



## Description

### JMT P-channel Enhancement Mode Power MOSFET

#### Features

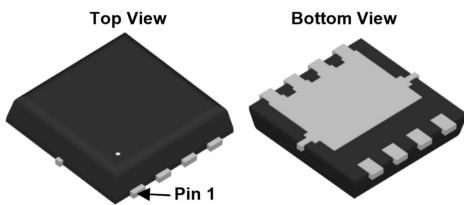
- $V_{DS}=-20V$ ,  $I_D=-55A$   
 $R_{DS(ON)} < 8.3m\Omega$  @  $V_{GS} = -4.5V$   
 $R_{DS(ON)} < 10.4m\Omega$  @  $V_{GS} = -2.5V$
- High Power and Current Handling Capability
- Lead Free Product is Acquired
- Surface Mount Package

#### Application

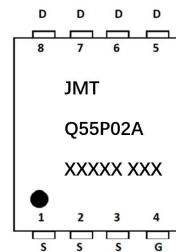
- PWM Applications
- Load Switch



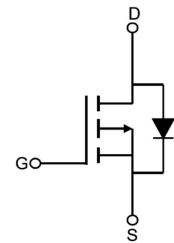
*100% UIS TESTED!*  
*100% ΔVds TESTED!*



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)
JMTQ55P02A	JMTQ55P02A	TAPING	PDFN3x3-8L	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	$\pm 12$	V
$I_D$	Continuous Drain Current	$T_C = 25^\circ C$	-55
		$T_C = 100^\circ C$	-35
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>	-220	A
$E_{AS}$	Single Pulsed Avalanche Energy <sup>note2</sup>	90	mJ
$P_D$	Power Dissipation	$T_C = 25^\circ C$	66
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.9	$^\circ C/W$
$T_J, T_{STG}$	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>DS</sub> =0V, V <sub>GS</sub> = ±12V	-	-	±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	-0.65	-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> =-15A	-	6.6	8.3	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-12A	-	8	10.4	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, f = 1.0MHz	-	4770	-	pF
C <sub>oss</sub>	Output Capacitance		-	570	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	502	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-10V, I <sub>D</sub> =-15A, V <sub>GS</sub> =-4.5V	-	56	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	8	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	16	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =-10V, I <sub>D</sub> =-13A, R <sub>GEN</sub> =2.7Ω, V <sub>GS</sub> =-10V	-	11	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	110	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	157	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	160	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	-55	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-220	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> = 0V, I <sub>S</sub> =-30A	-	-	-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	T <sub>J</sub> =25°C, I <sub>S</sub> =-15A,	-	23	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=-100A/μs	-	14	-	nC

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

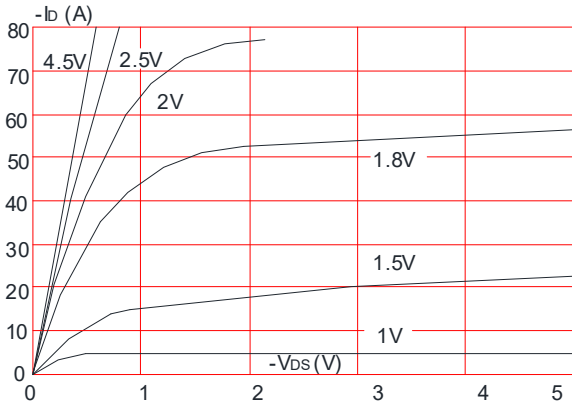
2. EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=-10V, V<sub>G</sub>=-10V, R<sub>G</sub>=25Ω, L=0.5mH, I<sub>AS</sub>=-19A

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

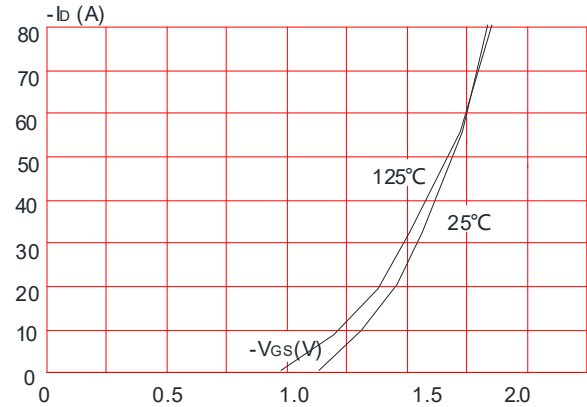


## Typical Performance Characteristics

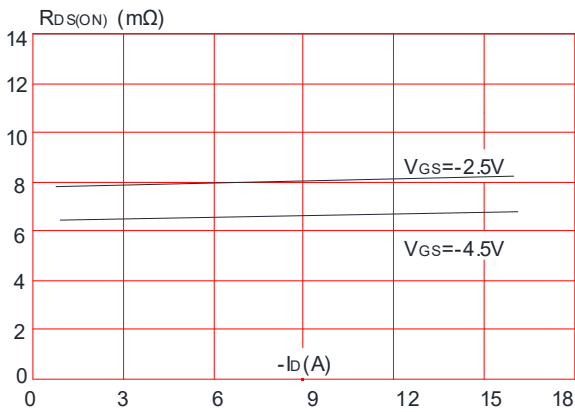
**Figure 1: Output Characteristics**



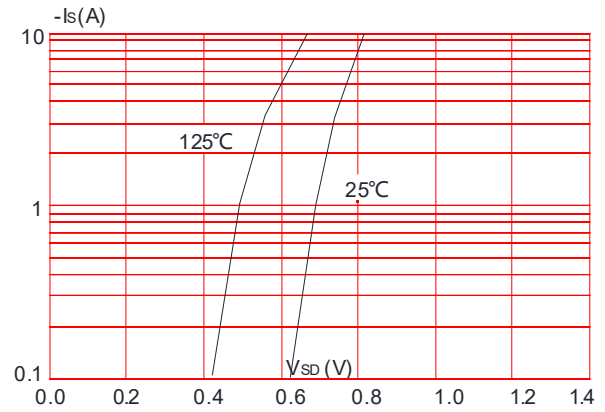
**Figure 2: Typical Transfer Characteristics**



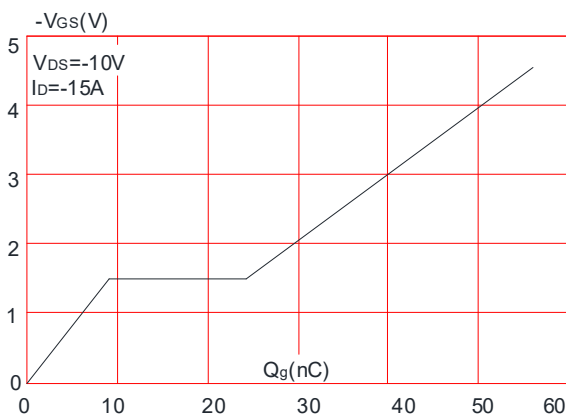
**Figure 3: On-resistance vs. Drain Current**



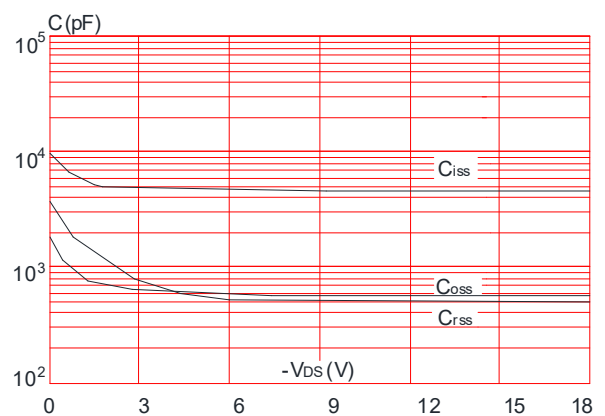
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**

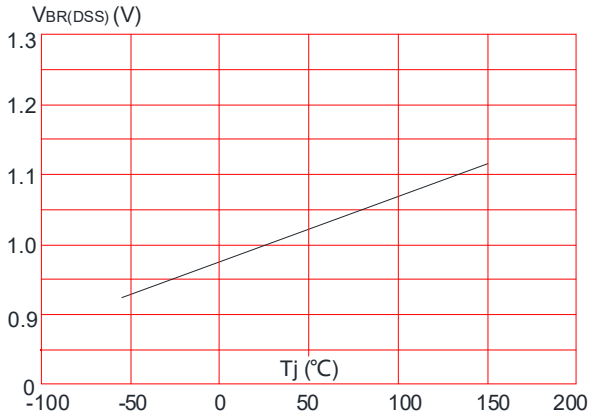


**Figure 6: Capacitance Characteristics**

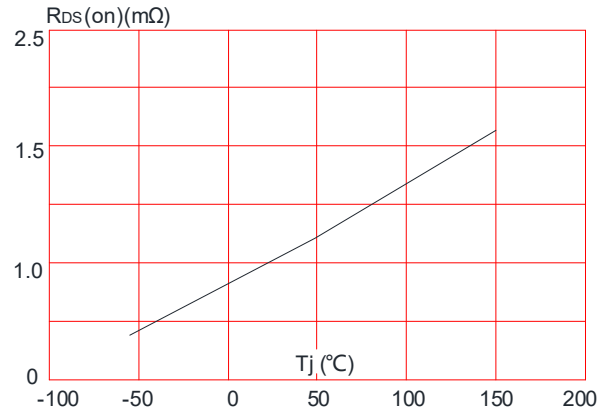




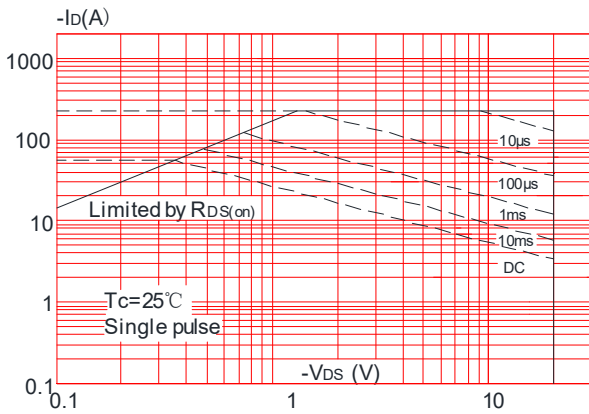
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



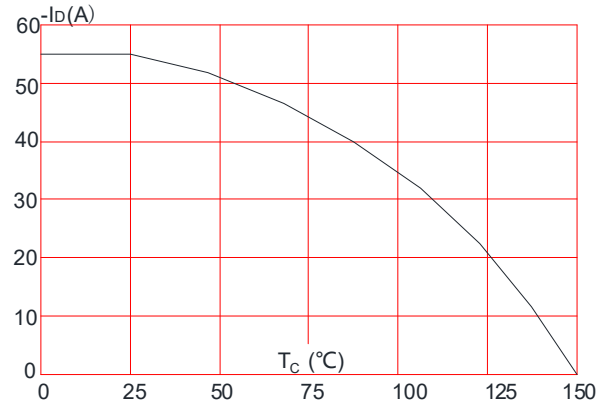
**Figure 8: Normalized on Resistance vs. Junction Temperature**



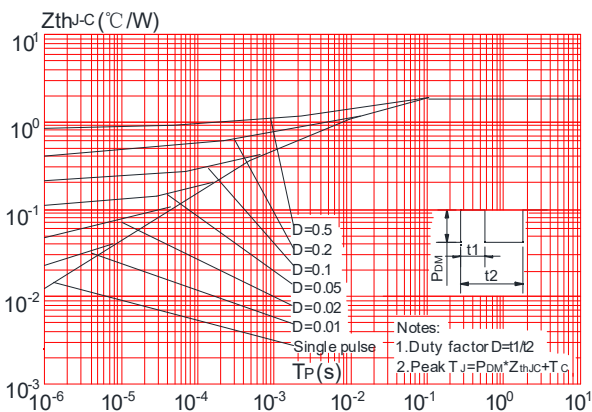
**Figure 9: Maximum Safe Operating Area**



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

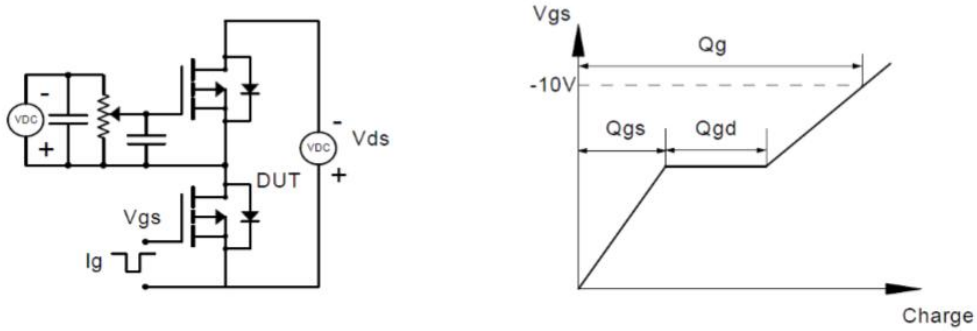


**Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case**

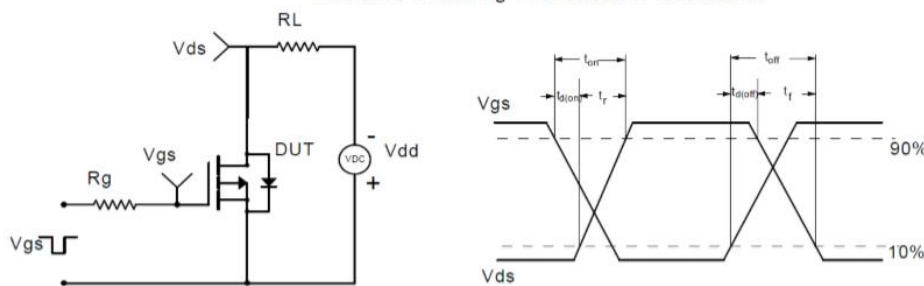


## Test Circuit

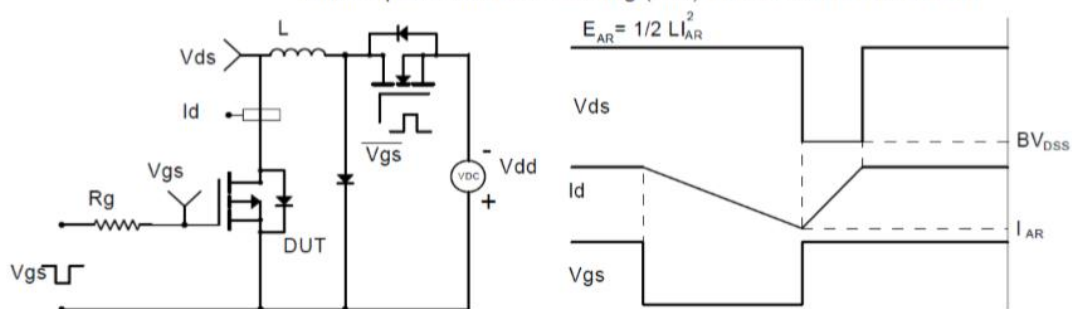
Gate Charge Test Circuit & Waveform



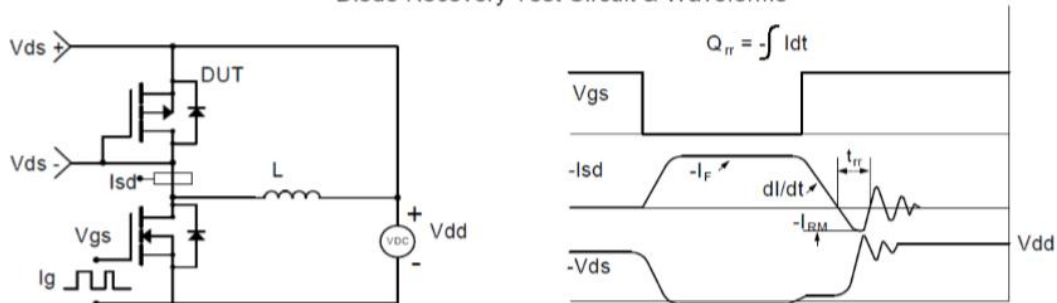
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

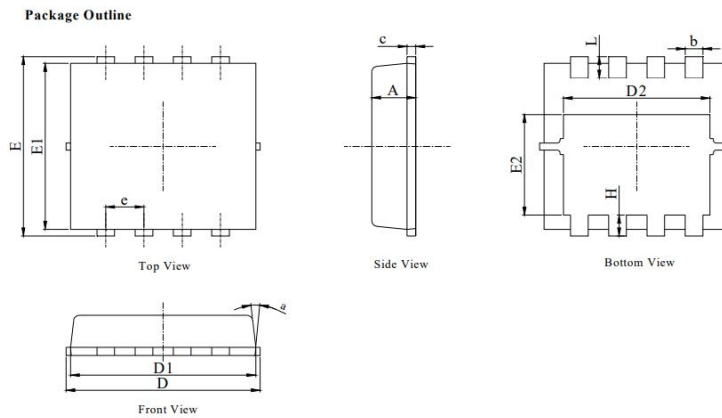


Diode Recovery Test Circuit & Waveforms





## Package Mechanical Data-PDFN3x3-8L

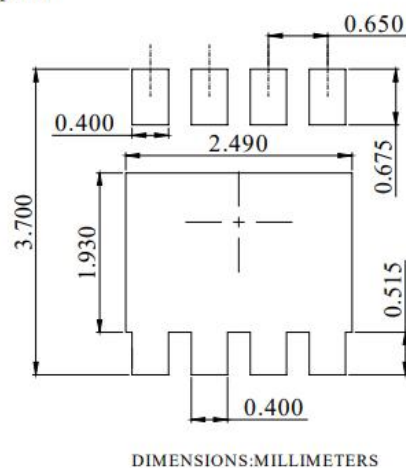


### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. ALL DIMNESIONS IN MILLIMETER (ANNGLE IN DEGREE).
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.20	0.25
D	3.00	3.15	3.25
D1	2.95	3.05	3.15
D2	2.39	2.49	2.59
E	3.20	3.30	3.40
E1	2.95	3.05	3.15
E2	1.70	1.80	1.90
e	0.65 BSC		
H	0.30	0.40	0.50
L	0.25	0.40	0.50
a	---	---	15°

### Recommended Soldering Footprint





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