

30V P-Channel Enhancement Mode MOSFET

Description

The PECN9P03QR uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in load switch and battery protection applications.

General Features

- ◆ $V_{DS} = -30V$, $I_D = -9.0A$
 $R_{DS(ON)}(Typ.) = 23.2m\Omega$ @ $V_{GS} = -4.5V$
 $R_{DS(ON)}(Typ.) = 18.3m\Omega$ @ $V_{GS} = -10V$
- ◆ High power and current handling capability
- ◆ Lead free product is acquired
- ◆ Surface mount package

Application

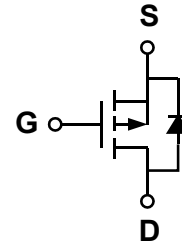
- ◆ Battery protection
- ◆ Load switch

Package

- ◆ PDFN3×3-8L

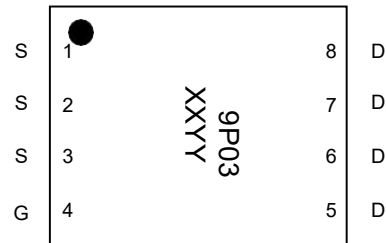


Schematic diagram



Marking and pin assignment

PDFN3×3-8L
(Top View)



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
PECN9P03Q R-G	-55°C to +150°C	PDFN3×3-8L	5000

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}	±20	V
Drain current-continuous ^a @Tj=125°C -pulse ^d	I_D	-9.0	A
	I_{DM}	-40	A
Drain-source Diode forward current	I_S	-2.5	A
Maximum power dissipation	P_D	35	W
Operating junction Temperature range	T_j	-55—150	°C

Electrical Characteristics (TA=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	-30	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =-30V, 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	-1.00	-1.6	-3.0	V
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} =10V, I _D =4.5A	-	18.3	22	mΩ
		V _{GS} =4.5V, I _D =4.5A		23.2	34	
Forward transconductance	g _{fs}	V _{GS} =-5V, I _D =-9A	-	24	-	S
Dynamic Characteristics						
Input capacitance	C _{ISS}	V _{DS} =-15V ,V _{GS} =0V f=1.0MHz	-	1040	1250	pF
Output capacitance	C _{OSS}		-	180	-	
Reverse transfer capacitance	C _{RSS}		-	125	175	
Switching Characteristics						
Turn-on delay time	t _{D(ON)}	V _{DS} =-15V R _L =2.2 Ω V _{GS} =-10V R _{GEN} =3 Ω	-	10	-	ns
Rise time	t _r		-	5.5	-	
Turn-off delay time	t _{D(OFF)}		-	26	-	
Fall time	t _f		-	9	-	
Total gate charge	Q _g (10V)	V _{DS} =-15V,I _D =-9A V _{GS} =-10V	-	19	-	nC
Total gate charge	Q _g (4.5V)			9.6		
Gate-source charge	Q _{gs}		-	3.6	-	
Gate-drain charge	Q _{gd}		-	4.6	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V _{SD}	V _{GS} =0V,I _s =-1.0A	-	-0.75	-1.0	V

Notes:

- The value of $R_{th JA}$ is measured with the device mounted on 1in² 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 power dissipation P_D is based on $T_{J(MAX)}=150^\circ C$, using $\leq 10s$ junction-to-ambient thermal resistance.
- Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ C$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ C$.
- The $R_{th JA}$ is the sum of the thermal impedance from junction to lead $R_{th JL}$ and lead to ambient.
- The static characteristics in Figures 1 to 6 are obtained using $<300\mu s$ pulses, duty cycle 0.5% max.
- These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_J(MAX)=150^\circ C$. The SOA curve provides a single pulse rating.

Thermal Characteristics

Thermal Resistance junction-to ambient	Rth JA	3.57	°C/W
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Typical Performance Characteristics

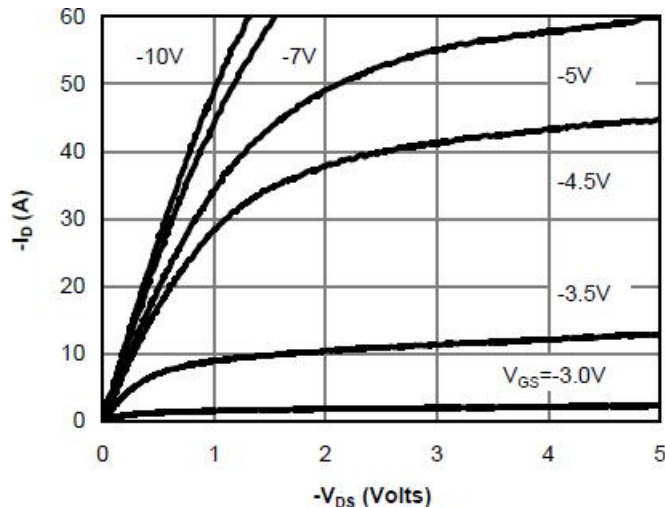


Fig 1: On-Region Characteristics (Note E)

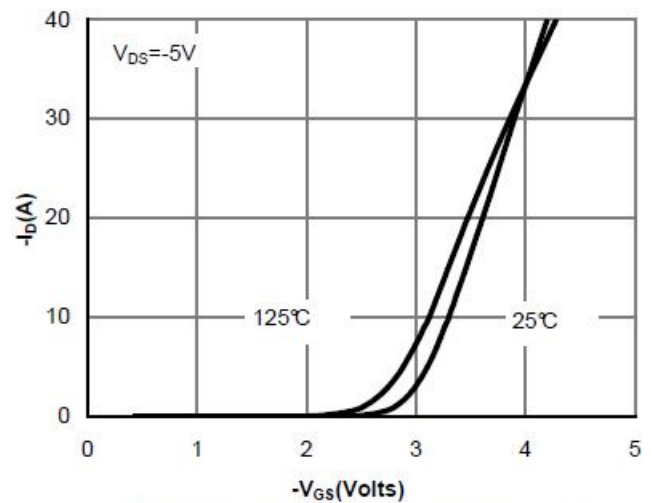


Figure 2: Transfer Characteristics (Note E)

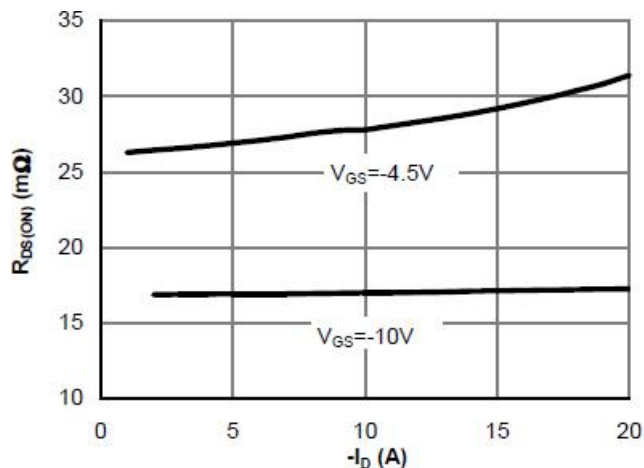


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

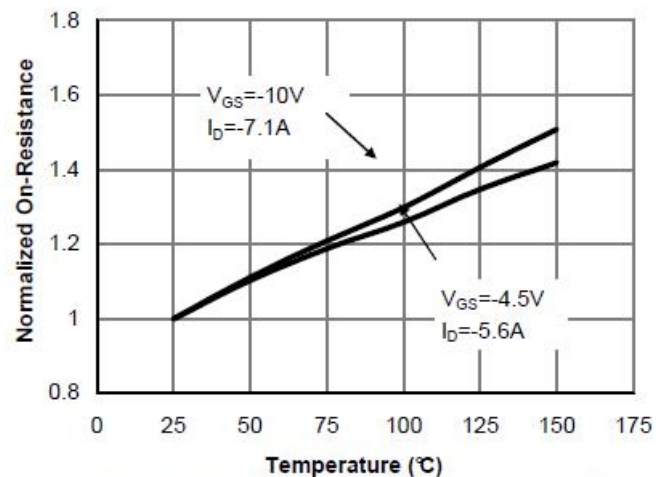


Figure 4: On-Resistance vs. Junction Temperature (Note E)

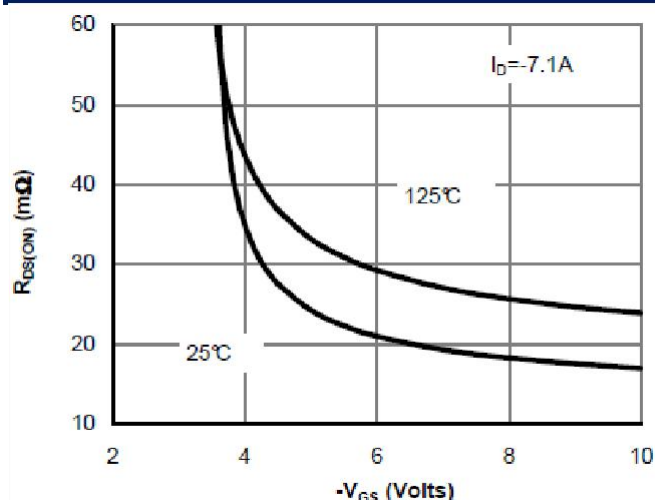


Figure 5: On-Resistance vs. Gate-Source Voltage

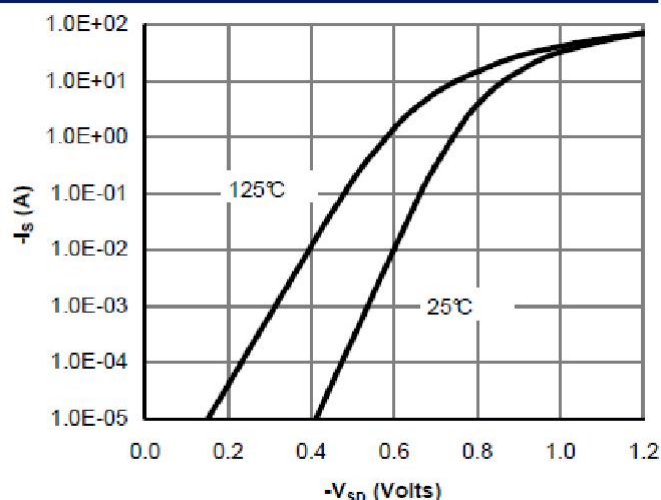


Figure 6: Body-Diode Characteristics (Note E)

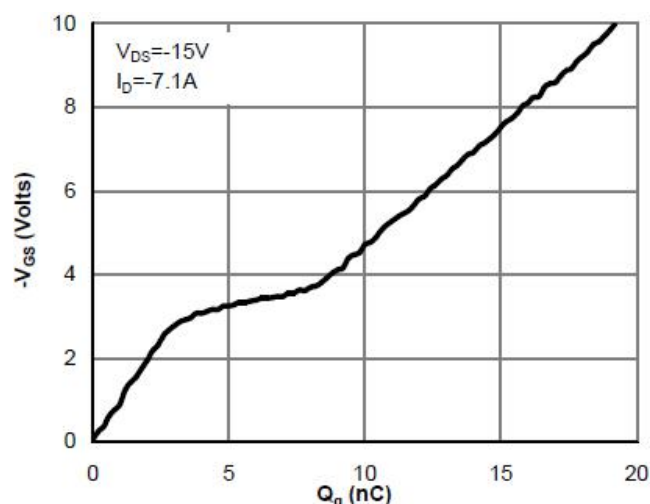


Figure 7: Gate-Charge Characteristics

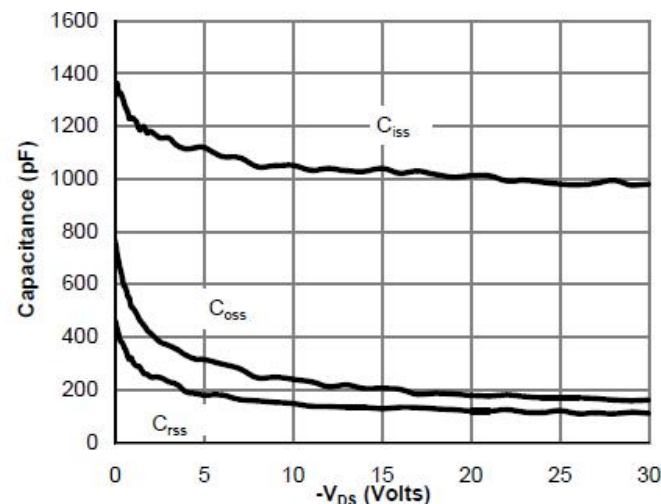


Figure 8: Capacitance Characteristics

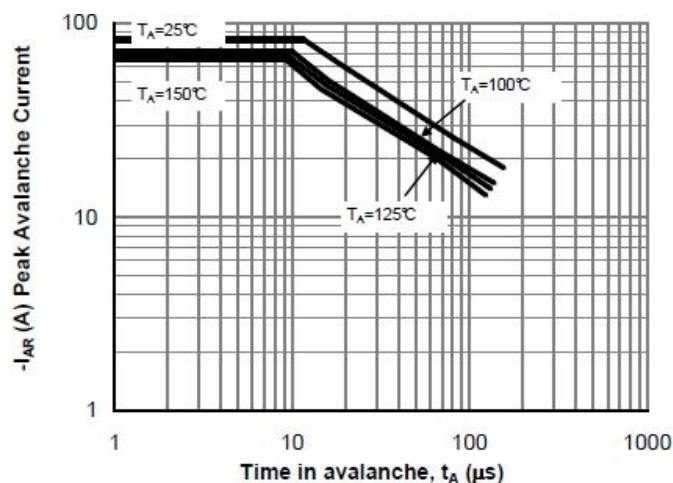


Figure 9: Single Pulse Avalanche capability (Note C)

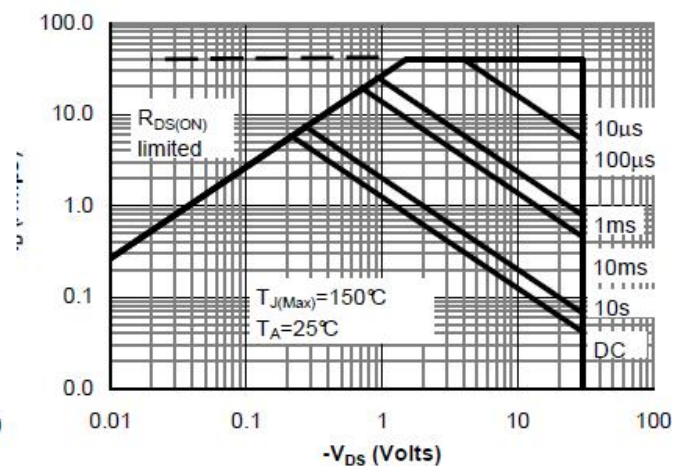


Figure 10: Maximum Forward Biased Safe Operating Area (Note F)

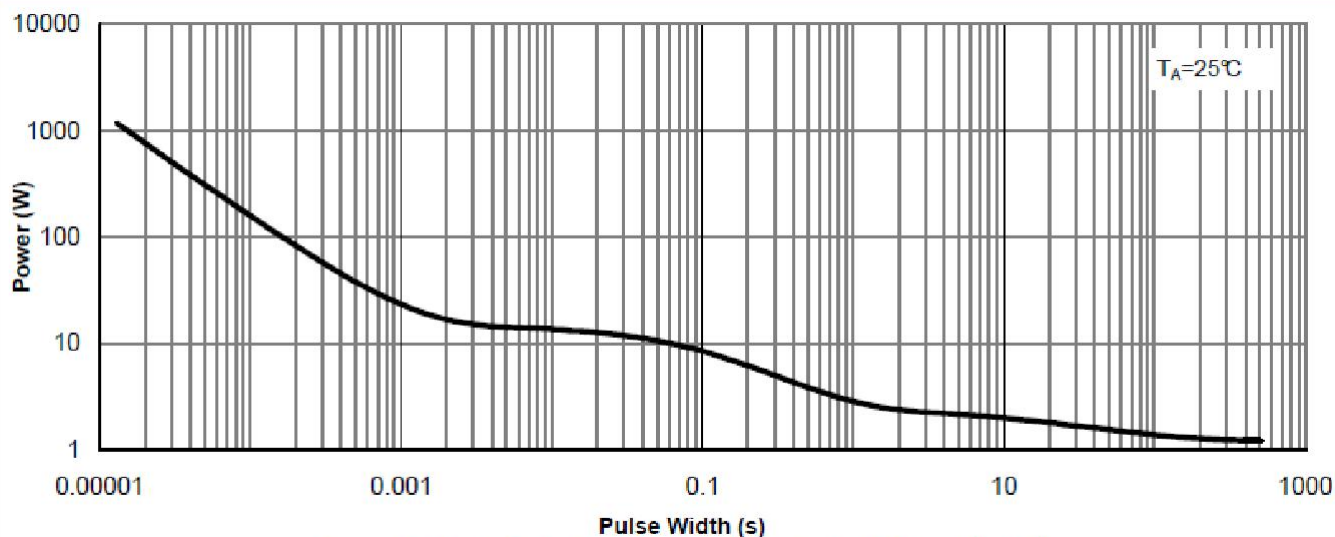


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)

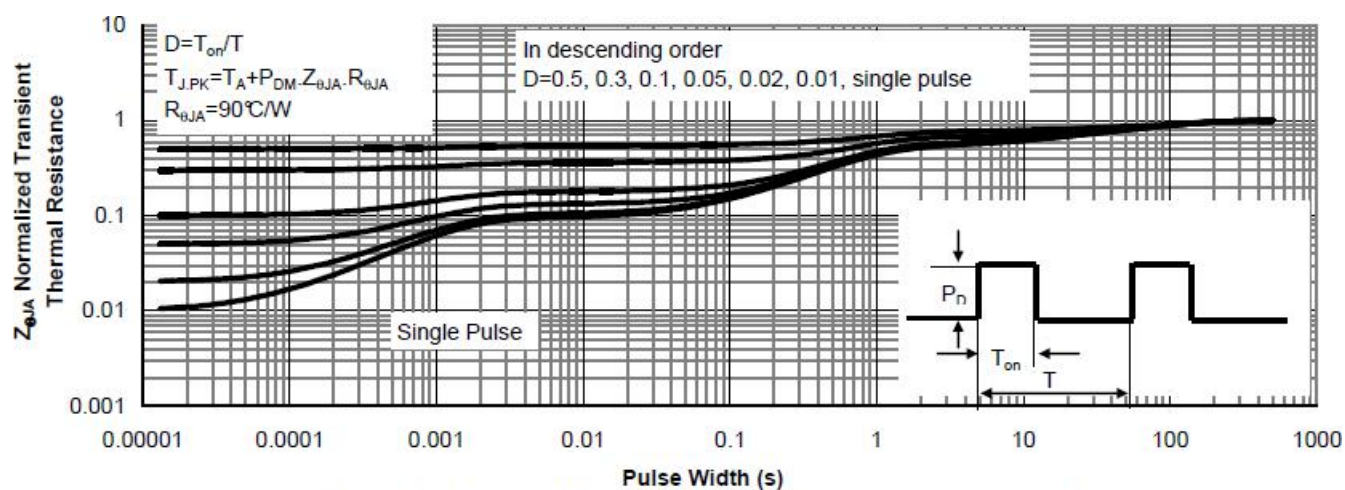


Figure 12: Normalized Maximum Transient Thermal Impedance (Note F)

Package Information

- PDFN3×3-8L

