

Preliminary

## ES/FMM5116YE

### K,Ka-Band Up-Converter MMIC

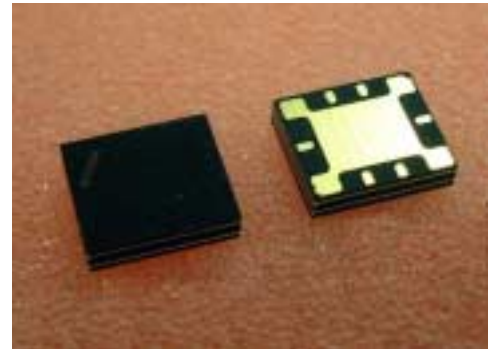
#### FEATURES

- High Conversion Gain,  $G_c = -11$  dB (Typ.)
- High Linearity
- Broad RF Frequency Band ; 20 - 30 GHz
- SMT Laminate Package (YE Package)
- Impedance Matched  $Z_{in}/Z_{out} = 50\Omega$

#### DESCRIPTION

The FMM5116YE is a double, single balanced diode mixer up-converter MMIC. The device consists of a low noise mixer, LO amplifier, and LO frequency doubler. This upconverter is uniquely suited for point-to-point radios, point-to-multi point radios, and satellite communications.

Eudyna's stringent Quality Assurance Program assures the highest reliability and consistent performance.



#### ABSOLUTE MAXIMUM RATING

Item	Symbol	Rating	Unit
DC Supply Voltage	V <sub>DD</sub>	8	V
IF Input Power	P <sub>inIF</sub>	20	dBm
Lo Input Power	P <sub>inLO</sub>	10	dBm
Storage Temperature	T <sub>stg</sub>	-55 to +125	°C

#### RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Recommend	Unit
DC Supply Voltage	V <sub>DD</sub>	≤5	V
Input Local power level	P <sub>inLO</sub>	0 to +5	dBm
Operating Case Temperature	T <sub>c</sub>	-40 to +85	°C

#### ELECTRICAL CHARACTERISTICS (Ambient Temperature T<sub>a</sub>=25°C)

Item	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
RF Frequency Range	f <sub>RF</sub>	V <sub>DD</sub> =+5V P <sub>LO</sub> =+3dBm P <sub>IF</sub> =0dBm	20	-	30	GHz
LO Frequency Range	f <sub>LO</sub>		9.5	-	16.5	GHz
IF Frequency Range	f <sub>IF</sub>		0.1	-	3	GHz
Conversion Gain	G <sub>c</sub>		-19	-11	-	dB
Conversion Gain Flatness (fixed f <sub>IF</sub> , swept f <sub>LO</sub> ) (f <sub>IF</sub> =1.0GHz)	dG		-	3	-	dB
Conversion Gain Flatness (fixed f <sub>LO</sub> , swept f <sub>IF</sub> ) (f <sub>LO</sub> =13.5GHz)	dG		-	2	-	dB
Return Loss (RF/LO)	RL <sub>RF</sub> , RL <sub>LO</sub>		-	-12	-	dB
Return Loss (IF)	RL <sub>IF</sub>		-	-4	-	dB
Input P1dB at IF port	P <sub>1dBIFin</sub>		-	14	-	dBm
3rd Order Input Intercept Point	IIP <sub>3</sub>		-	22	-	dBm
Current Consumption @DC	I <sub>DD(DC)</sub>	-	120	170	mA	
Current Consumption @RF	I <sub>DD(RF)</sub>	-	160	220	mA	

ESD	Class 0	~ 199V
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Note : Based on EIAJ ED-4701 C-111A(C=100pF, R=1.5kW)

Case Style	YE
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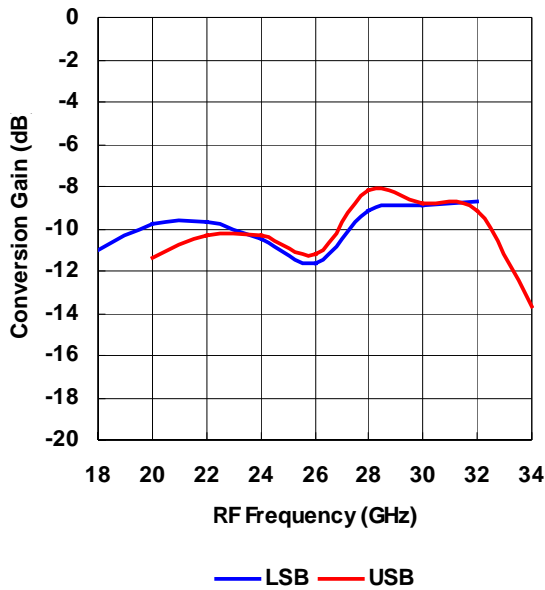
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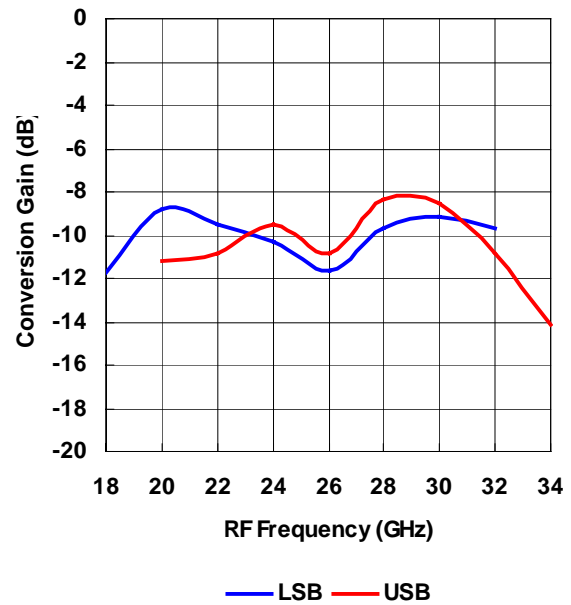
Conversion Gain vs. Frequency

@ f<sub>IF</sub>=1GHz, V<sub>DD</sub>=5V, P<sub>in(IF)</sub>=0dBm, P<sub>in(Lo)</sub>=+3dBm



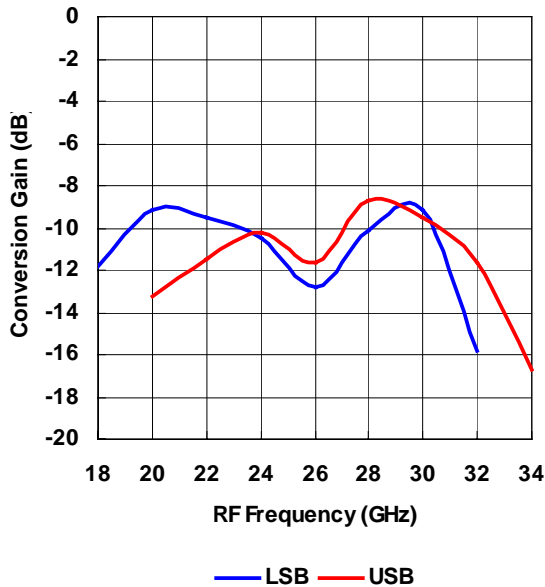
Conversion Gain vs. Frequency

@ f<sub>IF</sub>=2GHz, V<sub>DD</sub>=5V, P<sub>in(IF)</sub>=0dBm, P<sub>in(Lo)</sub>=+3dBm



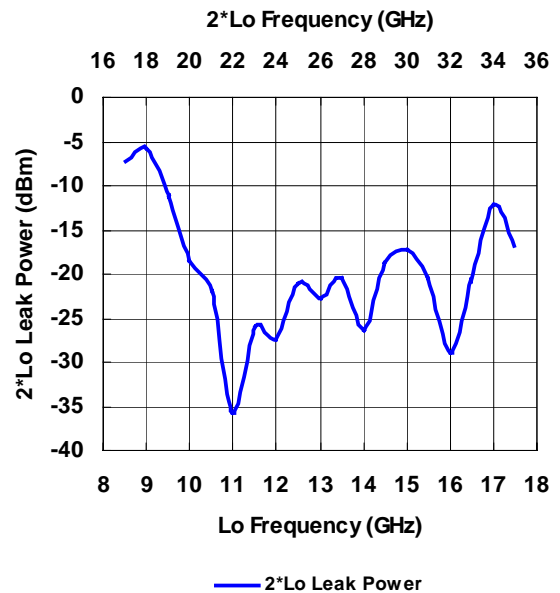
Conversion Gain vs. Frequency

@ f<sub>IF</sub>=3GHz, V<sub>DD</sub>=5V, P<sub>in(IF)</sub>=0dBm, P<sub>in(Lo)</sub>=+3dBm



2xLo Leak Power vs. Frequency

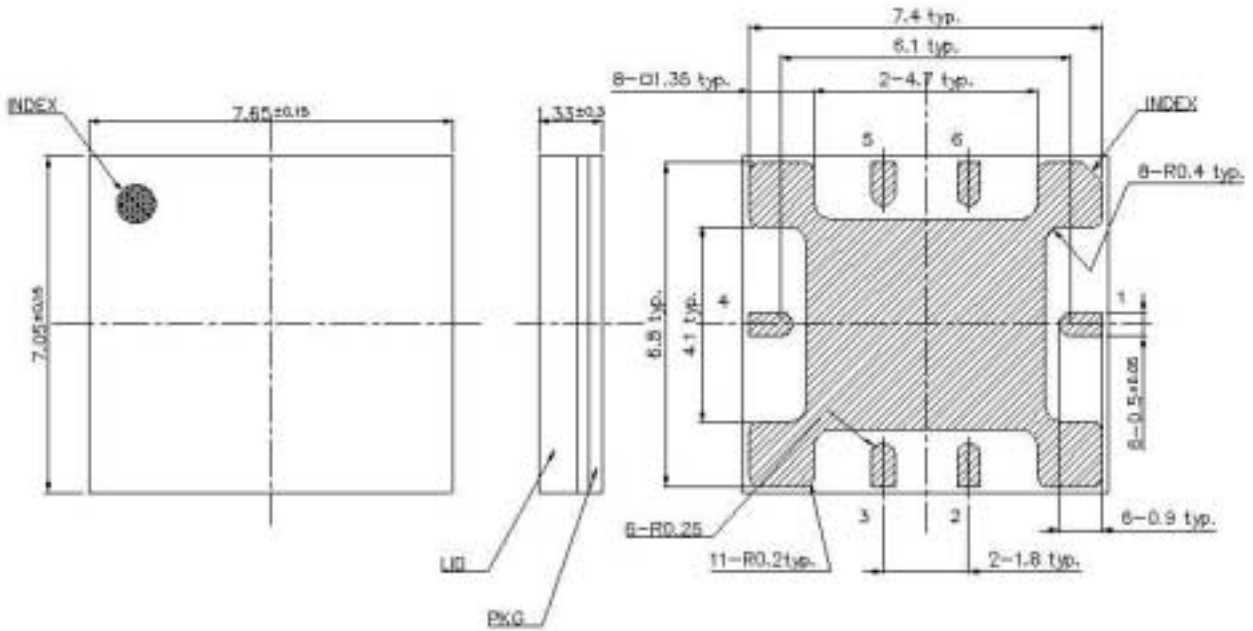
@ V<sub>DD</sub>=5V, P<sub>in(Lo)</sub>=+3dBm



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■ Package Outline



Pin Assignment

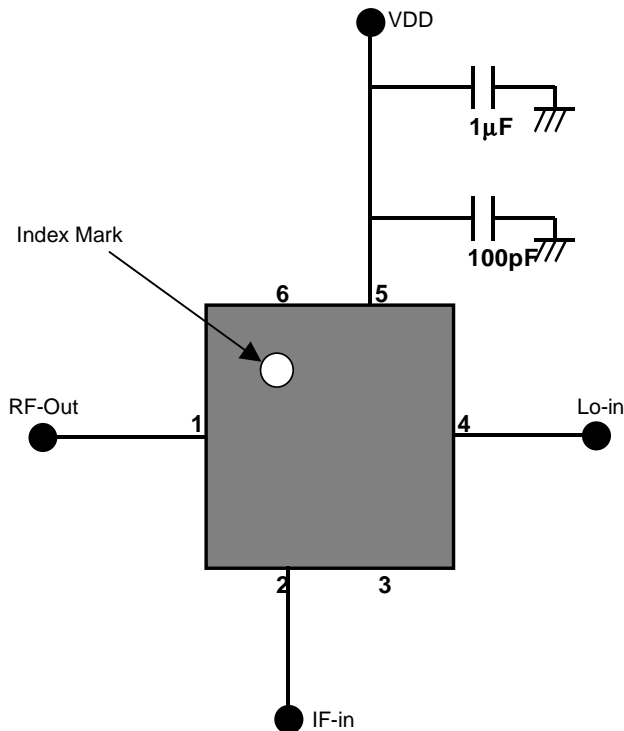
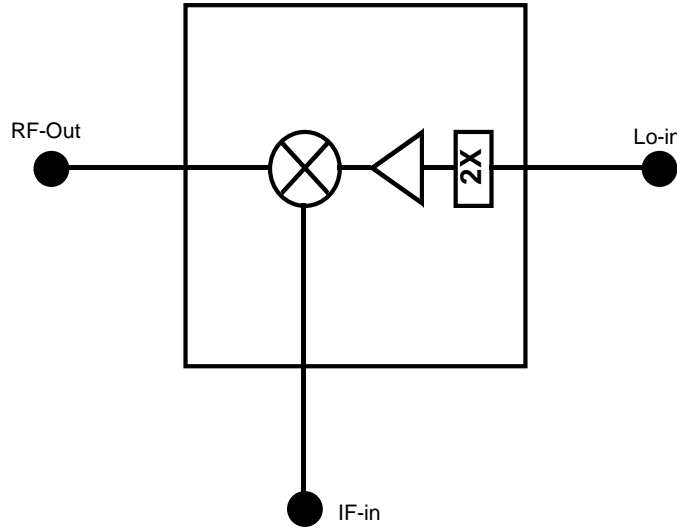
- 1 : RF-Output
- 2 : IF-Input
- 3 : N.C.
- 4 : Lo-Input
- 5 : VDD
- 6 : N.C.

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### ■ Block Diagram and External Component

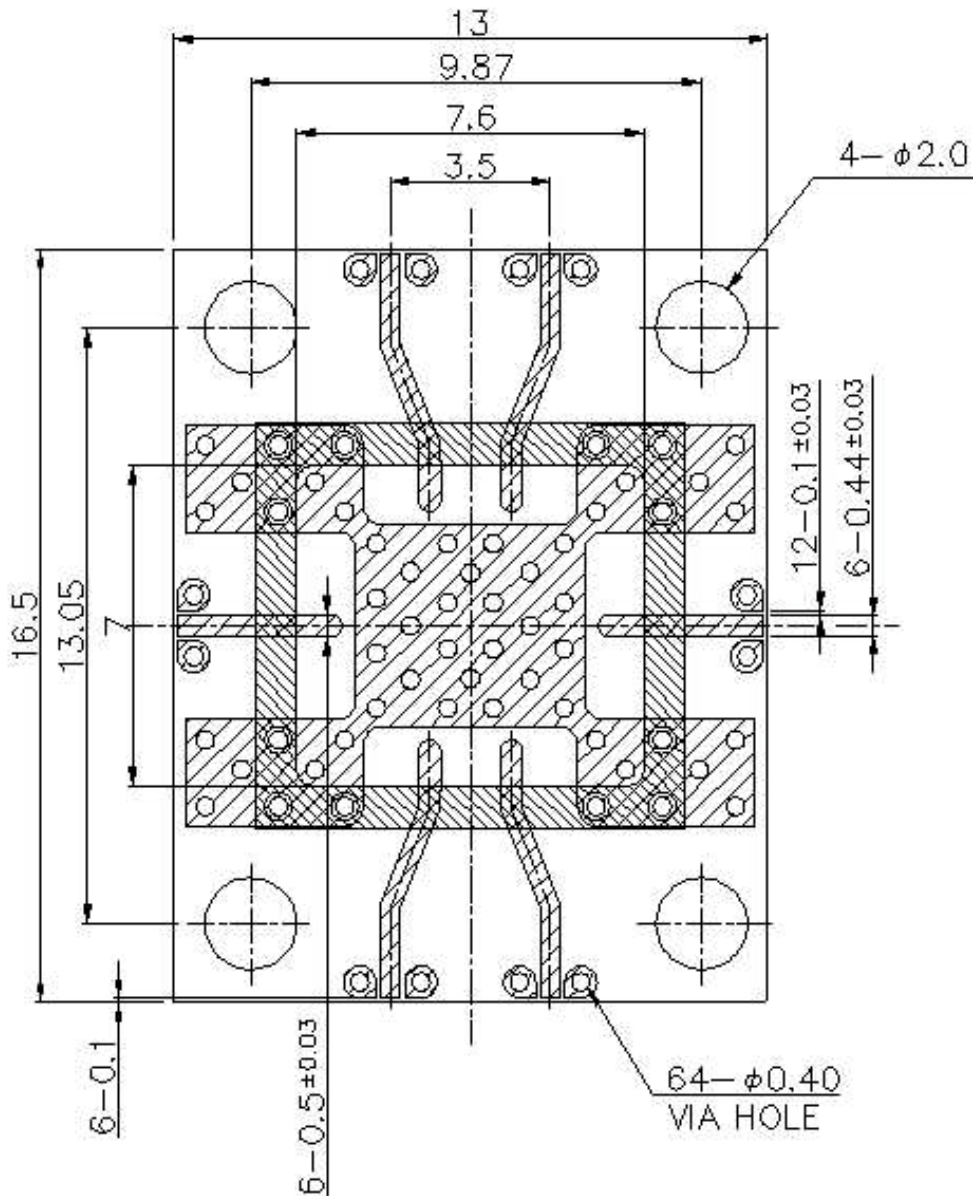


Note) : The capacitors are recommended on the bias supply line, close to the package, in order to prevent video oscillations which could damage the module.



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■ Recommended Foot Pattern Layout



Notes :

- 1.LAMINATE : Rogers Corporation RO4003, Thickness  $t=0.2\text{mm}$ , Cu Foil  $18\mu\text{m}$
2.  : Finish to copper foil ; Ni  $0.1\mu\text{m}$  min./Au  $0.1\pm 0.08\mu\text{m}$  (Both side)
3.  : Resist

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