



Description

JMT N-channel Enhancement Mode Power MOSFET

Features

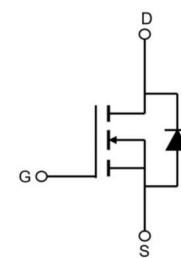
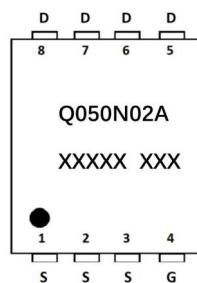
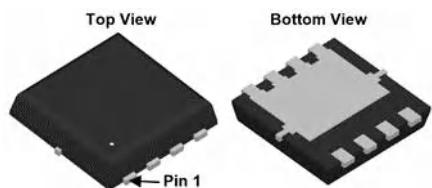
- 20V, 50A
- $R_{DS(ON)} < 5\text{m}\Omega$ @ $V_{GS} = 4.5\text{V}$
- $R_{DS(ON)} < 8\text{m}\Omega$ @ $V_{GS} = 2.5\text{V}$
- Lead free and Green Device Available
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

Application

- Load Switch
- PWM Application
- Power management



100% UIS TESTED!
100% ΔV_{ds} TESTED!



PDFN3x3-8L

Marking and pin Assignment

Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
Q050N02A	JMTQ050N02A	TAPING	PDFN3x3-8L	13inch	5000	50000

Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		20	V
V_{GSS}	Gate-Source Voltage		± 12	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	50	A
		$T_C = 100^\circ\text{C}$	33	A
I_{DM}	Pulsed Drain Current ^{note1}		200	A
E_{AS}	Single Pulsed Avalanche Energy ^{note2}		56.2	mJ
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$	21	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		6	$^\circ\text{C}/\text{W}$
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	$^\circ\text{C}$

**Electrical Characteristics** ($T_J=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(\text{BR})\text{DSS}}$	Drain-Source Breakdown Voltage	$V_{\text{GS}}=0\text{V}$, $I_D=250\mu\text{A}$	20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{\text{DS}}=20\text{V}$, $V_{\text{GS}}=0\text{V}$	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	$V_{\text{GS}}= \pm 12\text{V}$, $V_{\text{DS}}=0\text{V}$	-	-	± 100	nA
On Characteristics						
$V_{\text{GS}(\text{th})}$	Gate Threshold Voltage	$V_{\text{DS}}=V_{\text{GS}}$, $I_D=250\mu\text{A}$	0.4	0.7	1.0	V
$R_{\text{DS}(\text{on})}$ note3	Static Drain-Source On-Resistance	$V_{\text{GS}}=4.5\text{V}$, $I_D=30\text{A}$	-	3.8	5	$\text{m}\Omega$
		$V_{\text{GS}}=2.5\text{V}$, $I_D=20\text{A}$		5.5	8	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{\text{DS}}=10\text{V}$, $V_{\text{GS}}=0\text{V}$, $f=1.0\text{MHz}$	-	2500	-	pF
C_{oss}	Output Capacitance		-	407	-	pF
C_{rss}	Reverse Transfer Capacitance		-	386	-	pF
Q_g	Total Gate Charge	$V_{\text{DS}}=10\text{V}$, $I_D=30\text{A}$, $V_{\text{GS}}=4.5\text{V}$	-	23	-	nC
Q_{gs}	Gate-Source Charge		-	3	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	7.9	-	nC
Switching Characteristics						
$t_{\text{d}(\text{on})}$	Turn-On Delay Time	$V_{\text{DS}}=10\text{V}$, $I_D=30\text{A}$, $R_G=1.8\Omega$, $V_{\text{GS}}=4.5\text{V}$	-	17	-	ns
t_r	Turn-On Rise Time		-	49	-	ns
$t_{\text{d}(\text{off})}$	Turn-Off Delay Time		-	74	-	ns
t_f	Turn-Off Fall Time		-	26	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_s	Maximum Continuous Drain to Source Diode Forward Current		-	-	50	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	200	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{\text{GS}}=0\text{V}$, $I_{\text{SD}}=30\text{A}$, $T_J=25^\circ\text{C}$	-	-	1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: $T_J=25^\circ\text{C}$, $V_{\text{DD}}=10\text{V}$, $V_G=4.5\text{V}$, $R_G=25\Omega$, $L=0.5\text{mH}$, $I_{\text{AS}}=15\text{A}$ 3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$

Typical Performance Characteristics

Figure 1: Output Characteristics

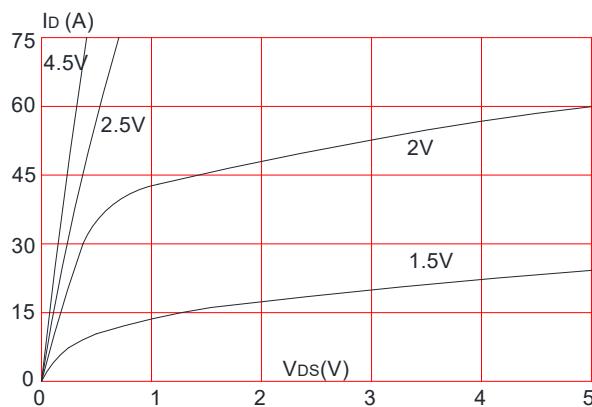


Figure 2: Typical Transfer Characteristics

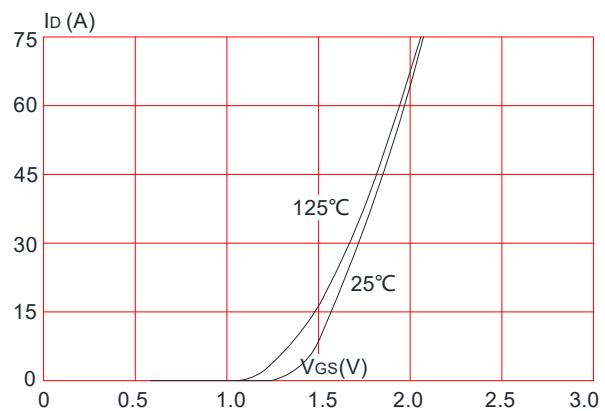


Figure 3: On-resistance vs. Drain Current

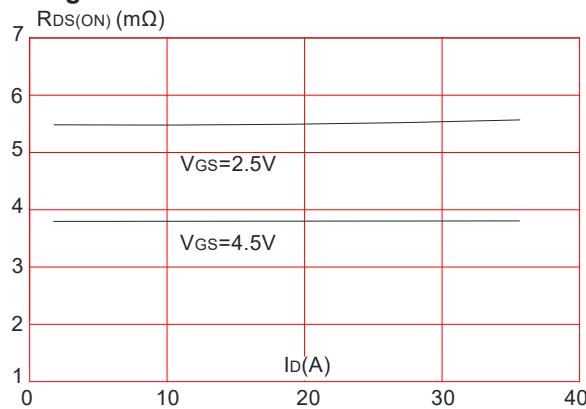


Figure 5: Gate Charge Characteristics

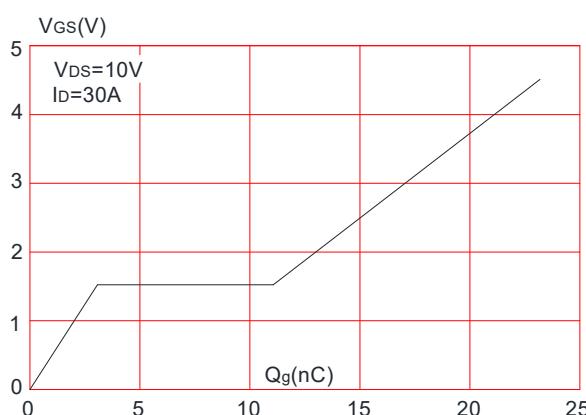


Figure 4: Body Diode Characteristics

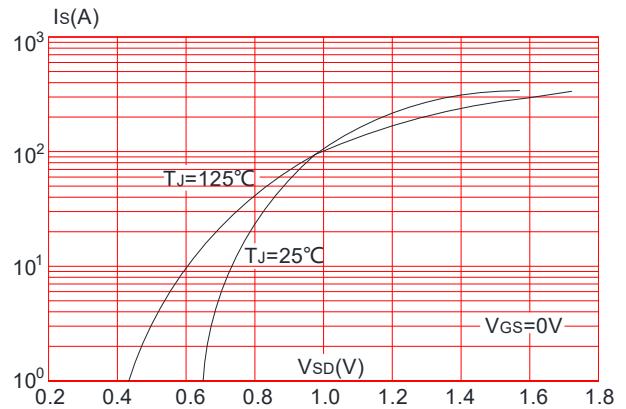


Figure 6: Capacitance Characteristics

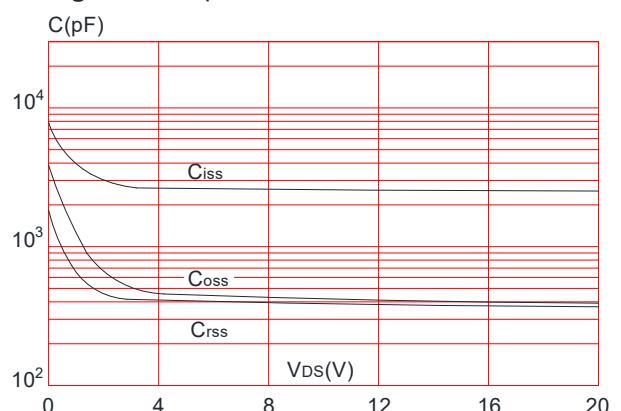


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

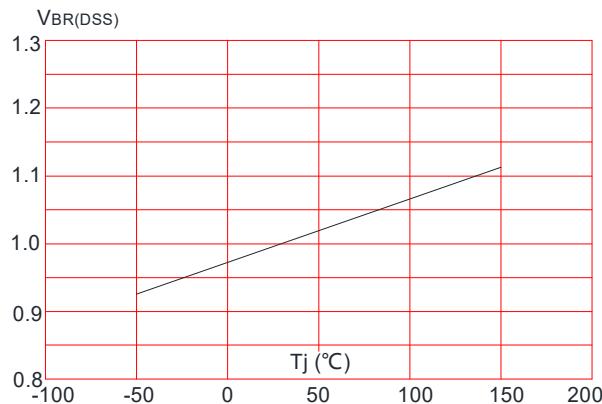


Figure 9: Maximum Safe Operating Area

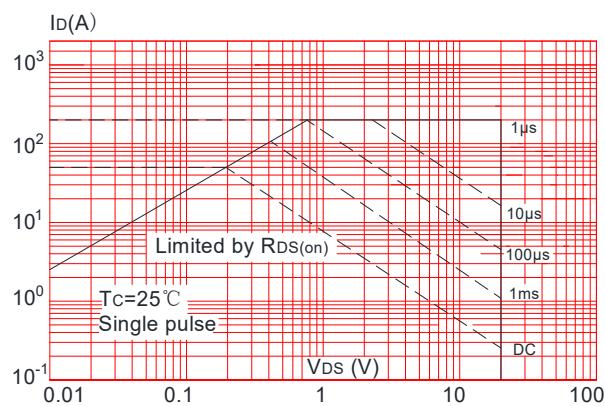


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

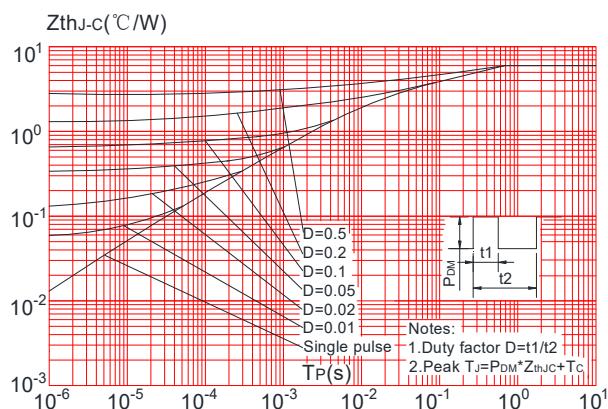


Figure 8: Normalized on Resistance vs. Junction Temperature

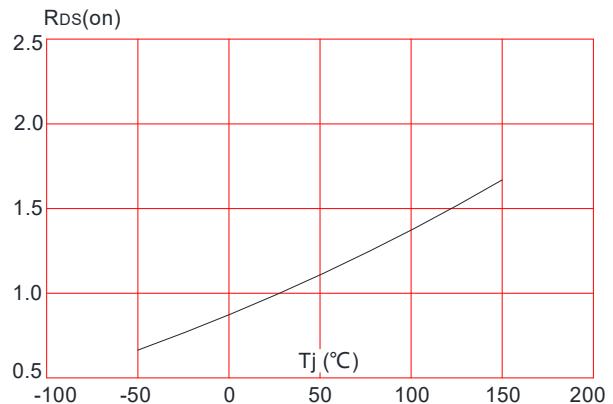
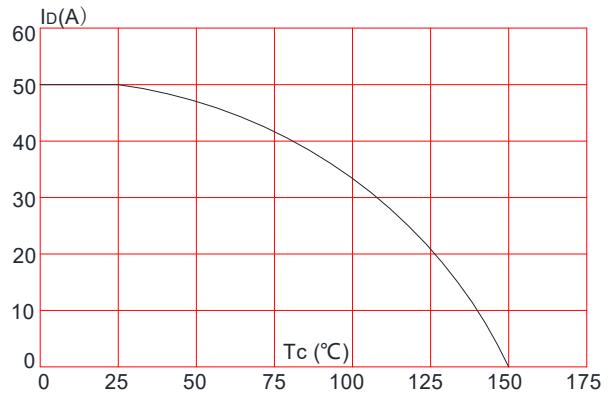


Figure 10: Maximum Continuous Drain Current vs. Case Temperature



Test Circuit

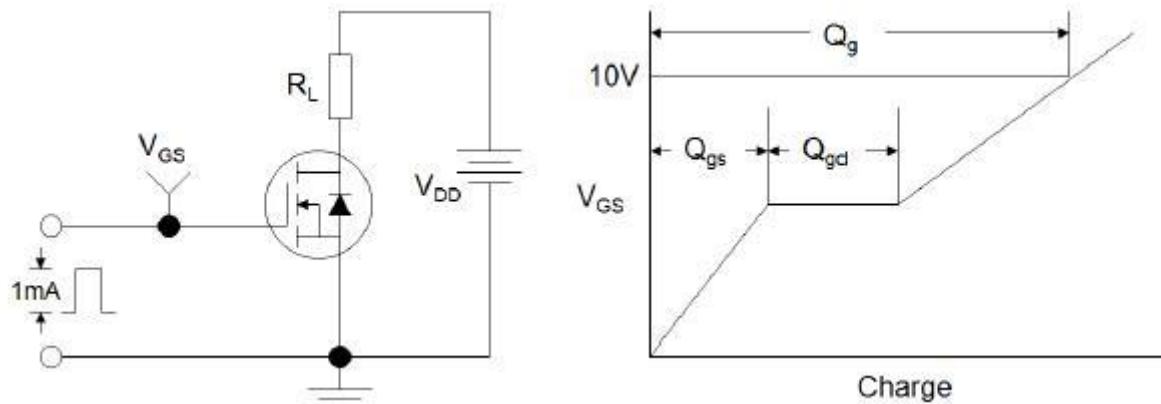


Figure 1: Gate Charge Test Circuit & Waveform

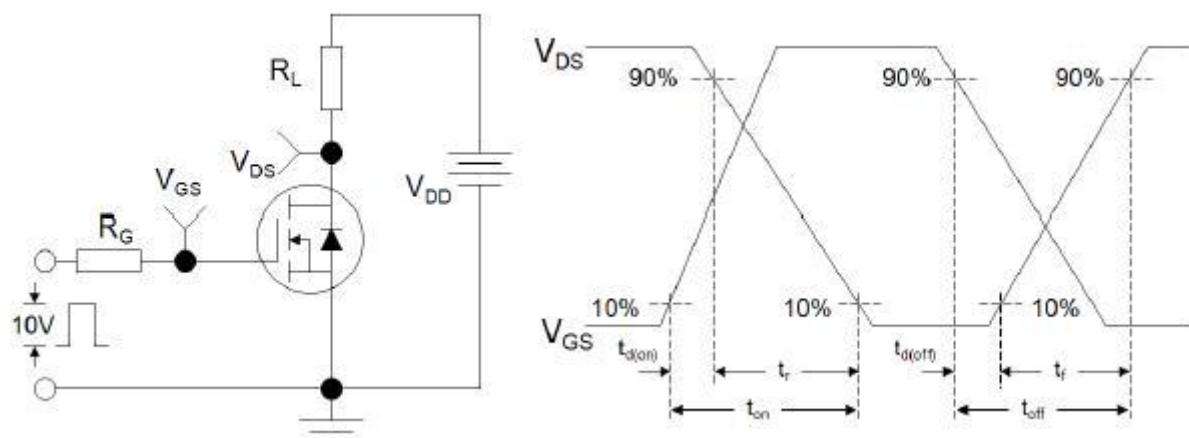


Figure 2: Resistive Switching Test Circuit & Waveforms

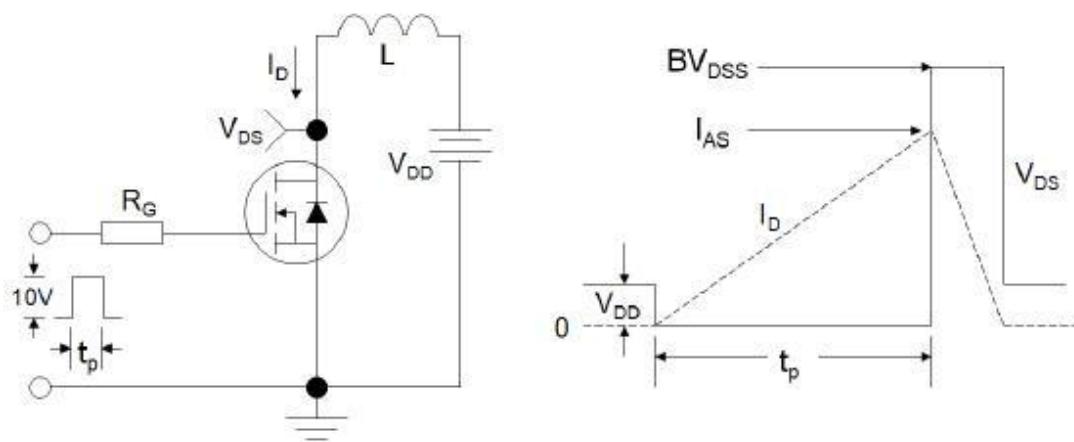
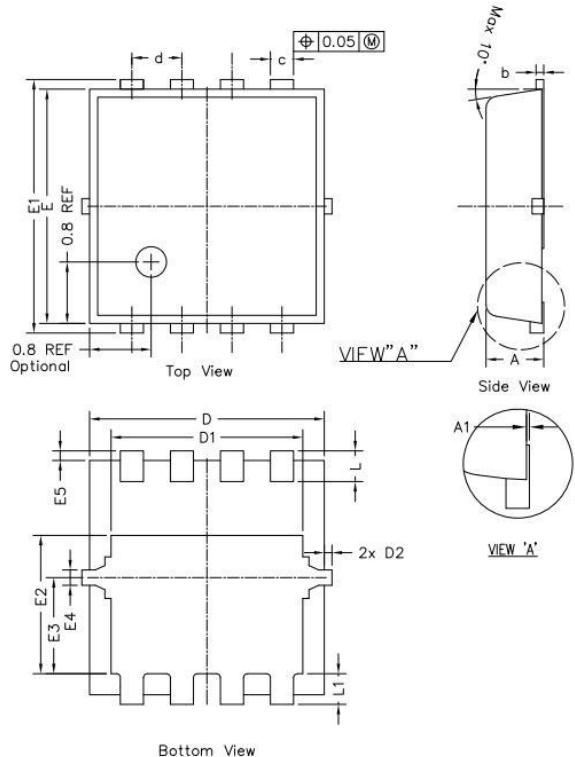


Figure 3: Unclamped Inductive Switching Test Circuit & Waveforms



Package Mechanical Data- PDFN3x3-8L



SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.700	0.750	0.800	0.028	0.030	0.031
A1	---	---	0.050	---	---	0.002
b	0.144	0.152	0.202	0.006	0.006	0.008
c	0.250	0.300	0.350	0.010	0.012	0.014
d	0.65 BSC			0.026 BSC		
D	2.950	3.050	3.150	0.116	0.120	0.124
D1	2.390	2.490	2.590	0.094	0.098	0.102
D2	---	---	0.125	---	---	0.005
E	2.950	3.050	3.150	0.116	0.120	0.124
E1	3.200	3.300	3.400	0.126	0.130	0.134
E2	1.700	1.800	1.900	0.067	0.071	0.075
E3	1.150	1.250	1.350	0.045	0.049	0.053
E4	0.150	0.200	0.250	0.006	0.008	0.010
E5	0.075	0.125	0.175	0.003	0.005	0.007
L	0.300	0.400	0.500	0.01	0.02	0.02
L1	0.300	0.400	0.500	0.01	0.02	0.02

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