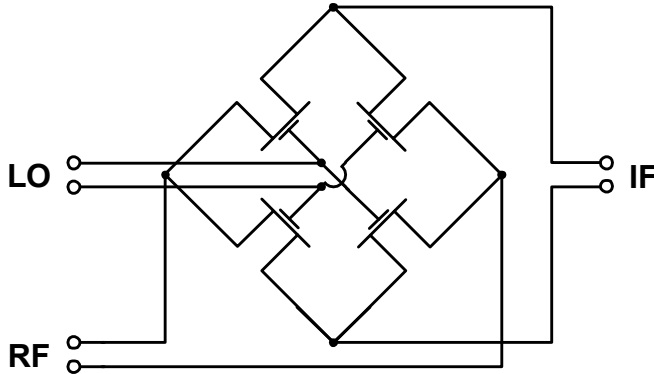


## Product Description

The PE84140 is an ultra-high linearity, passive broadband Quad MOSFET array with high dynamic range performance capable of operation beyond 6.0 GHz. This quad array operates with differential signals at all ports (RF, LO, IF), allowing mixers to be built that use LO powers from -7 dBm to +20 dBm. Typical applications range from frequency up/down-conversion to phase detection for Cellular/PCS Base Stations, Wireless Broadband Communications and STB/Cable modems.

The PE84140 is optimized for stringent military applications. It is manufactured on Peregrine's UltraCMOS™ process, a patented variation of silicon-on-insulator (SOI) technology on a sapphire substrate, offering the performance of GaAs with the economy and integration of conventional CMOS.

**Figure 1. Functional Diagram**



**Figure 2. Package Type**

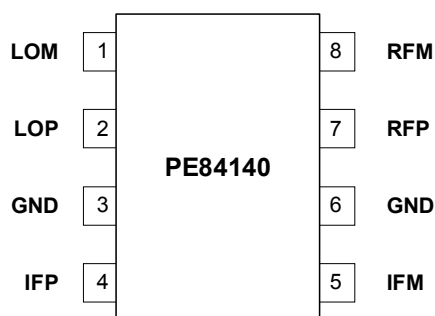
8-lead MSOP



**Table 1. AC and DC Electrical Specifications @ +25 °C**

| Symbol                | Characteristics                        | Min | Typ  | Max | Units    | Test Conditions                                               |
|-----------------------|----------------------------------------|-----|------|-----|----------|---------------------------------------------------------------|
| $F_{\text{Typ}}$      | Operating Frequency Range <sup>1</sup> | DC  | 6.0  |     | GHz      |                                                               |
| $V_{\text{DS}}$       | Drain-Source Voltage                   |     | 330  |     | mV       | $V_{\text{GS}} = +3\text{V}$ , $I_{\text{DS}} = 40\text{ mA}$ |
| $V_{\text{DS Match}}$ | Drain-Source Voltage Match             |     | 20   |     | mV       |                                                               |
| $V_{\text{T}}$        | Threshold Voltage                      |     | -100 |     | mV       | $V_{\text{DS}} = 0.1\text{V}$ ; per ASTM F617-00              |
| $R_{\text{DS}}$       | Drain-Source 'ON' Resistance           |     | 8.25 |     | $\Omega$ | $V_{\text{GS}} = +3\text{V}$ , $I_{\text{DS}} = 40\text{ mA}$ |

Note 1: Typical untested operating frequency range of Quad MOSFET transistors.

**Figure 3. Pin Configuration (Top View)**

**Table 2. Pin Descriptions**

| Pin No. | Pin Name | Description                  |
|---------|----------|------------------------------|
| 1       | LOM      | LO Input Connection (Gate)   |
| 2       | LOP      | LO Input Connection (Gate)   |
| 3       | GND      | Ground Connection            |
| 4       | IFP      | IF Output Connection (Drain) |
| 5       | IFM      | IF Output Connection (Drain) |
| 6       | GND      | Ground Connection            |
| 7       | RFP      | RF Input Connection (Source) |
| 8       | RFM      | RF Input Connection (Source) |

**Table 3. Absolute Maximum Ratings**

| Symbol      | Parameter/Conditions                                             | Min | Max  | Units |
|-------------|------------------------------------------------------------------|-----|------|-------|
| $T_{ST}$    | Storage temperature range                                        | -65 | 150  | °C    |
| $T_{OP}$    | Operating temperature range                                      | -55 | 125  | °C    |
| $V_{DC+AC}$ | Maximum DC plus peak AC voltage across Drain-Source              |     | ±3.3 | V     |
| $V_{DC+AC}$ | Maximum DC plus peak AC voltage across Gate-Drain or Gate-Source |     | ±4.2 | V     |
| $V_{ESD}$   | ESD Sensitive Device                                             |     | 250  | V     |

Absolute Maximum Ratings are those values listed in the above table. Exceeding these values may cause permanent device damage. Functional operation should be restricted to the limits in the DC Electrical Specifications table. Exposure to absolute maximum ratings for extended periods may affect device reliability.

## Electrostatic Discharge (ESD) Precautions

This MOSFET device has minimally protected inputs and is highly susceptible to ESD damage. When handling this UltraCMOS™ device, observe the same precautions that you would use with other ESD-sensitive devices.

## Latch-Up Avoidance

Unlike conventional CMOS devices, UltraCMOS™ devices are immune to latch-up.

## Device Description

The PE84140 passive broadband Quad MOSFET array is designed for use in up-conversion and down-conversion applications for high performance systems.

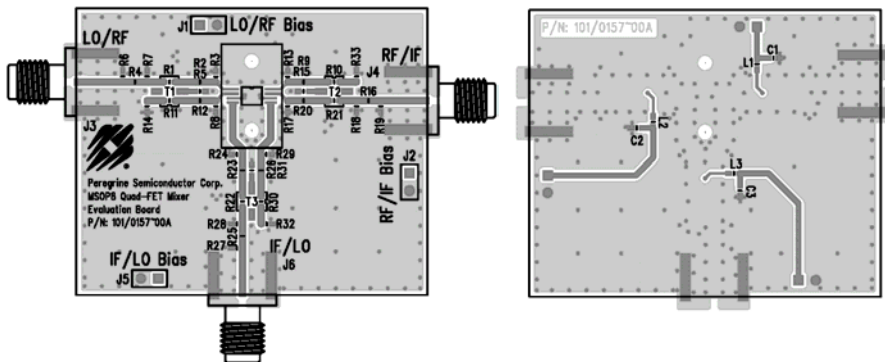
The PE84140 is an ideal mixer core for a wide range of mixer products, including module level solutions that incorporate baluns or other single-ended matching structures enabling three-port operation.

The performance level of this passive mixer is made possible by the very high linearity afforded by Peregrine's UltraCMOS™ process.

## Evaluation Kit

**Figure 4. Evaluation Board Layout**

Peregrine Specification 101/0157



## Applications Support

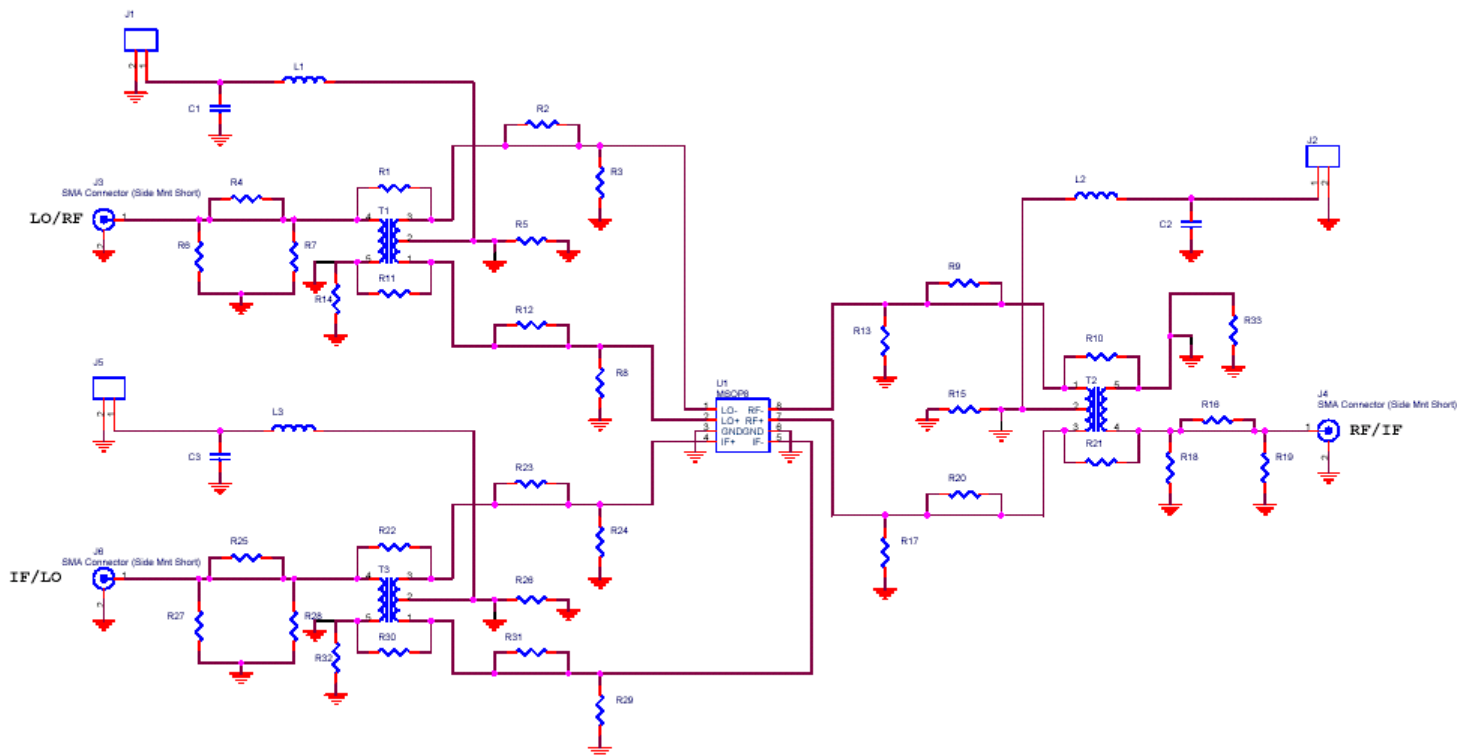
If you have a problem with your evaluation kit or if you have applications questions, please contact applications support:

E-Mail: [help@psemi.com](mailto:help@psemi.com) (fastest response)

Phone: (858) 731-9400

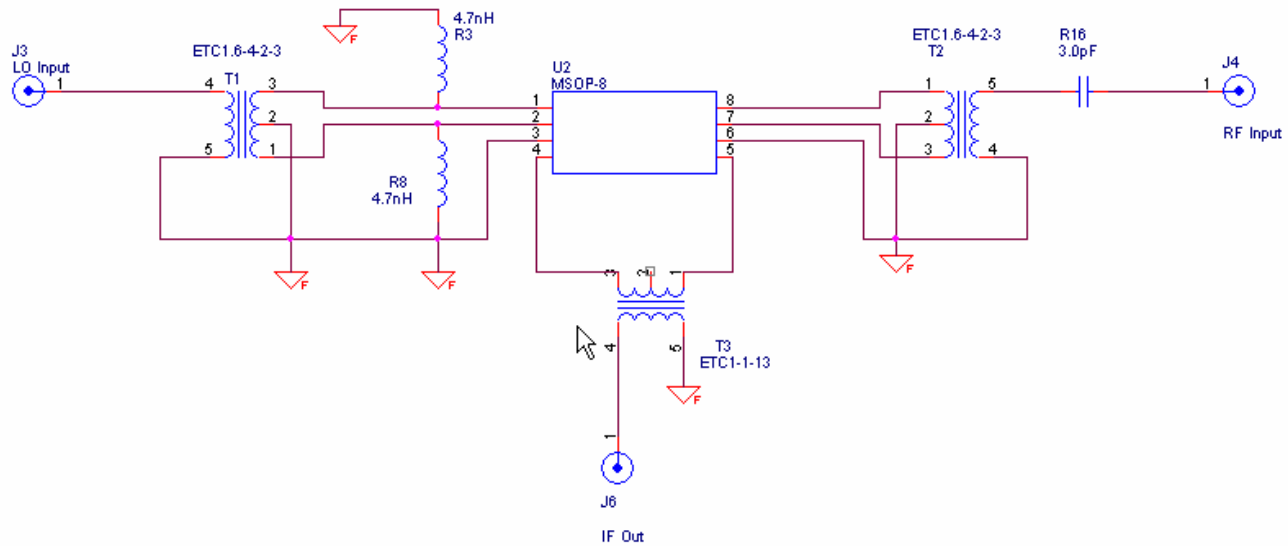
**Figure 5. Evaluation Board Schematic**

Peregrine Specification 102/0214



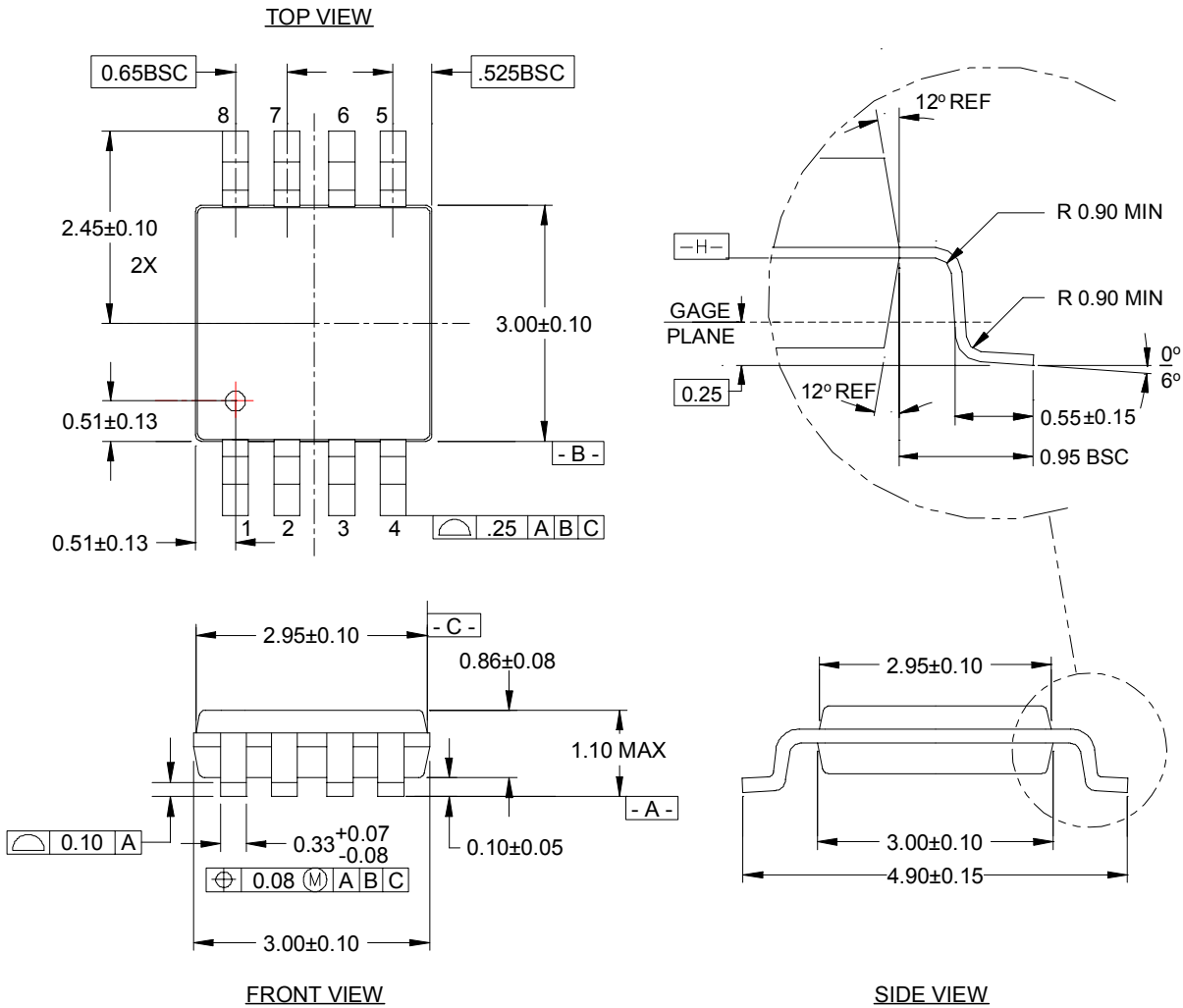
**Note:** This is the complete evaluation board schematic; which can be used for multiple configurations. Not all components need be populated. Refer to the typical schematic on the following page.

**Figure 6. Typical Schematic**



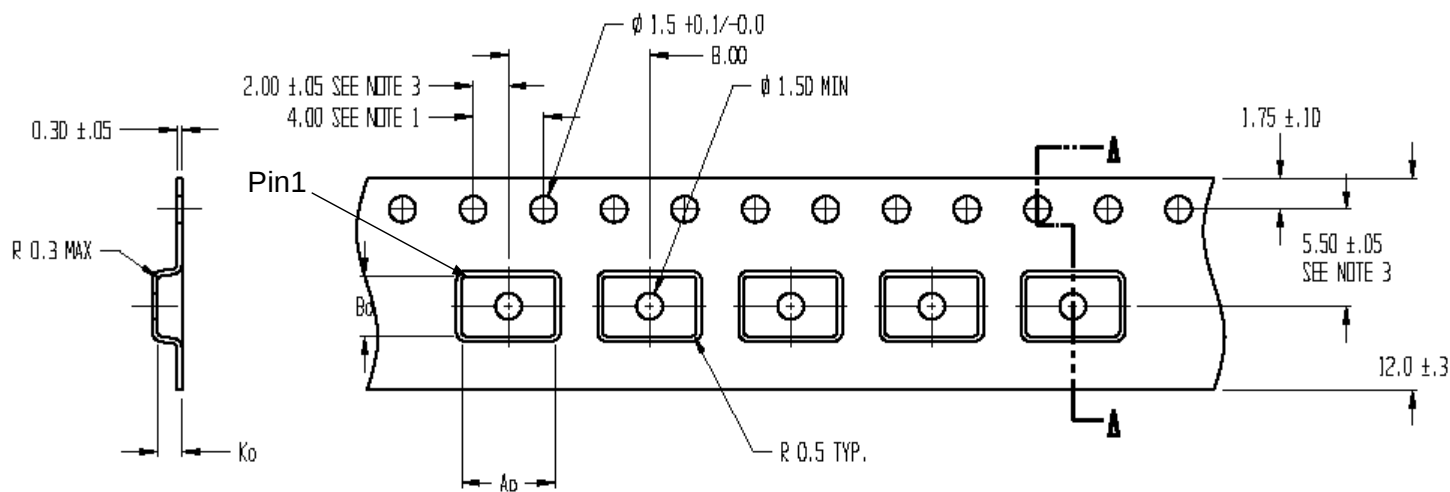
**Figure 7. Package Drawing**

8-lead MSOP



**Figure 8. Tape and Reel Specifications**

8-lead MSOP



$A_0 = 5.30$   
 $B_0 = 3.40$   
 $K_0 = 1.40$

**NOTES:**

1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE  $\pm 0.2$
2. CAMBER IN COMPLIANCE WITH EIA 481
3. POCKET POSITION RELATIVE TO SPROCKET HOLE MEASURED AS TRUE POSITION OF POCKET, NOT POCKET HOLE

**Table 7. Ordering Information**

| Order Code | Part Marking | Description          | Package        | Shipping Method  |
|------------|--------------|----------------------|----------------|------------------|
| 84140-01   | 84140        | PE84140-08MSOP-50A   | 8-lead MSOP    | 50 units / Tube  |
| 84140-02   | 84140        | PE84140-08MSOP-2000C | 8-lead MSOP    | 2000 units / T&R |
| 84140-00   | PE84140-EK   | PE84140-08MSOP-EK    | Evaluation Kit | 1 / Box          |

## Sales Offices

### *The Americas*

#### **Peregrine Semiconductor Corporation**

9450 Carroll Park Drive  
San Diego, CA 92121  
Tel: 858-731-9400  
Fax: 858-731-9499

### *Europe*

#### **Peregrine Semiconductor Europe**

Bâtiment Maine  
13-15 rue des Quatre Vents  
F-92380 Garches, France  
Tel: +33-1-4741-9173  
Fax : +33-1-4741-9173

#### **Space and Defense Products**

##### **Americas:**

Tel: 858-731-9453

##### **Europe, Asia Pacific:**

180 Rue Jean de Guirmand  
13852 Aix-En-Provence Cedex 3, France  
Tel: +33-4-4239-3361  
Fax: +33-4-4239-7227

### *North Asia Pacific*

#### **Peregrine Semiconductor K.K.**

Teikoku Hotel Tower 10B-6  
1-1-1 Uchisaiwai-cho, Chiyoda-ku  
Tokyo 100-0011 Japan  
Tel: +81-3-3502-5211  
Fax: +81-3-3502-5213

#### **Peregrine Semiconductor, Korea**

#B-2402, Kolon Tripolis, #210  
Geumgok-dong, Bundang-gu, Seongnam-si  
Gyeonggi-do, 463-480 S. Korea  
Tel: +82-31-728-4300  
Fax: +82-31-728-4305

### *South Asia Pacific*

#### **Peregrine Semiconductor, China**

Shanghai, 200040, P.R. China  
Tel: +86-21-5836-8276  
Fax: +86-21-5836-7652

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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А