

## Description

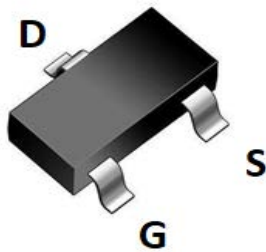
### JMT P-channel Enhancement Mode Power MosFET

#### Features

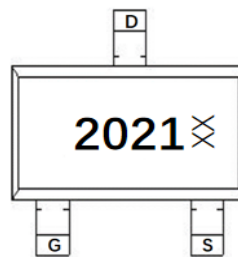
- -20V, -7A
- $R_{DS(ON)} < 18.7m\Omega @ V_{GS} = -4.5V$
- $R_{DS(ON)} < 24.4m\Omega @ V_{GS} = -2.5V$
- Advanced Trench Technology
- Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead Free

#### Applications

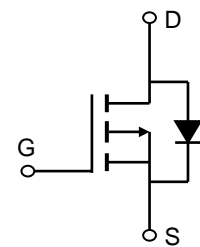
- Load Switch
- PWM Application
- Power Management



SOT-23-3L Top View



Marking and Pin Assignment



Schematic Diagram

### Package Marking and Ordering Information

Device Marking	Device	Outline	Package	Reel Size	Reel(pcs)	Per Carton (pcs)
2021	JMTJ210P02A	TAPING	SOT-23-3L	7"	3000	120000

### Absolute Maximum Ratings (@ $T_A = 25^\circ C$ unless otherwise specified)

Symbol	Parameter	Value	Units
$V_{DS}$	Drain-to-Source Voltage	-20	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 12$	V
$I_D$	Continuous Drain Current	$T_A = 25^\circ C$	-7
		$T_A = 100^\circ C$	-4.4
$I_{DM}$	Pulsed Drain Current <sup>(1)</sup>	-28	A
$P_D$	Power Dissipation	$T_A = 25^\circ C$	1.3
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient <sup>(3)</sup>	96	$^\circ C/W$
$T_J, T_{STG}$	Junction & Storage Temperature Range	-55 to 150	$^\circ C$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V	-20	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V	-	-	-1.0	μA
I <sub>GSS</sub>	Gate-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	-0.8	-1.0	V
R <sub>DS(ON)</sub>	Static Drain-Source ON-Resistance <sup>(4)</sup>	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -7A	-	14.4	18.7	mΩ
		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -5A	-	18.8	24.4	mΩ
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V, V <sub>DS</sub> = -10V, f = 1MHz	-	1797	-	pF
C <sub>oss</sub>	Output Capacitance		-	213	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	180	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 0 to -4.5V V <sub>DS</sub> = -10V, I <sub>D</sub> = -7A	-	16	-	nC
Q <sub>gs</sub>	Gate Source Charge		-	4	-	nC
Q <sub>gd</sub>	Gate Drain("Miller") Charge		-	3	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> = -4.5V, V <sub>DD</sub> = -10V I <sub>D</sub> = -7A, R <sub>GEN</sub> = 3Ω	-	8	-	ns
t <sub>r</sub>	Turn-On Rise Time		-	35	-	ns
t <sub>d(off)</sub>	Turn-Off DelayTime		-	71	-	ns
t <sub>f</sub>	Turn-Off Fall Time		-	70	-	ns
<b>Drain-Source Diode Characteristics and Max Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	-7	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-28	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> = 0V, I <sub>S</sub> = -7A	-	-	-1.2	V
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> = -7A, di/dt = 100A/us	-	10	-	ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge		-	3	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. EAS condition: Starting T<sub>J</sub>=25C, V<sub>DD</sub>=-15V, V<sub>G</sub>=-10V, R<sub>G</sub>=25ohm, L=0.5mH, I<sub>AS</sub>=-10A
3. R<sub>θJA</sub> is measured with the device mounted on a 1inch<sup>2</sup> pad of 2oz copper FR4 PCB
4. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 0.5%.

## Typical Performance Characteristics

Figure 1: Output Characteristics

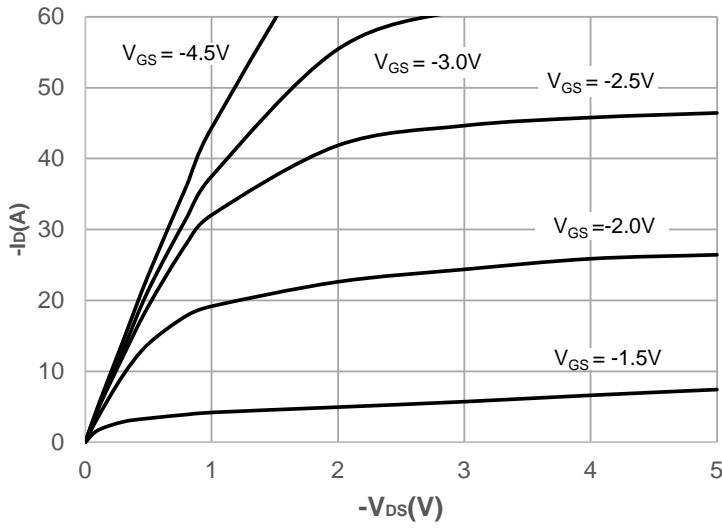


Figure 2: Typical Transfer Characteristics

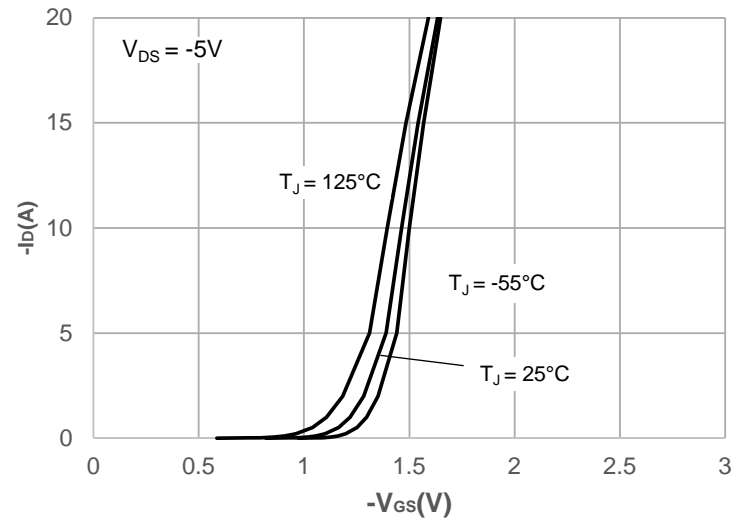


Figure 3: On-resistance vs. Drain Current

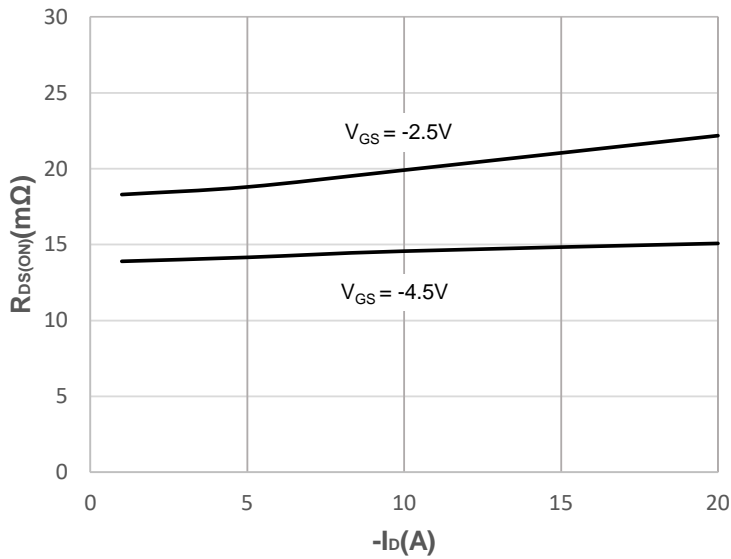


Figure 4: Body Diode Characteristics

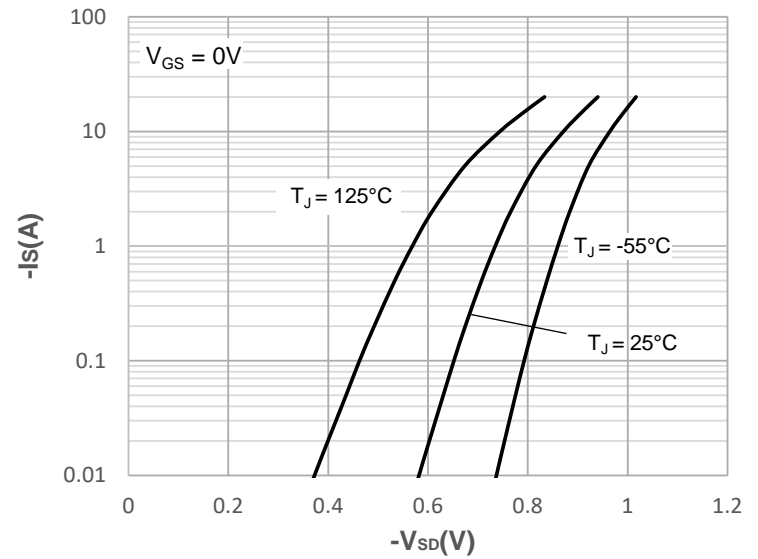


Figure 5: Gate Charge Characteristics

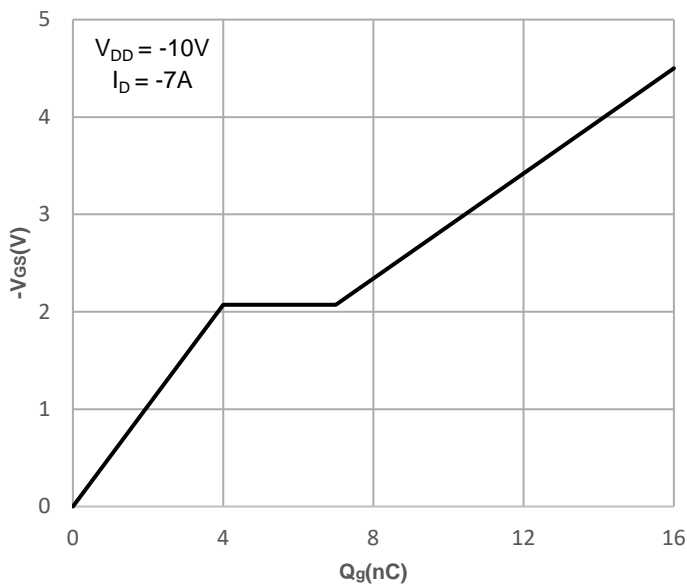
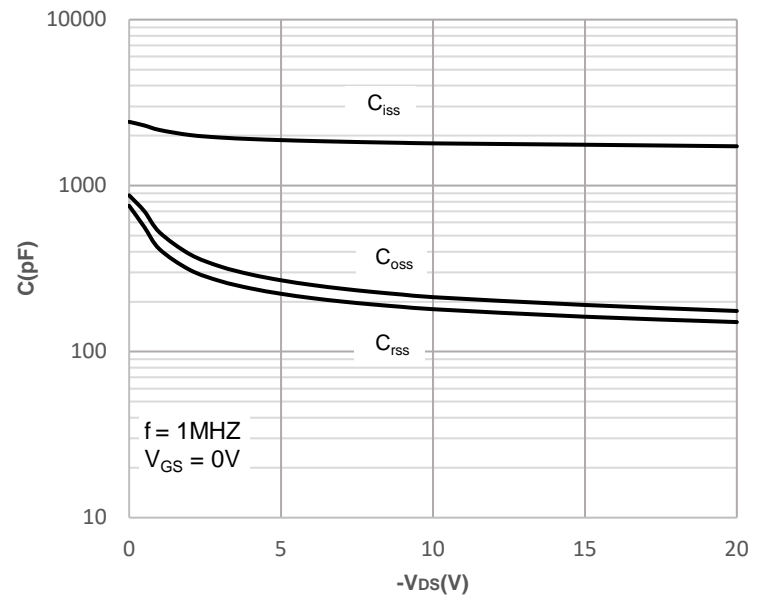


Figure 6: Capacitance Characteristics



## Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

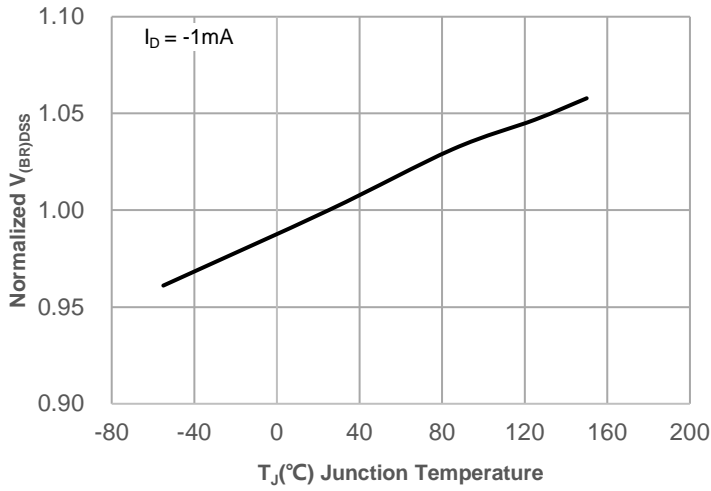


Figure 8: Normalized on Resistance vs. Junction Temperature

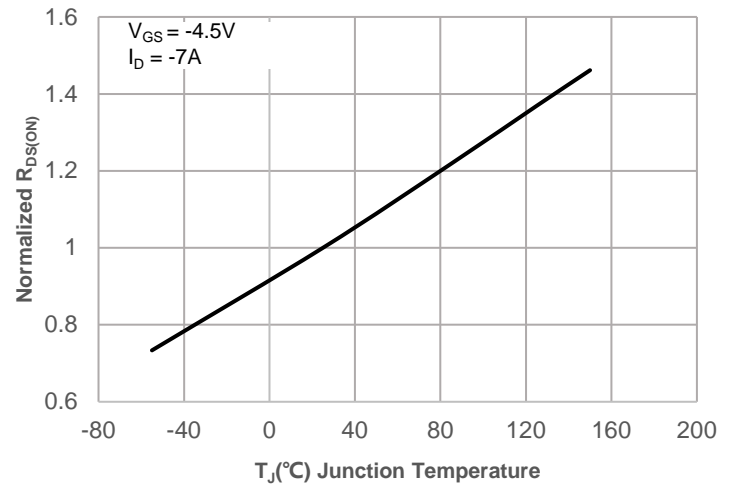


Figure 9: Maximum Safe Operating Area

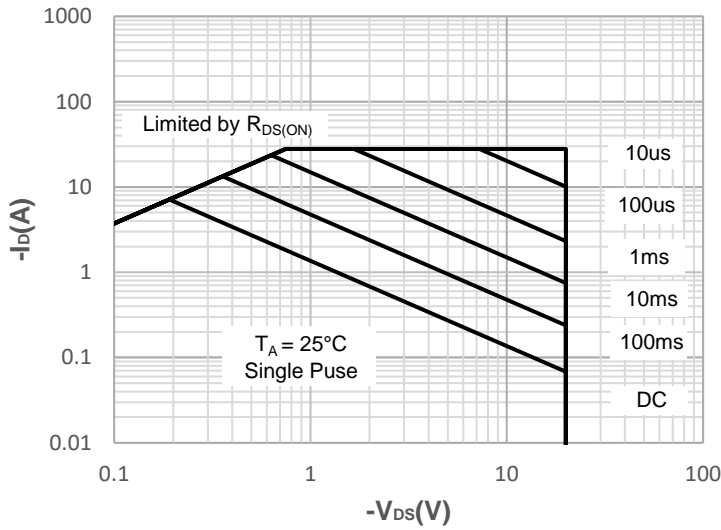


Figure 10: Maximum Continuous Driant Current vs. Ambient Temperature

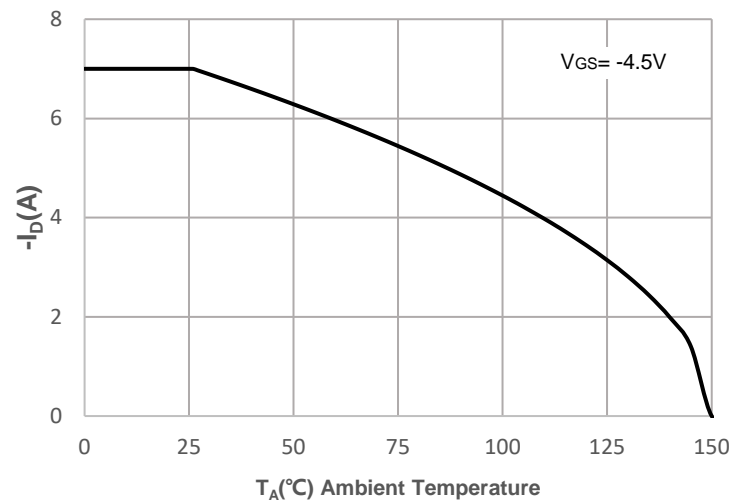


Figure 11: Normalized Maximum Transient Thermal Impedance

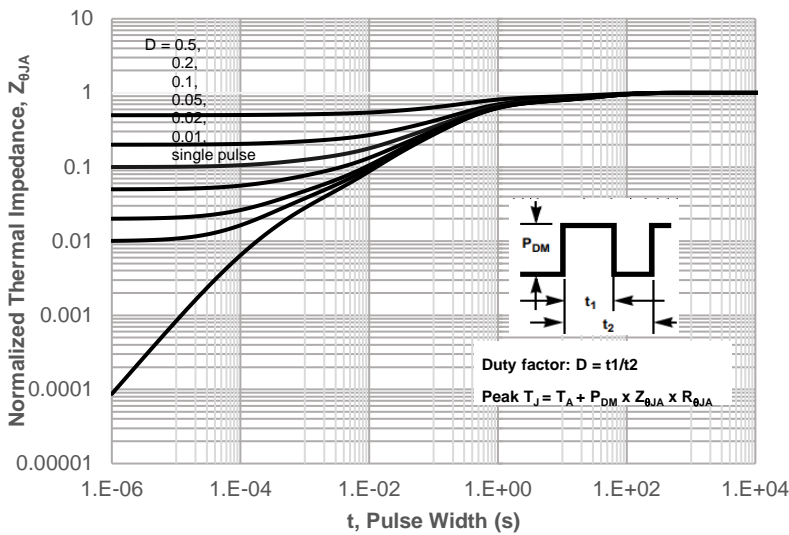
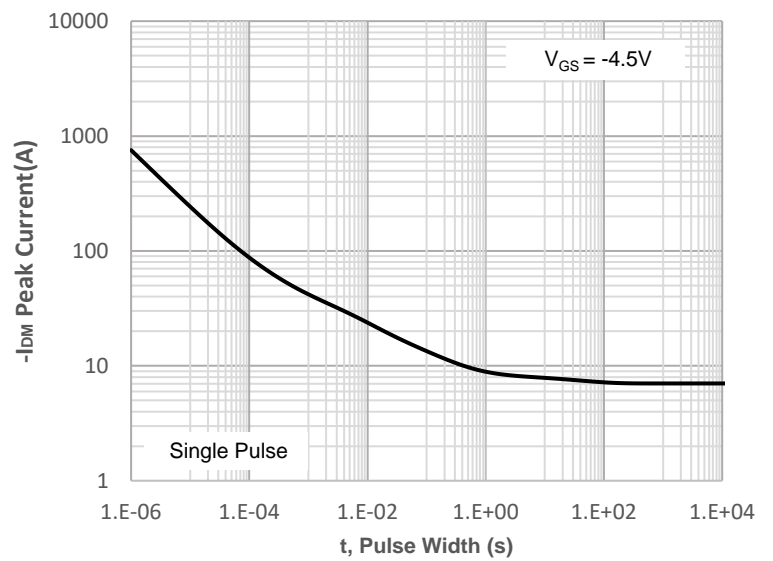


Figure 12: Peak Current Capacity



## Test Circuit

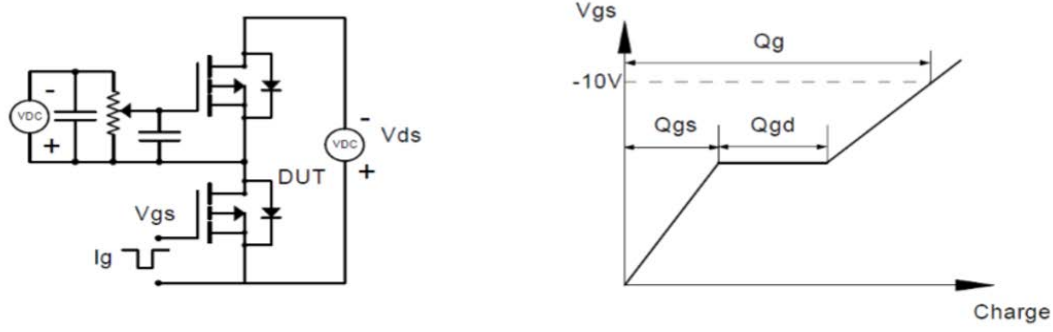


Figure 1: Gate Charge Test Circuit & Waveform

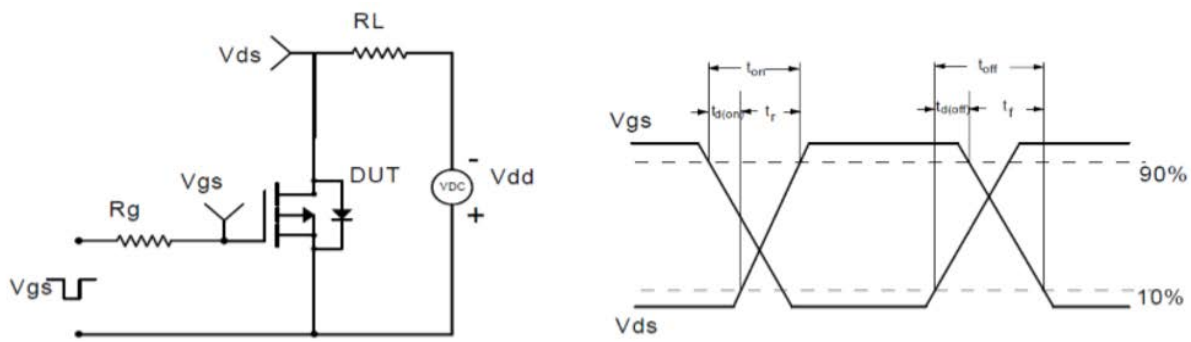


Figure 2: Resistive Switching Test Circuit & Waveform

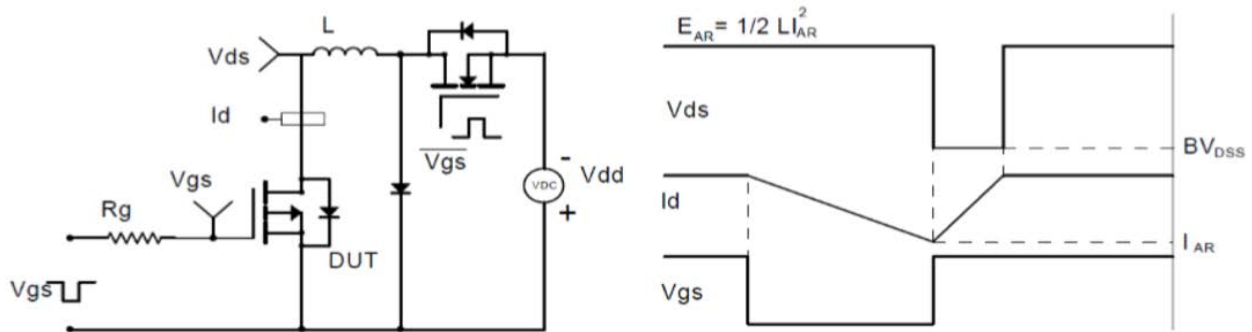


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

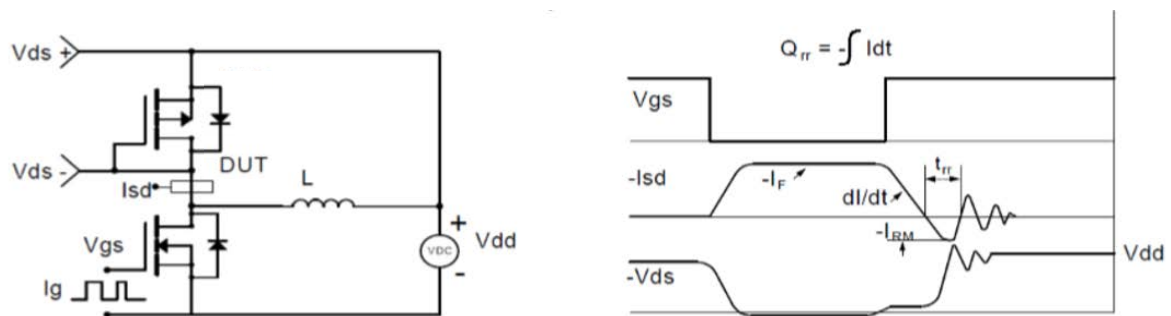
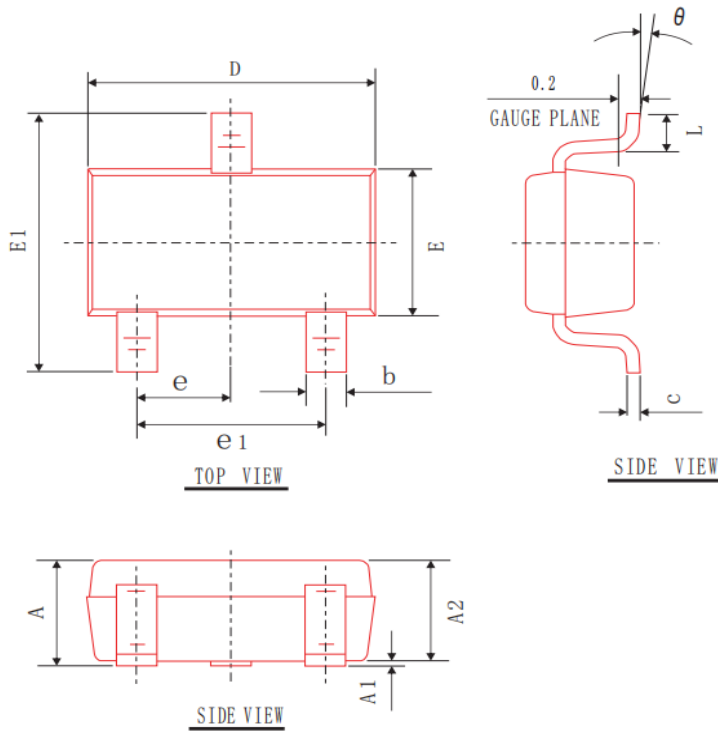


Figure 4: Diode Recovery Test Circuit & Waveform

## 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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