



**Description**

**JMT N-channel Enhancement Mode Power MOSFET**

**Features**

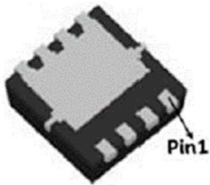
- 20V,60A  
 $R_{DS(ON)} < 4m\Omega @ V_{GS} = 4.5V$   
 $R_{DS(ON)} < 6m\Omega @ V_{GS} = 2.5V$
- Advanced Trench Technology
- Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead free product is acquired

**Application**

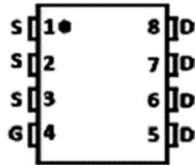
- Load Switch
- PWM Application
- Power management



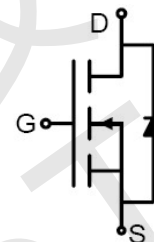
*100% UIS TESTED!*  
*100% ΔVds TESTED!*



PDFN3.3X3.3-8L top view



Marking and pin Assignment



Schematic Diagram

**Package Marking and Ordering Information**

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
JMTQ90N02A	JMTQ90N02A	TAPING	PDF3.3X3.3-8L	13inch	5000	50000

**Absolute Maximum Ratings** ( $T_C=25^\circ C$  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	$T_C = 25^\circ C$	60 A
		$T_C = 100^\circ C$	40 A
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>	240	A
$E_{AS}$	Single Pulsed Avalanche Energy <sup>note2</sup>	100	mJ
$P_D$	Power Dissipation	$T_C = 25^\circ C$	23 W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	5.43	°C/W
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	°C



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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=20V, V_{GS}=0V,$	-	-	1.0	$\mu A$
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 12V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4	0.7	1.1	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note3</small>	$V_{GS}=4.5V, I_D=30A$	-	2.8	4	m $\Omega$
		$V_{GS}=2.5V, I_D=20A$	-	4	6	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=10V, V_{GS}=0V,$ $f = 1.0MHz$	-	2800	-	pF
$C_{oss}$	Output Capacitance		-	353	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	265	-	pF
$Q_g$	Total Gate Charge	$V_{DS}=10V, I_D=20A,$ $V_{GS}=4.5V$	-	32	-	nC
$Q_{gs}$	Gate-Source Charge		-	3	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	11	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=10V,$ $I_D=20A, R_{GEN}=3\Omega,$ $V_{GS}=4.5V$	-	17	-	ns
$t_r$	Turn-on Rise Time		-	49	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	74	-	ns
$t_f$	Turn-off Fall Time		-	26	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	60	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	240	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS} = 0V, I_S=30A$	-	-	1.2	V

- Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature  
 2. EAS condition:  $T_J=25^\circ\text{C}$ ,  $V_{DD}=10V$ ,  $V_G=4.5V$ ,  $L=0.5mH$ ,  $R_G=25\Omega$ ,  $I_{AS}=20A$   
 3. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 0.5\%$



Test Circuit

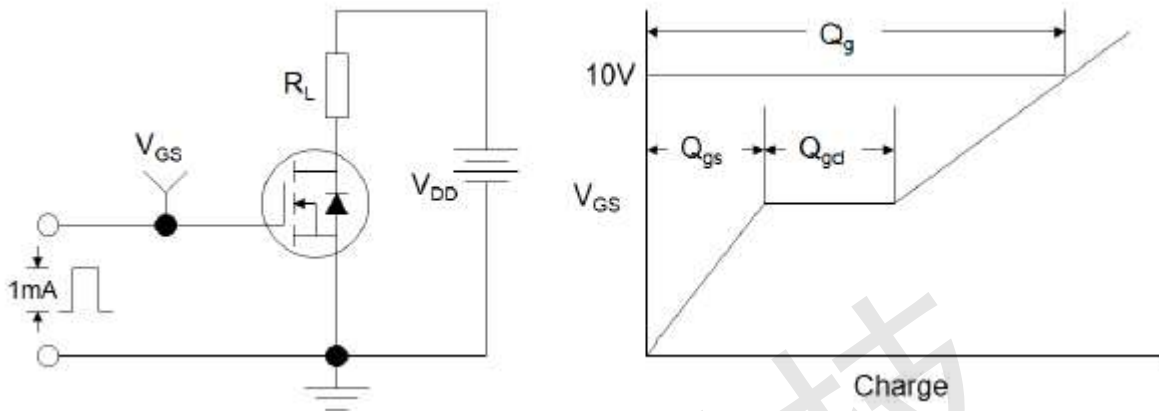


Figure1:Gate Charge Test Circuit & Waveform

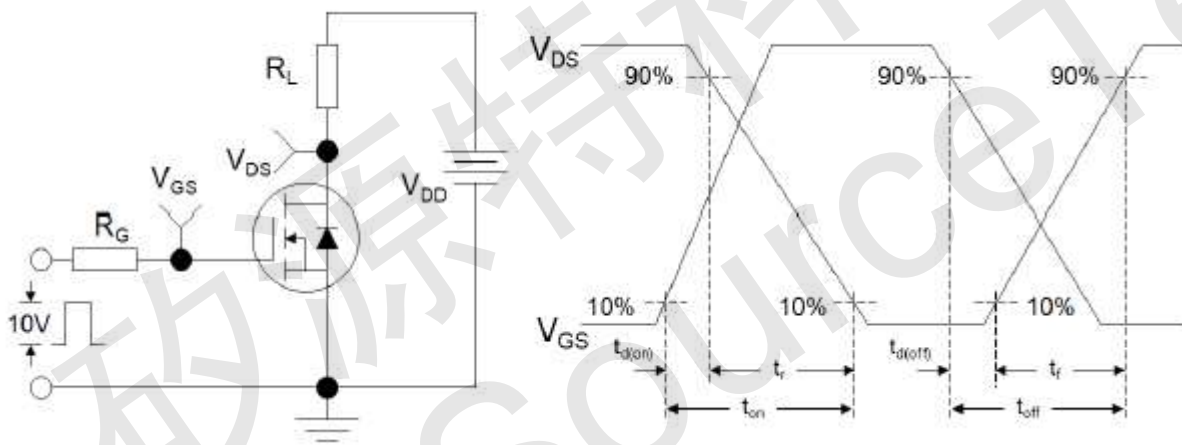


Figure 2: Resistive Switching Test Circuit & Waveforms

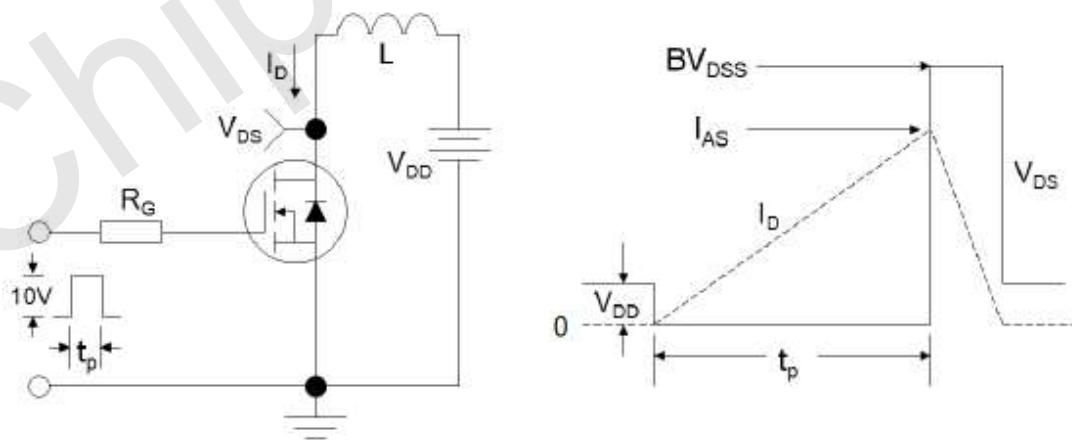
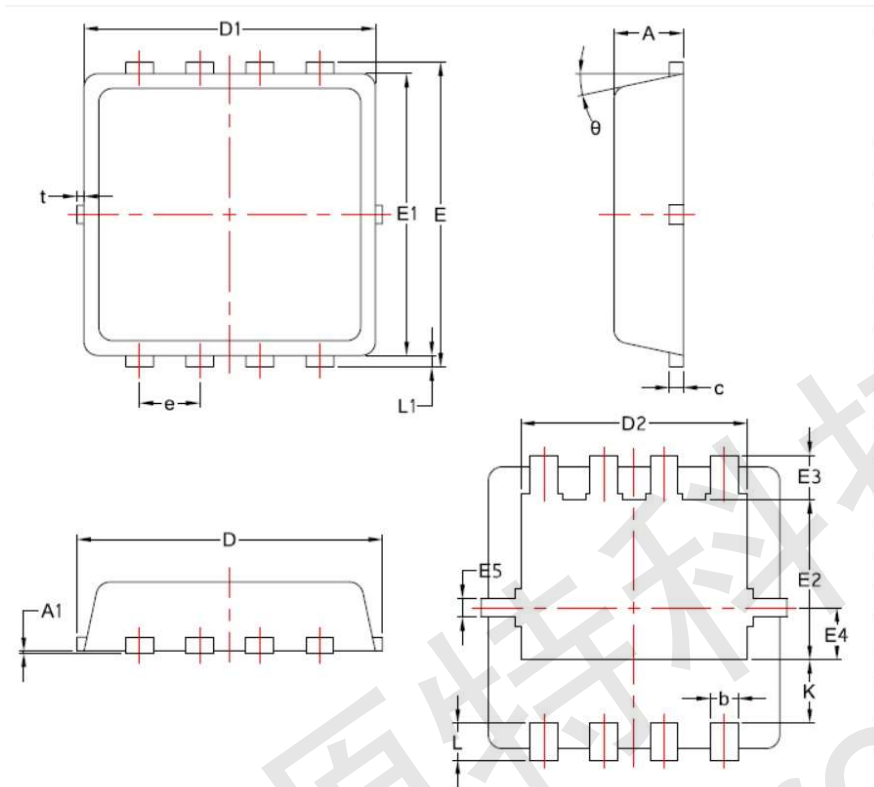


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



Package Mechanical Data



SYMBOL	COMMON		
	MM		
	MIN	NOM	MAX
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.59	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0	0.075	0.13
θ	10°	12°	14°

