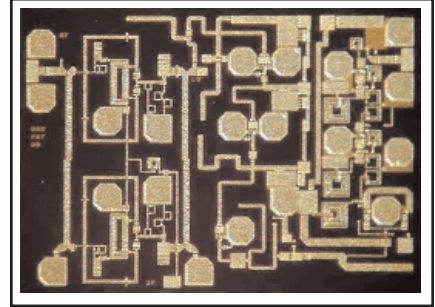


FEATURES

- Integrated Monolithic Downconverter
- High Linearity
- Single Supply Voltage Operation
- High Reliability

DESCRIPTION

The FMM5117X is a double, single balanced diode mixer downconverter designed for applications in the 20 to 32GHz frequency range. The device consists of a low noise mixer, LO amplifier, and LO frequency doubler. This downconverter is uniquely suited for point-to-point radios, local multi-point distribution systems (LMDS) and satellite communications, as it offers a high dynamic range over a large bandwidth.



ABSOLUTE MAXIMUM RATINGS (Ambient Temperature Ta=25°C)

Parameter	Symbol	Rating	Unit
DC Supply Voltage	$V_{DD1,2}$	8	V
Input Power	P_{inRF}	20	dBm
Input Power	P_{inLO}	10	dBm
Storage Temperature	T_{stg}	-65 to +175	°C

RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Recommend			Unit
		Min.	Typ.	Max.	
DC Supply Voltage	$V_{DD1,2}$		5.0		V
Input LO Power Level	P_{inLO}	0.0	3.0	5.0	dBm
Operating Backside Temperature	T_{bs}	-45	25	110	°C

Note 1: This product should be hermetically packaged.

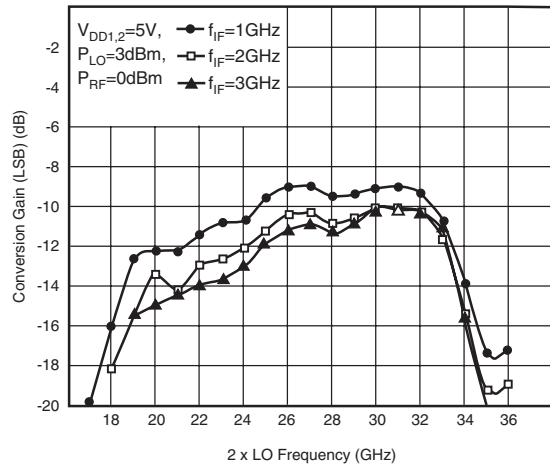
ELECTRICAL CHARACTERISTICS (Ambient Temperature Ta=25°C)

Item	Symbol	Conditions	Limits			Unit
			Min.	Typ.	Max.	
RF Frequency Range	f_{RF}	$V_{DD1,2}=5V$, $V_{GG}=0V$, $P_{LO}=3dBm$, $P_{RF}=0dBm$	20	-	32	GHz
LO Frequency Range	f_{LO}		9.5	-	16.5	GHz
IF Frequency Range (Note 2)	f_{IF}		0.1	-	3	GHz
Conversion Gain	G		-18	-10	-	dB
Conversion Gain Flatness (fixed f_{IF} , swept f_{LO}) ($f_{IF}=1.0GHz$)	ΔG		-	5	-	dB
Conversion Gain Flatness (fixed f_{LO} , swept f_{IF}) ($f_{LO}=13.5GHz$)	ΔG		-	2	-	dB
Return Loss (RF/LO)	RL_{RF}, RL_{LO}		-	12	-	dB
Return Loss (IF)	RL_{IF}		-	4	-	dB
Input P1dB at RF Port	$P1dB_{RFIN}$		-	15	-	dBm
3rd Order Input Intercept Point	IIP3		-	23	-	dBm
DC Current Consumption	I_{DC}		-	100	150	mA
RF Current Consumption	I_{RF}		-	140	200	mA

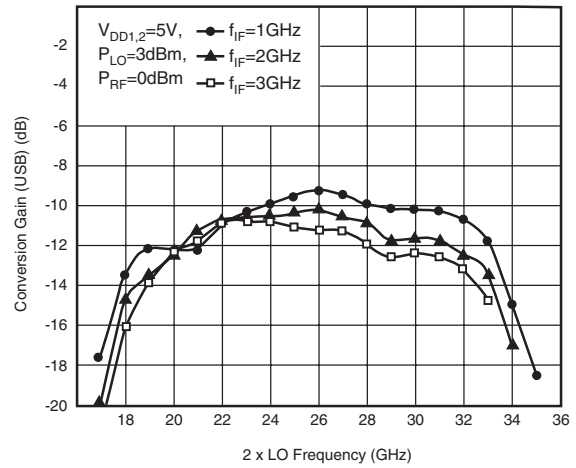
Note 1: The electrical characteristics are measured on a sample basis at 10pcs./wafer. Criteria: (accept/reject)=(0/1)

Note 2: The IF frequency range is dependent on the selected LO and RF frequency.

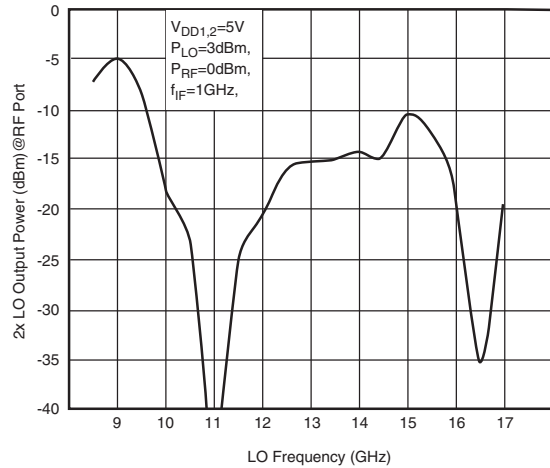
CONVERSION GAIN (LSB) vs. FREQUENCY



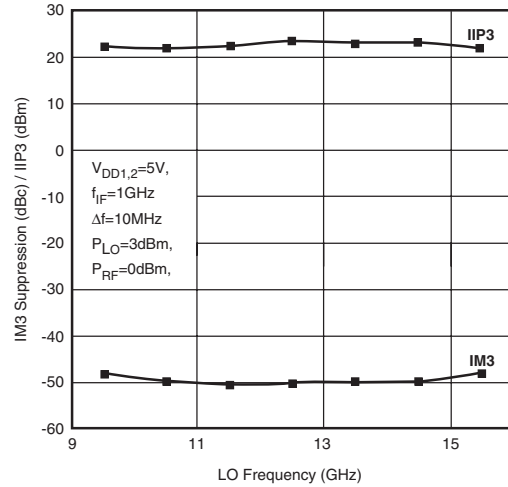
CONVERSION GAIN (USB) vs. FREQUENCY



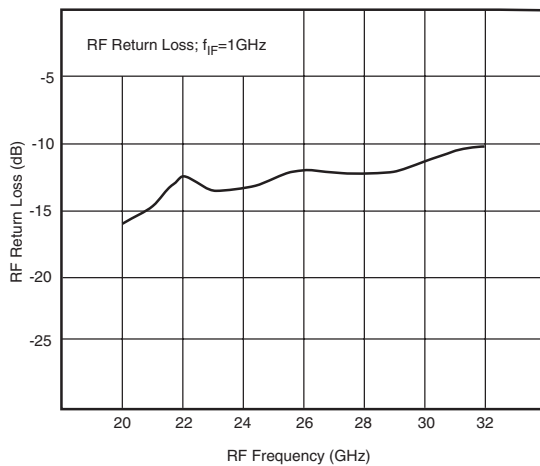
2xLO OUTPUT POWER vs. FREQUENCY



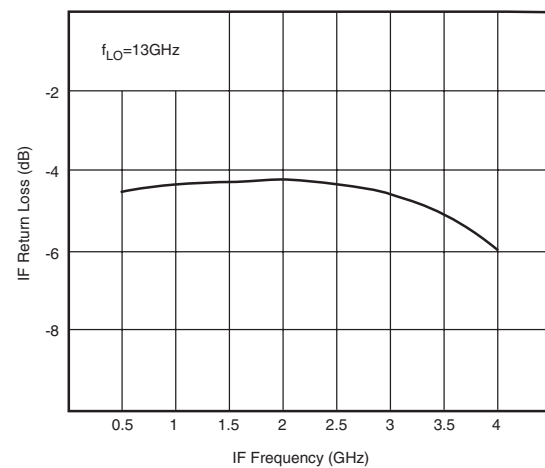
IM3 vs. FREQUENCY



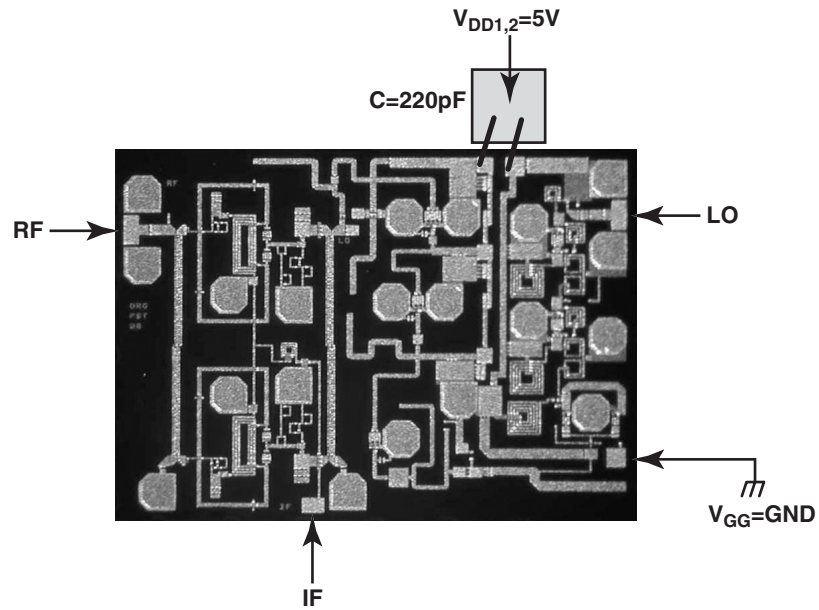
RF RETURN LOSS vs. FREQUENCY



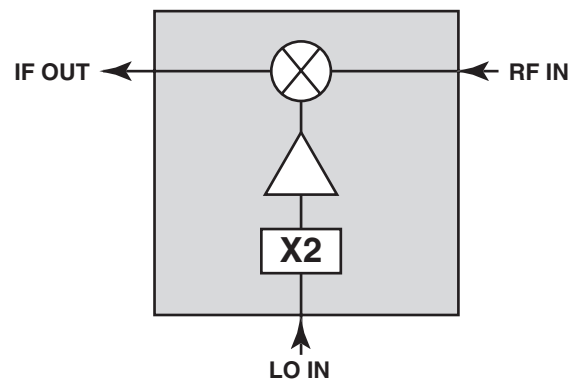
IF RETURN LOSS vs. FREQUENCY



BONDING DIAGRAM



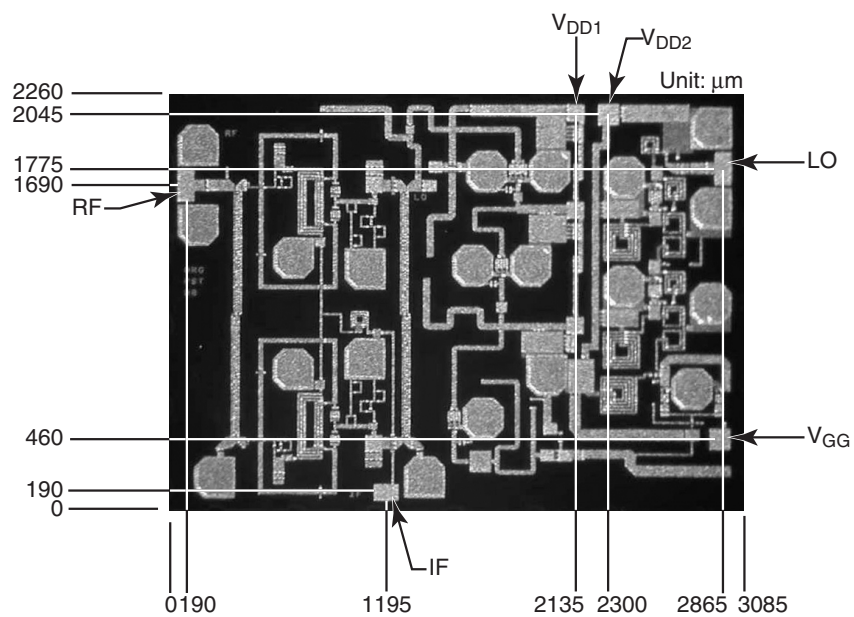
FUNCTIONAL DIAGRAM



FMM5117X

20-32GHz Downconverter MMIC

CHIP OUTLINE



Chip Size: 3.085mm x 2.26mm
Chip Thickness: 110 μm (Typ.)
Pad Dimensions: 1. RF: 80 x 160 μm
2. V_{DD1} : 80 x 80 μm
3. V_{DD2} : 100 x 100 μm
4. LO: 80 x 160 μm
5. V_{GG} : 100 x 100 μm
6. IF: 80 x 120 μm