

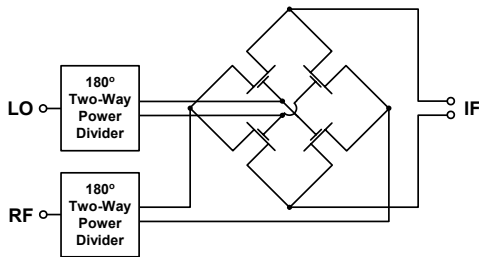
PE4123

Product Description

The PE4123 is a high linearity, passive Quad MOSFET Mixer for PCS & 3G Base Station Receivers, exhibiting high dynamic range performance over a broad 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 PE4123 is optimized for frequency down-conversion using high-side LO injection for PCS & 3G Base Station applications, and is also suitable for up-conversion applications.

The PE4123 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 PCS & 3G BTS

Features

- Integrated, single-ended RF & LO interfaces
- High linearity: +32 dBm, 1.9 GHz (+17 dBm LO)
- Low-conversion loss: 7.5 dB (+17 dBm LO)
- High isolation: Typical LO-IF at 35 dB, LO-RF at 33 dB
- Optimized for high-side LO injection
- Packaged in a very small 6-lead 3x3mm MLPM

Figure 2. Package Type

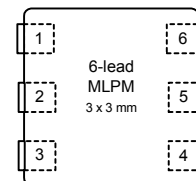


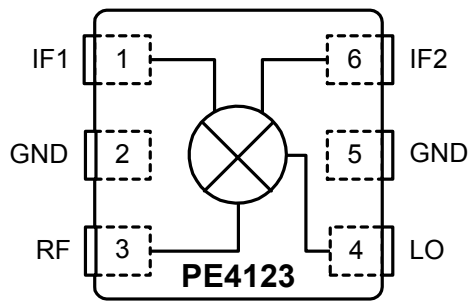
Table 1. Electrical Specifications @ +25 °C

Parameter	Minimum	Typical	Maximum	Units
Frequency Range:				
LO	2050	--	2250	MHz
RF	1800	--	2000	MHz
IF*	--	260	--	MHz
Conversion Loss**		7.5		dB
Isolation:				
LO-RF		33		dB
LO-IF		35		dB
Input IP3		32		dBm
Input 1 dB Compression		22		dBm

*An IF frequency of 260 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.

**Conversion Loss includes loss of IF transformer (M/A COM ETK4-2T, nominal loss 0.7 dB at 260 MHz).

Test conditions unless otherwise noted: IF = 260 MHz, LO input drive = 17 dBm, RF input drive = 0 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.

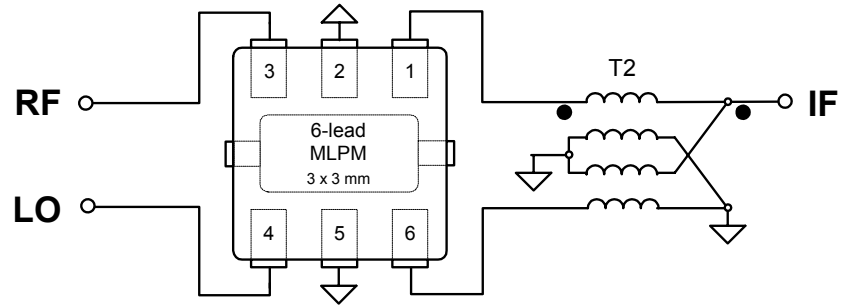
Table 2. Pin Descriptions

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		250	V

Figure 4. Evaluation Board Schematic Diagram



T2, M/A-Com E-Series RF 4:1 Transformer, 2.0 – 1000 MHz, ETK4-2T

Figure 5. Evaluation Board Layout

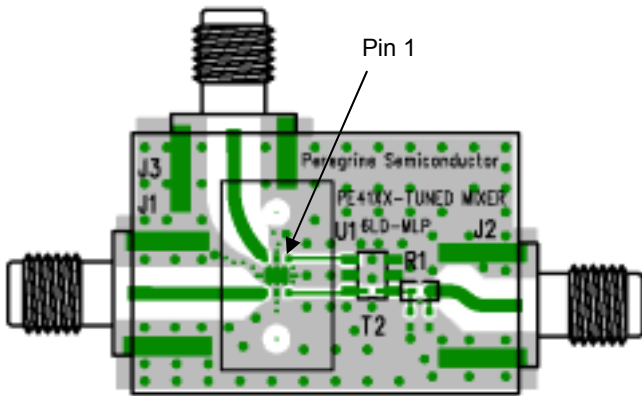
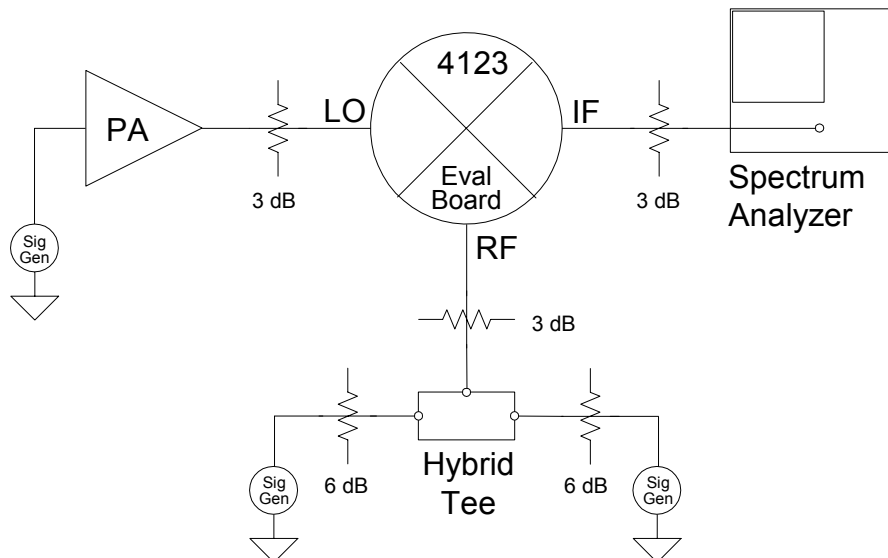


Table 4. Bill of Materials

Reference	Value / Description
T2	M/A Com ETK4-2T
R1	0Ω
U1	PE4123 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

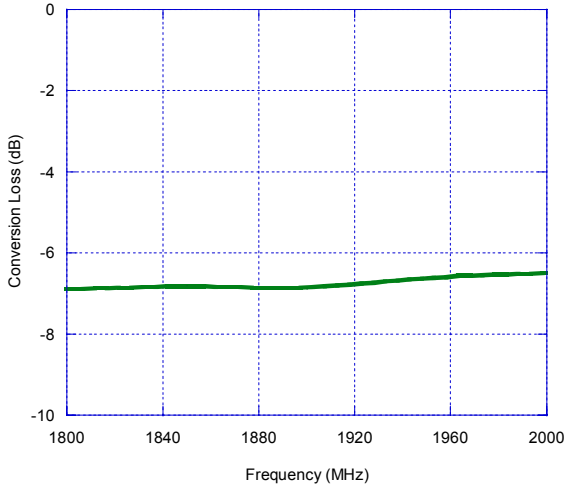


Figure 8. Input 1dB Compression

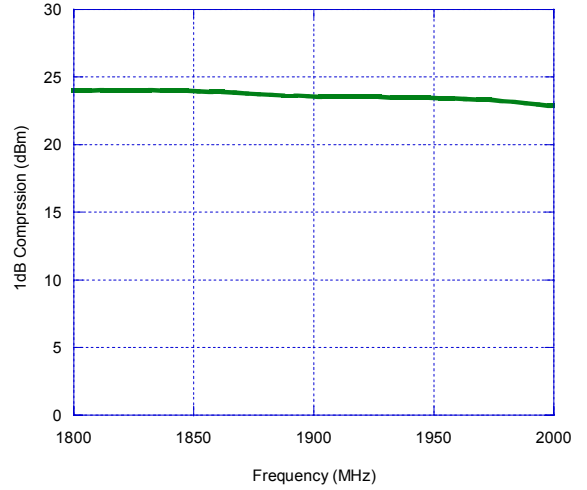


Figure 9. Input IP3

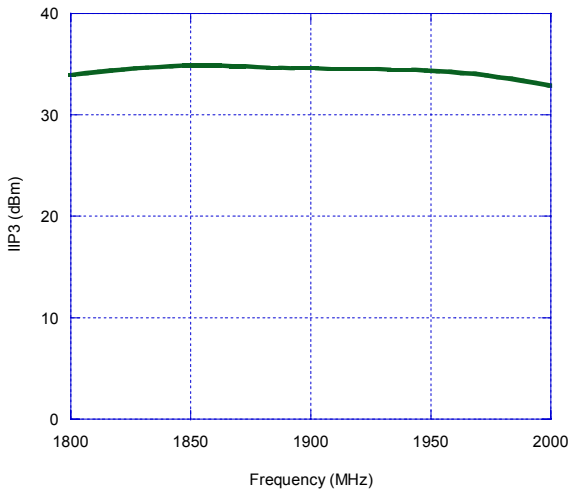
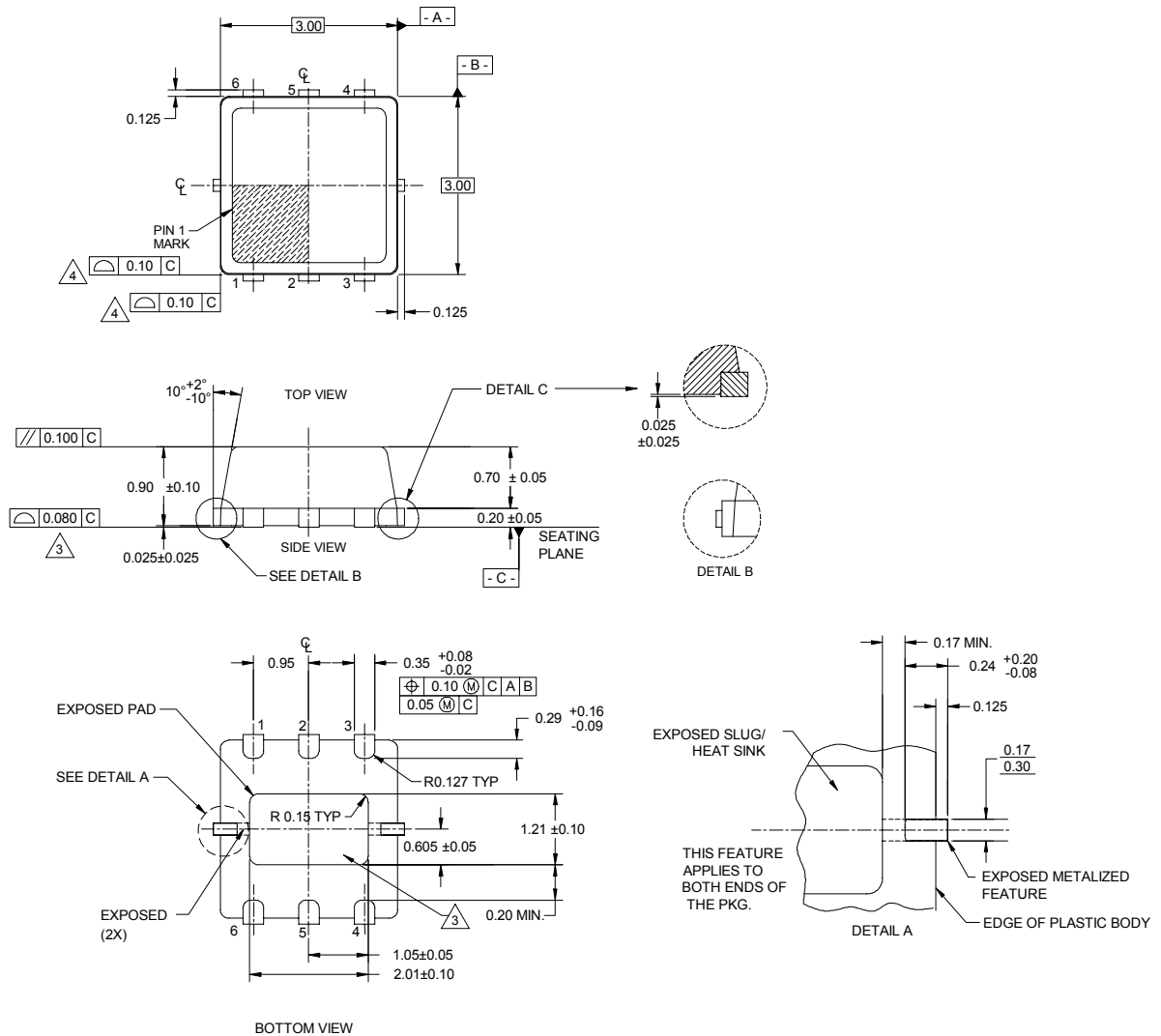


Figure 10. Package Drawing

6-lead MLPM



1. DIMENSIONS AND TOLERANCES ARE PER ANSI Y14.5
2. DIMENSIONS ARE IN MILLIMETERS, ANGLES ARE IN DEGREES.
3. COPLANARITY APPLIES TO EXPOSED HEAT SLUG AS WELL AS THE TERMINALS.
4. PROFILE TOLERANCE APPLIES TO PLASTIC BODY ONLY.

Table 5. Ordering Information

Order Code	Part Marking	Description	Package	Shipping Method
4123-01	4123	PE4123-06MLP3x3-12800F	6-lead 3x3 MLPM	12800 units / Canister
4123-02	4123	PE4123-06MLP3x3-3000C	6-lead 3x3 MLPM	3000 units / T&R
4123-00	4123-EK	PE4123-06ML3x3P-EK	Evaluation Board	1 / Box

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Data Sheet Identification

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Preliminary Specification

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