CRMJTU0310A

N-Channel 30V, 12mΩ Typ. Power MOSFET

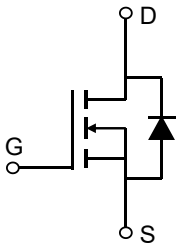
Description

Features

- 30V, 9A

  $R_{DS(ON)}$ Typ = 12mΩ @ V_{GS} = 4.5V

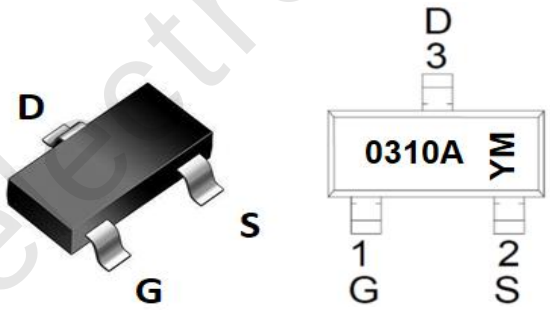
  $R_{DS(ON)}$ Typ = 14.5mΩ @ V_{GS} =2.5V
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free



Schematic Diagram

Application

- Load Switch
- PWM Application
- Power Management



Marking and Pin Assignment

Package Marking and Ordering Information

Device	Marking	Package	Outline	Reel Size	Reel (pcs)	Per Carton (pcs)
CRMJTU0310A	0310A	SOT-23-3L	TAPING	7"	3000	120000

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

Symbol	Parameter		Value	Units
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	9	A
		T_A = 100°C	5.4	A
I_{DM}	Pulsed Drain Current [1]		36	A
P_D	Power Dissipation	T_A = 25°C	2.1	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient[2]		58	°C/W
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	°C

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	0.5	0.75	1.3	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} =4.5V, I_D = 5A	-	12	15.6	mΩ
		V_{GS} = 2.5V, I_D =3A	-	14.5	19	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz	-	1444	-	pF
C_{oss}	Output Capacitance		-	109	-	pF
C_{rss}	Reverse Transfer Capacitance		-	93	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DS} = 10V, I_D =9A	-	19	-	nC
Q_{gs}	Gate Source Charge		-	3	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	4	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 15V I_D= 9A, R_{GEN} = 3Ω	-	6	-	ns
t_r	Turn-On Rise Time		-	18	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	21	-	ns
t_f	Turn-Off Fall Time		-	5	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	9	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	36	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 9A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F = 9A, di/dt = 100A/us	-	7	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	2	-	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%.

Typical Performance Characteristics

Figure 1: Output Characteristics

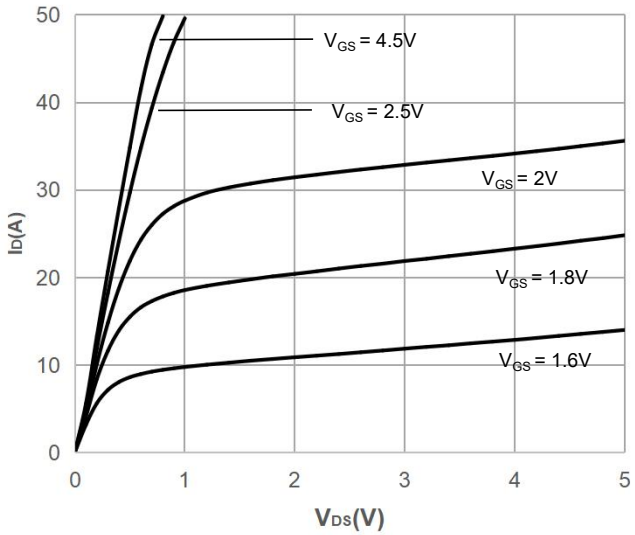


Figure 2: Typical Transfer Characteristics

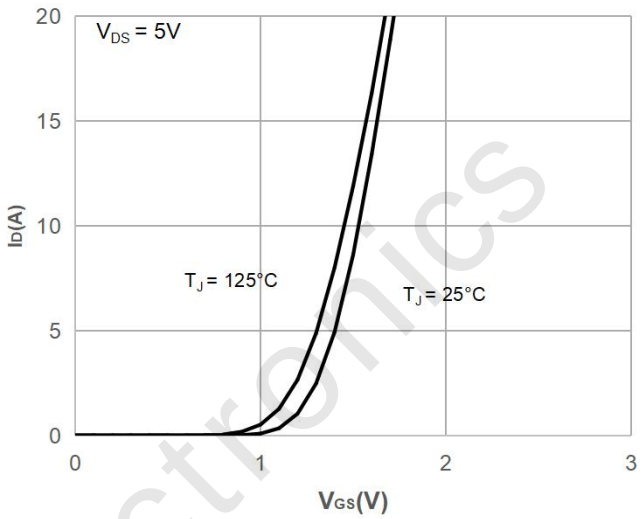


Figure 3: On-resistance vs. Drain Current

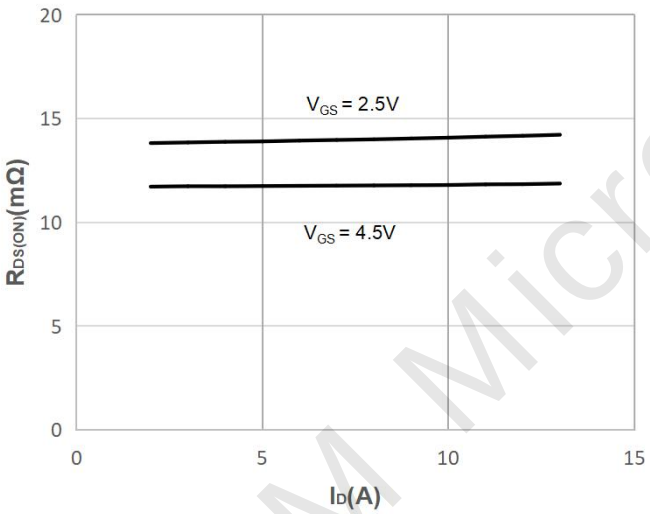


Figure 4: Body Diode Characteristics

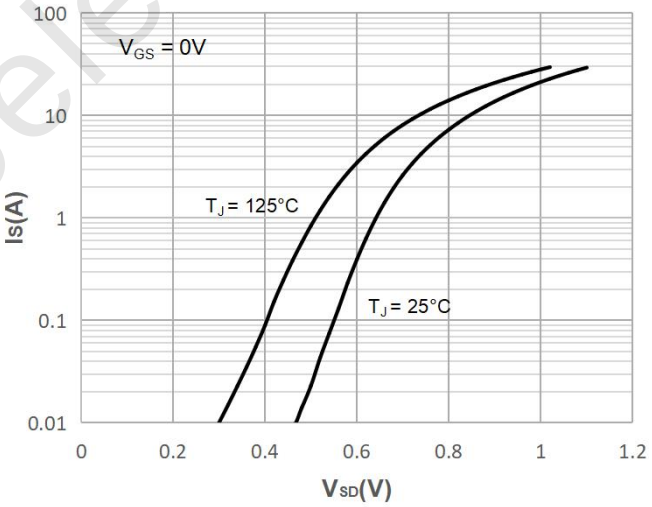


Figure 5: Gate Charge Characteristics

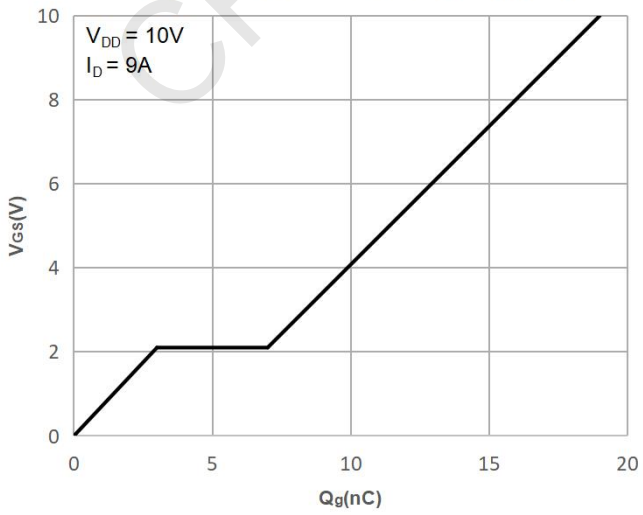
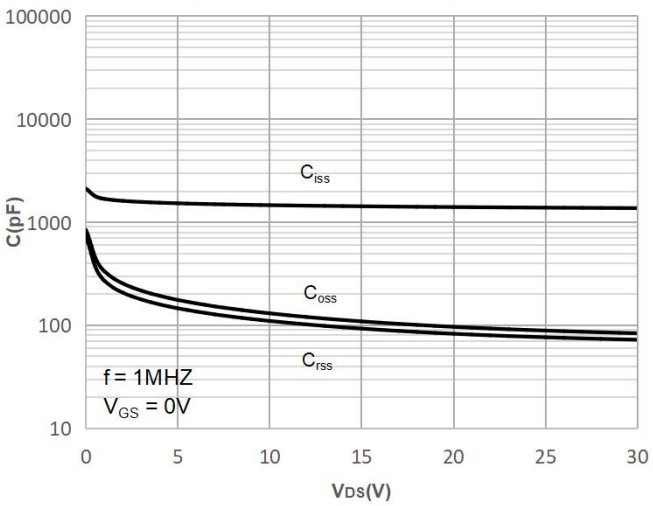


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

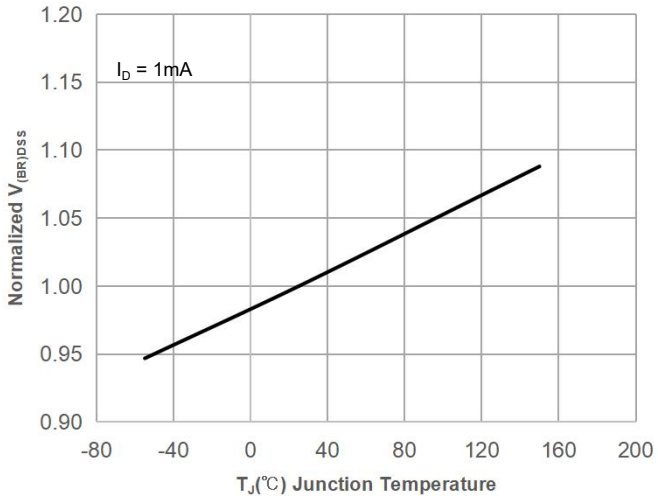


Figure 8: Normalized on Resistance vs. Junction Temperature

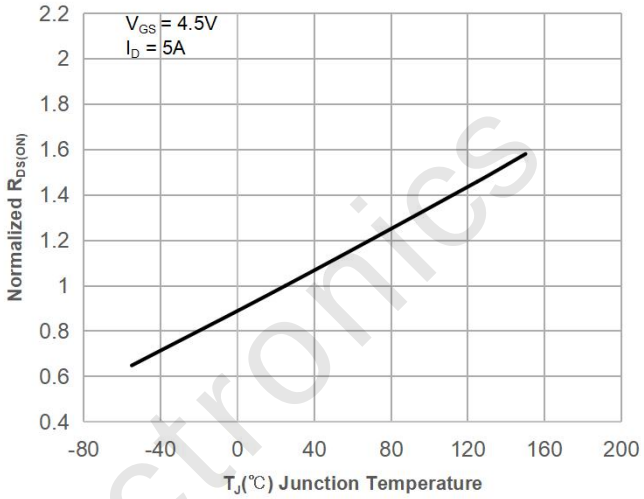


Figure 9: Maximum Safe Operating Area

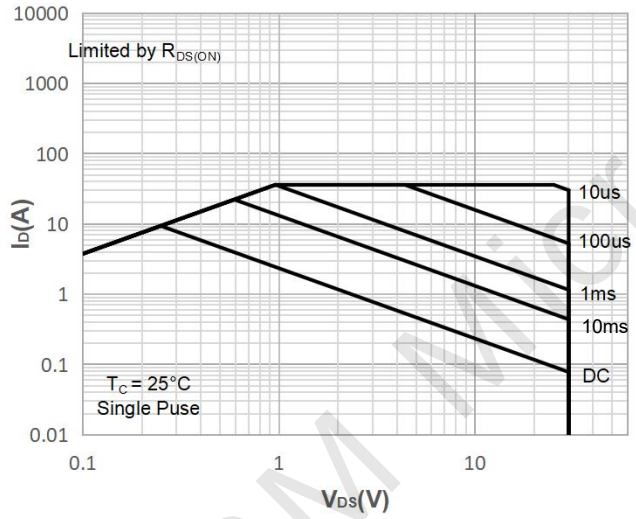


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

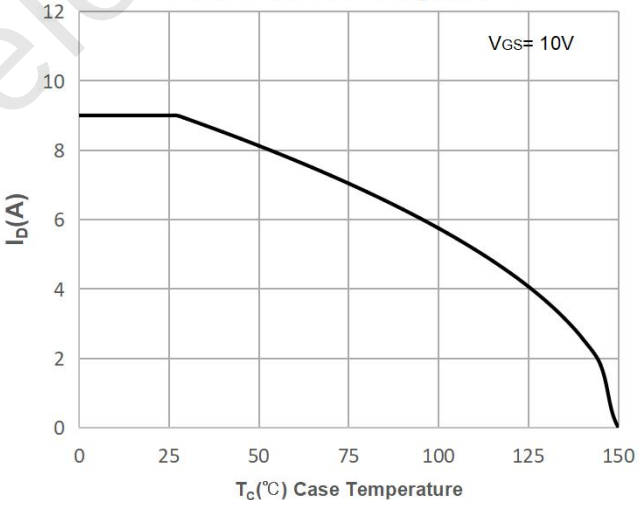


Figure 11: Normalized Maximum Transient Thermal Impedance

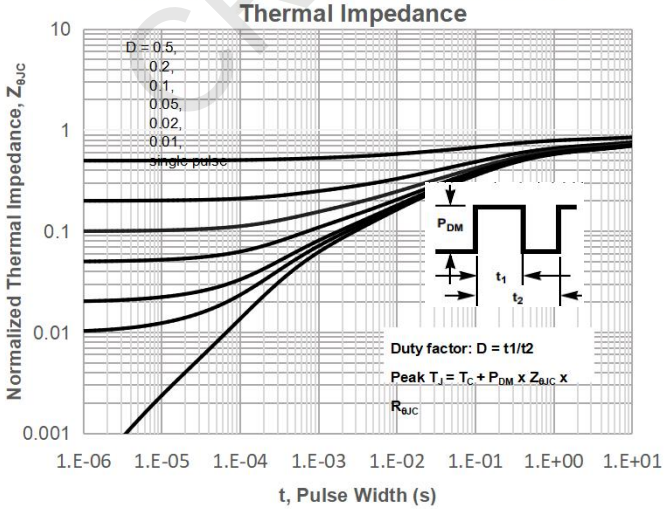
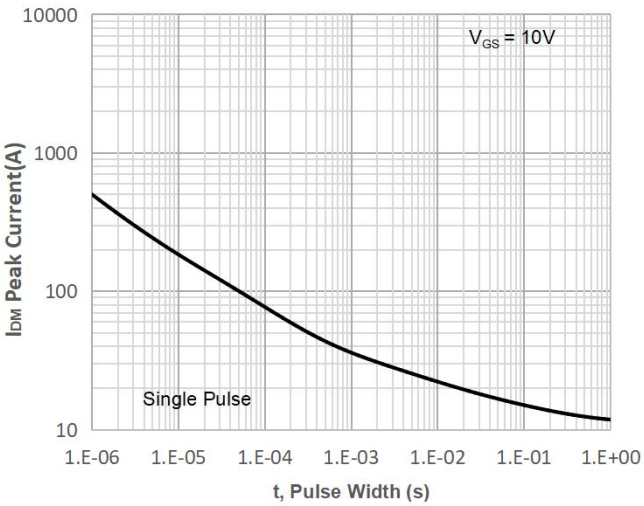


Figure 12: Peak Current Capacity



Test Circuit

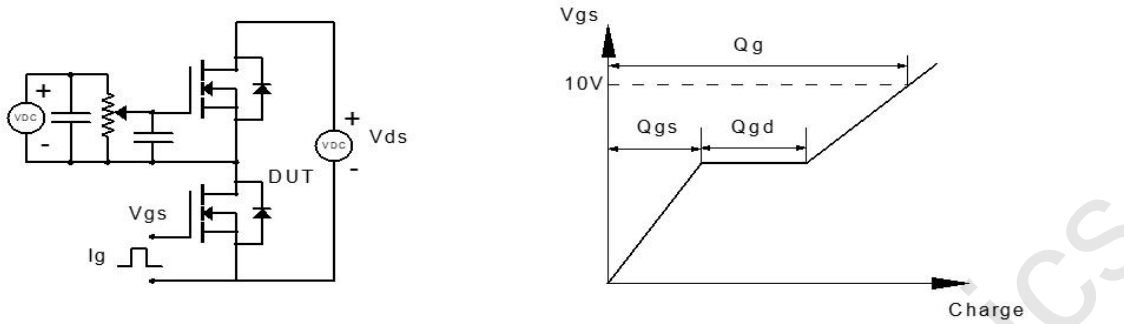


Figure 1: Gate Charge Test Circuit & Waveform

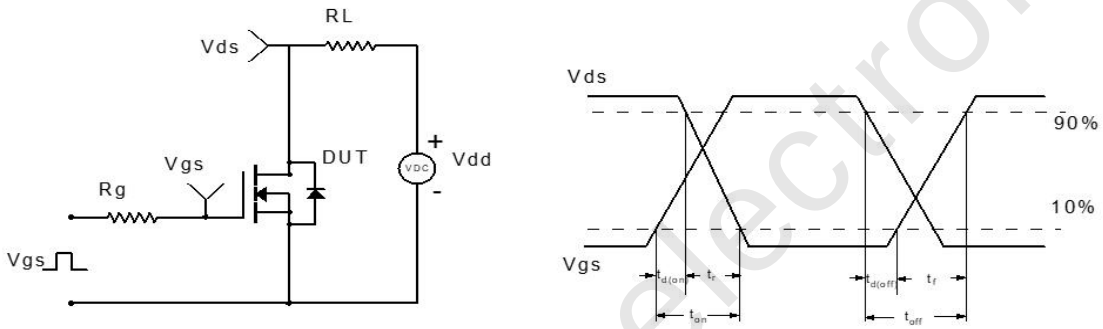


Figure 2: Resistive Switching Test Circuit & Waveform

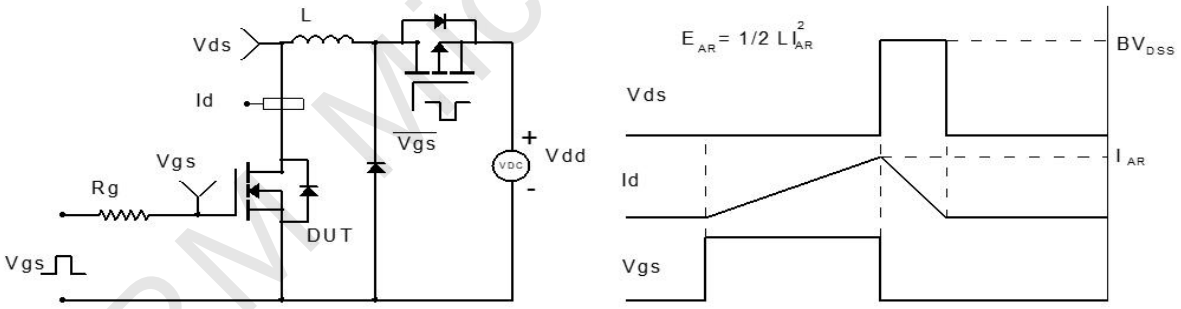


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

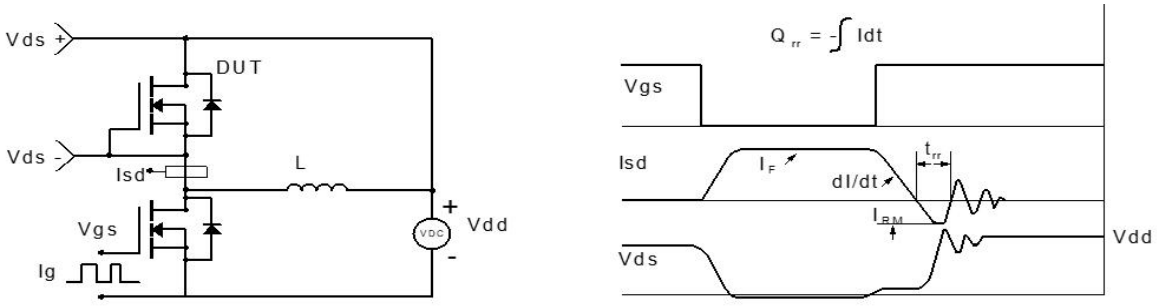
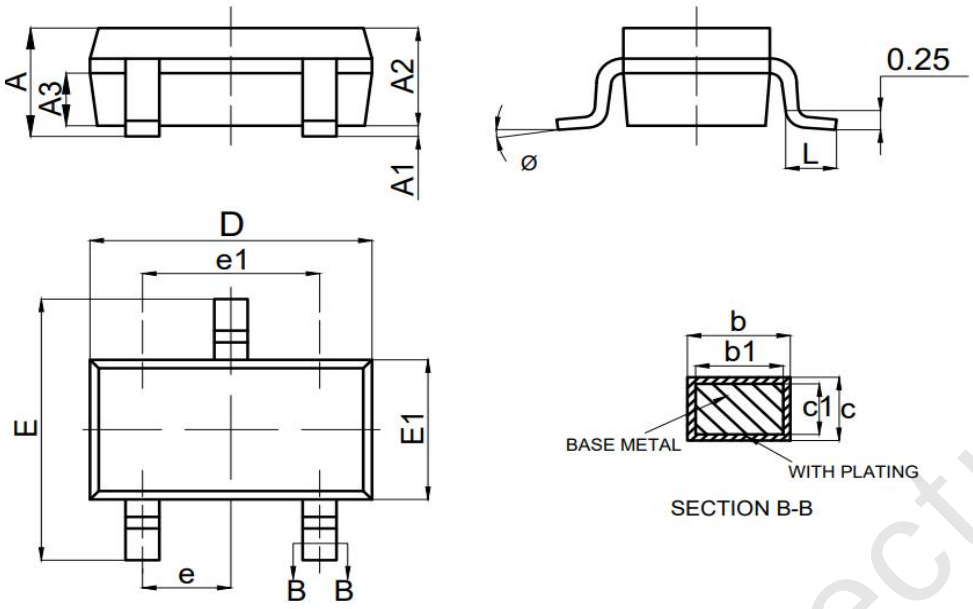


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(SOT-23-3L)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	——	——	1.25
A1	0.04	——	0.10
A2	1.00	1.10	1.20
A3	0.55	0.65	0.75
b	0.30	——	0.40
b1	0.37	0.40	0.43
c	0.11	——	0.21
c1	0.10	0.13	0.16
D	2.72	2.92	3.12
E	2.60	2.80	3.00
E1	1.40	1.60	1.80
e	0.95BSC		
e1	1.90BSC		
L	0.30	——	0.60
ø	0	——	8°

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