

### 40V N-Channel Enhancement Mode MOSFET

#### Description

The PECN4008SR 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  $Cr_{ss}$ .

#### General Features

- ◆  $V_{DS} = 40V$   $I_D = 6A$   
 $R_{DS(ON)}(Typ.) = 25m\Omega$  @  $V_{GS} = 10V$   
 $R_{DS(ON)}(Typ.) = 31m\Omega$  @  $V_{GS} = 4.5V$
- ◆ Lead free product is acquired
- ◆ Surface mount package

#### Application

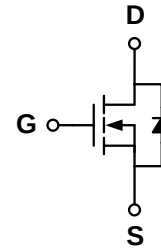
- ◆ High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- ◆ Networking DC-DC Power System
- ◆ Load switch

#### Package

- ◆ SOP-8

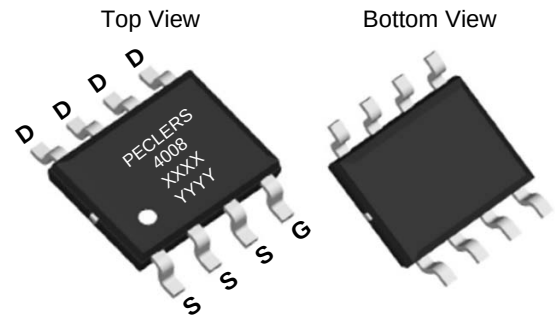
*100% UIS TESTED!*  
*100%  $\Delta V_{ds}$  TESTED!*

#### Schematic diagram



#### Marking and pin assignment

##### SOP-8



XXXX—Date Code  
 YYYY—Quality Code.



#### Ordering Information

| Part Number | Storage Temperature | Package | Devices Per Reel |
|-------------|---------------------|---------|------------------|
| PECN4008SR  | -55°C to +150°C     | SOP-8   | 4000             |

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

| parameter                            |         | symbol   | limit   | unit |
|--------------------------------------|---------|----------|---------|------|
| Drain-source voltage                 |         | $V_{DS}$ | 40      | V    |
| Gate-source voltage                  |         | $V_{GS}$ | ±20     | V    |
| Continuous Drain Current             | TC=25°C | $I_D$    | 6       | A    |
|                                      | TC=70°C |          | 4       |      |
| Pulsed Drain Current                 |         | $I_{DP}$ | 24      | A    |
| Avalanche energy( L=0.1mH)           |         | $E_{AS}$ | 10      | mJ   |
| Power Dissipation                    | TC=25°C | $P_D$    | 3       | W    |
|                                      | TC=70°C |          | 2.1     |      |
| 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                | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                               | 40  | -    | -         | V          |
| Zero gate voltage drain current               | $I_{DSS}$    | $V_{DS}=40V, V_{GS}=0V$                                 | -   | -    | 1         | $\mu A$    |
|                                               |              | $T_J=85^\circ C$                                        | -   | -    | 5         |            |
| Gate Leakage Current                          | $I_{GSS}$    | $V_{DS}=0V, V_{GS}=\pm 20V$                             | -   | -    | $\pm 100$ | nA         |
| Gate threshold voltage                        | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$                           | 1.0 | 1.4  | 2.0       | V          |
| Drain-source on-state resistance <sup>1</sup> | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=6A$                                    | -   | 25   | 28        | m $\Omega$ |
|                                               |              | $V_{GS}=4.5V, I_D=4A$                                   |     | 31   | 35        |            |
| On Status Drain Current                       | $I_{D(ON)}$  | $V_{DS}=10V, V_{GS}=5V$                                 | 6   | -    | -         | A          |
| <b>Diode Characteristics</b>                  |              |                                                         |     |      |           |            |
| Diode Forward Voltage                         | $V_{SD}$     | $I_{SD}=1A, V_{GS}=0V$                                  | -   | 0.82 | 1.1       | V          |
| Diode Continuous Forward Current              | $I_S$        |                                                         | -   | -    | 2         | A          |
| Reverse Recovery Time                         | $t_{rr}$     | $I_F=6A,$                                               | -   | 18   | -         | ns         |
| Reverse Recovery Charge                       | $Q_{rr}$     | $dI/dt=100A/\mu s$                                      | -   | 10   | -         | nC         |
| <b>Dynamic Characteristics</b>                |              |                                                         |     |      |           |            |
| Gate Resistance                               | $R_G$        | $V_{GS}=0V, V_{DS}=0V, f=1MHz$                          | -   | 4.6  | -         | $\Omega$   |
| Input capacitance                             | $C_{ISS}$    | $V_{GS}=0V, V_{DS}=20V$<br>$f=1.0MHz$                   | -   | 516  | -         | pF         |
| Output capacitance                            | $C_{OSS}$    |                                                         | -   | 82   | -         |            |
| Reverse transfer capacitance                  | $C_{RSS}$    |                                                         | -   | 43   | -         |            |
| Turn-on delay time                            | $t_{D(ON)}$  | $V_{GS}=10V, V_{DS}=20V, R_L=1\Omega,$<br>$R_G=3\Omega$ | -   | 6.4  | -         | ns         |
| Turn-on Rise time                             | $t_r$        |                                                         | -   | 3.6  | -         |            |
| Turn-off delay time                           | $t_{D(OFF)}$ |                                                         | -   | 16.2 | -         |            |
| Turn-off Fall time                            | $t_f$        |                                                         | -   | 6.6  | -         |            |
| Total gate charge                             | $Q_g$        | $V_{GS}=10V, V_{DS}=15V, I_D=13A$                       | -   | 8.9  | -         | nC         |
| Gate-source charge                            | $Q_{gs}$     |                                                         |     | 2.4  |           |            |
| Gate-drain charge                             | $Q_{gd}$     |                                                         | -   | 1.4  | -         |            |

### Thermal Characteristics

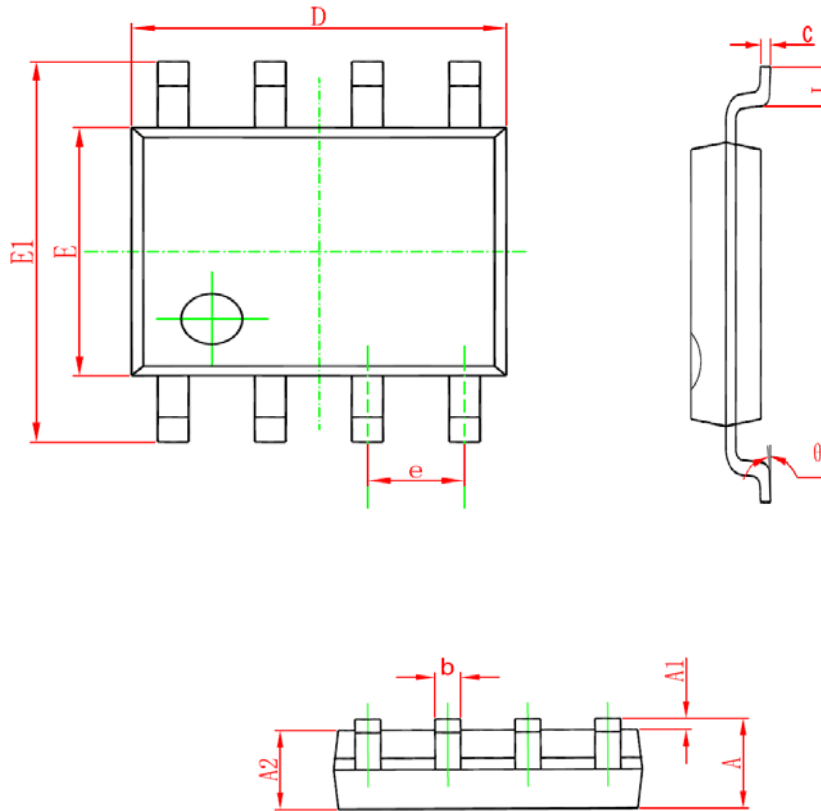
| Parameter                                |              | Symbol          | Typ | Max | Unit         |
|------------------------------------------|--------------|-----------------|-----|-----|--------------|
| Maximum Junction-to-Ambient <sup>A</sup> | $\leq 10s$   | $R_{\theta JA}$ | 33  | 40  | $^\circ C/W$ |
| Maximum Junction-to-Ambient <sup>A</sup> | Steady-State |                 | 59  | 75  |              |
| Maximum Junction-to-Lead <sup>B</sup>    | Steady-State | $R_{\theta JC}$ | 16  | 24  |              |

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.

### Package Information

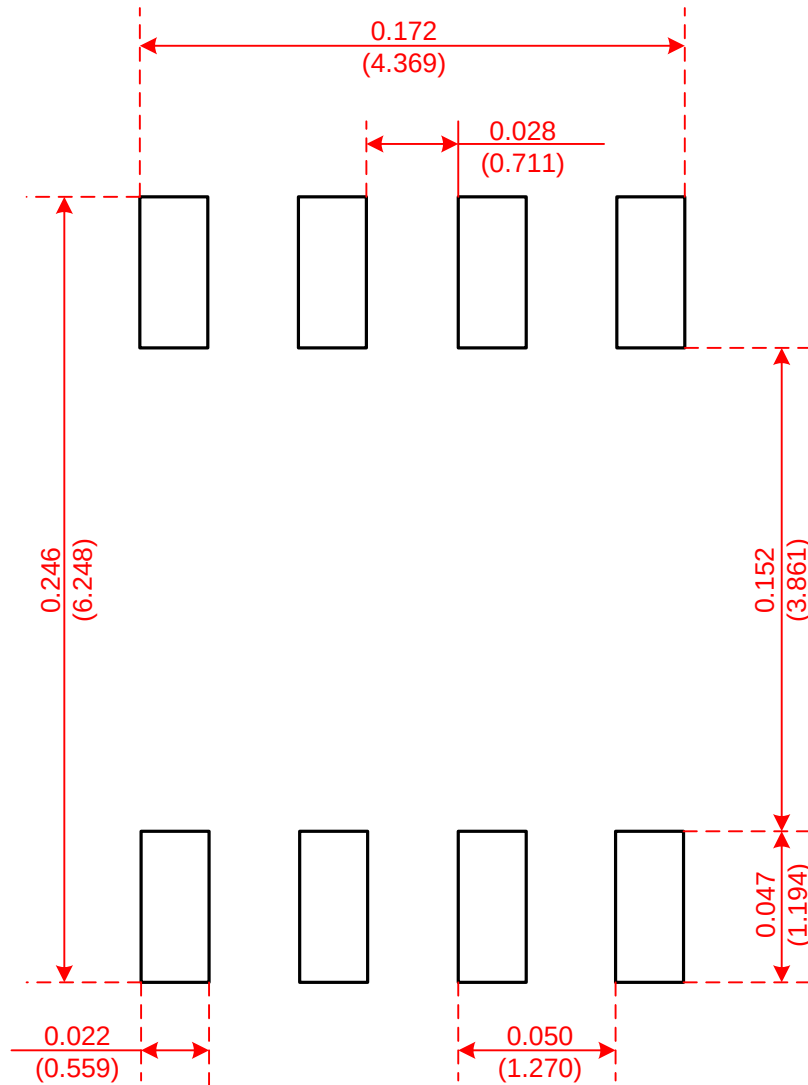
- SOP-8



| 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°    |

## Recommended Minimum Pads

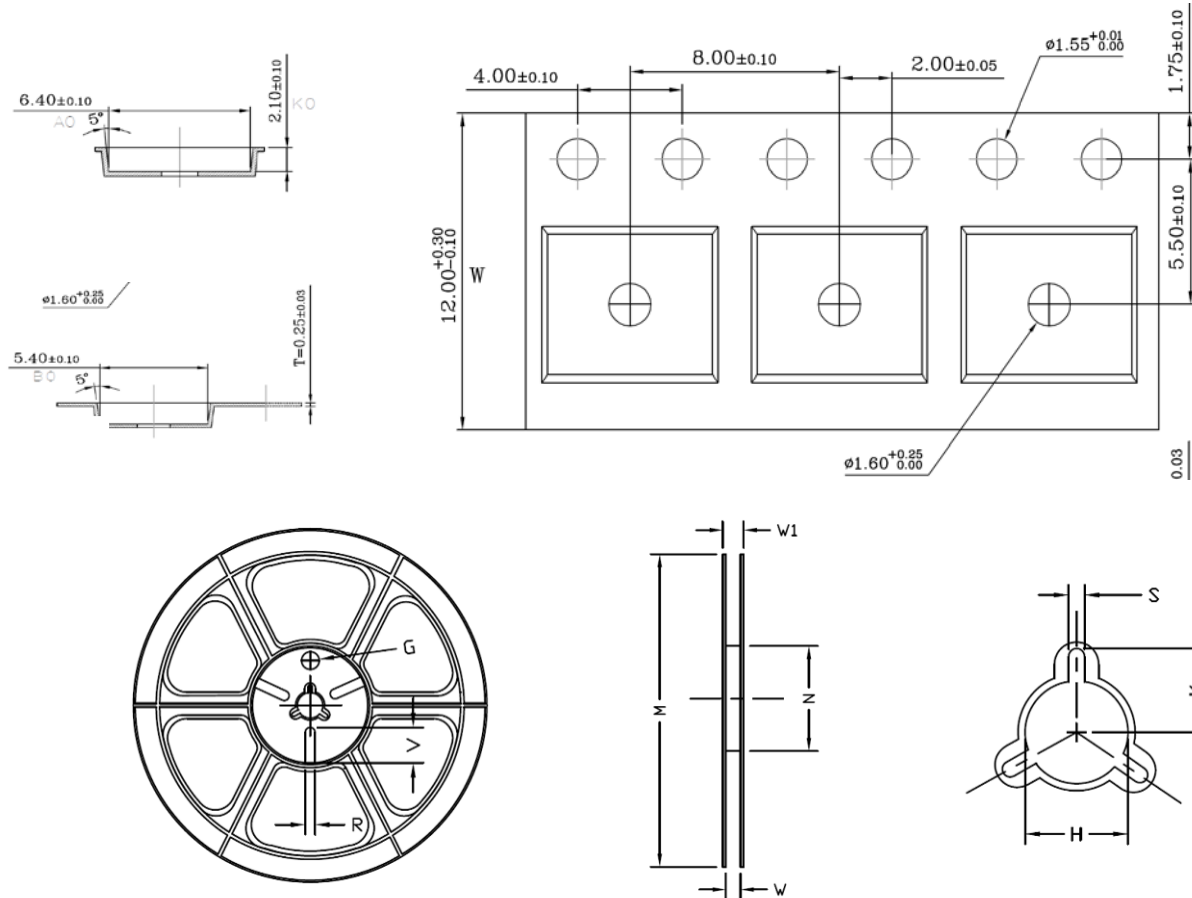
- SOP-8



Recommended Minimum Pads  
Dimensions in Inches/(mm)

### Tape and Reel

- SOP-8



| Tape Size | Reel Size | M                | N               | W              | W1             | H              | K    | S             | G | R | V |
|-----------|-----------|------------------|-----------------|----------------|----------------|----------------|------|---------------|---|---|---|
| 12mm      | Φ330      | Φ330.00<br>±0.50 | Φ97.00<br>±0.30 | 13.00<br>±0.30 | 17.40<br>±1.00 | Φ13.00<br>±0.5 | 10.6 | 2.00<br>±0.50 | — | — | — |

Unit Per Reel:  
4000pcs

