



Package: SOIC 8



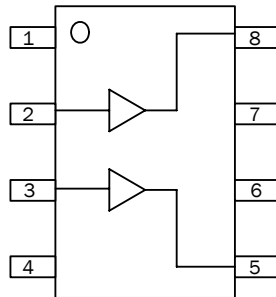
## Product Description

RFMD's CGR-0118Z is a high performance 75Ω push-pull InGaP HBT MMIC amplifier utilizing a Darlington configuration with an active bias network. The active bias network provides stable current over temperature and process variations. Designed to run over a wide range of supply voltage, from 5V to 12V, the CGR-0118Z does not require a bias resistor as compared to typical Darlington amplifiers. The CGR-0118Z is designed for 75Ω return path applications where linear performance is needed over the frequency range 5MHz to 65MHz.

### 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
- RF MEMS
- LDMOS

### Amplifier Configuration



## Features

- Flat Gain Response: 25.4 ± 0.3dB
- Excellent OIP3: 37.5dBm
- Superior Return Loss: >20dB
- Extremely Low CSO/CTB: -80/-67 dBc
- Low Noise Figure: 3.0dB
- Single Supply: 5V to 12V
- Low DC Current: 130mA

## Applications

- CATV Return Path Amplifier
- CATV Line Amplifier
- Optical RX/TX

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Electrical Characteristics					
V <sub>CC</sub> = 12V, T <sub>A</sub> = 25°C, 75Ω System					
Gain		25.4		dB	5 MHz to 65 MHz
Gain Slope		±0.3		dB	5 MHz to 65 MHz
Input Return Loss		20		dB	5 MHz to 65 MHz
Output Return Loss		20		dB	5 MHz to 65 MHz
Noise Figure		3		dBc	5 MHz to 65 MHz
Composite Triple Beat		-60		dBc	T7-T13 50dBmV/Channel
Cross Modulation		-63		dBc	T7-T13 50dBmV/Channel
Composite Second Order		-80		dBc	T7-T13 50dBmV/Channel
1dB Gain Compression Point		73.5		dBmV	65MHz
Output 3rd Order Intercept Point		37.5		dBm	5 MHz, 65 MHz (5dBm/tone at output, 1MHz spacing)
Supply Voltage		12		V	
Operating Current		130		mA	

## Absolute Maximum Ratings

Parameter	Rating	Unit
DC Supply ( $V_{CC}$ )	14	$V_{DC}$
RF Input Voltage (Single Tone) ( $V_{IN}$ )	65	dBmV
Operating Case Temperature Range (TC)	-40 to +100	$^{\circ}C$
Storage Temperature Range ( $T_{STG}$ )	-40 to +150	$^{\circ}C$
RF Input (RFIN)	+24	dBmV

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.



**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.

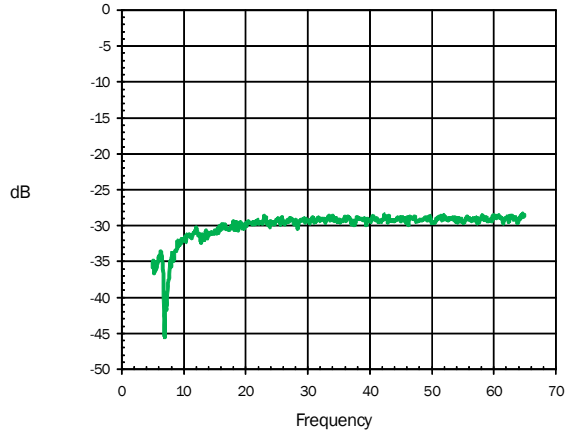
RoHS status based on EU Directive 2002/95/EC (at time of this document revision).

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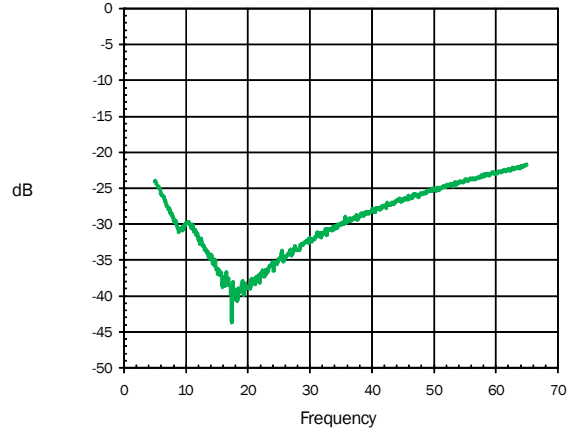
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Electrical Characteristics					$V_{CC}=8V, T_A=25^{\circ}C, 75\Omega$ System
Gain		25.4		dB	5 MHz to 65 MHz
Gain Slope		$\pm 0.3$		dB	5 MHz to 65 MHz
Input Return Loss		20		dB	5 MHz to 65 MHz
Output Return Loss		20		dB	5 MHz to 65 MHz
Noise Figure		3		dBc	5 MHz to 65 MHz
Composite Triple Beat		-67		dBc	T7-T13 50dBmV/Channel
Cross Modulation		-63		dBc	T7-T13 50dBmV/Channel
Composite Second Order		-80		dBc	T7-T13 50dBmV/Channel
1dB Gain Compression Point		73.5		dBmV	65 MHz
Output 3rd Order Intercept Point		37.5		dBm	5 MHz, 65 MHz (5dBm/tone at output, 1MHz spacing)
Supply Voltage		8		V	
Operating Current		130		mA	
5V Specification Table					$V_{CC}=5V, T_A=25^{\circ}C, 75\Omega$ System
Gain		25.4		dB	5 MHz to 65 MHz
Gain Slope		$\pm 0.3$		dB	5 MHz to 65 MHz
Input Return Loss		20		dB	5 MHz to 65 MHz
Output Return Loss		20		dB	5 MHz to 65 MHz
Noise Figure		2.7		dBc	5 MHz to 65 MHz
Composite Triple Beat		-60		dBc	T7-T13 50dBmV/Channel
Cross Modulation		-63		dBc	T7-T13 50dBmV/Channel
Composite Second Order		-80		dBc	T7-T13 50dBmV/Channel
1dB Gain Compression Point		74		dBmV	65 MHz
Output 3rd Order Intercept Point		40		dBm	5 MHz, 65 MHz (5dBm/tone at output, 1MHz spacing)
Supply Voltage		5		V	
Operating Current		262		mA	

Typical Performance Curves ( $T_A = 25^\circ\text{C}$ )

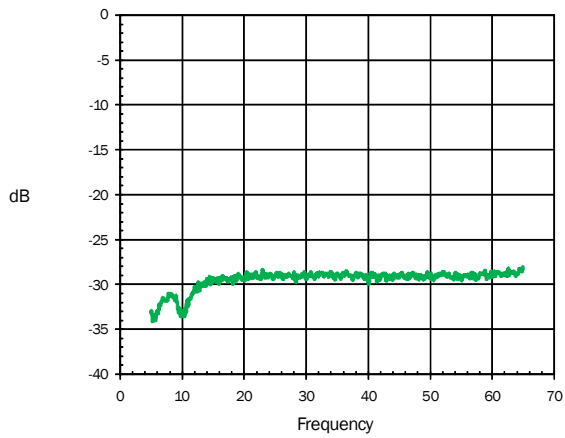
Output Return Loss  $V_{DD}=8\text{V}$



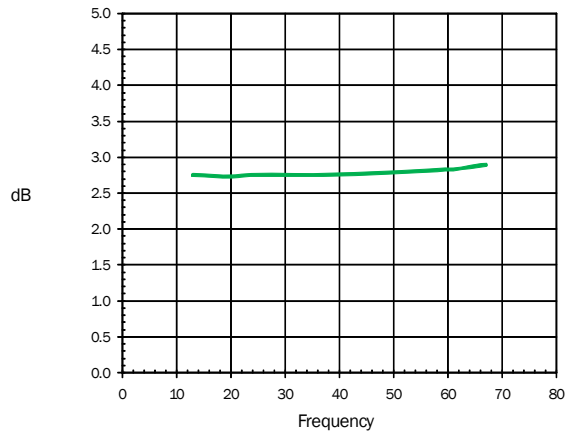
Input Return Loss  $V_{DD}=12\text{V}$



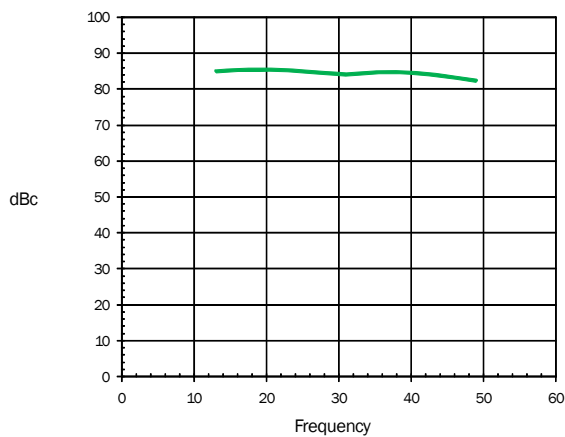
Output Return Loss  $V_{DD}=12\text{V}$



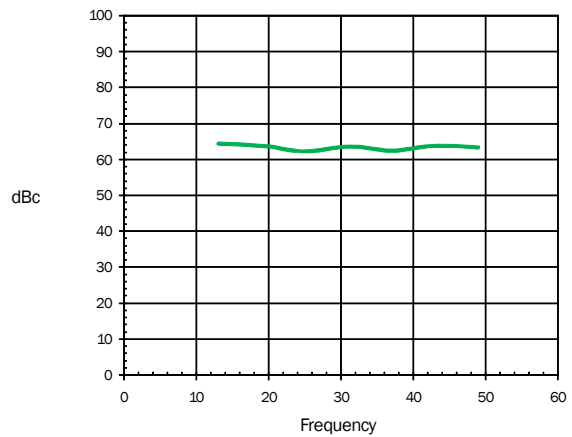
Noise Figure  $V_{DD}=12\text{V}$



CSO  $V_{DD}=12\text{V}$

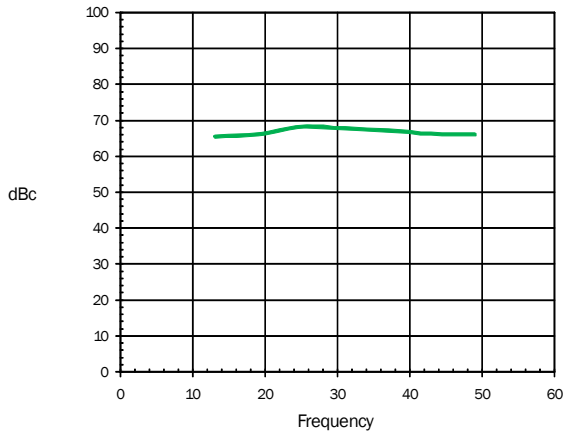


CTB  $V_{DD}=12\text{V}$

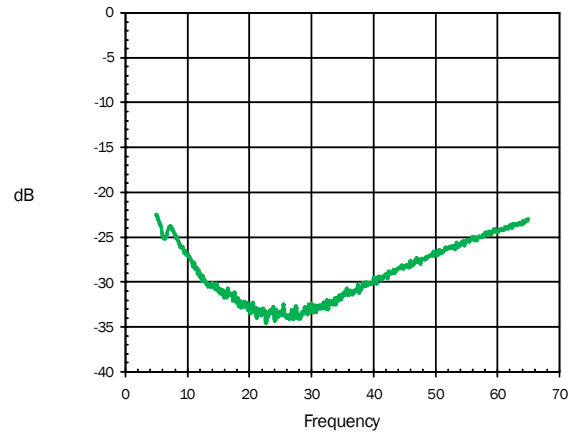


## Typical Performance Curves (TA=25 °C)

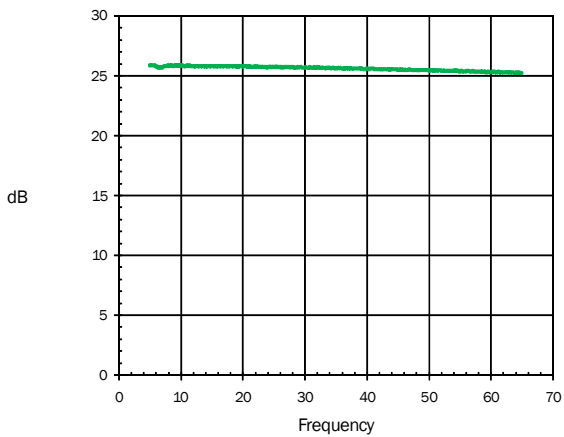
XMOD  $V_{DD}=12V$



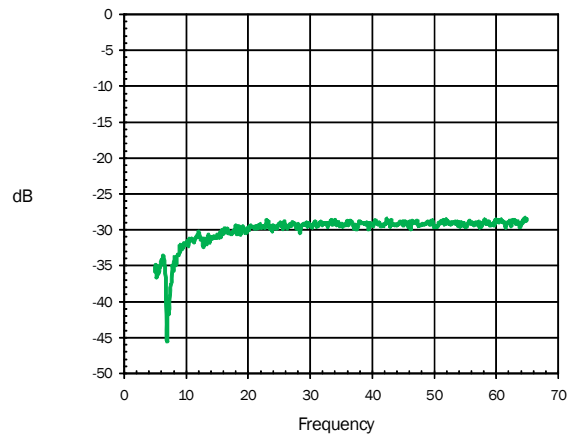
Input Return Loss  $V_{DD}=8V$



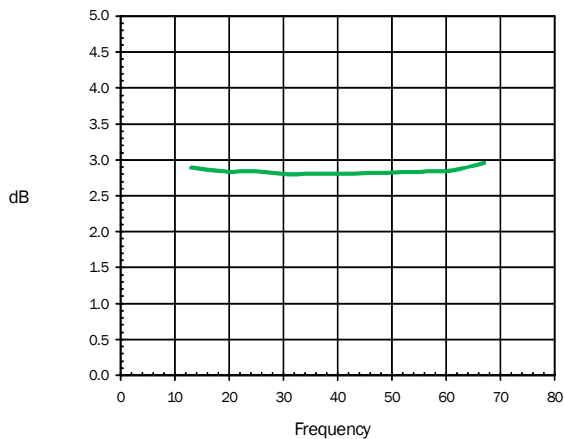
Gain  $V_{DD}=8V$



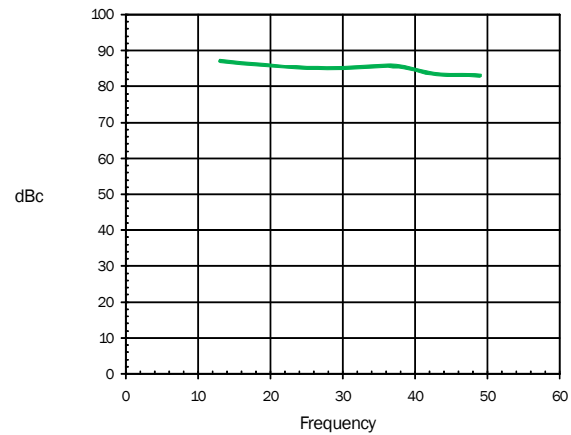
Output Return Loss  $V_{DD}=8V$



Noise Figure  $V_{DD}=8V$

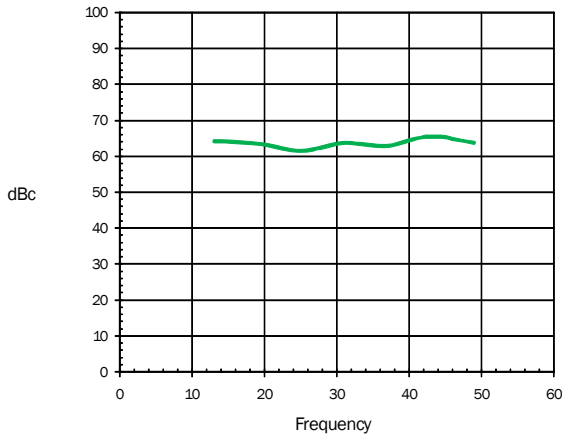


CSO  $V_{DD}=8V$

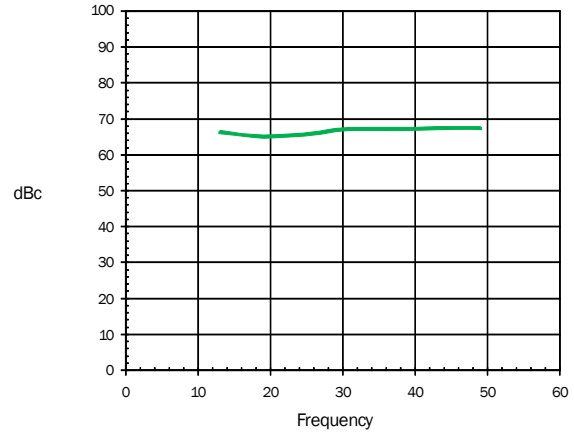


Typical Performance Curves (TA = 25 ° C)

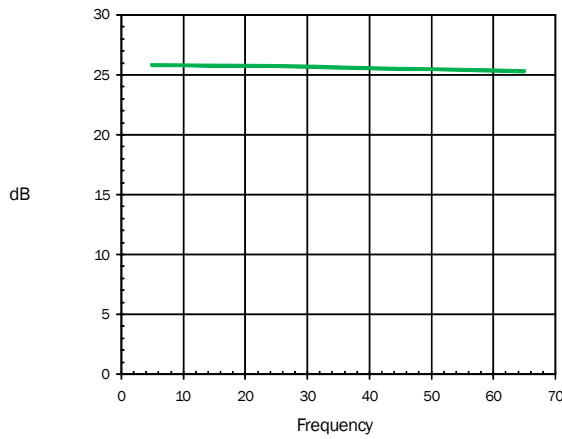
CTB  $V_{DD}=8V$



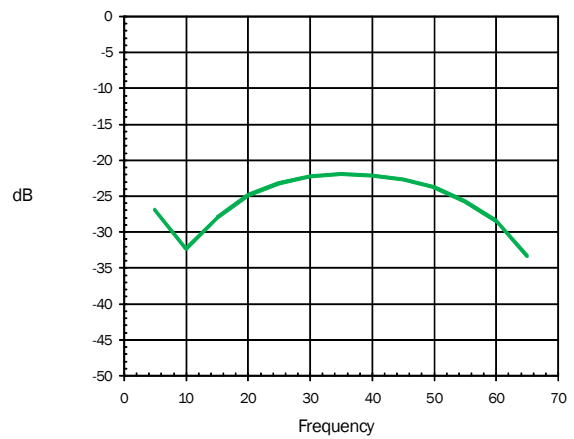
XMOD  $V_{DD}=8V$



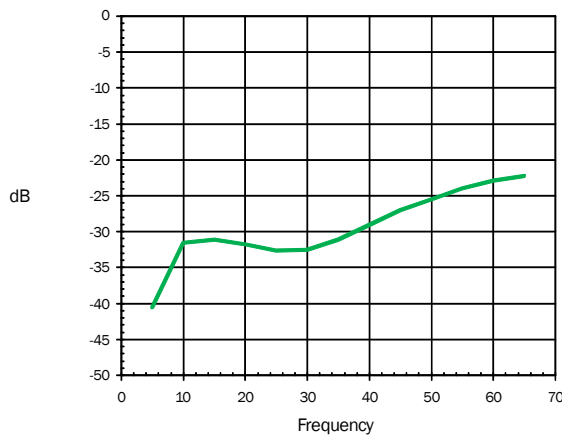
Gain  $V_{DD}=5V$



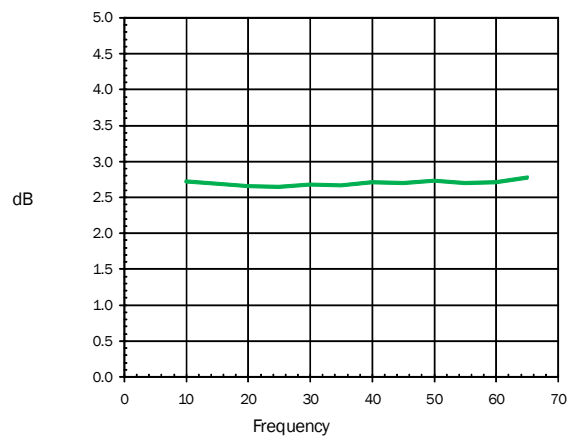
Input Return Loss  $V_{DD}=5V$



Output Return Loss  $V_{DD}=5V$

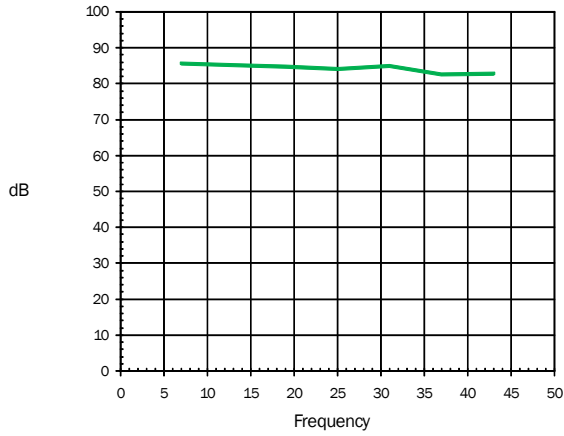


Noise Figure  $V_{DD}=5V$

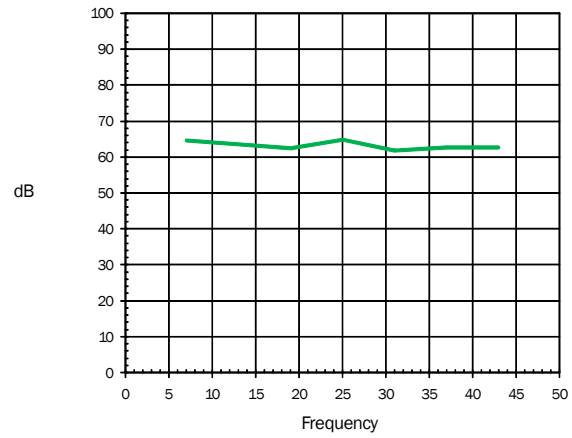


## Typical Performance Curves (TA=25 °C)

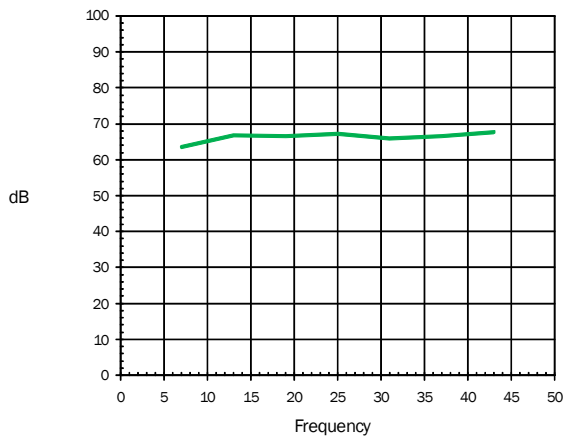
CSO  $V_{DD}=5V$



CTB  $V_{DD}=5V$

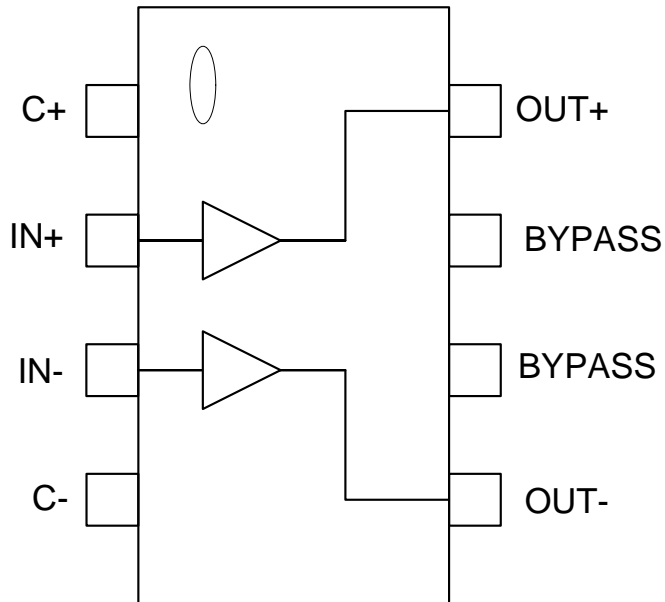


XMOD  $V_{DD}=5V$

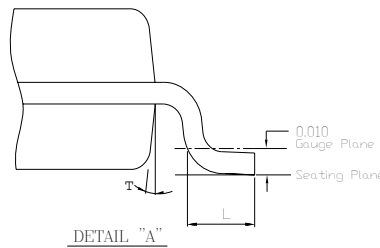
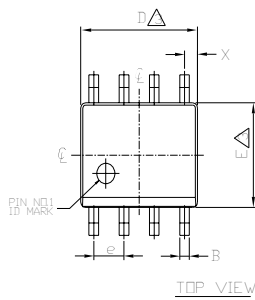


Pin	Function	Description
<b>1</b>	<b>RFFB</b>	Feedback pin. External DC-blocking capacitor is required.
<b>2</b>	<b>RFIN</b>	RF input pin. External DC-blocking capacitor is required.
<b>3</b>	<b>RFIN</b>	Same as pin 2.
<b>4</b>	<b>RFFB</b>	Same as pin 1.
<b>5</b>	<b>RFOUT</b>	RF output and bias pin (open collector).
<b>6,7</b>	<b>BYPASS</b>	AC ground/Bypass.
<b>8</b>	<b>RFOUT</b>	Same as pin 5.
<b>EPAD</b>	<b>GND</b>	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.

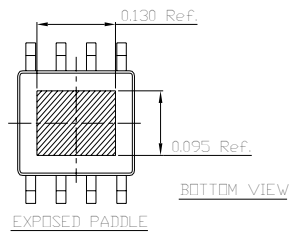
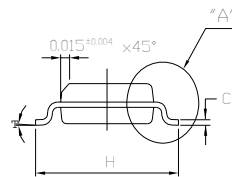
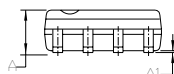
## Pin Assignment



## Outline Dimensions



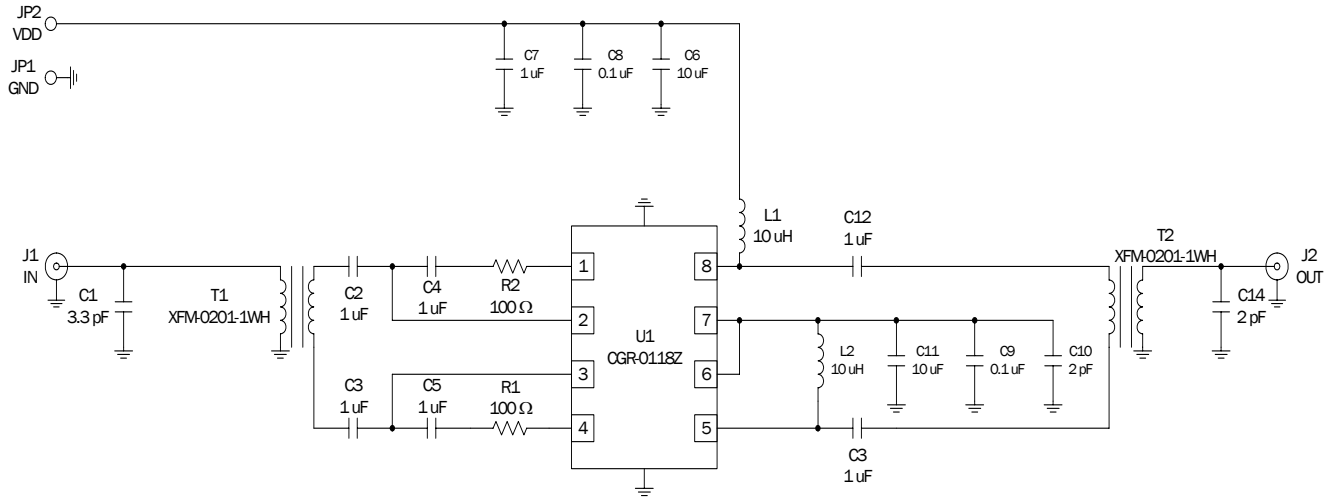
8 SOIC		
SYMBOL	MIN	MAX
A	0.054	0.068
A1	0.001	0.004
B	0.014	0.019
D	0.189	0.196
E	0.150	0.157
H	0.229	0.244
e	0.050	BSC
C	0.0075	0.0098
L	0.020	0.040
X	0.0215	REF
T	0°	8°
T	7°	BSC



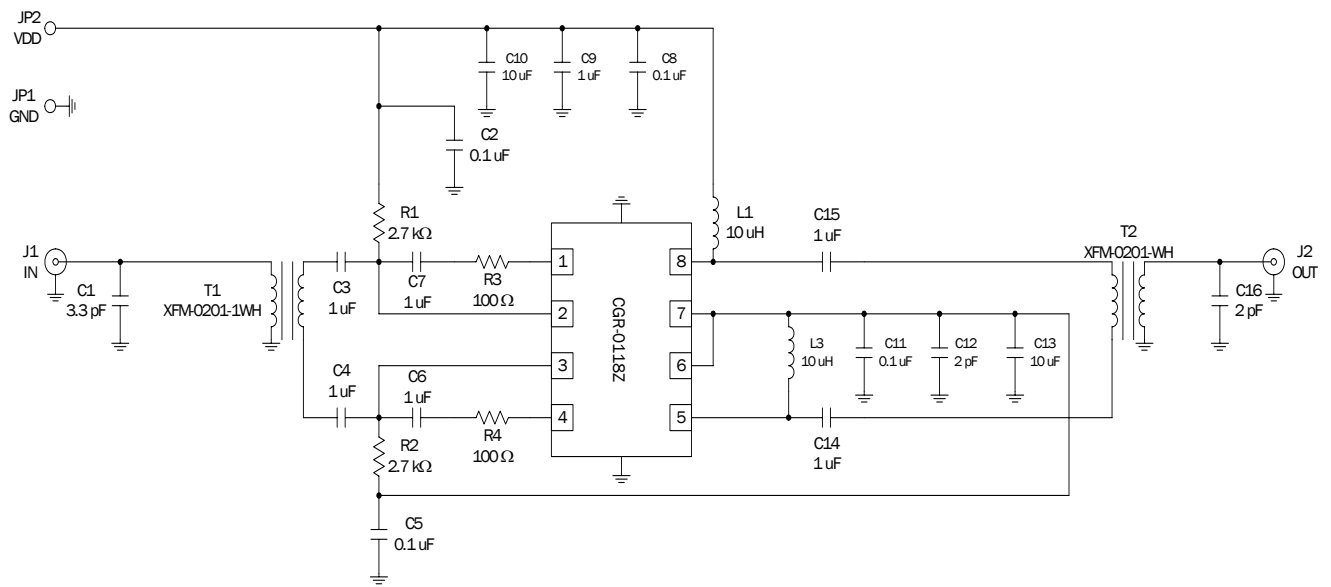
- NOTE:
1. TOP PACKAGE SURFACE TO BE MATTE FINISH VDI 24-27.
  2. BOTTOM PACKAGE SURFACE TO BE MATTE FINISH VDI 8-11.
  - △ DIMENSION ARE EXCLUSIVE MOLD FLASH AND GATE BURR.
  4. FOOT LENGTH MEASURING IS BASED ON THE GAUGE PLANE METHOD.



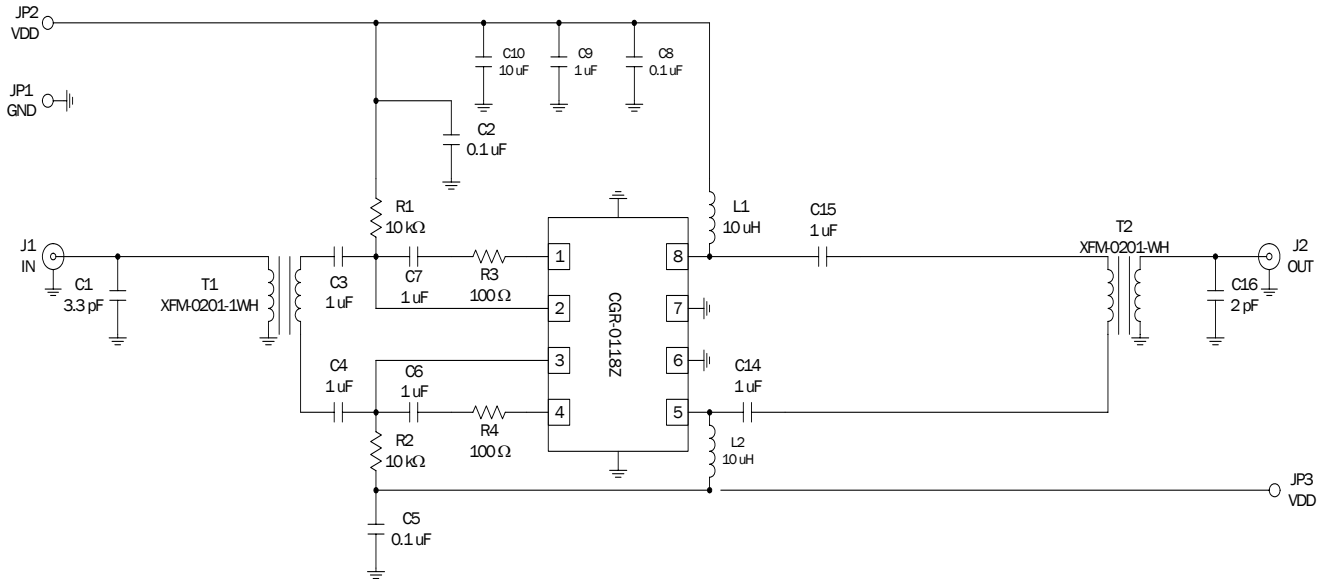
### 12V Application Schematic



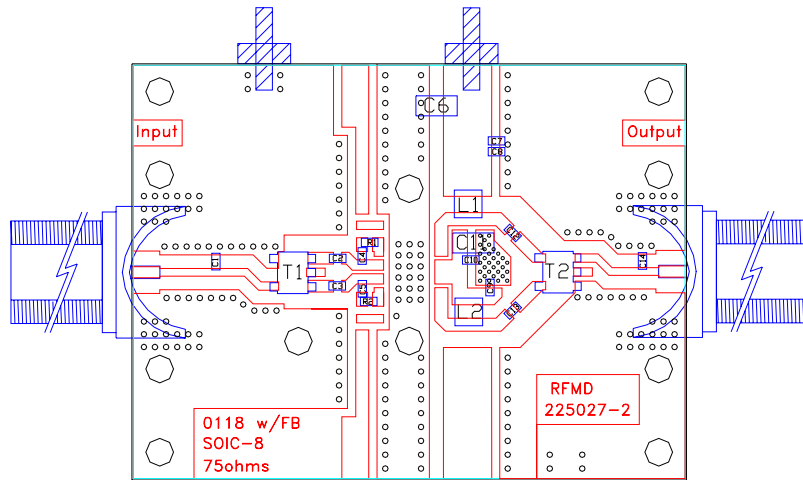
### 8V Application Schematic



## 5V Application Schematic

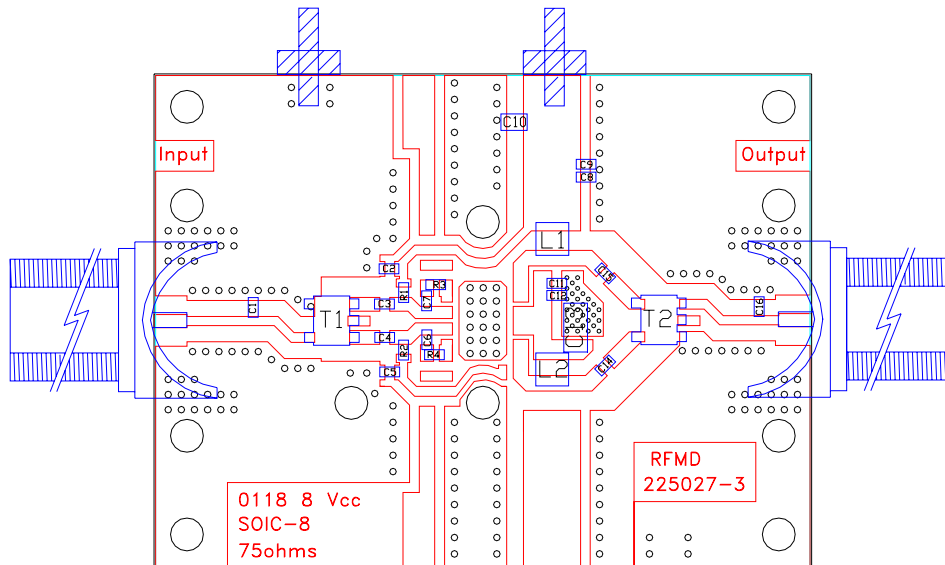


### 12V Evaluation Board Layout



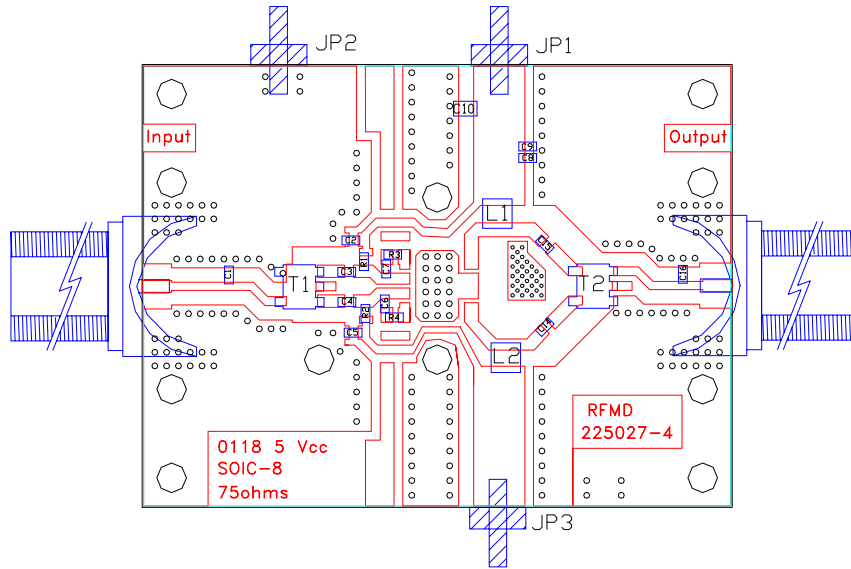
Value	Qty.	Location
2pF	2	C10, C14
3.3pF	1	C1
0.1uF	2	C8, C9
1uF	7	C2, C3, C4, C5, C7, C12, C13
10uF	2	C6, C11
100 Ohms	2	R1, R2
10uH (1008 PS-103 KLB)	2	L1, L2
RFMD™ XFM-0201-1WH	2	T1, T2

## 8V Evaluation Board Layout



Value	Qty.	Location
2pF	2	C12, C16
3.3pF	1	C1
0.1uF	4	C2, C5, C8, C11
1uF	7	C3, C4, C6, C7, C9, C14, C15
10uF	2	C10, C13
2.7 k Ohms	2	R1, R2
100 Ohms	2	R3, R4
10uH (1008 PS-103 KLB)	2	L1, L2
RFMD™ XFM-0201-1WH	2	T1, T2

### 5V Evaluation Board Layout



Value	Qty.	Location
2pF	1	C16
3.3pF	1	C1
0.1uF	3	C2, C5, C8
1uF	7	C3, C4, C6, C7, C9, C14, C15
10uF	1	C10
10 k Ohms	2	R1, R2
100 Ohms	2	R3, R4
10uH (1008 PS-103 KLB)	2	L1, L2
RFMD™ XFM-0201-1WH	2	T1, T2

## Ordering Information

Part Number	Description	Reel Size (in)	Devices/Reel
CGR-0118ZSB	5 pcs Sample Bag	N/A	N/A
CGR-0118ZSQ	25 pcs Sample Bag	N/A	N/A
CGR-0118ZSR	Lead Free, RoHS Compliant	7	100
CGR-0118ZTR7	Lead Free, RoHS Compliant	7	750
CGR-0118ZTR13	Lead Free, RoHS Compliant	13	2500
CGR-0118ZPCBA-410	5 MHz to 65 MHz 12V Evaluation Board	N/A	N/A
CGR-0118ZPCBA-411	5 MHz to 65 MHz 8V Evaluation Board	N/A	N/A
CGR-0118ZPCBA-412	5 MHz to 65 MHz 5V Evaluation Board	N/A	N/A