SME1400B-17

Broadband Surface Mount Mixer

Product Features

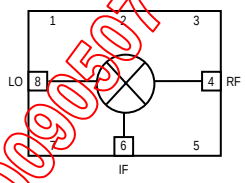
- +27 dBm Input IP3
- RF: 1 – 2200 MHz
- LO: 1 – 2200 MHz
- IF: 1 – 2000 MHz
- +17 dBm LO Drive Level
- No Internal Solder Connections
- RoHS-compliant SMT package
- No External Bias Required

Product Description

The SME1400B-17 is a passive double-balanced diode-ring mixer that provides high dynamic range performance in a RoHS-compliant surface mount package. The mixer is nominally driven with a LO input power of +17 dBm to optimize its performance. Other SME models are available for other LO drive levels.

Typical applications include frequency up/down conversion, modulation and demodulation for receivers and transmitters used in 2.5G and 3G GSM/CDMA/W-CDMA systems.

Functional Diagram



Top View

Applications

- Up/down frequency conversion

Specifications (1)

Parameter	Units	Min	Typ	Max	Notes
SSB Conversion Loss					
RF/LO = 10-1300 MHz, IF = 10-1000 MHz	dB		6.5	8.5	See note 1. Guaranteed at 8 dB max at 25 ˚C.
RF/LO = 10-2200 MHz, IF = 30-1000 MHz	dB		7.5	9.5	See note 1. Guaranteed at 9 dB max at 25 ˚C.
RF/LO = 1-2200 MHz, IF = 1-2000 MHz	dB		8.0		
Port-to-Port Isolation					
L-R = 10-1500 MHz	dB	21	30		
L-R = 10-2200 MHz	dB	17	25		
L-I = 10-2000 MHz	dB	20	26		
L-I = 10-2200 MHz	dB	16	22		
R-I = 10-2200 MHz	dB		25		
3rd Order Input Intercept Point	dBm		+27		
1dB Input Compression Point	dBm		+13		
VSWR					
RF Port = 600-2000 MHz			1.7:1		
RF Port = 10-2200 MHz			2.0:1		
LO Port = 600-2000 MHz			1.6:1		
LO Port = 10-2200 MHz			2.0:1		
IF Port			1.8:1		
LO Drive Level	dBm		+17		

1. Measured in a 50 ohm system with a nominal LO drive of +17 dBm, low-side LO, in a downconversion application with LO = 400-2100 MHz, RF = 500-2200 MHz, IF = 100 MHz.

Absolute Maximum Rating

Parameter	Rating
Operating Case Temperature	-40 to +85 °C
Storage Temperature	-65 to +100 °C
RF Input Power	+23 dBm

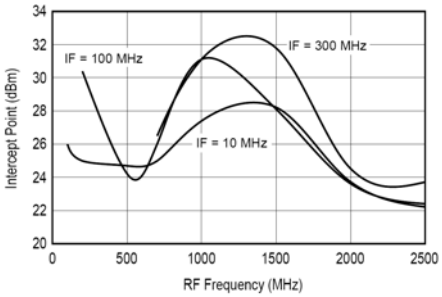
Operation of this device above any of these parameters may cause permanent damage.

Ordering Information

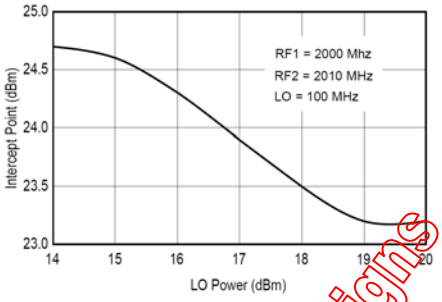
Part No.	Description
SME1400B-17	Broadband Surface Mount Mixer

Performance Charts

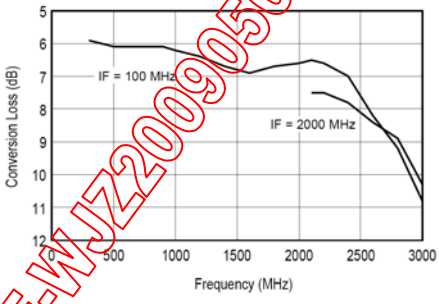
IIP3 vs. Frequency



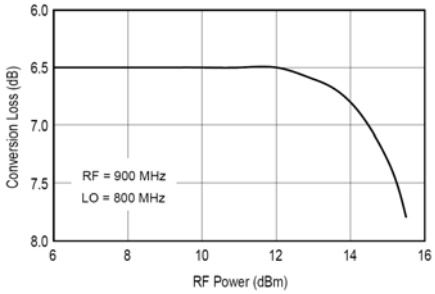
IIP3 vs. LO Power



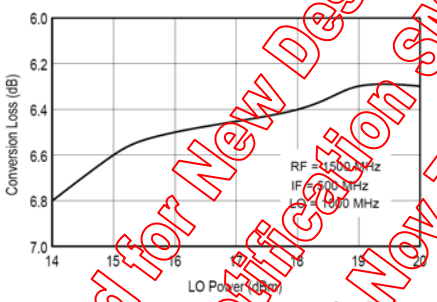
Conversion Loss vs. Frequency



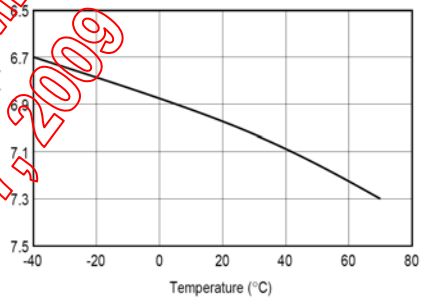
Conversion Loss vs. RF Power



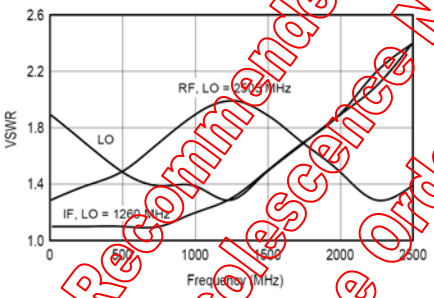
Conversion Loss vs. LO Power



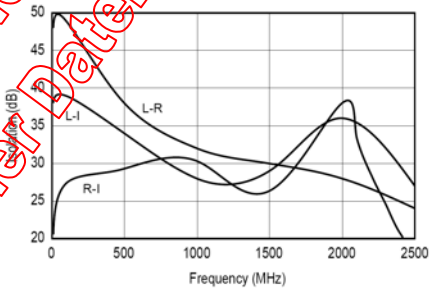
Conversion Loss vs. Temperature



VSWR vs. Frequency



Isolation vs. Frequency



Single-Tone IM Products

Harmonics of fRF	Harmonics of fLO 0	1	2	3	4	5
0		22	27	28	39	34
1	17	0	19	23	39	46
2	64	60	61	60	65	73
3	>80	77	>80	78	>80	>80
4	>80	>80	>80	>80	>80	>80
5	>80	>80	>80	>80	>80	>80

LO Mult	RF Mult	LO (MHz)	RF (MHz)	IM Products MHz	IM Products dBc
0	1	2150	2200	2200	17
0	2	2150	2200	4400	64
0	3	2150	2200	6600	81
0	4	2150	2200	8800	86
0	5	2150	2200	11000	86
1	0	2150	2200	2150	22
-1	1	2150	2200	50	0
-1	2	2150	1100	50	60
-1	3	2150	734	50	77
-1	4	2150	550	50	92
-1	5	2150	440	50	89
2	0	2150	2200	4300	27
-2	1	2150	4350	50	19
-2	2	2150	2175	50	61
-2	3	2150	1450	50	85
-2	4	2150	1088	52	90
-2	5	2150	870	50	88
3	0	2150	2200	6450	28
-3	1	2150	6500	50	23
-3	2	2150	3250	50	60
-3	3	2150	2167	51	78
-3	4	2150	1625	50	89
-3	5	2150	1300	50	88
4	0	2150	2200	8600	39
-4	1	2150	8650	50	39
-4	2	2150	4325	50	65
-4	3	2150	2884	52	81
-4	4	2150	2163	52	90
-4	5	2150	1730	50	87
5	0	2150	2200	10750	34
-5	1	2150	10800	50	46
-5	2	2150	5400	50	73
-5	3	2150	3600	50	88
-5	4	2150	2700	50	89
-5	5	2150	2160	50	89

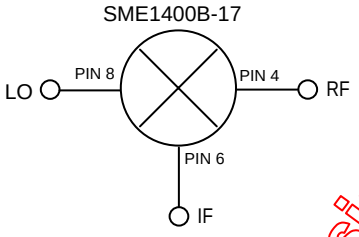
RF harmonics and intermodulation products are referenced to a desired signal produced by fRF = 2200 MHz and fLO = 2150 MHz

LO harmonics are referenced to the +17 dBm LO drive signal

Mechanical Information

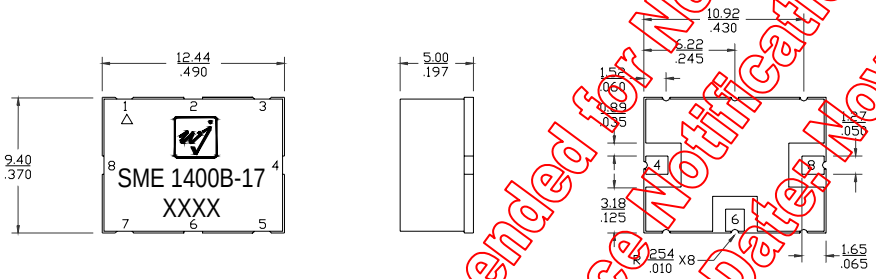
This package is RoHS-compliant. The plating material on the leads is AgPdPt.
It is compatible with a tin-lead (maximum 235 °C reflow temperature) soldering processes.

Application Circuit

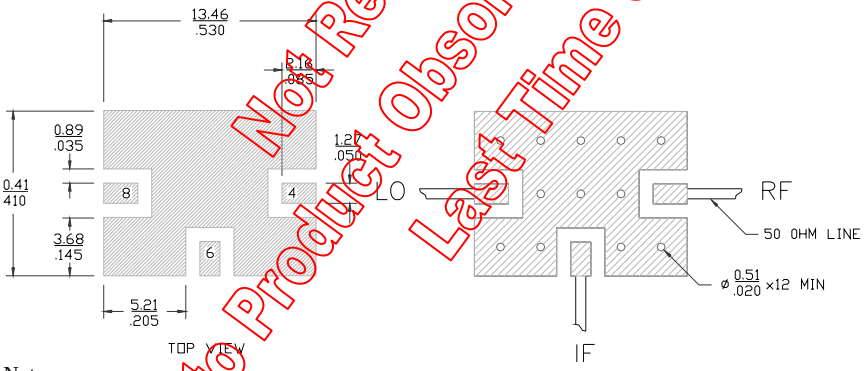


Notes:
1. Circuit board material: .014" FR-4, 4 layers, .062" total thickness
2. Blocking capacitors are required on the ports (pins 2, 5, 7) if any dc signal is present.

Outline Drawing



Land Pattern / Mounting Configuration



Notes:
1. Ground vias are critical for RF grounding considerations.
2. A minimum of 12 ground vias underneath the device are required.
3. Trace width depends on the PC board material and thickness.

Product Marking

The component will be marked with an "SME1400B-17" designator followed by an alphanumeric lot code on the top surface of the package.

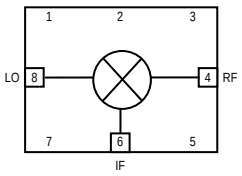
Tape and reel specifications for this part are located on the website in the "Application Notes" section.

ESD Information

Caution! ESD sensitive device.

ESD Classification:	Class 1C
Value:	Passes ⩾1000V to <2000 V
Test:	Human Body Model (HBM)
Standard:	JEDEC Standard JESD22-A114
ESD Classification:	Class IV
Value:	Passes ⩾1000 V
Test:	Charged Device Model (CDM)
Standard:	JEDEC Standard JESD22-C101

Functional Pin Layout



Top view

Pin No.	Function
4	RF
6	IF
8	LO
1, 2, 3, 5, 7 Backside metal	GND