

## 30V N-Channel Enhancement Mode MOSFET

### Description

The PECN3402MR 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

- ◆  $V_{DS} = 30V$ ,  $I_D = 4A$
- $R_{DS(ON)}(Typ.) = 37.5m\Omega$  @  $V_{GS} = 10V$
- $R_{DS(ON)}(Typ.) = 40m\Omega$  @  $V_{GS} = 4.5V$
- $R_{DS(ON)}(Typ.) = 48m\Omega$  @  $V_{GS} = 2.5V$
- ◆ High power and current handling capability
- ◆ Lead free product is acquired
- ◆ Surface mount package

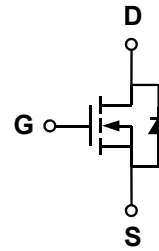
### Application

- ◆ PWM applications
- ◆ Load switch

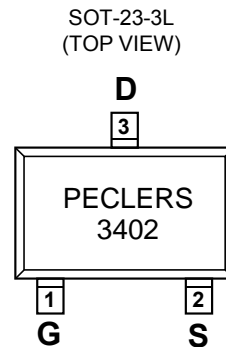
### Package

- ◆ SOT-23-3L

### Schematic diagram



### Marking and pin assignment



342— PECN3402MR  
L— Package Information



### Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
PECN3402MR	-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	$V_{GS}$	$\pm 12$	V	
Continuous Drain Current	$I_D$	$T_A = 25^\circ C$	4	A
		$T_A = 70^\circ C$	3.2	A
Pulsed Drain Current	$I_{DM}$	16	A	
Maximum power dissipation	$P_D$	$T_A = 25^\circ C$	1.4	W
		$T_A = 70^\circ C$	0.9	
Operating junction Temperature range	$T_j$	-55—150	°C	

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Drain-source breakdown voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-body leakage	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 12V$	-	-	$\pm 100$	nA
<b>ON Characteristics</b>						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.75	1.5	V
Drain-source on-state resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=4A$	-	37.5	45.0	m $\Omega$
		$V_{GS}=4.5V, I_D=3A$		40.0	55.0	
		$V_{GS}=2.5V, I_D=2A$		48.0	65.0	
Forward transconductance	$g_{fs}$	$V_{GS}=5V, I_D=3.6A$	-	14	-	S
<b>Dynamic Characteristics</b>						
IPECNut capacitance	$C_{ISS}$	$V_{DS}=15V, V_{GS}=0V$ $f=1.0MHz$	-	235	-	pF
Output capacitance	$C_{OSS}$		-	35	-	
Reverse transfer capacitance	$C_{RSS}$		-	18	-	
<b>Switching Characteristics</b>						
Turn-on delay time	$t_{D(ON)}$	$V_{DS}=15V$ $V_{GS}=10V$ $R_L=2.6\ ohm$ $R_{GEN}=3ohm$	-	3.5	-	ns
Rise time	$t_r$		-	1.5	-	
Turn-off delay time	$t_{D(OFF)}$		-	17.5	-	
Fall time	$t_f$		-	2.5	-	
Total gate charge	$Q_g$	$V_{DS}=15V, I_D=4A$ $V_{GS}=10V$	-	10	-	nC
Gate-source charge	$Q_{gs}$		-	0.95	-	
Gate-drain charge	$Q_{gd}$		-	1.6	-	
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode forward voltage	$V_{SD}$	$V_{GS}=0V, I_s=1A$	-	0.82	1.16	V

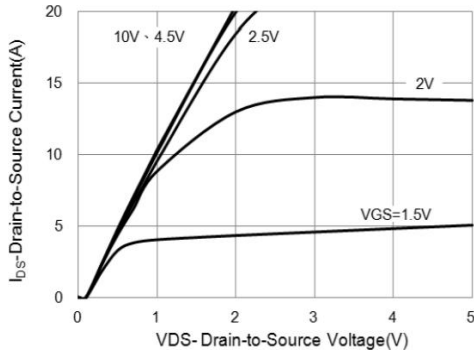
## Thermal Characteristics

Parameter		Symbol	Typ	Max	Unit
Maximum Junction-to-Ambient <sup>A</sup>	$\leq 10s$	$R_{\theta JA}$	65	90	$^{\circ}C/W$
Maximum Junction-to-Ambient <sup>A</sup>	Steady-State		85	125	
Maximum Junction-to-Lead <sup>B</sup>	Steady-State	$R_{\theta JC}$	63	80	

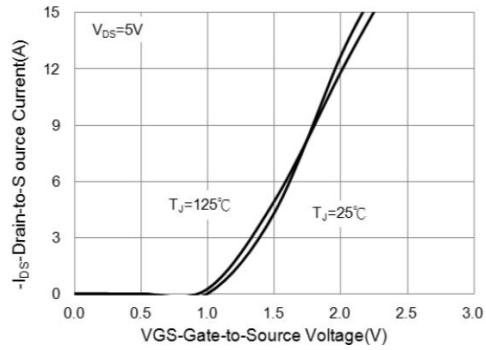
A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^{\circ}C$ . The value in any given application depends on the user's specific board design. The current rating is based on the  $t \leq 10s$  thermal resistance rating.

B: The  $R_{\theta JA}$  is the sum of the thermal impedance from junction to lead  $R_{\theta JL}$  and lead to ambient.

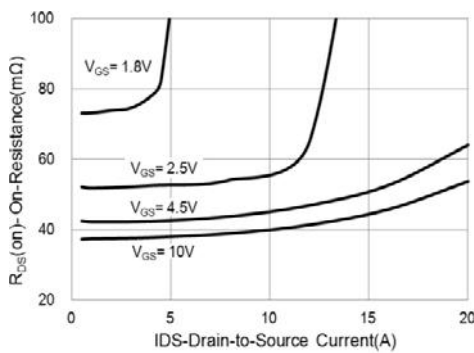
## Typical Performance Characteristics



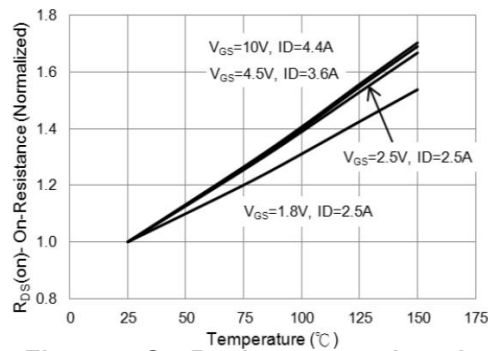
**Fig 1: On-Region Characteristics**



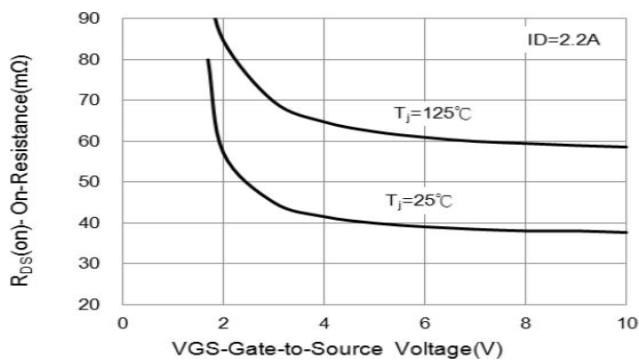
**Figure 2: Transfer Characteristics**



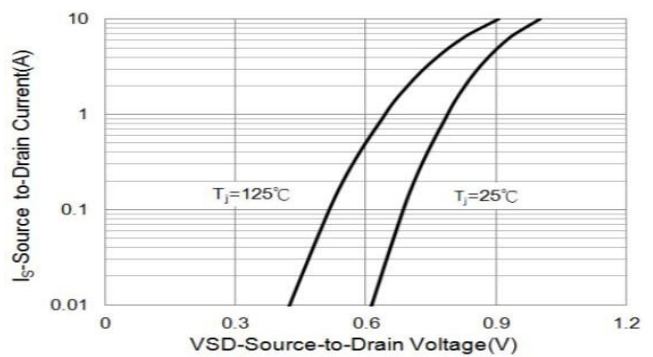
**Figure 3: On-Resistance vs. Drain Current and Gate Voltage**



**Figure 4: On-Resistance vs. Junction Temperature**



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



**Figure 6: Body-Diode Characteristics**

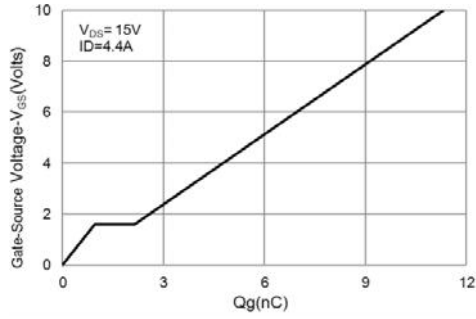


Figure 7: Gate-Charge Characteristics

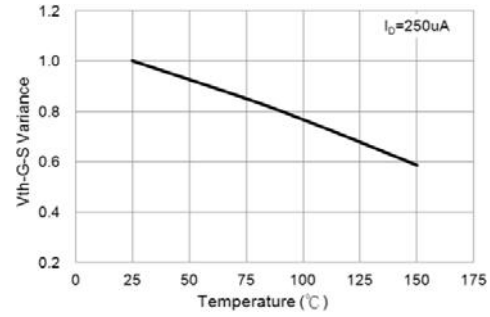
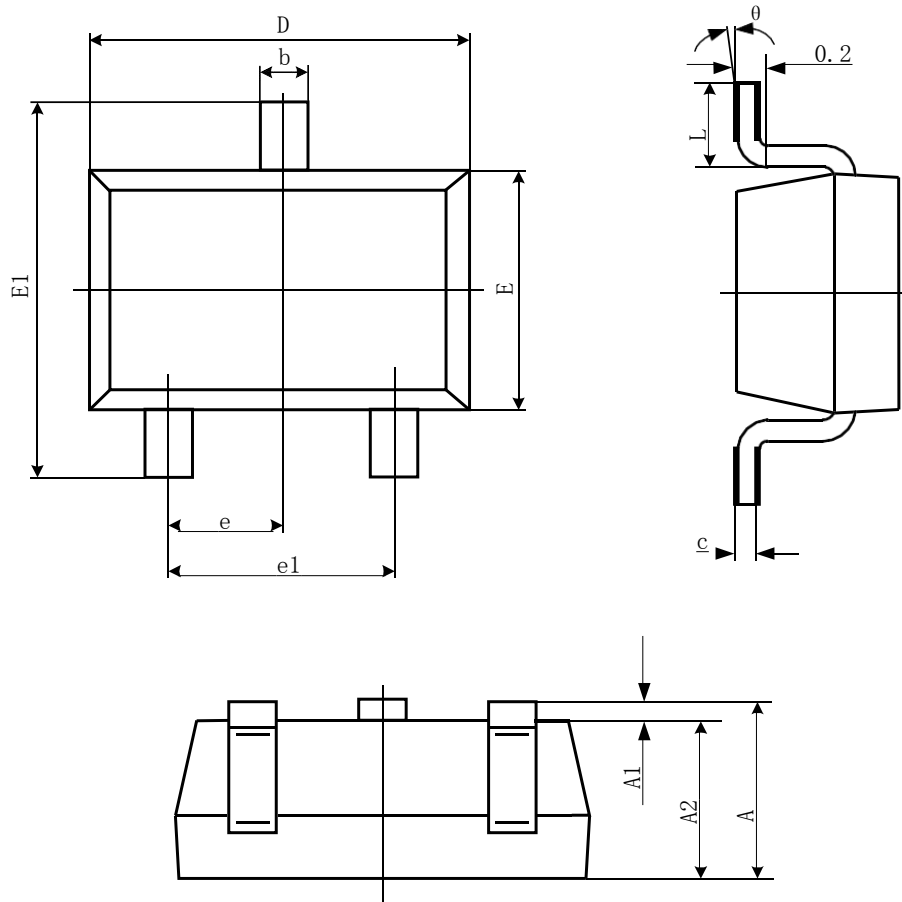


Figure 8: Threshold Voltage Variation with Temperature.

### 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°