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RFCA8818

DUAL CATV 40MHz TO 1008MHz HIGH LINEARITY, LOW NOISE GaAs AMPLIFIER

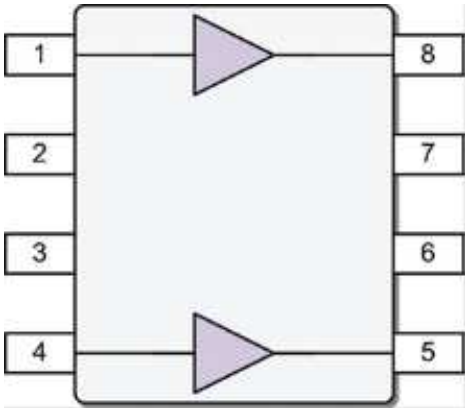
Package: Thermally Enhanced SOIC-8

Features

- 75Ω Push-Pull Amplifier
- 40MHz to 1008MHz Operation
- Internally Matched Input and Output
- 17dB Small Signal Gain
- 2.0dB Noise Figure
- Single 5V to 8V Positive Power Supply

Applications

- Linear LNA/Driver
- CATV Line Driver Amplifier
- Broadband Gain Blocks
- FTTx / xPON / ONU Driver Amplifier



Functional Block Diagram

Product Description

RFMD's RFCA8818 is a low-noise, linear high performance GaAs MESFET MMIC amplifier. The RFCA8818 contains two amplifiers for use in wideband push-pull CATV amplifiers requiring excellent second order performance. The second and third order non-linearities are greatly improved in the push-pull configuration.

Ordering Information

RFCA8818	Dual CATV 40MHz to 1008MHz High Linearity, low Noise GaAs Amplifier
RFCA8818PCBA	Fully Assembled Evaluation Board

Optimum Technology Matching® Applied

☐ GaAs HBT	☐ SiGe BiCMOS	☐ GaAs pHEMT	☐ GaN HEMT
☑ GaAs MESFET	☐ Si BiCMOS	☐ Si CMOS	☐ BiFET HBT
☐ InGaP HBT	☐ SiGe HBT	☐ Si BJT	

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Absolute Maximum Ratings

Parameter	Rating	Unit
Device Voltage	9	V
RF Input Power	13	dBm
Operating Temperature Range	-40 to +85	°C
Storage Temperature Range	-40 to +150	°C

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.

RFMD Green: RoHS compliant per EU Directive 2002/95/EC, halogen free per IEC 61249-2-21, < 1000 ppm each of antimony trioxide in polymeric materials and red phosphorus as a flame retardant, and <2% antimony in solder.

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Overall 75Ω					Temp = -40 °C to +85 °C, V_{CC} = 7V, Standard Application Circuit
Frequency Range	40		1008	MHz	
Gain	16	17	18	dB	
Gain Flatness		±1.0		dB	40MHz to 1008MHz
Noise Figure		2.0	2.5	dB	40MHz to 1008MHz
Input Return Loss	8	10		dB	40MHz to 1008MHz
Output Return Loss	13	15		dB	40MHz to 1008MHz
Output IP2	53	61	70	dBm	40MHz to 1008MHz, 30MHz tone spacing
Output IP3	35	37		dBm	40MHz to 1008MHz
Output P1dB	24	26			40MHz to 1008MHz
Distortion					
CSO		-72	-62	dBc	77 channels to 550MHz, 34dBmV P_{OUT}
CTB		-70	-64	dBc	77 channels to 550MHz, 34dBmV P_{OUT}
XMOD		-62	-58	dBc	77 channels to 550MHz, 34dBmV P_{OUT}
Thermal					
θ_{JC}		40		°C/W	Referenced to the GND via of Pin 2
Maximum Junction Temperature			150	°C	
Power Supply					
Supply Voltage (V_{DD})		7		V	
Operating Current Range		220		mA	

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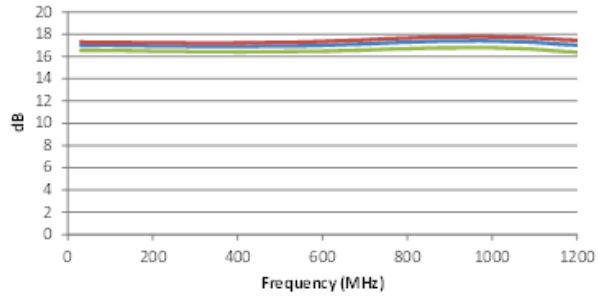
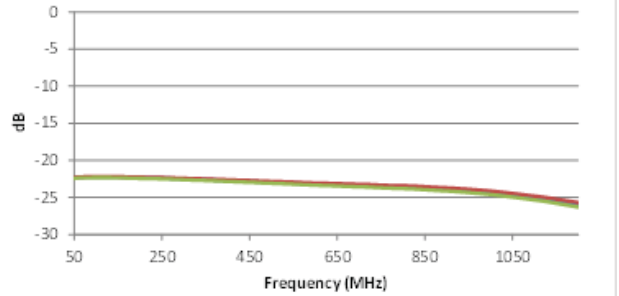
Typical Performance

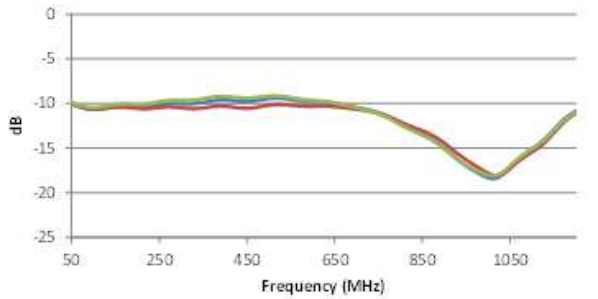
Gain S_{21}



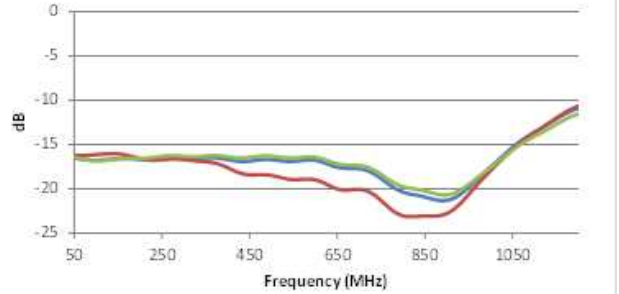
Reverse Isolation S_{12}



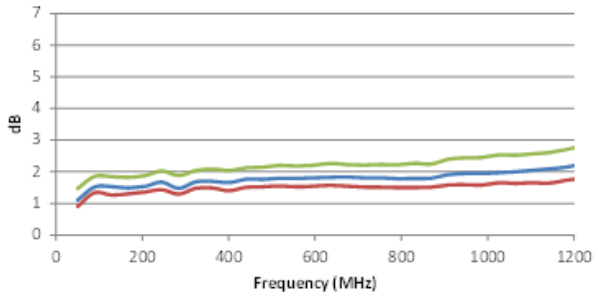
Input Return Loss S_{11}



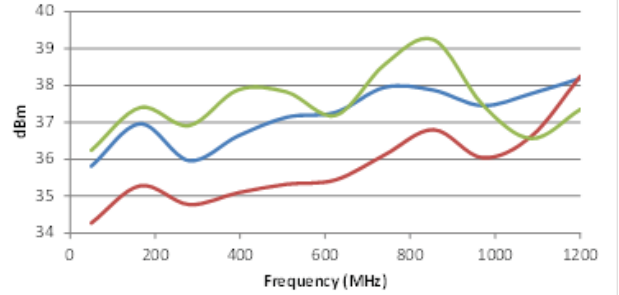
Output Return Loss S_{22}

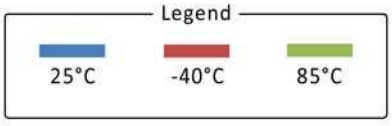


Noise Figure



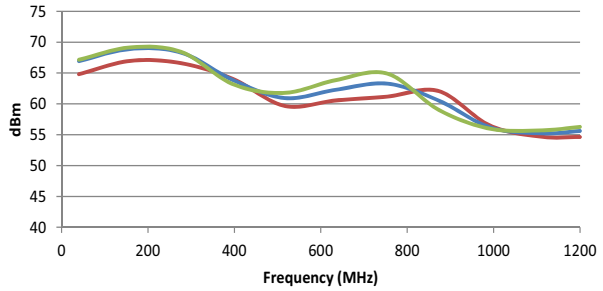
Third Order Intercept, IP_3



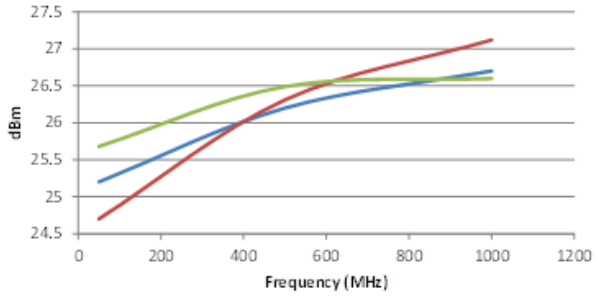


Typical Performance (continued)

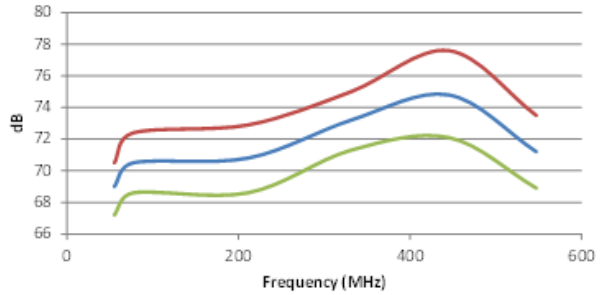
Second Order Intercept, IP_2



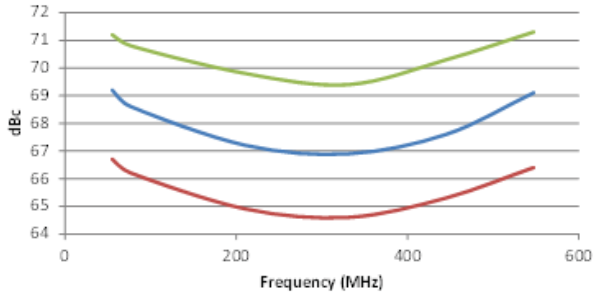
P1dB

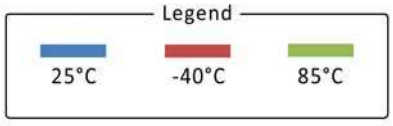


CSO



CTB





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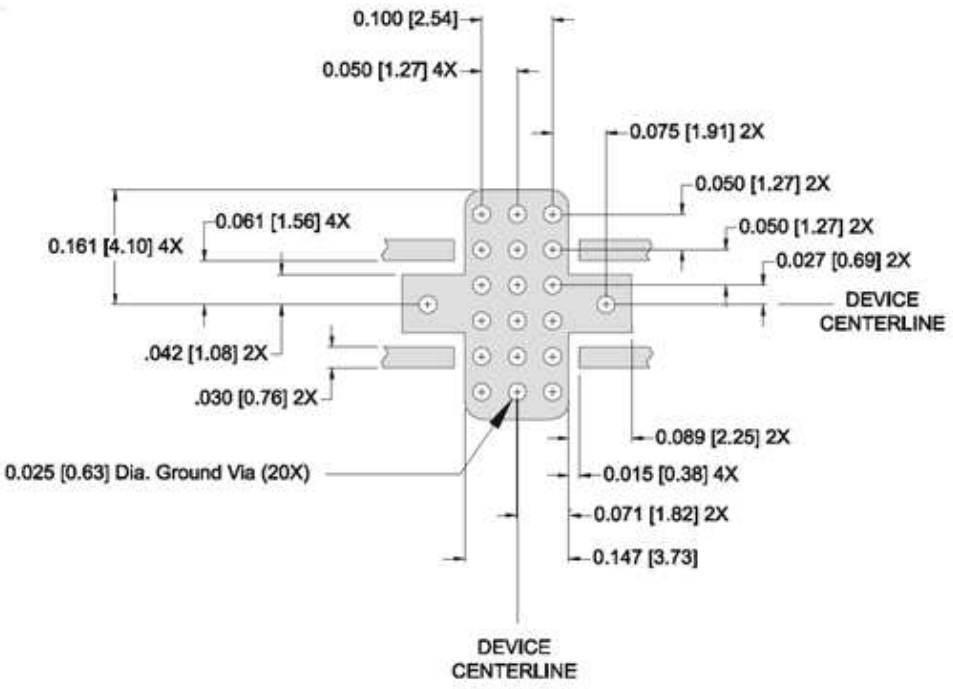
Pin Names and Descriptions

Pin	Name	Description
1	RFIN	Device 1, RF input pin. This pin is internally DC blocked. An external DC blocking capacitor is not required.
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	RFIN	Device 1, RF input pin. This pin is internally DC blocked. An external DC blocking capacitor is not required.
5	RFOUT / VCC	Device 2, RF output and bias pin. Because DC is present on this pin, a DC blocking capacitor suitable for the frequency of operation should be used in most applications. For biasing, only an RF choke is needed.
8	RFOUT / VCC	Device 1, RF output and bias pin. Because DC is present on this pin, a DC blocking capacitor suitable for the frequency of operation should be used in most applications. For biasing, only an RF choke is needed.
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.

PCB Pad Layout



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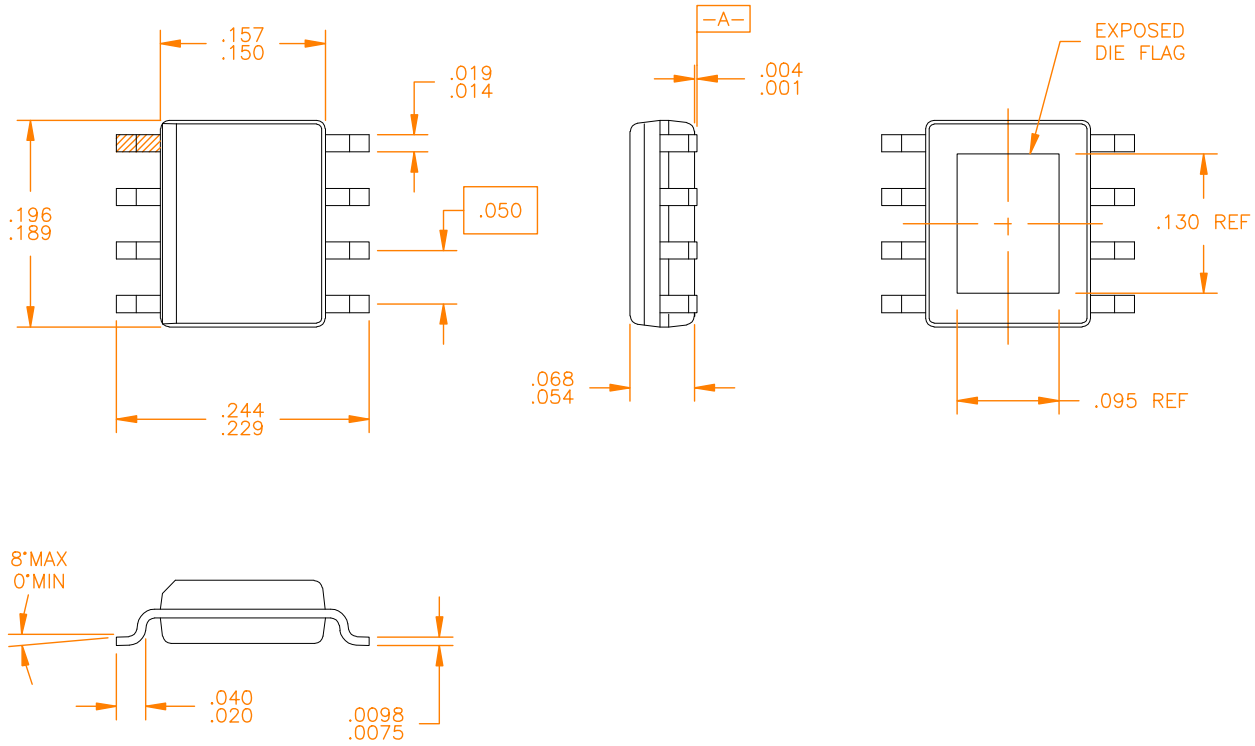
Package Drawing

Package Type: Thermally Enhanced SOIC-8
Dimensions in inches

NOTES:
1. SHADED LEAD IS PIN 1.
2. LEAD COPLANARITY: .003 WITH RESPECT TO DATUM 'A'.
3. DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.



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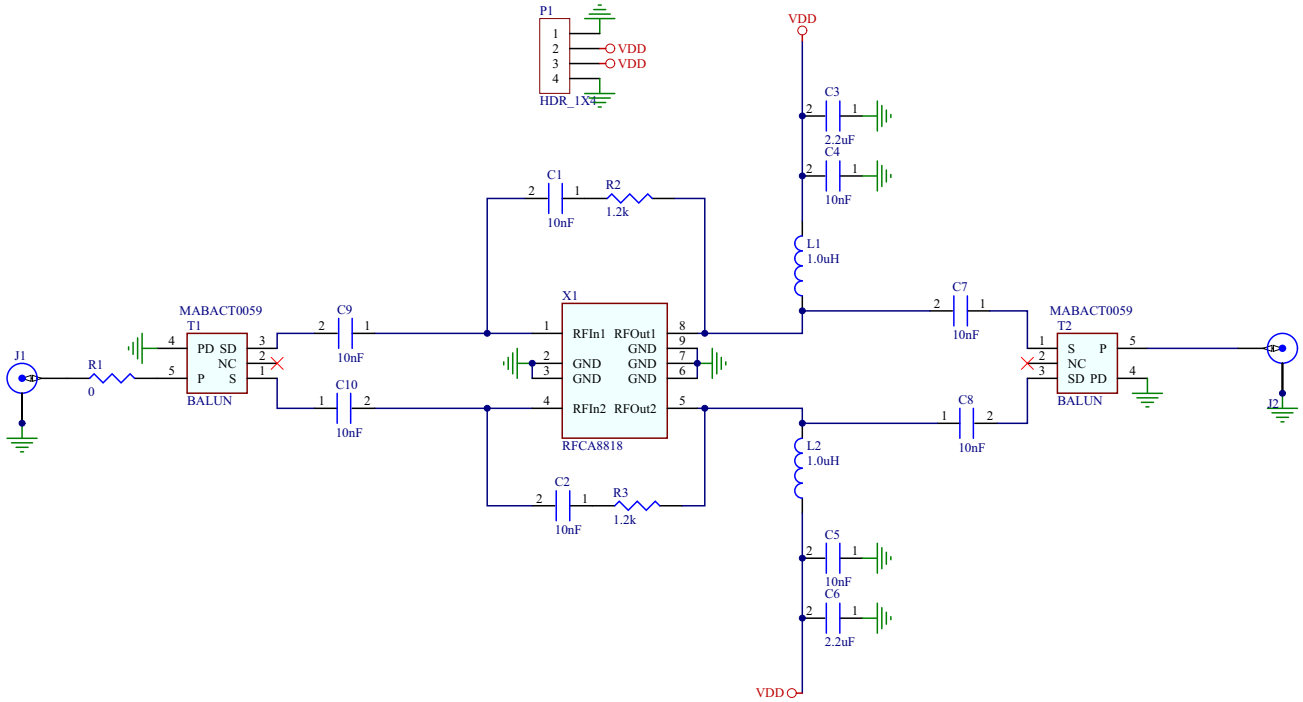
Application Schematic



Evaluation Board Bill of Materials (BOM)

Description	Reference Designator	Manufacturer	Manufacturer's P/N
Capacitor	C1-C2, C4-C5, C7-C10	Murata Electronics	GRM188R71H103KA01D
Capacitor	C3, C6	Murata Electronics	GRM188R61A105KA61D
F-Connector	J1-J2	Millimeter Wave Technologies, LLC	MW-846-C-DD-75
Inductor	L1-L2	Coilcraft, Inc.	0805LS-102XJLC
HDR_1X4	P1	AMP	640454-4
Resistor	R1	Panasonic Industrial Co.	ERJ-3GEY0R00V
Resistor	R2-R3	Panasonic Industrial Co.	ERJ-3GEYJ122V
BALUN	T1-T2	M/A-COM Technology Solutions, Inc.	MABACT0059
RFCA8818	X1	RFMD	RFCA8818