

### N-Channel Enhancement Mode MOSFET

#### Description

The PECN3400MR 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

- ◆  $V_{DS} = 30V$ ,  $I_D = 5.8A$   
 $R_{DS(ON)}(Typ.) = 28m\Omega$  @  $V_{GS} = 2.5V$   
 $R_{DS(ON)}(Typ.) = 22m\Omega$  @  $V_{GS} = 4.5V$
- ◆ High power and current handling capability
- ◆ Lead free product is acquired
- ◆ Surface mount package

#### Application

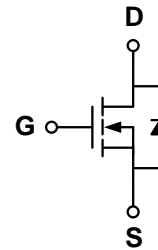
- ◆ PWM applications
- ◆ Load switch

#### Package

- ◆ SOT-23-3L

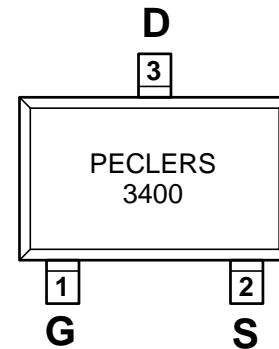


#### Schematic diagram



#### Marking and pin assignment

SOT-23-3L  
(TOP VIEW)



#### Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
PECN3400MR	-55°C to +150°C	SOT-23-3L	3000

#### Absolute Maximum Ratings (TA=25°C unless otherwise noted)

parameter	symbol	limit	unit
Drain-source voltage	$V_{DS}$	30	V
Gate-source voltage	$V_{GS}$	±12	V
Continuous Drain Current	$I_D$	$T_A = 25^\circ C$	5.8
		$T_A = 70^\circ C$	5.0
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	30	A
Maximum power dissipation <sup>B</sup>	$P_D$	$T_A = 25^\circ C$	1.4
		$T_A = 70^\circ C$	0.9
Operating junction Temperature range	$T_j$	-55—150	°C

#### Thermal Characteristics

Parameter		Symbol	Typ	Max	Unit
Maximum Junction-to-Ambient <sup>A</sup>	≤ 10s	R <sub>θJA</sub>	70	90	°C/W
Maximum Junction-to-Ambient <sup>A D</sup>	Steady-State		100	125	
Maximum Junction-to-Lead <sup>B</sup>	Steady-State	R <sub>θJL</sub>	63	80	

A. The value of R<sub>θJA</sub> is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub> =25°C. The value in any given application depends on the user's specific board design.

B. The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=150°C, using ≤ 10s junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150°C. Ratings are based on low frequency and duty cycles to keep initialT<sub>J</sub>=25°C.

D. The R<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>θJL</sub> and lead to ambient.

### Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Drain-source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-body leakage	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V	-	-	±100	nA
<b>ON Characteristics</b>						
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.5	0.8	1.1	V
Drain-source on-state resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A	-	22	28	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =4A	-	28	38	
Forward transconductance	gfs	V <sub>GS</sub> =5V, I <sub>D</sub> =5.8A	-	33	-	S
<b>Dynamic Characteristics</b>						
Input capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V f=1.0MHz	-	630	-	pF
Output capacitance	C <sub>OSS</sub>		-	76	-	
Reverse transfer capacitance	C <sub>RSS</sub>		-	55	-	
<b>Switching Characteristics</b>						
Turn-on delay time	t <sub>D(ON)</sub>	V <sub>DS</sub> =15V V <sub>GS</sub> =10V R <sub>L</sub> =2.6 ohm R <sub>GEN</sub> =3ohm	-	3	-	ns
Rise time	t <sub>r</sub>		-	2.5	-	
Turn-off delay time	t <sub>D(OFF)</sub>		-	25	-	
Fall time	t <sub>f</sub>		-	4	-	
Total gate charge	Qg	V <sub>DS</sub> =15V, I <sub>D</sub> =5.8A V <sub>GS</sub> =4.5V	-	6	-	nC
Gate-source charge	Qgs		-	1.3	-	
Gate-drain charge	Qgd		-	1.8	-	
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode forward voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A	-	0.76	1.16	V

### Typical Performance Characteristics

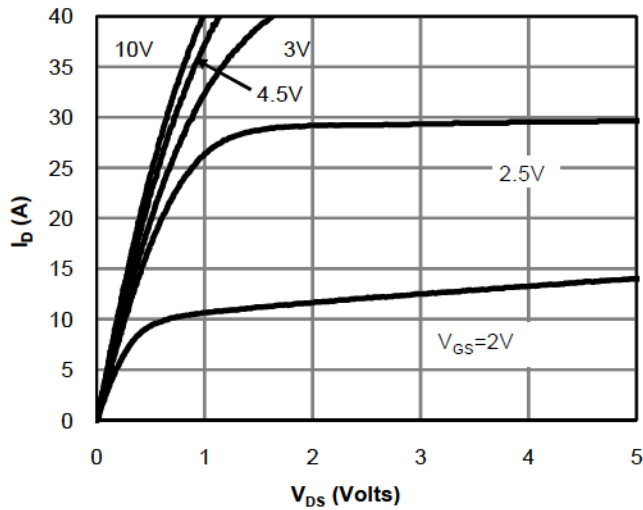


Fig 1: On-Region Characteristics (Note E)

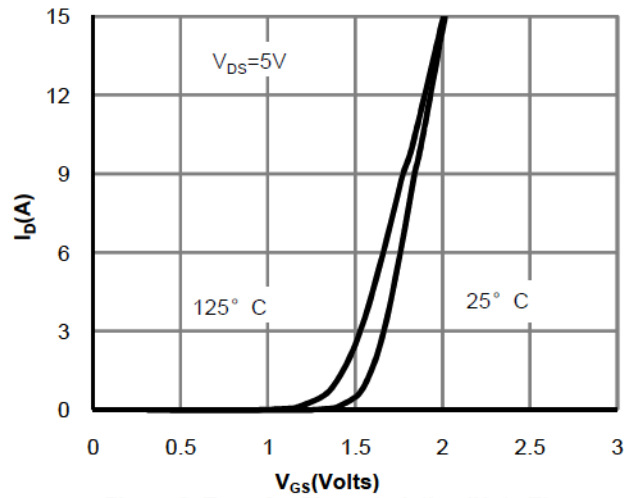


Figure 2: Transfer Characteristics (Note E)

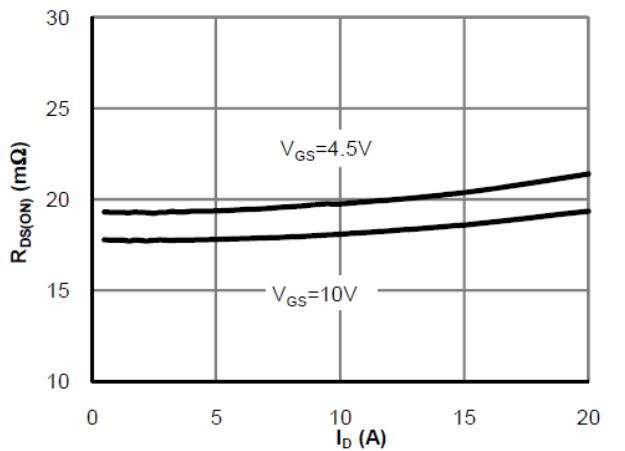


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

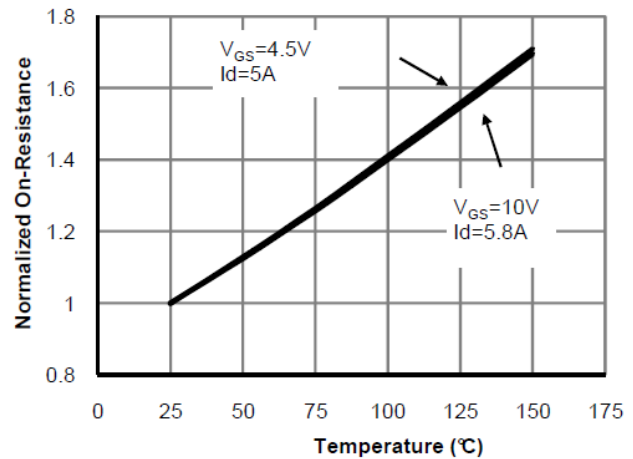


Figure 4: On-Resistance vs. Junction Temperature (Note E)

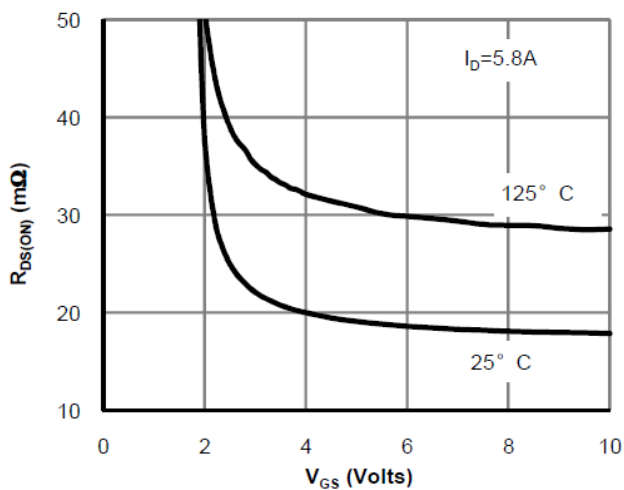


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

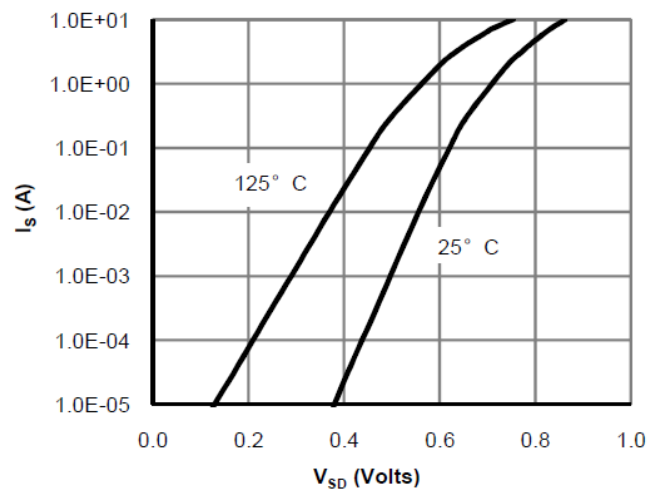


Figure 6: Body-Diode Characteristics (Note E)

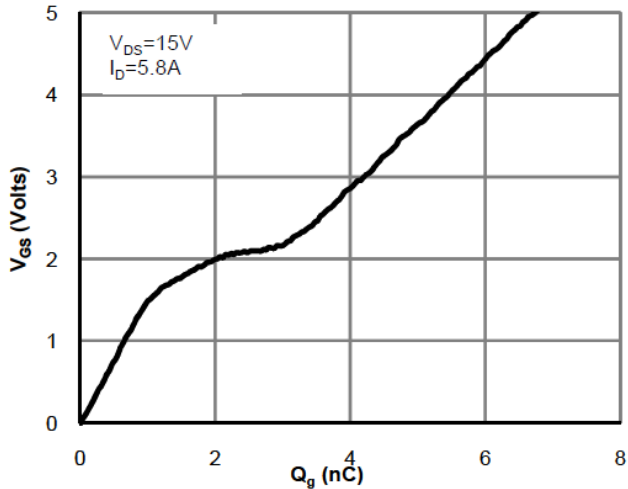


Figure 7: Gate-Charge Characteristics

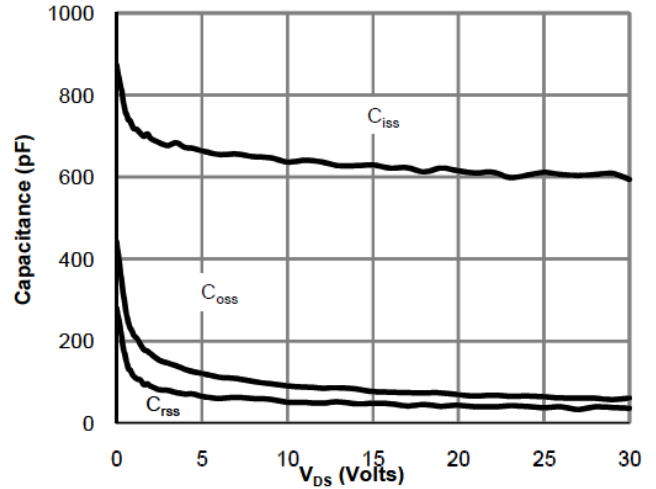


Figure 8: Capacitance Characteristics

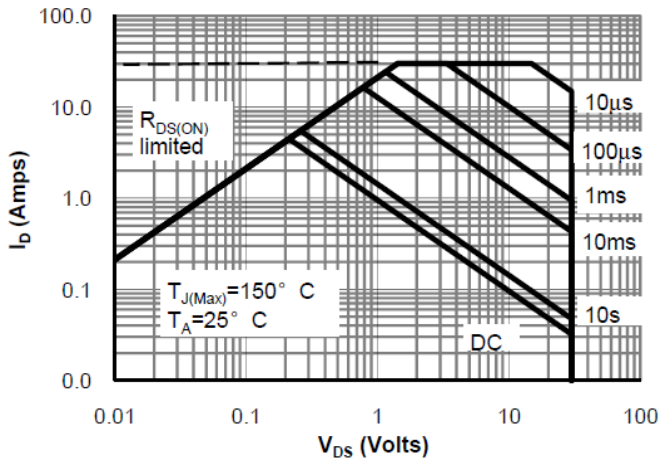


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

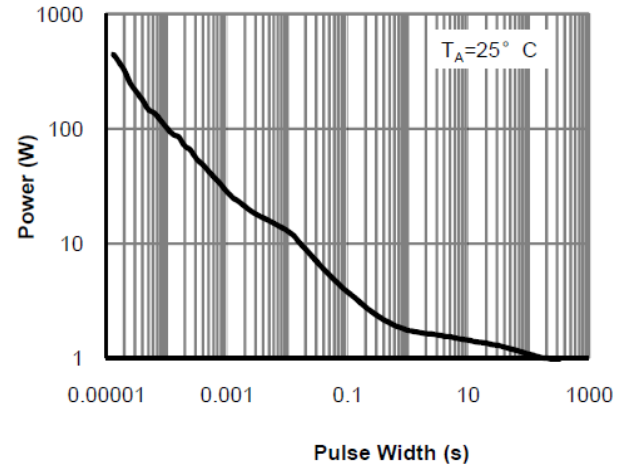


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

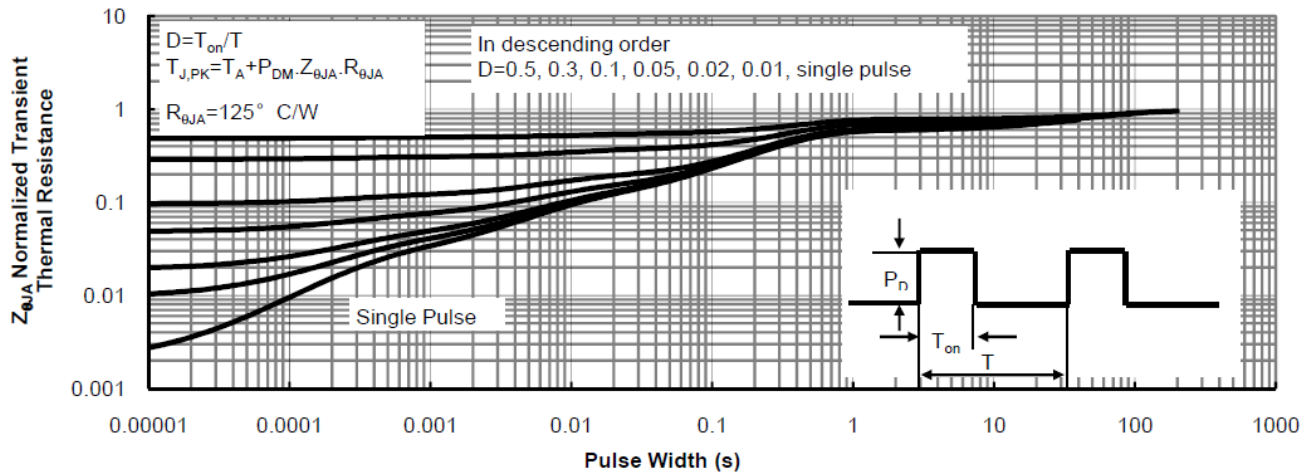
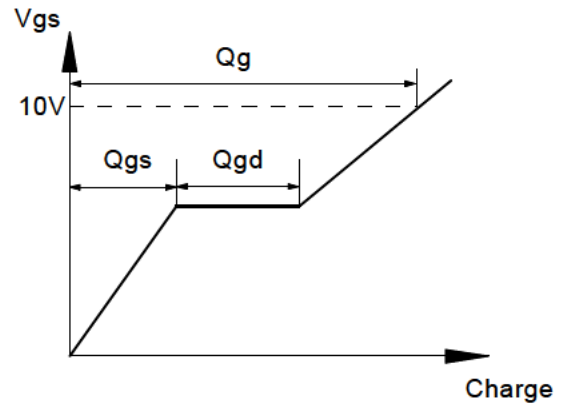
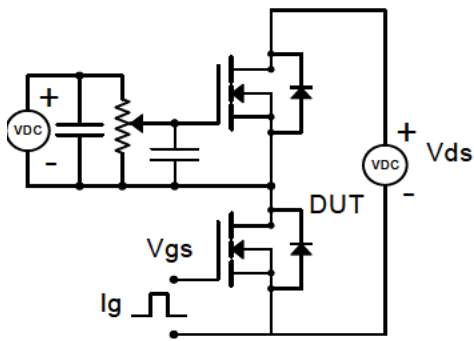


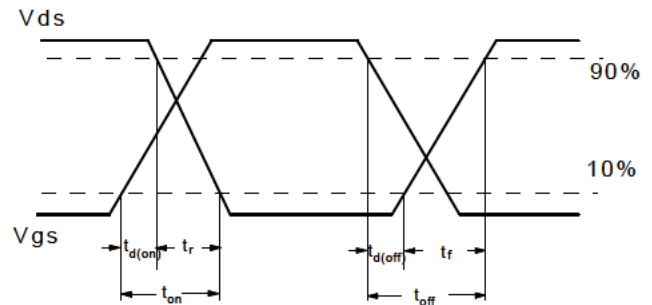
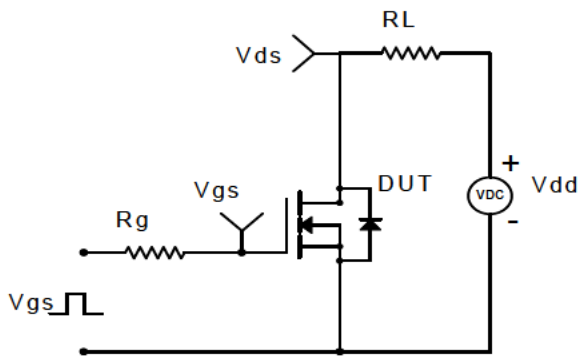
Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

### Gate Charge Test Circuit & Waveform

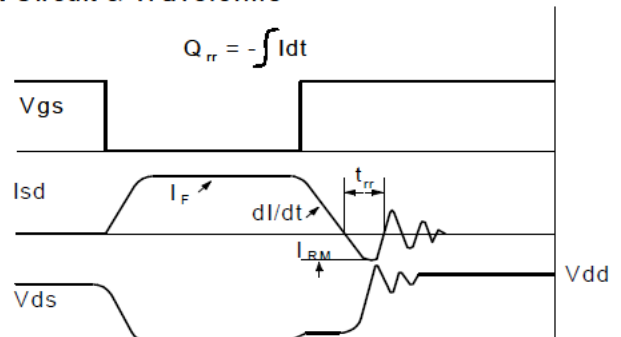
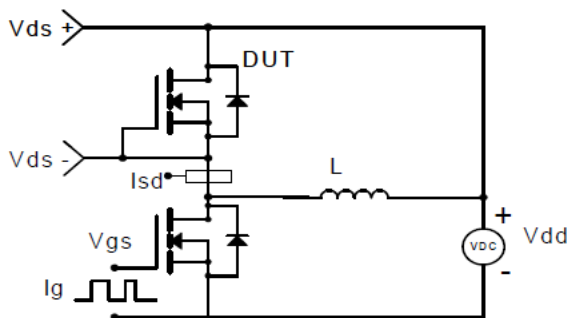


### Resistive Switching Test Circuit & Waveforms

#### Resistive Switching Test Circuit & Waveforms

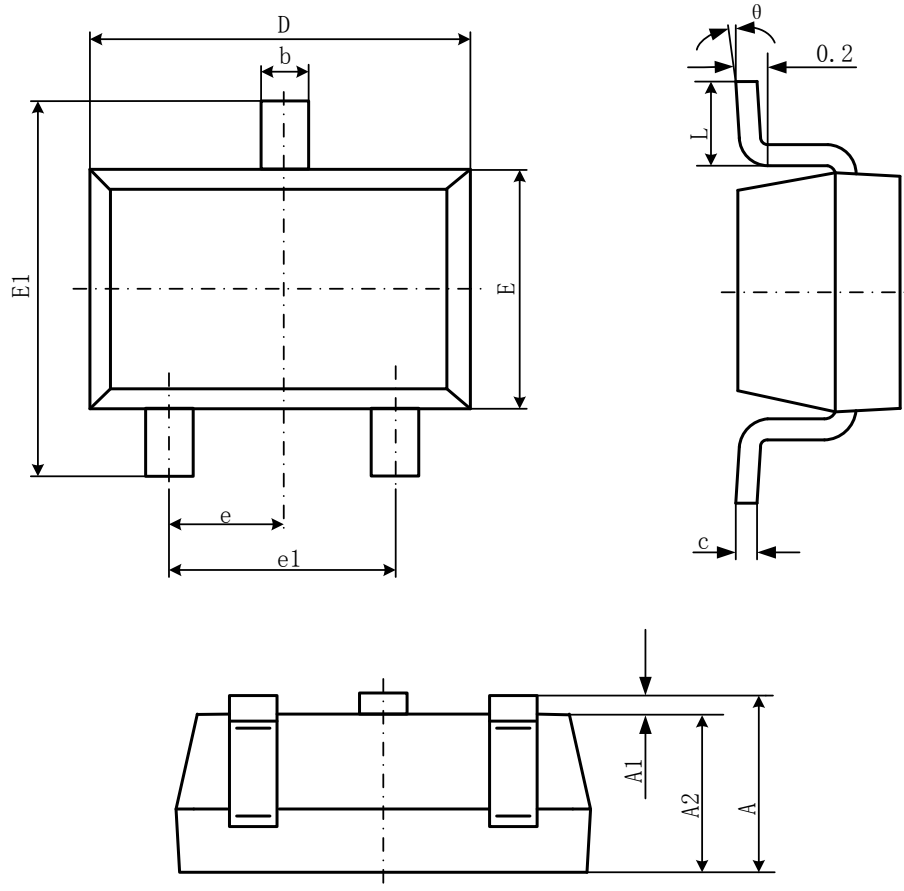


### Diode Recovery Test Circuit & Waveforms



### Package Information

- SOT-23-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°