

60V N-Channel Enhancement Mode MOSFET

Description

The PECN6003MR 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

- ◆ $V_{DS} = 60V$ $I_D = 3A$
 $R_{DS(ON)} < 90m\Omega$ @ $V_{GS} = 10V$ (Typ: $80m\Omega$)
 $R_{DS(ON)} < 100m\Omega$ @ $V_{GS} = 4.5V$ (Typ: $90m\Omega$)
- ◆ High density cell design for ultra low R_{dson} .
- ◆ Fully characterized avalanche voltage and current.
- ◆ Low gate to drain charge to reduce switching losses.

Application

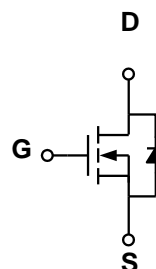
- ◆ Power switching application.
- ◆ Hard switched and high frequency circuits.
- ◆ Uninterruptible power supply.

Package

- ◆ SOT-23-3L

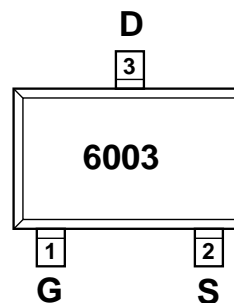


Schematic diagram



Marking and pin assignment

SOT-23-3L
(TOP VIEW)



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
PECN6003M R-G	-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}	60	V	
Gate-source voltage	V_{GS}	±20	V	
Continuous Drain Current	I_D	TC=25°C	3	A
		TC=70°C	2	
Pulsed Drain Current	I_{DP}	12	A	
Maximum power dissipation	P_D	TC=25°C	2	W
Power Dissipation – Derate above 25°C		TC=75°C	1.4	
Operating junction Temperature range	T_j	-55—150	°C	

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
BVDSS Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, $I_D=1mA$		33		mV/°C
Zero gate voltage drain current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	1	μA
		$T_J=85^\circ C$	-	-	30	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.9	2.5	V
Drain-source on-state resistance ¹	$R_{DS(ON)}$	$V_{GS}=10V, I_D=3A$	-	75	90	mΩ
		$V_{GS}=4.5V, I_D=2A$		86	100	
On Status Drain Current	$I_{D(ON)}$	$V_{DS}=10V, V_{GS}=10V$	3	-	-	A
Diode Characteristics						
Diode Forward Voltage	V_{SD}	$I_{SD}=1A, V_{GS}=0V$	-	0.75	1.1	V
Diode Continuous Forward Current	I_S		-	-	3	A
Reverse Recovery Time	t_{rr}	$I_F=1.5A,$	-	15	-	ns
Reverse Recovery Charge	Q_{rr}	$dI/dt=100A/us$	-	12	-	nC
Dynamic Characteristics²						
Gate Resistance	R_G	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	-	2.0	-	Ω
Input capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=25V$ $f=1.0MHz$	-	175	-	pF
Output capacitance	C_{OSS}		-	21	-	
Reverse transfer capacitance	C_{RSS}		-	13	-	
Turn-on delay time	$t_{D(ON)}$	$V_{GS}=10V, V_{DD}=30V,$ $R_L=4.7\Omega, I_D=1.5A,$ $R_G=3.3\Omega$	-	15	-	ns
Turn-on Rise time	t_r		-	16	-	
Turn-off delay time	$t_{D(OFF)}$		-	10	-	
Turn-off Fall time	t_f		-	10	-	
Total gate charge	Q_g	$V_{GS}=10V, I_D=2A$ $V_{DS}=30V$	-	4.1		nC
Gate-source charge	Q_{gs}			0.8		
Gate-drain charge	Q_{gd}		-	1	-	

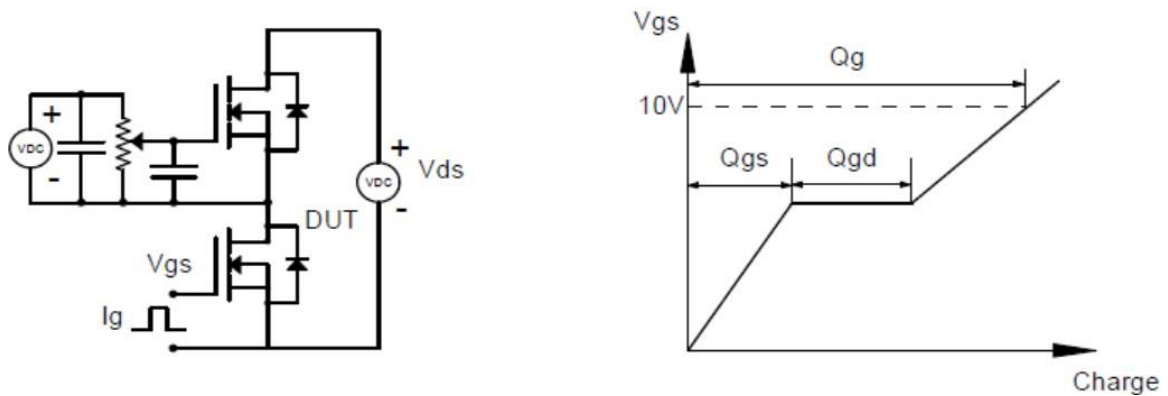
Note: 1: Pulse test; pulse width $\leq 300ns$, duty cycle $\leq 2\%$.

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

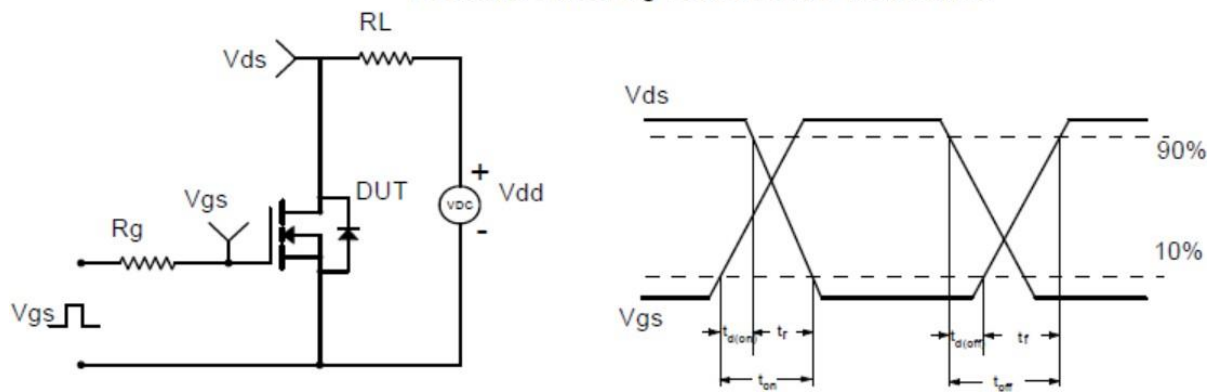
Thermal Characteristics

Parameter	Symbol	Typical	Unit
Thermal Resistance-Junction to Case	$R_{\theta jc}$	60	°C/W
Thermal Resistance junction-to ambient	$R_{\theta ja}$	90	

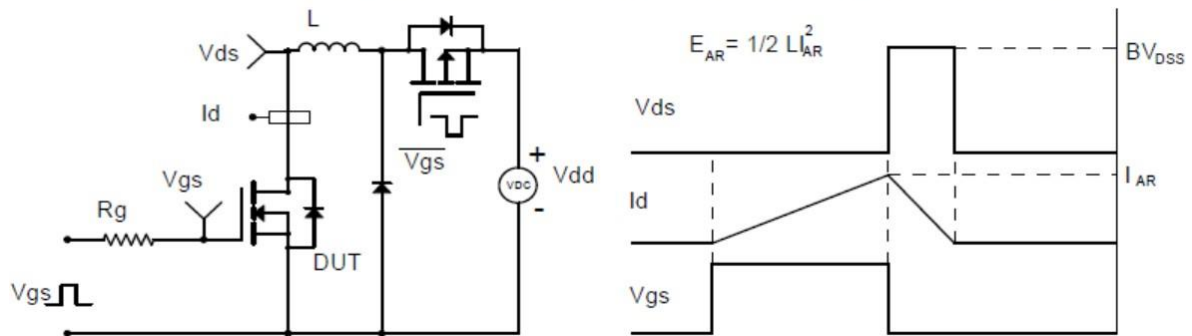
Gate Charge Test Circuit & Waveform



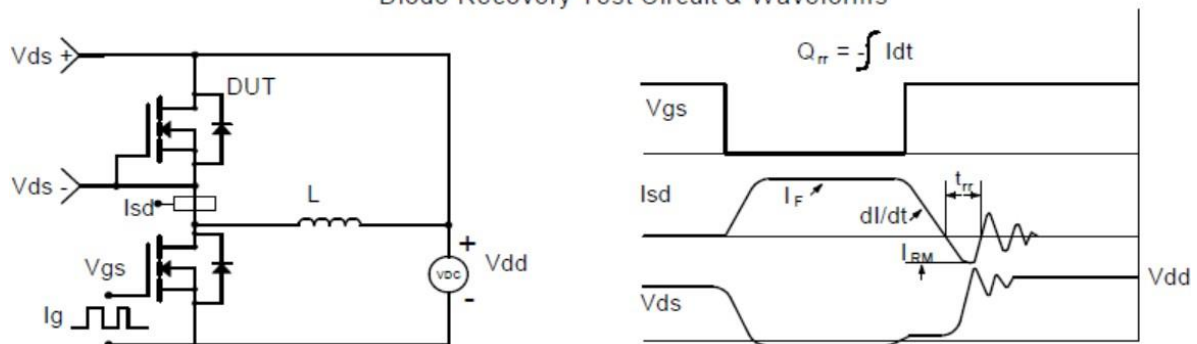
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

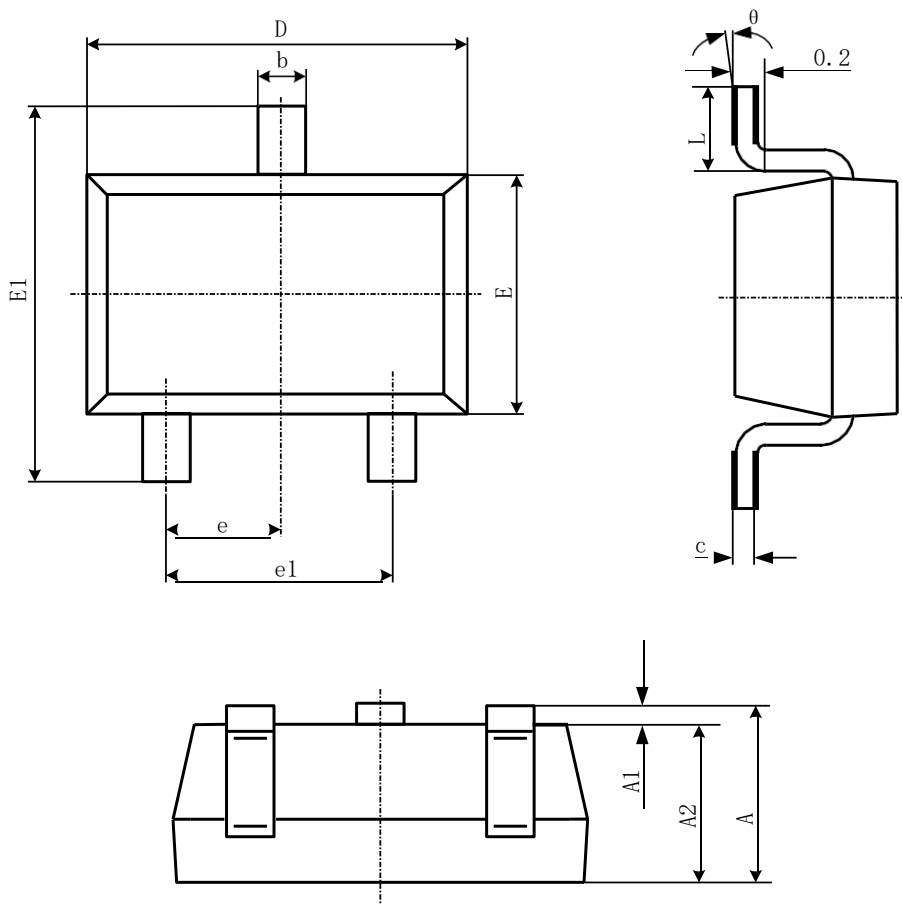


Diode Recovery Test Circuit & Waveforms



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°