

RFCA8830

High Linearity, Low Noise, 19 dB Gain Block

The RFCA8830 is a GaAs pHEMT RF balanced amplifier IC with a 45MHz to 1218MHz operating bandwidth. This IC is designed to provide a low noise, high linearity, and high gain for use as a Post Amplifier in Optical Receivers or low noise balanced preamp. The IC uses a 5V power supply for applications requiring lower power dissipation. It is designed to support the new DOCSIS 3.1 Data Over Cable specification.



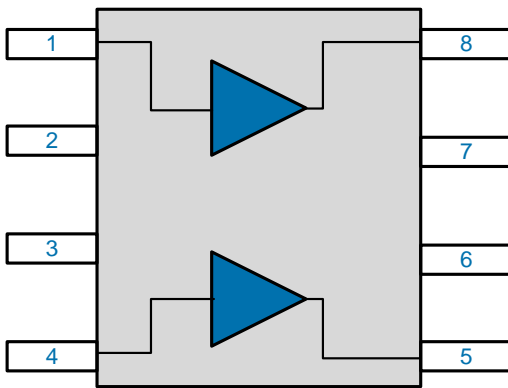
SOIC-8 with Exposed Pad

Features

- 45MHz to 1218MHz Operation
- 5V Operation
- >75dBc CSO and CTB at 34dBmV/ch, 79 channel flat
- 19dB Gain
- Low Noise Figure: >2dB

Applications

- HFC Optical Nodes
- Balanced Antenna Applications
- DOCSIS 3.1 Systems



Functional Block Diagram

Ordering Information

RFCA8830PCBA-410	Fully assembled evaluation board
RFCA8830SB	Sample bag with 5 pieces
RFCA8830SQ	Sample bag with 25 pieces
RFCA8830SR	7" Reel with 100 pieces
RFCA8830TR7	7" Reel with 2500 pieces

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Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage (VDD)	+7.0	V
Maximum CW Input Power for VDD = +5 V	+3	dBm
Operating Temperature Range	-40 to +85	°C
Storage Temperature Range	-40 to +150	°C
Maximum Junction Temperature	+160	°C
ESD Rating – Human Body Model (HBM)	TBD	V
Moisture Sensitivity Level	MSL1	



Caution! ESD sensitive device.



RFMD Green: RoHS status based on EU Directive 2011/65/EU (at time of this document revision), halogen free per IEC 61249-2-21, < 1000ppm each of antimony trioxide in polymeric materials and red phosphorus as a flame retardant, and <2% antimony in solder.

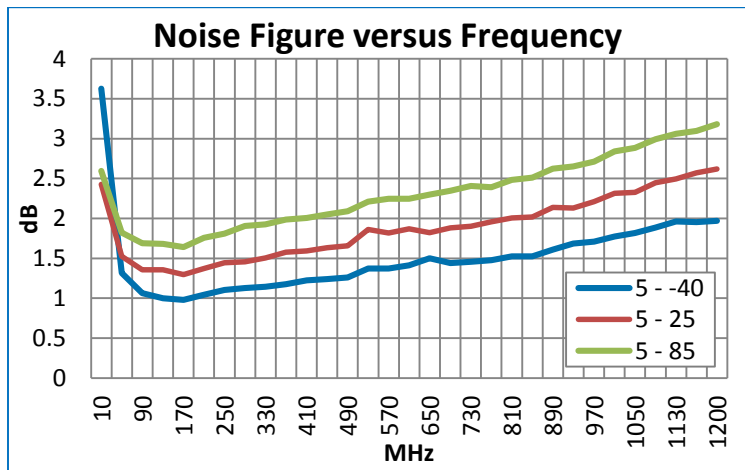
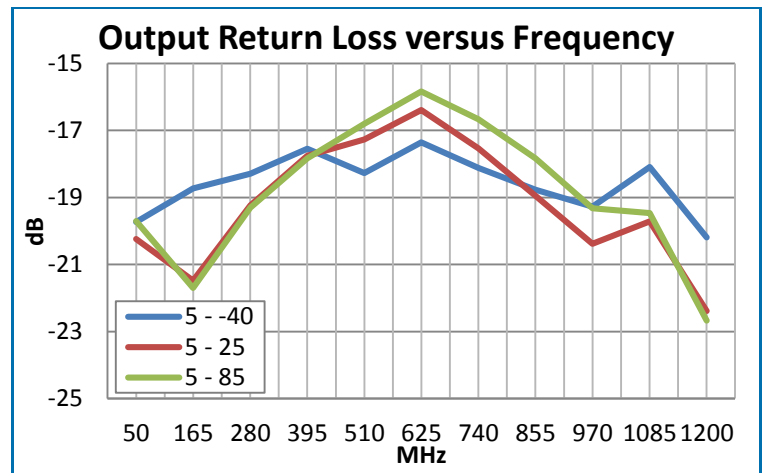
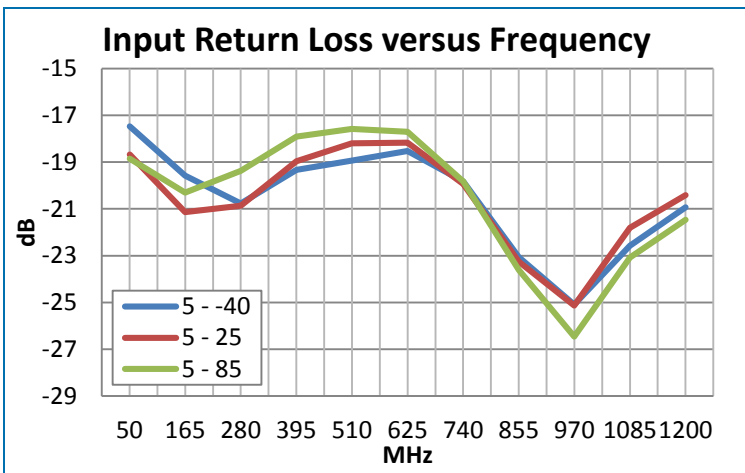
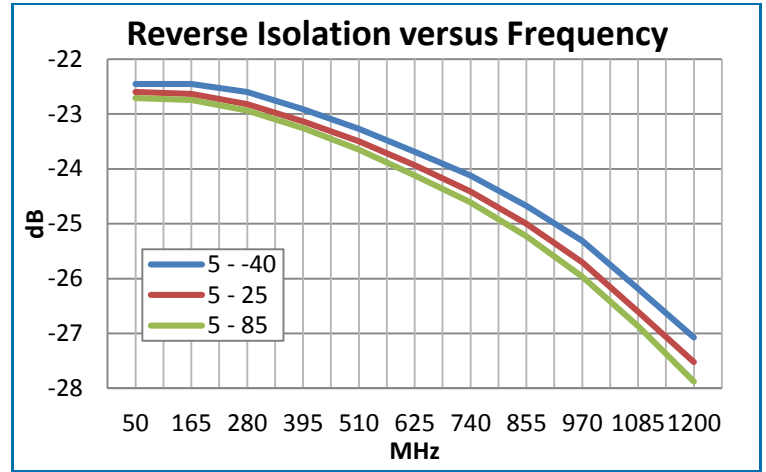
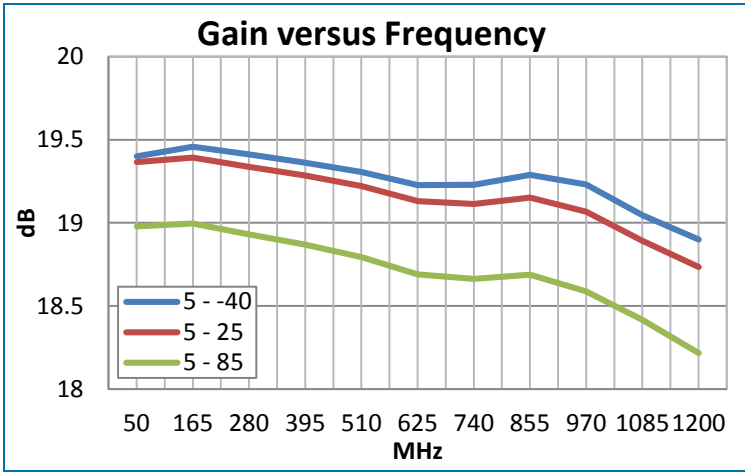
Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute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

Electrical Specifications

Parameter	Specification			Unit	Condition
	Min	Typ	Max		
General Performance					Electrical Specifications, TA=25°C, VDD=+5VDC, 75Ω Zo
Supply Voltage (VDD)	4.5	5	5.5	V	
Device Operating current		277		mA	5V VDD
Operating Frequency	45		1218	MHz	
Small Signal Gain		19.4		dB	50MHz
		19.2		dB	600MHz
		18.7		dB	1200MHz
Gain Flatness		±0.5		dB	
Output IP3		41		dBm	50MHz, 1M spacing 6MHz, POUT = 5dBm per tone
		40		dBm	600MHz
		39		dBm	1200MHz
Output IP2		80		dBm	50MHz, 1M spacing 30MHz, POUT = 0dBm per tone
		67		dBm	600MHz
		67		dBm	1200MHz
Output P1dB		24		dBm	600MHz
Output Return Loss		-19		dB	50MHz
		-16		dB	600MHz
		-15		dB	1200MHz
Input Return Loss		-19		dB	50MHz
		-14		dB	600MHz
		-16		dB	1200MHz
Noise Figure (Balun Insertion Loss Included)		1.8		dB	500MHz
		2.5		dB	1200MHz
CSO		-85		dBc	79 Channel, Flat tilt, +34dBmV/ch
CTB		-77		dBc	79 Channel, Flat tilt, +34dBmV/ch
XMOD		-63		dBc	79 Channel, Flat tilt, +34dBmV/ch
Thermal Resistance		41		°C/W	Reference is measured on the backside of PCB under IC

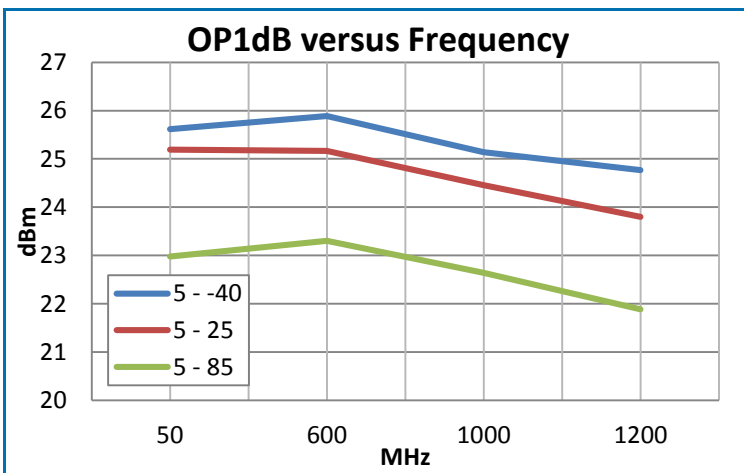
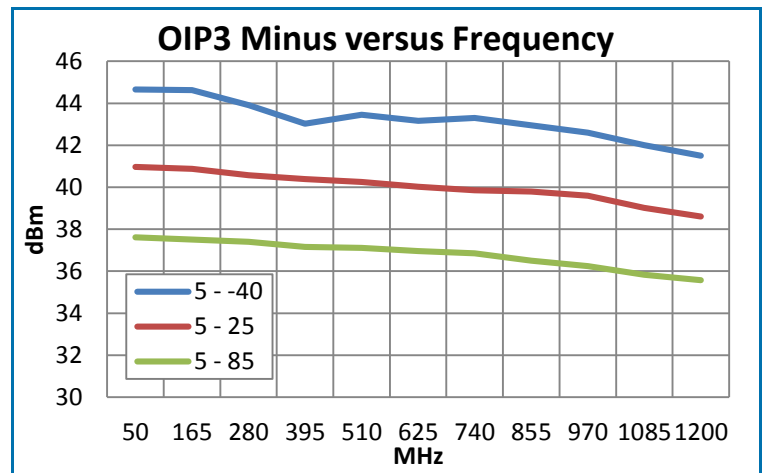
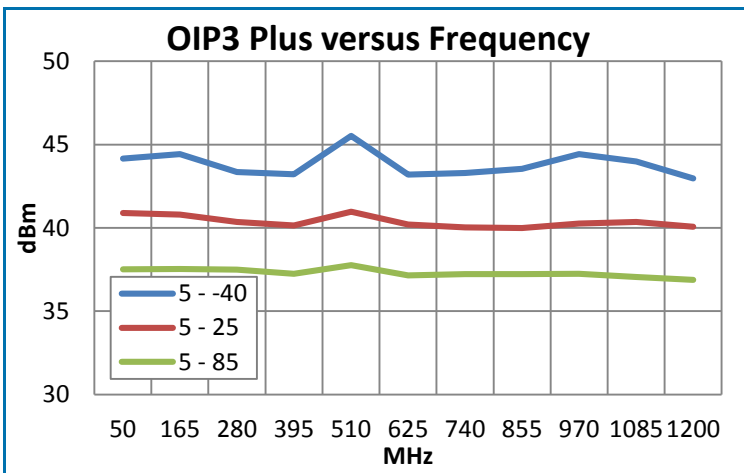
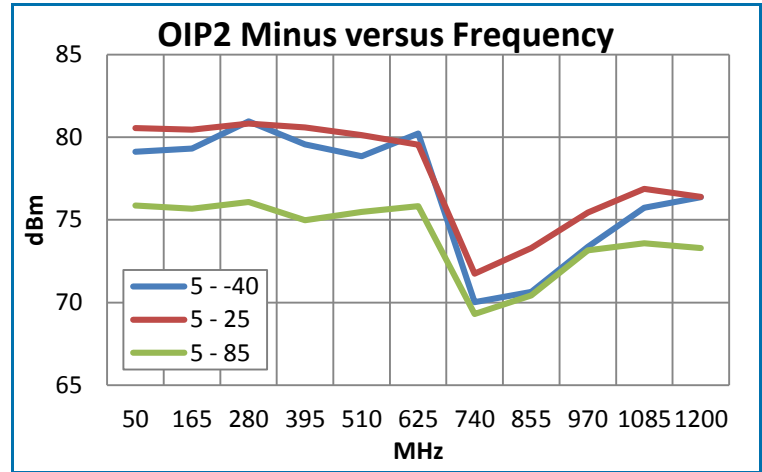
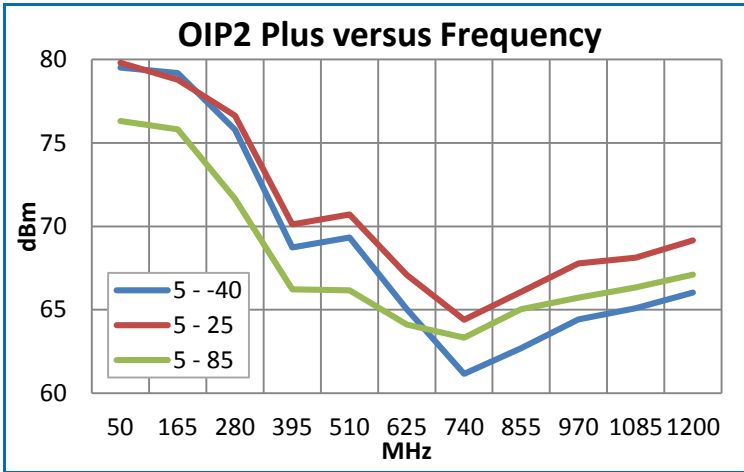
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Typical Performance: T=+25 °C, VDD = +5 V unless otherwise noted



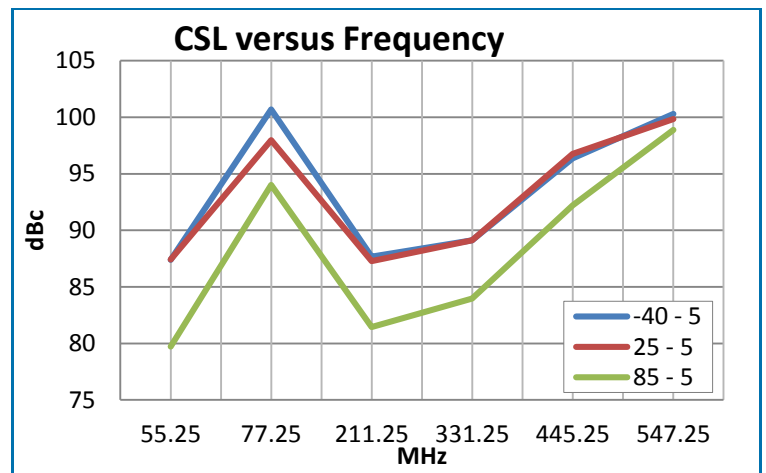
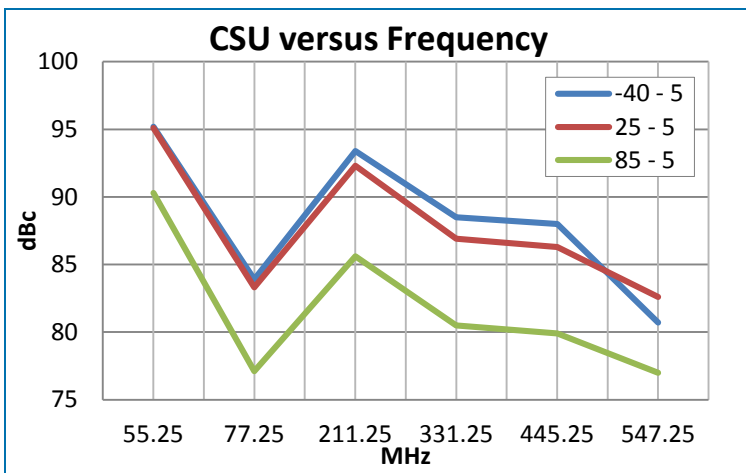
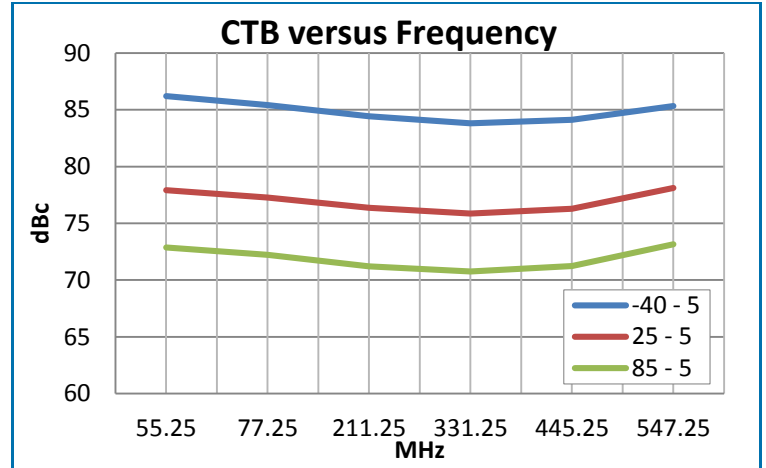
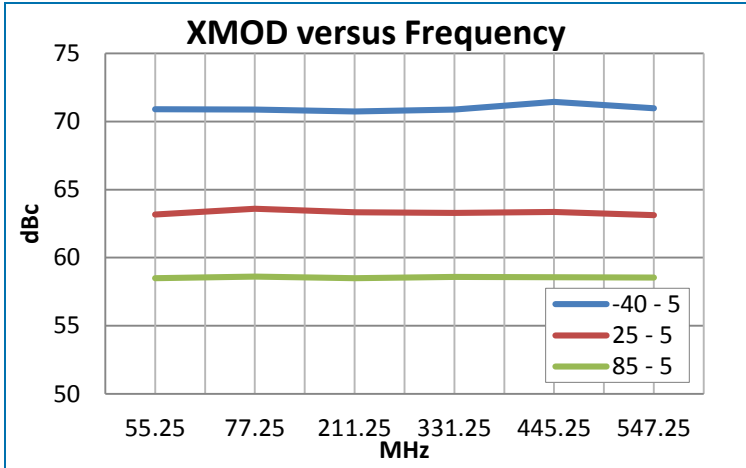
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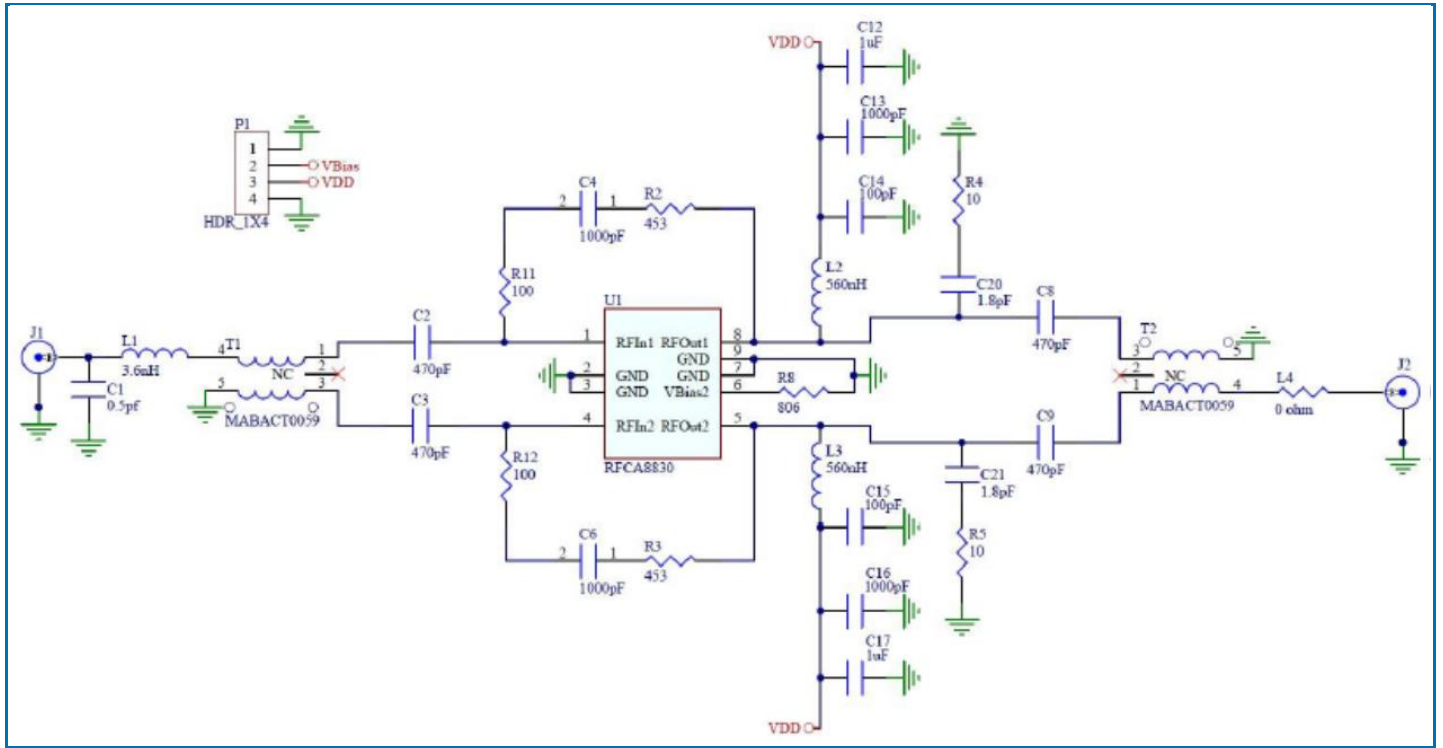
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Typical Performance: T=+25 °C, VDD = +5 V unless otherwise noted;
79 channel, flat tilt, 34dBmV/ch



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Evaluation Board Schematic 45MHz to 1218MHz Application Circuit



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Evaluation Board Bill of Materials (BOM) 45MHz to 1200MHz Application Circuit

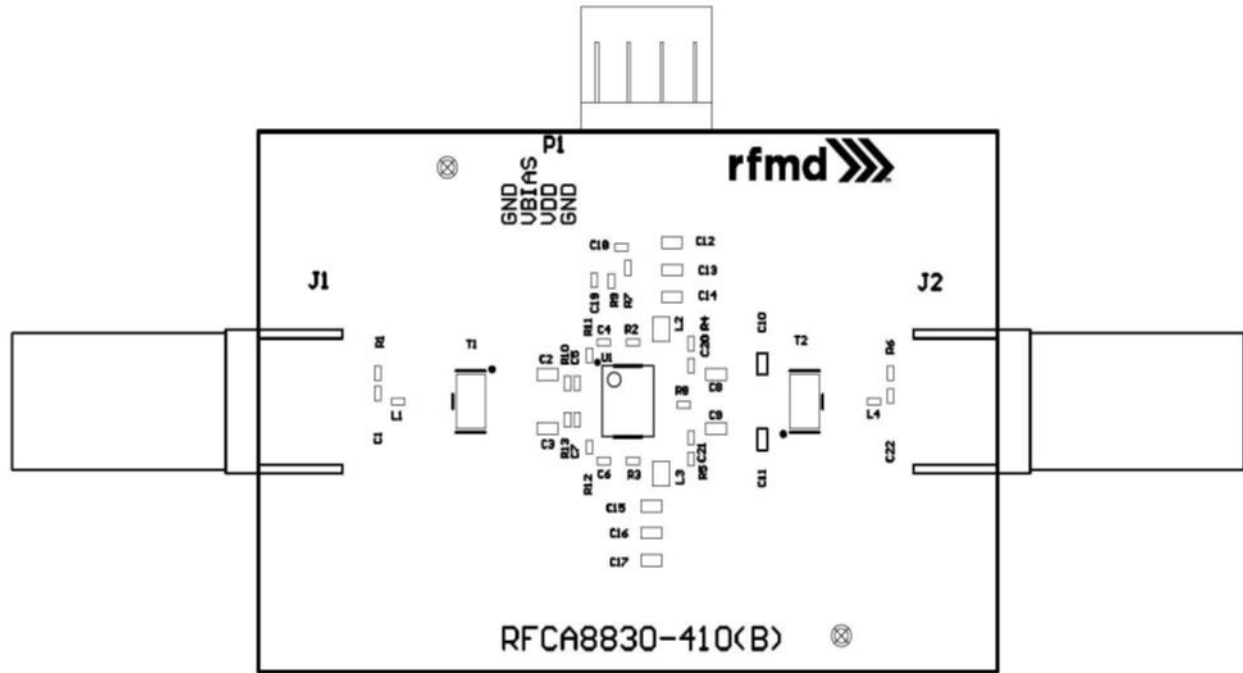
Reference Designator	Description	Manufacturer	Manufacturer's P/N
	RFCA8830-410 Evaluation Board	Marcel Electronics Int'l (MEI)	RFCA8830-410(B)
U1	Balanced PHEMT CATV Amp	RFMD	RFCA8830
C13, C16	CAP, 1000pF, 5%, 50V, COG, 0603	Murata Electronics	GRM1885C1H102JA01D
C4, C6	CAP, 1000pF, 5%, 50V, COG, 0402	Murata Electronics	GRM1555C1H102JA01D
C2-C3, C8-C9	CAP, 470pF, 5%, 50V, COG, 0603	Murata Electronics	GRM1885C1H471JA01D
C1	CAP, 0.5pF, +/-0.25pF, 50V, COG, 0402	Murata Electronics	GRM1555C1HR50CA01D
C20-C21	CAP, 1.8pF, +/-0.1pF, 50V, COG, 0603	Murata Electronics	GRM1885C1H1R8BA01D
C12, C17	CAP, 1µF, 10%, 16V, X7R, 0603	Murata Electronics	GRM188R71C105KA12D
C14-C15	CAP, 100pF, 5%, 50V, COG, 0603	Murata Electronics	GRM1885C1H101JA01D
L2-L3	IND, 560nH, 5%, 550mA, W/W, 0603	Coilcraft, Inc.	0603LS-561XJLB
L1	IND, 3.6nH, +/-0.1nH, T/F, 0402	Murata Electronics	LQP15MN3N6B02D
R2-R3	RES, 453Ω, 1%, 1/10W, 0402	Panasonic Industrial Devices	ERJ-2RKF4530X
R8	RES, 806Ω, 1%, 1/10W, 0402	Panasonic Industrial Devices	ERJ-2RKF8060X
R11-R12	RES, 100Ω, 1%, 1/10W, 0402	Panasonic Industrial Devices	ERJ-6ENF1000
R4-R5	RES, 10Ω, 0402 KAMAYA	Kamaya, Inc	RMC1/16S-100JTH
R1, R9, L4	RES, 0Ω, 0402 KAMAYA	Kamaya, Inc	RMC1/16SJPTH
T1-T2	BALUN, 1:1, 4.5-3000MHz, 75Ω, SMD	M/A-COM Technology Solutions	MABACT0059
P1	CONN, HDR, ST, 4-PIN, 0.100"	SAMTEC INC.	TSW-104-08-S-S
J1-J2	CONN, F FEM EDGE MOUNT, 75Ω, 0.068"	Millimeter Wave , LLC	MW-846-C-DD-75
	HEATSINK BLOCK, 1.5 X 2.0 IN	Shenzhen Minxingda Automation	EEF-105441
S1-S4	SCREW, 2-56 X 3/16", SOCKET HEAD		92196A076
R6-R7, R10, R13, C5, C7, C10-C11, C18-C19, C22	DNP		

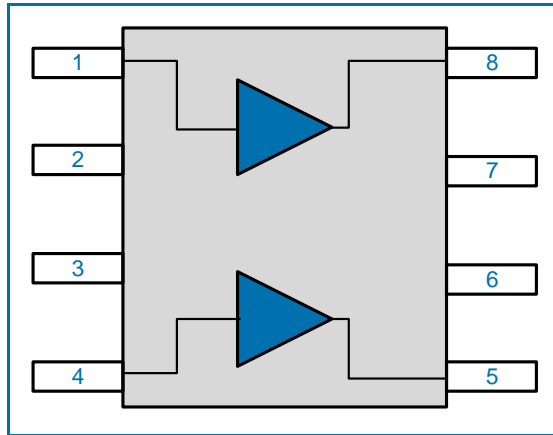
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Evaluation Board Assembly Drawing

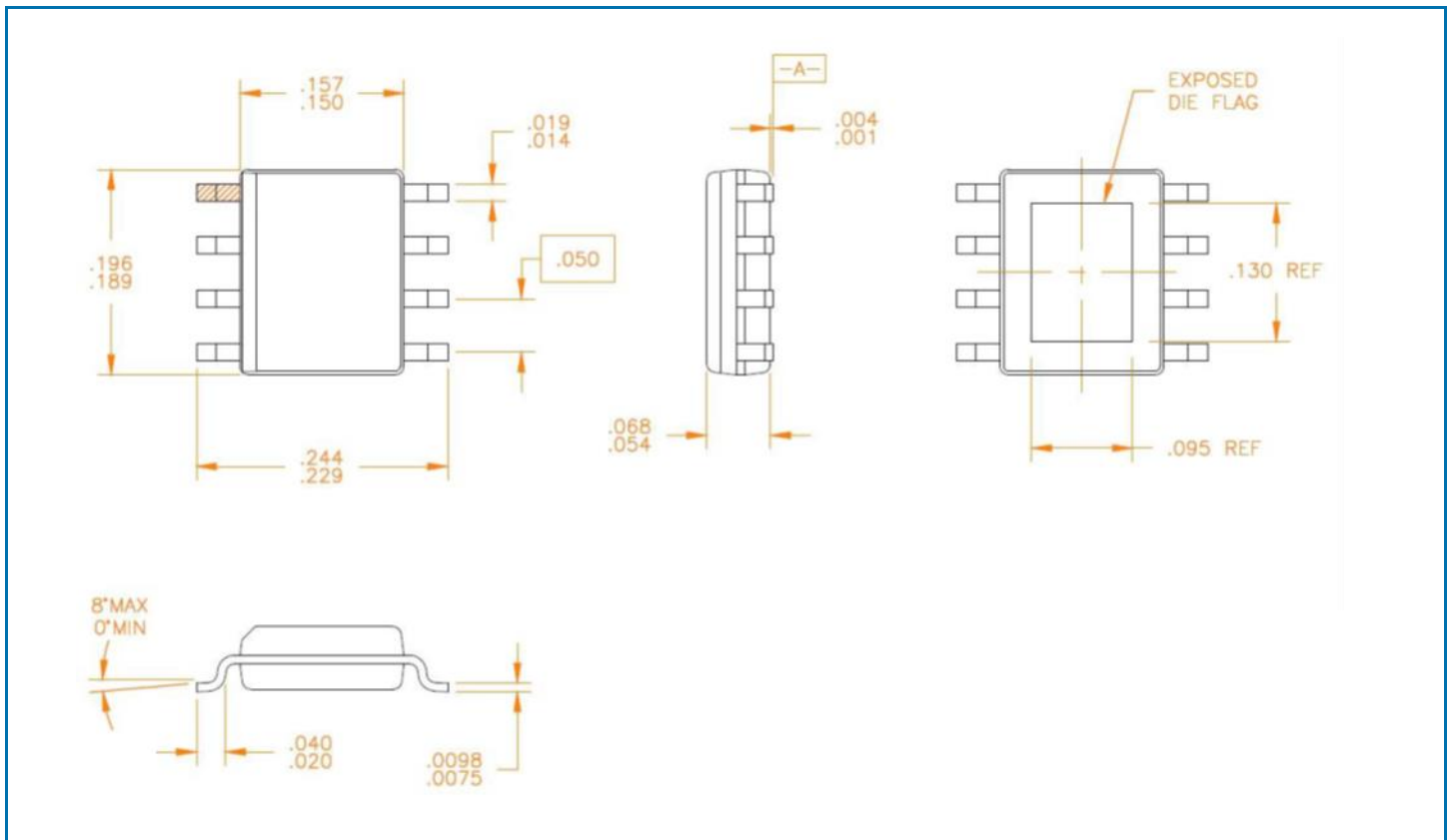


RFMD + TriQuint = Qorvo





Package Outline and Branding Drawing (Dimensions in inches)



RFCA8830

Pin Names and Descriptions

Pin	Name	Description
1	RFIN1	RF input for plus side of amplifier
2	GND	Internally no connected
3	GND	Internally not connected
4	RFIN2	RF input for minus side of amplifier
5	RFOUT2	RF output for minus side of amplifier
6	GND	Internally not connected
7	GND	Internally not connected
8	RFOUT1	RF output for plus side of amplifier
9	GND	Exposed bottom of part, device ground

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

Web: www.rfmd.com **Tel:** 1-844-890-8163
Email: customer.support@qorvo.com

For information about the merger of RFMD and TriQuint as Qorvo:

Web: www.qorvo.com

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