HMJ7-1

High Dynamic Range FET Mixer

The Communications Edge ™

Product Information

Product Features

- Greater than +34 dBm IIP3
- 77 dBc 2x1 Spur Rejection in IF Band
- RF 1000 - 2000 MHz
- LO 1000 - 2000 MHz
- IF 10 - 1000 MHz
- +24 dBm LO Drive Level
- +5V Bias (40 mA)
- SMT J-Lead Package

Applications

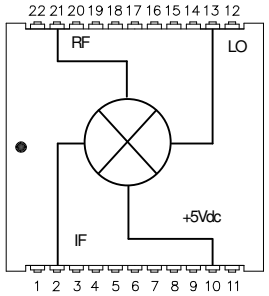
- CATV Head-End Equipment

Product Description

The HMJ7-1 is a high dynamic range GaAs FET mixer. This active broadband mixer realizes a typical third order intercept point of +34 dBm at an LO drive level of +21 dBm. The HMJ7-1 also provides excellent suppression of spurious intermodulation products, greater than 67 dBc, meeting DOCSIS2 and Euro DOCSIS system requirements. The HMJ7-1 is a specially screened version of the HMJ7 mixer meeting all of the performance requirements of the HMJ7 with 21 dBm LO power, but also meeting the suppression requirements for intermodulation products at a 24 dBm LO power level.

The HMJ7-1 comes in a low cost, 22-pin J-Lead package. The combination of high dynamic range and spurious suppression makes the HMJ7-1 an ideal choice for CATV headend transmission equipment and other applications requiring a broadband mixer in the 1000 MHz to 2000 MHz frequency range.

Functional Diagram



Function	Pin No.
IF	2
LO	13
RF	21
+5V	10
Ground	All other pins

Specifications (1)

Parameter	Units	Min	Typ	Max	Condition
RF Frequency Range	MHz		1000 – 2000		
LO Frequency Range	MHz		1000 – 2000		
IF Frequency Range	MHz		10 – 1000		
SSB Conversion Loss	dB		8.5	9.5	
Noise Figure	dB		10.5		
LO-RF Isolation	dB	21	24		
LO-IF Isolation	dB	24	30		
RF-IF Isolation	dB		24		
Input IP3	dBm	29	34		RF = 1018 MHz @ 0 dBm
RF Return Loss	dB		10		
LO Return Loss	dB		5		
IF Return Loss	dB		14		
Spurious Rejection (2)	dBc	67	77		LO = +24 dBm, IF freq = 150 – 540 MHz, 640 – 1000 MHz
Spurious Rejection (2)	dBc	76	77		LO = +24 dBm, IF freq = 540 – 640 MHz
Input P1dB	dBm		+23		
LO Drive Level	dBm		+21		
DC Current at +5V Bias	mA		40	60	

1. Test conditions unless otherwise noted: 25 ºC, RF = 1018.75 MHz @ 0 dBm, LO = 21 dBm, IF = 50, 650, 860 MHz in a high-side LO configuration.
2. The 2x1 spur is tested where the IM spur = 2 * RF input – LO, where RF input = 1090 MHz @ -14 dBm, LO = 1190 to 2090 MHz @ 24 dBm, IM spur = output frequency. The IM spur level is specified in dBc with respect to the desired IF frequency calculated: IF output = LO - RF input.

Absolute Maximum Rating

Parameters	Rating
Operating Case Temperature	-40 to +85 °C
Storage Temperature	-65 to +100 °C
Maximum Input Power	+25 dBm

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

Ordering Information

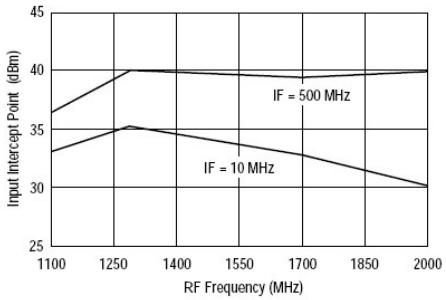
Part No.	Description
HMJ7-1	High Dynamic Range FET Mixer
HMJ7-1PCB	Fully Assembled Application Circuit

Specifications and information are subject to change without notice

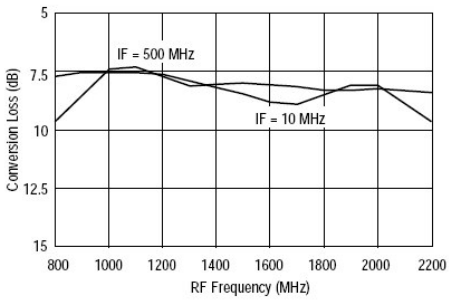
Typical Performance Data

All measurements are shown with a LO drive level = +21 dBm. Improved performance is expected with LO = +24 dBm.

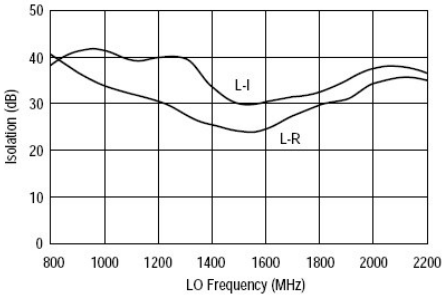
IIP3 vs. RF Frequency



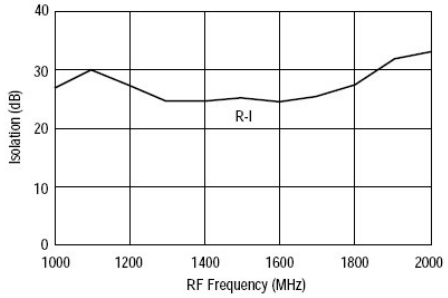
Conversion Loss vs. RF Frequency



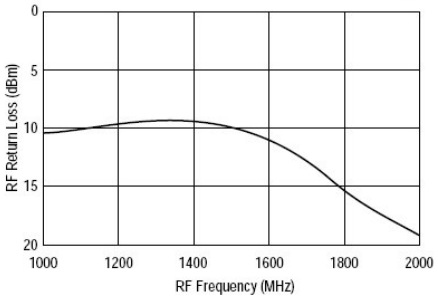
Isolation vs. LO Frequency



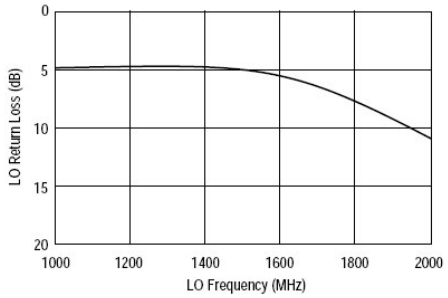
Isolation vs. RF Frequency



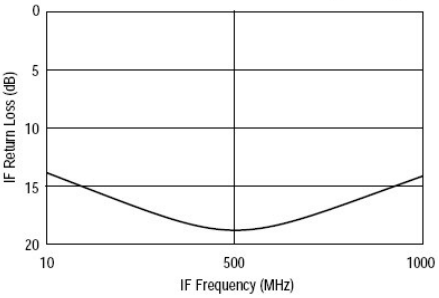
RF Return Loss vs. RF Frequency



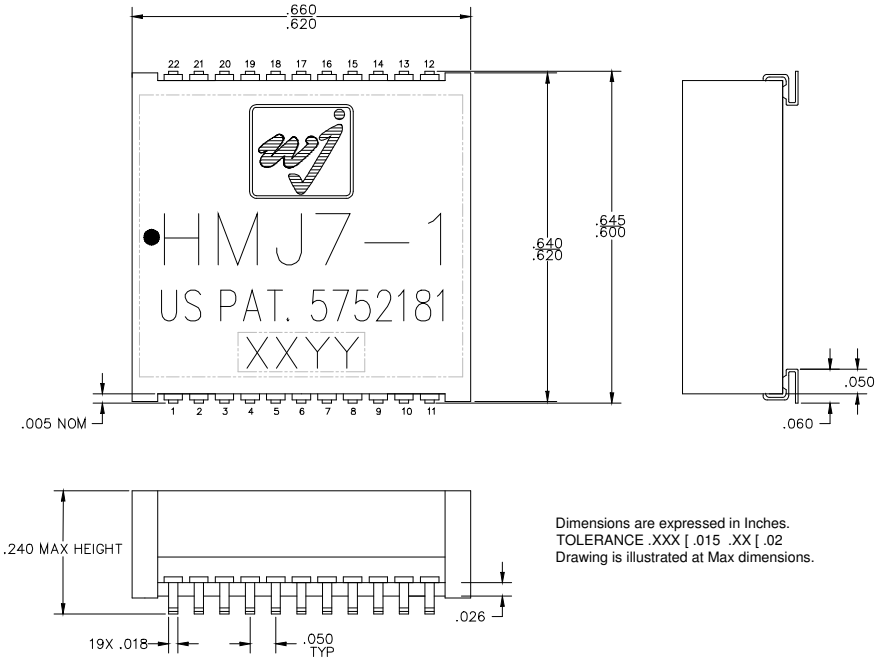
LO Return Loss vs. LO Frequency



IF Return Loss vs. IF Frequency

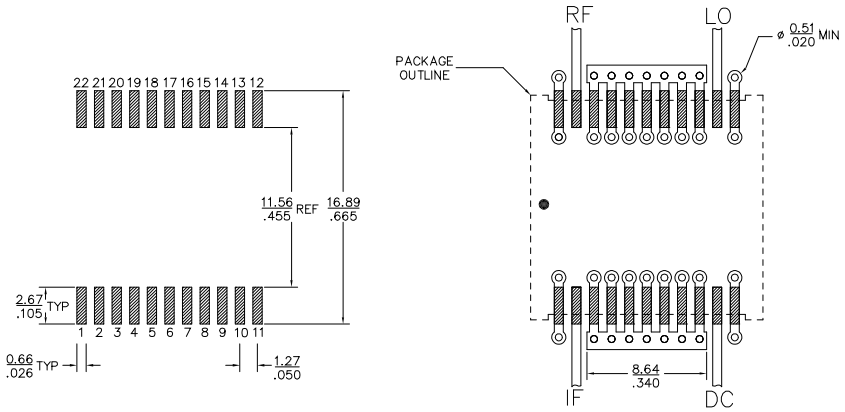


Outline Drawing



Dimensions are expressed in Inches.
TOLERANCE .XXX [.015 .XX [.02
Drawing is illustrated at Max dimensions.

Land Pattern / Mounting Configuration



FUNCTION	PIN NO.	FUNCTION	PIN NO.
GROUND	1	GROUND	12
IF	2	LO	13
GROUND	3–9	GROUND	14–20
DC	10	RF	21
GROUND	11	GROUND	22

Product Marking

The component will be marked with an "HMJ7-1" designator with a date code XXYY where XX refers to last two digits of the year and YY refers to week number within that year.

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

ESD Information

Caution! ESD sensitive device.

ESD Rating:	Class 2
Value:	Passes at 2000 V
Test:	Human Body Model (HBM)
Standard:	JEDEC Standard JESD22-A114

ESD Rating:	Class IV
Value:	Passes at 2000 V
Test:	Charged Device Model (CDM)
Standard:	JEDEC Standard JESD22-C101

Mounting Config. Notes

1. Ground vias are critical for thermal and RF grounding considerations.
2. A minimum of 36 ground vias are required for 14 mil FR4 boards.
3. If your PCB design rules allow, ground vias should be placed under the land pattern for better RF performance. Otherwise ground vias should be placed as close to the land pattern as possible.
4. Trace width depends on the PCB material.