



# JMTG90N02A

## Description

### JMT N-channel Enhancement Mode Power MOSFET

#### Features

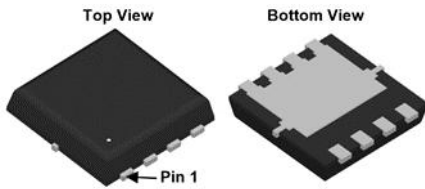
- 20V, 75A  
 $R_{DS(ON)} < 4.5m\Omega @ V_{GS} = 4.5V$   
 $R_{DS(ON)} < 6.5m\Omega @ V_{GS} = 2.5V$
- Lead free and Green Device Available
- Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead free product is acquired

#### Application

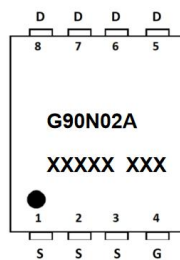
- Load Switch
- PWM Application
- Power management



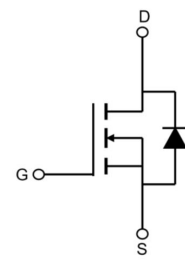
*100% UIS TESTED!*  
*100% ΔVds TESTED!*



PDFN5X6-8L



Marking and pin Assignment



Schematic Diagram

## Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
JMTG90N02A	JMTG90N02A	TAPING	PDFN5X6-8L	13inch	2500	25000

## 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	$\pm 12$	V
$I_D$	Continuous Drain Current	$T_C = 25^\circ C$	75
		$T_C = 100^\circ C$	49
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>	300	A
$E_{AS}$	Single Pulsed Avalanche Energy <sup>note2</sup>	90	mJ
$P_D$	Power Dissipation	$T_C = 25^\circ C$	38
$R_{\theta JC}$	Thermal Resistance, Junction to Ambient	3.3	$^\circ C/W$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^\circ C$



## Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V	-	-	1	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>GS</sub> = ±12V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.4	-	1.0	V
R <sub>DS(on)</sub>	Static Drain-Source On-Resistance <small>note3</small>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =30A	-	3	4.5	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =20A	-	4.3	6.5	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1.0MHz	-	3200	-	pF
C <sub>oss</sub>	Output Capacitance		-	460	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	445	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, I <sub>D</sub> =30A, V <sub>GS</sub> =4.5V	-	48	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	3.6	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	19	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DS</sub> =10V, I <sub>D</sub> =30A, R <sub>G</sub> =1.8Ω, V <sub>GS</sub> =4.5V	-	9.7	-	ns
t <sub>r</sub>	Turn-On Rise Time		-	37	-	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		-	63	-	ns
t <sub>f</sub>	Turn-Off Fall Time		-	52	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	75	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	300	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>SD</sub> =30A, T <sub>J</sub> =25°C	-	-	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	T <sub>J</sub> =25°C, I <sub>F</sub> =30A, di/dt =100A/μs	-	23	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	10	-	nC

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

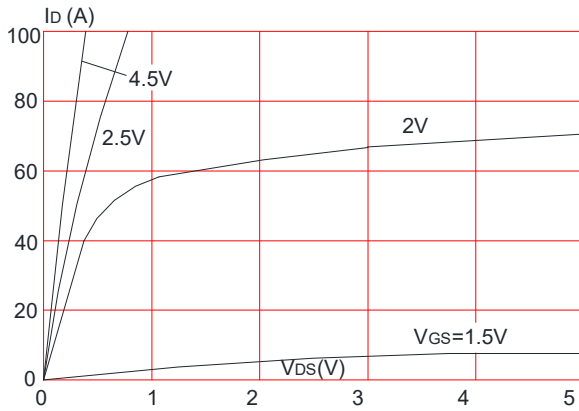
2. EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=15V, V<sub>G</sub>=4.5V, R<sub>G</sub>=25Ω, L=0.5mH, I<sub>AS</sub>=19A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

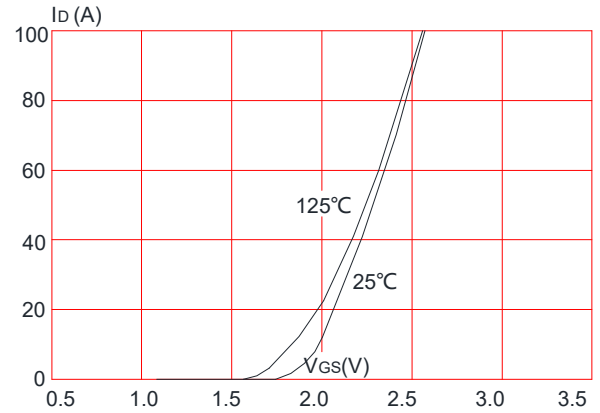


## Typical Performance Characteristics

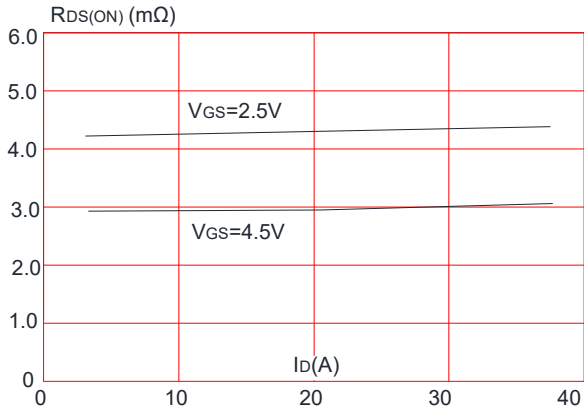
**Figure 1:** Output Characteristics



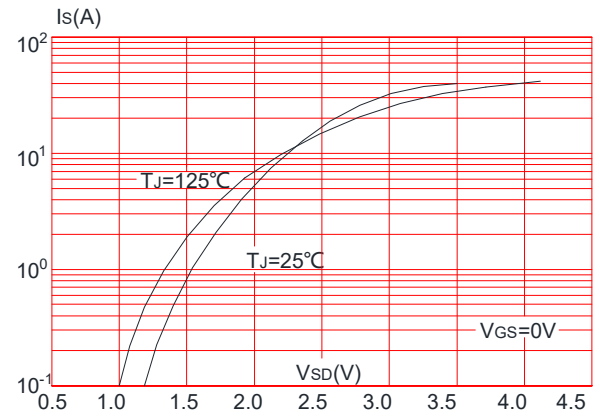
**Figure 2:** Typical Transfer Characteristics



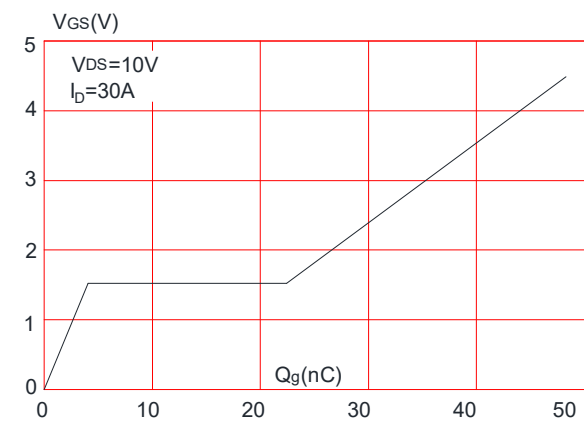
**Figure 3:** On-resistance vs. Drain Current



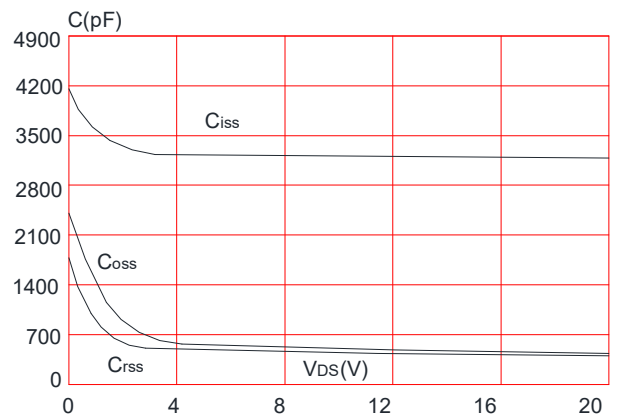
**Figure 4:** Body Diode Characteristics



**Figure 5:** Gate Charge Characteristics

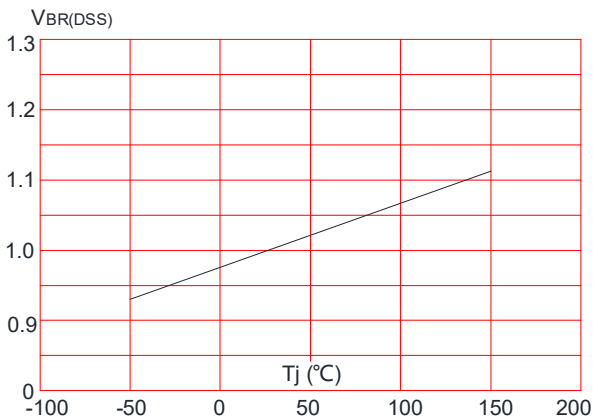


**Figure 6:** Capacitance Characteristics

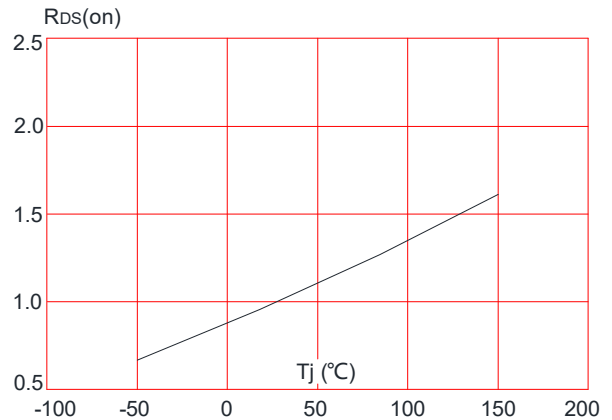




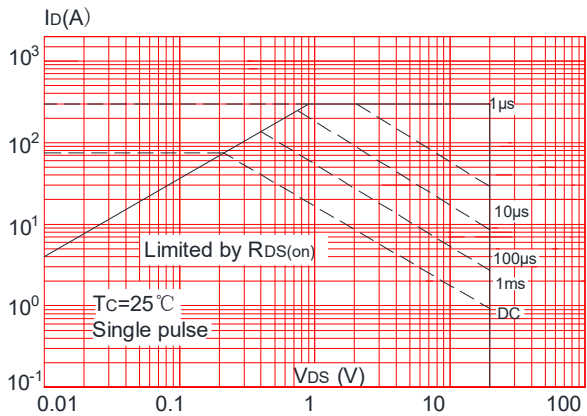
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



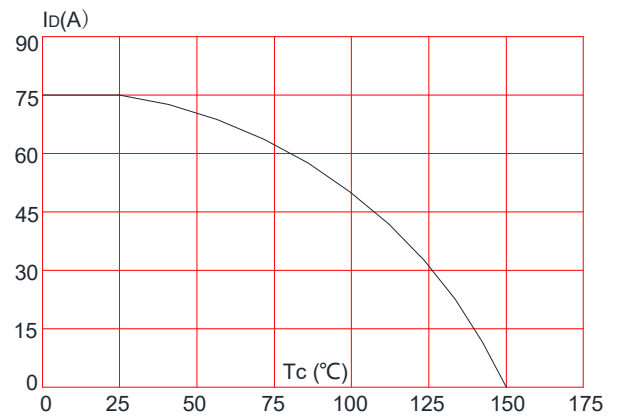
**Figure 8:** Normalized on Resistance vs. Junction Temperature



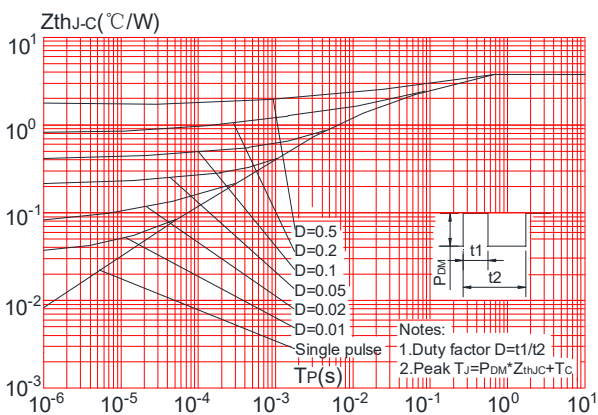
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature



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



## Test Circuit

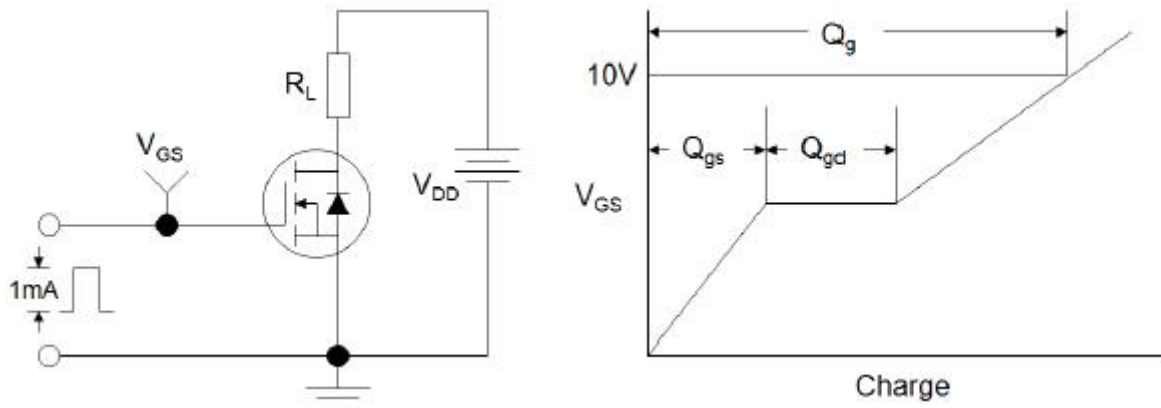


Figure1:Gate Charge Test Circuit & Waveform

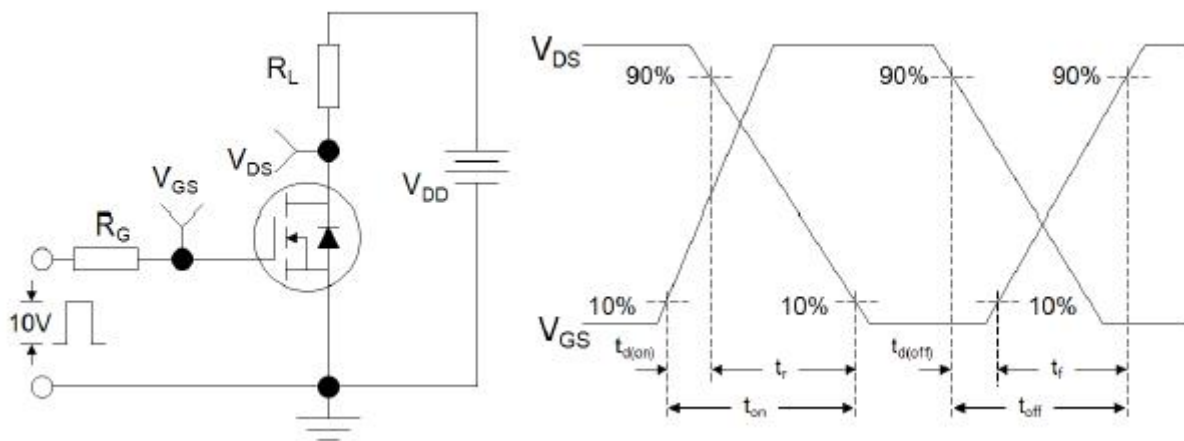


Figure 2: Resistive Switching Test Circuit & Waveforms

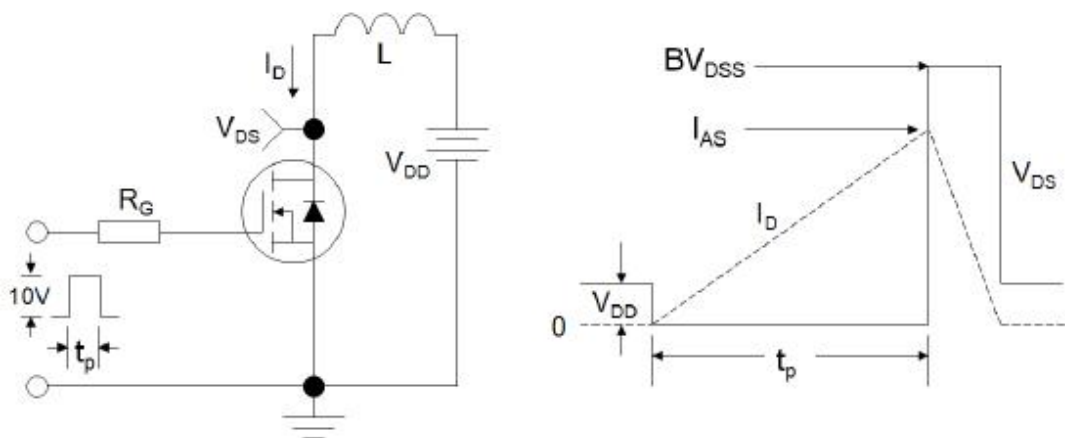
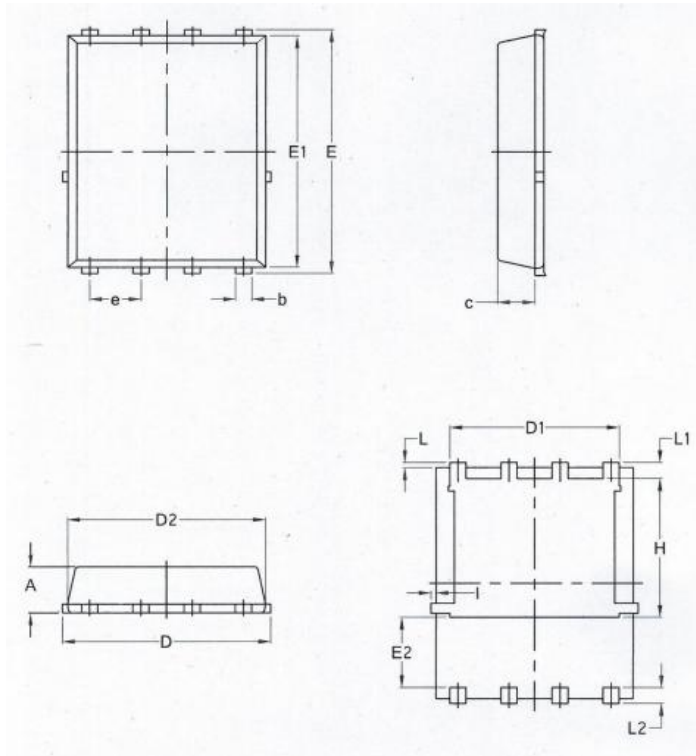


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



## Package Mechanical Data-PDFN5X6-8L



SYMBOL	COMMON			
	MM		INCH	
	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
I	—	0.18	—	0.0070

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