



QPL1842

75 Ω 25 dB CATV Amplifier (5 – 834MHz)

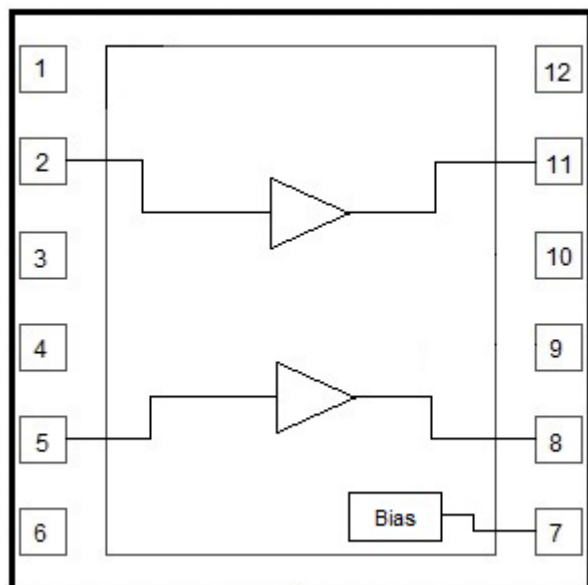
Product Overview

The QPL1842 is a GaAs pHEMT differential MMIC RF amplifier IC featuring 25dB of gain and low noise from 5MHz to 834MHz. This high linearity IC is designed to support Broadband CATV DOCSIS 4.0 applications, such as Nodes, Amplifiers, and Remote PHY Devices, as well as Fiber to The Home (FTTH), Home Gateways, and Cable Modems. The combination of low noise, excellent distortion, and high gain make this suitable for drop amps and other distribution amps. The device is powered by a single supply and can operate from 5V/250mA to 8V/350mA. At 5V, from 5-834MHz, the QPL1842 provides an output of 64.5dBmV TCP with a CCN of 51dB. The device is packaged in a 12-pin 5x5mm² Laminate Module.



5 x 5 12-pin Laminate MCM Package

Functional Block Diagram



Key Features

- 5 MHz to 834MHz Operation 5V & 8V
- Gain: 25dB Typical
- TCP: 64.5dBmV @ 5V & 67.5dBmV @ 8V
- Noise Figure: 1.8dB @ 700MHz; 2.0dB @ 834MHz
- Adjustable Bias Using External Resistors

Applications

- DOCSIS 4.0 Amplifiers
- DOCSIS 4.0 Optical Nodes
- DOCSIS 4.0 Remote PHY Devices
- FTTH GPON and GEPON
- DOCSIS 4.0 Cable Modem and Home Gateways

Ordering Information

Part Number	Description
QPL1842EVB-02	5V Upstream Evaluation Board
QPL1842EVB-04	8V Upstream Evaluation Board

Part Number	Description
QPL1842SB	Sample bag with 5 pieces 7" Reel with 100 pieces 13" Reel with 2500 pieces
QPL1842SR	
QPL1842TR13	



QPL1842

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**QPL1842****75 Ω 25 dB CATV Amplifier (5 – 834MHz)**

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage (V_{DD})	+10 V
Supply Current (I_{DD})	400 mA
Maximum Input Level	+65 dBmV
Operating Temperature Range (Operating Device Heat Slug Temperature)	-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 of Absolute Maximum Rating conditions to the device may reduce device reliability.

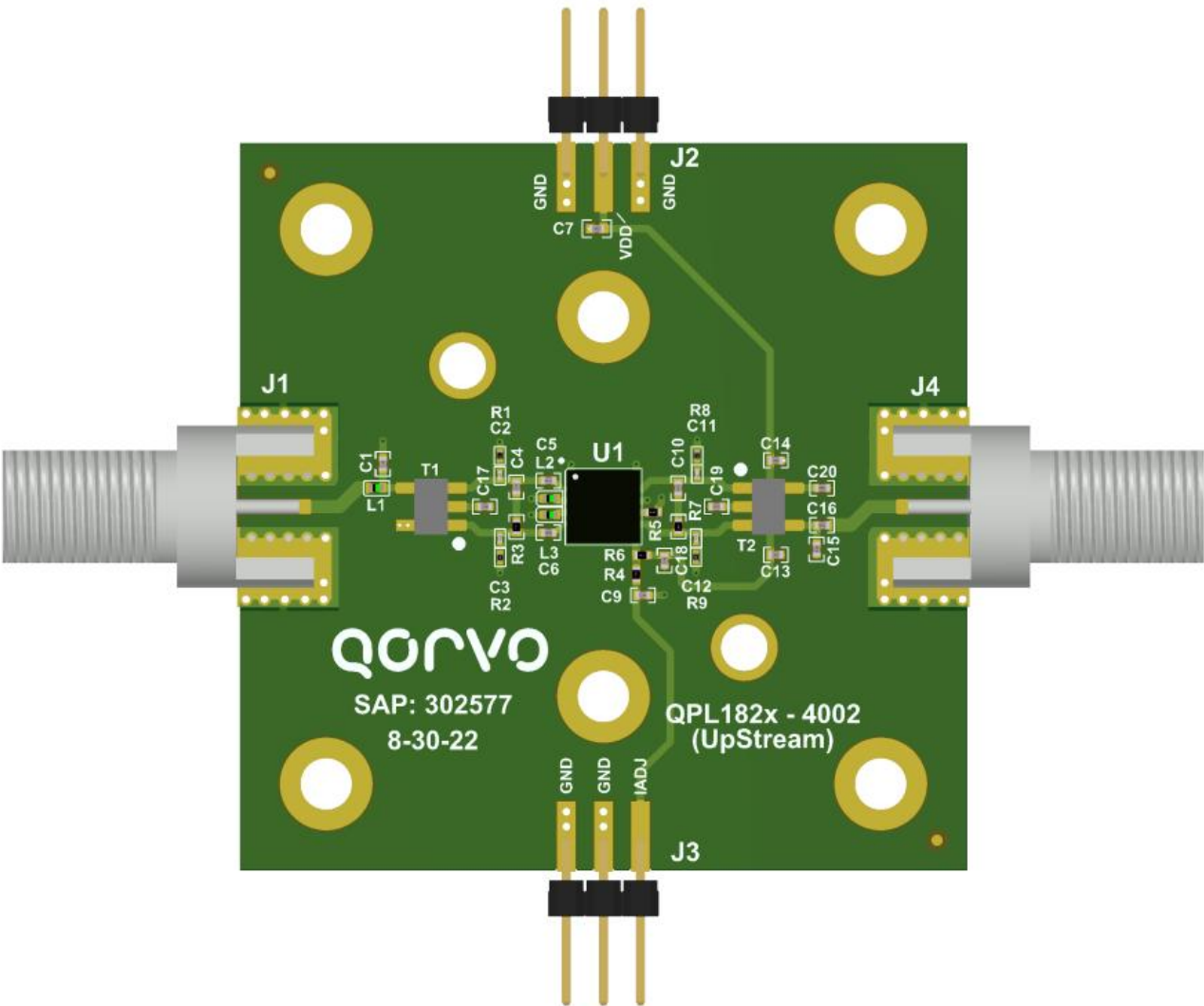
Electrical Specifications

Parameter	Condition (1)	Min	Typ	Max	Unit
Supply Voltage (V_{DD})			5/8		V
Supply Current (I_{DD})			250/350		mA
Frequency Range	5V and 8V operation	5		834	MHz
Gain			25		dB
Gain Slope			0.3		dB
Reverse Isolation			28		dB
Input Return Loss (5V)	5-700MHz		20		dB
Input Return Loss (5V)	700-834MHz		17		dB
Input Return Loss (8V)	5–834MHz		20		dB
Output Return Loss (5V)	5-700MHz		20		dB
Output Return Loss (5V)	700-834MHz		17		dB
Output Return Loss (8V)	5–834MHz		20		dB
Noise Figure	5-834MHz (2)		1.8/2.0		dB
CCN	At +64.5dBmV @ 5V and +67.5 @ 8V Total Composite Output Power. 57-729MHz, 113Ch, SC-QAM, 0dB tilt, 0dB offset (Source Corrected)		51		dB
OIP2L	+5 dBm / tone output, $\Delta f=6$ MHz, Full Band		75/80		dBm
OIP2U	+5 dBm / tone output, $\Delta f=6$ MHz, Full Band		68/73		dBm
OIP3	+5 dBm / tone output, $\Delta f=6$ MHz, Full Band		42/45		dBm
OP1dB	5-700MHz		25.5/29.5		dBm
OP1dB	700-834MHz		24.0/28.0		dBm
Thermal Resistance	Θ_{JC} (Junction to Device Heat Slug)		12		°C/W

Notes:

- (1) Typical performance at these conditions: Temp = +25 °C, V_{DD} = +5 V, 75 Ω system, Full band unless otherwise noted
- (2) Noise figure is 1.8 dB at 700MHz for 5V and 8V operation and 2.0 dB at 834MHz for 5V and 8V operation

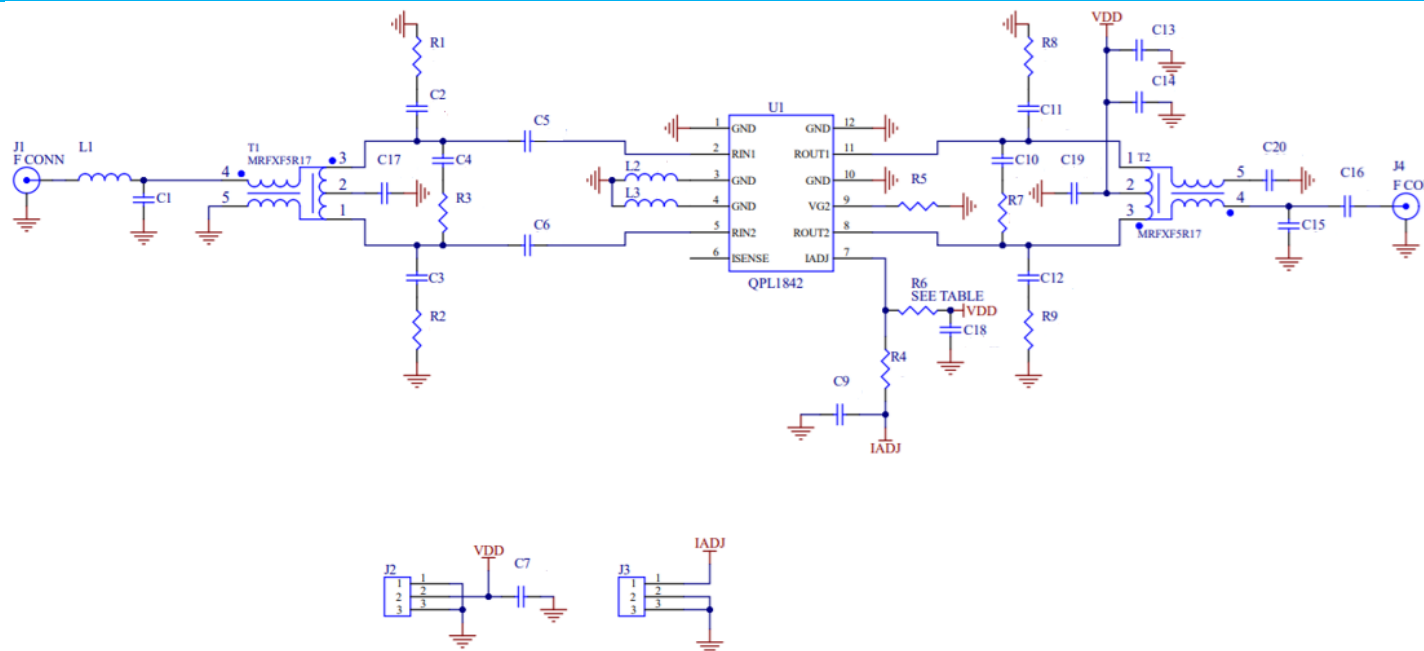
Evaluation Board Assembly Drawing



LAYER STACK LEGEND

	Material	Layer	Thickness	Dielectric Material	Type
		Top Overlay			Legend
	Surface Material	Top Solder	0.0004in	SM-001	Solder Mask
	CF-004	Top Layer	0.0007in		Signal
	Core		0.0600in	FR4	Dielectric
	CF-004	Bottom Layer	0.0007in		Signal
Total thickness: 0.0618in					

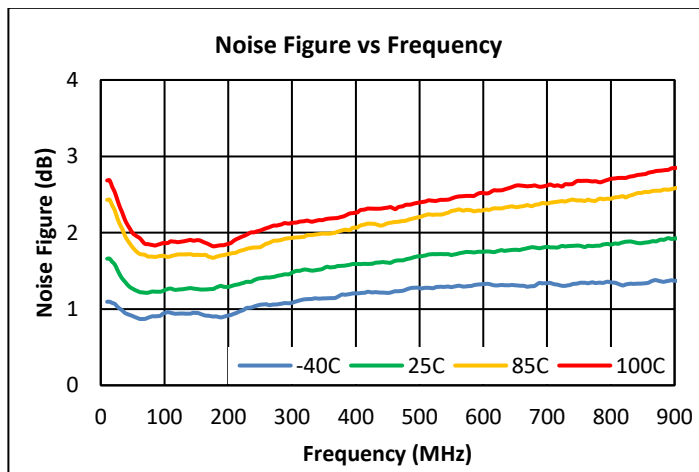
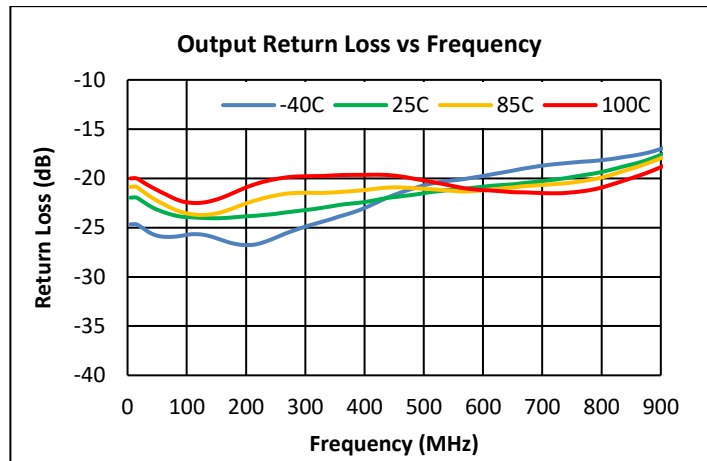
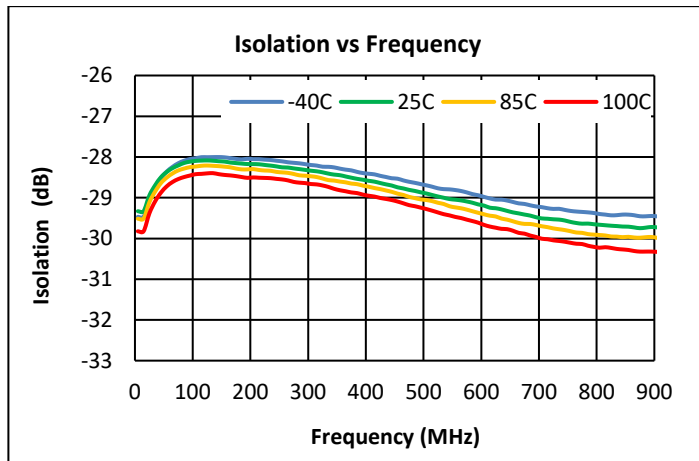
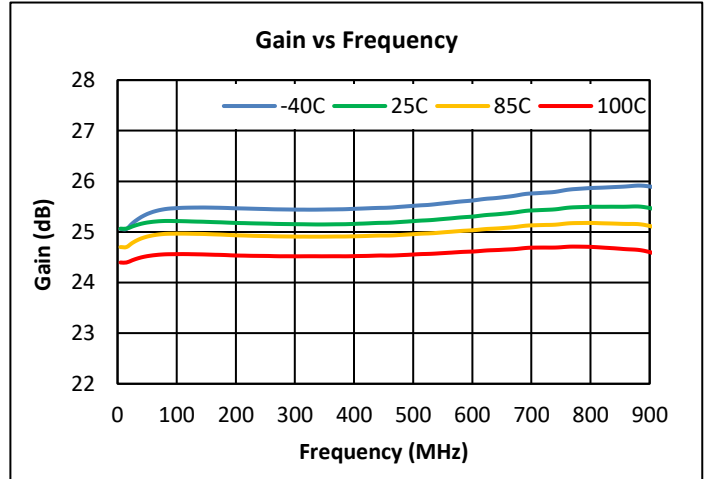
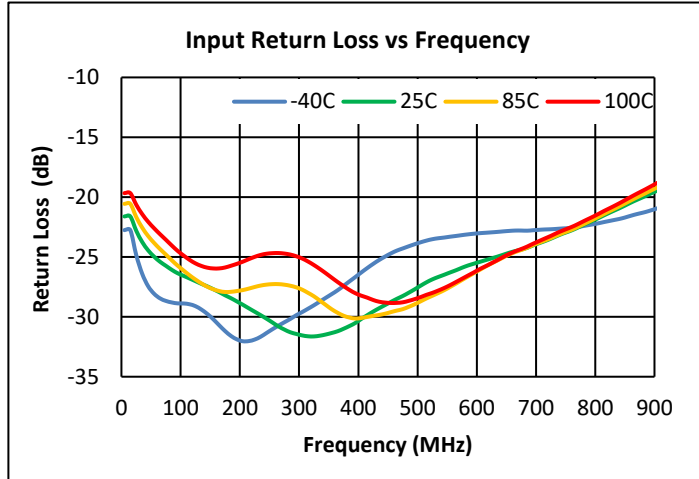
Evaluation Board Schematic 5 – 834MHz, 5V and 8V



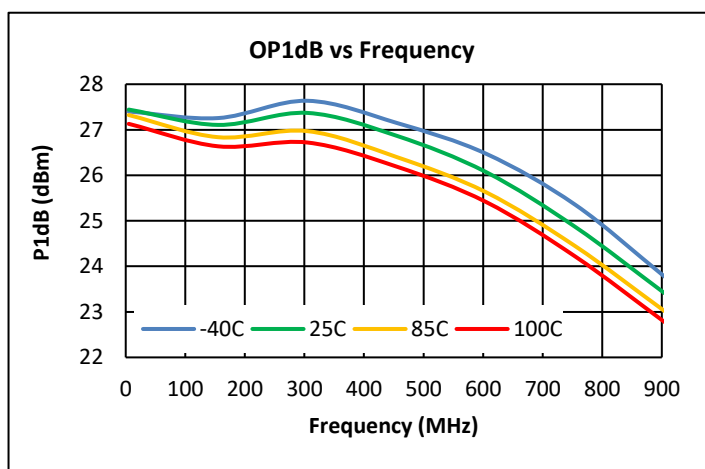
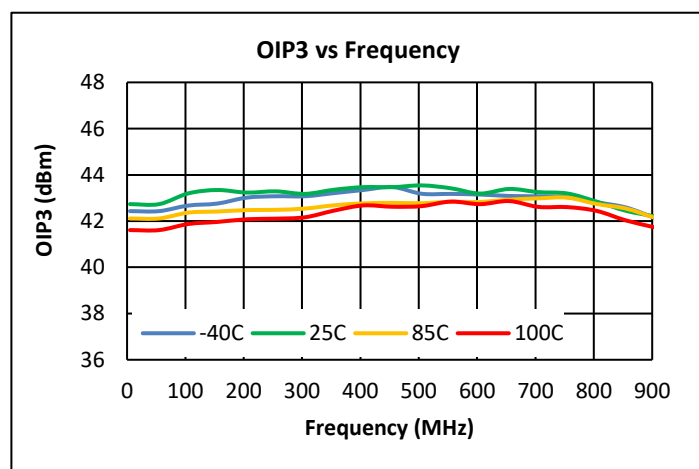
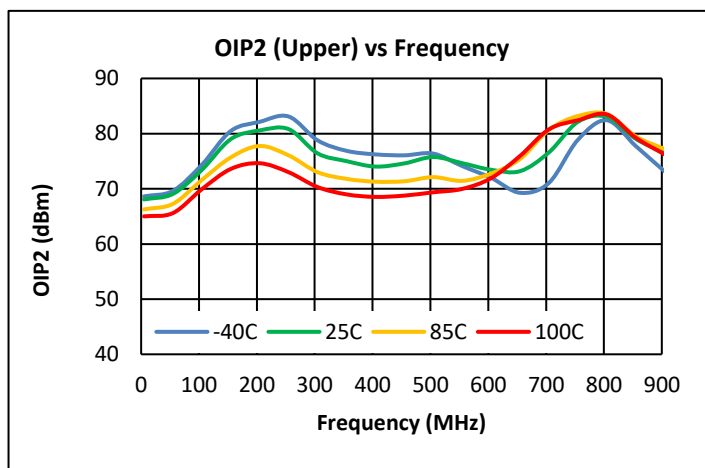
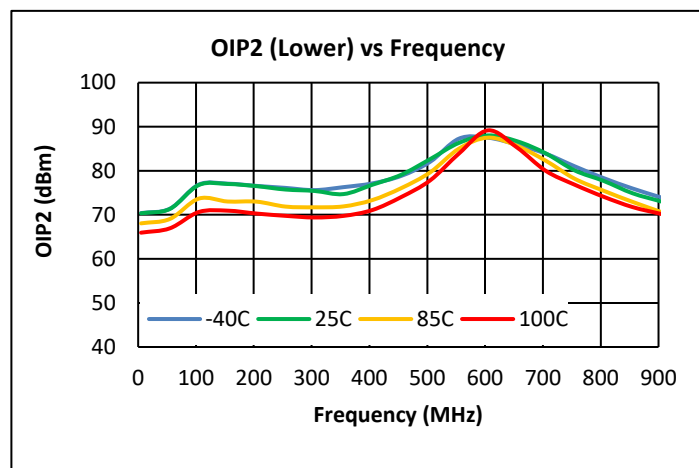
Evaluation Board Bill of Materials for 5V and 8V

Ref Des	Description	Mfg Name	Mfg Part #
PCB	PCB, QPL1820	TTM Technologies	QPL182x-4002(A)
U1	834MHz, 5/8V, 25dB gain	Qorvo	QPL1842
C2, C3	CAP, 0.7pF, +/-0.1pF, 50V, HI-Q, 0402	Murata	GJM1555C1HR70BB01D
C5, C6, C16	CAP, 0.1uF, 10%, 25V, X7R, 0402	Murata	GRM155R71E104KE14D
C7,C13,C18,C19,C20	CAP, 0.01uF, 10%, 50V, X7R, 0402	Murata	GCM155R71H103KA55D
C11,C12	CAP, 1.7pF, +/-0.1pF, 25V, HI-Q, 0201	Murata	GJM0335C1E1R7BA01D
C14	CAP, 1000pF, 10%, 50V, X7R, 0402	Murata	GRM155R71H102KA01D
C17	RES, 20 OHM, 5%, 1/10W, 0402	Panasonic	ERJ-2GEJ200X
R1,R2,R8,R9	RES, 0 OHM, JUMPER, 0201	Kamaya	010-0205-0000LF
L1	RES, 0 Ohm, 5%, 1/10W, 0402	Kamaya	RMC1/16SJPTH
R5	RES, 3.3K OHM, 5%, 1/10W, 0402	Kamaya	RMC1/16S-332JTH
R6 (5V)	RES, 820 OHM, 5%, 1/10W, 0402	Kamaya	RMC1/16S-821JTH
R6 (8V)	RES, 1.3K OHM, 5%, 1/10W, 0402	Panasonic	ERJ-2GEJ132X
T1,T2	XFMR, BALUN, 1:1, 5-850MHz, 75 OHM	MiniRF	MRFXF5R18
J2, J3	CONN, HDR, ST, 4-PIN, 0.100"	SAMTEC INC	TSW-103-07-G-S
J1, J4	CONN, F FEM EDGE MOUNT, 75 OHMS, 0.068"	MillimeterWave	MW-846-C-DD-75
Heatsink	50 x 50 x10, ALUMINUM	Alpha Nova Tech	S08EFV05-A
C1,C4,C9,C10,C15,L2,L3,R3,R4,R7	Not Populated Item		Dummy Part

Performance Data, 5V @ 250mA; 5MHz-834MHz



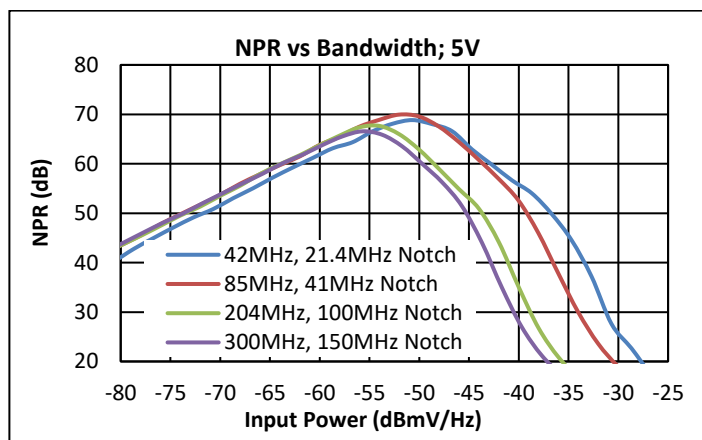
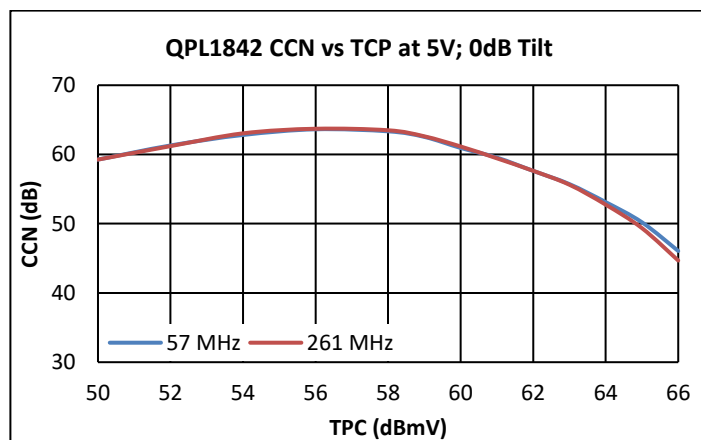
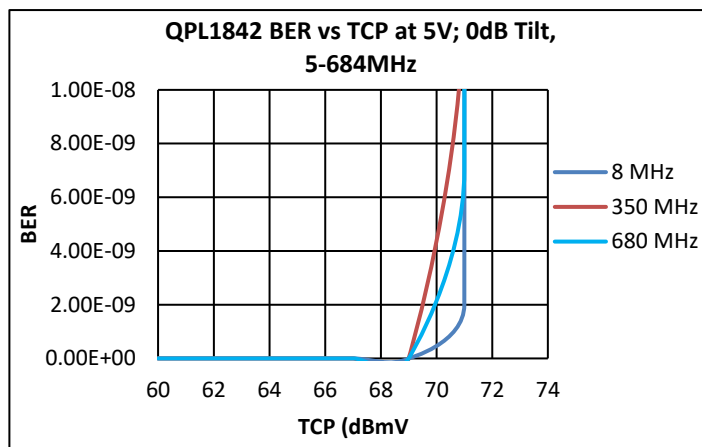
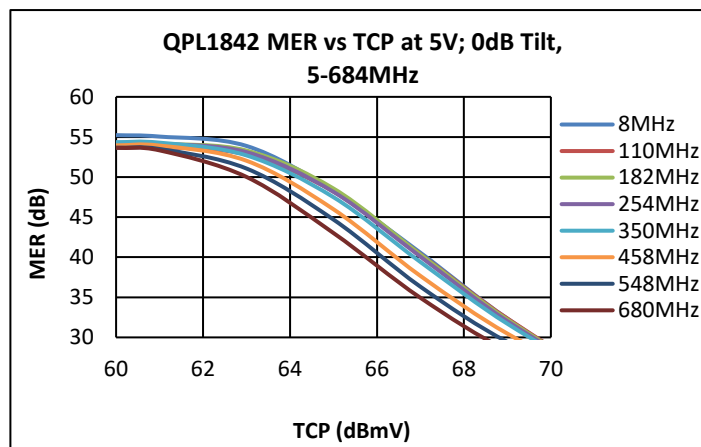
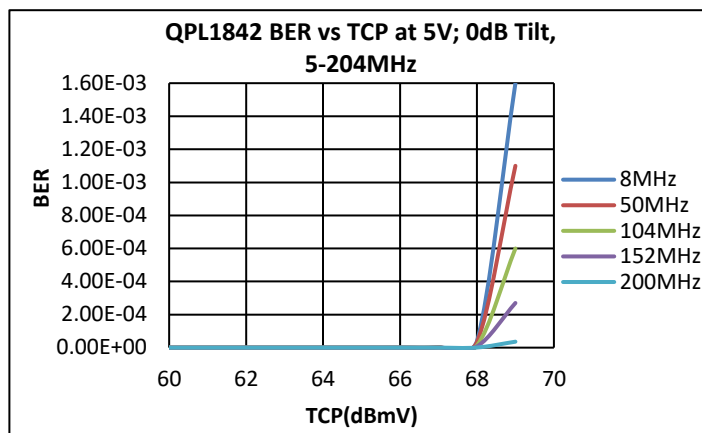
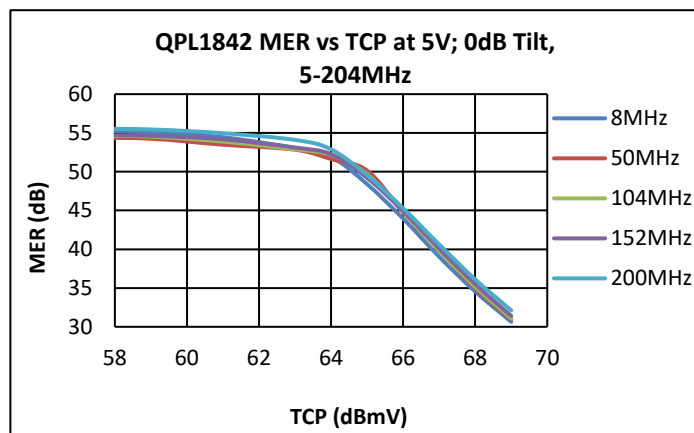
Performance Data, 5V @ 250mA, (Cont'd); 5MHz-834MHz



Notes:

- (1) 5V OIP2: +5dBm/ tone output @ $\Delta f = 6\text{MHz}$
- (2) 5V OIP3: +5dBm/ tone output @ $\Delta f = 6\text{MHz}$

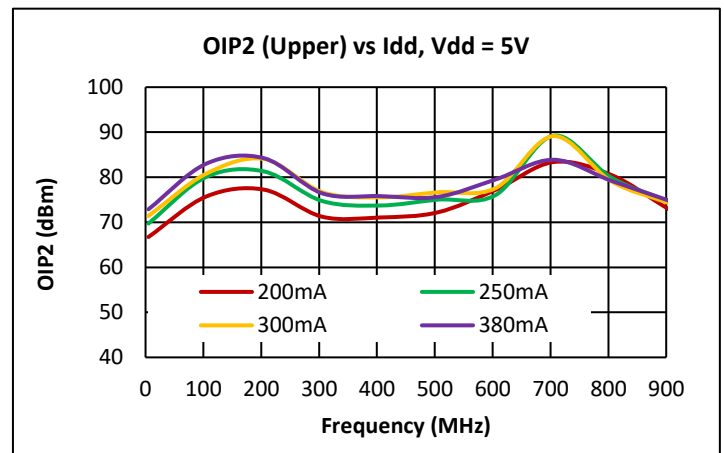
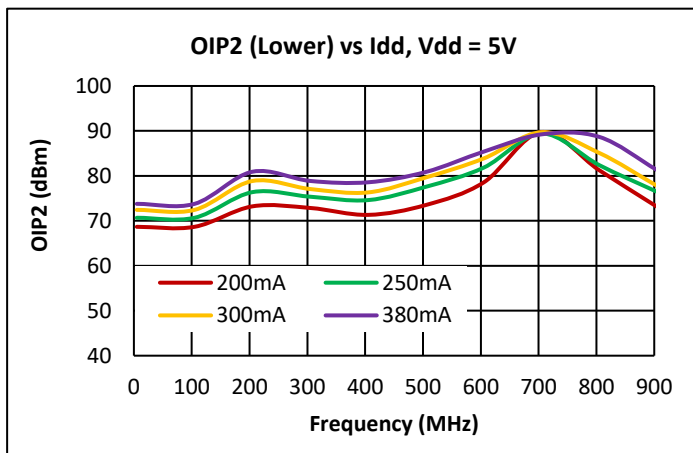
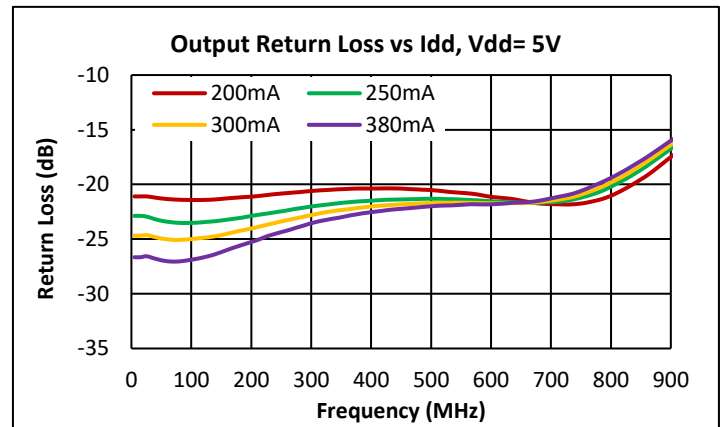
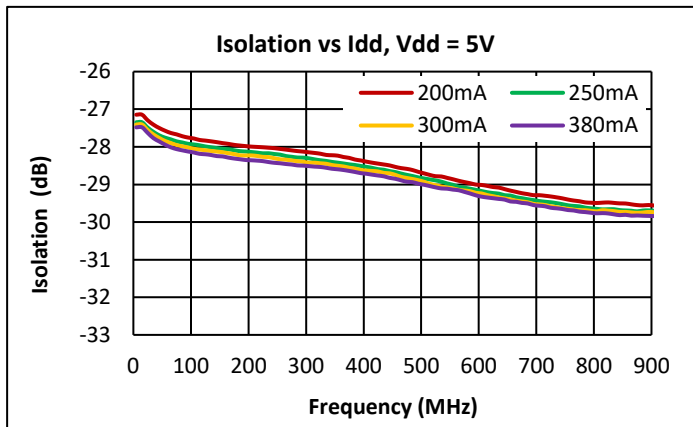
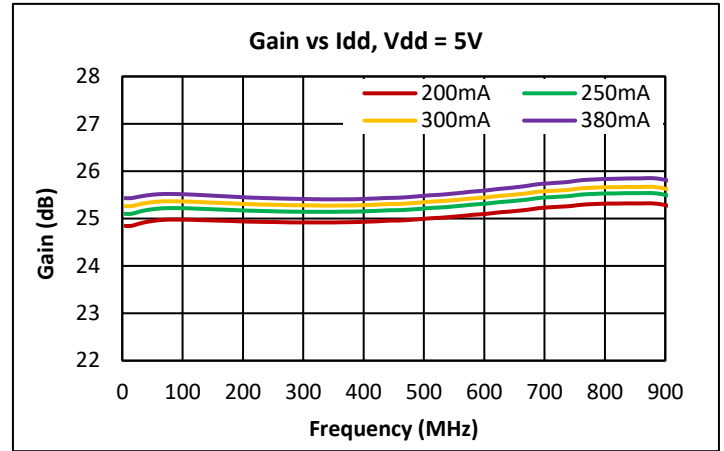
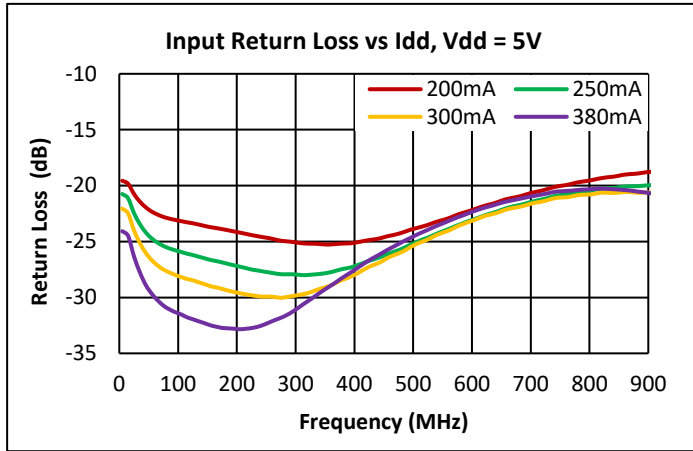
Performance Data, 5V @ 250mA, (Cont'd); 5MHz-834MHz



Notes:

- (1) BER & MER Test Conditions: 5-204MHz & 5-684MHz, 111 Ch. SC-QAM, 0dB tilt
- (2) CCN Test conditions: 57-885MHz, 138Ch, SC-QAM, 0dB tilt, 0dB offset

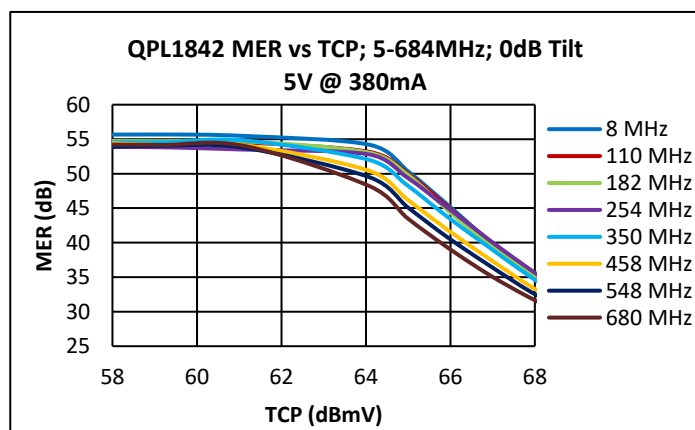
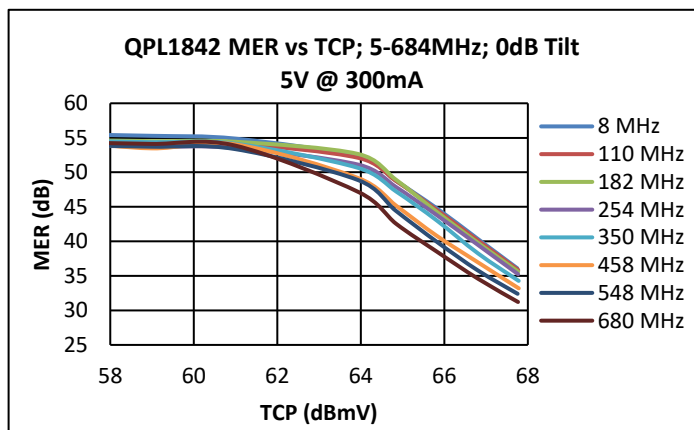
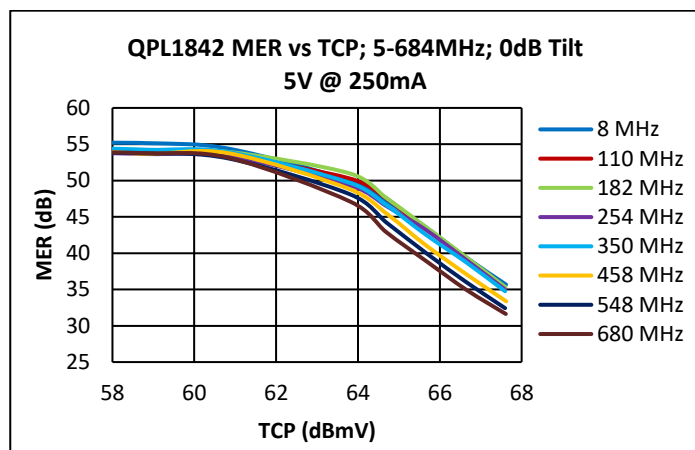
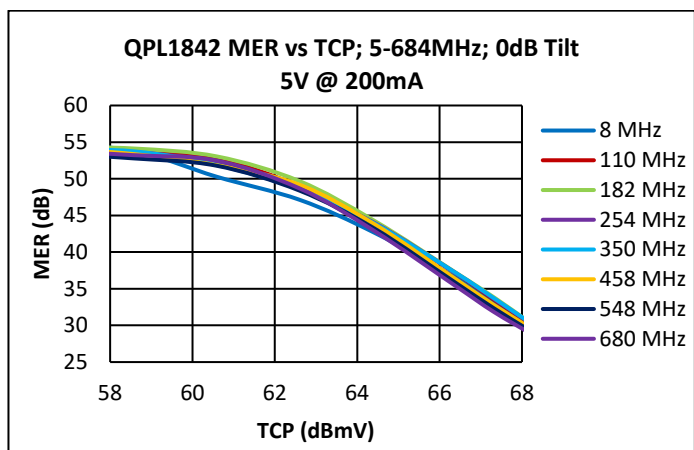
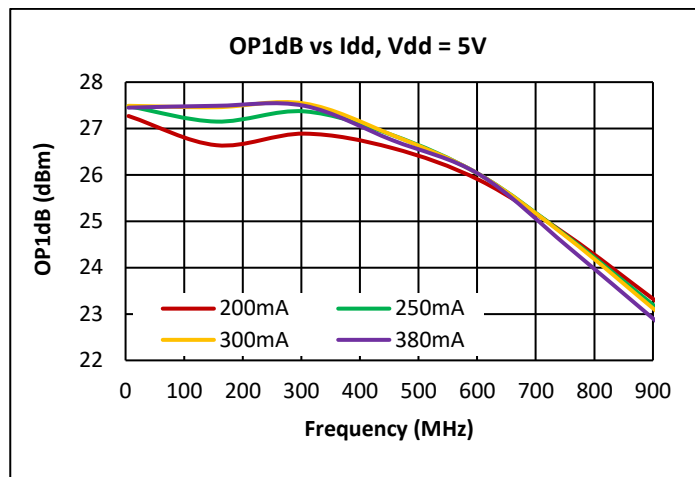
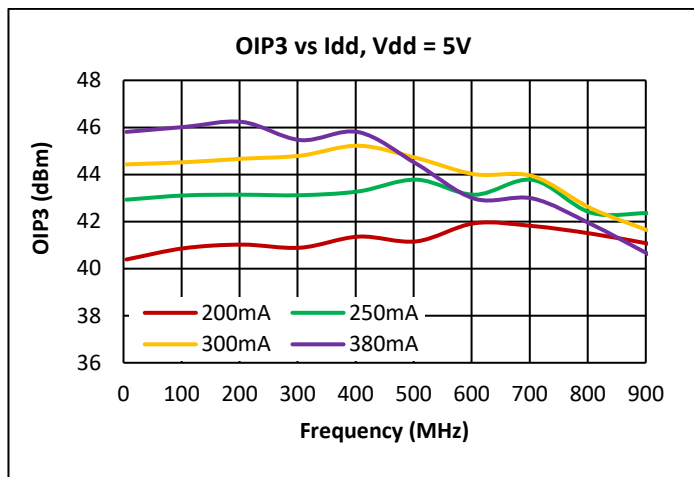
Performance Data vs Bias Supply, 5V; 5MHz-834MHz



Notes:

(1) 5V OIP2: +5dBm/ tone output @ $\Delta f = 6\text{MHz}$

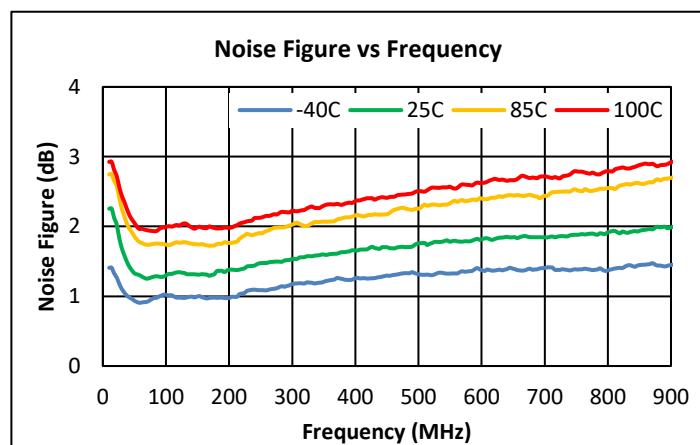
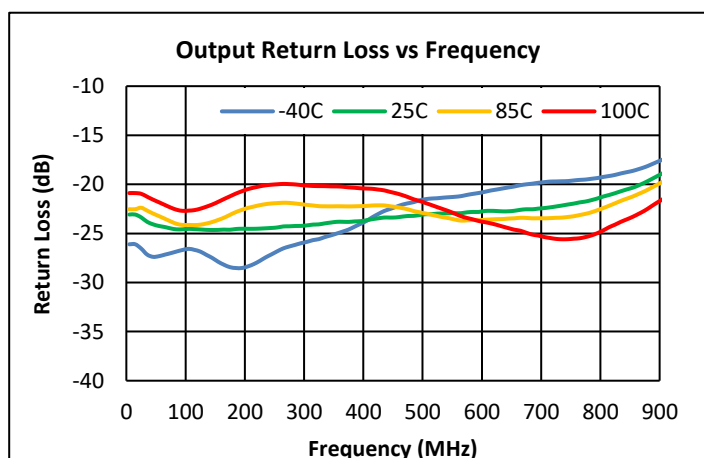
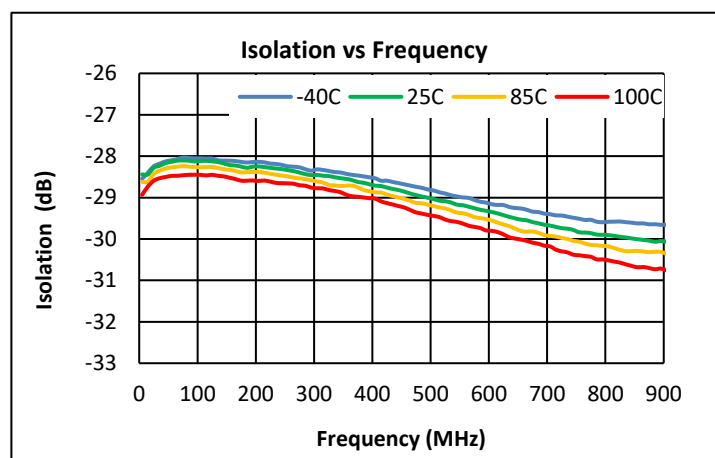
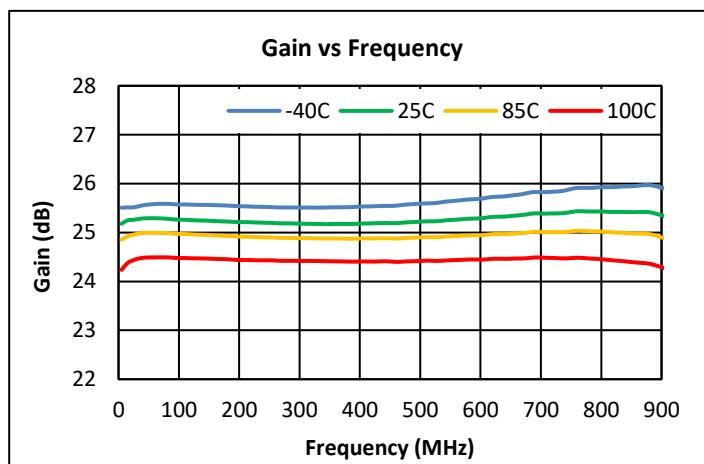
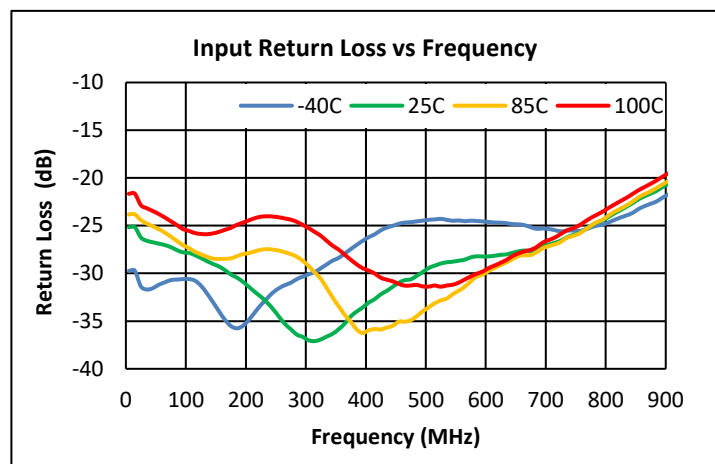
Performance Data vs Bias Supply, 5V, (Cont'd); 5MHz-834MHz



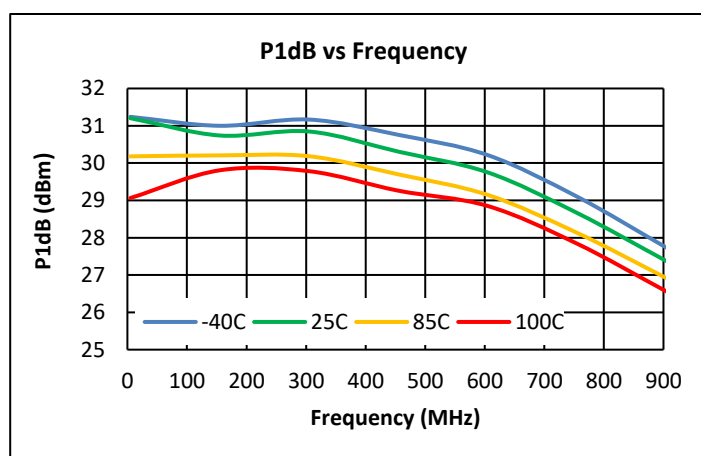
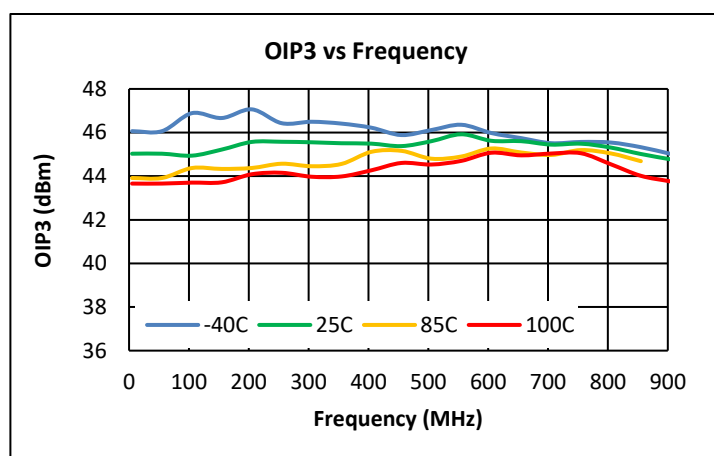
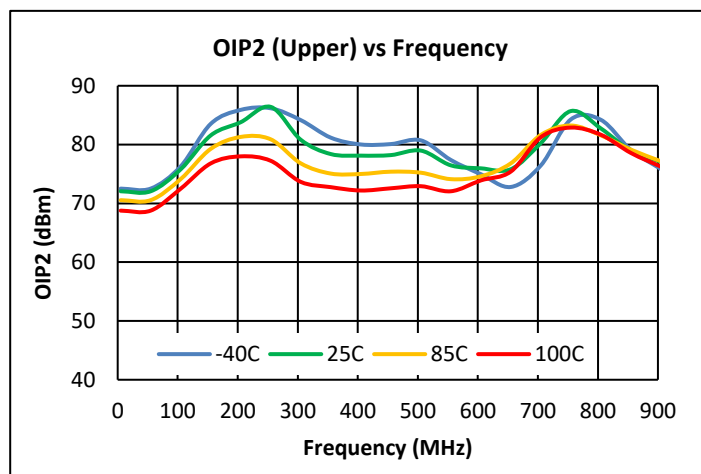
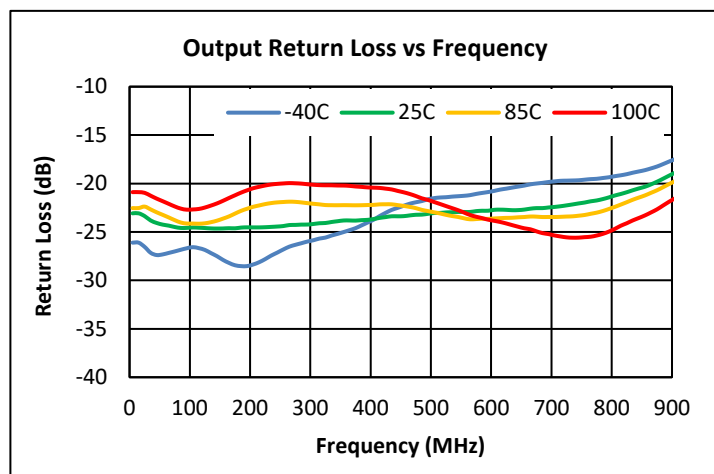
Notes:

- (1) 5V OIP3: +5dBm/ tone output @ $\Delta f = 6\text{MHz}$

Performance Data, 8V @ 350mA; 5MHz-834MHz



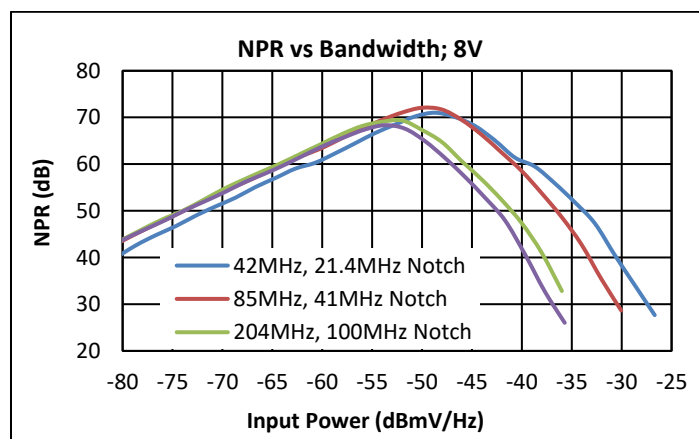
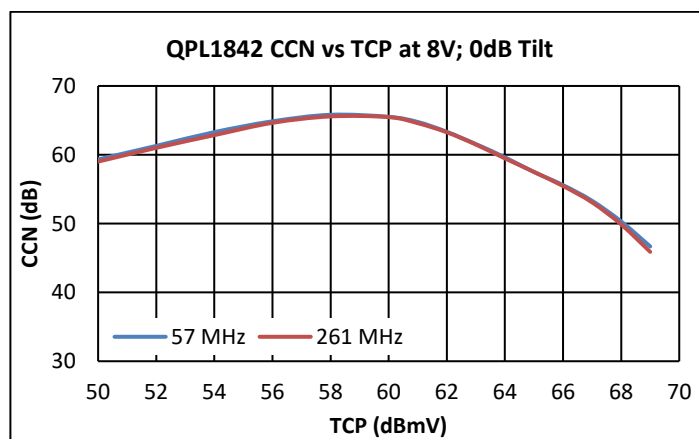
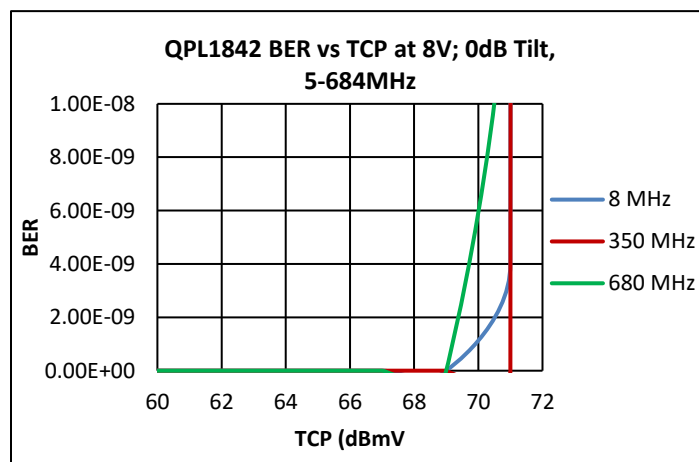
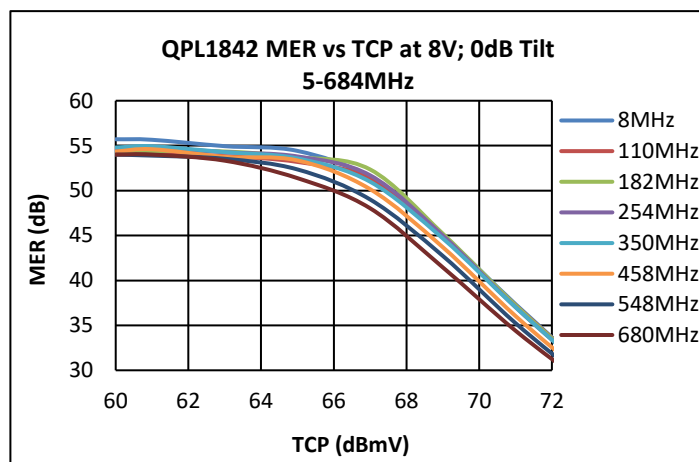
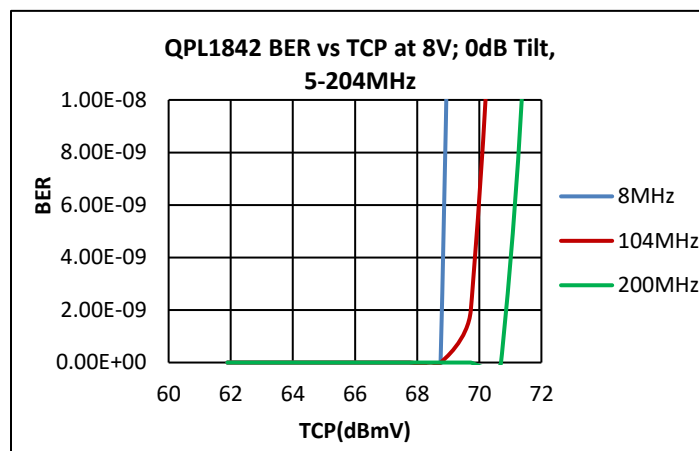
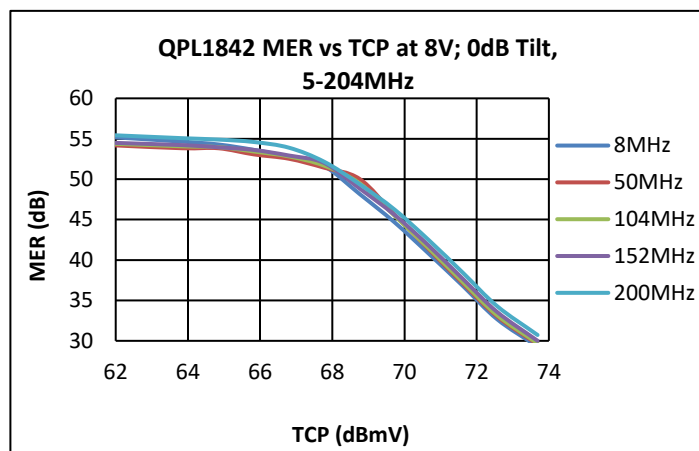
Performance Data, 8V @ 350mA, (Cont'd); 5MHz-834MHz



Notes:

- (1) 8V OIP2: +5dBm/tone output @ $\Delta f = 6\text{MHz}$
- (2) 8V OIP3: +5dBm/tone output @ $\Delta f = 6\text{MHz}$

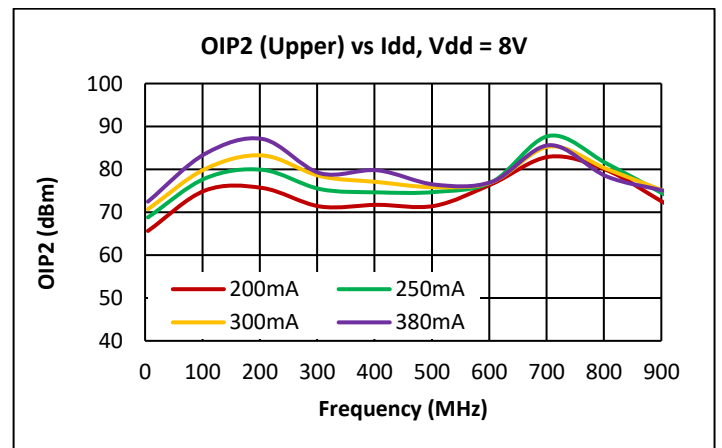
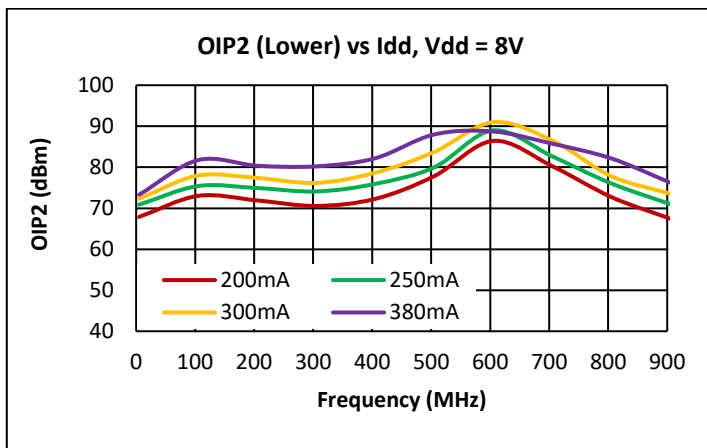
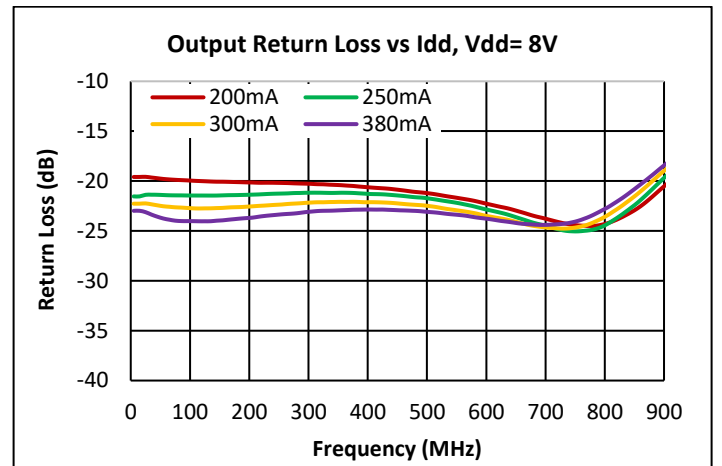
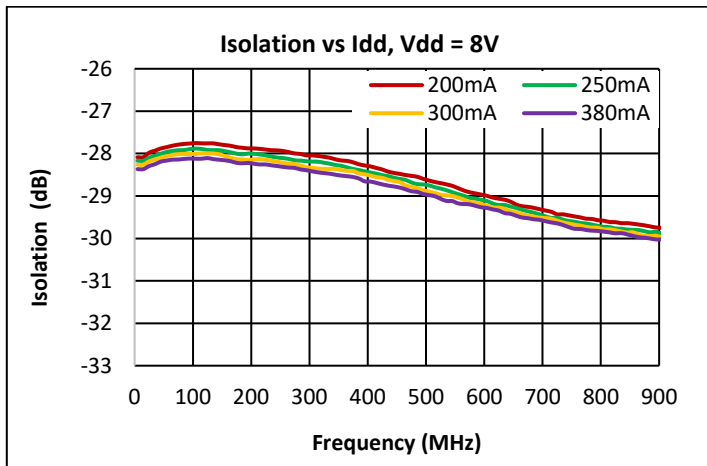
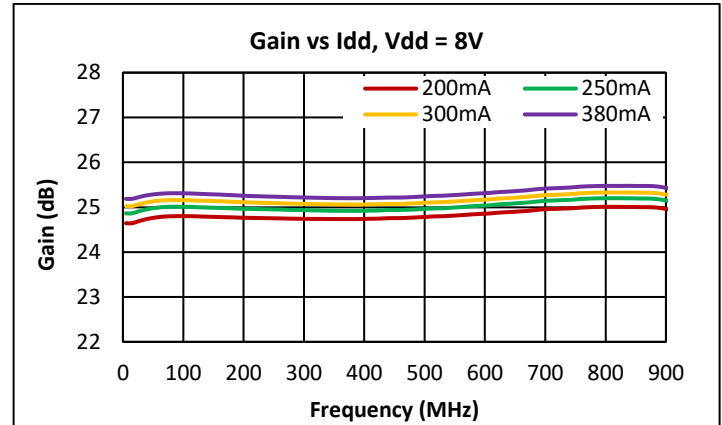
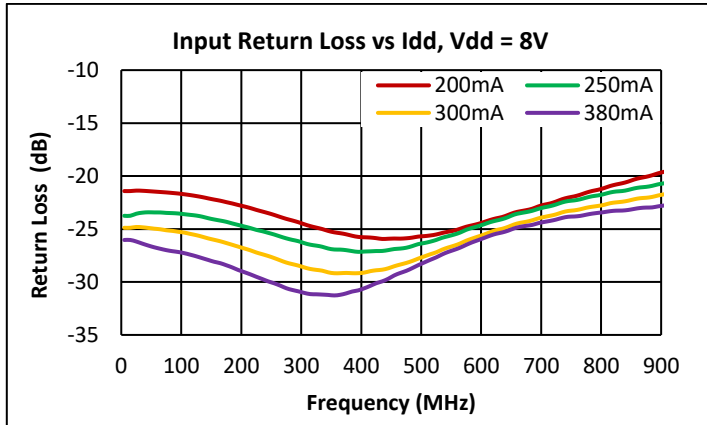
Performance Data, 8V @ 350mA (Cont'd); 5MHz-834MHz



Notes:

- 1) BER & MER Test Conditions: 5-204MHz & 5-684MHz, 111 Ch. SC-QAM, 0dB tilt
- 2) CCN Test Conditions: 57-885MHz; 138Ch, SC-QAM, 0dB tilt, 0dB offset

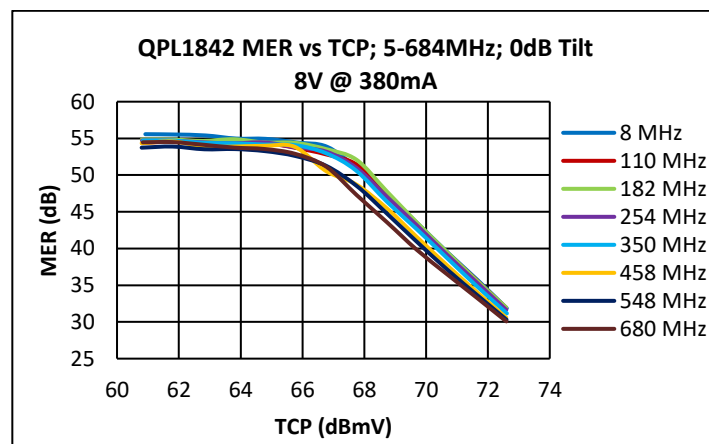
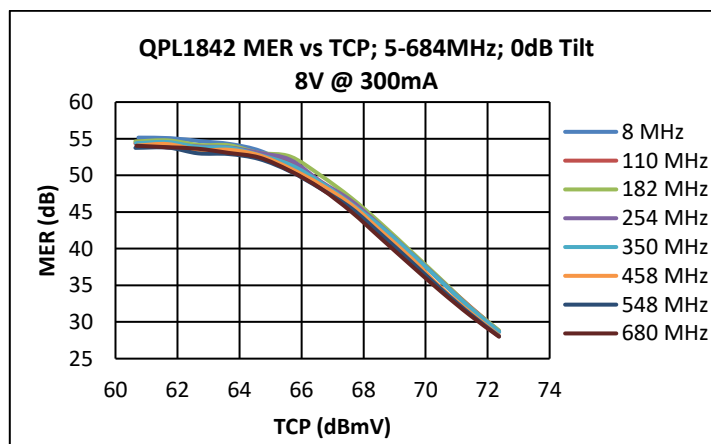
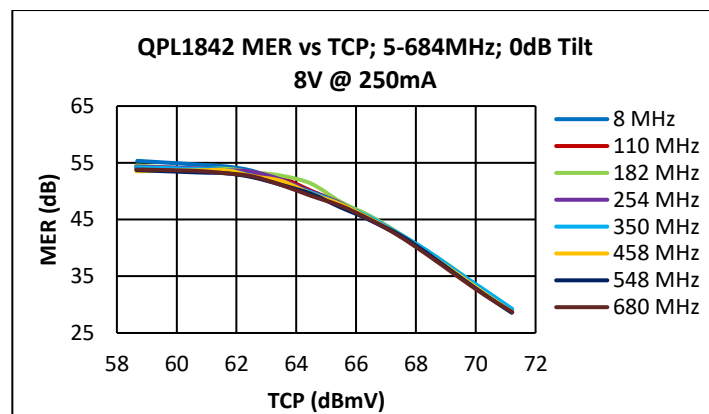
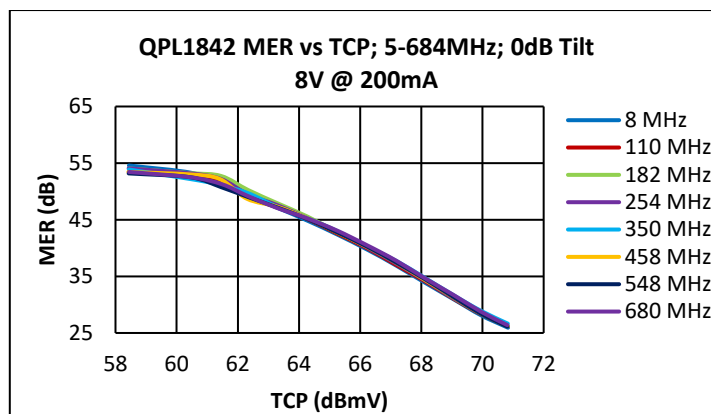
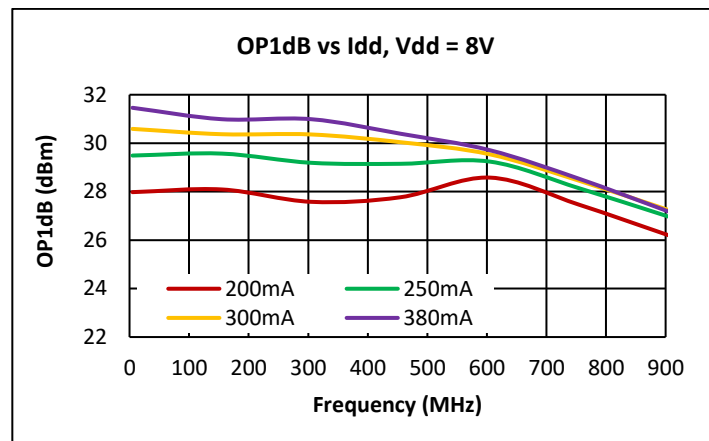
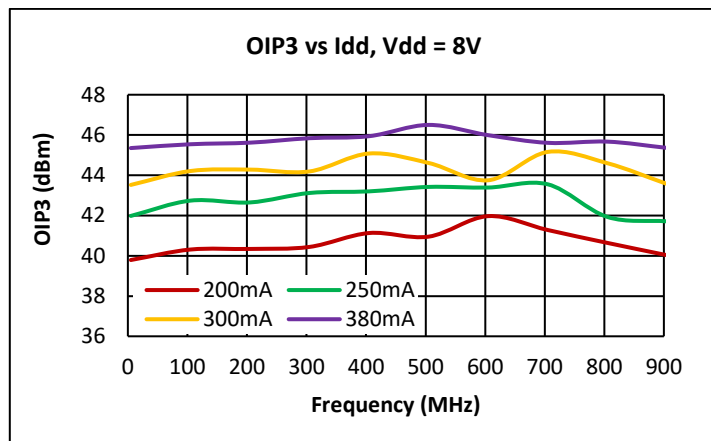
Performance Data vs Bias Supply, 8V; 5MHz-834MHz



Notes:

- (1) 8V OIP2: +5dBm/ tone output @ $\Delta f = 6\text{MHz}$

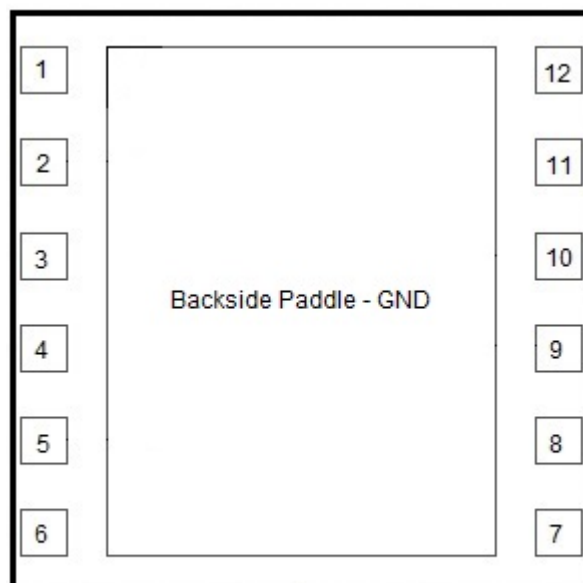
Performance Data vs Bias Supply, 8V (Cont'd); 5MHz-834MHz



Notes:

- (1) 8V OIP3: +5dBm/tone output @ $\Delta f = 6\text{MHz}$

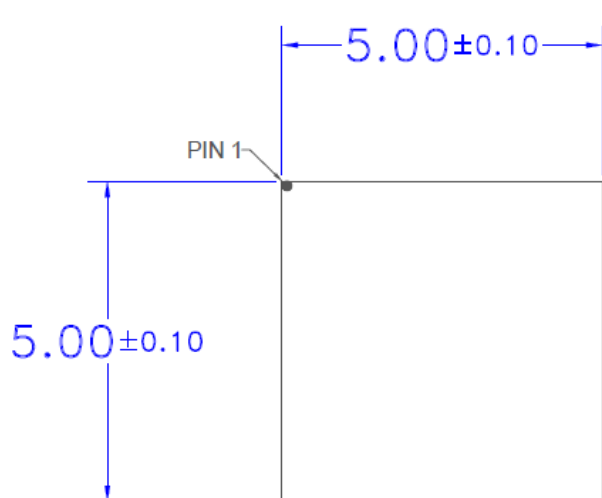
Pin Configuration



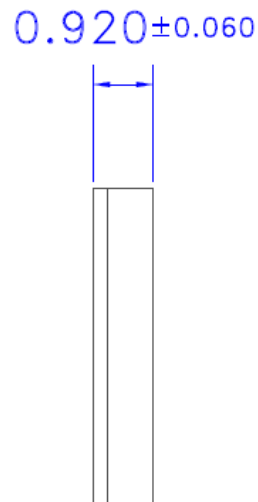
Pin Description

Pin Number	Label	Description
1	NC	No internal connection, recommend connecting to EVB GND
2	RFIN+	RF Input +
3	GND	Must be connected to EVB GND
4	GND	Must be connected to EVB GND
5	RFIN-	RF input -
6	NC	No connect pin. Leave it open. Do not connect to GND.
7	IADJ	IDD current set
8	RFOUT-/VDD2	RF output - and VDD through RF Choke
9	VG2	Cascode device bias resistor divider
10	NC	No internal connection, recommend connecting to EVB GND
11	RFOUT+/VDD	RF output + and VDD through RF Choke
12	NC	No internal connection, recommend connecting to EVB GND
Paddle	GND	DC/RF/Thermal/GND. (Maximize vias in this area)

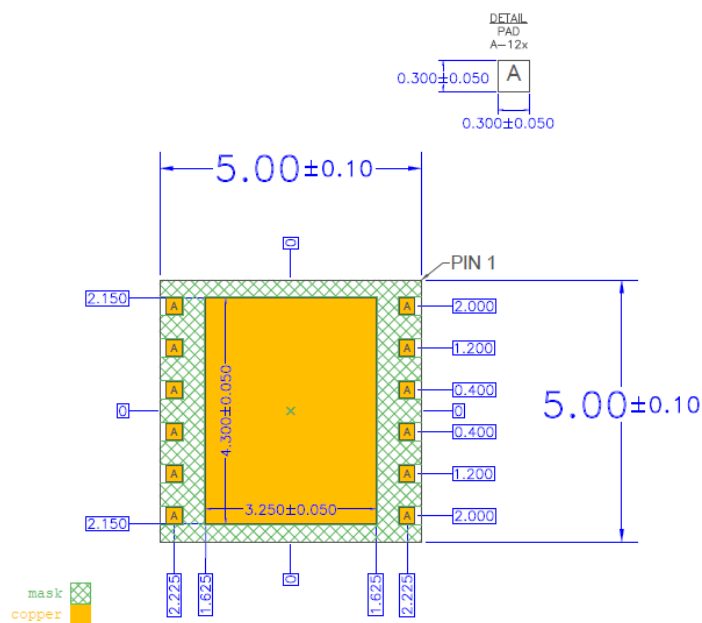
Package Outline



TOP
VIEW

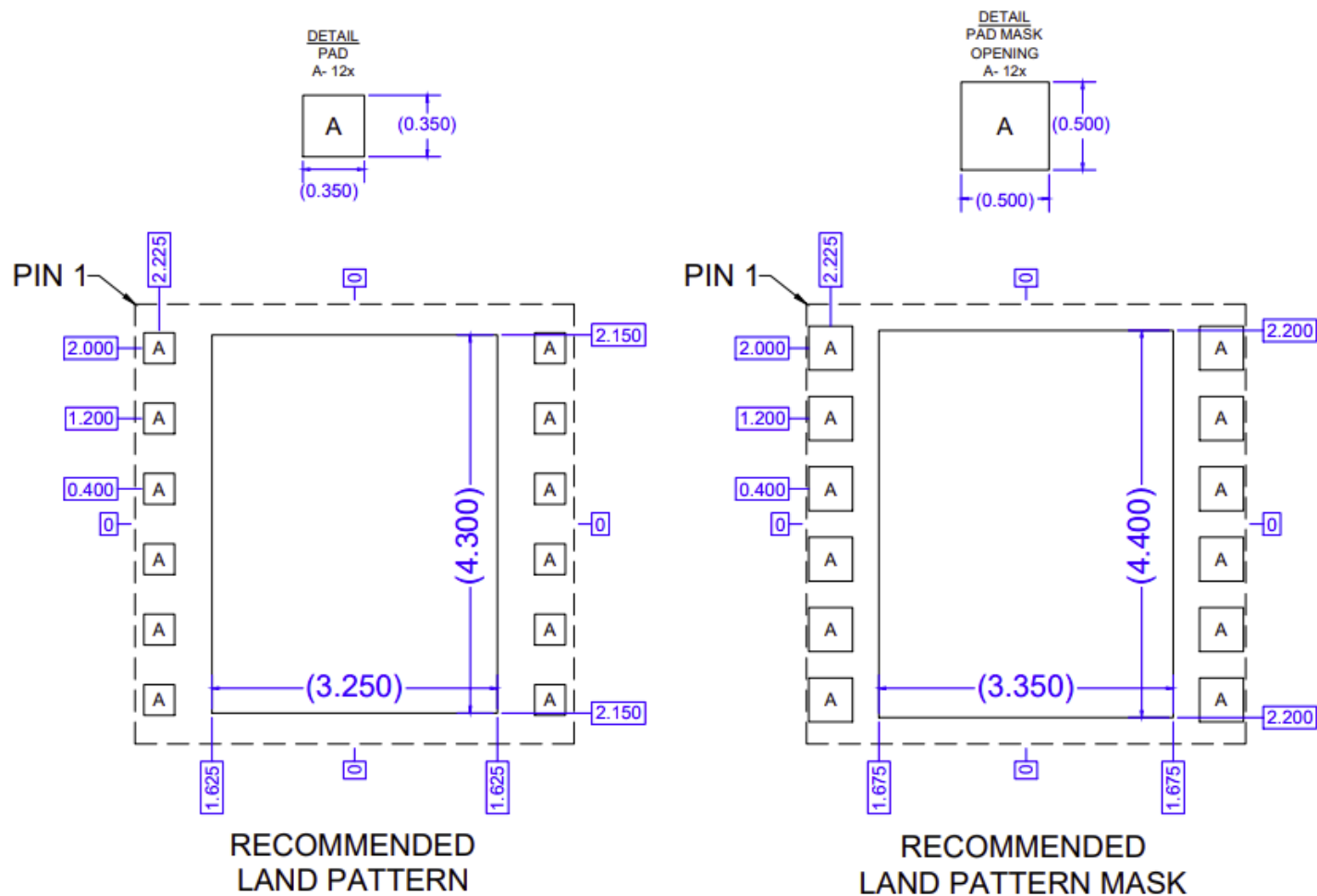


SIDE
VIEW

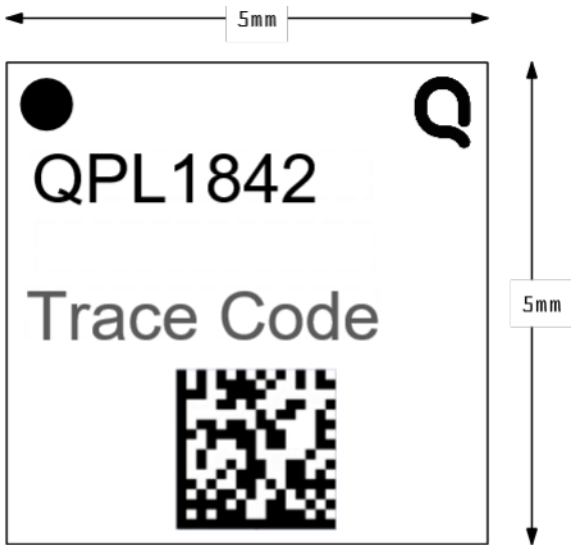


BOTTOM
VIEW

Landing Pattern



Package Marking



- Pin 1 Indicator
Qorvo Logo - Use Q5D
Trace Code to be assigned by SubCon
2D Matrix

Tape and Reel Information

Qorvo Part Number	Reel Diameter Inch (mm)	Hub Diameter Inch (mm)	Width (mm)	Pocket Pitch (mm)	Feed	Units Per Reel
QPL1842 TR13	13 (330)	4 (102)	12	8	Single	2500

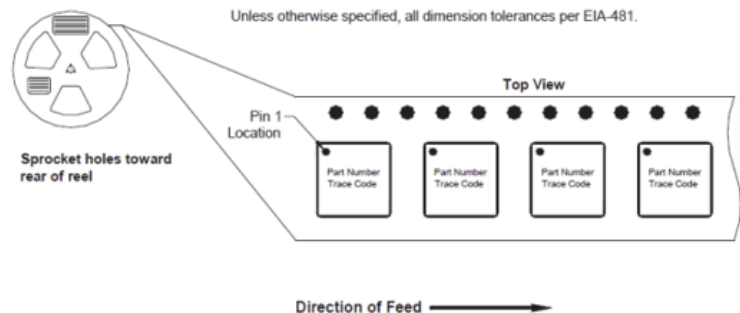


Figure 1: 5.000 mm x 5.000 mm (Carrier Tape Drawing with Part Orientation)



QPL1842

75 Ω 25 dB CATV Amplifier (5 – 834MHz)

Handling Precautions

Parameter	Rating	Standard	 Caution! ESD Sensitive Device
ESD – Human Body Model (HBM)	Class 1C (1000V to <2000V)	ANSI / ESDA / JEDEC JS-001	
ESD – Charged Device Model (CDM)	Class C3 ($\geq 1000V$)	ANSI / ESDA / JEDEC JS-002	
MSL – Moisture Sensitivity Level	MSL3	IPC / JEDEC J-STD-020	

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: ENEPIG

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:

- PFOS Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A ($C_{15}H_{12}Br_4O_2$) 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



QPL1842

75 Ω 25 dB CATV Amplifier (5 – 834MHz)

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