JJMICROELECTRONICS

30V,2.1A, 107mΩ N-channel Power Trench MOSFET

JMTL3402B

Features

- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Halogen-free; RoHS-compliant
- Pb-free plating

Applications

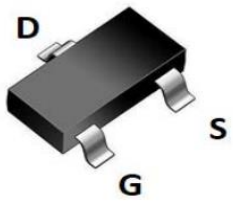
- Load Switch
- PWM Application
- Power Management

Product Summary

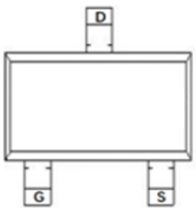
Parameters	Value	Unit
V_{DSS}	30	V
$V_{GS(th)_Typ}$	0.9	V
I_D(@V_{GS}=10V)	2.1	A
$R_{DS(ON)_Typ}$(@V_{GS}=10V	88	mΩ
$R_{DS(ON)_Typ}$(@V_{GS}=4.5V	92	mΩ
$R_{DS(ON)_Typ}$(@V_{GS}=2.5V	107	mΩ

RoHS

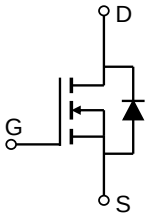
Lead-free Green



SOT-23 Top View



Pin Assignment



Schematic Diagram

Ordering Information

Device	Marking	MSL	Form	Package	Reel(pcs)	Per Carton (pcs)
JMTL3402B	3402B	3	Tape&Reel	SOT-23	3000	120000

Absolute Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{DS}	Drain-to-Source Voltage		30	V
V_{GS}	Gate-to-Source Voltage		±12	V
I_D	Continuous Drain Current	T_A = 25°C	2.1	A
		T_A = 100°C	1.3	
I_{DM}	Pulsed Drain Current [1]		Refer to Fig.4	A
P_D	Power Dissipation	T_A = 25°C	0.9	W
		T_A = 100°C	0.4	
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Max	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient[2]	139	

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Electrical Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 30V, V_{GS} = 0V	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±12V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	0.6	0.9	1.2	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} = 10V, I_D = 2A	-	88	114	mΩ
		V_{GS} = 4.5V, I_D = 1A	-	92	119	mΩ
		V_{GS} = 2.5V, I_D = 1A	-	107	139	mΩ
Dynamic Characteristics						
R_g	Gate Resistance	f = 1MHz	-	18	-	Ω
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz	120	168	227	pF
C_{oss}	Output Capacitance		15	21	29	pF
C_{rss}	Reverse Transfer Capacitance		10	14	19	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V, V_{DS} = 15V, I_D = 2A	-	4.4	-	nC
Q_{gs}	Gate Source Charge		-	0.5	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	0.4	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 15V, I_D= 2A, R_{GEN} = 3Ω	-	1.2	-	ns
t_r	Turn-On Rise Time		-	1.8	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	16	-	ns
t_f	Turn-Off Fall Time		-	5.8	-	ns
Body Diode Characteristics						
I_S	Maximum Continuous Body Diode Forward Current		-	-	2.1	A
I_{SM}	Maximum Pulsed Body Diode Forward Current		-	-	8.4	A
V_{SD}	Body Diode Forward Voltage	V_{GS} = 0V, I_S = 2A	-		1.2	V
trr	Body Diode Reverse Recovery Time	I_F = 2A, di/dt = 100A/us	-	5.0	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	1.6	-	nC

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

2. $R_{\theta JA}$ is measured with the device mounted on a $1inch^2$ pad of 2oz copper FR4 PCB.

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

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Typical Performance Characteristics

Figure 1: Power De-rating

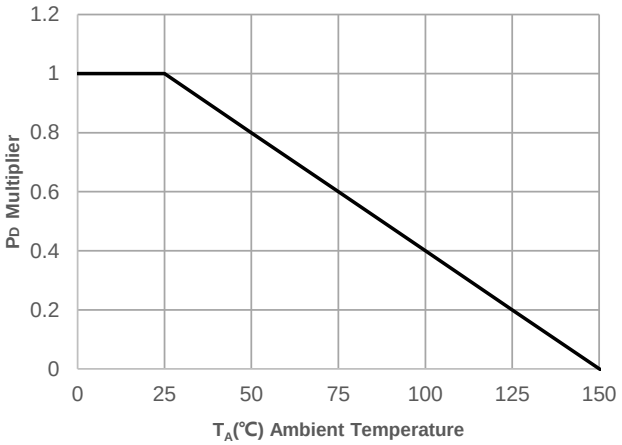


Figure 2: Current De-rating

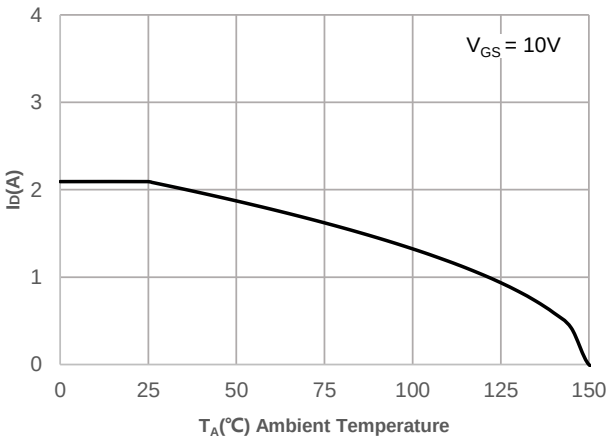


Figure 3: Normalized Maximum Transient Thermal Impedance

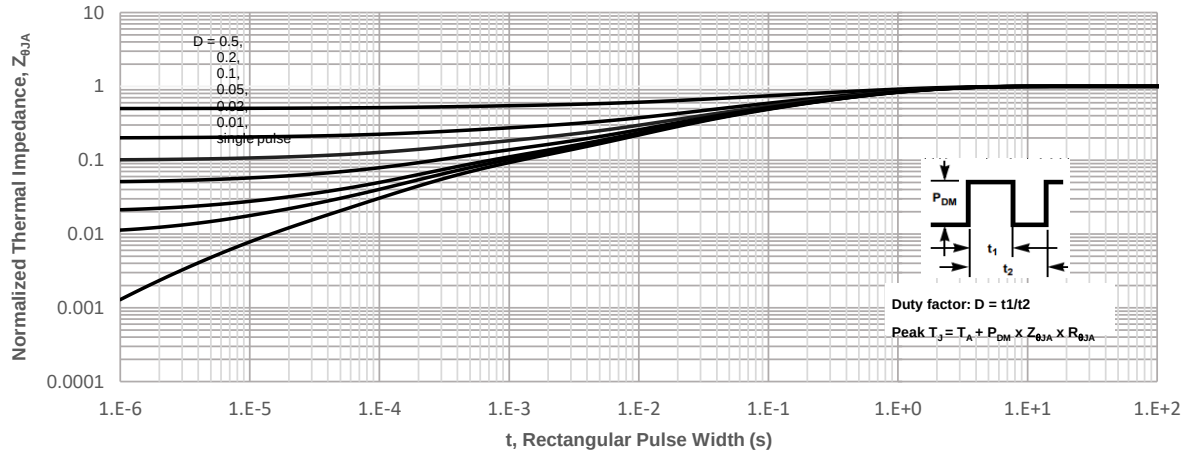
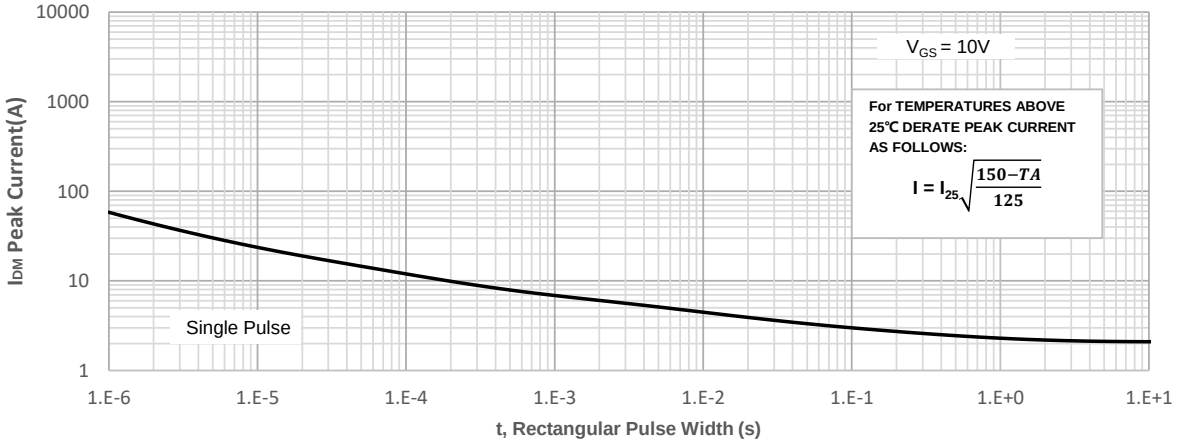


Figure 4: Peak Current Capacity



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Typical Performance Characteristics

Figure 5: Output Characteristics

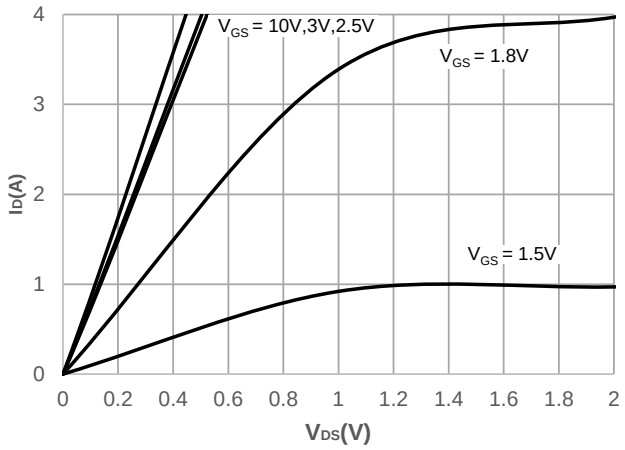


Figure 6: Typical Transfer Characteristics

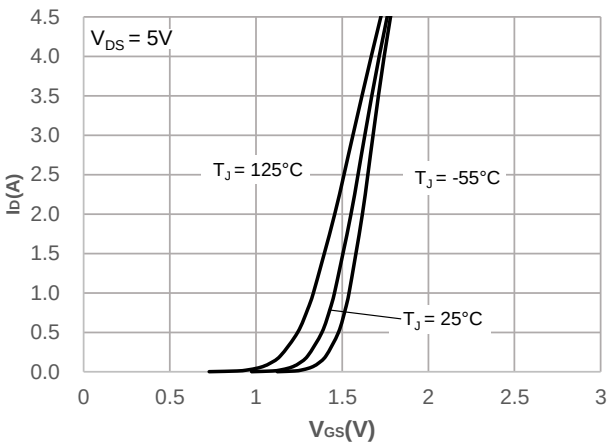


Figure 7: On-resistance vs. Drain Current

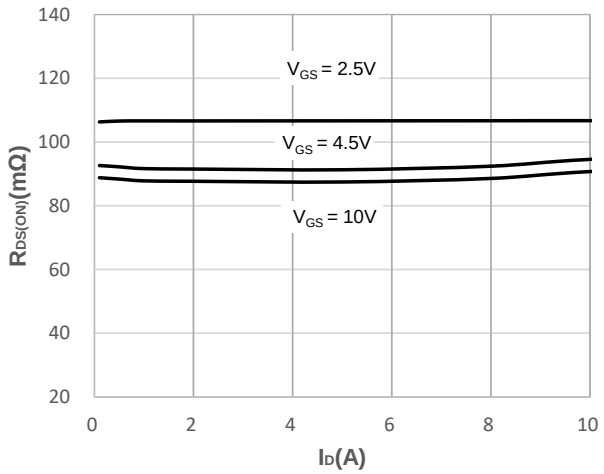


Figure 8: Body Diode Characteristics

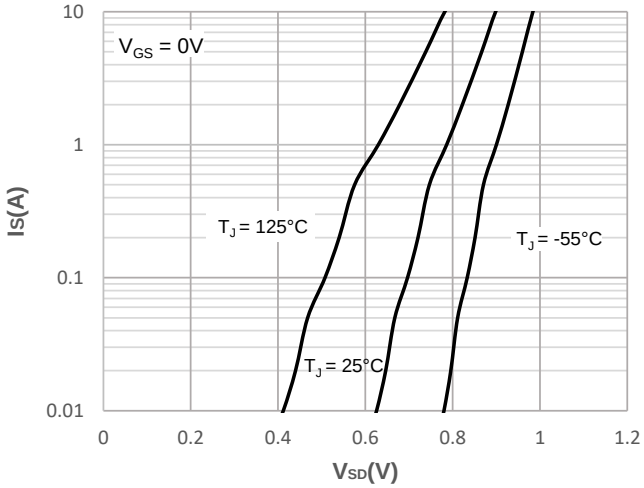


Figure 9: Gate Charge Characteristics

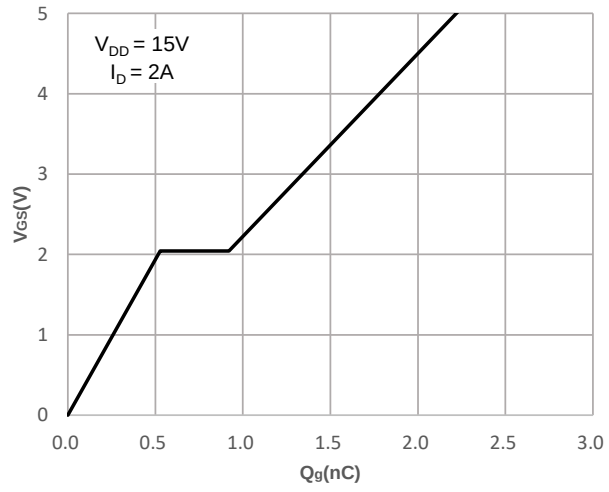
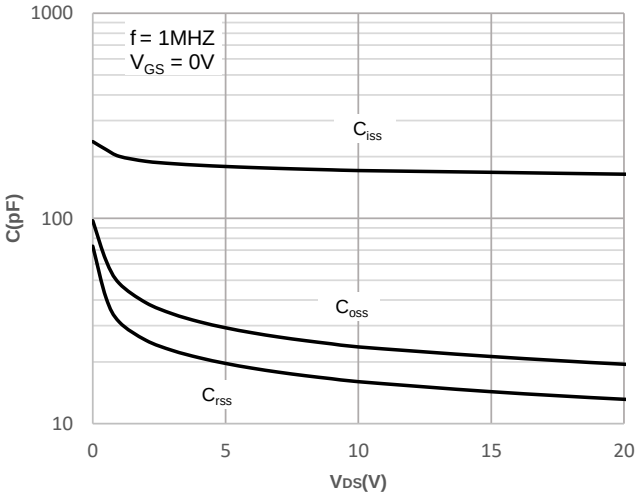


Figure 10: Capacitance Characteristics



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Typical Performance Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

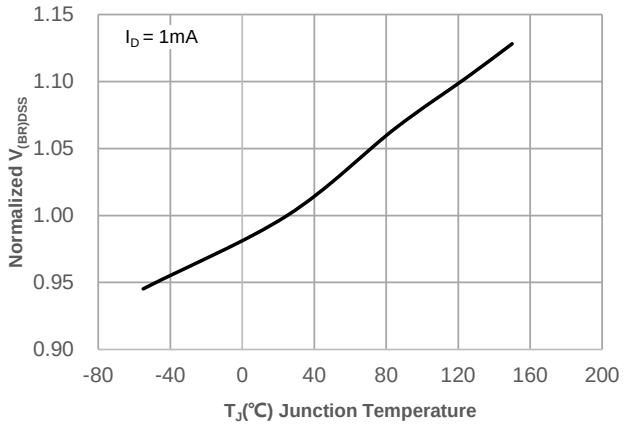


Figure 12: Normalized on Resistance vs. Junction Temperature

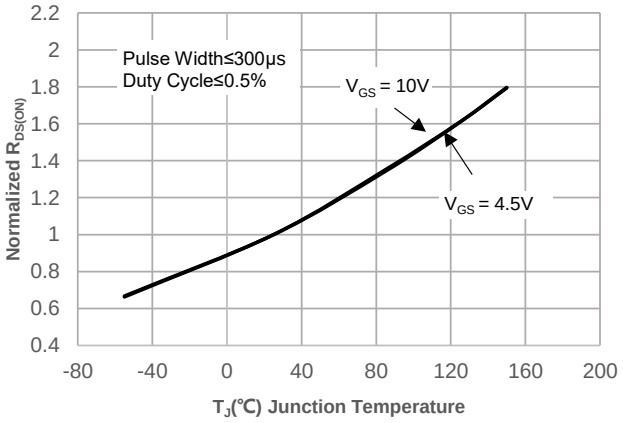


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

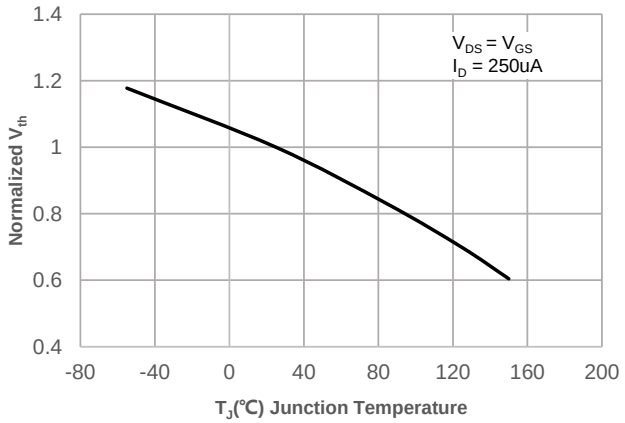


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

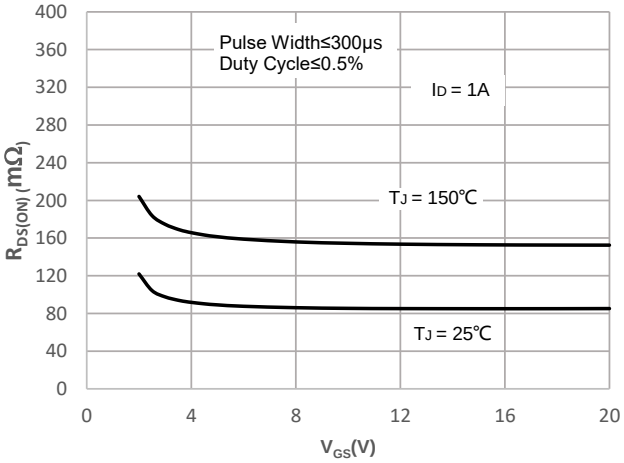
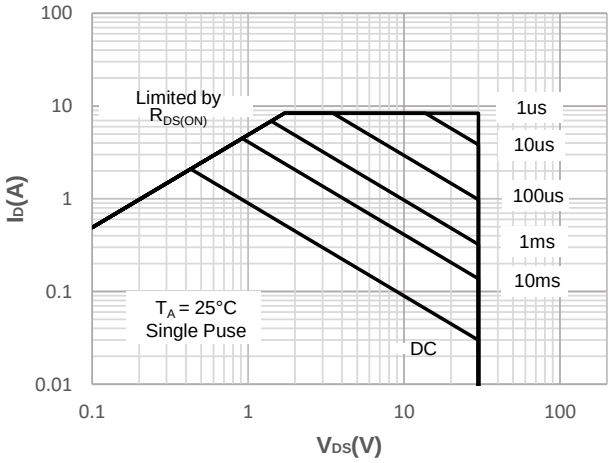


Figure 15: Maximum Safe Operating Area



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Test Circuit

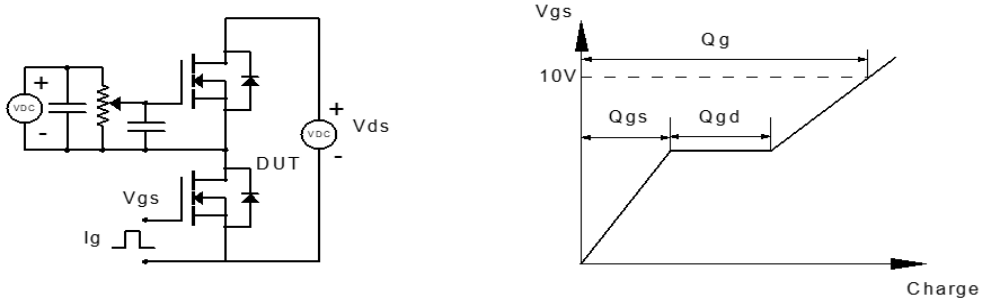

Figure 1: Gate Charge Test Circuit & Waveform

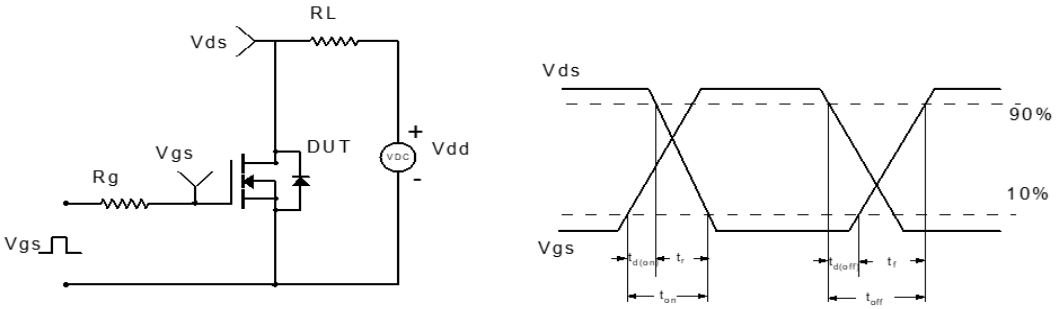

Figure 2: Resistive Switching Test Circuit & Waveform

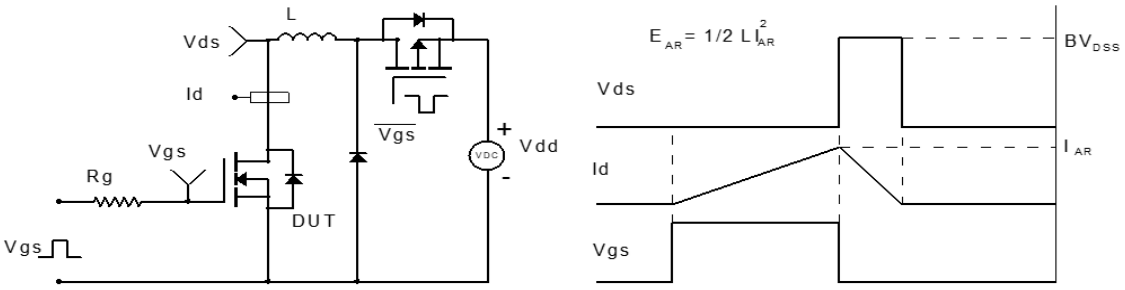

Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

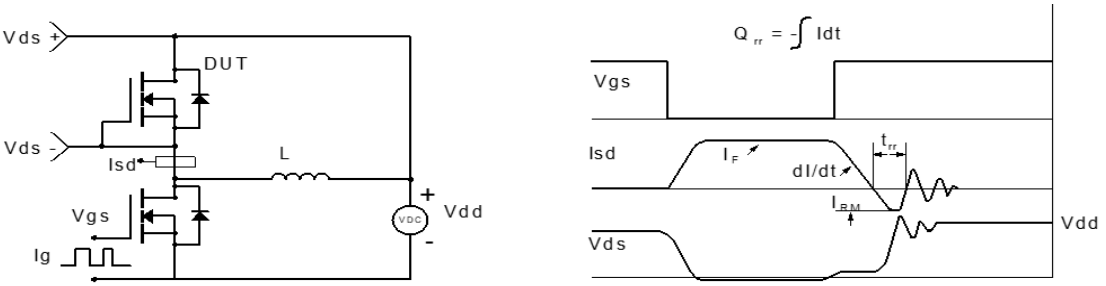

Figure 4: Diode Recovery Test Circuit & Waveform

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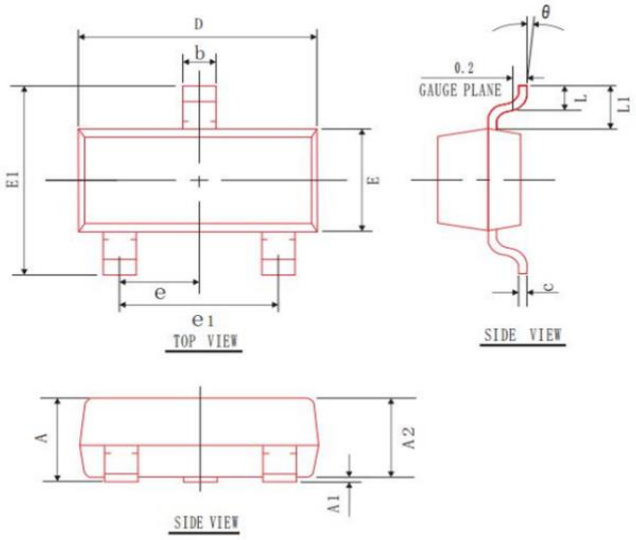
Package Mechanical Data(SOT-23)

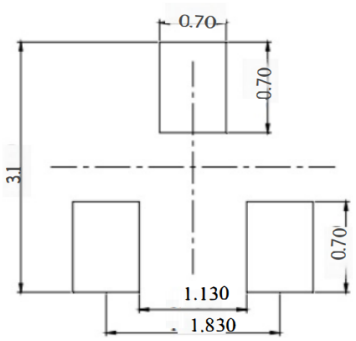
Package Outline



COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	0.90	1.05	1.20
A1	0.00	0.05	0.10
A2	0.90	1.00	1.10
b	0.30	0.40	0.50
c	0.08	0.10	0.15
D	2.80	2.90	3.00
E	1.20	1.30	1.40
E1	2.30	2.40	2.50
L	0.30	0.40	0.50
θ	0°	5°	10°
L1	0.55 REF		
e	0.95 BSC		
e1	1.90 REF		

Recommended Footprint



DIMENSIONS:MILLIMETERS

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