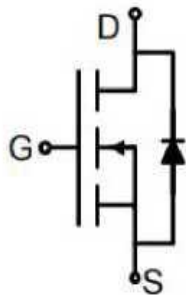
GENERAL FEATURES

- $V_{DS}=40V$, $I_D=189A$
 $R_{DS(ON)}(Typ.)=0.85m\Omega$ @ $V_{GS}=4.5V$
 $R_{DS(ON)}(Typ.)=0.55m\Omega$ @ $V_{GS}=10V$
- Surface Mounted package
- Advanced Trench Cell Design
- Super Trench

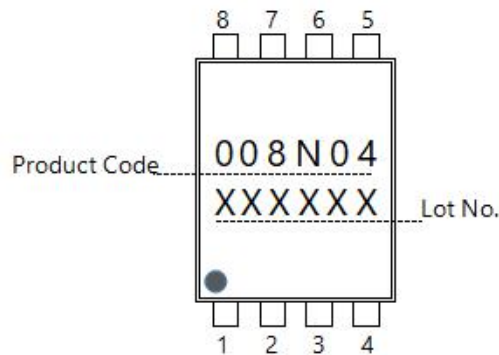
APPLICATION

- Motor Drivers
- DC-DC Converter

PINOUT



Schematic diagram



Marking and pin Assignment

Pin	Description
1, 2, 3	Source
4	Gate
5, 6, 7, 8	Drain

KEY PERFORMANCE PARAMETERS

Parameter	Value	Unit
V_{DS} @ $T_C=25^\circ C$	40	V
$R_{DS(ON)}(Typ.)$ @ $V_{GS}=10V$	0.55	$m\Omega$
$R_{DS(ON)}(Typ.)$ @ $V_{GS}=4.5V$	0.85	$m\Omega$
I_D @ $T_C=25^\circ C$	189	A
P_{tot} @ $T_C=25^\circ C$	35	W
T_J, T_{STG}	-55 to 175	$^\circ C$

PACKAGE INFORMATION

Part Number	Package	Storage Temperature	Devices per Reel
MXN008N04G	PDFN5X6-8L	-55 $^\circ C$ To 175 $^\circ C$	5000

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous ^(Note1)	I_D	189	A
Pulsed Drain Current ^{(Note1)(Note2)}	I_{DM}	756	A
Total Power Dissipation ^(Note1)	P_{tot}	35	W
Diode Forward Current	I_S	189	A
Single Pulsed Avalanche Energy ($L=1.0\text{mH}$) ^(Note1)	E_{AS}	1200	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	$^{\circ}\text{C}$

Note1. Surface Mounted on 1 in² pad area, $t \leq 10$ sec

Note2. Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$

THERMAL RESISTANCE

Parameter	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Ambient ^(Note1)	$R_{\theta JA}$	62.5	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case ^(Note1)	$R_{\theta JC}$	3.5	$^{\circ}\text{C}/\text{W}$

Note1. Surface Mounted on 1 in² pad area, $t \leq 10$ sec



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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
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Static Characteristics

Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	-	2	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=32V, V_{GS}=0V$	-	-	1	μA
		$T_J=85^\circ\text{C}$			30	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Drain-Source On-State Resistance ^(Note1)	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=20A$	-	0.55	0.63	m Ω
		$V_{GS}=10V, I_D=30A$	-	0.85	0.95	m Ω

Diode Characteristics

Diode Forward Voltage ^(Note1)	V_{SD}	$I_{SD}=30A, V_{GS}=0V$	-	-	1.3	V
Reverse Recovery Time	t_{rr}	$I_{SD}=30A,$ $di_{SD}/dt=100A/\mu s$	-	87	-	nS
Reverse Recovery Charge	Q_{rr}		-	127	-	nC

Dynamic Characteristics^(Note2)

Input Capacitance	C_{iss}	$V_{DS}=20V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	8355	-	PF
Output Capacitance	C_{oss}		-	2819	-	PF
Reverse Transfer Capacitance	C_{rss}		-	117	-	PF
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=20V, V_{GEN}=10V,$ $R_G=4.5\Omega, R_L=0.66\Omega,$ $I_{DS}=30A$	-	15	-	nS
Turn-on Rise Time	t_r		-	74	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	140	-	nS
Turn-Off Fall Time	t_f		-	92	-	nS

Gate Charge Characteristics^(Note2)

Total Gate Charge	Q_g	$V_{DS}=20V, I_{DS}=30A,$ $V_{GS}=10V$	-	145	-	nC
Gate-Source Charge	Q_{gs}		-	29	-	nC
Gate-Drain Charge	Q_{gd}		-	26	-	nC

Note1. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

Note2. Guaranteed by design, not subject to product.



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure1. Power Capability

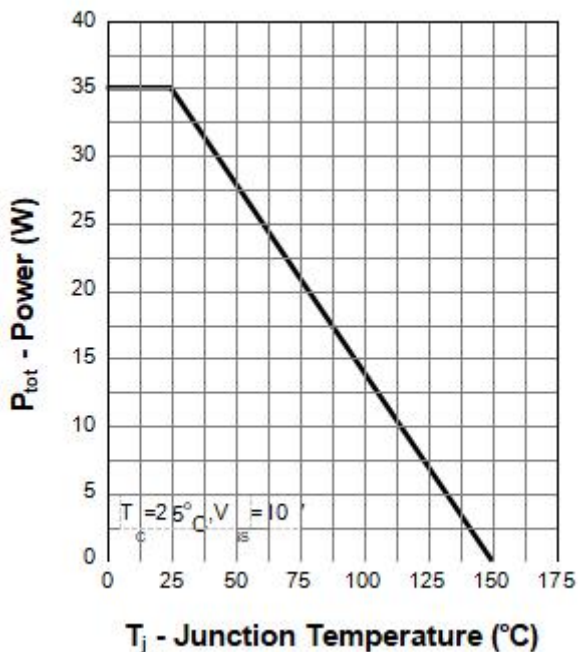


Figure2. Current Capability

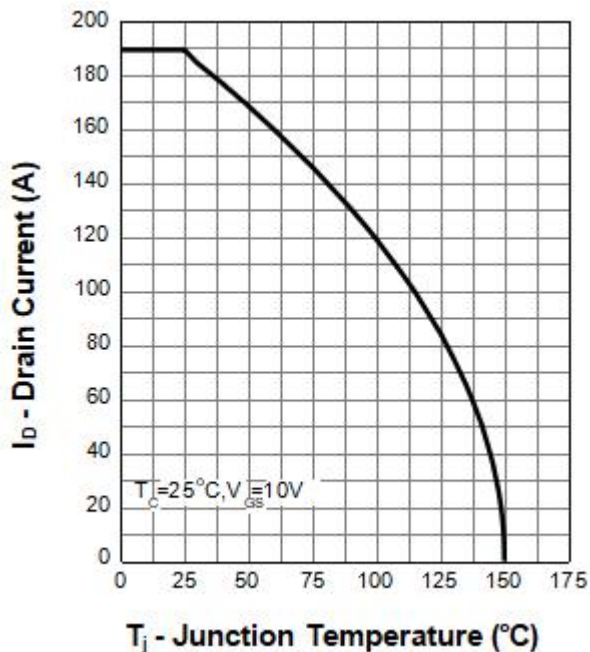


Figure3. Safe Operation Area

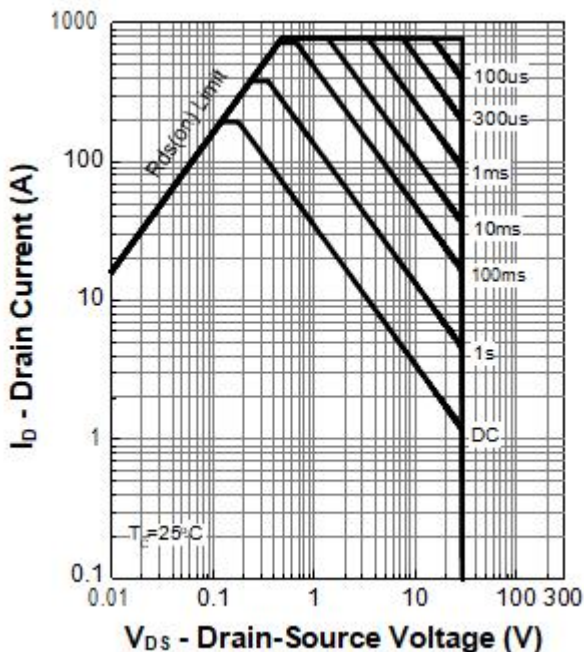
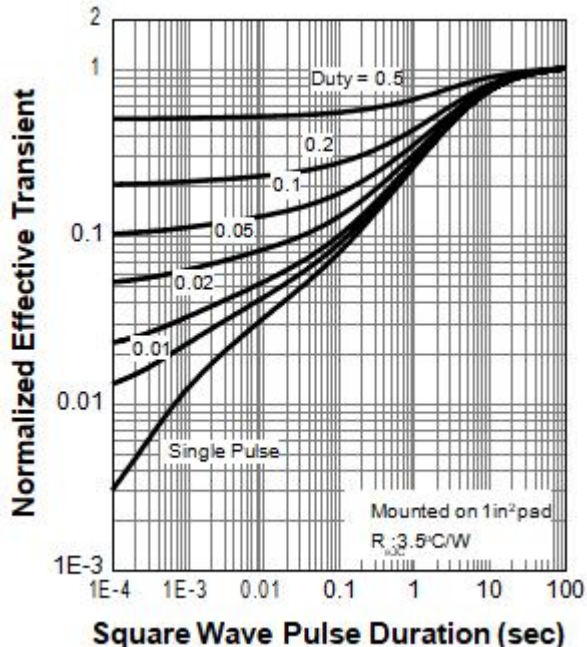


Figure4. Transient Thermal Impedance





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure5. Output Characteristics

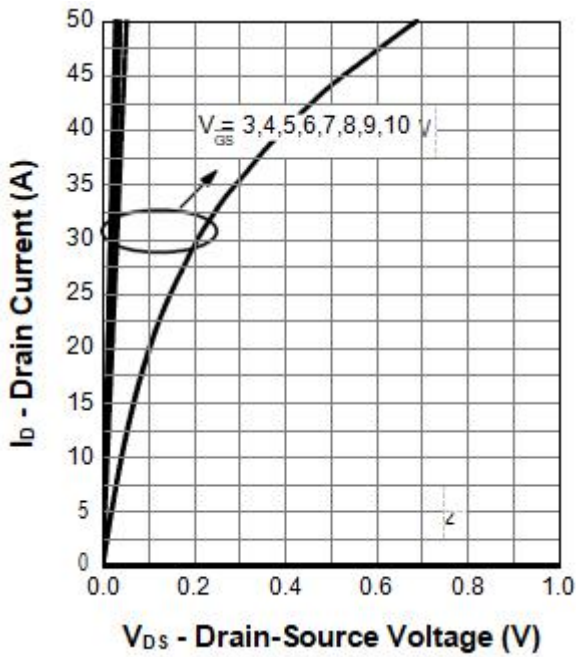


Figure6. On Resistance

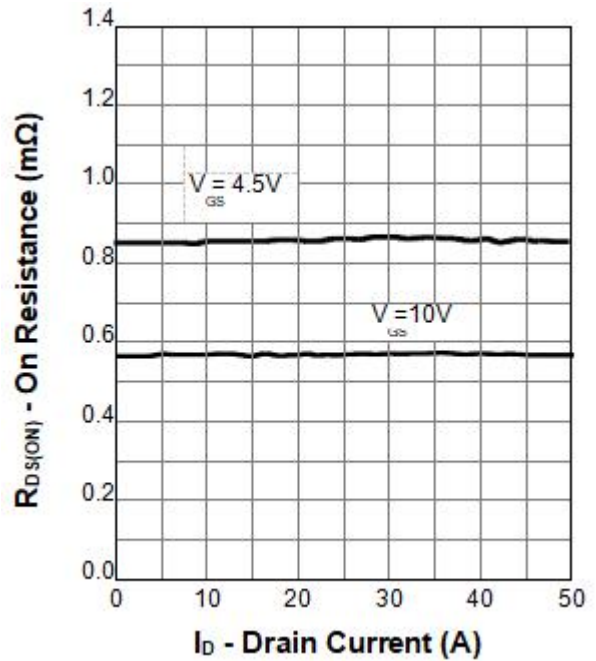


Figure7. Transfer Characteristics

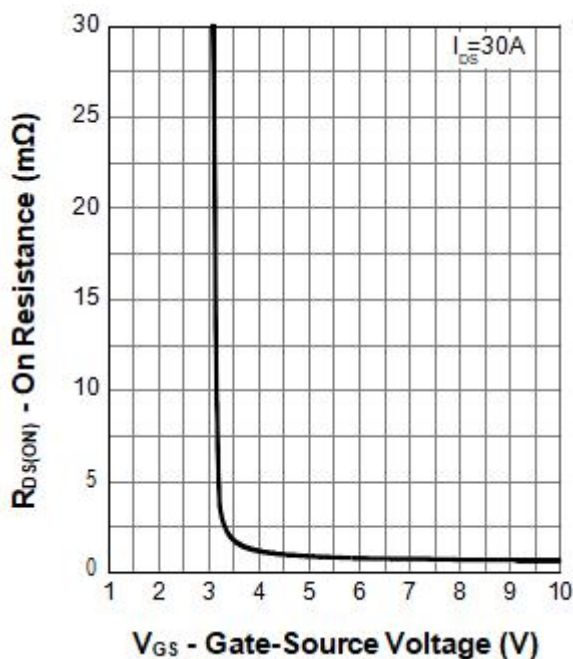
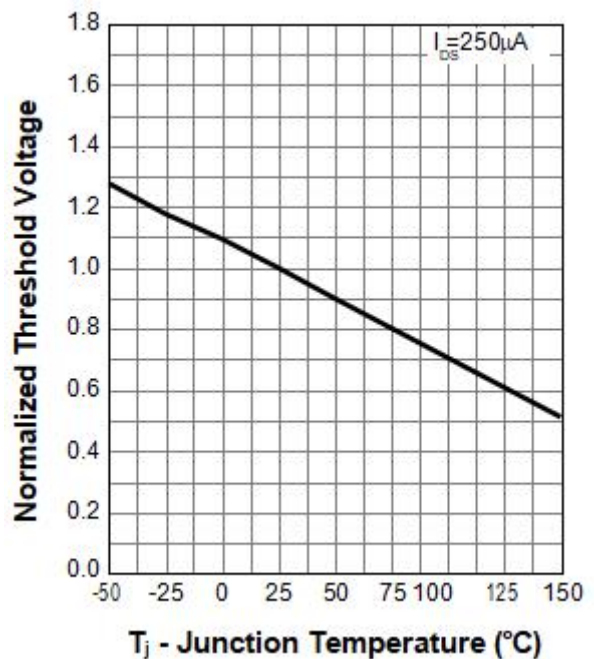


Figure8. Normalized Threshold Voltage





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure9. Normalized On Resistance

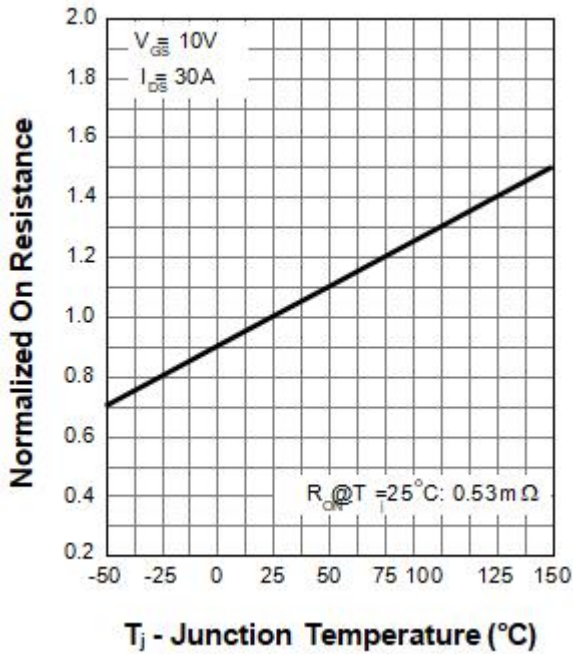


Figure10. Diode Forward Current

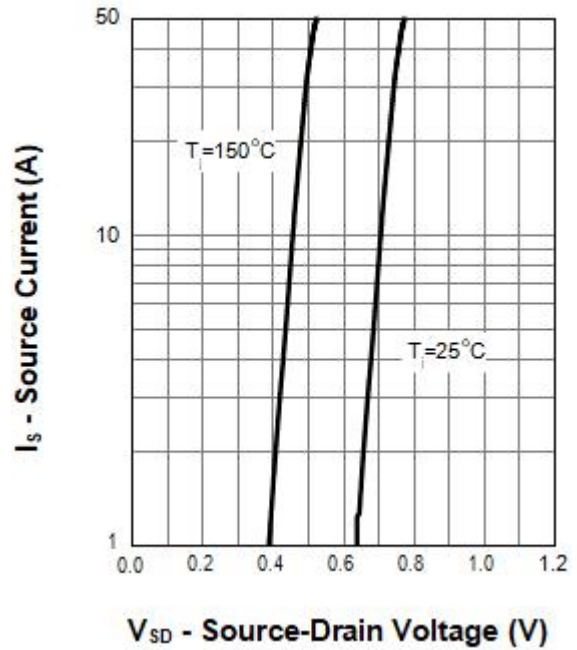


Figure11. Capacitance

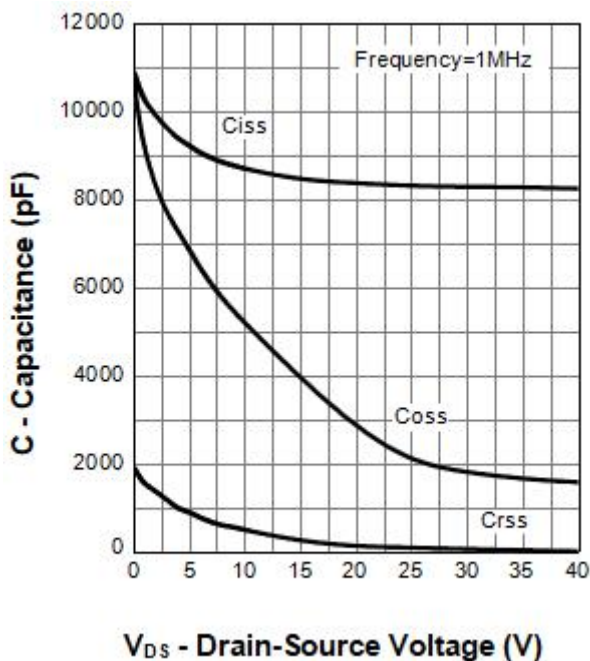
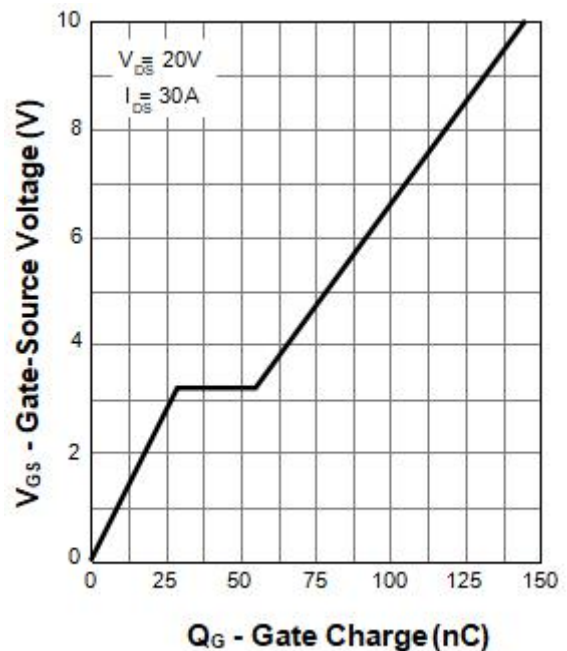
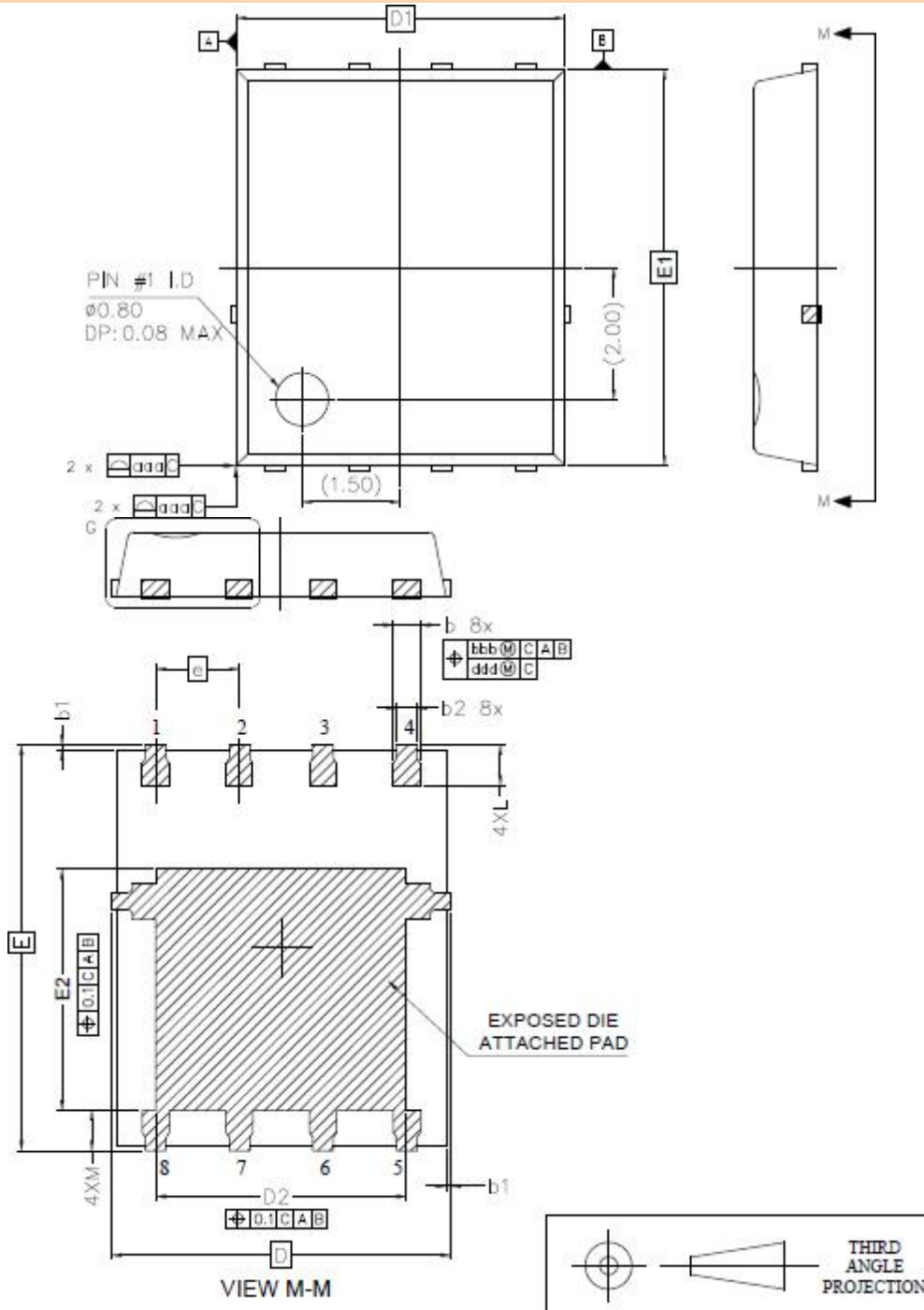


Figure12. Gate Charge

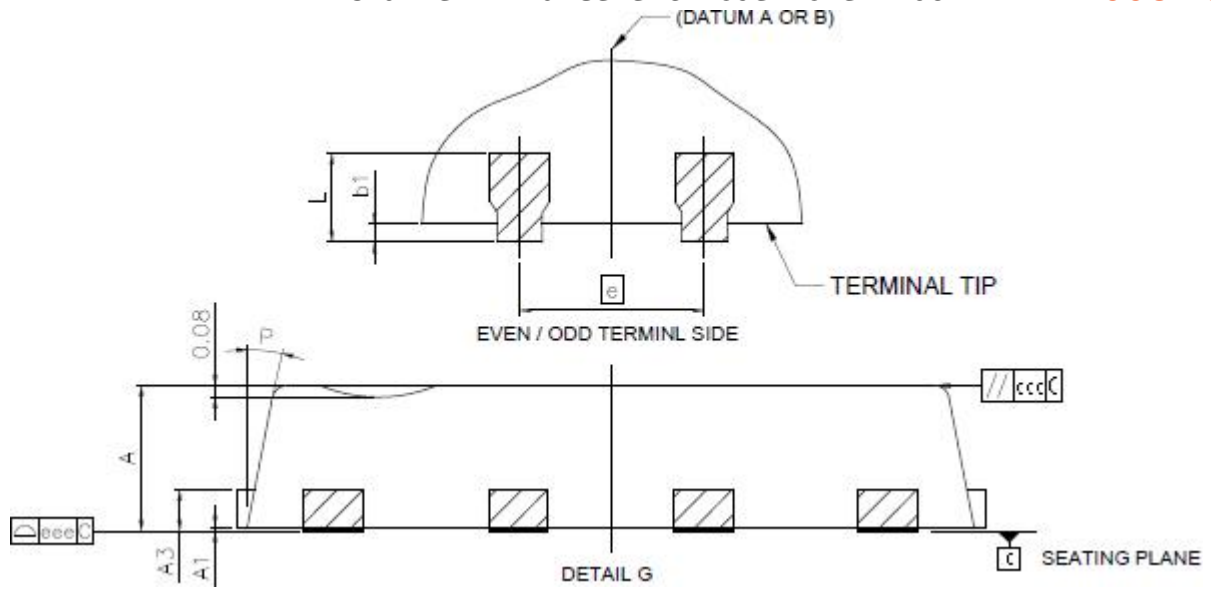


PACKAGE INFORMATION

PDFN5X6-8L



N-Channel Enhancement Mode Power MOSFET **MXN008N04G**
(DATUM A OR B)



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.95	-	1.05
A1	0.00	-	0.05
A3	0.25 REF		
b	0.31	-	0.51
b1	0.03	-	0.13
b2	0.21	-	0.41
D	5.15 BSC		
D1	5.00 BSC		
D2	3.70	-	3.90
E	6.15 BSC		
E1	6.00 BSC		
E2	3.56	-	3.76
e	1.27 BSC		
L	0.51	-	0.71
M	0.51	-	0.71
P	10°	-	12°
aaa	-	0.10	-
bbb	-	0.10	-
ccc	-	0.10	-
ddd	-	0.05	-
eee	-	0.08	-