

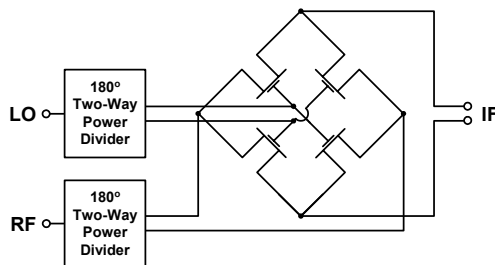
PE4128

Product Description

The PE4128 is a high linearity, passive Quad MOSFET Mixer for WCS and 2.4 GHz ISM applications exhibiting high dynamic range performance over an LO drive range of up to +20 dBm. This mixer integrates passive matching networks to provide single ended interfaces for the RF and LO ports, eliminating the need for external RF baluns or matching networks. The PE4128 is optimized for low-side injection using a 300-360 MHz nominal IF frequency, and is also suitable for use in up-conversion applications.

The PE4128 is manufactured in Peregrine's patented Ultra Thin Silicon (UTSi®) CMOS process, offering the performance of GaAs with the economy and integration of conventional CMOS.

Figure 1. Functional Schematic Diagram



High Linearity Quad MOSFET Mixer for WCS and 2.4 GHz ISM Band Applications

Features

- Integrated, single-ended RF & LO interfaces
- High linearity: IIP3 > +30 dBm, 2.28 – 2.5 GHz (+17 dBm LO)
- Low conversion loss: 8 dB max (+17 dBm LO)
- High isolation: typical LO-IF at 38 dB / LO-RF at 34 dB
- Designed for low-side LO injection

Figure 2. Package Type

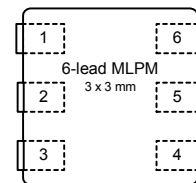


Table 1. Electrical Specifications @ +25 °C ($Z_S = Z_L = 50 \Omega$)

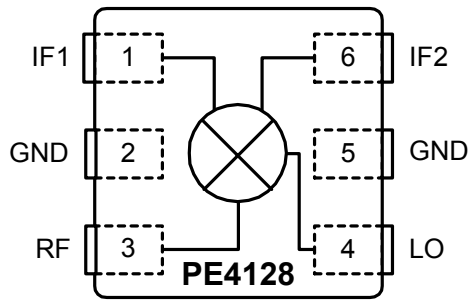
Parameter	Minimum	Typical	Maximum	Units
Frequency Range:				
LO	1920	--	2200	MHz
RF	2280	--	2500	MHz
IF*	--	300-360	--	MHz
Conversion Loss**		7.5		dB
Isolation:				dB
LO-RF		34		dB
LO-IF		38		dB
Input IP3		30		dBm
Input 1 dB Compression		20		dBm

*An IF frequency range of 300-360 MHz is a nominal frequency. The IF frequency can be specified by the user as long as the RF and LO frequencies are within the specified maximum and minimum limits.

**Conversion Loss includes loss of IF transformer (M/A COM ETC1-1-13, nominal loss of 0.7dB at 70 MHz).

Test conditions unless otherwise noted: LO input drive = 17 dBm.

Figure 3. Pin Configuration



Electrostatic Discharge (ESD) Precautions

When handling this UTSi device, observe the same precautions that you would use with other ESD-sensitive devices. Although this device contains circuitry to protect it from damage due to ESD, precautions should be taken to avoid exceeding the rating specified.

Latch-Up Avoidance

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

Table 2. Pin Descriptions

Pin No.	Pin Name	Description
1	IF1	IF differential output
2	GND	Ground connections for Mixer. Traces should be physically short and connect immediately to ground plane for best performance. The exposed solder pad must also be soldered to the ground plane for best performance.
3	RF	RF Input
4	LO	LO Input
5	GND	Ground connections for Mixer. Traces should be physically short and connect immediately to ground plane for best performance. The exposed solder pad must also be soldered to the ground plane for best performance.
6	IF2	IF differential output

Table 3. Absolute Maximum Ratings

Symbol	Parameter/Conditions	Min	Max	Units
T _{ST}	Storage temperature range	-65	150	°C
T _{OP}	Operating temperature range	-40	85	°C
P _{LO}	LO input power		20	dBm
P _{RF}	RF input power		16	dBm
V _{ESD}	ESD Sensitive Device		200	V

Figure 4. Typical Application Schematic

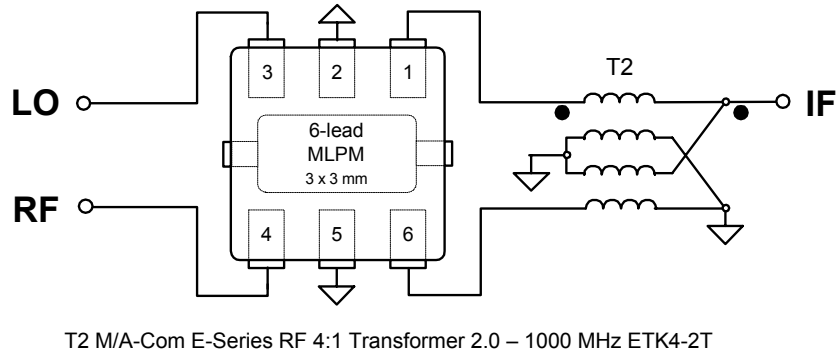


Figure 5. Evaluation Board Layout

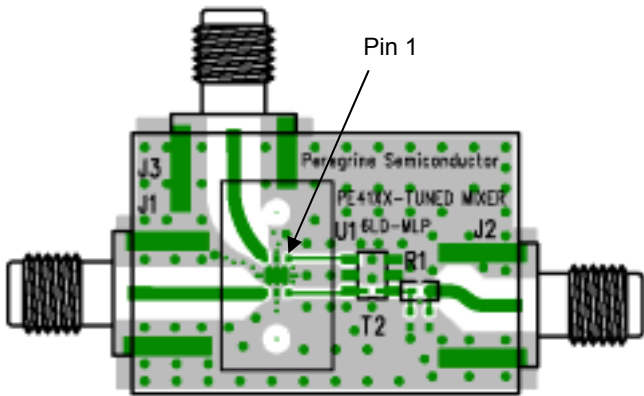
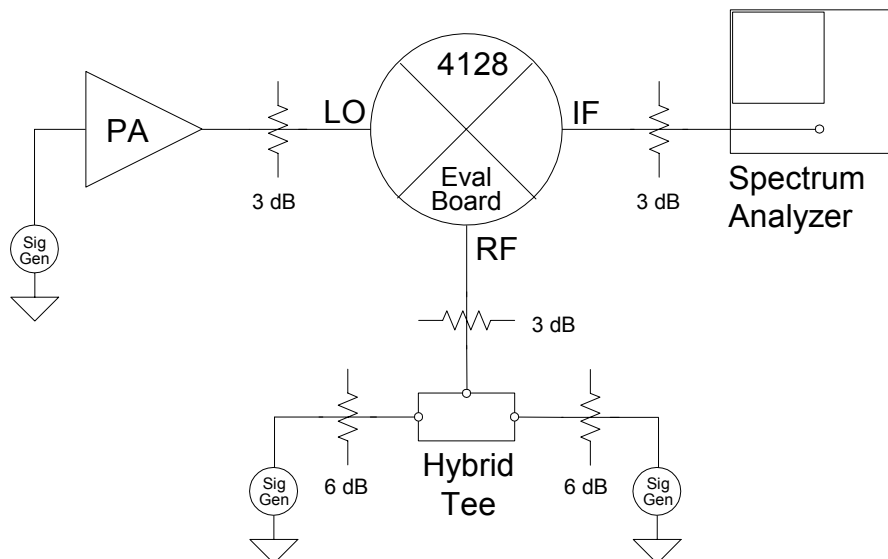


Table 4. Bill of Materials

Reference	Value / Description
T2	M/A Com ETK4-2T
R1	0Ω
U1	PE4128 MLP Mixer
J1, J2, J3	SMA Connector

Figure 6. Evaluation Board Testing Block Diagram, 2-Tone Setup



Typical Performance Plots @ +25 °C

Figure 7. Conversion Loss

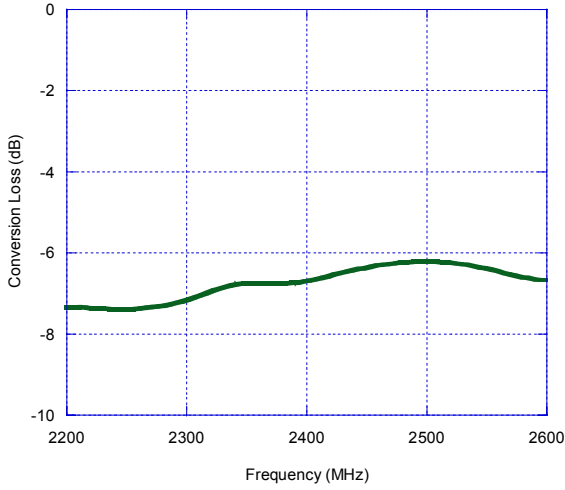


Figure 8. Input 1dB Compression

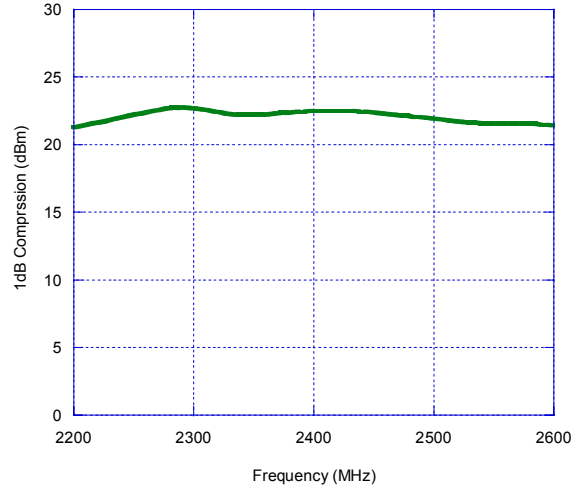


Figure 9. Input IP3

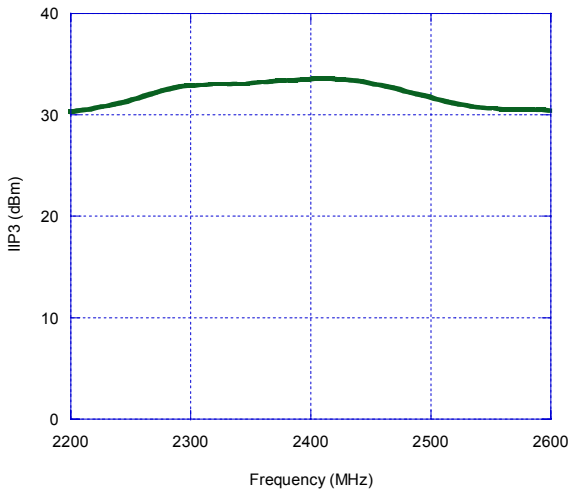


Figure 10. Package Drawings

6-lead MLPM

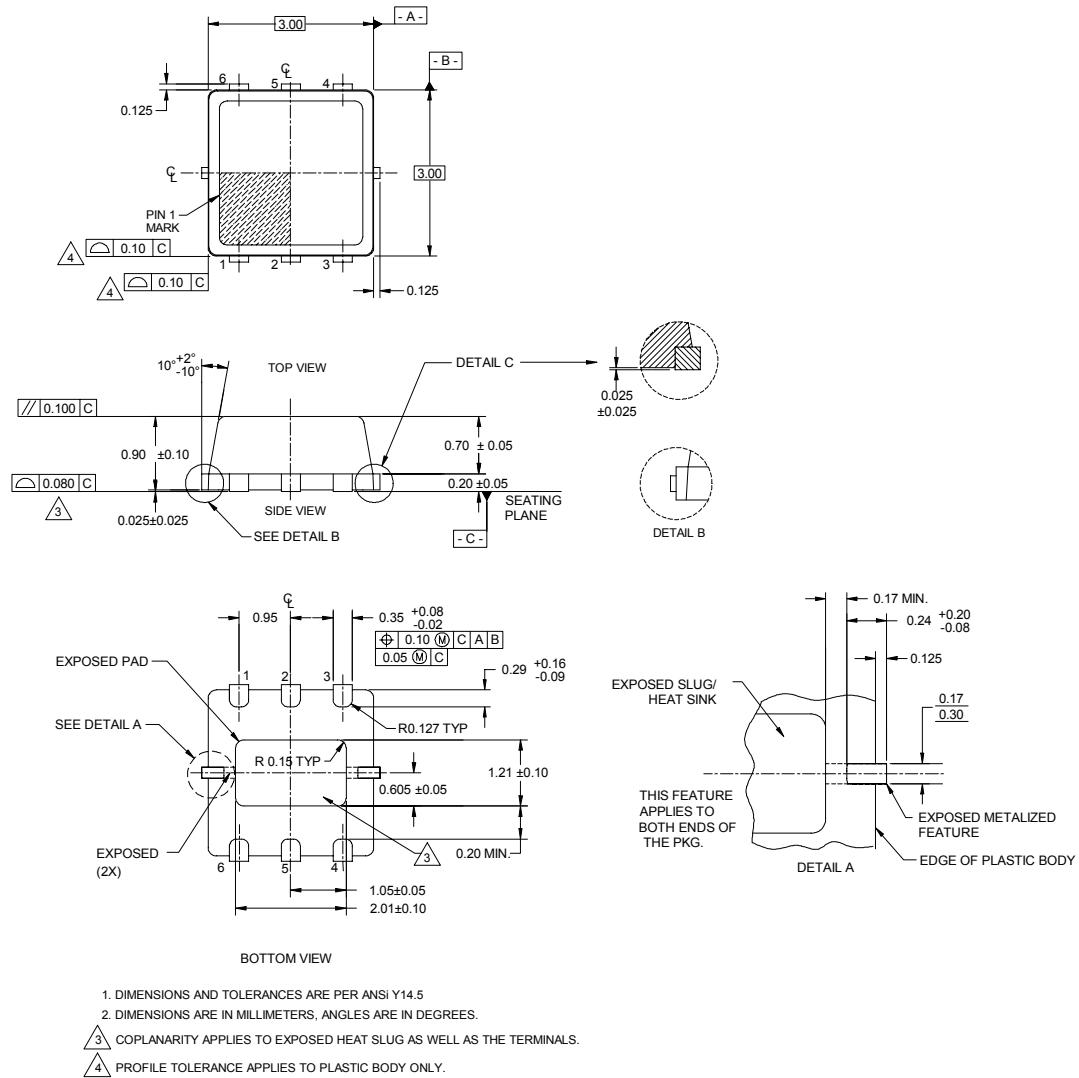


Table 5. Ordering Information

Order Code	Part Marking	Description	Package	Shipping Method
4128-01	4128	PE4128-06MLP3x3-12800F	6-lead 3x3 MLPM	12800 units / Canister
4128-02	4128	PE4128-06MLP3x3-3000C	6-lead 3x3 MLPM	3000 units / T&R
4128-00	PE4128-EK	PE4128-06 MLP3x3-EK	Evaluation Board	1 / Box

Sales Offices

United States

Peregrine Semiconductor Corp.

6175 Nancy Ridge Drive
San Diego, CA 92121
Tel 1-858-455-0660
Fax 1-858-455-0770

Europe

Peregrine Semiconductor Europe

Bâtiment Maine
13-15 rue des Quatre Vents
F- 92380 Garches
Tel 33-1-47-41-91-73
Fax 33-1-47-41-91-73

Japan

Peregrine Semiconductor K.K.

5A-5, 5F Imperial Tower
1-1-1 Uchisaiwaicho, Chiyoda-ku
Tokyo 100-0011 Japan
Tel: 03-3507-5755
Fax: 03-3507-5601

Australia

Peregrine Semiconductor Australia

8 Herb Elliot Ave.
Homebush, NSW 2140
Australia
Tel: 011-61-2-9763-4111
Fax: 011-61-2-9746-1501

For a list of representatives in your area, please refer to our Web site at: <http://www.peregrine-semi.com>

Data Sheet Identification

Advance Information

The product is in a formative or design stage. The data sheet contains design target specifications for product development. Specifications and features may change in any manner without notice.

Preliminary Specification

The data sheet contains preliminary data. Additional data may be added at a later date. Peregrine reserves the right to change specifications at any time without notice in order to supply the best possible product.

Product Specification

The data sheet contains final data. In the event Peregrine decides to change the specifications, Peregrine will notify customers of the intended changes by issuing a PCN (Product Change Notice).

The information in this data sheet is believed to be reliable. However, Peregrine assumes no liability for the use of this information. Use shall be entirely at the user's own risk.

No patent rights or licenses to any circuits described in this data sheet are implied or granted to any third party.

Peregrine's products are not designed or intended for use in devices or systems intended for surgical implant, or in other applications intended to support or sustain life, or in any application in which the failure of the Peregrine product could create a situation in which personal injury or death might occur. Peregrine assumes no liability for damages, including consequential or incidental damages, arising out of the use of its products in such applications.

Peregrine products are protected under one or more of the following U.S. patents: 6,090,648; 6,057,555; 5,973,382; 5,973,363; 5,930,638; 5,920,233; 5,895,957; 5,883,396; 5,864,162; 5,863,823; 5,861,336; 5,663,570; 5,610,790; 5,600,169; 5,596,205; 5,572,040; 5,492,857; 5,416,043. Other patents are pending.

Peregrine, the Peregrine logotype, Peregrine Semiconductor Corp., and UTSi are registered trademarks of Peregrine Semiconductor Corporation. Copyright © 2003 Peregrine Semiconductor Corp. All rights reserved.