

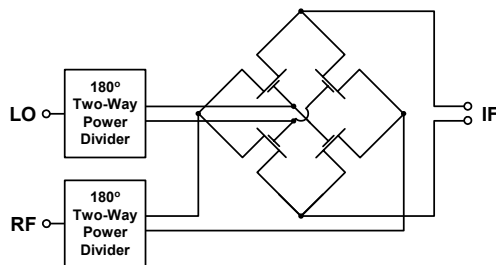
# PE4129

## Product Description

The PE4129 is a high linearity, passive Quad MOSFET Mixer for MMDS 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 PE4129 is optimized for low-side injection using a 300-380 MHz nominal IF frequency, and is also suitable for use in up-conversion applications.

The PE4129 is manufactured in Peregrine's patented Ultra Thin Silicon (UTSi<sup>®</sup>) 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 MMDS Applications

### Features

- Integrated, single-ended RF & LO interfaces
- High linearity: IIP3 > +30 dBm, 2.5 – 2.7 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

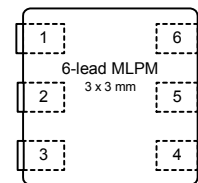


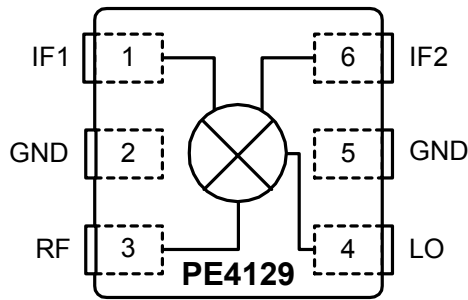
Table 1. Electrical Specifications @ +25 °C ( $Z_S = Z_L = 50 \Omega$ )

Parameter	Minimum	Typical	Maximum	Units
Frequency Range:				
LO	2120	--	2400	MHz
RF	2500	--	2700	MHz
IF*	--	300-380	--	MHz
Conversion Loss**		7.5		dB
Isolation:				
LO-RF		34		dB
LO-IF		38		dB
Input IP3		30		dBm
Input 1 dB Compression		20		dBm

\*An IF frequency range of 300-380 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 in Table 3.

**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

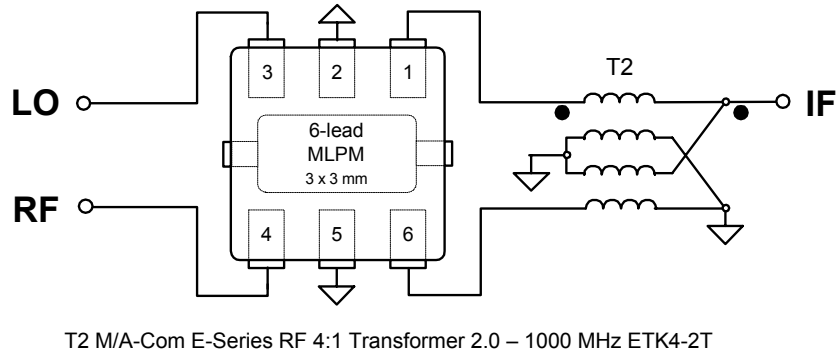


Figure 5. Evaluation Board Layout

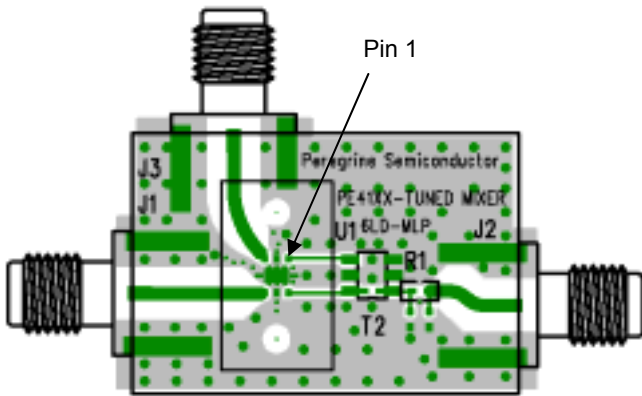
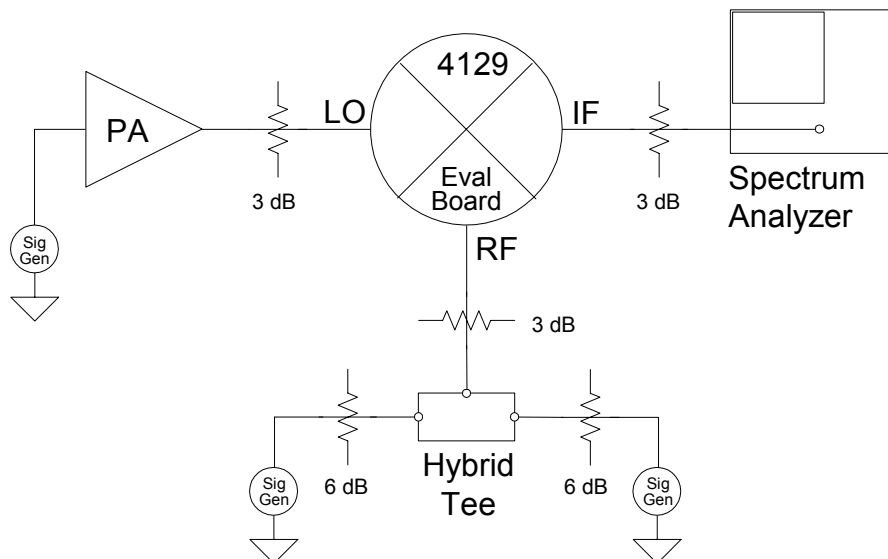


Table 4. Bill of Materials

Reference	Value / Description
T2	M/A Com ETK4-2T
R1	0Ω
U1	PE4129 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

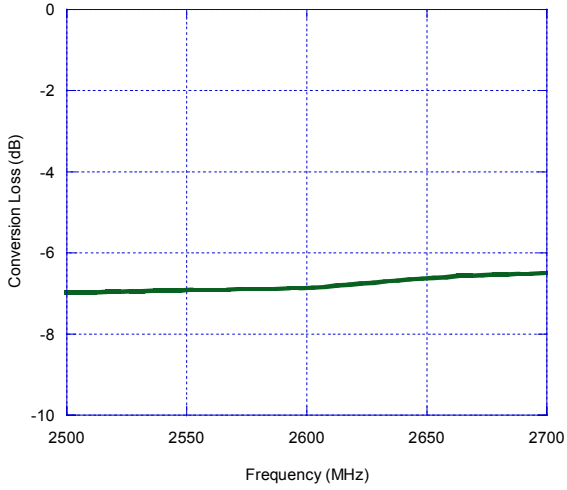


Figure 8. Input 1dB Compression

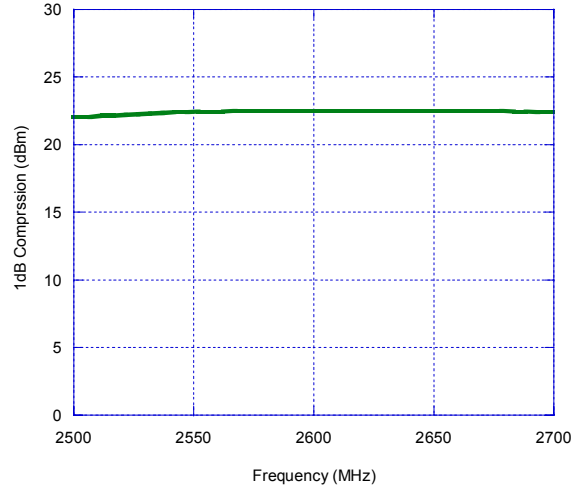
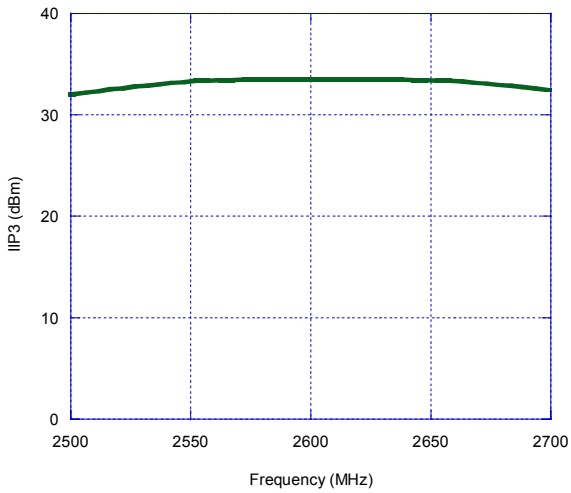


Figure 9. Input IP3



### Figure 10. Package Drawings

6-lead MLPM

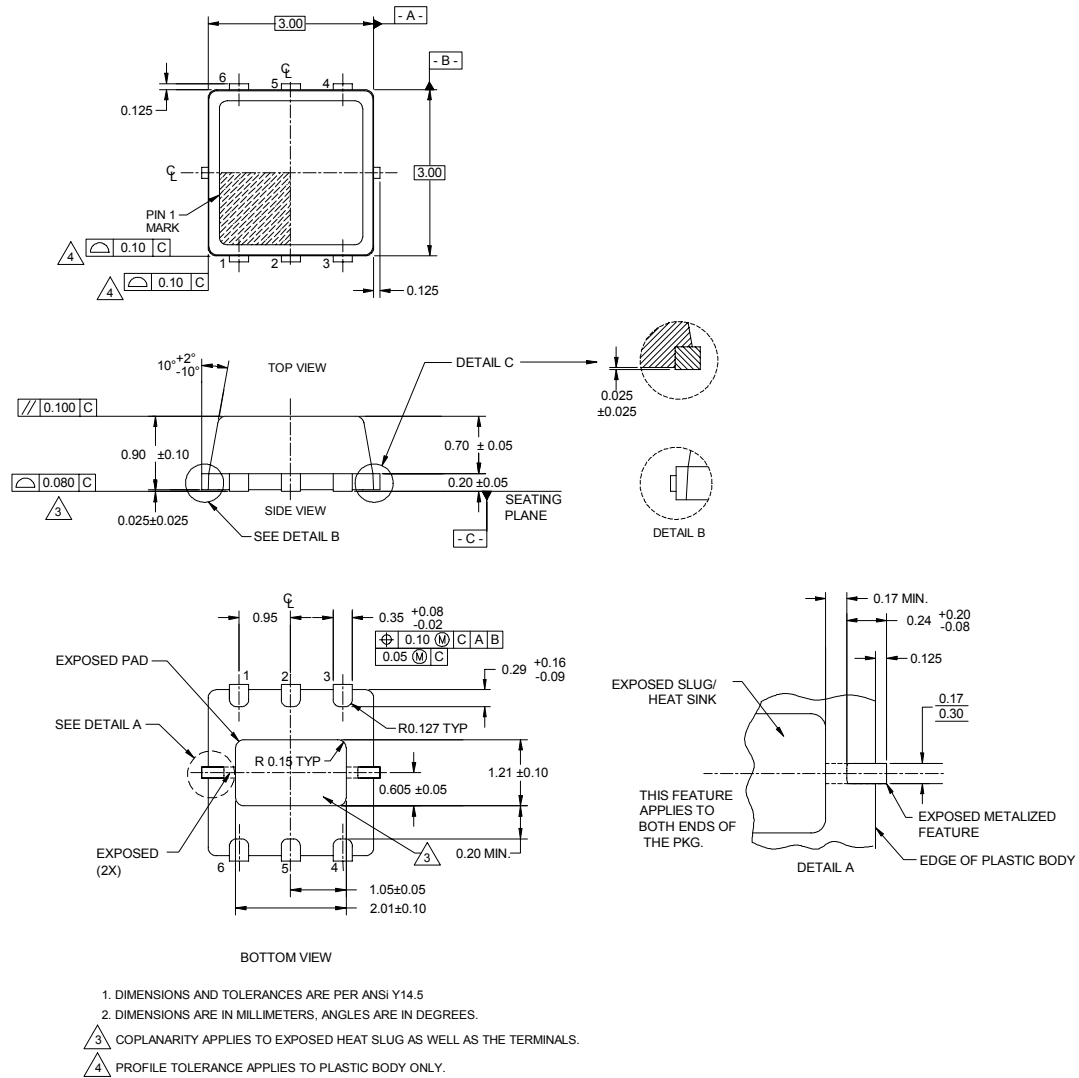


Table 5. Ordering Information

Order Code	Part Marking	Description	Package	Shipping Method
4129-01	4129	PE4129-06MLP3x3-12800F	6-lead 3x3 MLPM	12800 units / Canister
4129-02	4129	PE4129-06MLP3x3-3000C	6-lead 3x3 MLPM	3000 units / T&R
4129-00	PE4129-EK	PE4129-06 MLP3x3-EK	Evaluation Board	1 / Box

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