



## Description

### JMT P-channel Enhancement Mode Power MOSFET

#### Features

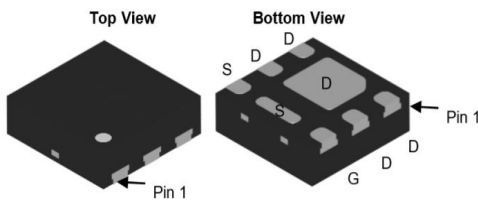
- -20V, -10A  
 $R_{DS(ON)} < 19.2m\Omega @ V_{GS} = -4.5V$   
 $R_{DS(ON)} < 27.8m\Omega @ V_{GS} = -2.5V$
- Advanced Trench Technology
- Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead Free

#### Application

- Load Switch
- PWM Application
- Power Management



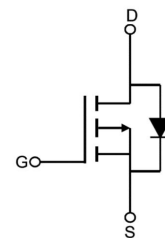
*100% UIS TESTED!*



DFN2020-6L top view



Marking and pin Assignment



Schematic Diagram

## Package Marking and Ordering Information

Device Marking	Device	Outline	Package	Reel Size	Reel (pcs)	Per Carton (pcs)
250P02A	JMTV250P02A	TAPING	DFN2020-6L	7"	3000	120000

## Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ 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	$T_C = 25^\circ\text{C}$	-10
		$T_C = 100^\circ\text{C}$	-6.5
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>	-40	A
$E_{AS}$	Single Pulsed Avalanche Energy <sup>note2</sup>	25	mJ
$P_D$	Power Dissipation	$T_C = 25^\circ\text{C}$	13
$R_{\theta JC}$	Thermal Resistance, Junction to Case	9.3	$^\circ\text{C/W}$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$



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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristics</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	-0.7	-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> = -7A	-	15.3	19.2	mΩ
		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -4A	-	21.4	27.8	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = -10V, V <sub>GS</sub> =0V, f=1.0MHz	-	1200	-	pF
C <sub>oss</sub>	Output Capacitance		-	191	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	168	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DD</sub> = -10V, I <sub>D</sub> = -5A, V <sub>GS</sub> = -4.5V	-	14	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	2.5	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	3	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> = -10V, I <sub>D</sub> = -5A, V <sub>GS</sub> = -4.5V, R <sub>GEN</sub> =10Ω	-	13	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	52	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	103	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	81	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	-10	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-40	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> = -10A	-	-	-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> = -3A,	-	11	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=100A/μs	-	4	-	nC

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

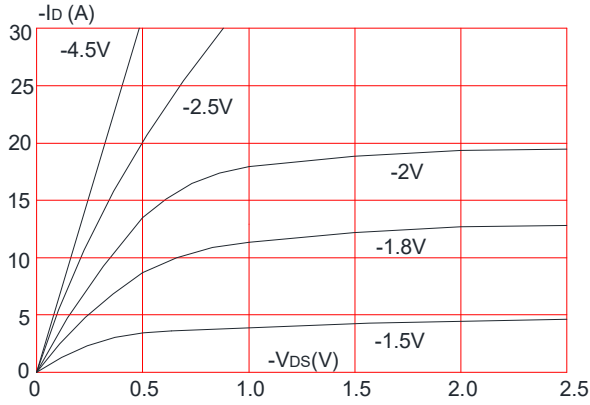
2. E<sub>AS</sub> condition: Starting T<sub>J</sub>=25°C, V<sub>DD</sub>= -10V, V<sub>GS</sub>= -4.5V, R<sub>g</sub>=25Ω, L=0.5mH, I<sub>AS</sub>= -10A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

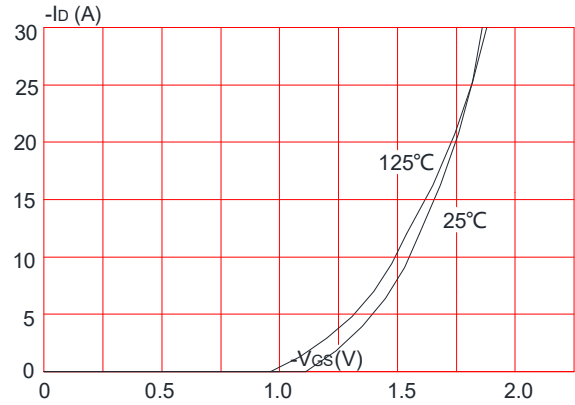


## Typical Performance Characteristics

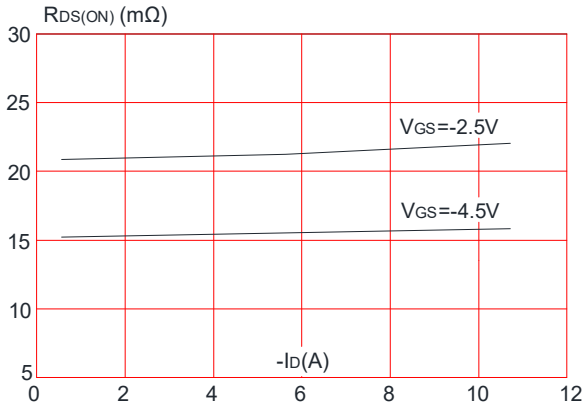
**Figure 1: Output Characteristics**



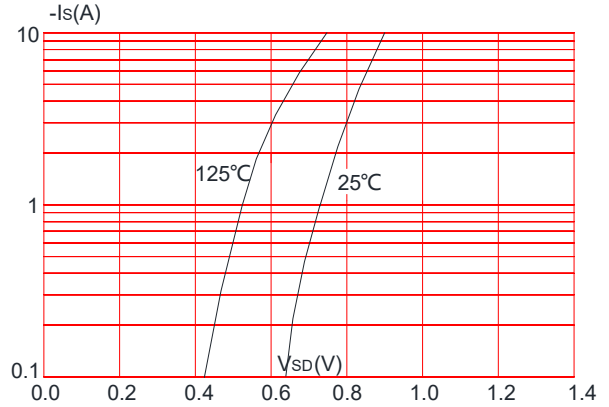
**Figure 2: Typical Transfer Characteristics**



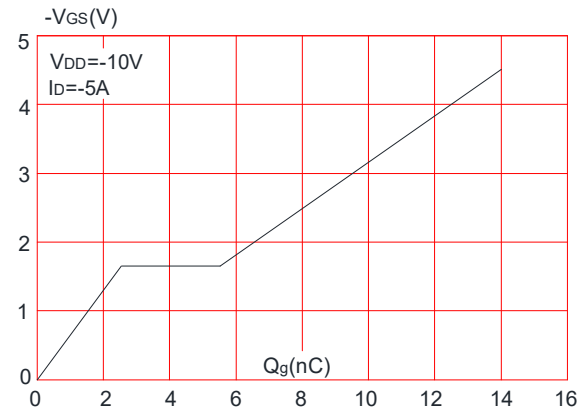
**Figure 3: On-resistance vs. Drain Current**



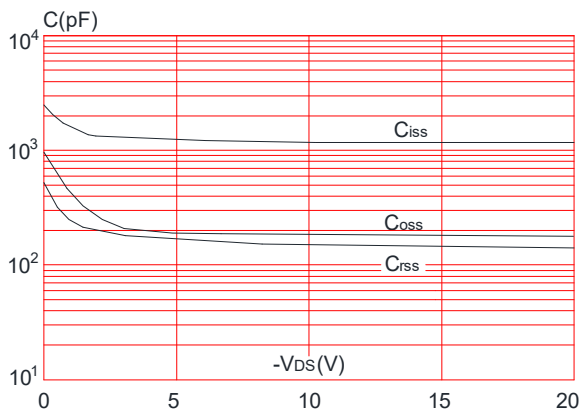
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**



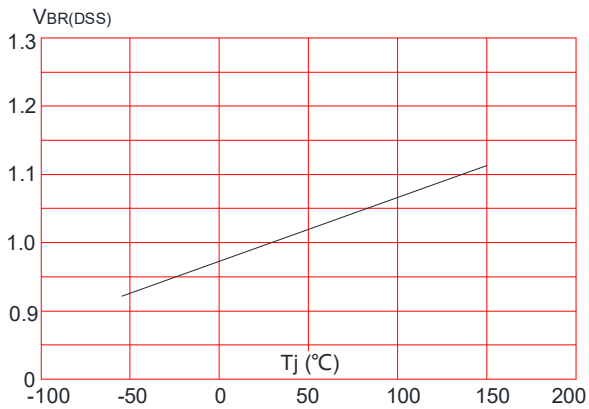
**Figure 6: Capacitance Characteristics**



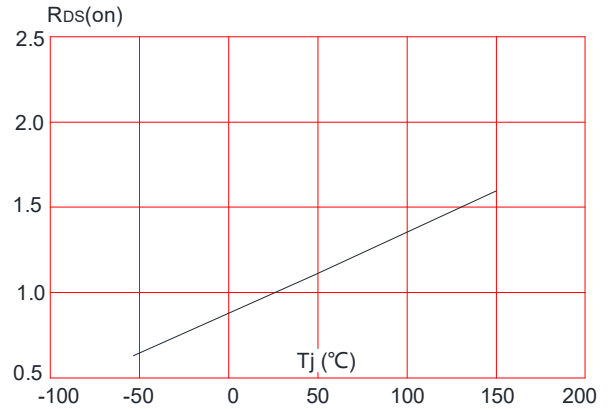


# JMTV250P02A

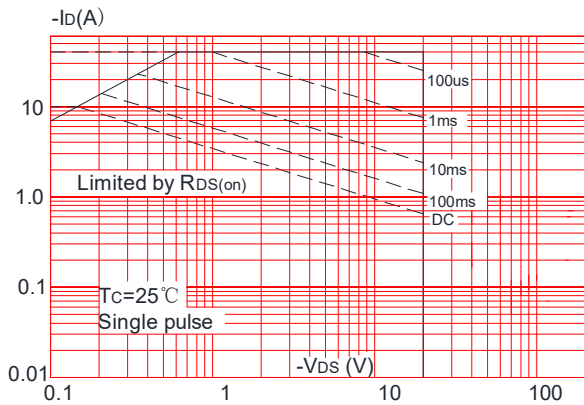
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



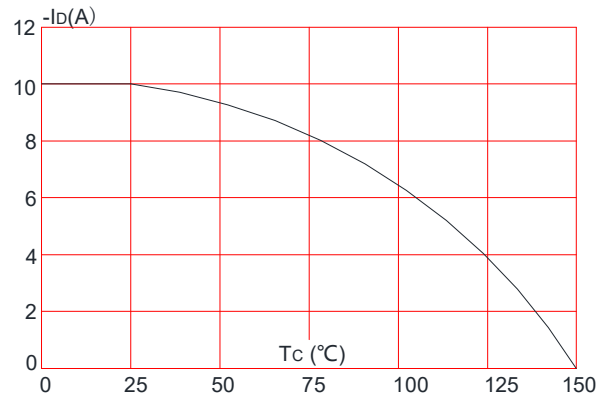
**Figure 8: Normalized on Resistance vs. Junction Temperature**



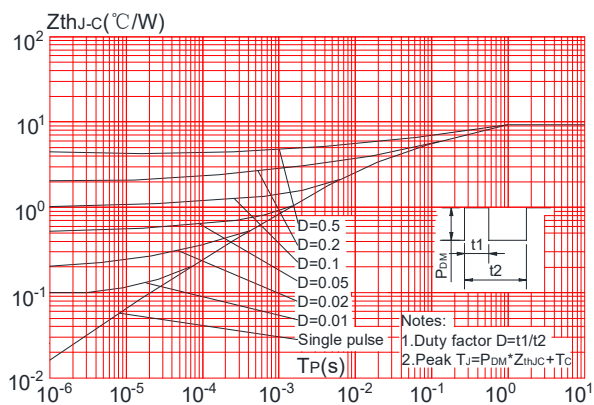
**Figure 9: Maximum Safe Operating Area**



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

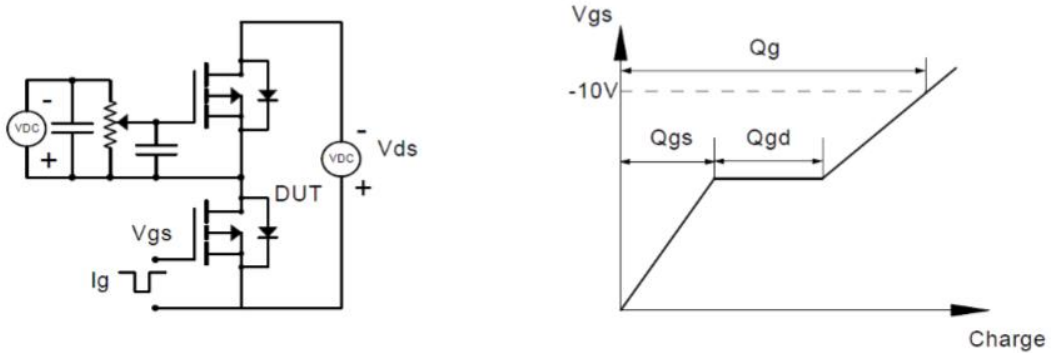


**Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case**

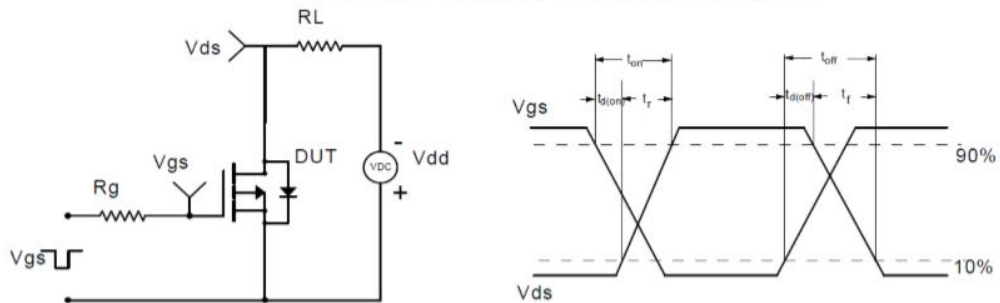


## Test Circuit

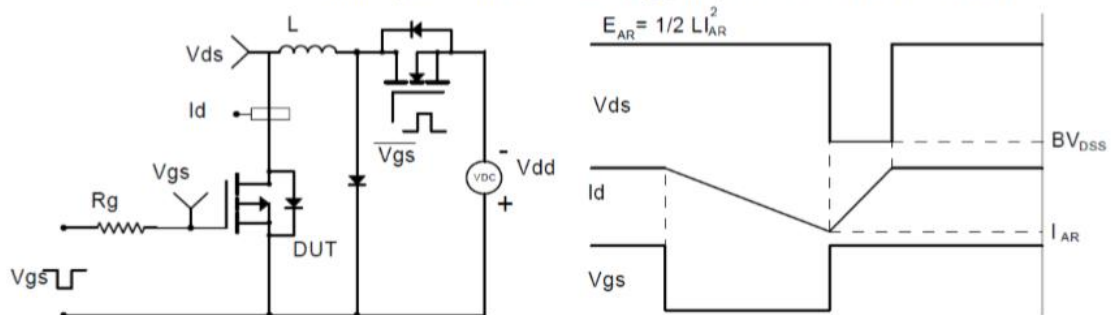
### Gate Charge Test Circuit & Waveform



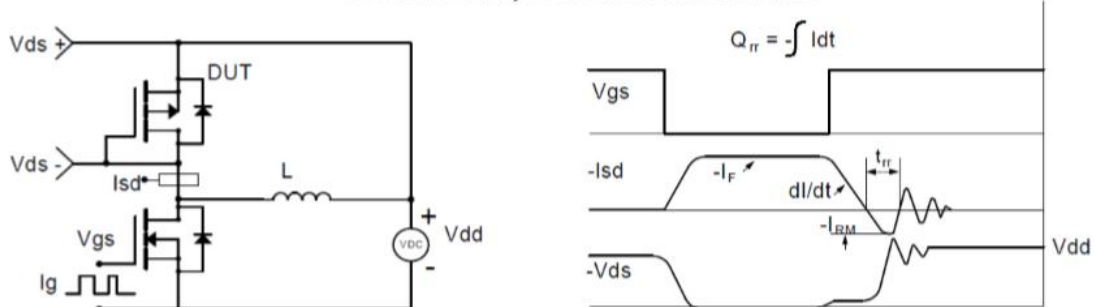
### Resistive Switching Test Circuit & Waveforms



### Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

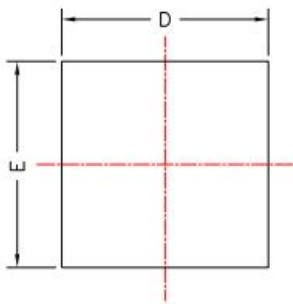


### Diode Recovery Test Circuit & Waveforms

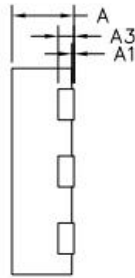




## Package Mechanical Data-DFN2020-6L



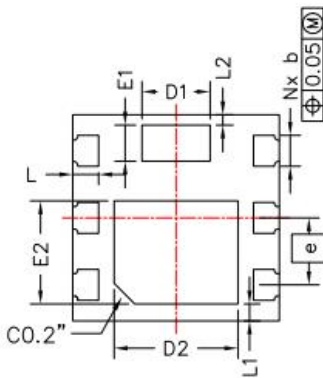
Top View



Side View



Bottom View



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
A3	0.195	0.203	0.211	0.008	0.008	0.008
b	0.250	0.300	0.350	0.010	0.012	0.014
e	0.65BSC			0.026 BSC		
D	1.900	2.000	2.100	0.075	0.079	0.083
E	1.900	2.000	2.100	0.075	0.079	0.083
D1	0.560	0.660	0.760	0.022	0.026	0.030
E1	0.250	0.350	0.450	0.010	0.014	0.018
D2	1.100	1.200	1.300	0.043	0.047	0.051
E2	0.900	1.000	1.100	0.035	0.039	0.043
L	0.150	0.250	0.350	0.006	0.010	0.014
L1	0.065	0.165	0.265	0.003	0.006	0.010
L2	0.000	0.100	0.200	0.000	0.004	0.008

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