

## 100V N-Channel Enhancement Mode MOSFET

### Description

The PECN1004 uses trench MOSFET technology that is uniquely optimized to provide the most efficient high frequency switching performance. Conduction and switching losses are minimized due to an extremely low combination of  $R_{DS(ON)}$  and  $C_{rss}$ .

### General Features

- ◆  $V_{DS} = 100V$   $I_D = 4A$   
 $R_{DS(ON)}(Typ.) = 91m\Omega$  @  $V_{GS} = 10V$   
 $R_{DS(ON)}(Typ.) = 110m\Omega$  @  $V_{GS} = 4.5V$
- ◆ Lead free product is acquired
- ◆ Surface mount package

### Application

- ◆ High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- ◆ Networking DC-DC Power System
- ◆ Load switch

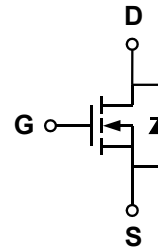
### Package

- ◆ SOP-8

*100% UIS TESTED!*

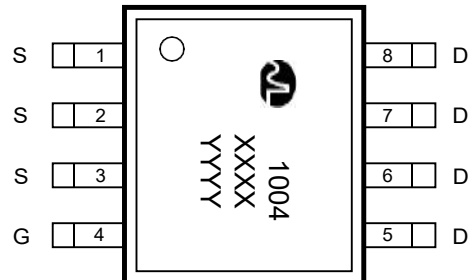
*100%  $\Delta V_{ds}$  TESTED!*

### Schematic diagram



### Marking and pin assignment

SOP-8  
(TOP VIEW)



### Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
PECN1004S R	-55°C to +150°C	SOP-8	4000

### 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	$I_D$	TC=25°C	4	A
		TC=100°C	3	
Pulsed Drain Current	$I_{DP}$	16	A	
Avalanche energy( L=0.1mH)	EAS	14	mJ	
Maximum power dissipation	$P_D$	TC=25°C	2.5	W
Power Dissipation – Derate above 25°C		TC=25°C	2	
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>Static Characteristics</b>						
Drain-source breakdown voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	100	-	-	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	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V$	-	-	1	$\mu A$
		$T_J=85^\circ C$	-	-	30	
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	$\pm 100$	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.8	2.4	3.0	V
Drain-source on-state resistance <sup>1</sup>	$R_{DS(ON)}$	$V_{GS}=10V, I_D=4A$	-	91	120	mΩ
		$V_{GS}=4.5V, I_D=3A$		110	140	
On Status Drain Current	$I_{D(ON)}$	$V_{DS}=5V, V_{GS}=4V$	25	-	-	A
<b>Diode Characteristics</b>						
Diode Forward Voltage <sup>1</sup>	$V_{SD}$	$I_{SD}=1A, V_{GS}=0V$	-	0.8	1.1	V
Diode Continuous Forward Current	$I_S$		-	-	18	A
Reverse Recovery Time	$t_{rr}$	$I_F=4A,$ $di/dt=100A/us$	-	30	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	44	-	nC
<b>Dynamic Characteristics<sup>2</sup></b>						
Gate Resistance	$R_G$	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	-	3.3	-	Ω
Input capacitance	$C_{ISS}$	$V_{GS}=0V, V_{DS}=50V$ $f=1.0MHz$	-	556	-	pF
Output capacitance	$C_{OSS}$		-	34.7	-	
Reverse transfer capacitance	$C_{RSS}$		-	18.7	-	
Turn-on delay time	$t_{D(ON)}$	$V_{DD}=50V, I_D=1A,$ $V_{GS}=10V, R_{GEN}=6\Omega$	-	4.4	-	ns
Turn-on Rise time	$t_r$		-	21	-	
Turn-off delay time	$t_{D(OFF)}$		-	25	-	
Turn-off Fall time	$t_f$		-	21.2	-	
Total gate charge	$Q_g$	$V_{GS}=10V,$ $I_D=4A, V_{DS}=50V$	-	20.5		nC
Gate-source charge	$Q_{gs}$		-	3.2		
Gate-drain charge	$Q_{gd}$		-	4	-	
<b>Drain-Source Diode Characteristics</b>						
Diode forward voltage	$V_{SD}$	$I_{SD}=4A, V_{GS}=0V$	-	0.8	1.1	V

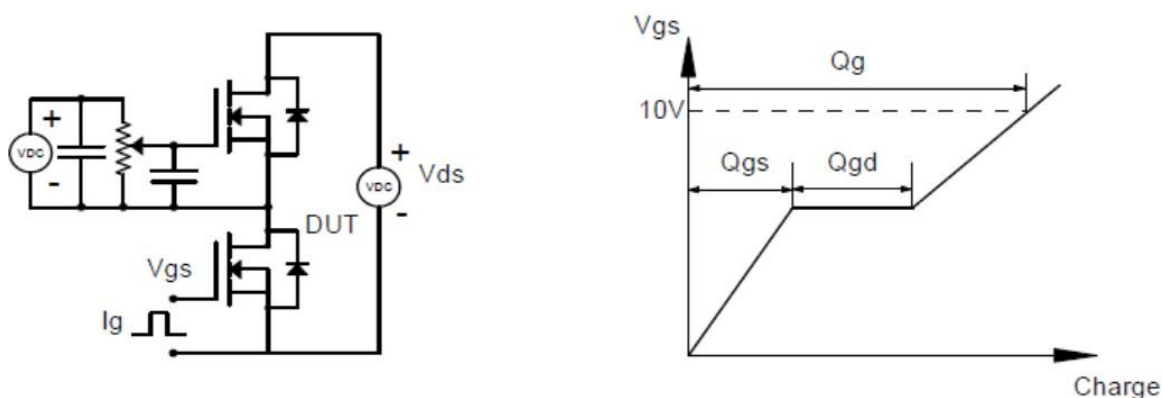
Note: 1: Pulse test; pulse width  $\leq 300ns$ , duty cycle  $\leq 2\%$ .

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

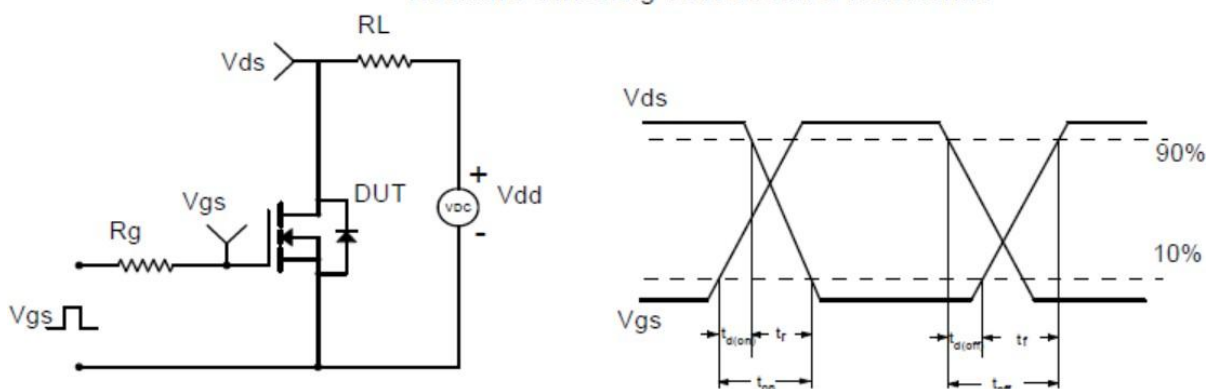
## Thermal Characteristics

Parameter	Symbol	Typical	Unit
Thermal Resistance-Junction to Case	$R_{\theta jc}$	1.7	°C/W
Thermal Resistance junction-to ambient	$R_{\theta ja}$	62.5	

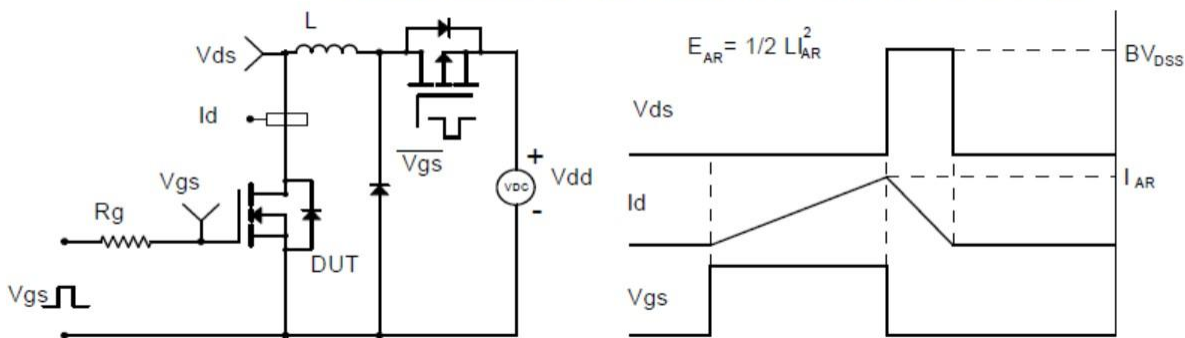
### Gate Charge Test Circuit & Waveform



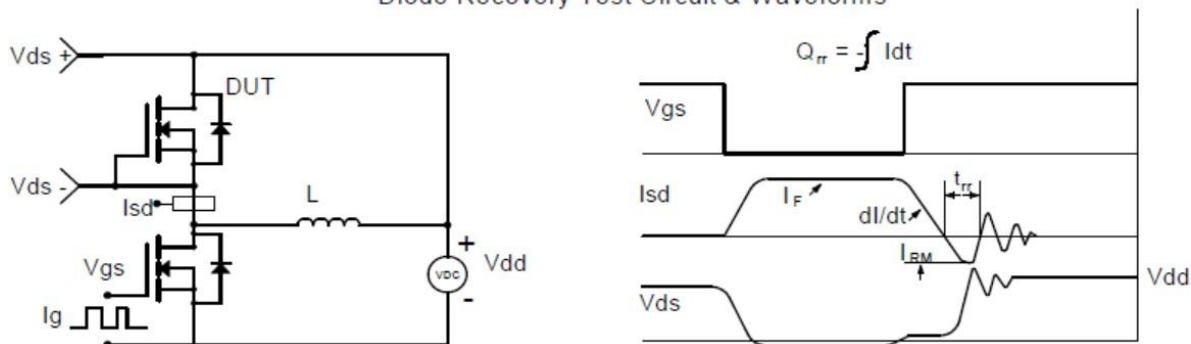
### Resistive Switching Test Circuit & Waveforms



### Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

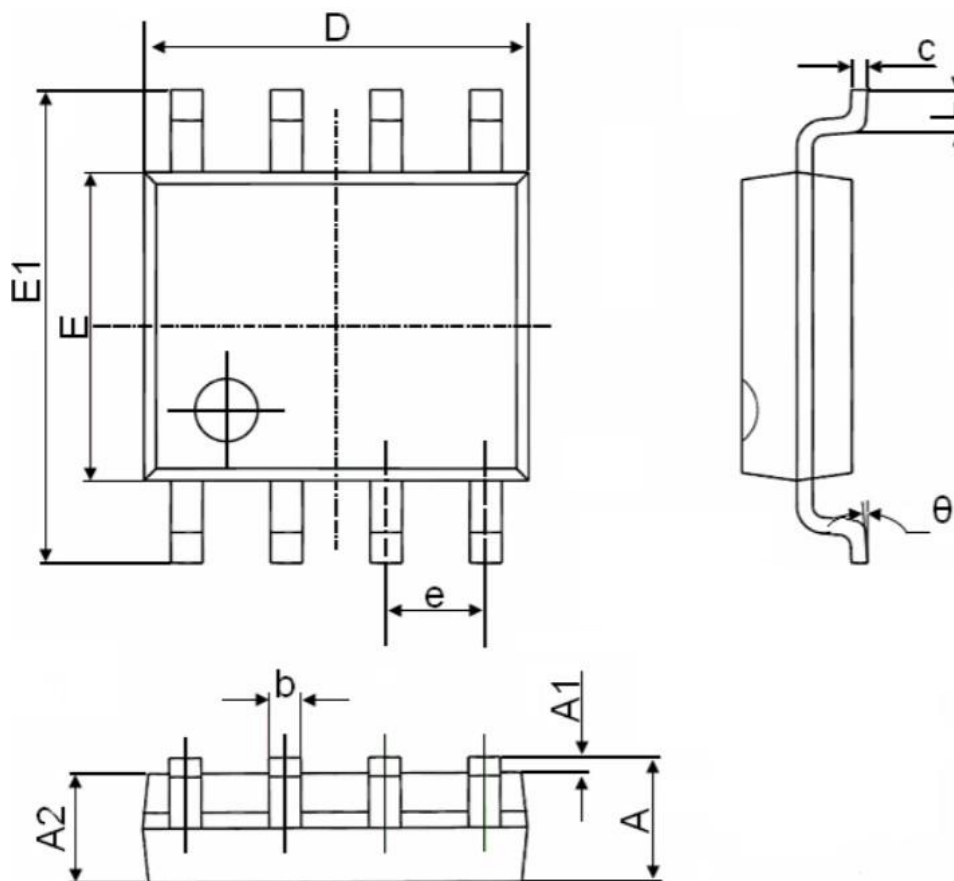


### Diode Recovery Test Circuit & Waveforms



## Package Information

- SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°