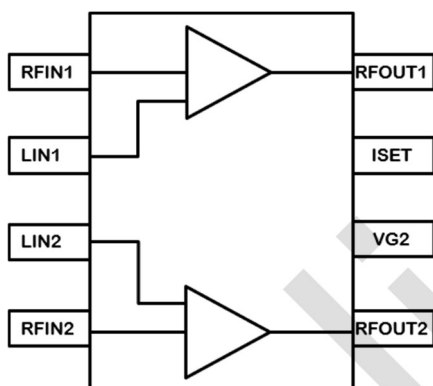


Product Overview

The QPL8834 is an ultra-linear GaAs pHEMT 75-Ohm RF balanced amplifier IC with 5 MHz to 1218 MHz operating bandwidth, featuring high linearity, high gain and low noise for use as Post Amplifier in Optical Receivers or as a low noise balanced preamp. This IC uses a 5V supply for applications requiring lower power dissipation. Due to its wide operational bandwidth, the QPL8834 can be used as a downstream amp in DOCSIS 3.1 as well as an upstream amplifier for DOCSIS 3.1 or DOCSIS 4.0 applications.

Functional Block Diagram



8-Pin SOIC Package

Key Features

- Gain: 12 dB @ 1218 MHz
- Bandwidth: 5 – 1218 MHz
- OIP3: +42 dBm
- OP1dB: 24 dBm
- Low Noise Figure: 4 dB
- Excellent Composite Distortion
- pHEMT GaAs device technologies
- Compact Size: 8-pin SOIC
- Power Consumption (5 V, 280 mA, 1.4 W)

Applications

- DOCSIS 3.1 Systems
- Balanced Antenna Applications
- HFC Optical Nodes
- 75-Ohm amplifiers
- Upstream amplifier for DOCSIS 3.1 and DOCSIS 4.0 Applications.

Ordering Information

Part Number	Description
QPL8834SB	Sample bag with 5 pieces
QPL8834SR	7" Reel with 100 pieces
QPL8834TR13	13" Reel with 2500 pieces
QPL8834PCK-01	47 – 1218 MHz PCBA

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage (V_{DD})	+ 8 V
Supply Current (I_{DD})	400 mA
Maximum Input Level (single tone)	+ 15 dBm
Operating Temperature Range	– 40 to + 85 °C
Storage Temperature Range	– 40 to +150 °C
Maximum Junction Temperature	+ 150 °C

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.

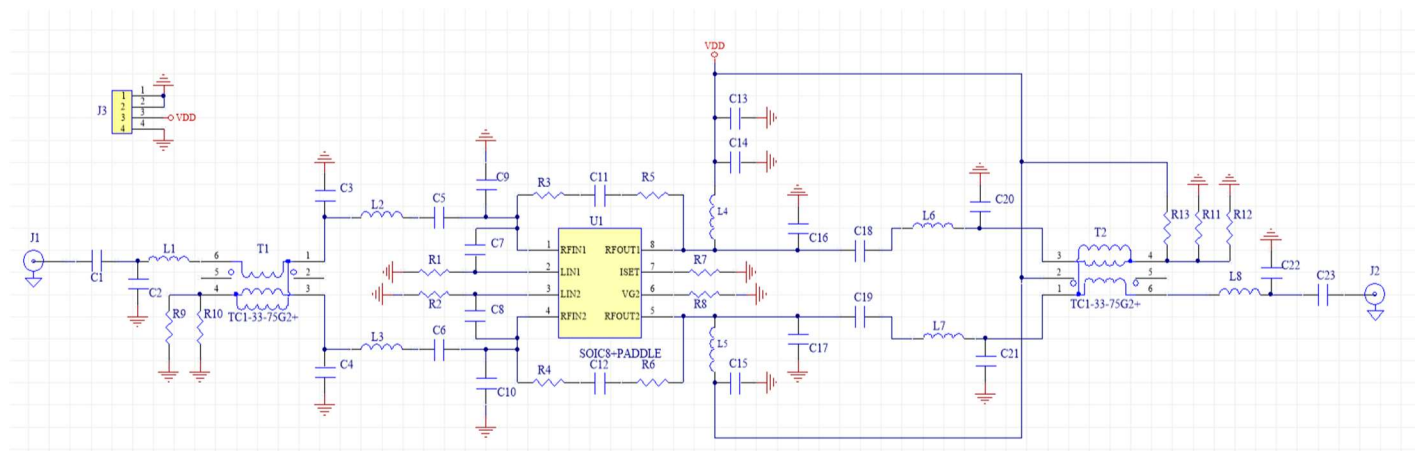
Electrical Specifications

Parameter	Condition ⁽¹⁾	Min	Typ	Max	Unit
Supply Voltage (V_{DD})			5		V
Supply Current (I_{DD})	V_{DD} total current		280		mA
Frequency Range		5		1218	MHz
Gain	5–1218 MHz		12		dB
Gain Flatness			± 0.5		dB
Input Return Loss			18		dB
Output Return Loss			18		dB
Noise Figure			4		dB
CSO	80 NTSC + 111 QAM, flat tilt, 42 dBmV / Ch Output at 1218MHz		-73		dBc
CTB			-72		dBc
CCN			62		dB
OIP2	13 dBm / tone, $\Delta f = 50$ MHz, Full Band		67		dBm
OIP3	13 dBm / tone, $\Delta f = 6$ MHz, Full Band		42		dBm
Output P1dB	Full Band		24		dBm
Thermal Resistance			13		°C/W

Notes:

1. Typical performance at these conditions: Temp = + 25 °C, V_{DD} = + 5 V, 75 Ω system, Full band unless otherwise noted

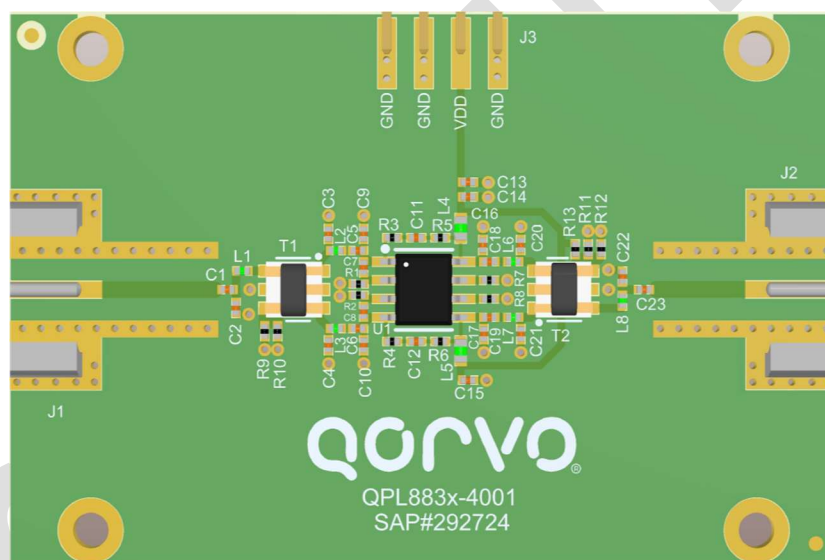
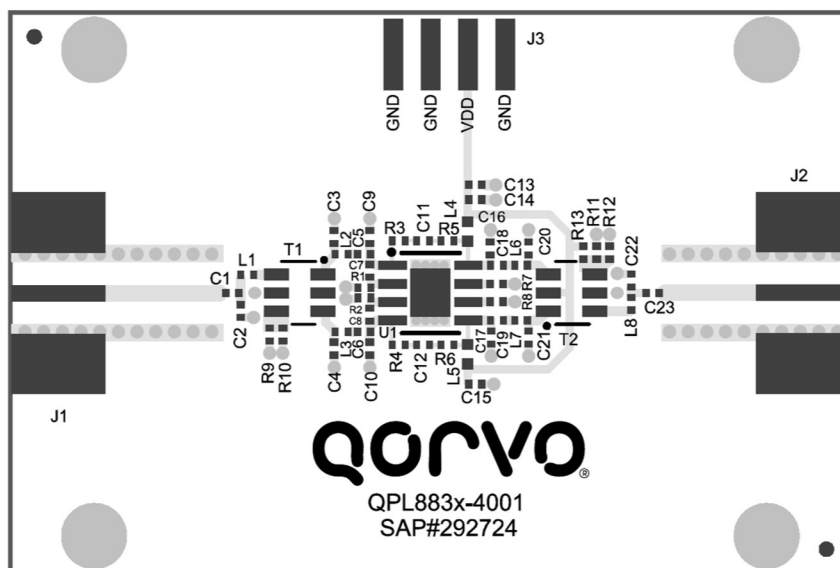
Evaluation Board Schematic



Evaluation Board Bill of Materials

Reference Designator	Description	Manufacturer	Manufacturer PN
U1	1218 MHz, 12 dB Push-Pull Amp	Qorvo	QPL8834SB
PCB	EVB PCB, QPL8834	Qorvo	QPL883x-4001
C1, C5, C6, C7, C8, C11, C12, C13, C14, C15, C23	CAP, 0.01uF, 5 %, 50 V, COG, 0402	Murata	GCM155R71H103KA55D
C3, C4	CAP, 0.3 pF, 0402	Murata	GRM615COG0R3B50K500
C18, C19	CAP, 270 pF, 5 %, 0402	Murata	GCM1555C1H271JA16D
C22	CAP, 0.5pF, 0402	Murata	GJM1555C1HR50WB01D
R5, R6, R9, R11	RES, 0 Ω , 0402	Kamaya	RMC1/16SJPTH
R7	RES, 2.2 K Ω , 5 %, 1/16 W, 0402	Kamaya	RMC1/16S-222JTH
R8	RES, 6.8 K Ω , 5 %, 1/16 W, 0402	Kamaya	RMC1/16S-682JTH
R3, R4	RES, 330 Ω , 5 %, 1/16 W, 0402	Kamaya	RMC1/16S-331JTH
R1, R2	FER BEAD, 1.8K, 200mA, 0402	TDK	MMZ1005A182ET000
L4, L5	IND, 560nH, 5 %, 0603	Coilcraft	0603LS-561XJLB
L2, L3	RES, 4.7 Ω , 0402	Kamaya	RMC1/16S-4R7JTH
L1, L6, L7	RES, 0 Ω , 0402	Kamaya	RMC1/16SJPTH
L8	IND, 2.7nH, 0402	Murata	LQG15HS2N7S02D
T1, T2	TRANSFORMER, 1:1	MiniCircuits	TC1-33-75G2+
J3	CONN, HDR	Samtec	TSW-103-07-G-S
J1, J2	CONN, F FEM, 750 Ω	MillimeterWave	MW-846-C-DD-75
C2, C9, C10, C16, C17, C20, C21, C22, R10, R12, R13	DNP		

Typical Application Schematic



EVB PCB Material and Stack-up

Board Material: 59.8mil FR4, $\epsilon_r=4.2$

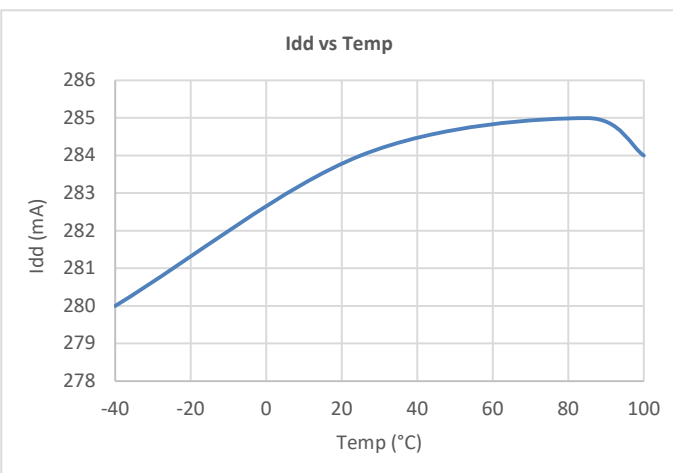
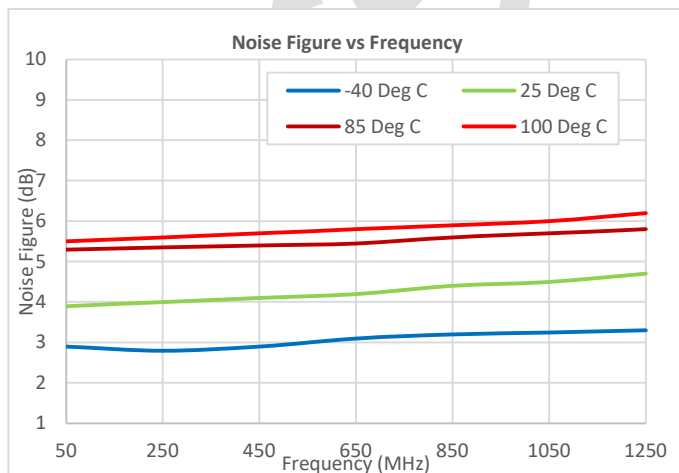
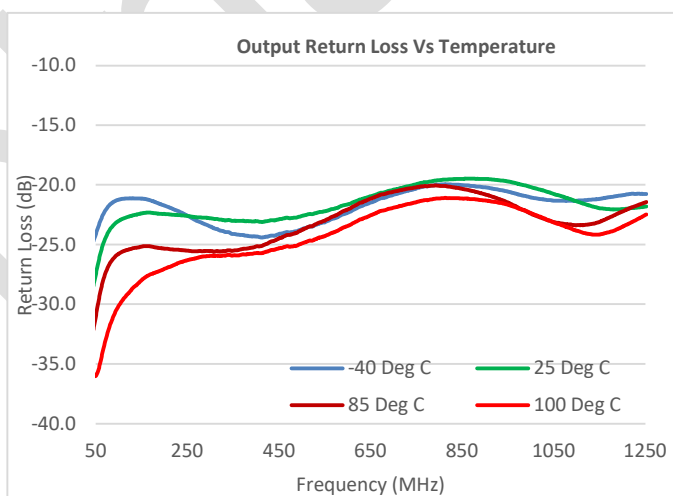
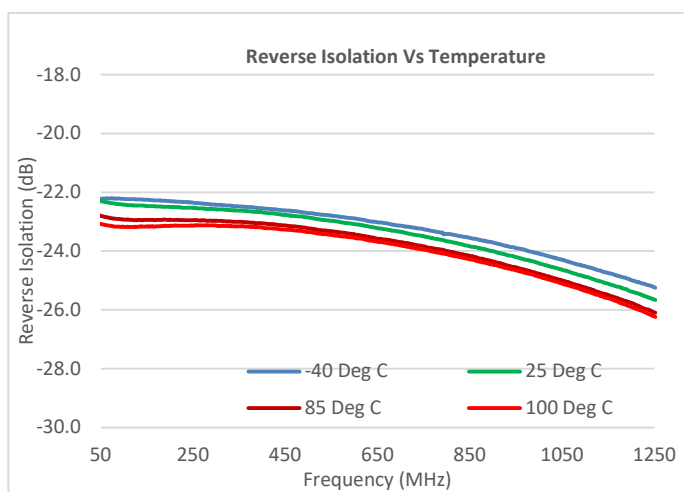
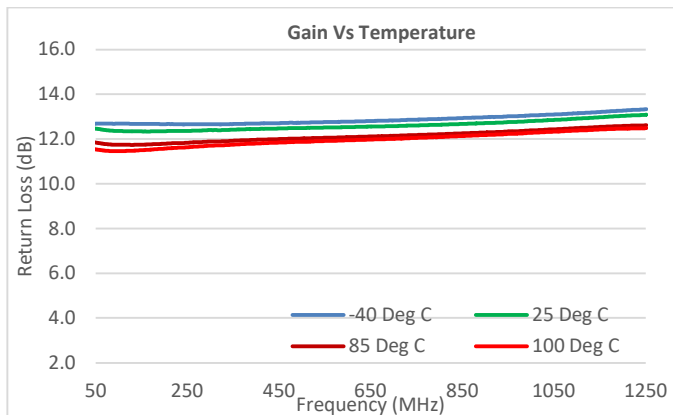
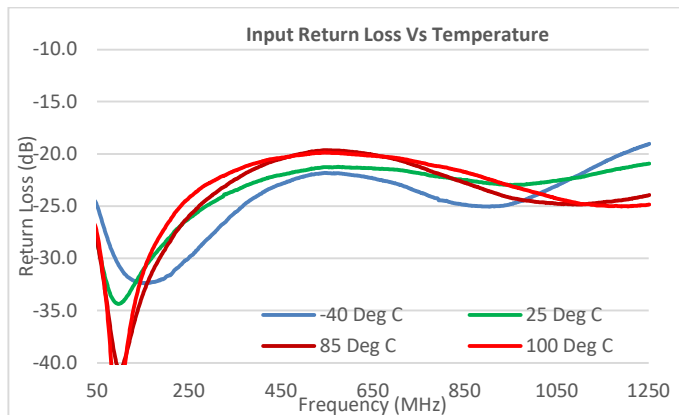
Plating: 1oz Copper

Board Dimension: 2.250" x 1.500"

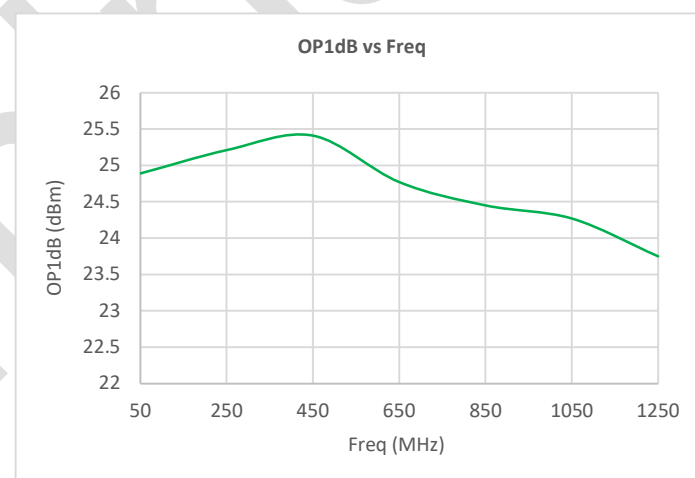
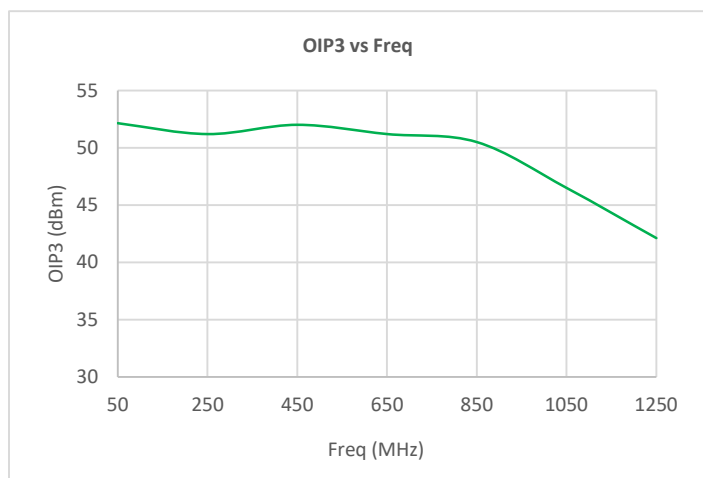
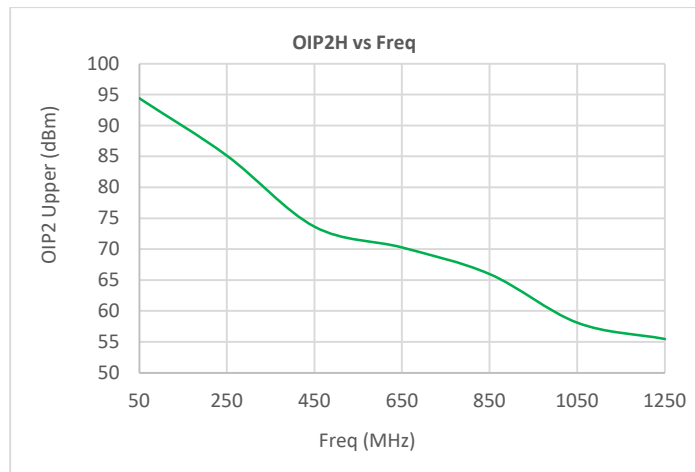
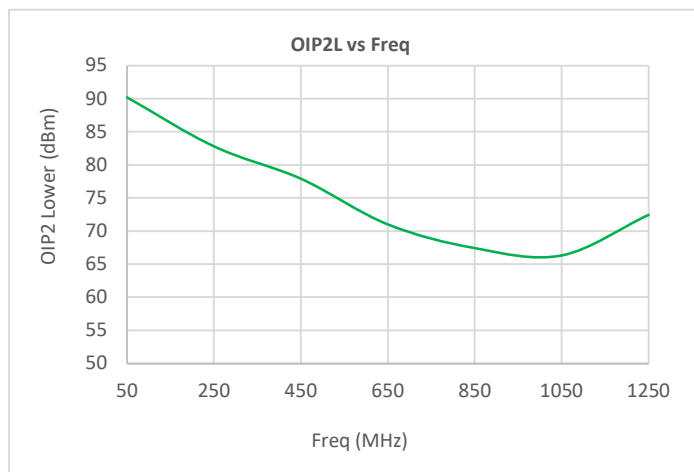
Layer	Name	Material	Thickness	Constant	Board Layer Stack
	Top Overlay				
	Top Solder	SM-001	0.40mil	3.5	
1	Top Layer	Copper	0.70mil		
	Dielectric 1	FR4	58.00mil	4.2	
2	Bottom Layer	Copper	0.70mil		

Total Thickness: 59.8mil

Performance Data at +5V for Downstream (50-1218MHz), 75 Ω



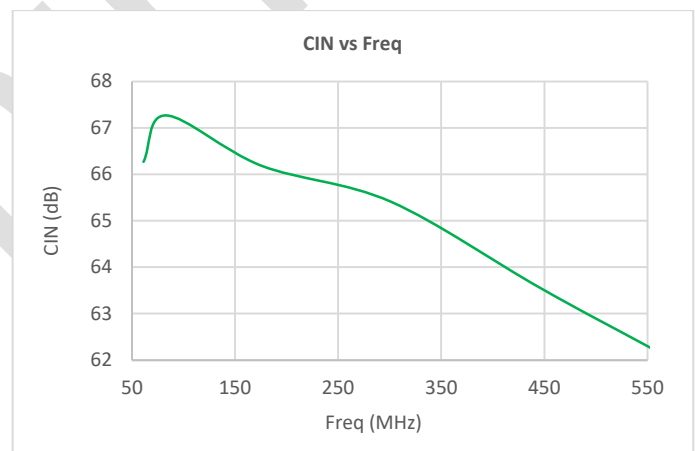
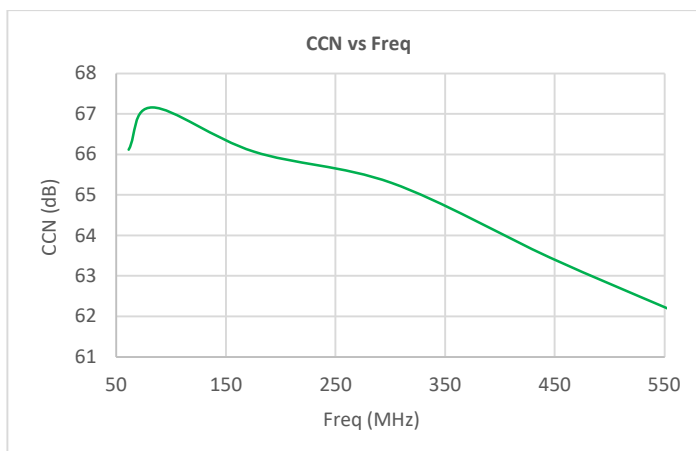
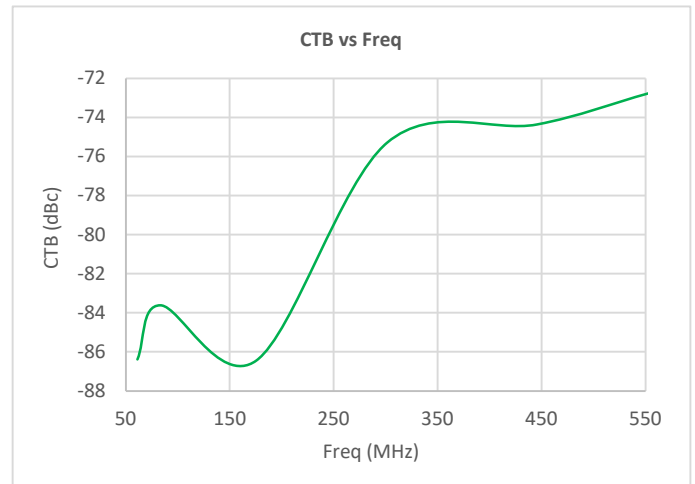
Performance Data at +5V, 25°C for Downstream (50-1218MHz), 75 Ω



Notes:

1. OIP2: 13dBm / tone output, $\Delta f = 50$ MHz, Full Band.
2. OIP3: 13dBm / tone output, $\Delta f = 6$ MHz, Full Band
3. Temp = +25°C, VDD = +5V, 75 Ω system.

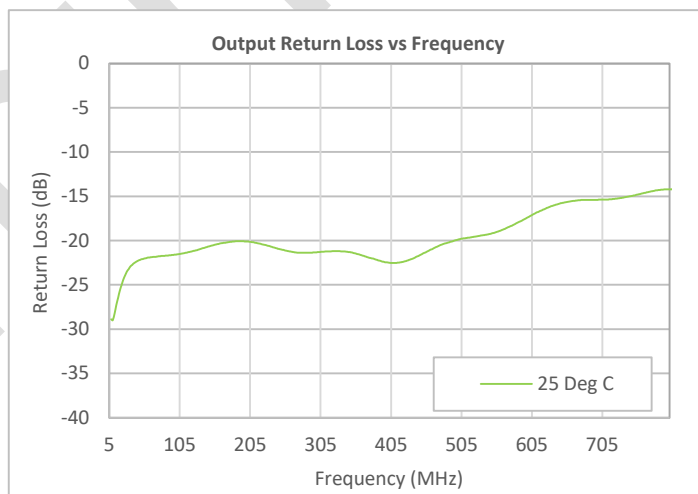
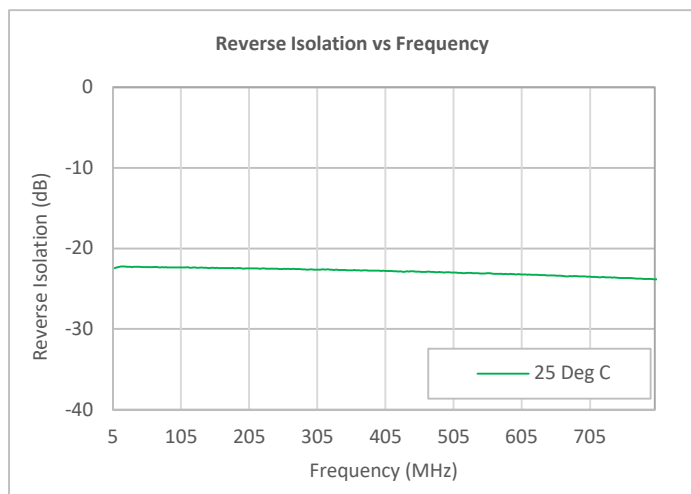
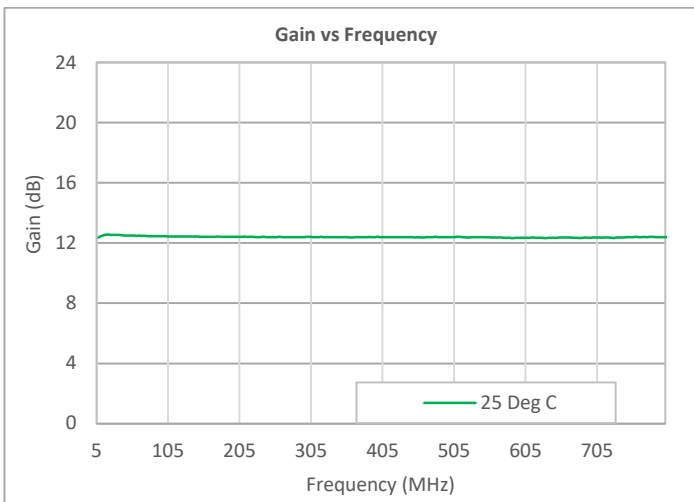
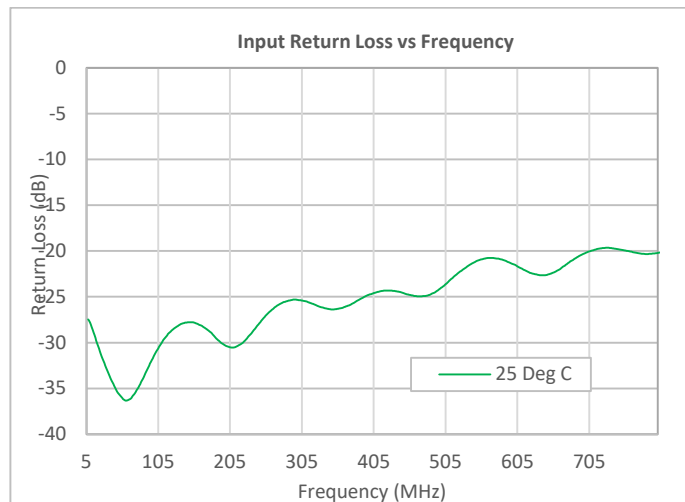
Performance Data at +5 V, 25°C for Downstream (50-1218MHz), 75 Ω



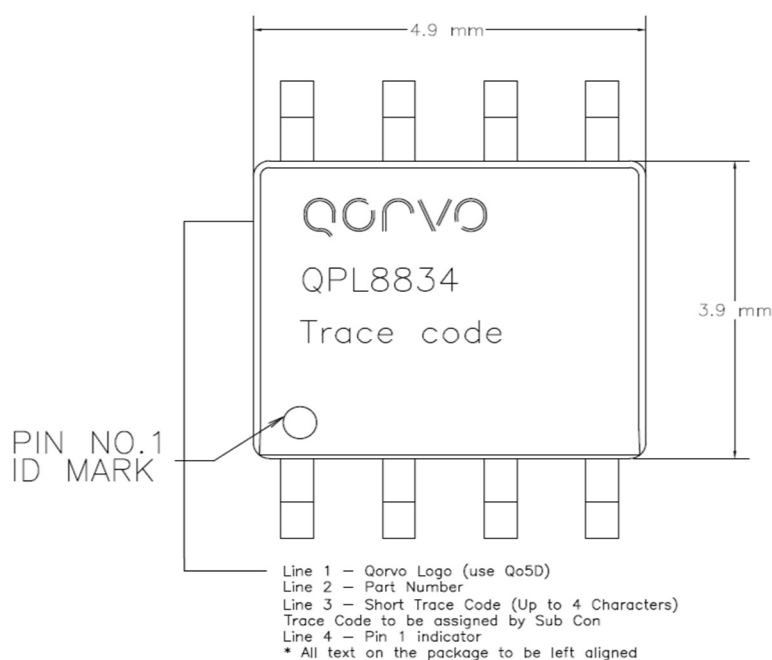
Notes:

1. 80 NTSC + 111 QAM, Flat Tilt, 42dBmV / Ch, Output at 1218MHz.
2. Temp = +25°C, VDD = +5V, 75 Ω system.

Performance Data at +5 V, 25°C for Upstream (5 – 700 MHz), 75 Ω



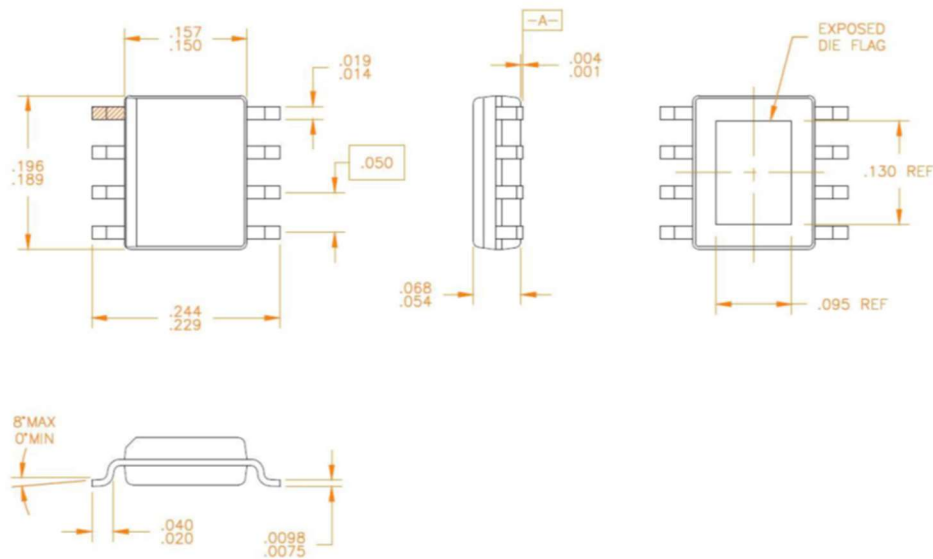
Package Marking



Pin Configuration and Description

Pin	Name	Description
1	RFIN1	RF input for plus side of amplifier
2	LIN1	Linearizer Current Set
3	LIN2	Linearizer Current Set
4	RFIN2	RF input for minus side of amplifier
5	RFOUT1	RF output for plus side of amplifier
6	ISSET	IDD Set
7	VG2	VG2 Adjust
8	RFOUT2	RF output for minus side of amplifier
9	GND	Exposed bottom of part, device ground

Package Outline

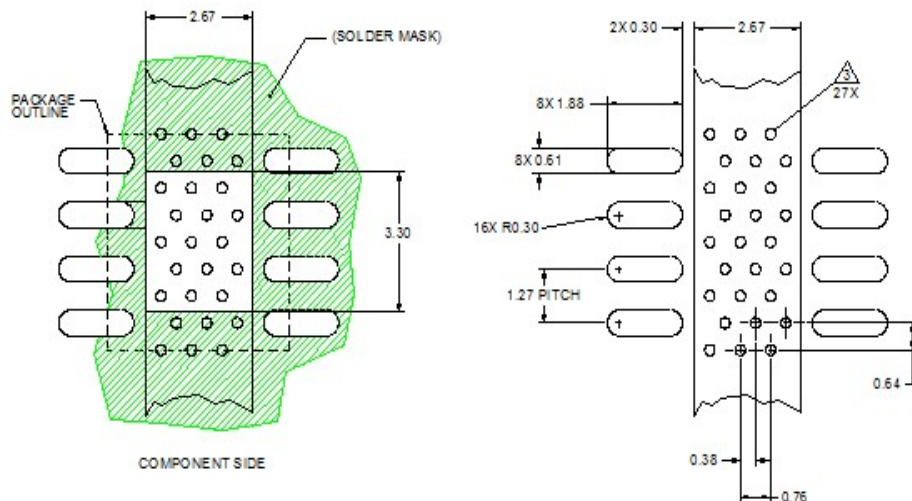


1. All dimensions are in inches. Angles are in degrees.

Notes:

1. All Dimensions are in inches.
2. Angles are in degrees.

Recommended Mounting Pattern



Notes: All dimensions are in millimeters. Angles are in degrees.

1. Use 1 oz. copper minimum for top and bottom layer metal.
2. Vias are required under the backside paddle for proper RF/DC grounding and thermal dissipation.
3. Recommend a 0.35 mm diameter bit for drilling via holes and a final plated thru diameter of 0.25 mm.

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1B	ESDA/JEDEC JS-001
ESD – Charged Device Model (CDM)	Class C3	ESDA/JEDEC JS-002
MSL – Moisture Sensitivity Level	Level 3	IPC/JEDEC J-STD-020



Caution!
ESD-Sensitive Device

Solderability

Compatible with both lead-free (260 °C max. reflow temp.) and tin/lead (245 °C max. reflow temp.) soldering processes. Solder profiles available upon request.

Contact plating: NiPdAu

RoHS Compliance

This part is compliant with 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment) as amended by Directive 2015/863/EU.

This product also has the following attributes:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A (C₁₅H₁₂Br₄O₂) Free
- PFOS Free
- SVHC Free



Contact Information

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

Tel: 1-844-890-8163

Web: www.qorvo.com

Email: customer.support@qorvo.com

Important Notice

The information contained herein is believed to be reliable; however, Qorvo makes no warranties regarding the information contained herein and assumes no responsibility or liability whatsoever for the use of the information contained herein. All information contained herein is subject to change without notice. Customers should obtain and verify the latest relevant information before placing orders for Qorvo products. The information contained herein or any use of such information does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other intellectual property rights, whether with regard to such information itself or anything described by such information. **THIS INFORMATION DOES NOT CONSTITUTE A WARRANTY WITH RESPECT TO THE PRODUCTS DESCRIBED HEREIN, AND QORVO HEREBY DISCLAIMS ANY AND ALL WARRANTIES WITH RESPECT TO SUCH PRODUCTS WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

Without limiting the generality of the foregoing, Qorvo products are not warranted or authorized for use as critical components in medical, life-saving, or life-sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death.

Copyright 2019 © Qorvo, Inc. | Qorvo is a registered trademark of Qorvo, Inc.