30V N-Channel Enhancement Mode MOSFET

Description

The PECN3404VR uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and high density cell Design for ultra low on-resistance. This device is suitable for use as a load switch or in PWM applications.

General Features

- V_{DS} =30V，I_D =5A
  $R_{DS(ON)}$(Typ.)=25mΩ @V_{GS}=10V
  $R_{DS(ON)}$(Typ.)=30mΩ @V_{GS}=4.5V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

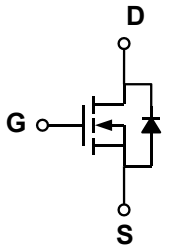
Application

- PWM applications
- Load switch

Package

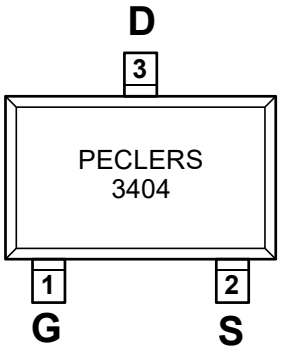
- SOT-23

Schematic diagram



Marking and pin assignment

SOT-23
(TOP VIEW)



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
PECN3404VR	-55°C to +150°C	SOT-23	3000

Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

parameter	symbol	limit	unit
Drain-source voltage	V_{DS}	30	V
Gate-source voltage	V_{GS}	±20	V
Drain current-continuous[a]@Tj=125℃	I_D	5	A
-pulse *d*[b]	I_{DM}	20	A
Drain-source Diode forward current	Is	5	A
Maximum power dissipation	P_D	1.4	W
Operating junction Temperature range	Tj	-55—150	℃

parameter	symbol	limit	unit

Drain-source voltage		V_{DS}	-30	V
Gate-source voltage		V_{GS}	±20	V
Continuous Drain Current (TJ = 150 °C)	T_C=25°C	I_D	5	A
	T_C=70°C		4	
	T_A=25°C		3.7[b,c]	
	T_A=70°C		2.9[b,c]	
Continuous Source-Drain Diode Current	T_C=25°C	I_S	1.4	
	T_A=25°C		1[b,c]	
Pulsed Drain Current (t = 300 μs)		I_{DM}	-12.8	
Maximum power dissipation	T_C=25°C	P_D	1.7	W
	T_C=70°C		1.1	
	T_A=25°C		1[b,c]	
	T_A=70°C		0.6[b,c]	
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55—150	℃

Thermal Characteristics

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[b, d]	t ≤ 5 s	$R_{\theta JA}$	100	130	℃/W
Maximum Junction-to-Foot (Drain)	Steady State	$R_{\theta JF}$	60	75	

Notes:

a. TC = 25 °C.

b. Surface mounted on 1" x 1" FR4 board.

c. t = 5 s.

d. Maximum under steady state conditions is 175 °C/W.

Electrical Characteristics (TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	30	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=30V, V_{GS}=0V	-	-	1	μA
Gate-body leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
ON Characteristics						
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D=250μA	0.8	1.35	1.9	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=5A	-	25	30	mΩ
		V_{GS}=4.5V, I_D=4A		30	36	
Forward transconductance	gfs	V_{DS}=5V, I_D=5A	-	15	-	S
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS}=15V ,V_{GS}=0V f=1.0MHz	-	255	-	pF
Output capacitance	C_{OSS}		-	45	-	

Reverse transfer capacitance	C_{RSS}		-	35	-	
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DS}=15V V_{GS}=10V R_L=2.6 ohm R_{GEN}=3ohm	-	4.5	-	ns
Rise time	tr		-	2.5	-	
Turn-off delay time	$t_{D(OFF)}$		-	14.5	-	
Fall time	tf		-	3.5	-	
Total gate charge	Qg	V_{DS}=15V,I_D=5.8A V_{GS}=10V	-	5.2	-	nC
Gate-source charge	Qgs		-	0.85	-	
Gate-drain charge	Qgd		-	1.3	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V_{SD}	V_{GS}=0V,Is=1A	-	0.76	1.16	V

Typical Performance Characteristics

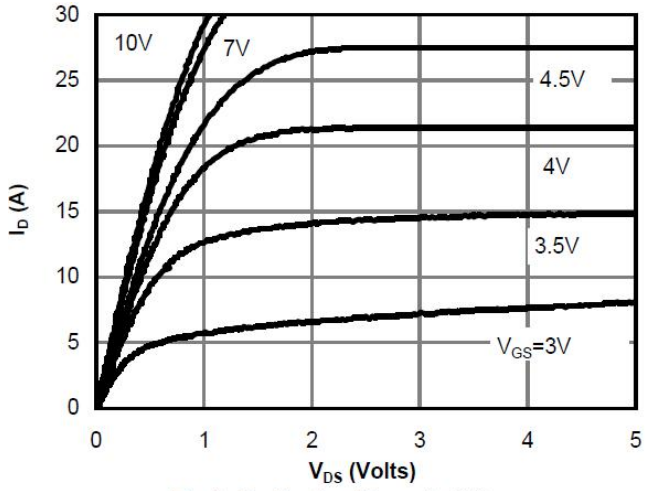


Fig 1: On-Region Characteristics

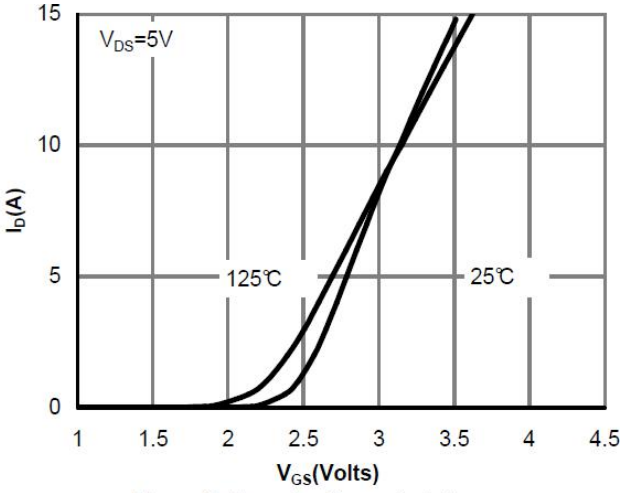


Figure 2: Transfer Characteristics

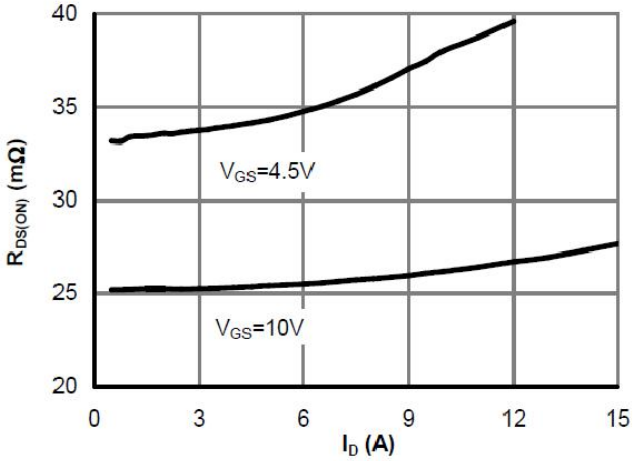


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

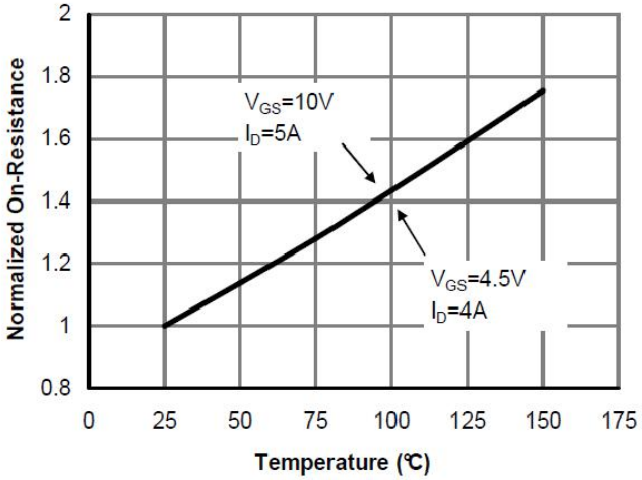


Figure 4: On-Resistance vs. Junction Temperature

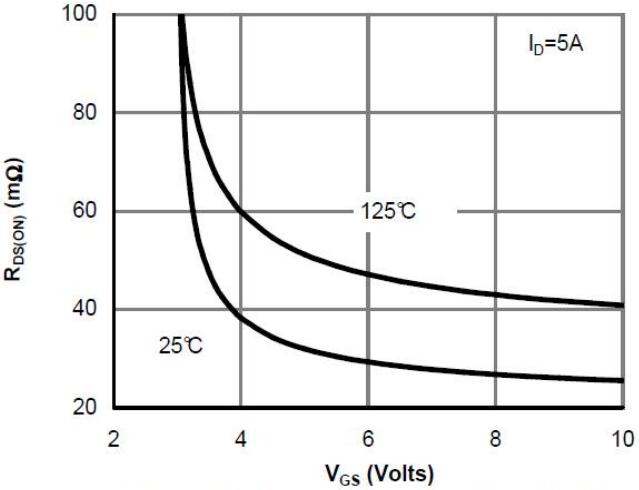


Figure 5: On-Resistance vs. Gate-Source Voltage

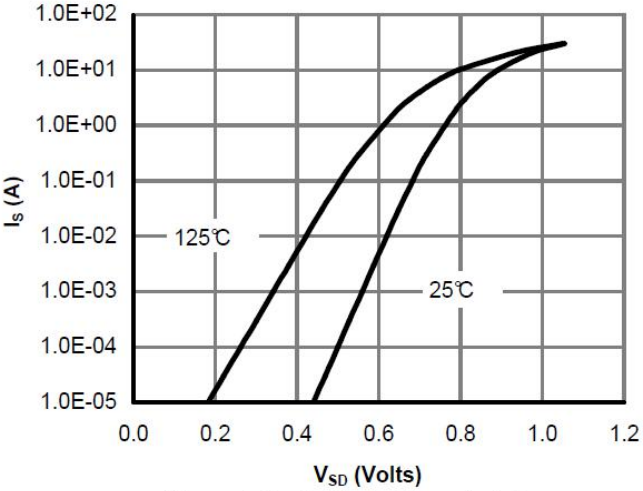


Figure 6: Body-Diode Characteristics

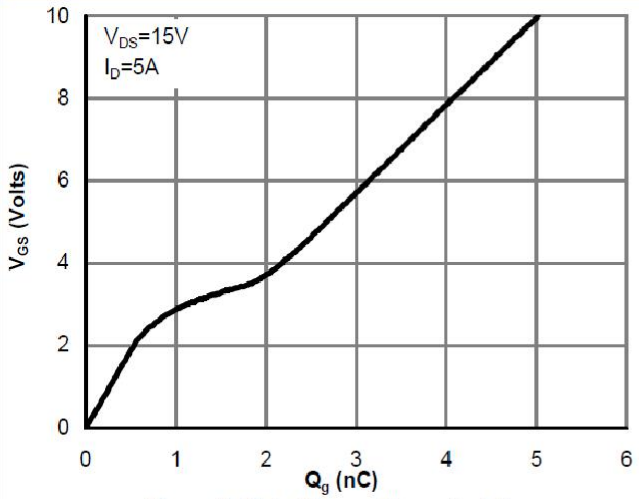


Figure 7: Gate-Charge Characteristics

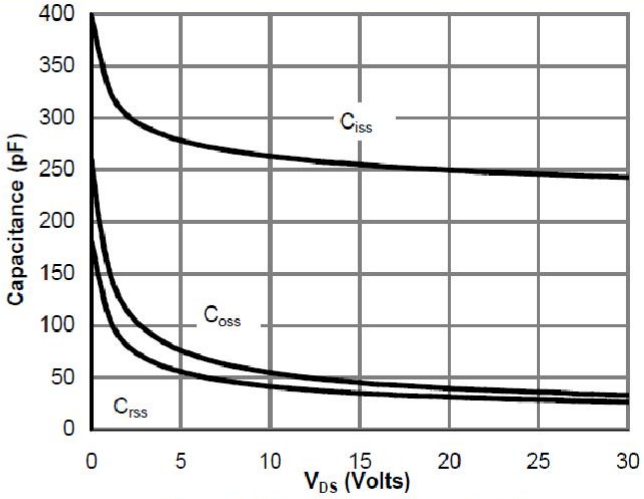


Figure 8: Capacitance Characteristics

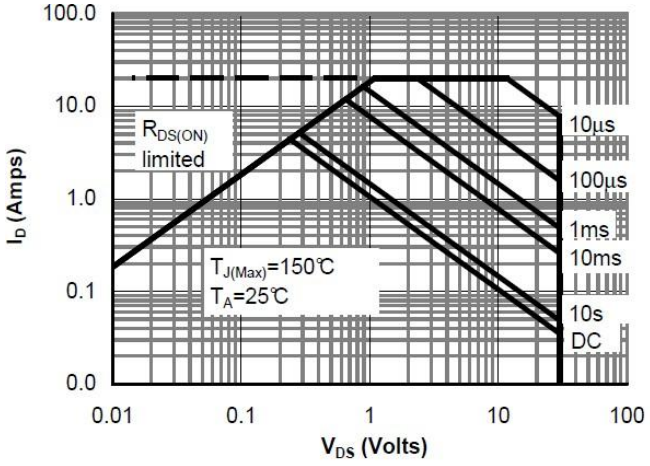


Figure 10: Maximum Forward Biased Safe Operating Area

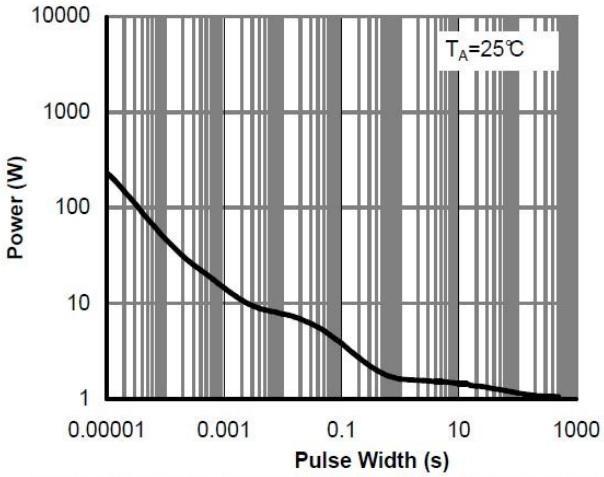


Figure 11: Single Pulse Power Rating Junction-to-Ambient

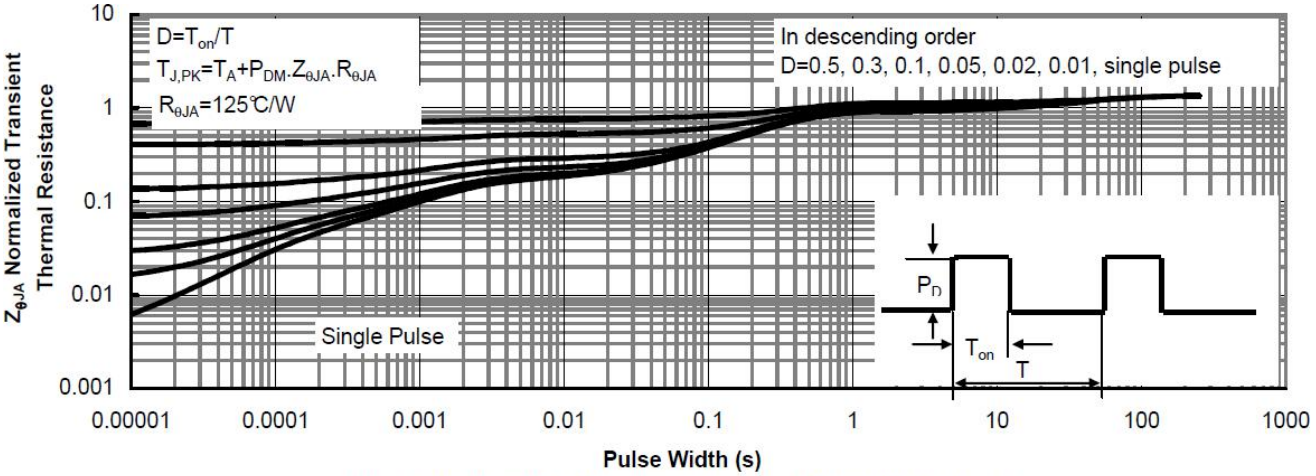
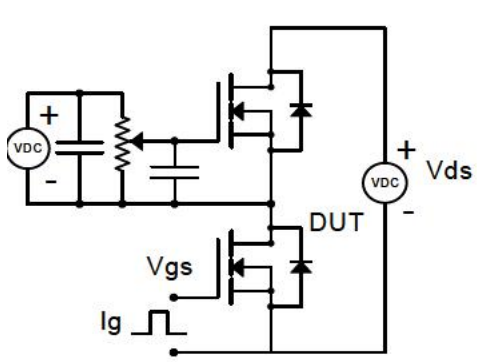
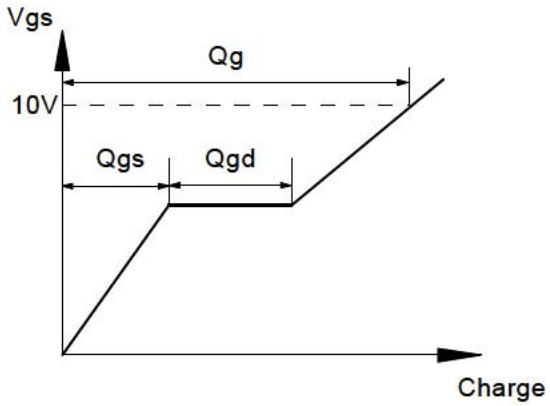


Figure 12: Normalized Maximum Transient Thermal Impedance

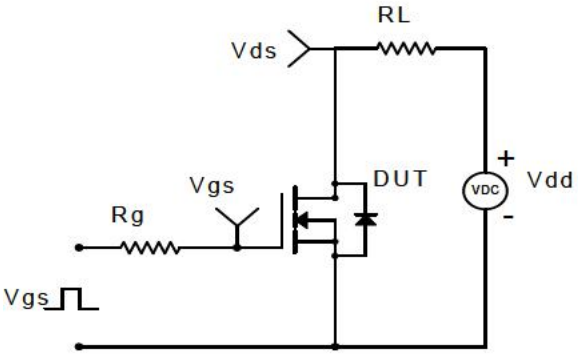
Gate Charge Test Circuit & Waveform

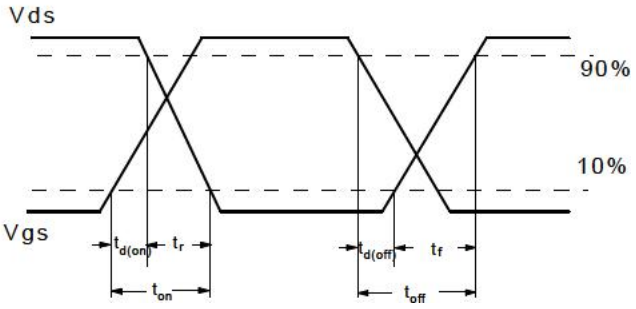




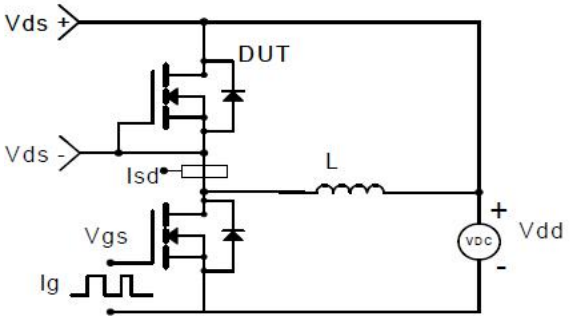
Resistive Switching Test Circuit & Waveforms

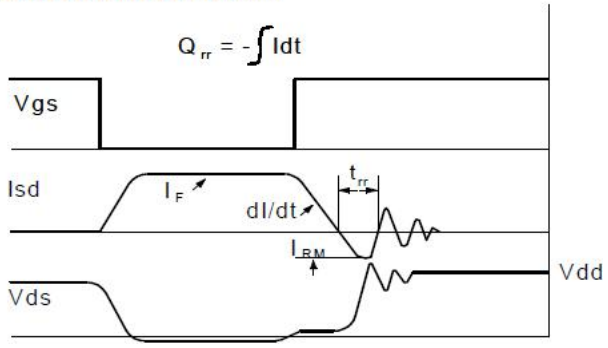
Resistive Switching Test Circuit & Waveforms





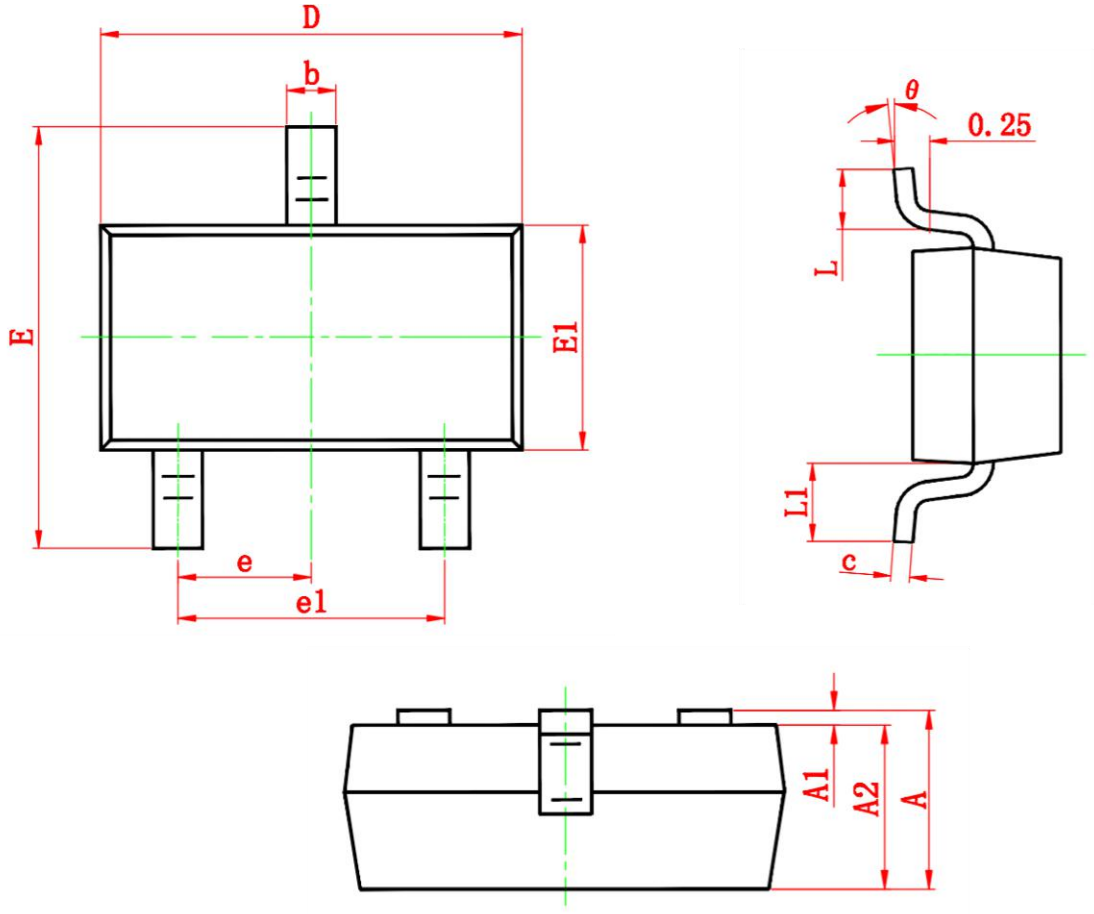
Diode Recovery Test Circuit & Waveforms





Package Information

- **SOT-23**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	2.250	2.550	0.089	0.100
E1	1.200	1.400	0.047	0.055
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.300	0.500	0.012	0.020
L1	0.550 REF.		0.022 REF.	
θ	0°	8°	0°	8°