



N-Channel Enhancement Mode Power MOSFET **MXN035N02**

DESCRIPTION

The MXN035N02 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a wide variety of applications.

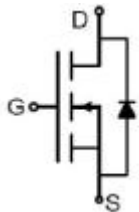
GENERAL FEATURES

- $V_{DS}=20V$, $I_D=56A$
 $R_{DS(ON)}(Typ.)=4.7m\Omega$ @ $V_{GS}=2.5V$
 $R_{DS(ON)}(Typ.)=3.5m\Omega$ @ $V_{GS}=4.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

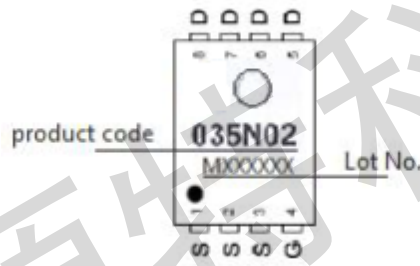
APPLICATION

- Battery Protection
- Load switch
- Power management

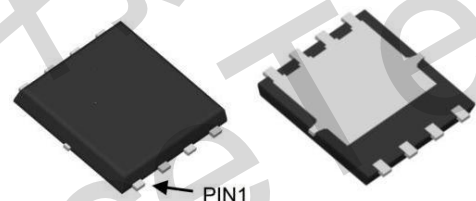
PINOUT



Schematic diagram



Marking and Pin Assignment



DFN5X6-8L top & bottom view

ORDERING INFORMATION

Device	Marking	Storage Temperature	Package	Devices Per Reel
MXN035N02	035N02	-55°C to 150°C	DFN5X6-8L	2500

KEY PERFORMANCE PARAMETERS ($T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS}=0V$)	V_{DS}	20	V
Gate-Source Voltage ($V_{DS}=0V$)	V_{GS}	± 12	V
Drain Current-Continuous ($T_C=25^\circ C$) ^(Note1)	I_D	56	A
Drain Current-Continuous ($T_C=100^\circ C$)	I_D	35.5	A
Drain Current-Continuous@Current-Pulsed ^(Note2)	$I_{DM(pluse)}$	224	A
Maximum Power Dissipation ($T_C=25^\circ C$)	P_D	43.1	W
Maximum Power Dissipation ($T_C=100^\circ C$)	P_D	17.2	W
Single Pulse Avalanche Energy ^(Note3)	E_{AS}	340	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

THERMAL CHARACTERISTIC

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.9	$^\circ C/W$

Notes 1.The maximum current rating is package limited.

Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3. E_{AS} condition: $T_J=25^\circ C, V_{DD}=30V, V_G=4.5V, R_G=25\Omega$,



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

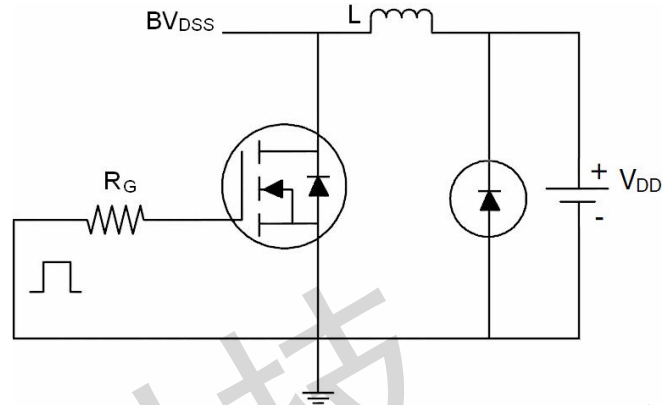
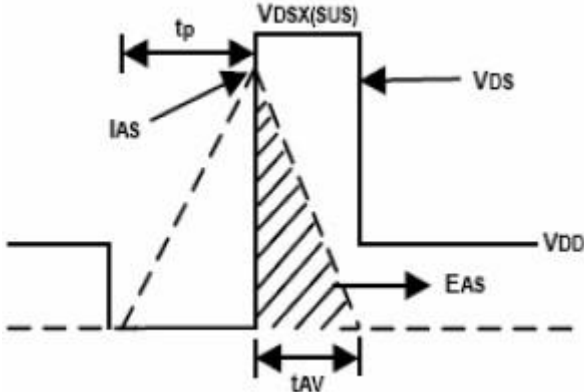
Parameter	Symbol	Condition	Min	Typ	Max	Unit
On/Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	20	23	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=20V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.7	1.1	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=2.5V, I_D=15A$	-	4.7	8.9	m Ω
		$V_{GS}=4.5V, I_D=20A, T_C=125^\circ\text{C}$	-	5.1	8.9	m Ω
		$V_{GS}=4.5V, I_D=20A, T_C=25^\circ\text{C}$	-	3.5	4.9	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=15A$	-	40	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, F=1.0\text{MHz}$	-	2800	-	pF
Output Capacitance	C_{oss}		-	353	-	pF
Reverse Transfer Capacitance	C_{rss}		-	265	-	pF
Gate resistance	R_g	$V_{DS}=0V, V_{GS}=0V, F=1.0\text{MHz}$	-	1.1	-	Ω
Total Gate Charge	Q_g	$V_{DS}=10V, I_D=12A, V_{GS}=4.5V$	-	32	-	nC
Gate-Source Charge	Q_{gs}		-	3	-	nC
Gate-Drain Charge	Q_{gd}		-	11	-	nC
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=15V, R_L=0.75\Omega, V_{GS}=4.5V, R_{GEN}=3\Omega$	-	17	-	nS
Turn-on Rise Time	t_r		-	49	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	74	-	nS
Turn-Off Fall Time	t_f		-	26	-	nS
Source-Drain Diode Characteristics						
Source-Drain Current(Body Diode)	I_{SD}		-	-	54	A
Forward On Voltage	V_{SD}	$V_{GS}=0V, I_{SD}=20A$	-	-	1.2	V
Reverse Recovery Time	t_{rr}	$I_F=20A, di/dt=100A/\mu s$	-	23	-	nS
Reverse Recovery Charge	Q_{rr}		-	10	-	nC



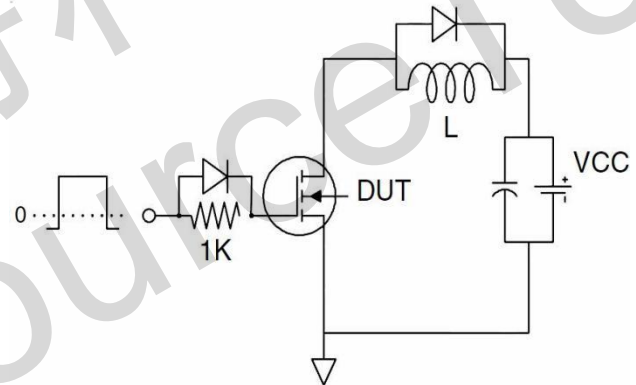
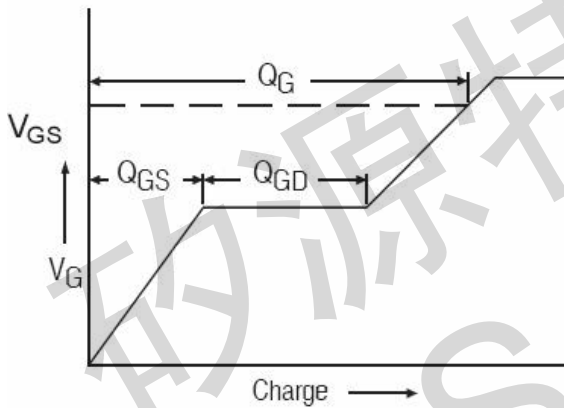
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TEST CIRCUIT

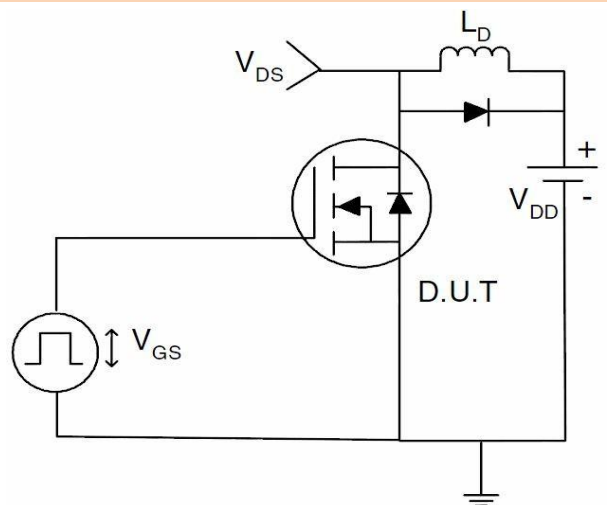
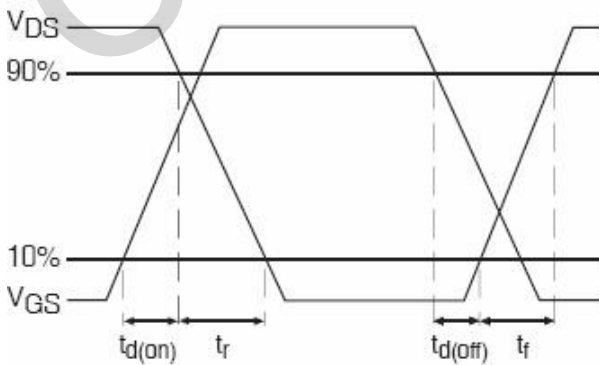
1) EAS Test Circuits



2) Gate Charge Test Circuit



3) Switch Time Test Circuit





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TYPICAL PERFORMANCE CHARACTERISTICS

Figure1. Output Characteristics

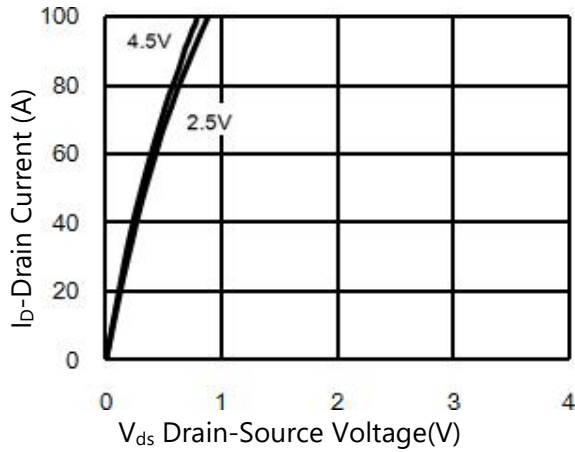


Figure2. Transfer Characteristics

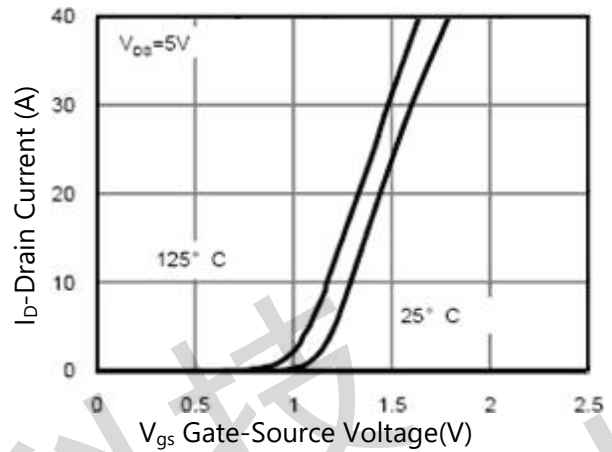


Figure3. BV_{DSS} vs Junction Temperature

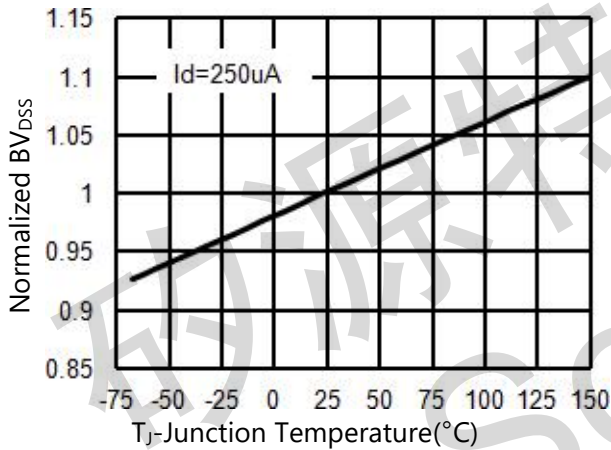


Figure4. Drain Current

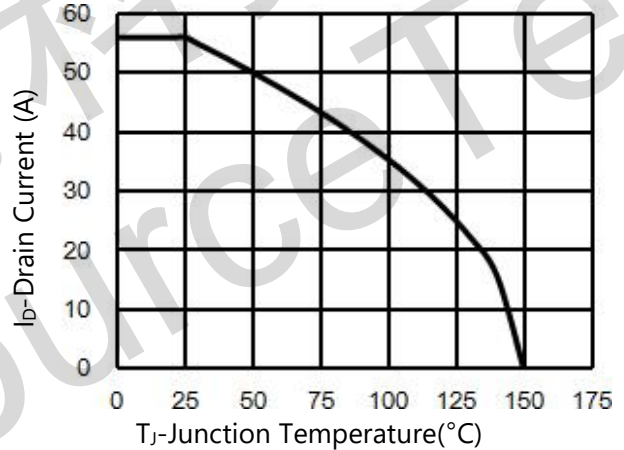


Figure5. $V_{GS(th)}$ vs Junction Temperature

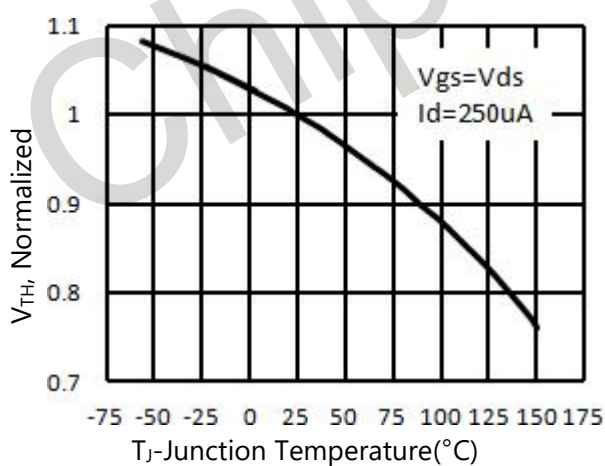
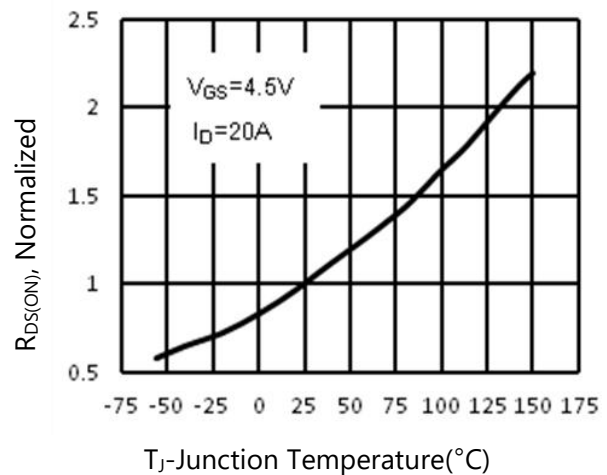


Figure6. $R_{DS(ON)}$ vs Junction Temperature





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TYPICAL PERFORMANCE CHARACTERISTICS

Figure7. Gate Charge Waveforms

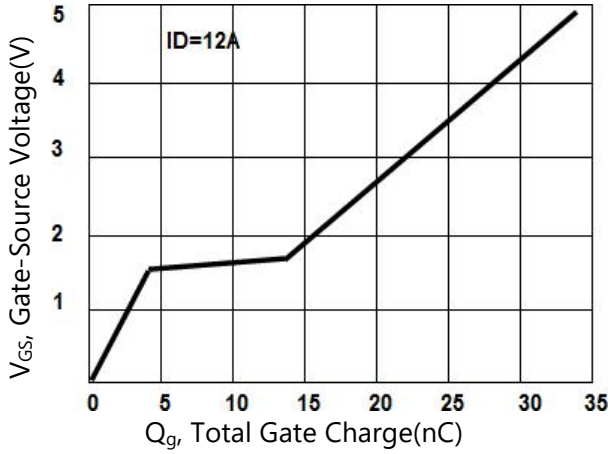


Figure8. Capacitance

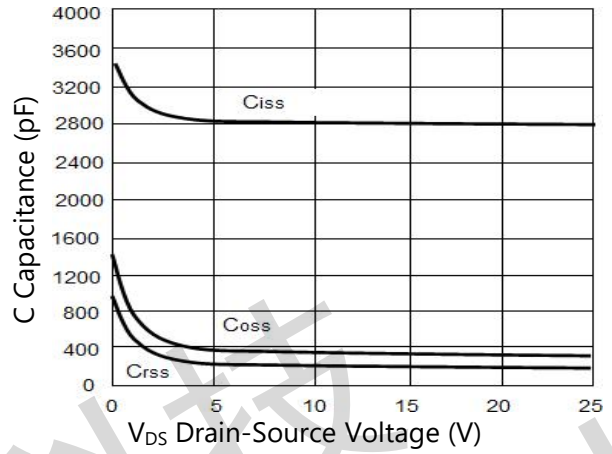


Figure9. Body Diode Forward

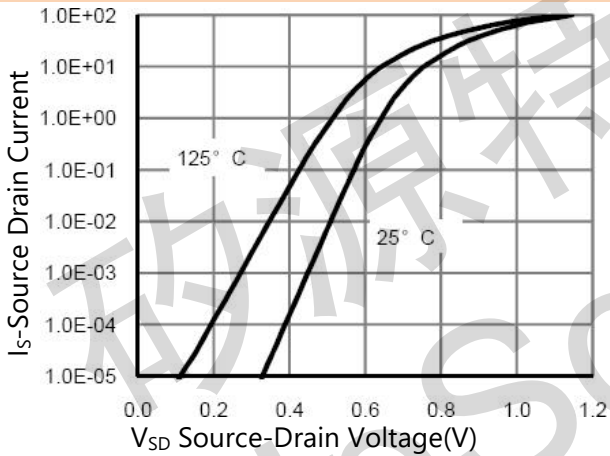
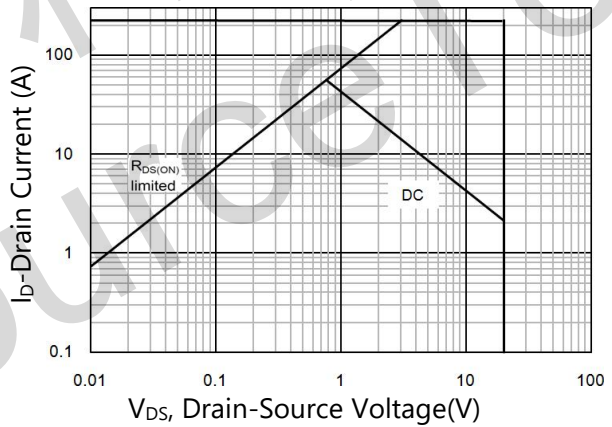


Figure10. Maximum Safe Operating Area

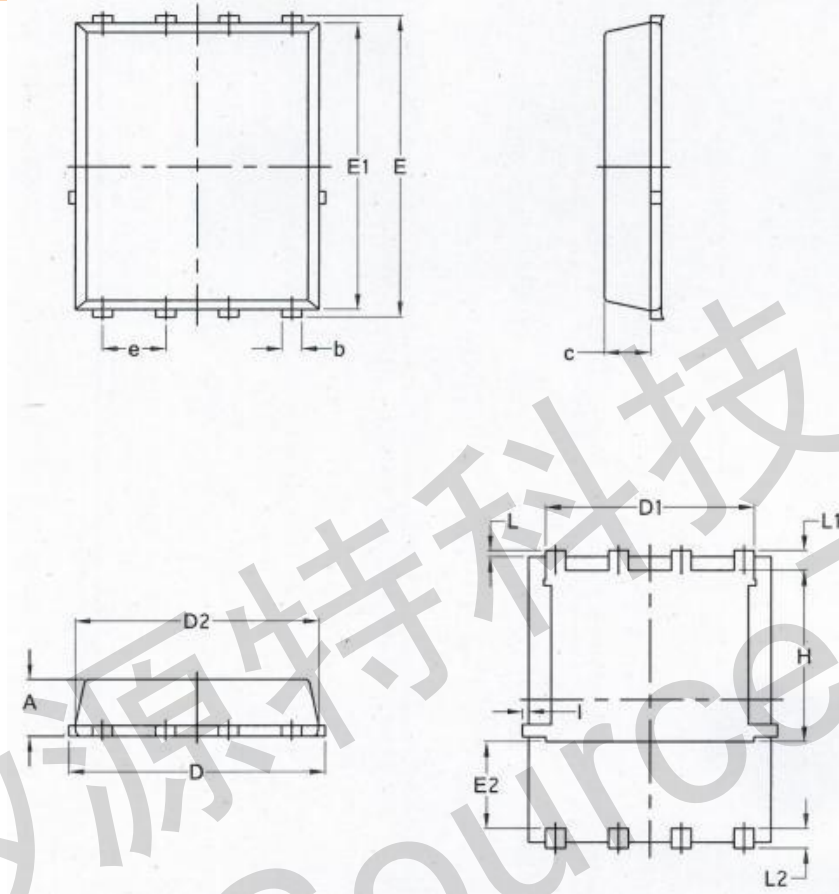




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 **PACKAGE INFORMATION**

DFN5X6-8L



SYMBOL	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.970	0.0324	0.0382
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	-	0.0630	-
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
l	-	0.18	-	0.0070