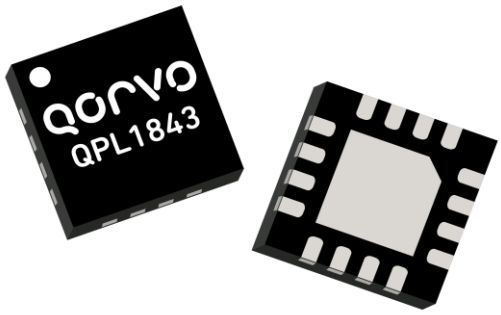
QPL1843

75 Ω 11 dB CATV Amplifier 50 – 1800 MHz

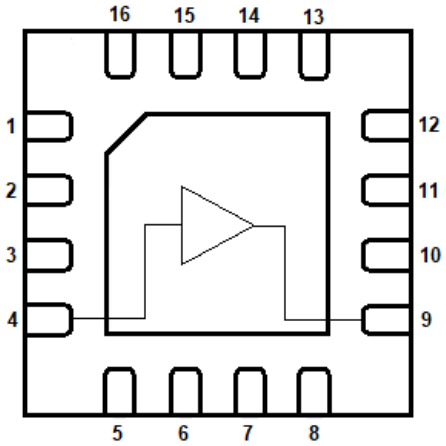
Product Overview

The QPL1843 is a GaAs pHEMT single ended RF amplifier IC featuring 11dB of gain and low noise. The balance of low noise and distortion provides an ideal solution for a wide range of broadband amplifiers used in Cable TV applications such as Optical Receivers and low noise front ends. QPL1843 is packaged in a 3x3 16-Pin QFN package for convenient layout and design in set top and infrastructure projects for 75 Ω CATV and satellite applications.



3 X 3 16-pin QFN

Functional Block Diagram



Key Features

- 50 MHz to 1800 MHz Operation
- 6 V Single Power Supply
- Gain: 11 dB Typical
- Noise Figure: 3.5 dB
- Convenient 16 Pin QFN Package
- RoHS Compliant

Ordering Information

Part Number	Description
QPL1843SB	Sample bag with 5 pieces
QPL1843SR	7" Reel with 100 pieces
QPL1843TR7	7" Reel with 2500 pieces
QPL1843EVB-01	Evaluation Board

Applications

- FTTH GPON and GEPON
- DOCSIS 4.0
- Head End CMTS Equipment
- Optical Node
- Satellite Low Noise Amplifier
- Cable Modem and Set Top Box
- Single Ended Gain Block

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage (V_{DD})	+8 V
Supply Current (I_{DD})	170 mA
Maximum Input Level	60 dBmV
Operating Temperature Range	-40 to +100 °C
Storage Temperature Range	−65 to +150 °C
Maximum Junction Temperature	+150 °C

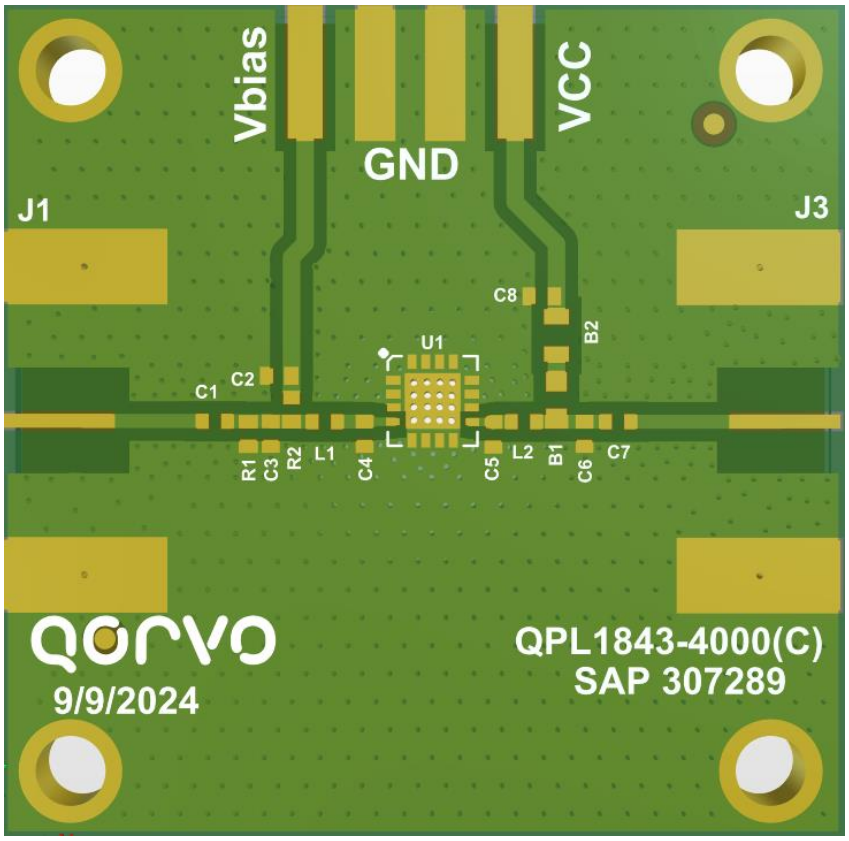
Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application o
Absolute Maximum Rating conditions to the device may reduce device reliability.

Electrical Specifications at 6 V

Parameter	Condition (1)	Min	Typ	Max	Unit
Supply Voltage (V_{DD})			6		V
Supply Current (I_{DD})			130		mA
Frequency Range		50		1800	MHz
Gain			11		dB
Gain Flatness			±1		dB
Reverse Isolation			16.5		dB
Input Return Loss			16		dB
Output Return Loss			16		dB
Noise Figure	50MHz 1800MHz		3.5 3		dB dB
CCN	+54dBmV Total Composite Output Power +55dBmV Total Composite Output Power 258MHz to 1791MHz SC-QAM, 0dB tilt, 6dBstep down @ 1023MHz		51 48		dB dB
OIP2 (Lower)	0 dBm / tone output		65		dBm
OIP2 (Upper)	0 dBm / tone output		55		dBm
OIP3	0 dBm / tone output		36		dBm
OP1dB			19.5		dBm
Thermal Resistance (2)	Θ_{JC}		46		˚C/W

Notes: 1. Typical performance at these conditions: Temp = +25 °C, V_{DD} = +6 V, 75 Ω system, Full band unless otherwise noted
2. Includes PCB Thermal Resistance measured on the backside of PCB under IC

Evaluation Board Assembly Drawing



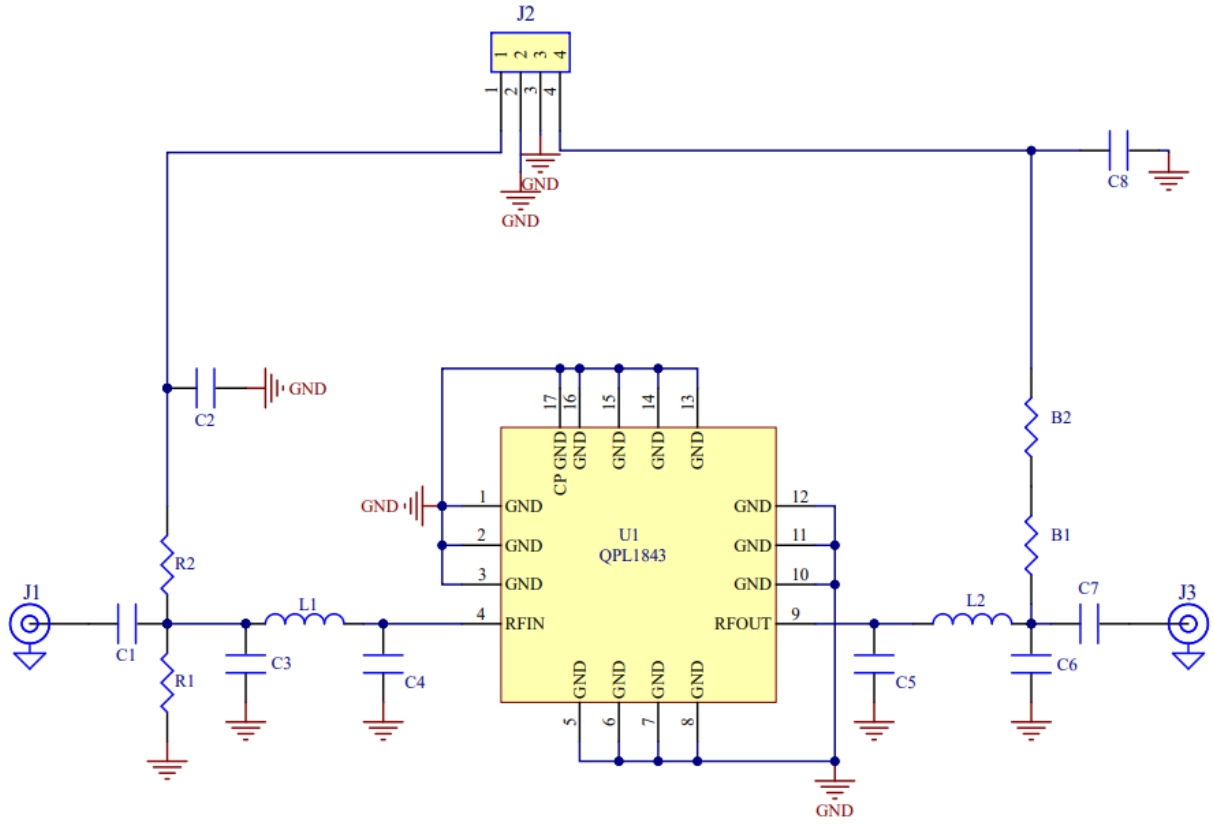
LAYER STACK LEGEND

Material	Layer	Thickness	Dielectric Material	Type
	Top Overlay			Legend
Surface Material	Top Solder	0.0004in	Solder Resist	Solder Mask
Copper	**Top Layer**	**0.0014in**		**Signal**
Core	FR4 408HR	*0.0580in*	*FR408HR*	*Dielectric*
Copper	**Bottom Layer**	**0.0014in**		**Signal**
Surface Material	Bottom Solder	0.0004in	Solder Resist	Solder Mask
	Bottom Overlay			Legend

Finished board thickness: 0.0608in

Note: Please see QPL1843-4000 Rev. C document for further PCB layer details.

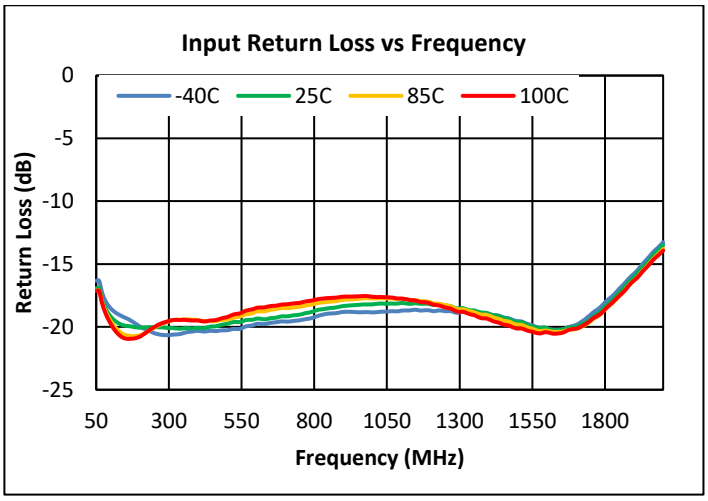
Evaluation Board Schematic 50 MHz – 1800 MHz

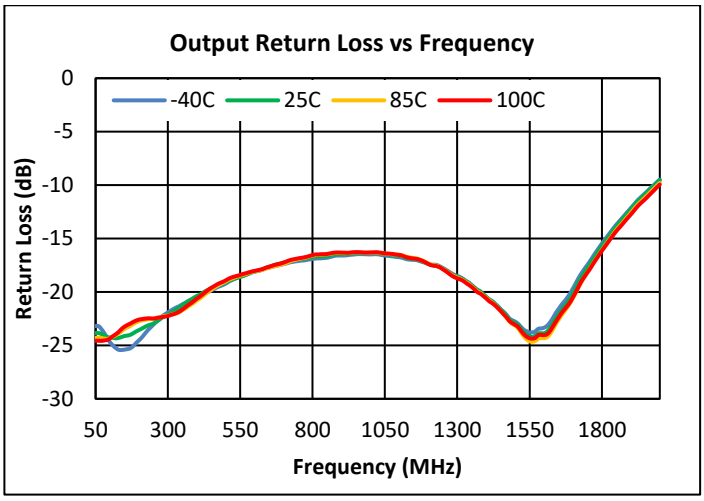


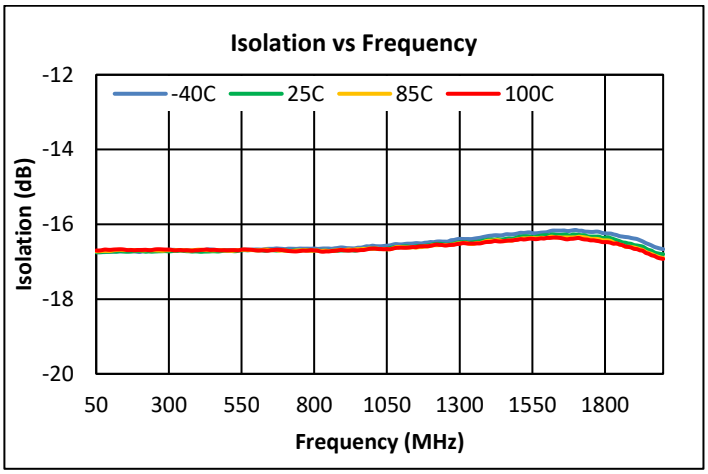
Evaluation Board Bill of Materials

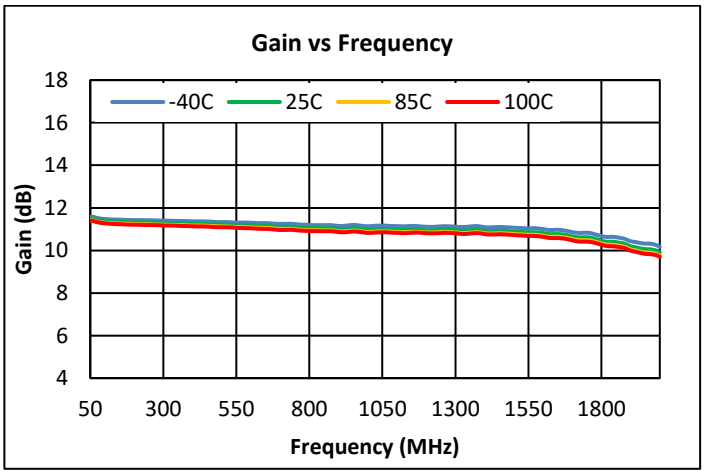
Ref Des.	Description	Mfg Name	Mfg Part #
PCB	PCB, QPL1843	Qorvo	QPL1843-4000(C)
U1	CATV DOCSIS 4.0 LNA, 5V, 1.8GHz, 75-ohm	Qorvo	QPL1843
C1, C8	CAP, 1000pF, 5%, 50V, C0G, 0402	Murata	GRM1555C1H102JA01D
C3	CAP, 0.4pF, +/-0.05pF, 50V, HI-Q, 0402	Murata	GJM1555C1HR40WB01D
C5	CAP, 0.1pF, +/-0.05pF, 50V C0G, 0402	Murata	GJM1555C1HR10WB01D
C6	CAP, 0.9pF, +/-0.25pF, 50V, HI-Q, 0402	Murata	GJM1555C1HR90CB01D
C7	CAP, 220pF, 5%, 50V C0G, 0402	Murata	GCM1555C1H221JA16D
L1	IND, 3.6nH, +/-0.3nH, M/L, 0402	Murata	LQG15HN3N6S02D
L2	IND, 4.7nH, +/-0.1nH, T/F, 0402	Murata	LQG15HN4N7B02D
B1	FER, BEAD, 1500 OHM, 500mA, 0603	Murata	BLM18HE152SN1D
B2	RES, 0 OHM, 0402	Kamaya, Inc	RMC1/16SJPTH
J2	CONN, 4-PIN, 0.100"	Samtec	TSW-104-07-G-S
J1, J3	CONN, F FEM EDGE MOUNT, 75 OHMS, 0.068"	Millimeter Wave	MW-846-C-DD-75
R1, R2, C2, C4	NOT POPULATED ITEM		

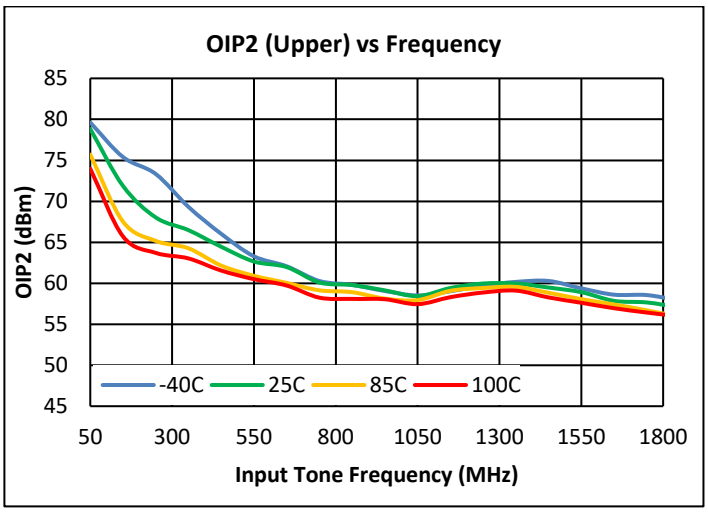
Performance Data at 6 V

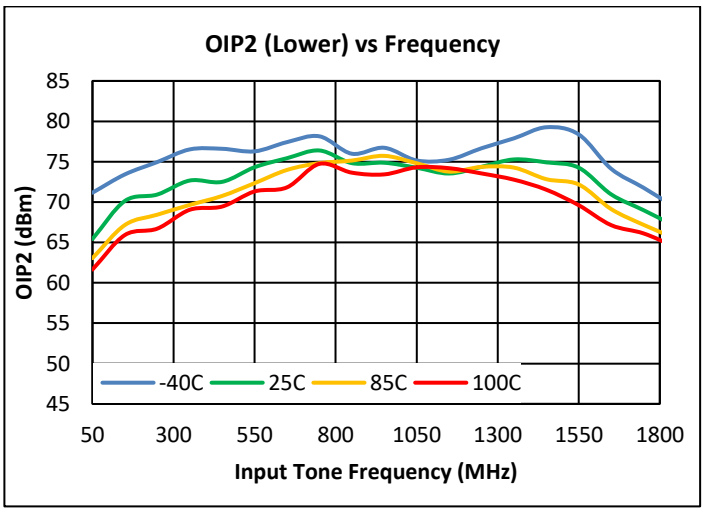






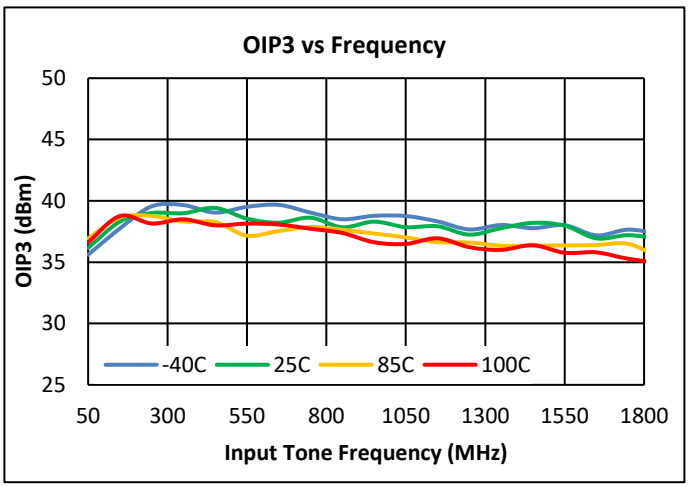


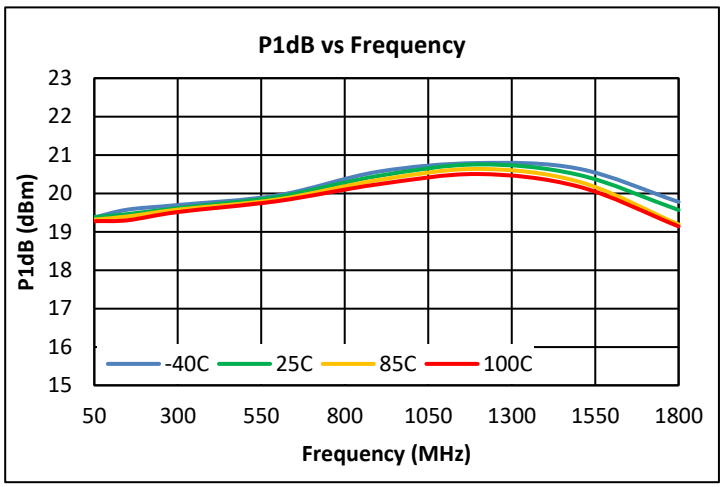


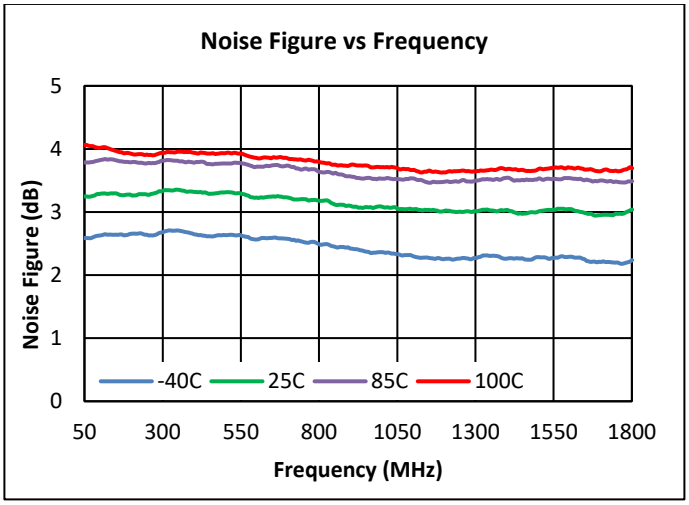


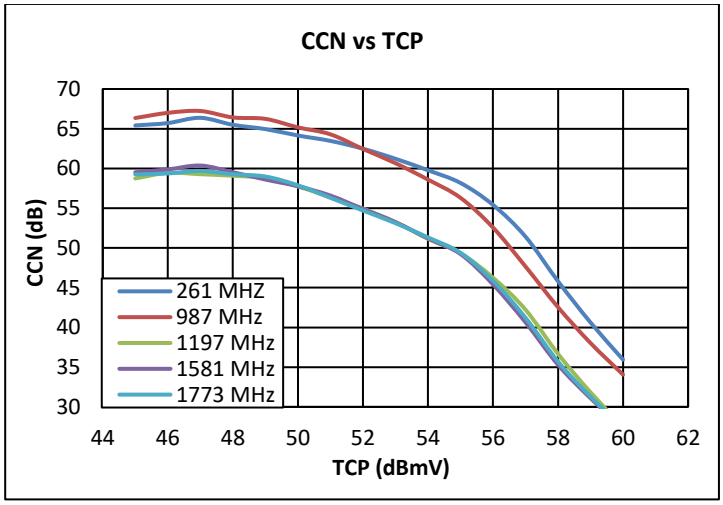
Notes: (1) OIP2: 0dBm/tone output

Performance Data at 6 V







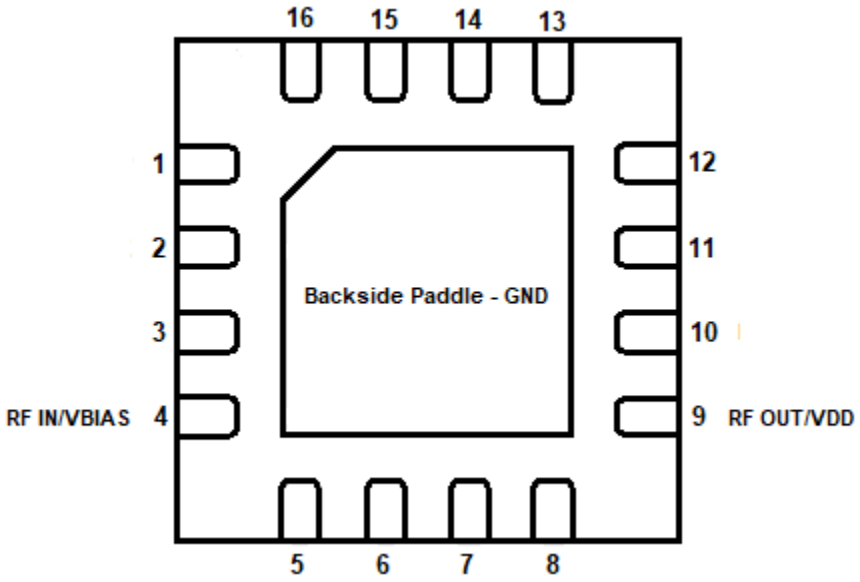


Notes:

(1) OIP3: 0 dBm / tone output

(2) CCN Test Conditions: 258MHz to 1791MHz SC-QAM, 0dB tilt, 6dB step down @ 1023MHz

Pin Configuration and Description

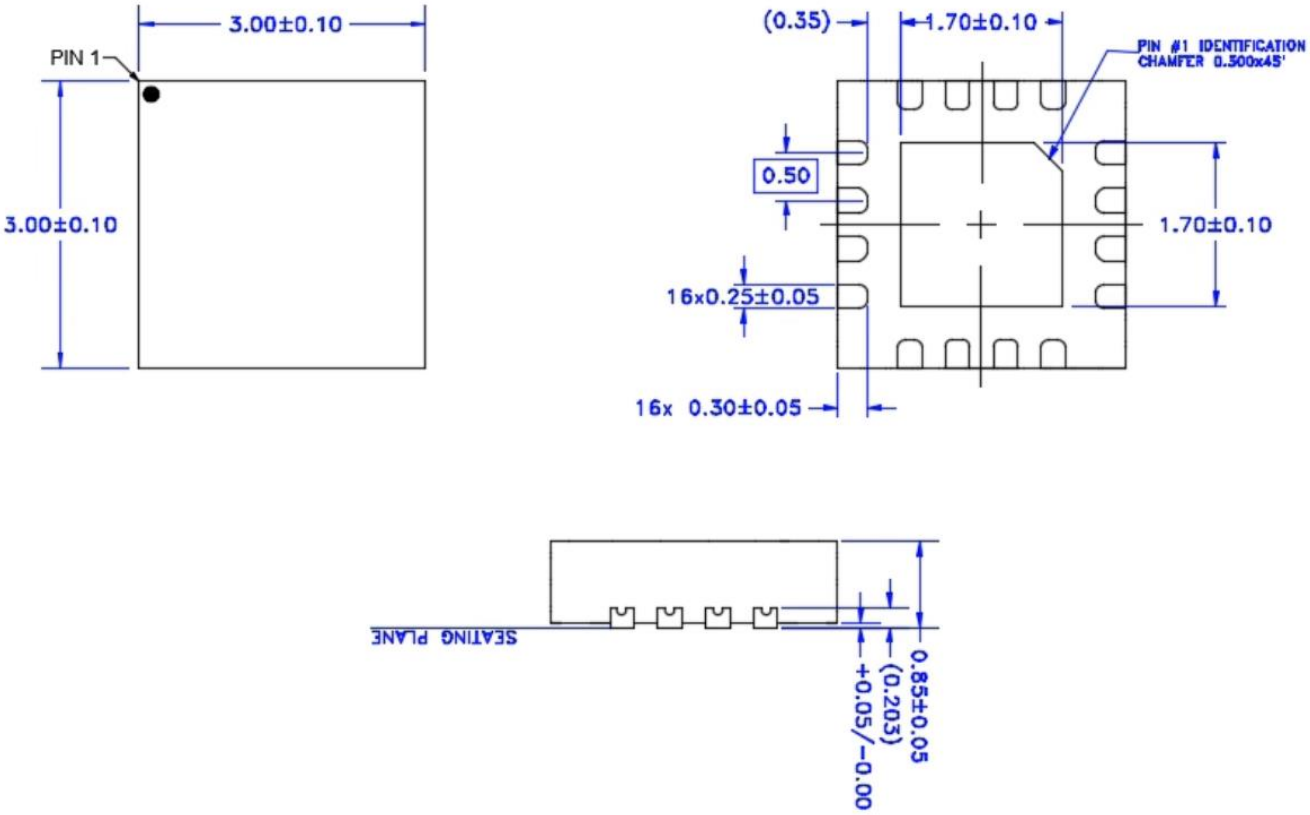


Top View

3 X 3 16-pin QFN

Pin Number	Label	Description
4	RF IN / VBIAS	RF Input, DC blocking capacitor required
9	RF OUT / VDD	RF Output, DC blocking cap required, RF choke required from DC supply
1-3, 5-8, 10-16	GND	Internally not connected
Backside Paddle	GND	Ground. Use recommended via pattern to minimize inductance and thermal resistance. See PCB Mounting Pattern for suggested footprint.

Package Outline



3 X 3 16-pin QFN

Notes:
1. Dimensions in millimeters (inches)

Tape and Reel

Qorvo Part Number	Reel Diameter Inch (mm)	Hub Diameter Inch (mm)	Width (mm)	Pocket Pitch (mm)	Feed	Units Per Reel
QPL1843TR7	7 (178)	2.4 (61)	12	4	Single	2500

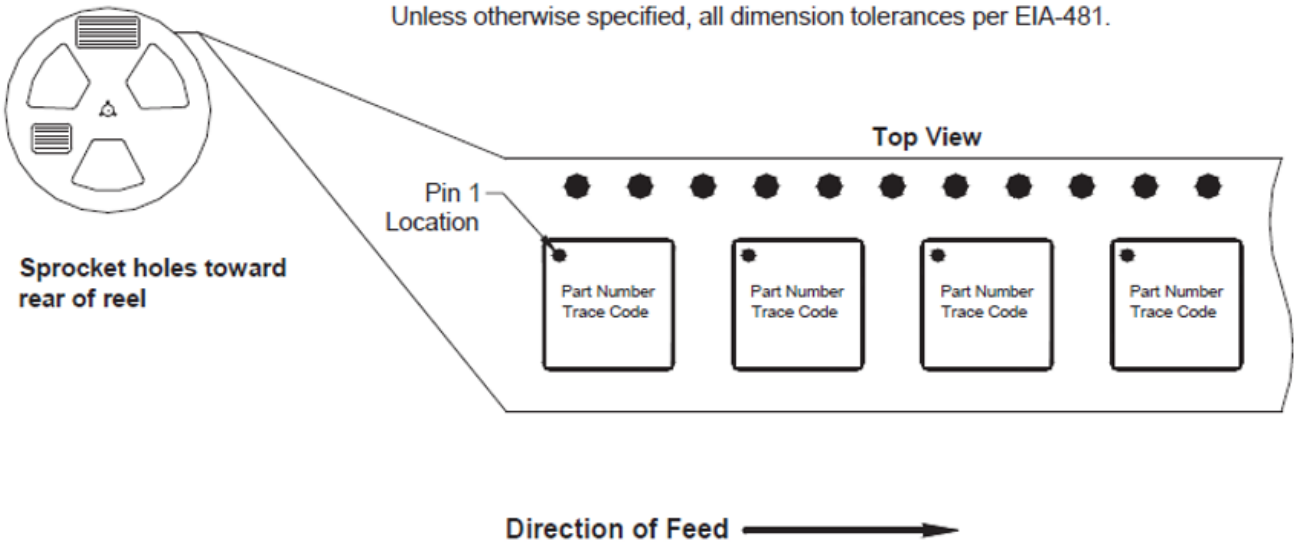
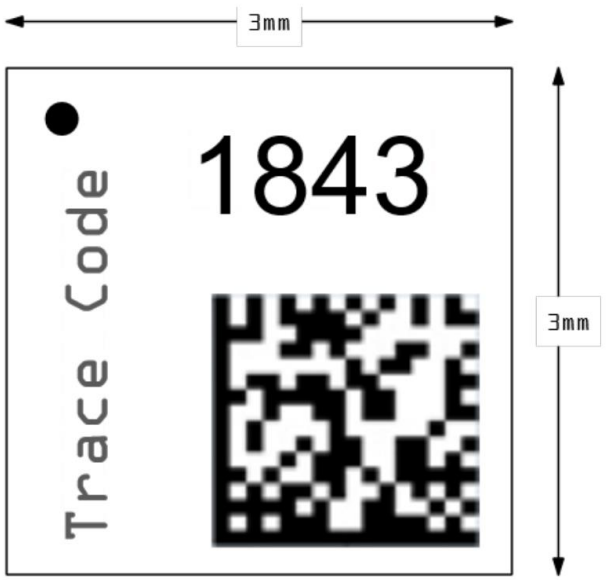


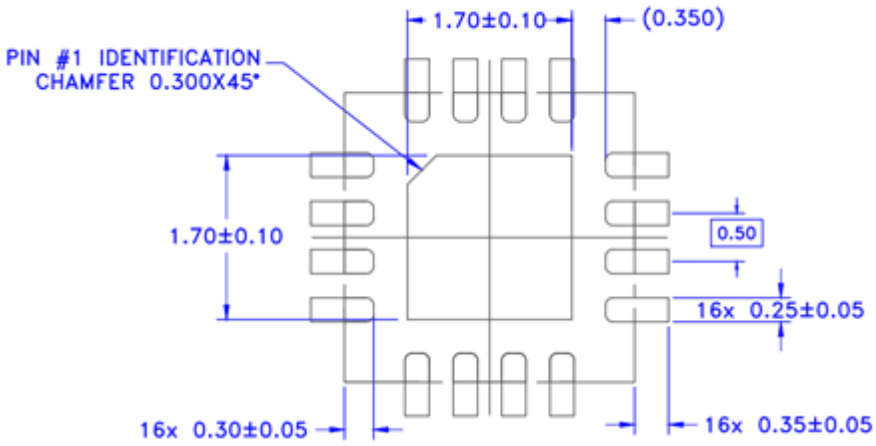
Figure 1. 3.000 mm x 3.000 mm (Carrier Tape Drawing with Part Orientation).

Package Marking



● Pin 1 Indicator
Trace Code to be assigned by SubCon

Recommended Mounting Pattern



Note: All dimensions are in millimeters (inches). Angles are in degrees.

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	1000V (1C)	ESDA/JEDEC JS-001
ESD – Charged Device Model (CDM)	1000V (C3)	ESDA/JEDEC JS-002
MSL – Moisture Sensitivity Level	2	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 ($C_{15}H_{12}Br_4O_2$) Free
- SVHC Free
- PFOS 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**

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