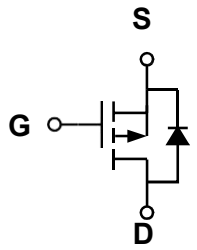
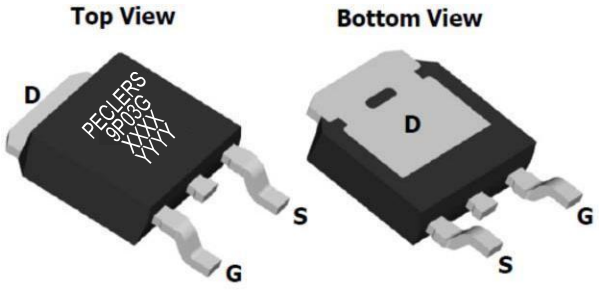
30V P-Channel Enhancement Mode MOSFET

Schematic diagram



Marking and pin assignment



XXXX—Date Code

YYYY—Quality Code

Description

The PECN9P03G uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

- V_{DS} =-30V I_D =-25A
  $R_{DS(ON)}$(Typ.)=14.5mΩ @V_{GS}=-10V
  $R_{DS(ON)}$(Typ.)=19.5mΩ @V_{GS}=-4.5V
  High power and current handing capability
- Lead free product is acquired
- Surface mount package

Application

- Load switch

Package

- TO-252-2L

Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
PECN9P03G	-55°C to +150°C	TO-252-2L	2500

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
Continuous Drain Current	TC=25°C	I_D	-25	A
	TC=100°C		-16	
Pulsed Drain Current		I_{DP}	-100	A
Avalanche Current		IAS	-15	A
Avalanche energy(L=0.5mH)		EAS	170	mJ
Maximum power dissipation	TC=25°C	P_D	85	W
	TC=100°C		44	
Operating junction Temperature range		Tj	-55—150	℃

Electrical Characteristics (TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static 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
		T_J=85°C	-	-	30	
Gate Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.2	-1.6	-2.5	V
Drain-source on-state resistance[1]	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-10A	-	14.5	20	mΩ
		V_{GS}=-4.5V, I_D=-7A	-	19.5	25	
On Status Drain Current	$I_{D(ON)}$	V_{DS}=-15V, V_{GS}=-10V	25	-	-	A
Diode Characteristics						
Diode Forward Voltage[1]	V_{SD}	I_{SD}=-25A,V_{GS}=0V	-	-0.8	-1.3	V
Diode Continuous Forward Current	I_S		-	-25	-	A
Reverse Recovery Time	t_{rr}	I_F=-15A, dI/dt=-100A/us	-	24	-	ns
Reverse Recovery Charge	Q_{rr}		-	16	-	nC
Dynamic Characteristics[2]						
Gate Resistance	R_G	V_{GS}=0V, V_{DS}=0V,f=1MHz	-	0.65	-	Ω
Input capacitance	C_{ISS}	V_{GS}=0V ,V_{DS}=-15V f=1.0MHz	-	1360	-	pF
Output capacitance	C_{OSS}		-	250	-	
Reverse transfer capacitance	C_{RSS}		-	210	-	
Turn-on delay time	$t_{D(ON)}$	V_{GS}=-10V, V_{DD}=-30V, R_L=3Ω, I_D=1A, R_G=2.5Ω	-	9	-	ns
Turn-on Rise time	tr		-	10	-	
Turn-off delay time	$t_{D(OFF)}$		-	50	-	
Turn-off Fall time	tf		-	20	-	
Total gate charge	Q_g	V_{GS}=-10V,I_D=-15A V_{DS}=-15V	-	31		nC
Gate-source charge	Q_{gs}			3		
Gate-drain charge	Q_{gd}		-	9	-	

Note: 1：Pulse test; pulse width ≦ 300ns, duty cycle ≦ 2%.

2：Guaranteed by design, not subject to production testing.

Thermal Characteristics

Parameter	Symbol	Typical	Unit
Thermal Resistance-Junction to Case	Rθjc	1.7	℃/W
Thermal Resistance junction-to ambient	Rθja	62.5	

Typical Performance Characteristics

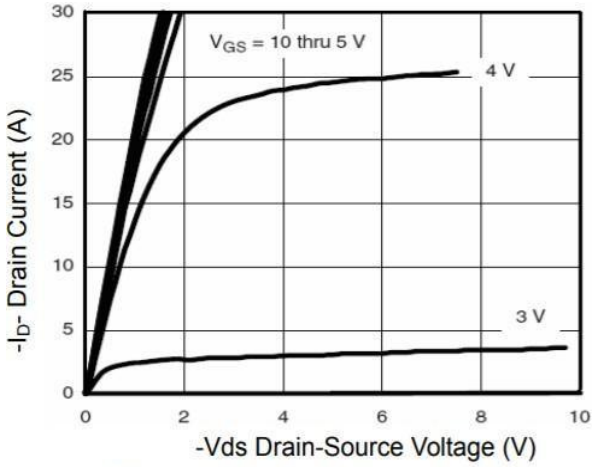


Figure 1 Output Characteristics

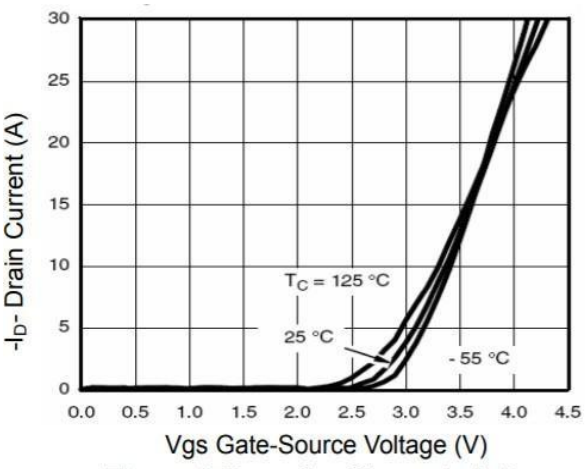


Figure 2 Transfer Characteristics

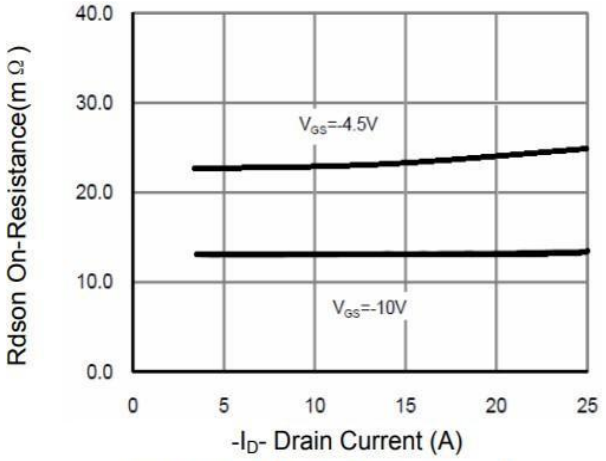


Figure 3 Rdson- Drain Current

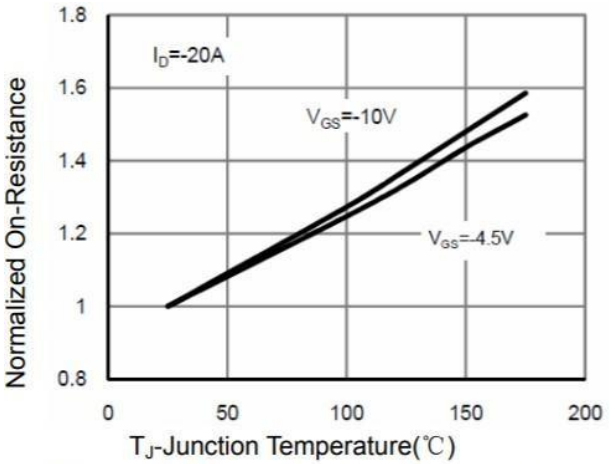


Figure 4 Rdson-Junction Temperature

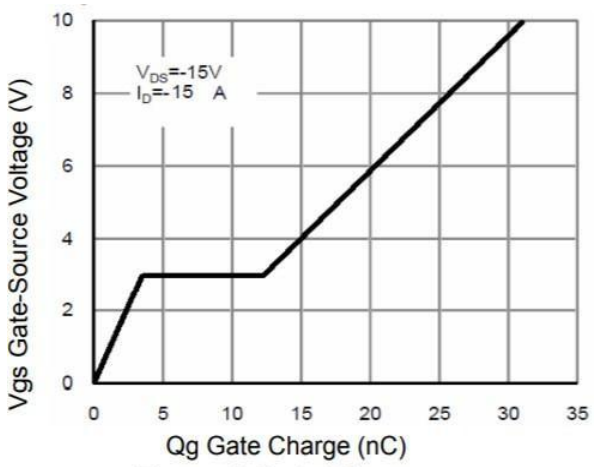


Figure 5 Gate Charge

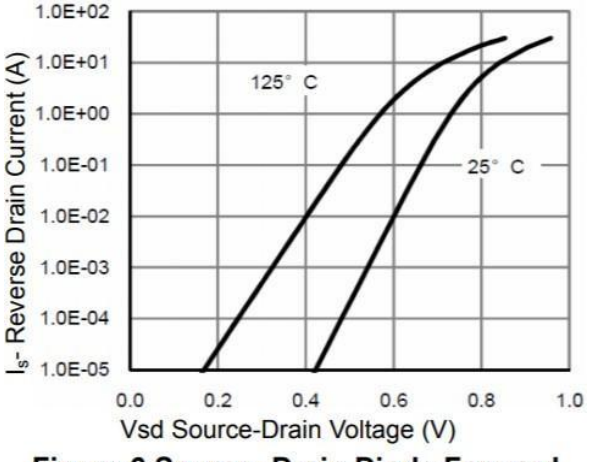


Figure 6 Source- Drain Diode Forward

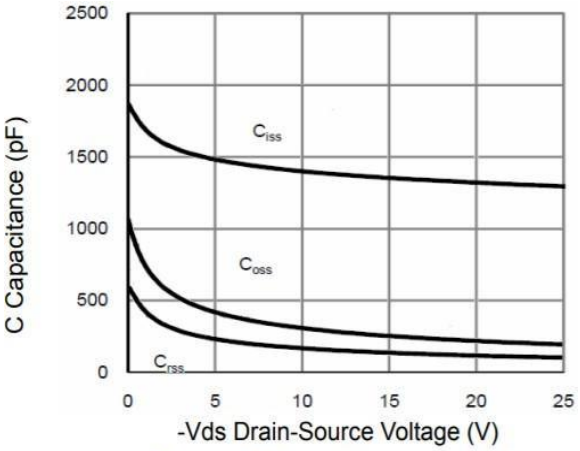


Figure 7 Capacitance vs Vds

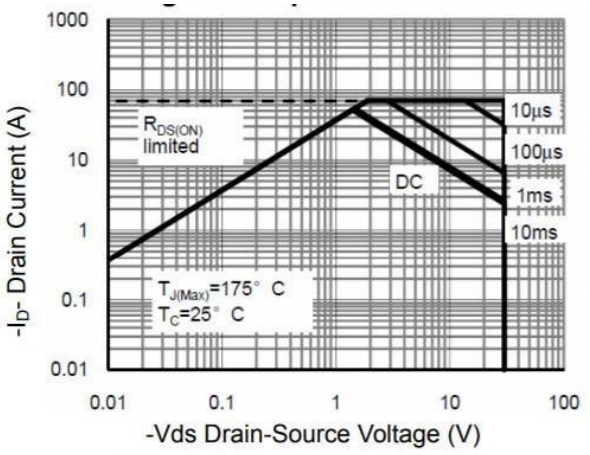


Figure 8 Safe Operation Area

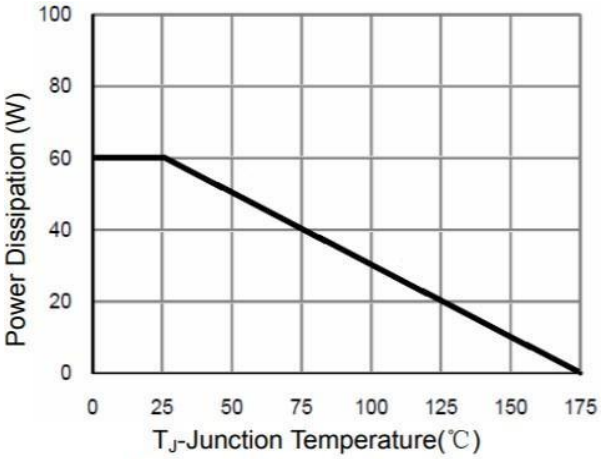


Figure 9 Power De-rating

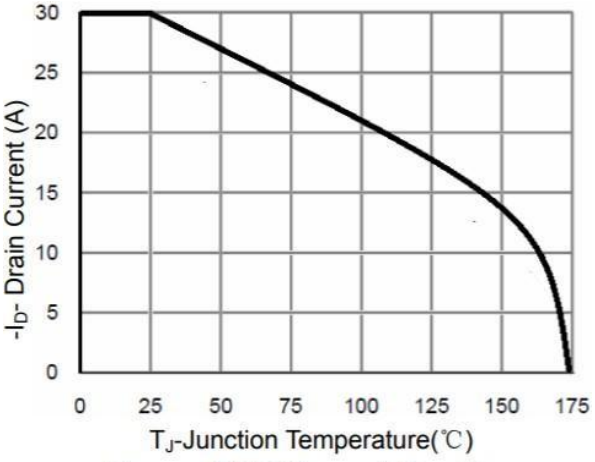


Figure 10 ID Current Derating

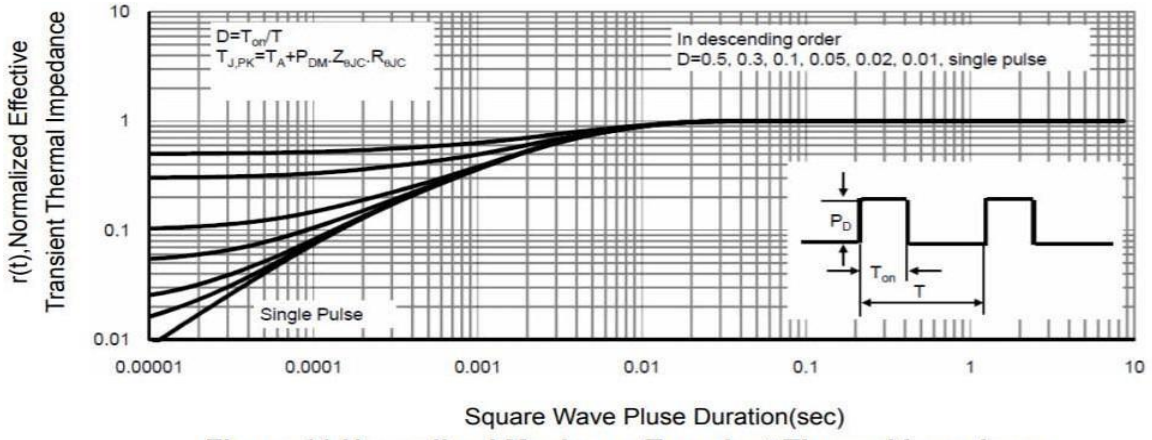


Figure 11 Normalized Maximum Transient Thermal Impedance

Figure A: Gate Charge Test Circuit & Waveforms

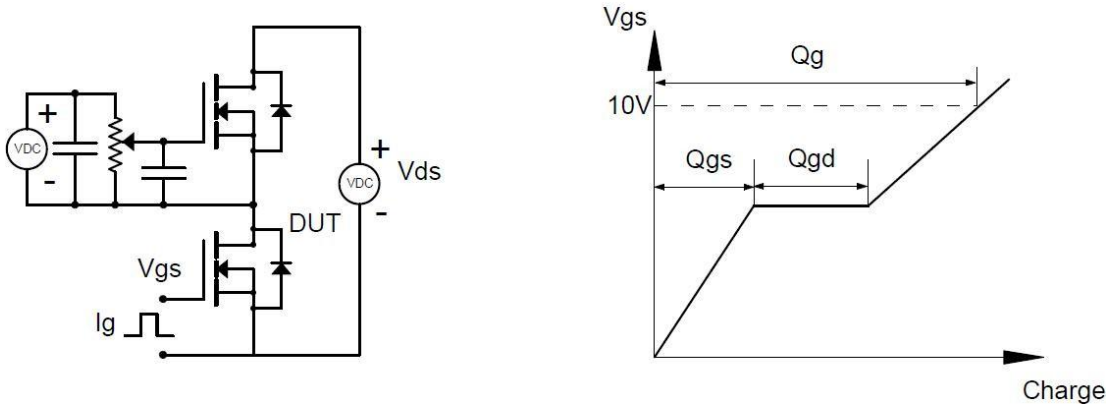


Figure B: Resistive Switching Test Circuit & Waveforms

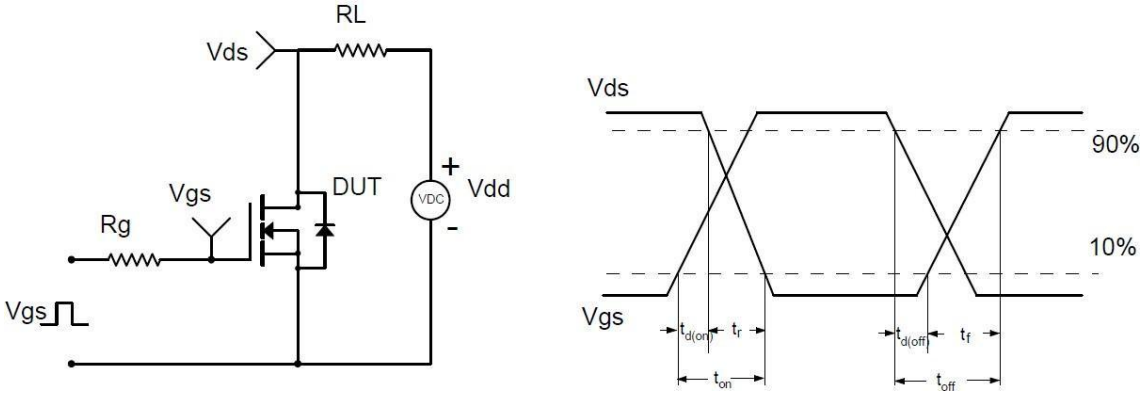


Figure C: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

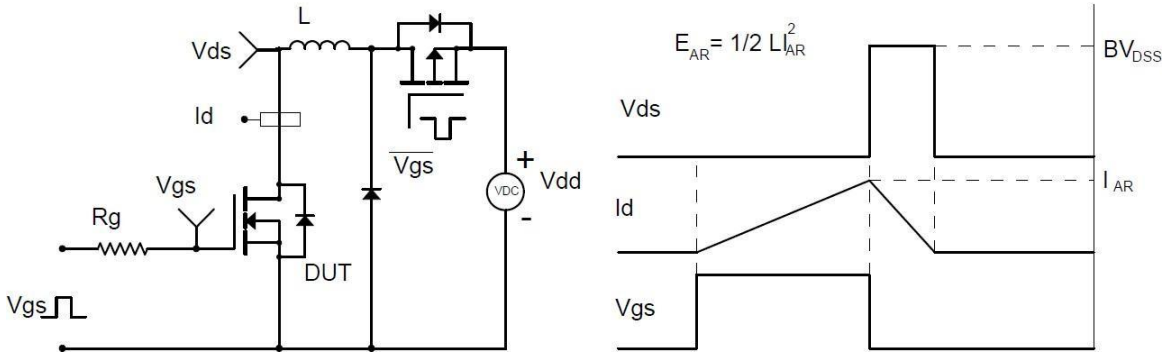
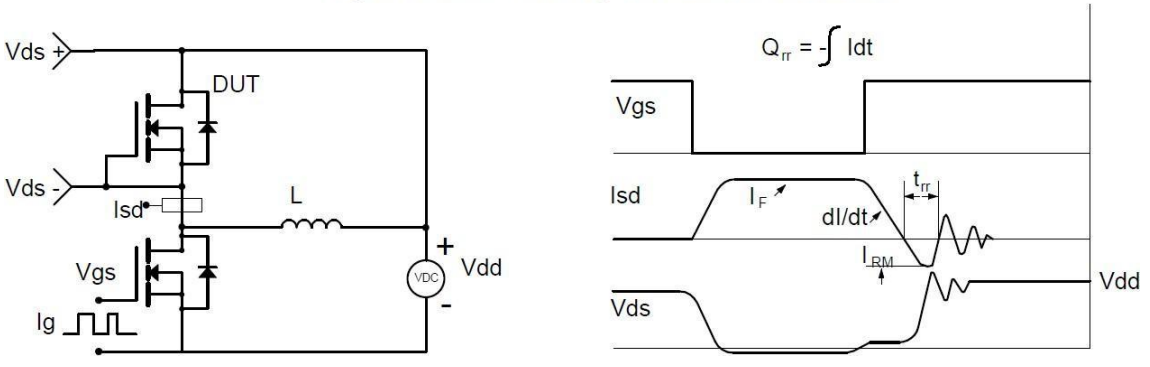
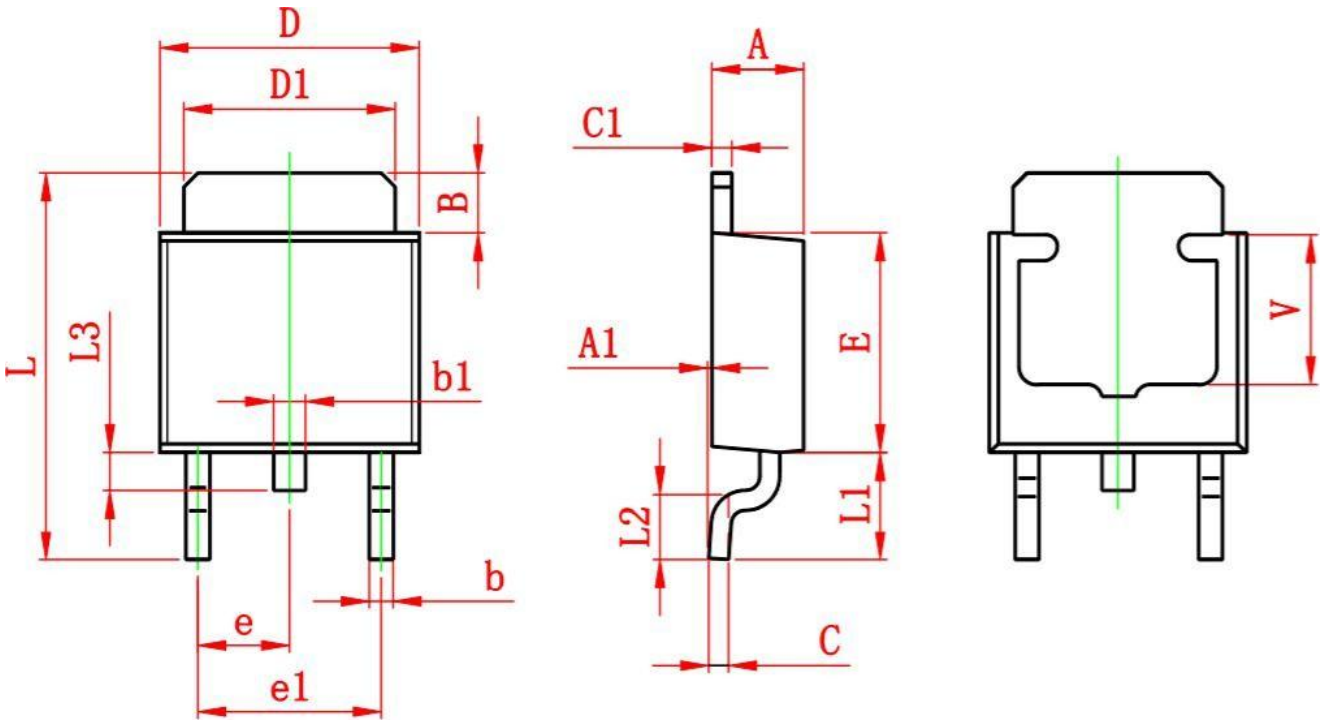


Figure D: Diode Recovery Test Circuit & Waveforms



Package Information

- **TO-252-2L**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800 REF.		0.150 REF.	