



### Ultra-High Linearity UltraCMOS™ Broadband Quad MOSFET Array

#### Features

- Ultimate Quad MOSFET array
- Ultra-high linearity, broadband performance beyond 6.0 GHz
- Ideal for mixer applications
- Up/down conversion
- Low conversion loss
- High LO Isolation
- Optimized for stringent military applications

#### 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

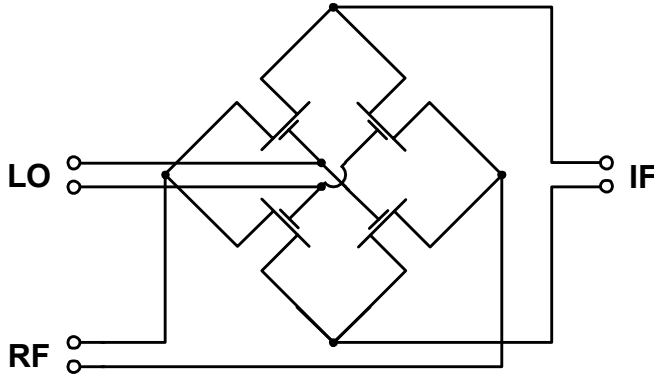


Figure 2. Package Type

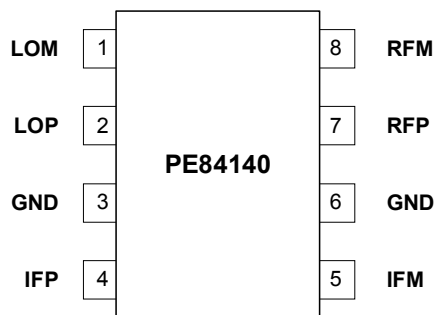
8-lead MSOP



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

Symbol	Characteristics	Min	Typ	Max	Units	Test Conditions
F <sub>TYP</sub>	Operating Frequency Range <sup>1</sup>	DC	6.0		GHz	
V <sub>DS</sub>	Drain-Source Voltage		330		mV	V <sub>GS</sub> = +3V, I <sub>DS</sub> = 40 mA
V <sub>DS Match</sub>	Drain-Source Voltage Match		20		mV	
V <sub>T</sub>	Threshold Voltage		-100		mV	V <sub>DS</sub> = 0.1V; per ASTM F617-00
R <sub>DS</sub>	Drain-Source 'ON' Resistance		8.25		Ω	V <sub>GS</sub> = +3V, I <sub>DS</sub> = 40 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 <sub>ST</sub>	Storage temperature range	-65	150	°C
T <sub>OP</sub>	Operating temperature range	-55	125	°C
V <sub>DC+AC</sub>	Maximum DC plus peak AC voltage across Drain-Source		±3.3	V
V <sub>DC+AC</sub>	Maximum DC plus peak AC voltage across Gate-Drain or Gate-Source		±4.2	V
V <sub>ESD</sub>	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.

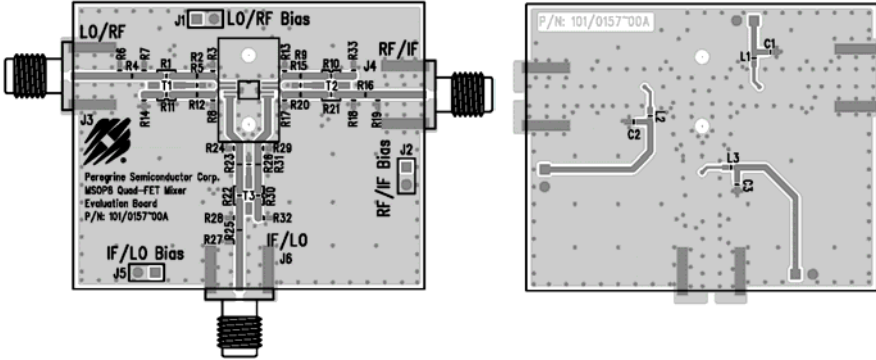
The PE84140 is an ideal mixer core for a wide range of mixer products, including module level solutions that incorporate baluns or other single-ended matching structures enabling three-port operation.

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



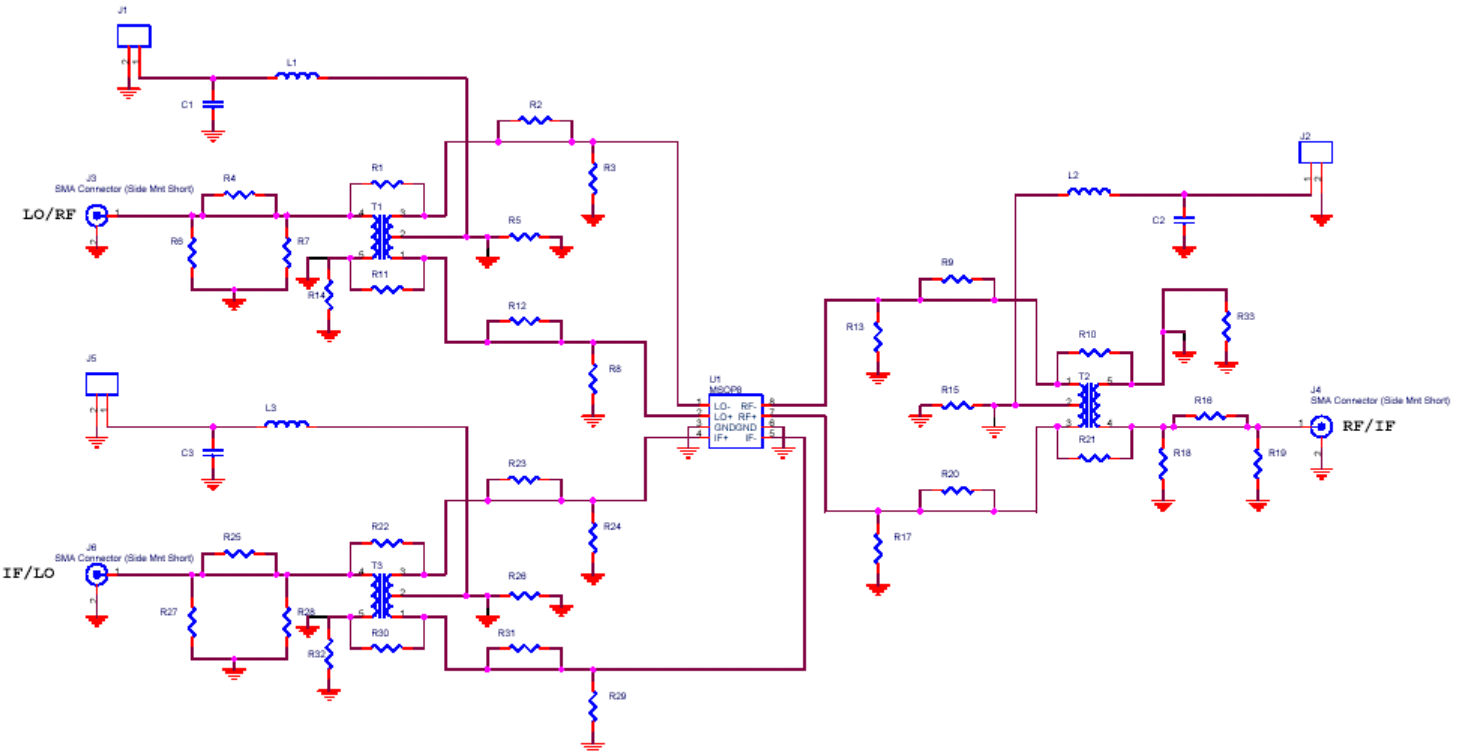
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If you have a problem with your evaluation kit or if you have applications questions, please contact applications support:

E-Mail: [help@psemi.com](mailto:help@psemi.com) (fastest response)  
Phone: (858) 731-9400

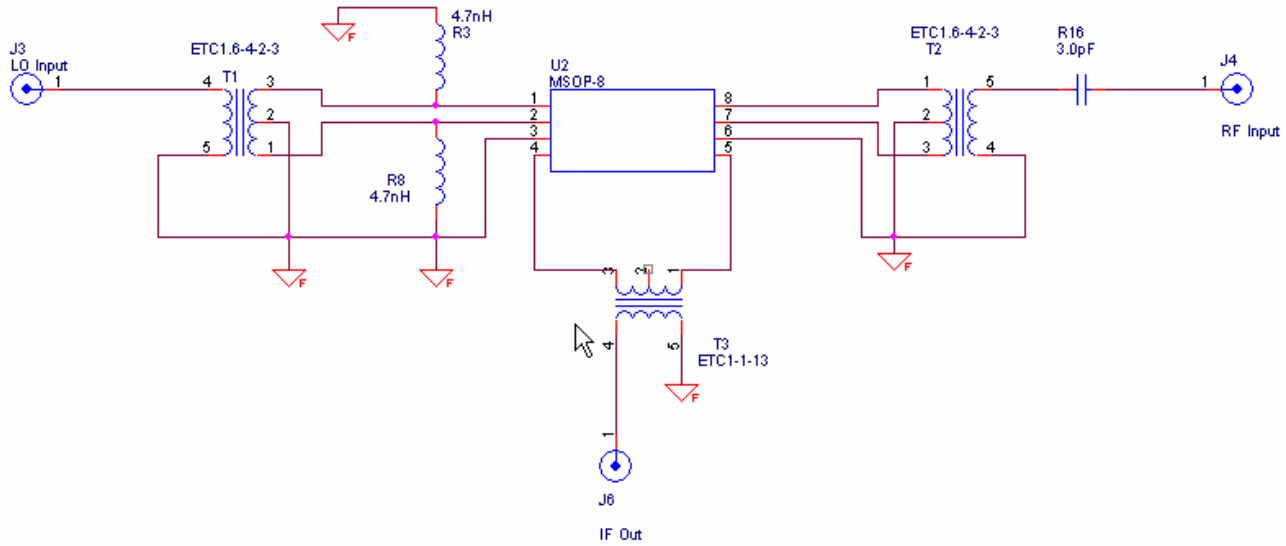
**Figure 5. Evaluation Board Schematic**

Peregrine Specification 102/0214



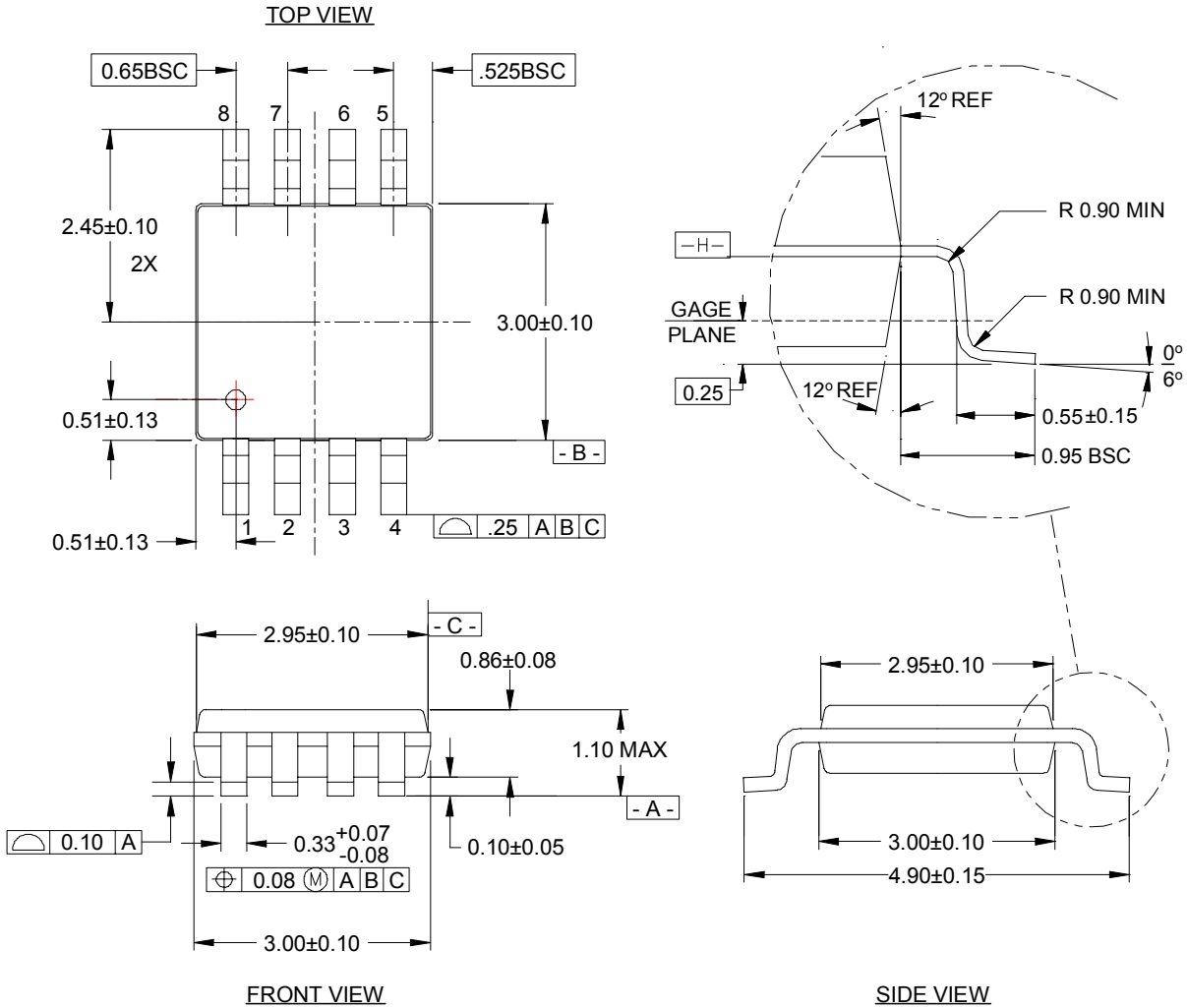
**Note:** This is the complete evaluation board schematic; which can be used for multiple configurations. Not all components need be populated. Refer to the typical schematic on the following page.

**Figure 6. Typical Schematic**



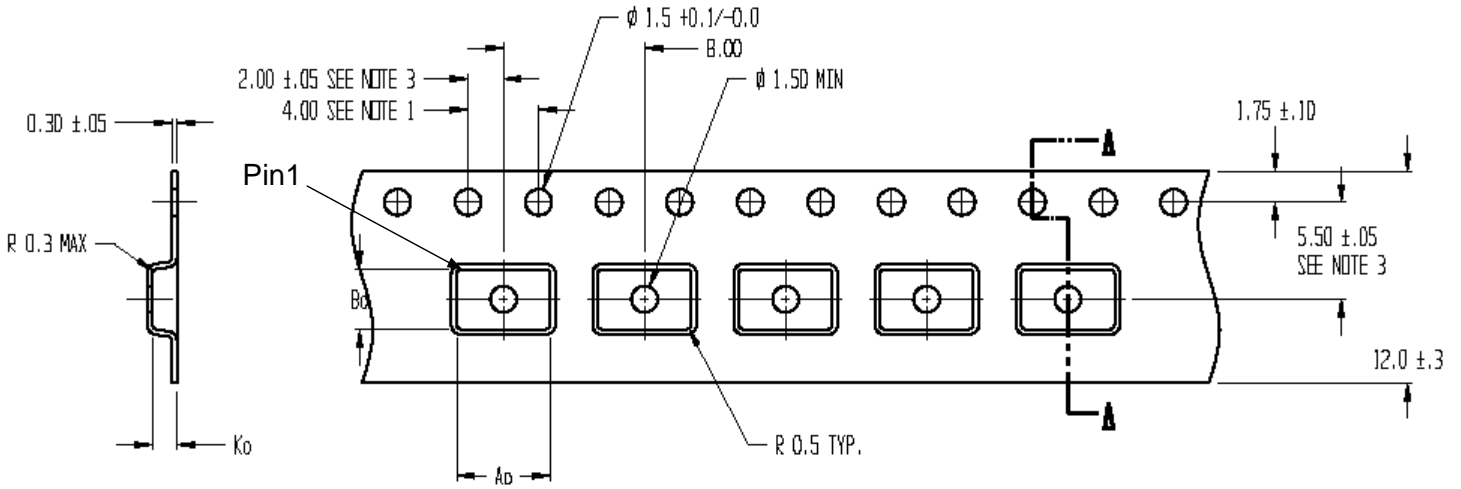
**Figure 7. Package Drawing**

8-lead MSOP



**Figure 8. Tape and Reel Specifications**

8-lead MSOP



A<sub>0</sub> = 5.30  
B<sub>0</sub> = 3.40  
K<sub>0</sub> = 1.40

**NOTES:**

1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±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

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