



FMM5116X

20-32GHz UP-Converter MMIC

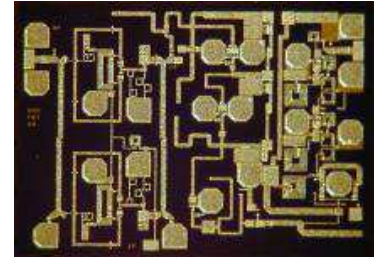
FEATURES

- Integrated Monolithic UP-Converter
- High Linearity
- Single Supply Voltage Operation
- High Reliability

DESCRIPTION

The FMM5116X is a double, single balanced diode mixer up-converter designed for applications in the 20 to 30GHz frequency range. The device consists of a low noise mixer, LO amplifier, and LO frequency doubler.

This up-converter is uniquely suitable for point-to-point radios, local multi-point distribution systems (LMDS) and satellite communications, as it offers a high dynamic range over a large band width.



ABSOLUTE MAXIMUM RATING (Ambient Temperature Ta=+25°C)

Item	Symbol	Rating	Unit
DC Supply Voltage	V _{DD1,2}	8	V
Input Power	P _{inIF}	20	dBm
Input Power	P _{inLO}	10	dBm
Storage Temperature	T _{stg}	-65 to +175	°C

RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Recommended			Unit
		Min.	Typ.	Max.	Unit
DC Supply Voltage	V _{DD1,2}		5		V
Input LO Power Level	P _{inLO}	0	3	5	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	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
RF Frequency Range	f _{RF}	V _{DD1,2} =5V V _G =0V P _{LO} =3dBm P _{IF} =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} =1GHz)	ΔG		-	3	-	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 IF Port	P1dB _{IFIN}		-	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.

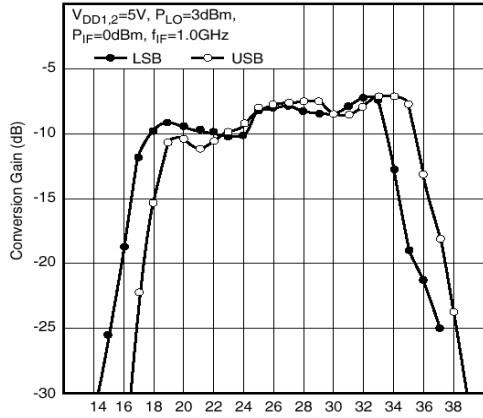
ESD	Class 0	=< 250V
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Note : Based on JEDEC JESD22-A114C (C=100pF, R=1.5kohm)

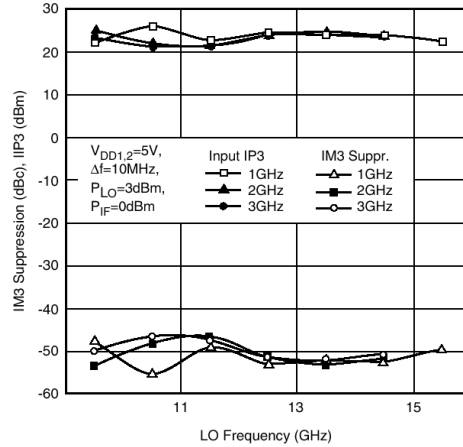
RoHS COMPLIANCE	YES
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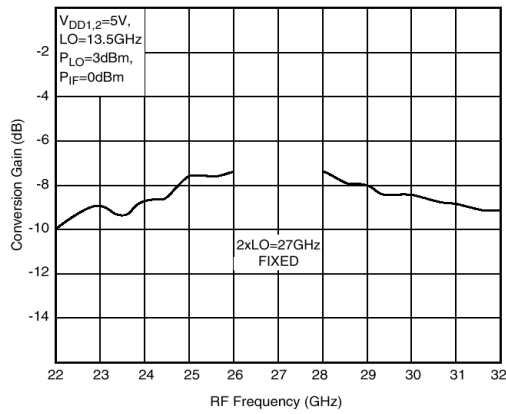
CONVERSION GAIN vs. FREQUENCY



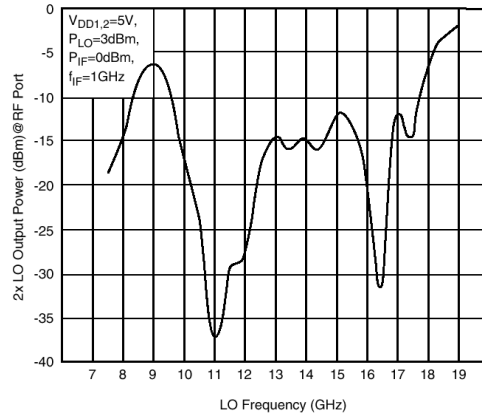
IM3 vs. FREQUENCY



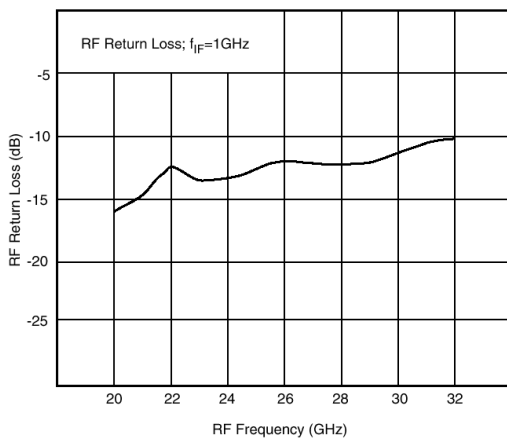
CONVERSION GAIN vs. FREQUENCY



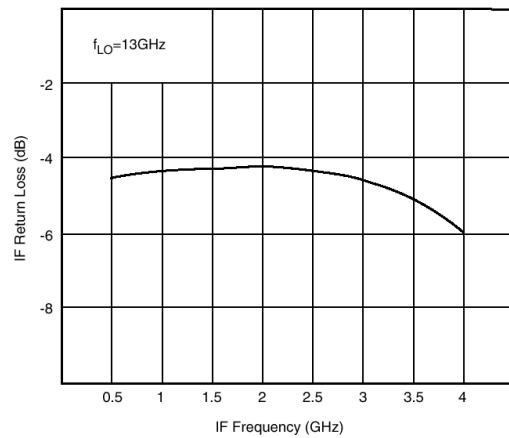
2xLO OUTPUT POWER vs. FREQUENCY



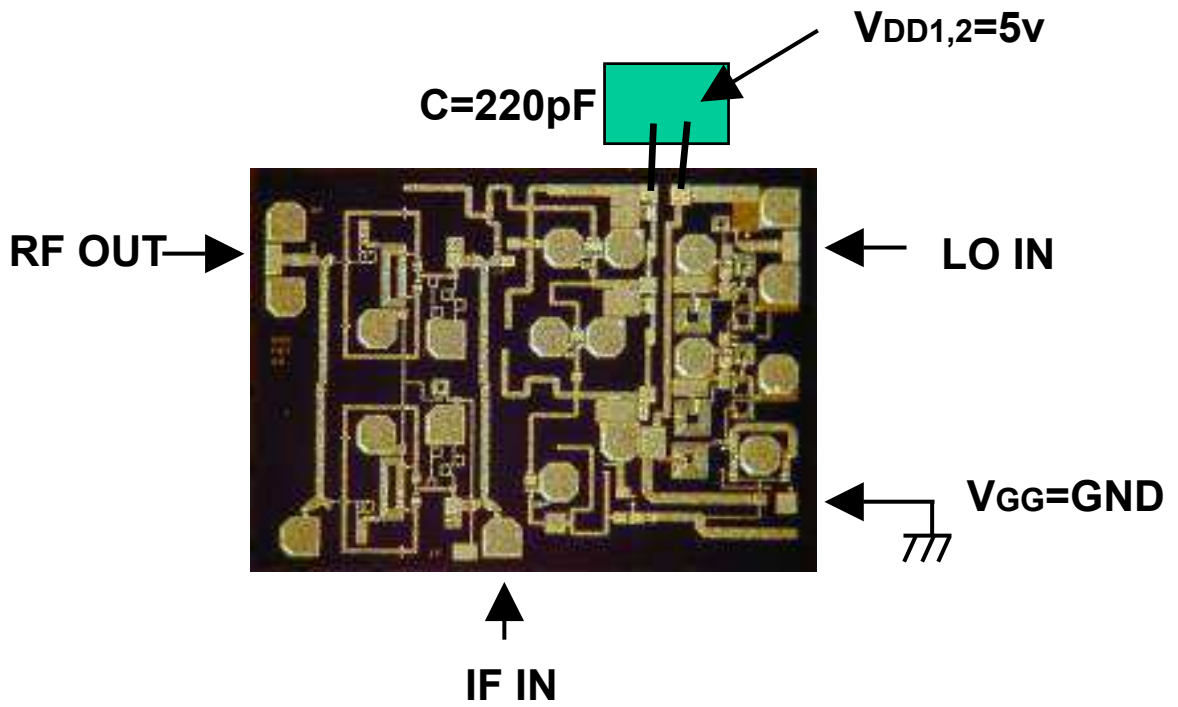
RF RETURN LOSS vs. FREQUENCY



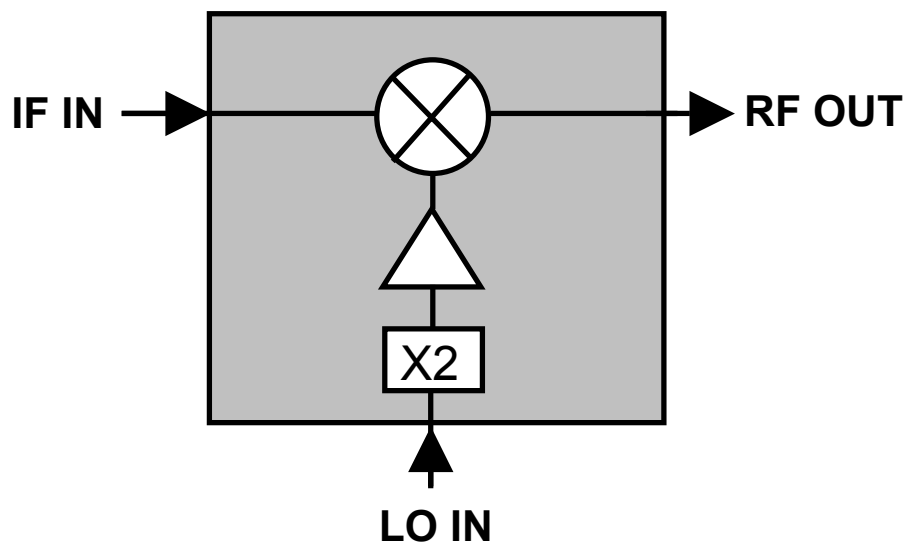
IF RETURN LOSS vs. FREQUENCY



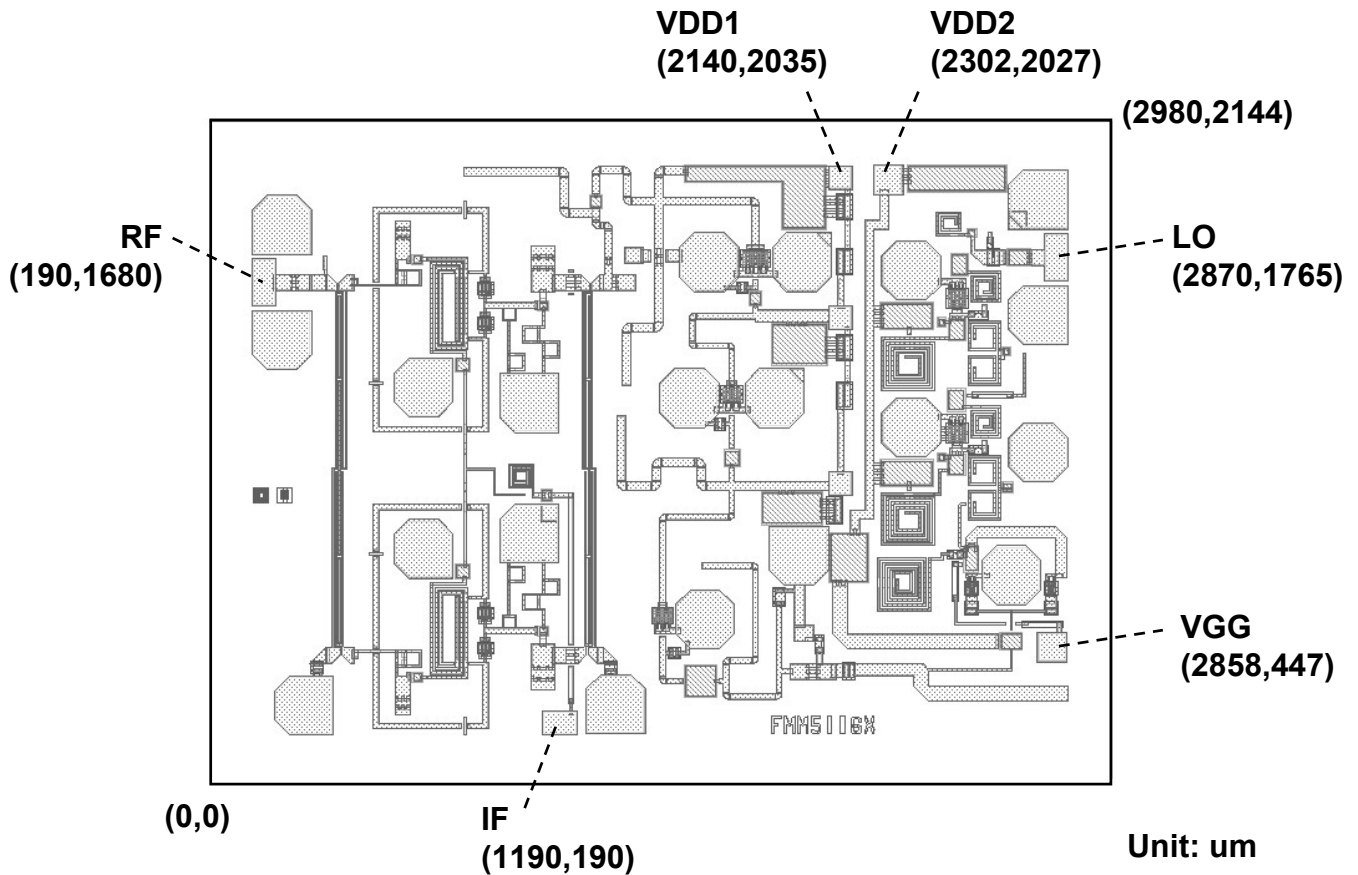
BONDING DIAGRAM



FUNCTIONAL DIAGRAM



CHIP OUTLINE

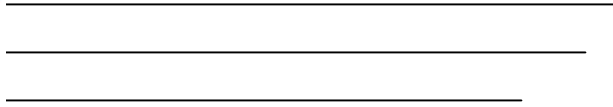


Chip Size : 2980 ± 70 x 2144 ± 70 (um)

Chip Thickness : 110 ± 20 (um)

Pad Dimensions

- 1.RF: 80 x 160 (um)
- 2.VDD1: 80 x80 (um)
- 3.VDD2: 100 x 100 (um)
- 4.LO: 80 x 160 (um)
- 5.VGG: 100x100 (um)
- 6.IF: 80 x 120 (um)



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For further information please contact:

<http://global-sei.com/Electro-optic/about/office.html>

CAUTION

Sumitomo Electric Device Innovations, Inc. products contain **gallium arsenide (GaAs)** which can be hazardous to the human body and the environment. For safety, observe the following procedures:

- Do not put these products into the mouth.
- Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.
- Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.