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CGA-6618Z

DUAL CATV 5MHz to 1000MHz HIGH LINEARITY GaAs HBT AMPLIFIER

Package: ESOP-8

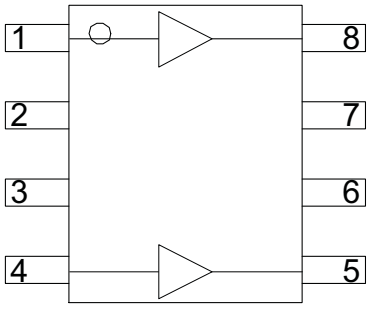
Product Description

RFMD's CGA-6681Z is a high performance GaAs HBT MMIC amplifier. Designed with the InGaP process technology for excellent reliability. A Darlington configuration is utilized for broadband performance. The heterojunction increases breakdown voltage and minimizes leakage current between junctions. The CGA-6618Z contains two amplifiers for use in wideband push-pull CATV amplifiers requiring excellent second order performance. The second or third order non-linearities are greatly improved in the push pull configuration.

Optimum Technology Matching® Applied

- ✓ GaAs HBT
- GaAs MESFET
- InGaP HBT
- SiGe BiCMOS
- Si BiCMOS
- SiGe HBT
- GaAs pHEMT
- Si CMOS
- Si BJT
- GaN HEMT
- InP HBT

Amplifier Configuration



Features

- Lead-Free, RoHS Compliant, and Green Packaging
- Excellent CSO/CTB/XMOD Performance at +34dBmV Output Power Per Tone
- Dual Devices in Each SOIC-8 Package Simplify Push-Pull Configuration PC Board Layout
- ESOP-8 Package

Applications

- CATV Head End Driver and Predriver Amplifier
- CATV Line Driver Amplifier

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Small Signal Gain		13.8		dB	50MHz
		14.1		dB	500MHz
	12.4	13.4	14.4	dB	870MHz
	12.0	13.0	14.0	dB	1000MHz
OIP_2, Tone Spacing = 1MHz, P_{OUT} per tone -/+6dBm		76.5		dBm	50MHz
		77.5		dBm	250MHz
	70.0	72.0		dBm	500MHz
OIP_3, Tone Spacing = 1MHz, P_{OUT} per tone -/+6dBm		38.0		dBm	50MHz
		39.0		dBm	500MHz
	38.0	40.0		dBm	870MHz
Output Power at 1dB Compression		20.0		dBm	50MHz
		21.0		dBm	500MHz
	19.5	21.5		dBm	870MHz
Input Return Loss		15.5		dB	500MHz
	10			dBm	100MHz to 870MHz
Output Return Loss		12.5		dB	500MHz
	9.0			dB	100MHz to 870MHz
Noise Figure - Balun Insertion Loss Included		5.3		dB	50MHz
		5.4		dB	500MHz
		5.6	6.6	dB	870MHz

Test Conditions: V_S = 8V, I_D = 160mA Typ., R_{BIAS} = 33Ω, T_L = 25°C, Z_S = Z_L = 75Ω, Push Pull Application Circuit

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Absolute Maximum Ratings

Parameter	Rating	Unit
Max Device Current (I_D)	240	mA
Max Device Voltage (V_D)	7	V
Max RF Input Power	+20	dBm
Max Junction Temp (T_J)	+150	°C
Operating Temp Range (T_L)	-40 to +85	°C
Max Storage Temp	+150	°C
Min Storage Temp	-65	°
Moisture Sensitivity Level	3	MSL

Operation of this device beyond any one of these limits may cause permanent damage. For reliable continuous operation, the device voltage and current must not exceed the maximum operating values specified in the table on page one.

Bias Conditions should also satisfy the following expression:

$I_D V_D < (T_J - T_L)/R_{TH}$, j-l and $T_L = T_{LEAD}$

Caution! ESD sensitive device.

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

RoHS status based on EU Directive 2002/95/EC (at time of this document revision).

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Worst Case Over Band, CSO		81		dBc	79 Ch., Flat, +34dBmV
Worst Case Over Band, CTB		70		dBc	79 Ch., Flat, +34dBmV
Worst Case Over Band, XMOD		63		dBc	79 Ch., Flat, +34dBmV
Device Operating Voltage	4.8	5.1	5.4	V	
Device Operating Current	144	160	176	mA	
Thermal Resistance		35		°C/W	(Junction to Lead)

Test Conditions: V_S = 8V, I_D = 160mA Typ., R_{BIAS} = 33Ω, T_L = 25°C, Z_S = Z_L = 75Ω, Push Pull Application Circuit

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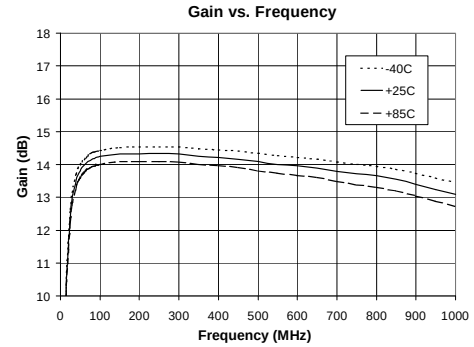
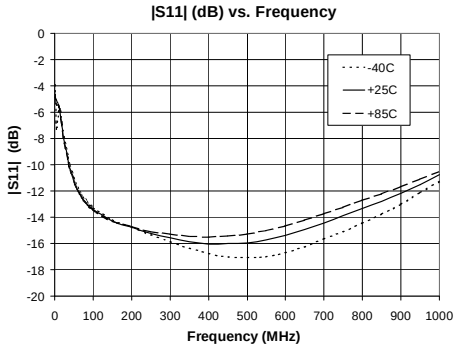
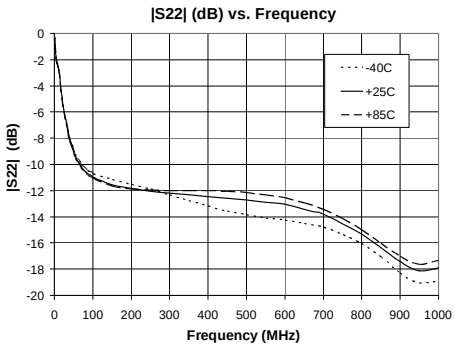
Typical RF Performance: V_S=8V, I_D=160mA @ T_L=+25°C, R_{BIAS}=33 Ohms, Push-Pull Config.

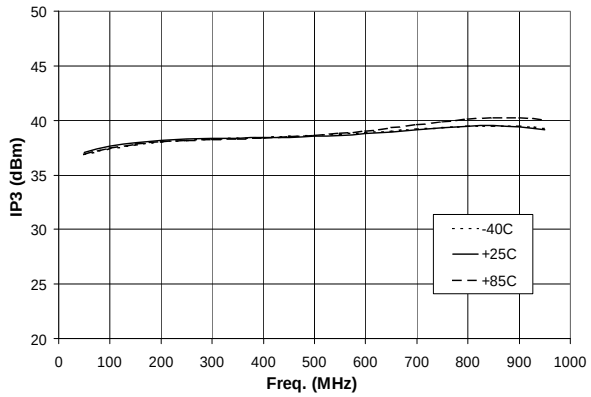




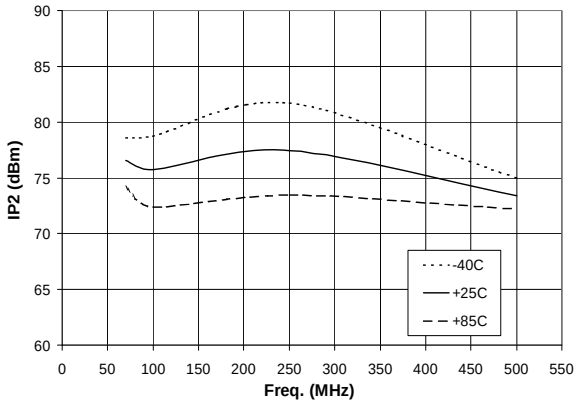


Typical RF Performance: V_S=8V, I_D=160mA @ T_L=+25°C, R_{BIAS}=33 Ohms, Push-Pull Config.

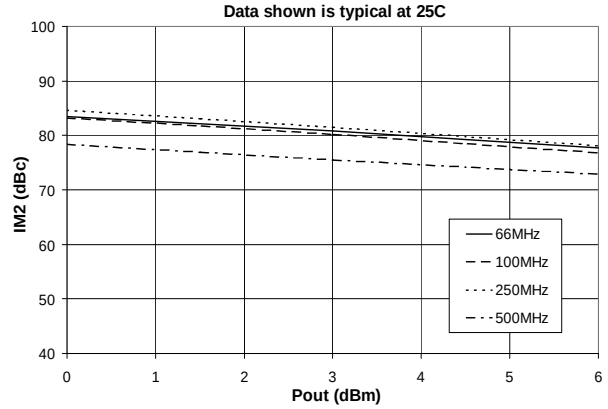
Third Order Intercept Point vs. Frequency over Temperature



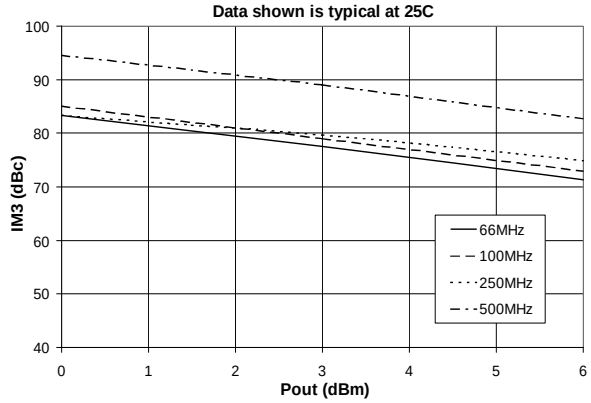
Second Order Intercept Point vs. Frequency over Temperature



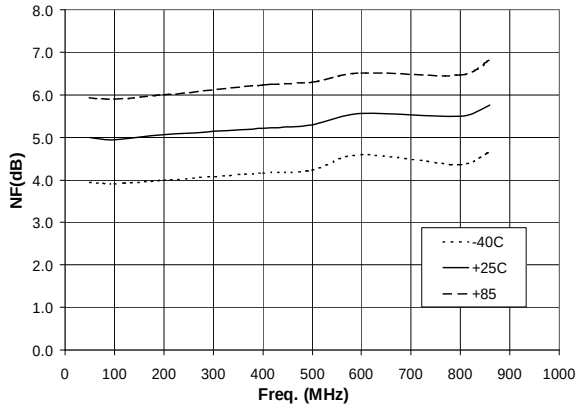
Second Harmonic vs. Pout and Freq.
Data shown is typical at 25C



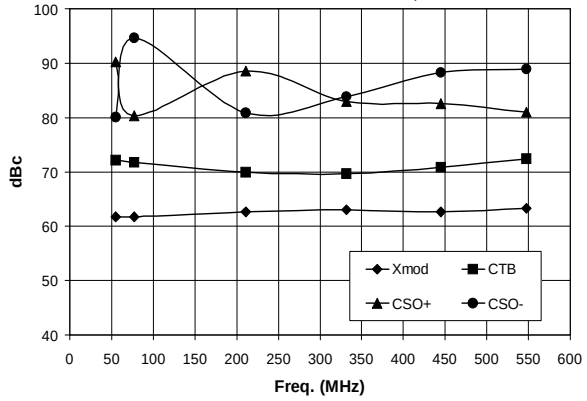
Third Harmonic vs. Pout and Freq.
Data shown is typical at 25C



Noise Figure vs. Frequency Over Temperature



CTB/CSO/XMOD 34dBmV/Chan., Flat



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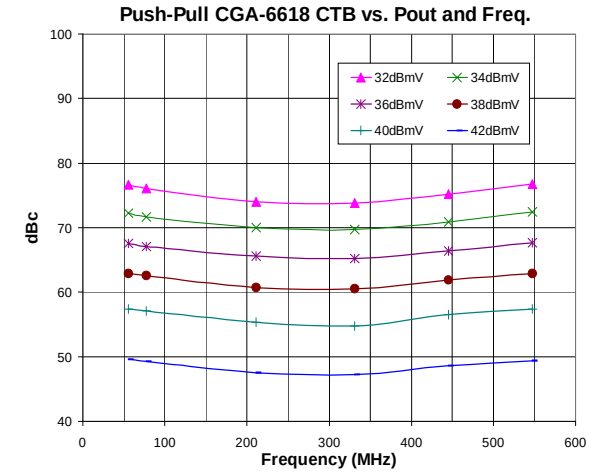
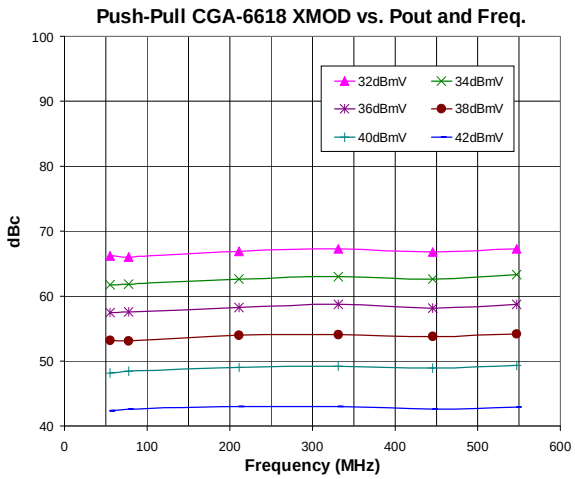
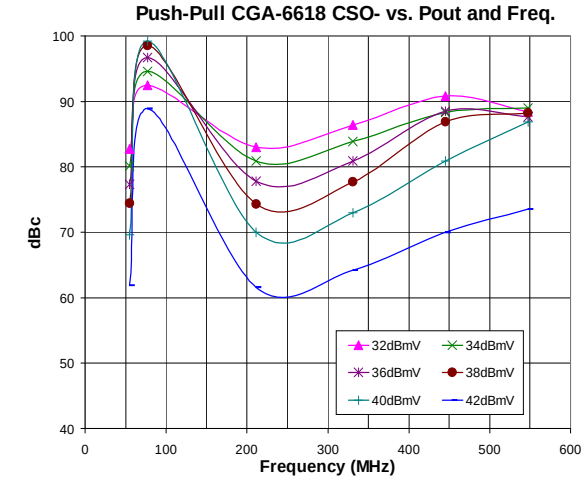
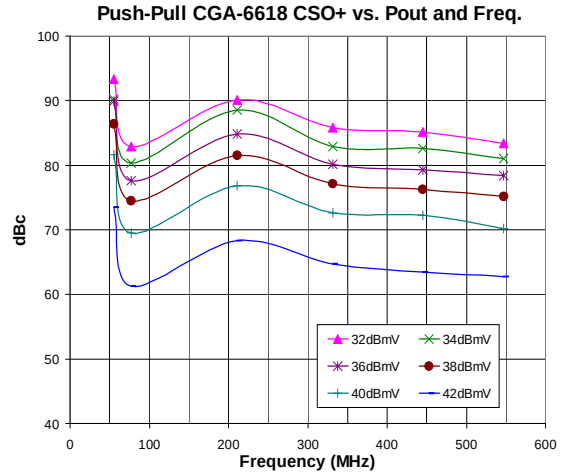
CSO/CTB/XMOD Performance:

V_S=8V, I_D=150mA @ T_L=+25°C, R_{BIAS}=39 Ohms, Push-Pull Config, 79 Ch. Flat Analog, No Digital Channels.



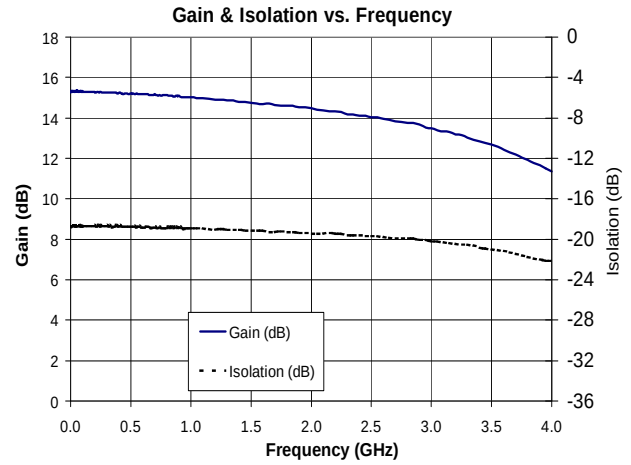


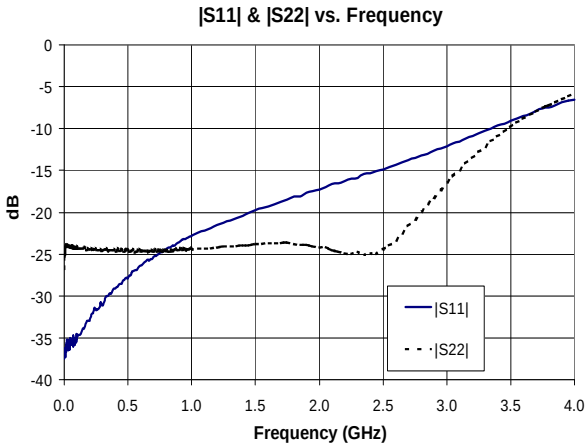




Typical RF Performance - Single Ended - 50 Ohm System

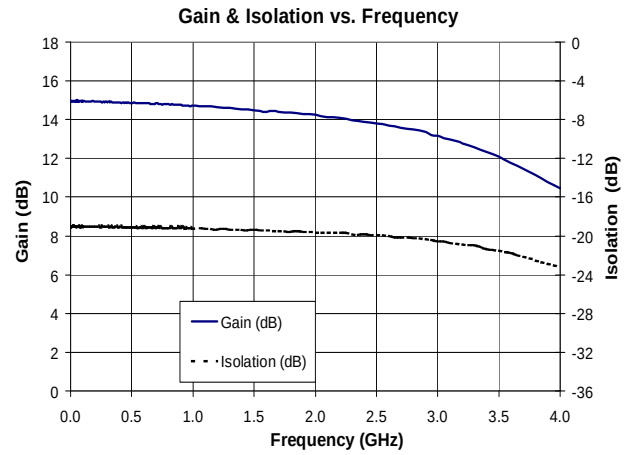
V_S=8V, I_D=80mA (one amp biased), T_L=+25°C, R_{BIAS}=33 Ohms

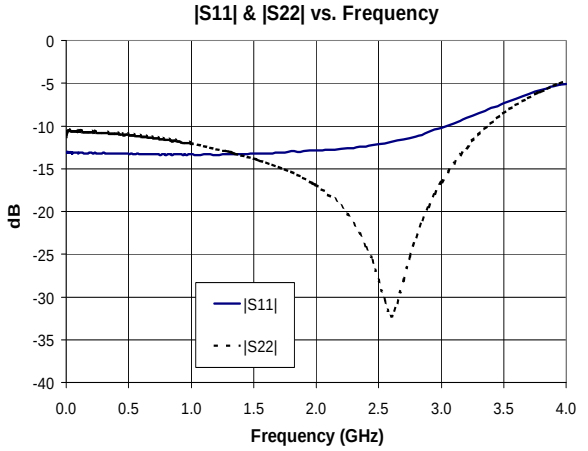




Typical RF Performance - Single Ended - 37.5 Ohm System

V_S=8V, I_D=80mA (one amp biased), T_L=+25°C, R_{BIAS}=33 Ohms





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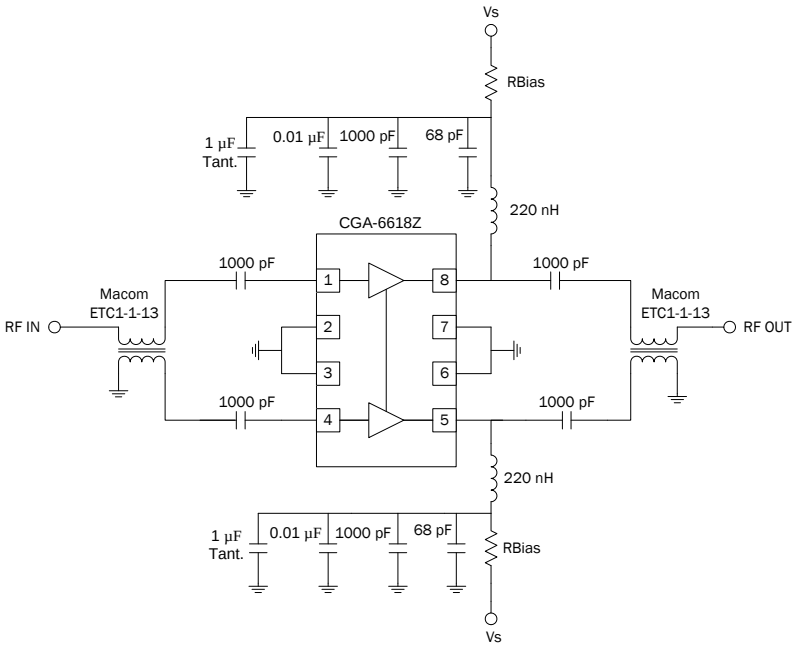
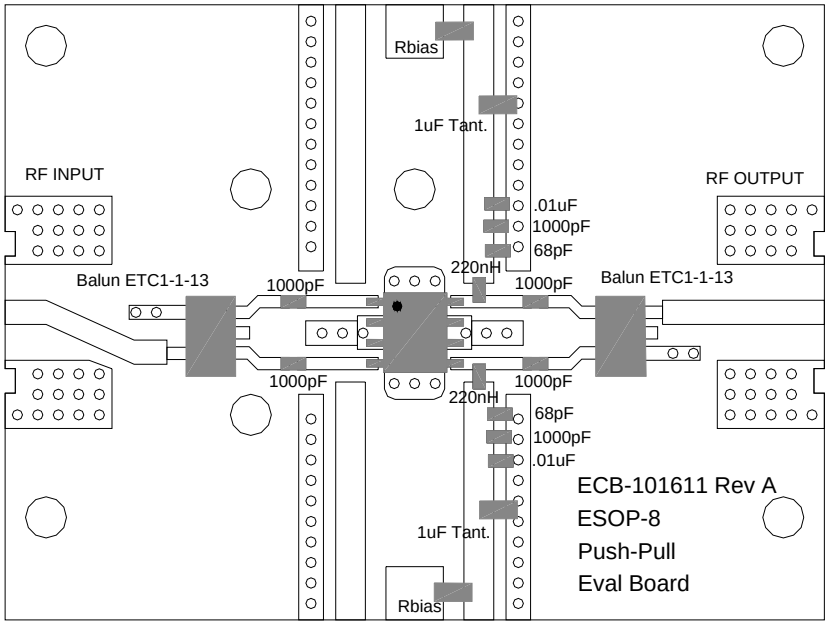
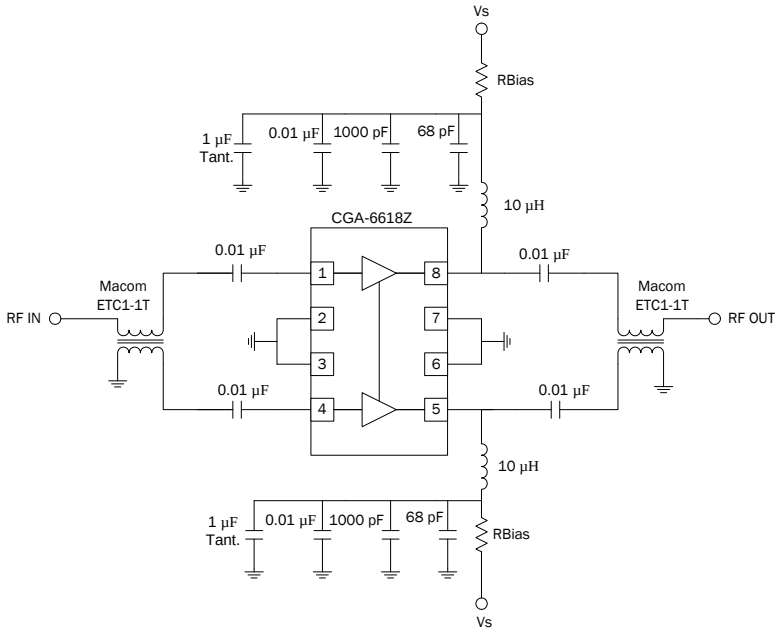
50MHz to 870MHz Application Circuit Schematic



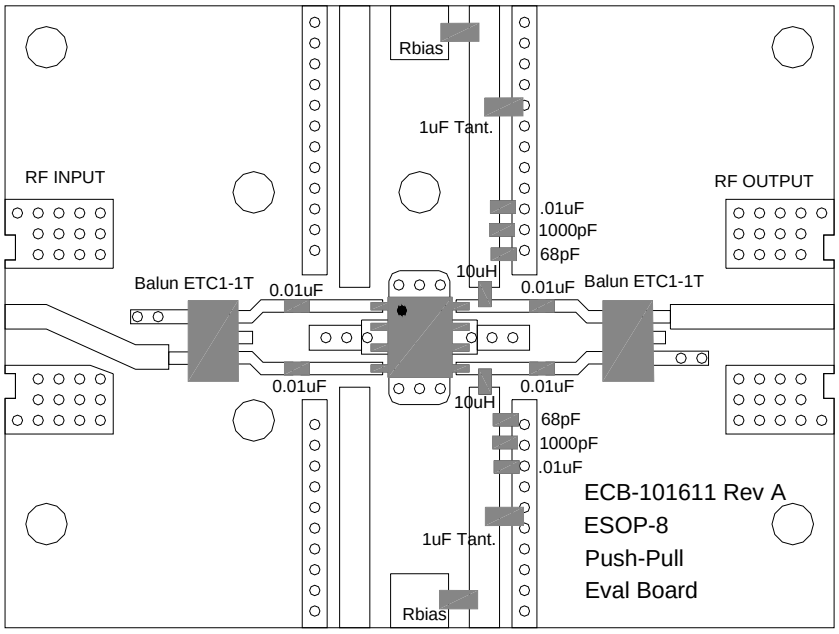
50MHz to 870MHz Evaluation Board Layout



5MHz to 100MHz Application Circuit Schematic



5MHz to 100MHz Evaluation Board Layout



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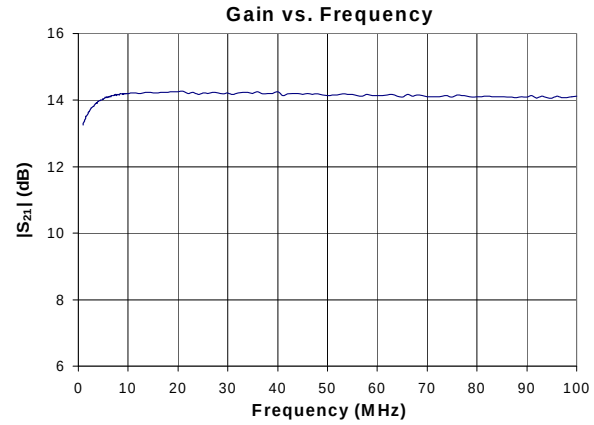
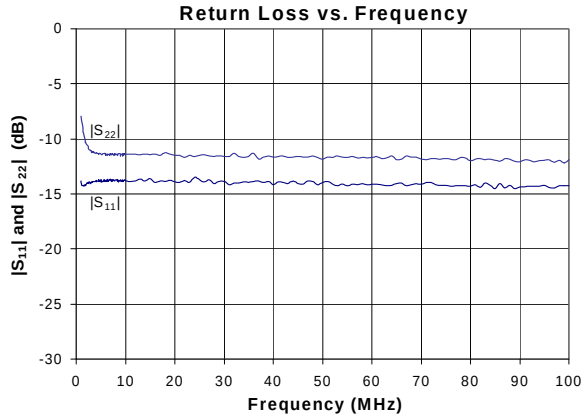
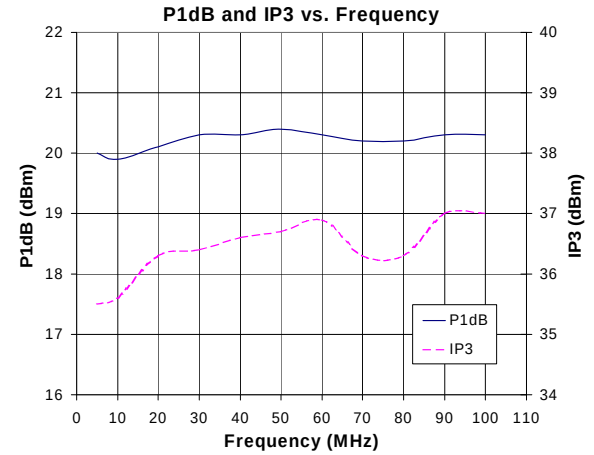
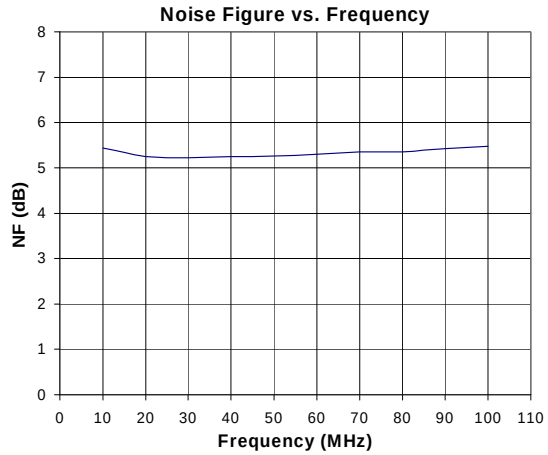
Recommended Bias Resistor Values for I_D=150mA $R_{BIAS}=2\ (V_S-V_D)\ /\ I_D$				
Supply Voltage(V_S)	8 V	9 V	12 V	15 V
R_{BIAS}	33 Ω	47 Ω	82 Ω	120 Ω
Note: R_{BIAS} provides DC bias stability over temperature.				

5 - 100 MHz Application Circuit: V_S=8V, I_D=160mA @ T_L=+25°C, Push-Pull Config.









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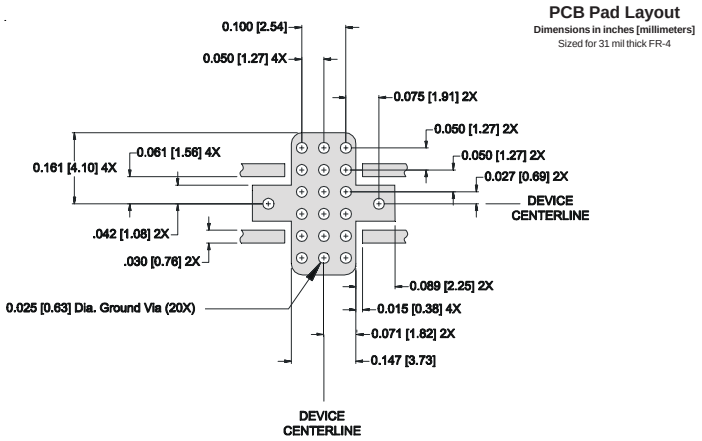
Pin	Function	Description
1	RF IN	Device 1. RF input pin. This pin requires the use of an external DC-blocking capacitor as shown in the schematic.
2, 3, 6, 7	GND	Connection to ground. Use via holes for best performance to reduce lead inductance as close to ground leads as possible.
4	RF IN	Device 2. RF input pin. This pin requires the use of an external DC-blocking capacitor as shown in the schematic.
5	RF OUT/VCC	Device 2. RF output and bias pin. Bias should be supplied to this pin through an external series resistor and RF choke inductor. Because DC biasing is present on this pin, a DC-blocking capacitor should be used in most applications. The supply side of the bias network should be well bypassed.
8	RF OUT/VCC	Device 1. Same as pin 5.
EPAD	GND	Exposed area on the bottom side of the package must be soldered to the ground plane of the board for optimum thermal and RF performance. Several vias should be located under the EPAD as shown in the recommended land pattern.

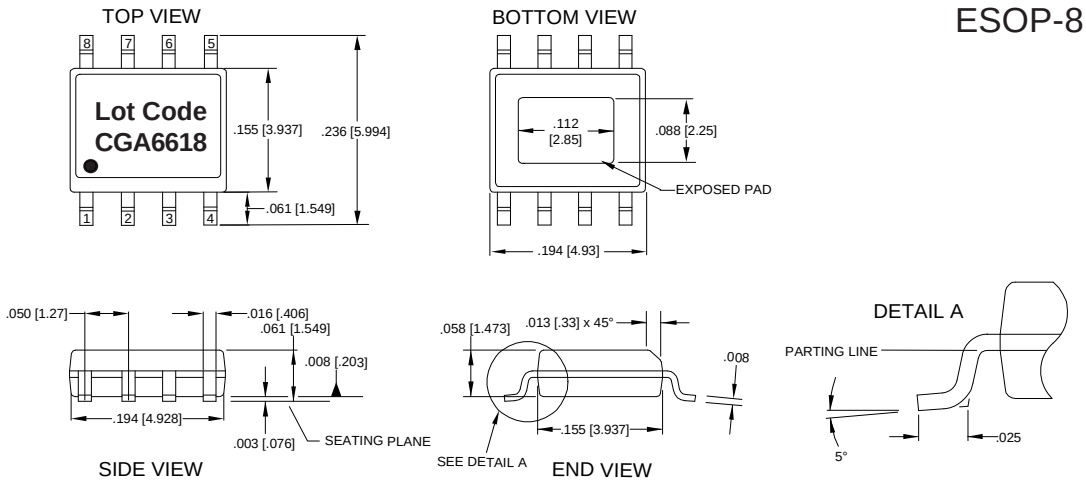
Suggested Pad Layout



Package Drawing and Marking

Dimensions in inches (millimeters)
Refer to drawing posted at www.rfmd.com for tolerances.

PACKAGE TYPE:
ESOP-8



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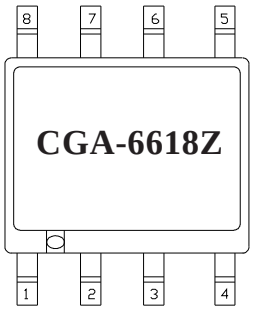
Part Identification



Ordering Information

Part Number	Description	Reel Size	Devices/Reel
CGA6618ZSB	5-Piece sample bag	N/A	N/A
CGA6618ZSQ	25-Piece sample bag	N/A	N/A
CGA6618ZSR	Dual CATV broadband HBT amp	7”	100 pieces
CGA6618Z	Dual CATV broadband HBT amp	7”	500 pieces
CGA6618ZPCK-410	50MHz to 870MHz eval board	N/A	N/A
CGA6618ZPCK-411	5MHz to 100MHz eval board	N/A	N/A

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