

100V N-Channel Enhancement Mode MOSFET

Description

The PECN2N10VR 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

- ◆ $V_{DS} = 100V$, $I_D = 2A$
 $R_{DS(ON)}(Typ.) = 220m\Omega$ @ $V_{GS} = 10V$
 $R_{DS(ON)}(Typ.) = 240m\Omega$ @ $V_{GS} = 4.5V$
- ◆ High power and current handing capability
- ◆ Lead free product is acquired
- ◆ Surface mount package

Application

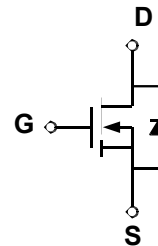
- ◆ PWM applications
- ◆ Load switch

Package

- ◆ SOT-23

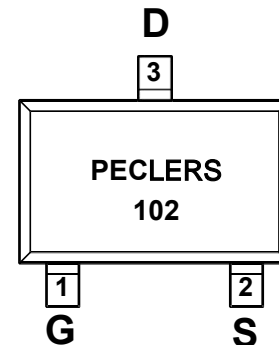


Schematic diagram



Marking and pin assignment

SOT-23
(TOP VIEW)



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
PECN2N10VR	-55°C to +150°C	SOT-23	3000

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

parameter	symbol	limit	unit	
Drain-source voltage	V_{DS}	100	V	
Gate-source voltage	V_{GS}	±20	V	
Continuous Drain Current ($T_J = 150^\circ C$)	I_D	$T_C = 25^\circ C$	2	A
		$T_C = 70^\circ C$	1.7	
		$T_A = 25^\circ C$	1.6 ^{b,c}	
		$T_A = 70^\circ C$	1.3 ^{b,c}	
Continuous Source-Drain Diode Current	I_S	$T_C = 25^\circ C$	2.1	
		$T_A = 25^\circ C$	1 ^{b,c}	
Pulsed Drain Current ($t = 300 \mu s$)	I_{DM}	5		

Maximum power dissipation	T _C =25°C	P _D	2.5	W
	T _C =70°C		1.6	
	T _A =25°C		1.25 ^{b,c}	
	T _A =70°C		0.8 ^{b,c}	
Operating Junction and Storage Temperature Range		T _J , T _{STG}	-55—150	°C

Thermal Characteristics

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, d}	R _{θJA}	100	130	°C/W
Maximum Junction-to-Foot (Drain)	R _{θJF}	60	75	

Notes:

a: T_C = 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 (T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	100	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =100V, 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	1.2	1.9	2.5	V
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} =10V, I _D =2A	-	220	240	mΩ
		V _{GS} =4.5V, I _D =2A	-	240	260	
Forward transconductance	g _{fs}	V _{DS} =5V, I _D =1A	1	-	-	S
Dynamic Characteristics						
Input capacitance	C _{ISS}	V _{DS} =50V, V _{GS} =0V f=1.0MHz	-	190	-	pF
Output capacitance	C _{OSS}		-	22	-	
Reverse transfer capacitance	C _{RSS}		-	13	-	
Switching Characteristics						
Turn-on delay time	t _{d(ON)}	V _{DD} =50V R _L =39ohm V _{GS} =10V R _G =1ohm	-	6	-	ns
Rise time	t _r		-	10	-	
Turn-off delay time	t _{d(OFF)}		-	10	-	
Fall time	t _f		-	6	-	
Total gate charge	Q _g	V _{DS} =50V I _D =1.3A V _{GS} =10V	-	5.2	-	nC
Gate-source charge	Q _{gs}		-	0.75	-	
Gate-drain charge	Q _{gd}		-	1.4	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V _{SD}	V _{GS} =0V, I _S =2A	-	0.76	1.16	V

Typical Performance Characteristics

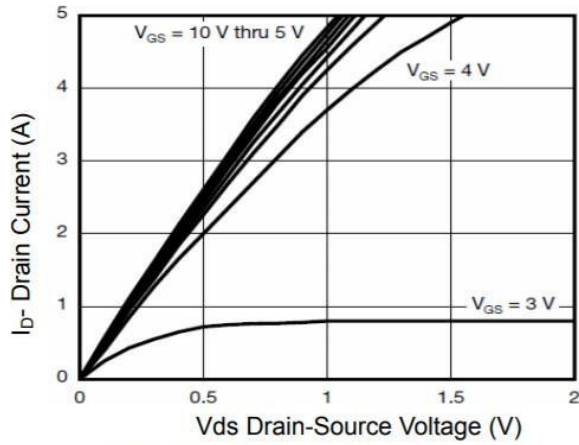


Figure 1 Output Characteristics

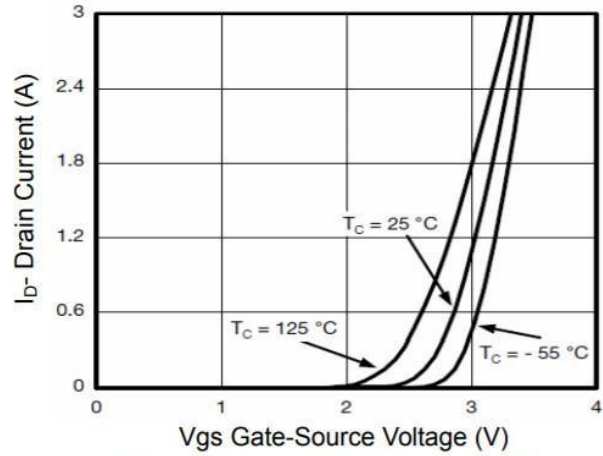


Figure 2 Transfer Characteristics

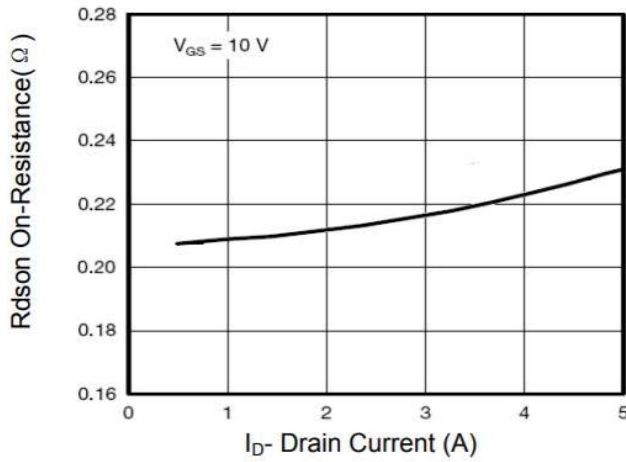


Figure 3 Rdson- Drain Current

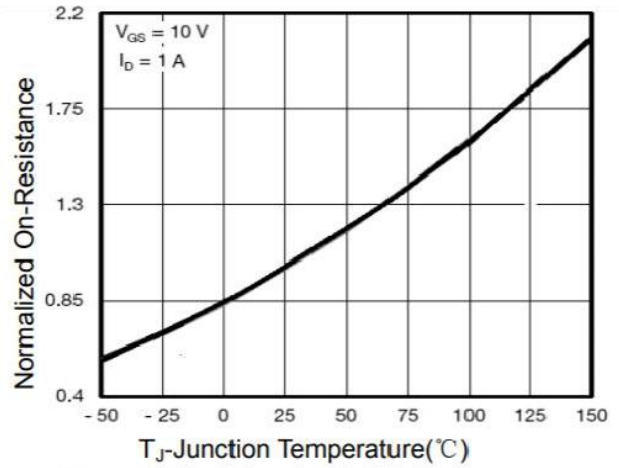


Figure 4 Rdson-Junction Temperature

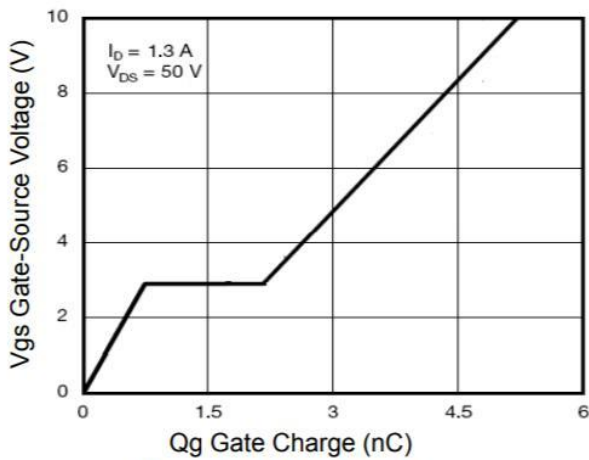


Figure 5 Gate Charge

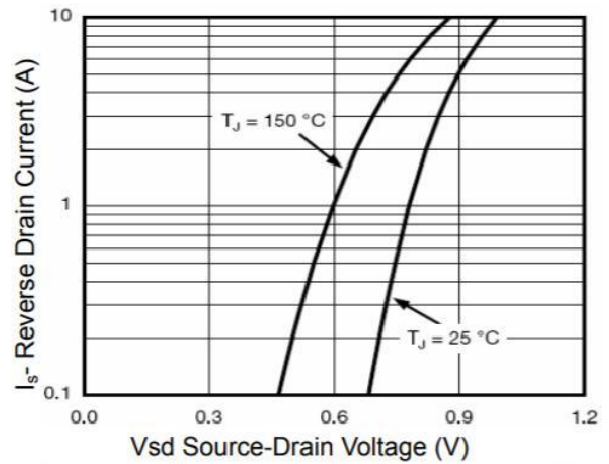


Figure 6 Source- Drain Diode Forward

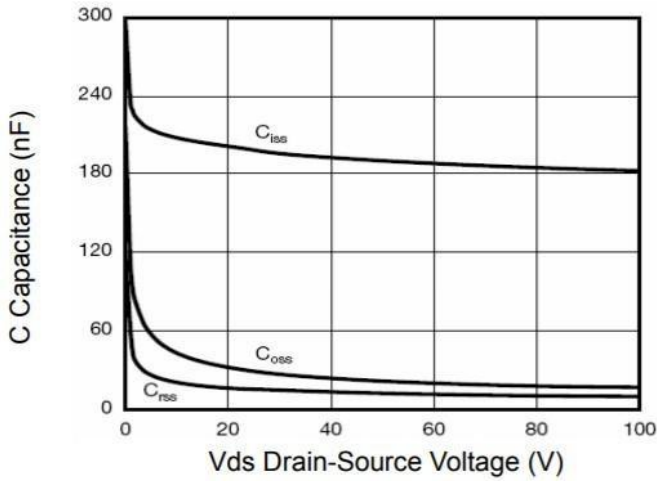


Figure 7 Capacitance vs Vds

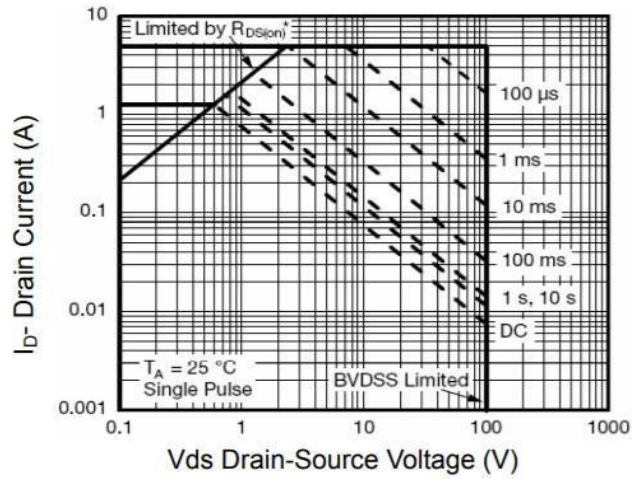


Figure 8 Safe Operation Area

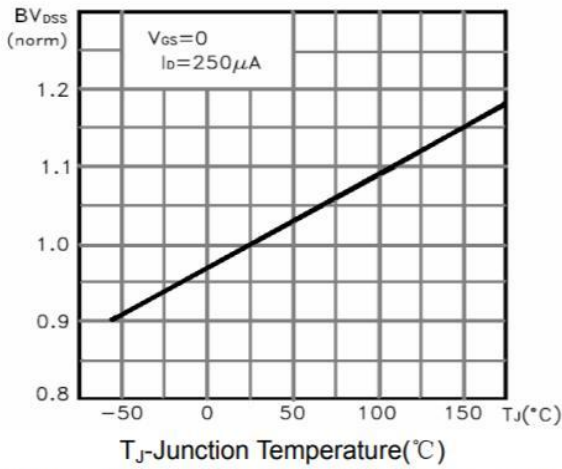


Figure 9 BV_{DSS} vs Junction Temperature

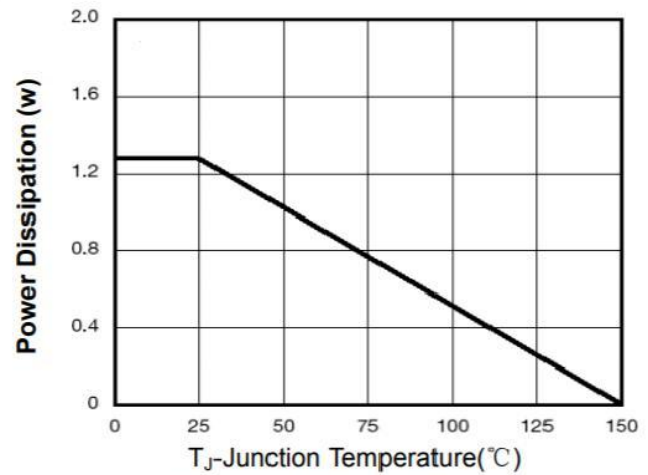


Figure 10 Power De-ratin

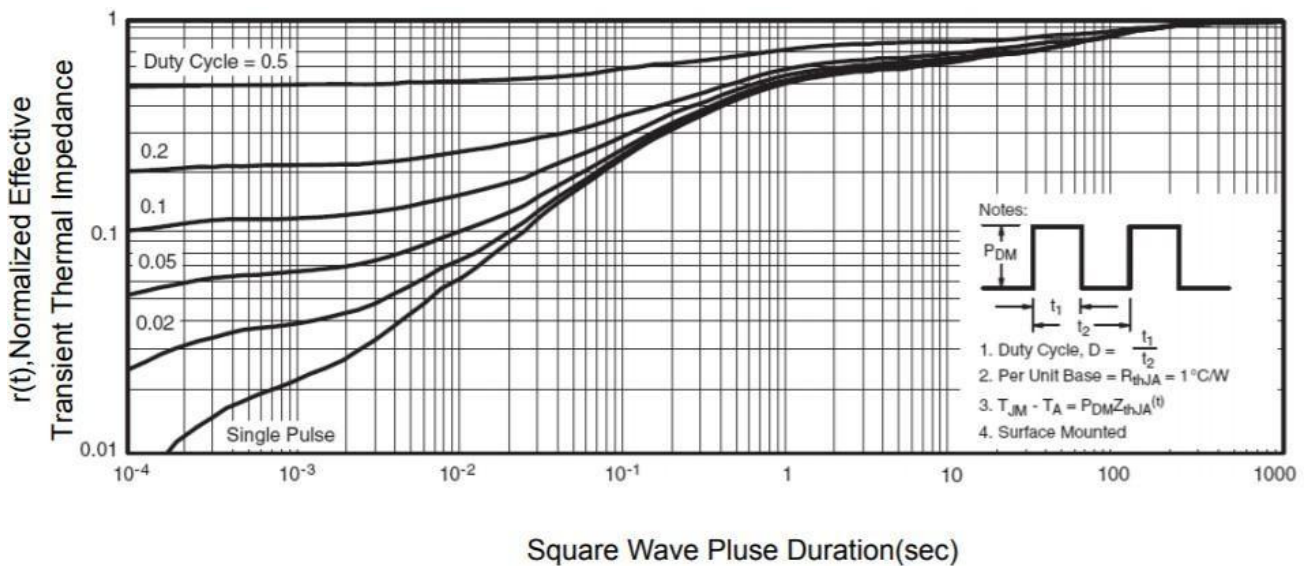
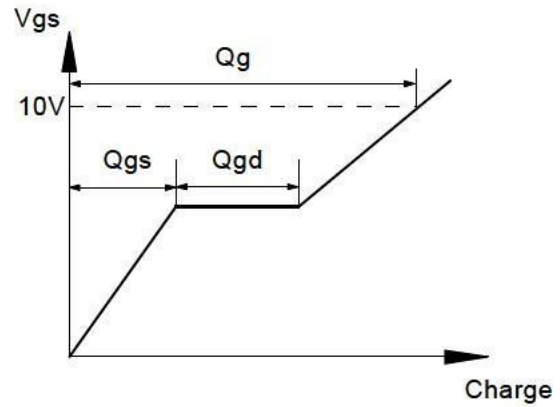
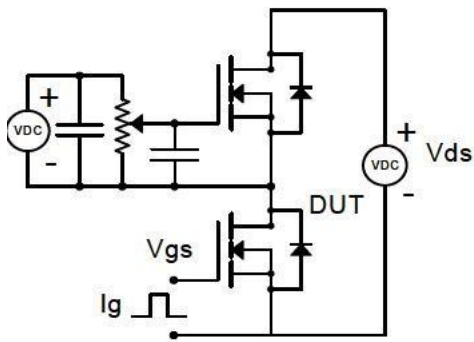


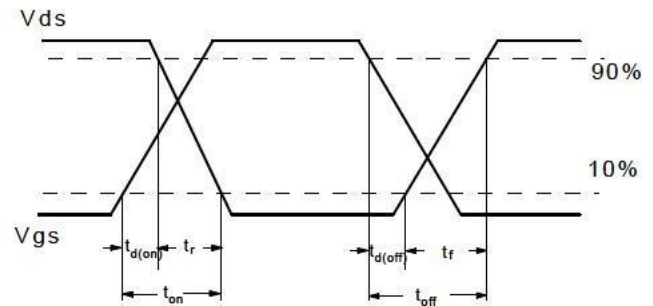
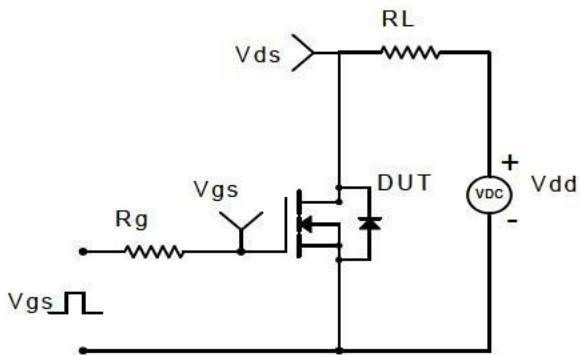
Figure 11 Normalized Maximum Transient Thermal Impedance

Gate Charge Test Circuit & Waveform

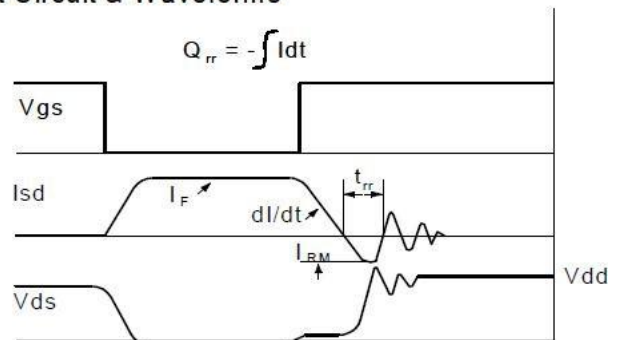
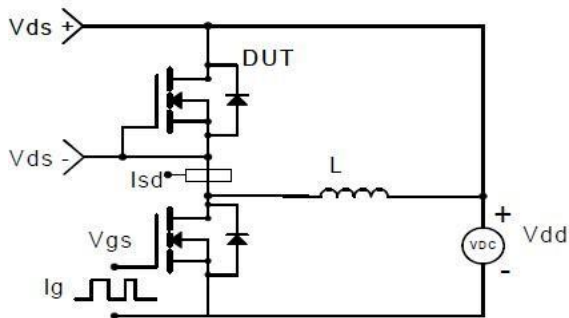


Resistive Switching Test Circuit & Waveforms

Resistive Switching Test Circuit & Waveforms

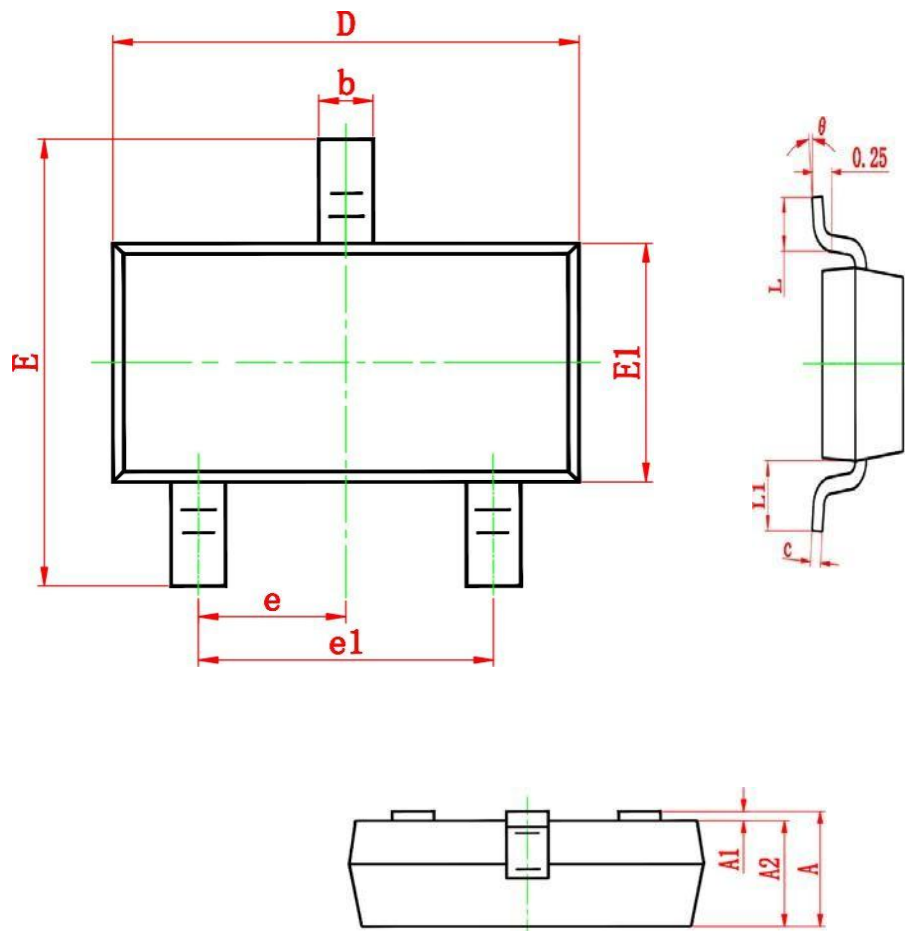


Diode Recovery Test Circuit & Waveforms



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°