



## Description

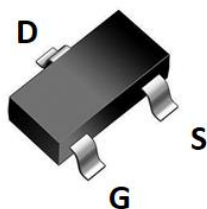
### JMT P-channel Enhancement Mode Power MOSFET

#### Features

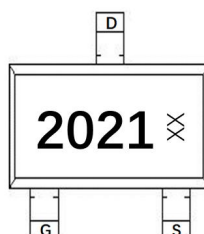
- 20V, -7A  
 $R_{DS(ON)} < 24.5\text{m}\Omega @ V_{GS} = -4.5\text{V}$   
 $R_{DS(ON)} < 32\text{m}\Omega @ V_{GS} = -2.5\text{V}$
- Advanced Trench Technology
- Provide Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead free product is acquired

#### Application

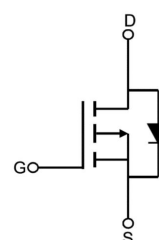
- Load Switch
- PWM Application
- Power management



SOT-23-3L 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)
2021	JMTJ210P02A	TAPING	SOT-23-3L	7inch	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	$T_A = 25^\circ\text{C}$	-7	A
		$T_A = 100^\circ\text{C}$	-4.6	A
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>	-28	A	
$P_D$	Power Dissipation	2	W	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62.5	$^\circ\text{C/W}$	
$T_J, T_{STG}$	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
<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	$\mu A$
$I_{GSS}$	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	-1.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note2</small>	$V_{GS} = -4.5V, I_D = -7A$	-	18.7	24.5	m $\Omega$
		$V_{GS} = -2.5V, I_D = -5A$	-	22.7	32	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS} = -10V, V_{GS}=0V,$ $f=1.0MHz$	-	2000	-	pF
$C_{oss}$	Output Capacitance		-	242	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	231	-	pF
$Q_g$	Total Gate Charge	$V_{DS} = -10V, I_D = -3A,$ $V_{GS} = -4.5V$	-	15.3	-	nC
$Q_{gs}$	Gate-Source Charge		-	2.2	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	4.4	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = -10V, I_D = -7A,$ $V_{GS} = -4.5V,$ $R_{GEN}=2.5\Omega$	-	10	-	ns
$t_r$	Turn-on Rise Time		-	31	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	28	-	ns
$t_f$	Turn-off Fall Time		-	8	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	-7	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-28	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S = -7A$	-	-0.8	-1.2	V

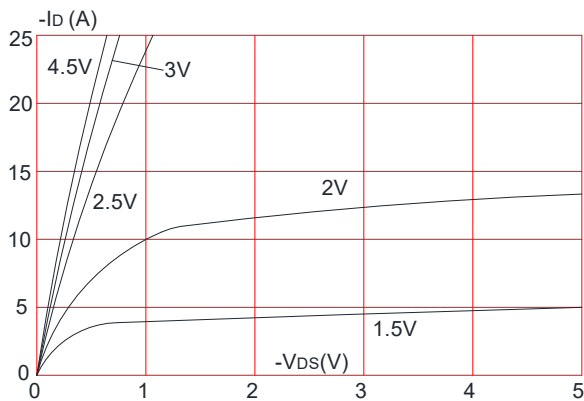
Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$

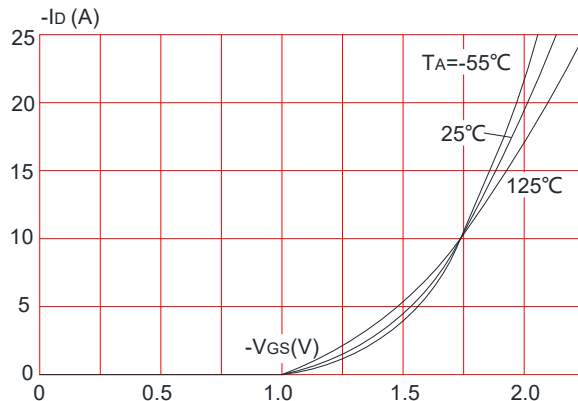


## Typical Performance Characteristics

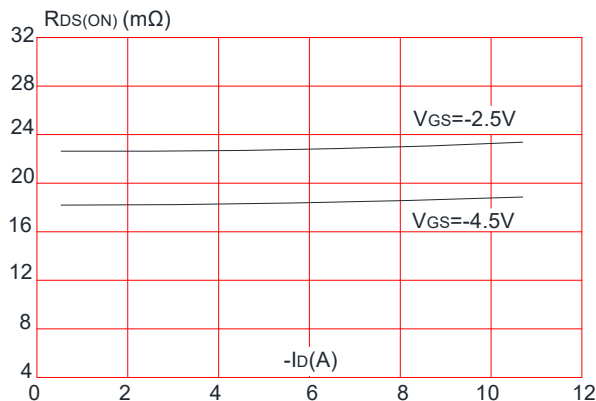
### Figure 1: Output Characteristics



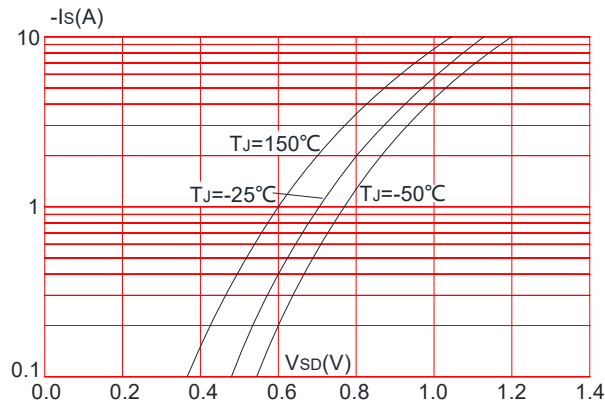
### Figure 2: Typical Transfer Characteristics



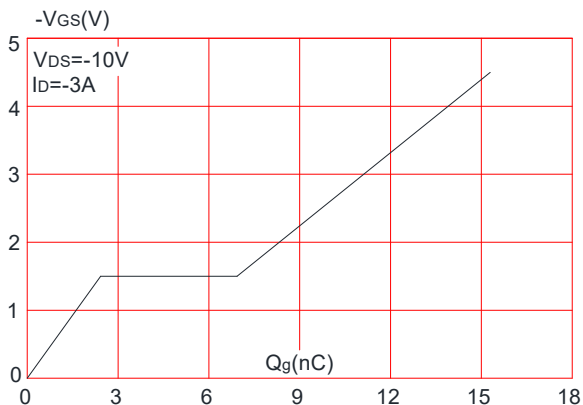
### Figure 3: On-resistance vs. Drain Current



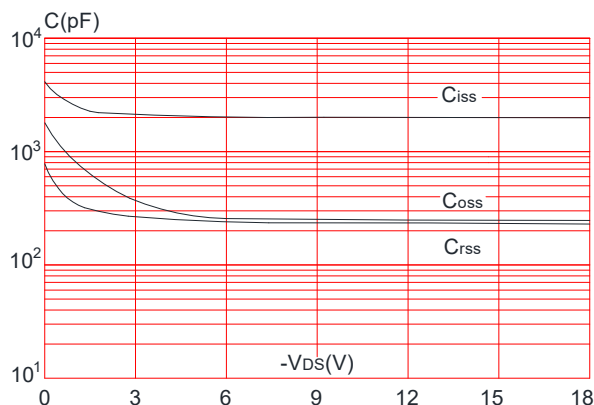
### Figure 4: Body Diode Characteristics



### Figure 5: Gate Charge Characteristics



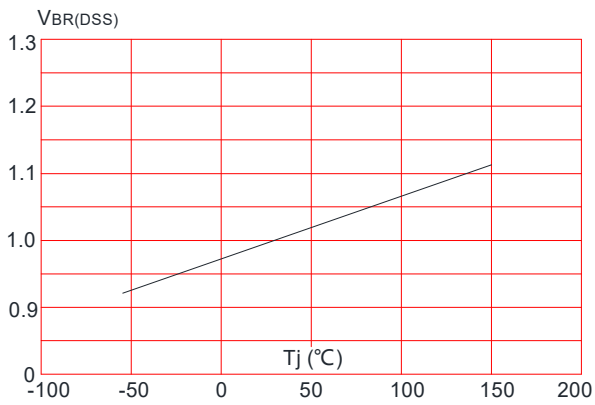
### Figure 6: Capacitance Characteristics



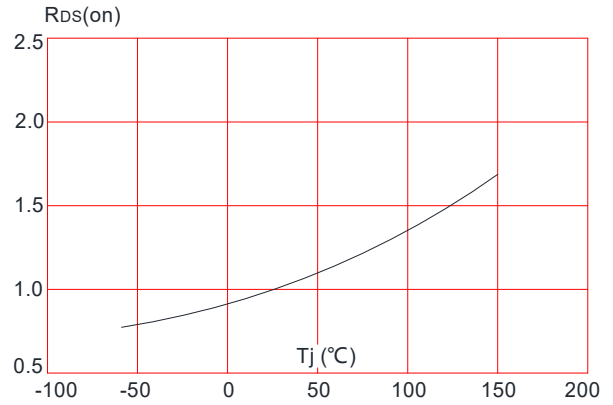


# JMTJ210P02A

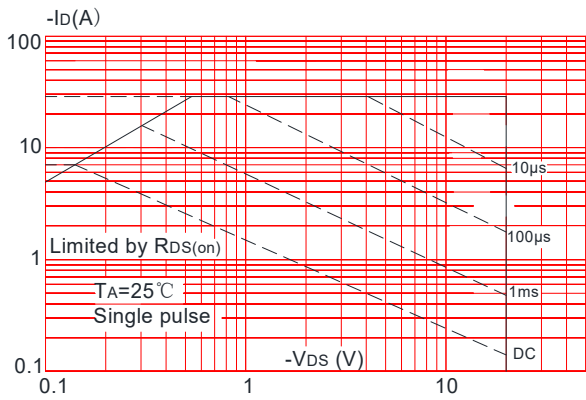
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



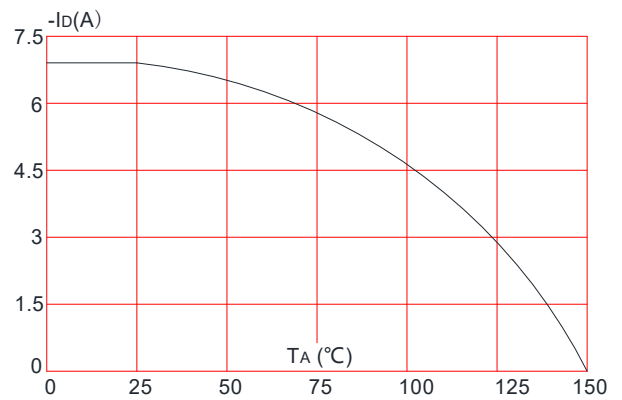
**Figure 8:** Normalized on Resistance vs. Junction Temperature



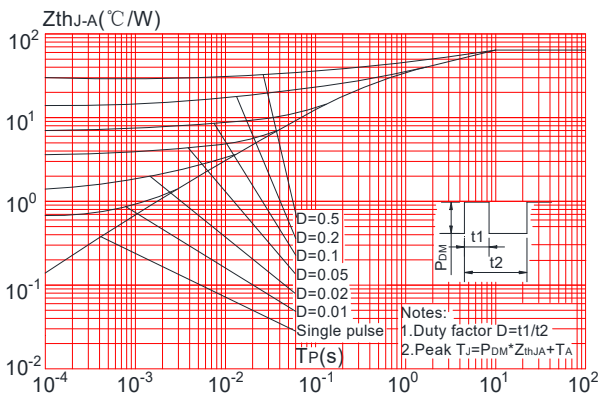
**Figure 9:** Maximum Safe Operating Area



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

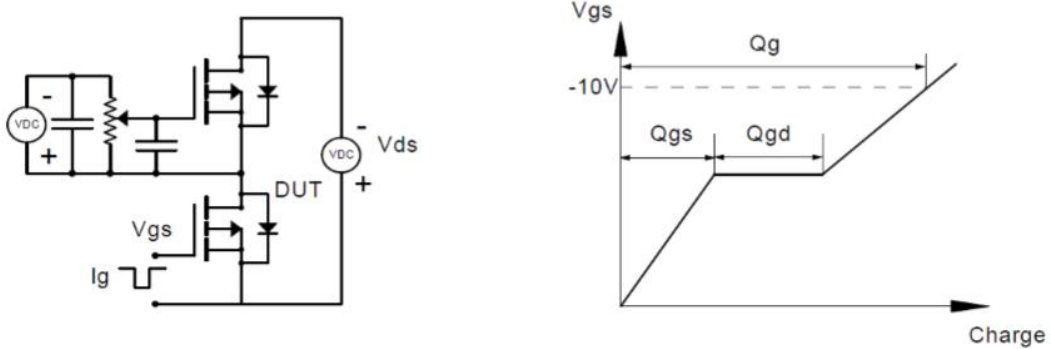


**Figure 11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

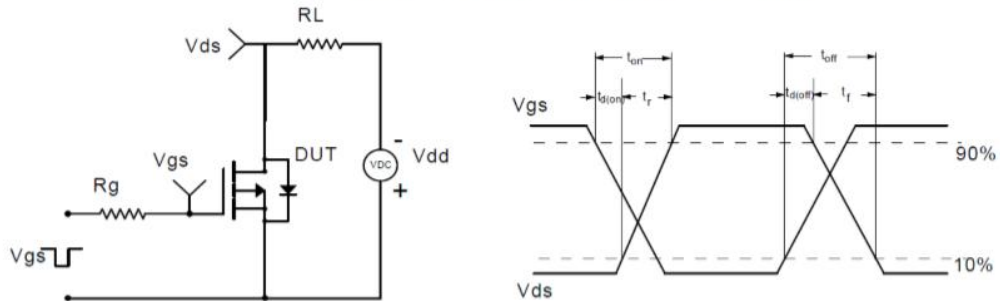


## Test Circuit

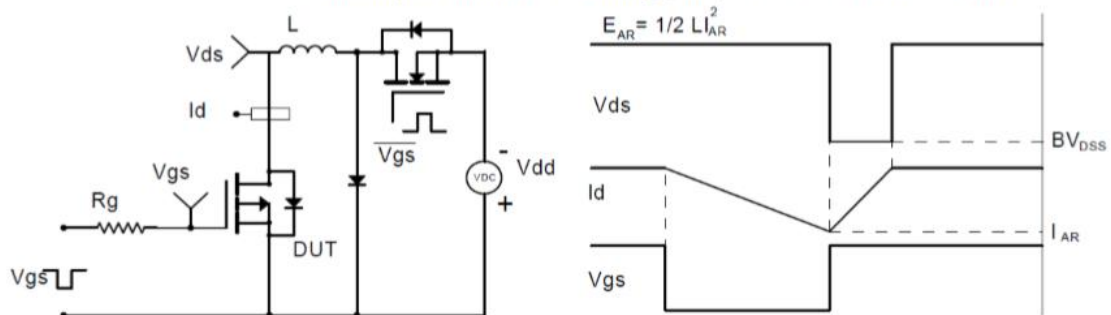
### Gate Charge Test Circuit & Waveform



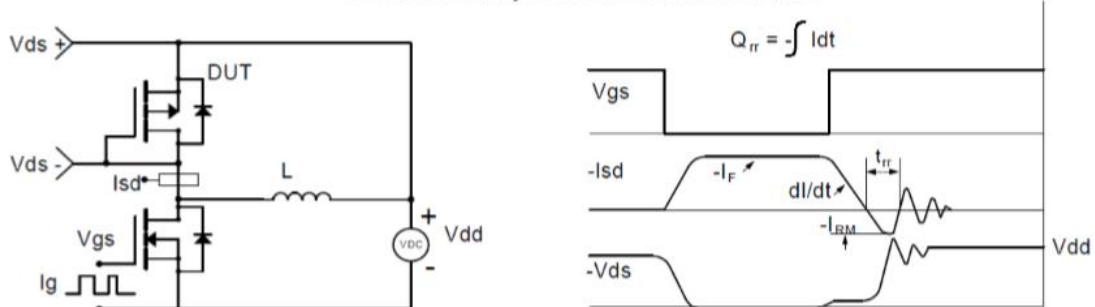
### Resistive Switching Test Circuit & Waveforms



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

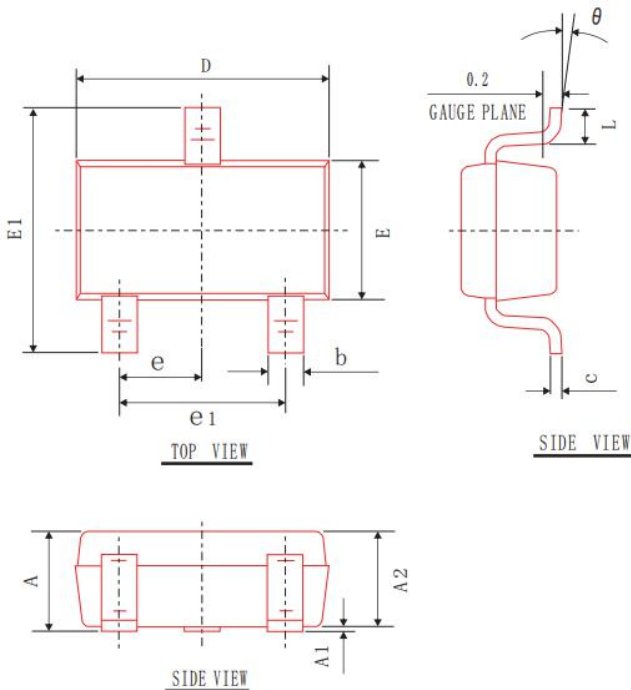


### Diode Recovery Test Circuit & Waveforms





## Package Mechanical Data-SOT-23-3L



COMMON DIMENSIONS  
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	---	---	1.30
A1	0.00	0.05	0.10
A2	1.00	1.10	1.20
b	0.30	0.40	0.50
c	0.119	0.127	0.135
e1	1.80	1.90	2.00
D	2.80	2.90	3.00
E	1.50	1.60	1.70
E1	2.60	2.80	3.00
L	0.30	0.45	0.60
$\theta$	0°	4°	8°
e	0.95BSC		

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