PEREGRINE SEMICONDUCTOR

PRELIMINARY SPECIFICATION

PE4126

High Linearity MOSFET Quad Mixer For DCS 1800 BTS

Features

- Integrated, Single-Ended RF & LO Interfaces
- High linearity: IIP3>+30 dBm, 1700 – 1800 MHz (+17 dBm LO)
- Low conversion loss: 8 dB (+17 dBm LO)
- High Isolation: Typical LO-IF at 38 dB / LO-RF at 38 dB
- Designed for Low-Side LO Injection

Product Description

The PE4126 is a high linearity, passive MOSFET Quad Mixer for DCS1800 Base Station Receivers exhibiting high dynamic range performance over an LO drive range of 14 dBm 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 PE4126 is optimized for frequency down conversion using low-side LO injection for DCS1800 Base Station applications.

The PE4126 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

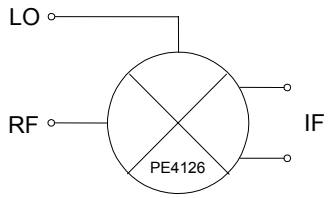


Figure 2. Package Drawing

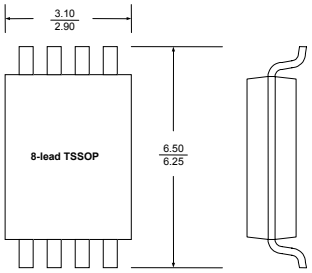


Table 1. Electrical Specifications @ +25 °C (Z_S = Z_L = 50 Ω)

Parameter	Minimum	Typical	Maximum	Units
Frequency Range:				
LO	1450	--	1550	MHz
RF	1700	--	1800	MHz
IF	--	250*	--	MHz
Conversion Loss		7.9**	8.3	dB
Isolation:				
LO-RF				
1.7 GHz	31	34		dB
1.75 GHz	34	36		dB
1.8 GHz	35	38		dB
LO-IF	34	37		dB
Input IP3	30	32		
Input 1 dB Compression		21		dBm

**An IF frequency of 250 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. Test conditions unless otherwise noted: LO input drive = 17 dBm. **Conversion Loss includes loss of IF transformer (M/ACom ETK4-2T - Nominal 0.7 dB at 250 MHz.*

Figure 3. Pin Configuration

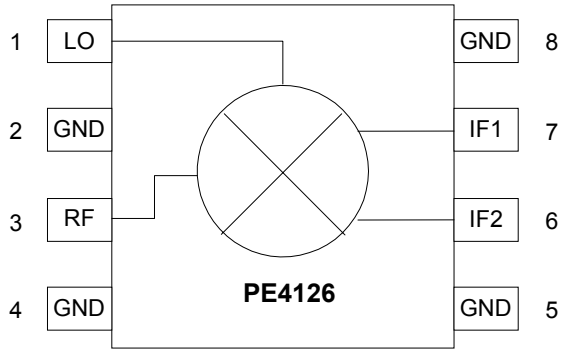


Table 2. Pin Descriptions

Pin No.	Pin Name	Description
1	LO	LO Input
2	GND	Ground connection for Mixer. Traces should be physically short and connect immediately to ground plane for best performance.
3	RF	RF Input
4	GND	Ground.
5	GND	Ground.
6	IF1	IF differential output
7	IF2	IF differential output
8	GND	Ground.

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		20	dBm
VESD	ESD Sensitive Device		200	V

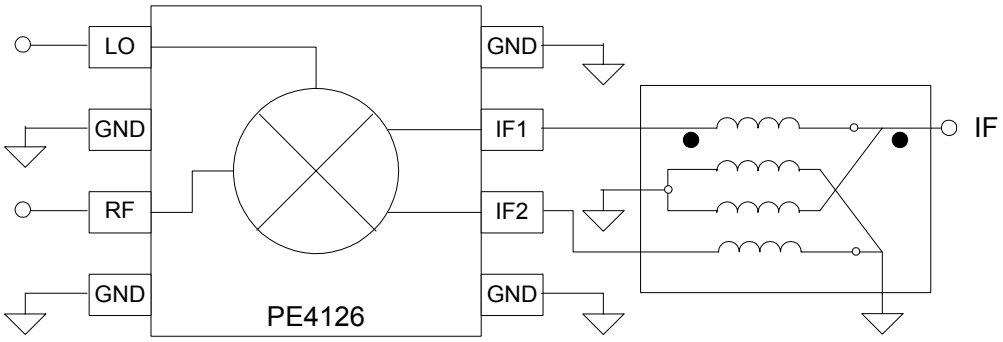
Electrostatic Discharge (ESD) Precautions

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.

Figure 4. Typical Application Schematic



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

Figure 5. Evaluation Board

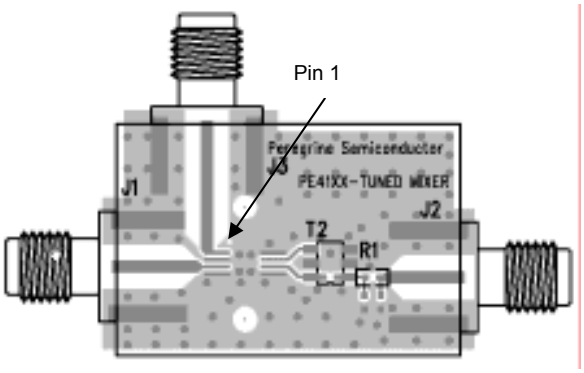
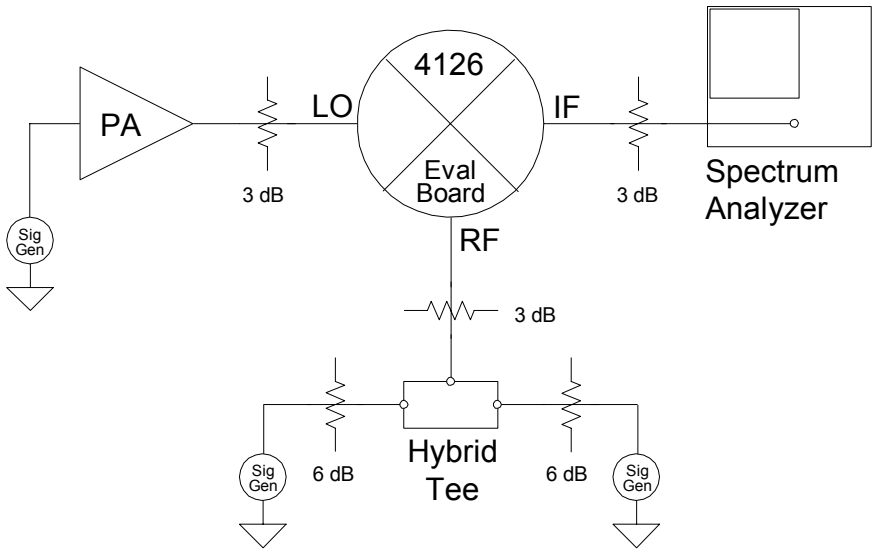


Table 4. Bill of Materials

Reference	Value / Description
T2	M/A Com ETK4-2T
U1 (Not Labeled)	PE4126 Mixer
R1	0Ω
J1, J2, J3	SMA Connector

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



Typical Performance Data

Figure 7. 1 dB Compression

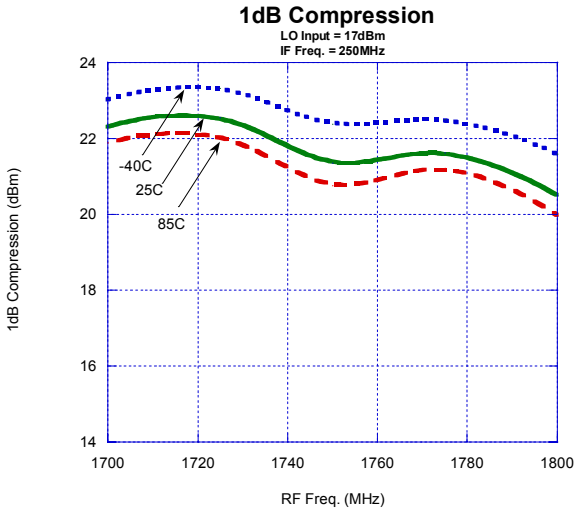


Figure 8. Conversion Loss vs. Temperature

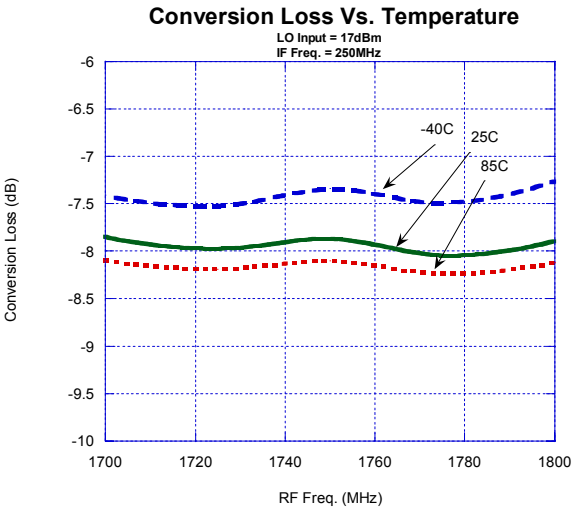


Figure 9. Input IP3 vs. Temperature

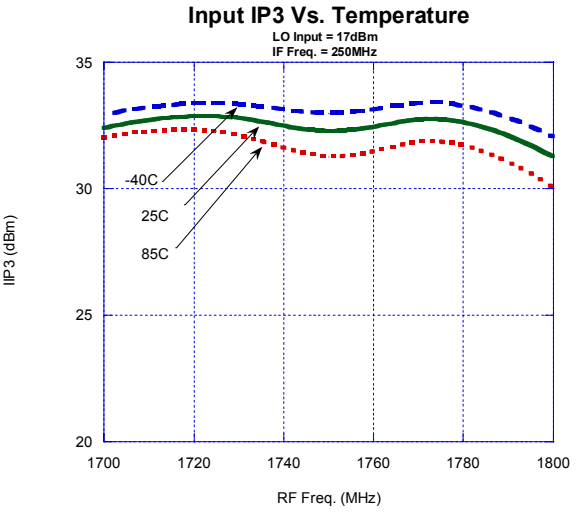
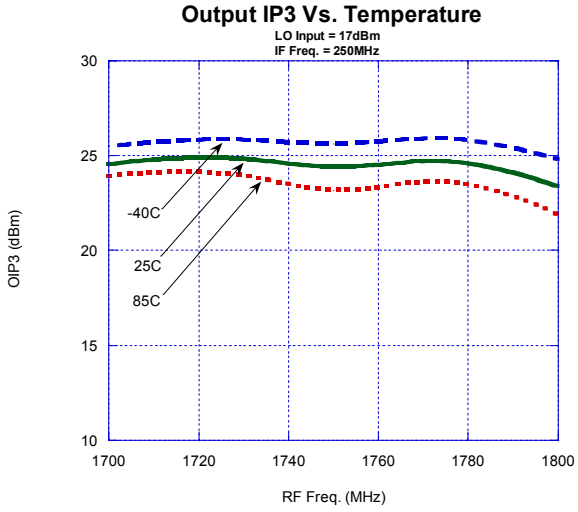


Figure 10. Output IP3 vs. Temperature



Typical Performance Data

Figure 11. LO-IF Isolation vs. Temperature

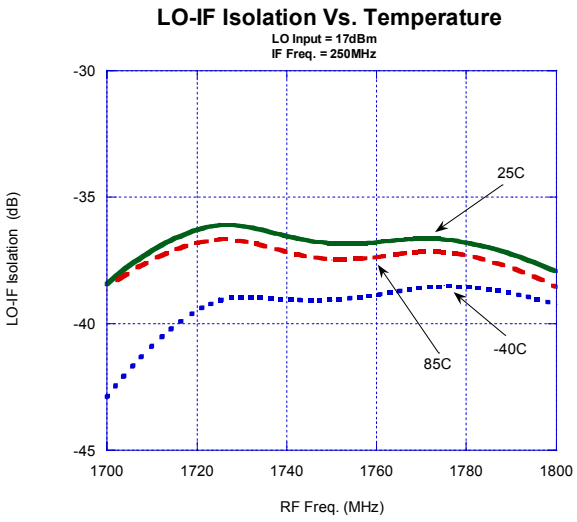


Figure 12. LO-RF Isolation vs. Temperature

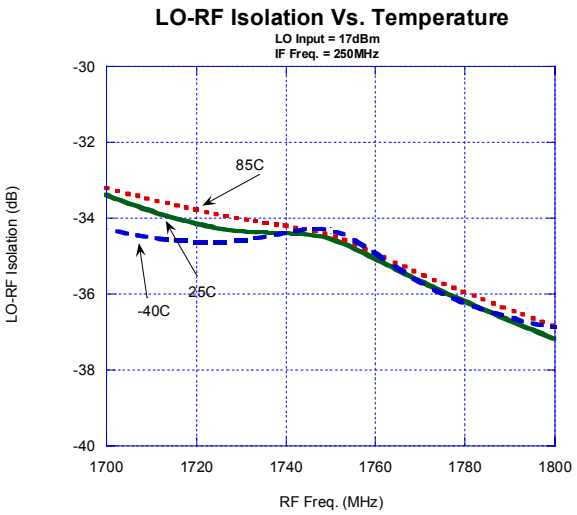


Figure 13. LO Port Return Loss

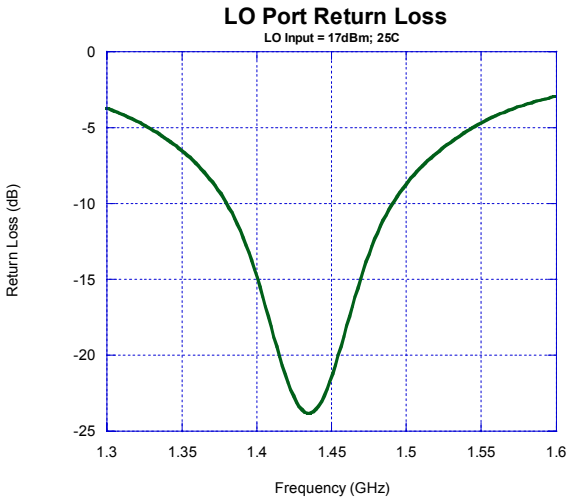
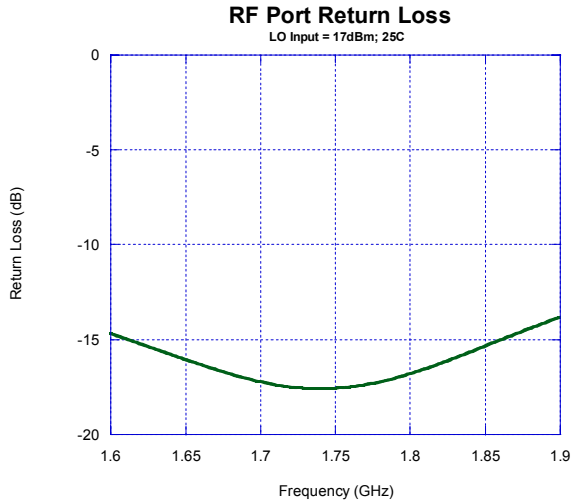


Figure 14. RF Port Return Loss



Typical Performance Data

Figure 15. Conversion Loss across LO Power

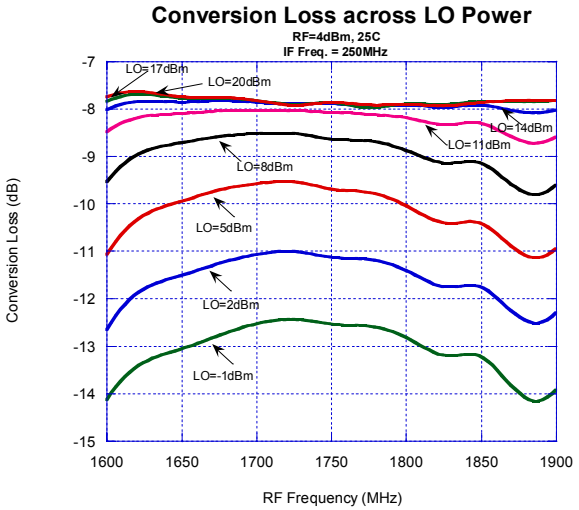


Figure 16. IIP3 across LO Power

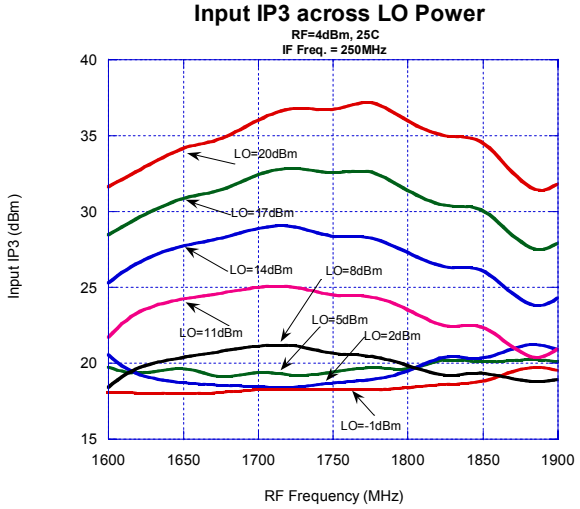


Figure 17. Conversion Loss across LO Power (1750 MHz)

Figure 18. IIP3 across LO Power (1750 MHz)

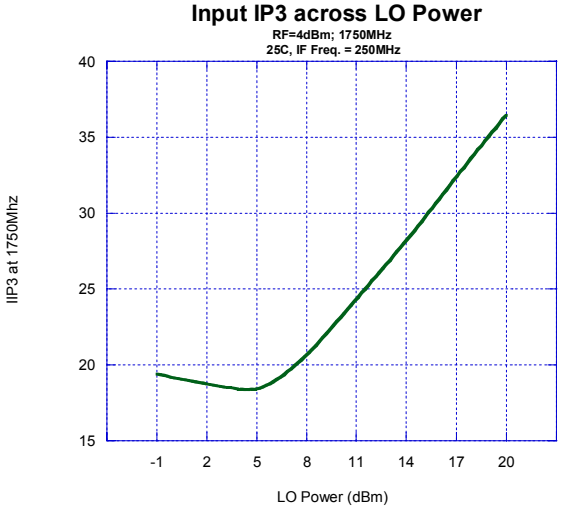


Figure 19. Package Drawing

8-lead TSSOP

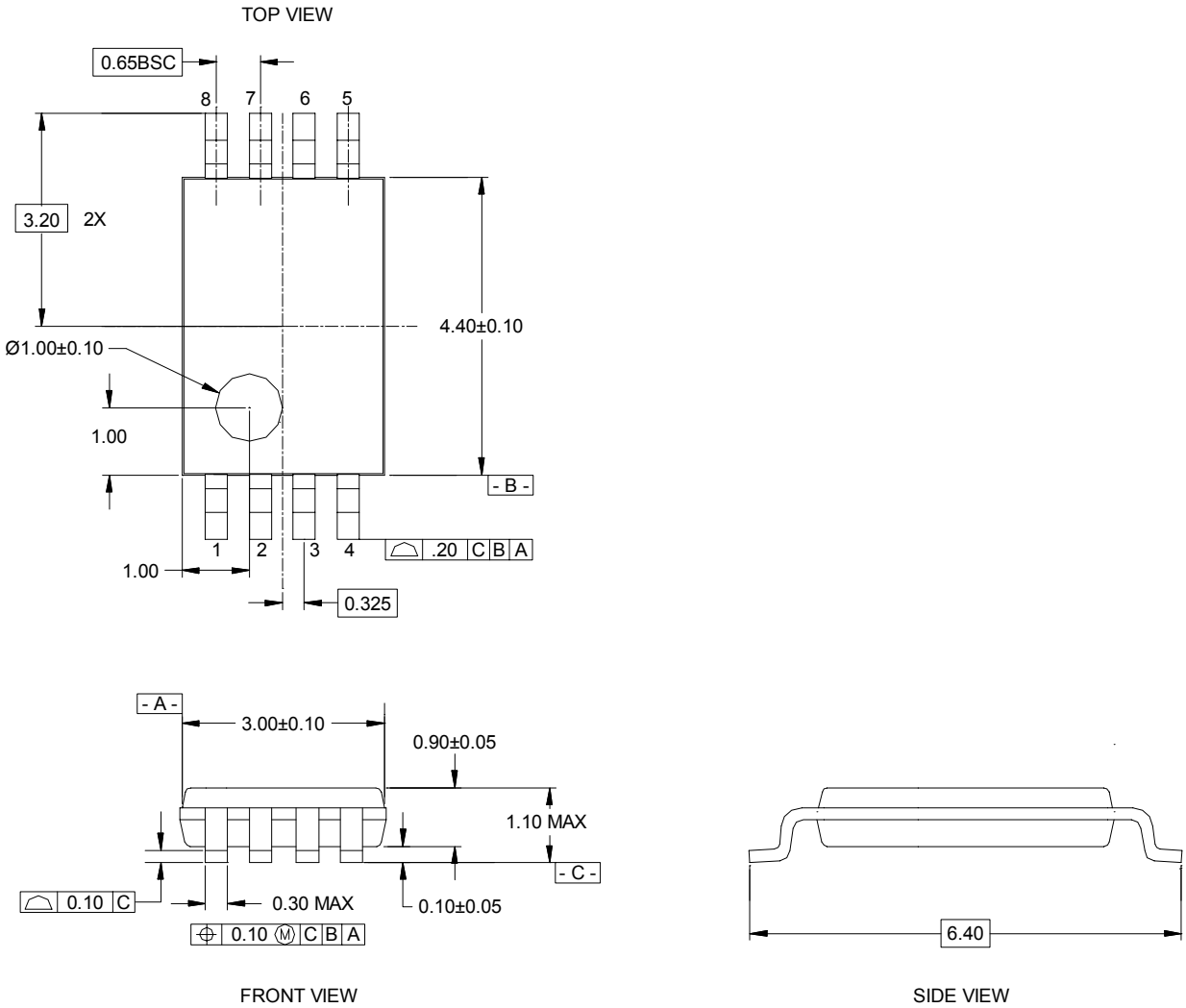


Table 5. Ordering Information

Order Code	Part Marking	Description	Package	Shipping Method
4126-21	4126		8-lead TSSOP	100 pcs. / Tube
4126-22	4126		8-lead TSSOP	2000 pcs. / T&R
4126-00	PE4126-EK		Evaluation Board	1 / Box

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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).

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