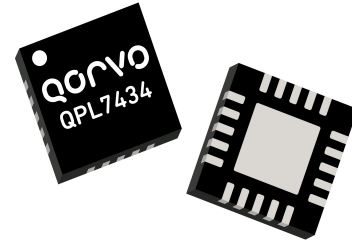


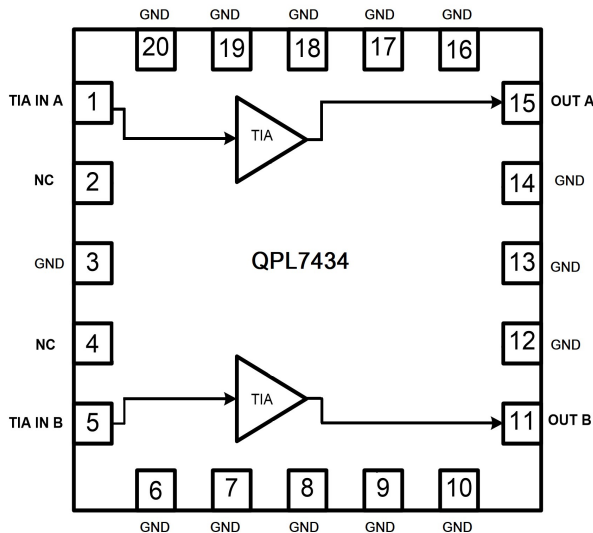
Product Overview

The QPB7434 is a 47 – 1218 MHz High Gain, Low EIN, Differential RF Optical Receiver for FTTH PON applications. It is a technology leader with an optical input range from -20 dBm to +2 dBm. It runs on a single +5 V supply eliminating the need for an extra ONT supply. The differential input configuration enables direct connection of the Photo Diode to the device. This eliminates the Balun and improves overall EIN of the system.



20 Pad 4.0 x 4.0 x 0.85 mm QFN Package

Functional Block Diagram



Top View

Key Features

- Optical Input range: +2dBm to -20dBm
- High Gain: > 25dB at 550MHz
- Efficient Power Consumption: 1.0 W at +5 V
- Low Noise: 2.8 pA / $\sqrt{\text{Hz}}$ Equivalent Input Noise Current (EINC)
- High Linearity
- 47 – 1218 MHz Operational Bandwidth
- Convenient QFN Package
- RoHS Compliant

Applications

- FTTH xPON
- DOCSIS 3.1
- Head End CMTS Equipment
- Optical Node
- Cable Modem and Set Top Box

Ordering Information

Part No.	Description
QPL7434SB	Sample Bag with 5 Pieces
QPL7434SR	7" Reel with 100 Pieces
QPL7434TR13	13" Reel with 2500 Pieces
QPL7434PCK-01	EVB with 5 Piece Sample Bag

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage (V _{DD})	+6.0 V
Storage Temperature Range	-40 to +150 °C
Maximum RF input Power	-10dBm

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 red device reliability.

Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
Operating Temperature	-40		+85	°C
Junction Temperature			+160	°C
RF Power Supply Voltage	+4.5	+5.0	+5.5	V

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

Optical to Electrical Receiver Application Specifications

Parameter	Condition ⁽¹⁾	Min	Typ	Max	Unit
Supply Current (I _{DD})	Steady state operation		210		mA
Frequency Range		47		1218	MHz
Optical Gain	At 550MHz. O/E gain is defined by 20*log (Z _I /75)		27		dB
Gain Flatness			±1.5		dB
Tilt	Linear tilt from 45 – 1218 MHz; higher tilt can be achieved by changing components		6		dB
Equivalent Input Noise			2.8		pA / √Hz
Maximum RF Output Level at 547.25 MHz	Input from CATV Optical transmitter with an OMI of 4.5%. The PD responsivity was ~0.96(@1550nm		+15		dBmV/ch
	At 45 MHz		-17		dB
Output Return Loss	At 600 MHz		-15		dB
	At 1218 MHz		-18		dB
MER	90MHz to 850MHz, 0dB tilt, 96 channels, 8MHz spacing. ITU-T Annex A 256 QAM 6.952 Msymbols/s.		32	44	
BER				1E-04	

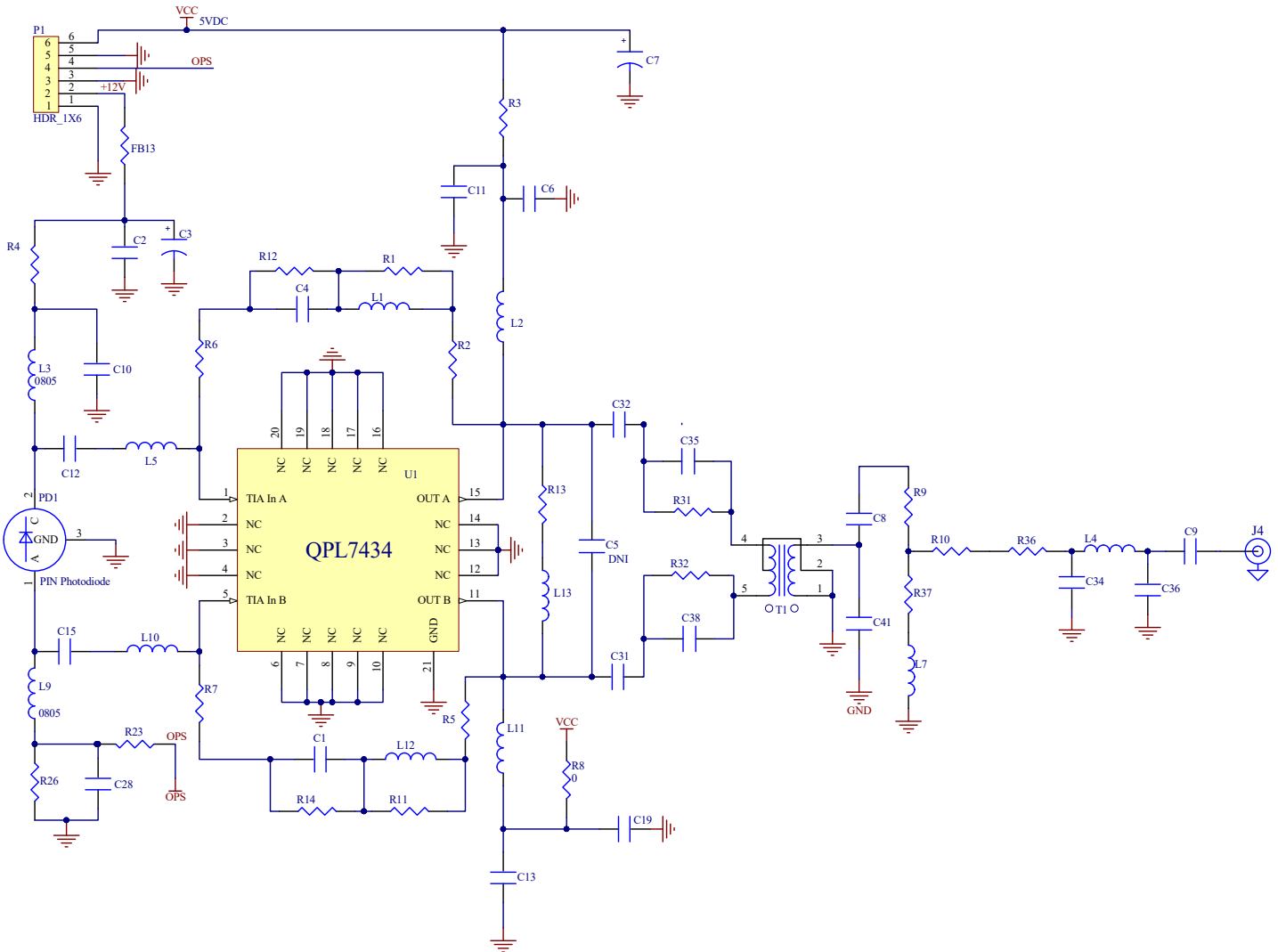
Notes:

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

Optical Input Requirements

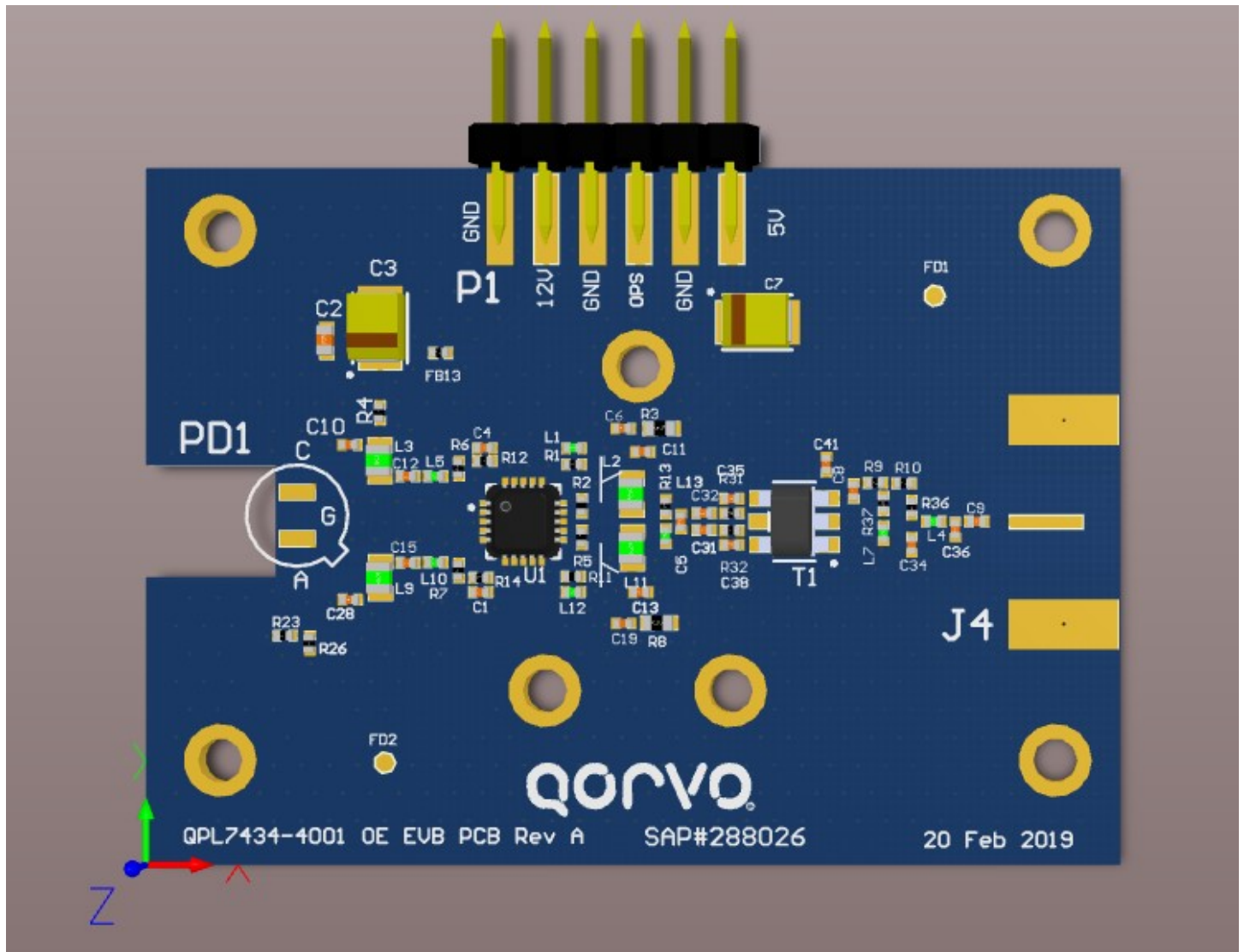
Parameter	Unit	Min	Typical	Max
Optical Input Power	dBm	-20		+2
Optical Modulation Index (OMI)	%/ch (79ch)		3.5	4.5
1550 nm PIN Responsivity	mA/mW		0.96	
1550 nm PIN Capacitance	pF		0.35	

Typical Application Schematic



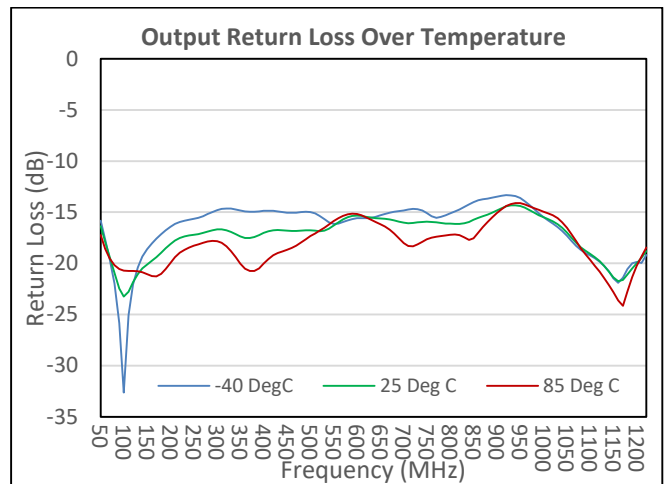
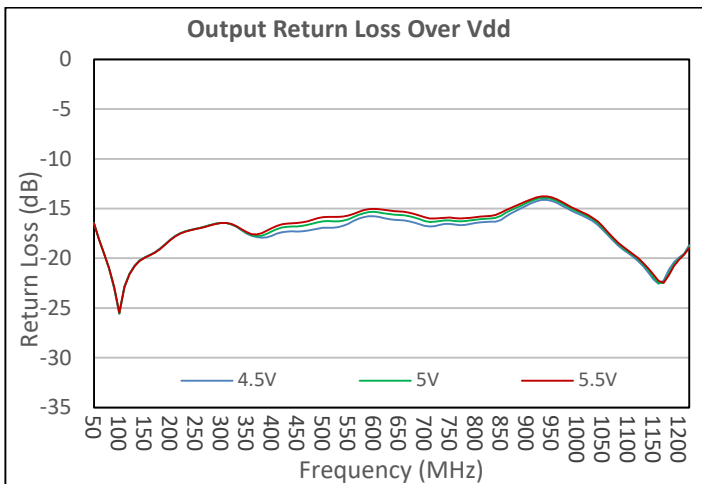
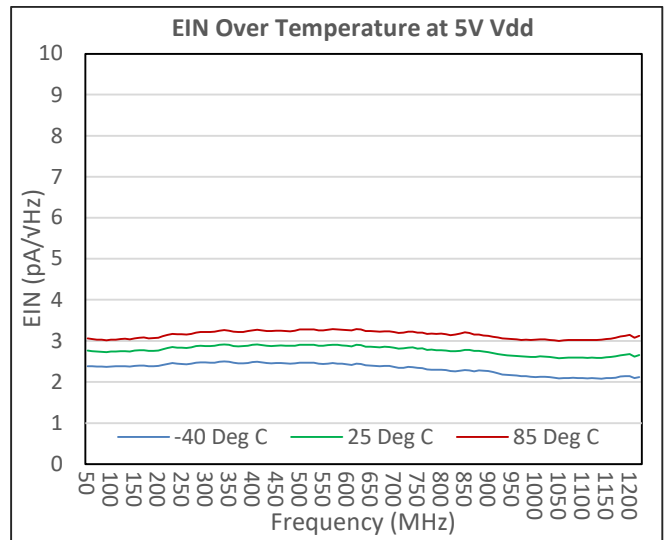
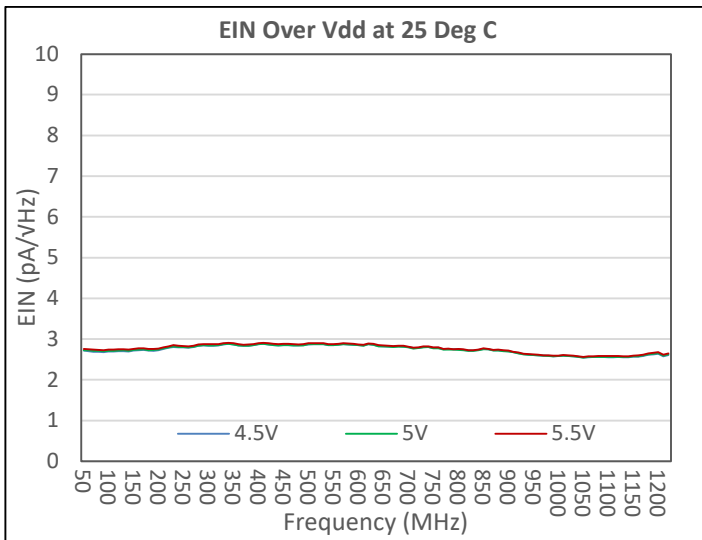
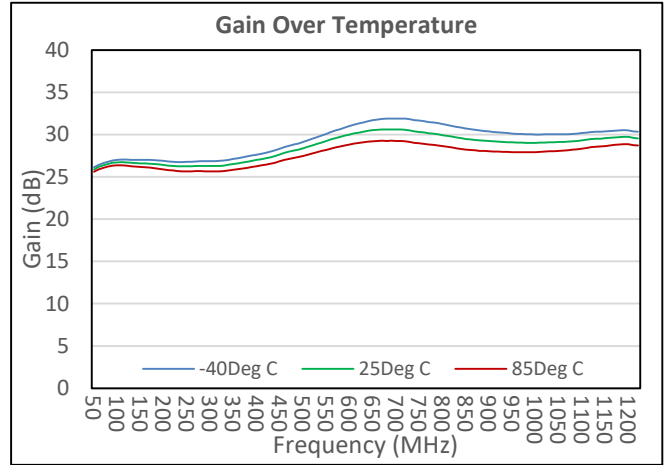
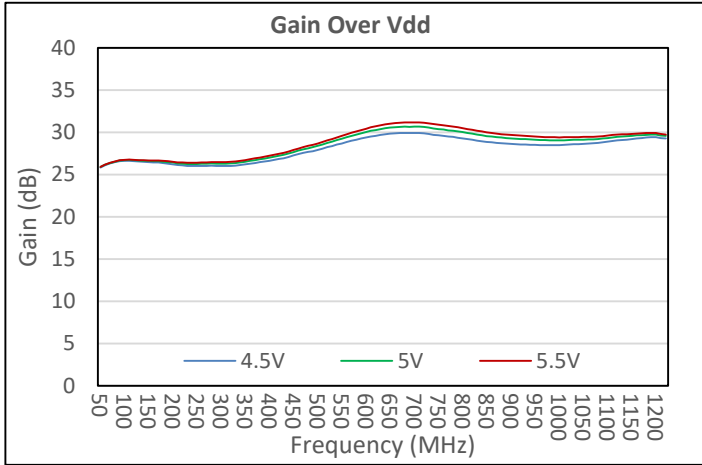
Reference Designator	Description	Manufacturer	Manufacturer Part #
C1, C4, C8, C9, C12, C15	CAP, 1000pF, 10%, 50V, X7R, 0402	Taiyo Yuden	RM UMK105BJ102KV-F
C36	CAP, 0.5pF, +/-0.1pF, 50V, HI-Q, 0402	Johanson Technology	500R07S0R5BV4TD
C11, C13	CAP, 120pF, 5%, 50V, C0G, 0402	Murata Electronics	GRM1555C1H121JA01D
C3, C7	CAP, 10uF, 10%, 16V, TANT-B	AVX Asia Limited	TAJB106K016RNJ
C34	CAP, 1pF, +/-0.1pF, 50V, HI-Q, 0402	Johanson Technology	500R07S1R0BV4TD
C31, C32	CAP, 100pF, 10%, 50V, STD, 0402	AVX Asia Limited	04025C101KAT2A
C6, C10, C19, C28	Cap, 10nF /10%/0402/X7R/25V/NISN	AVX Asia Limited	
C2	Cap, 100nF/10%/0402/X7R/16V/NISN	AVX Asia Limited	
R1, R11, FB13, R36	RES, 0 OHM, 5%, 1/10W, 0402	Kamaya, Inc	RMC1/16SJPTH
R9, R10	RES, 22 OHM, 5%, 1/16W, 0402	Kamaya, Inc	RMC1/16S-220JTH
R13	RES, 150 OHM, 5%, 1/16W, 0402	Kamaya, Inc	RMC1/16S-151JTH
R2, R5, R6, R7	RES, 3.3K, 5%, 1/16W, 0402	Kamaya, Inc	RMC1/16S-332JTH
R12, R14	RES, 1.5M, 5%, 1/16W, 0402	Kamaya, Inc	RMC1/16S-155JTH
R23	RES, 10K, 1%, 1/16W, 0402	Panasonic Devices Sales	ERJ-2RKF1002X
R37	RES, 360 OHM, 1%, 1/10W, 0402	Kamaya, Inc	RMC1/16SK3600FTH
R31, R32	RES, 47 OHM, 5%, 1/16W, 0402	Panasonic Devices Sales	ERJ-2GEJ470
R3, R8	Res, 0R /0603/Chip	Kamaya, Inc	
R26, R4	RES, 1K, 1%, 1/10W, 0402	KOA Europe GmbH	RK73H1ETTPL1001F
PD1	DIO, PHOTO, 1000-1650nm, 6GHz, SC/APC	SWT Beijing SWT Science & Technology	PDS133-CSA-C0104
L4	IND, 10nH, 5%, M/L, 0402	Taiyo Yuden	LG HK 1005 10NJ-T
L7, L13	IND, 68nH, 5%, W/W, 0402	Coil craft, Inc.	0402CS-68NXJRW
L3, L9	IND, 880nH, 5%, W/W, 0805	Gowanda Electronics	CC0805-880J-2
L5, L10	IND, 4.7nH, +/-0.1nH, W/W, 0402	Murata Electronics	LQW15AN4N7B00D
L2, L11	IND, 1uH, 20%,3A,1mm, W/W, 0805 HQ	CoilCraft Inc	0805LS-0102
T1	XFMR, 1:3, 5-1200MHz, 75Ohms, 2W, S20	Mini RF, Inc.	RFXF5743
J4	CONN. 75 OHM, EDGE LAUNCH F	Samtec Inc	LTI-FSF55NT-P
P1	CONN, HDR, ST, 6-PIN, 0.100"	Samtec INC.	TSW-106-07-G-S
C5, C35, C38, C41, L1, L12	NOT POPULATED ITEM-1		DUMMY PART
U1	Differential TIA, QPL7434, 4x4 QFN		QPL7434

Evaluation Board Assembly Drawing



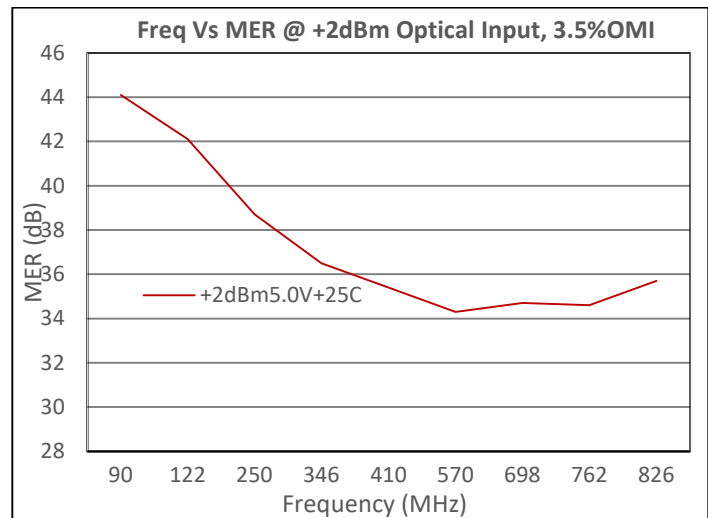
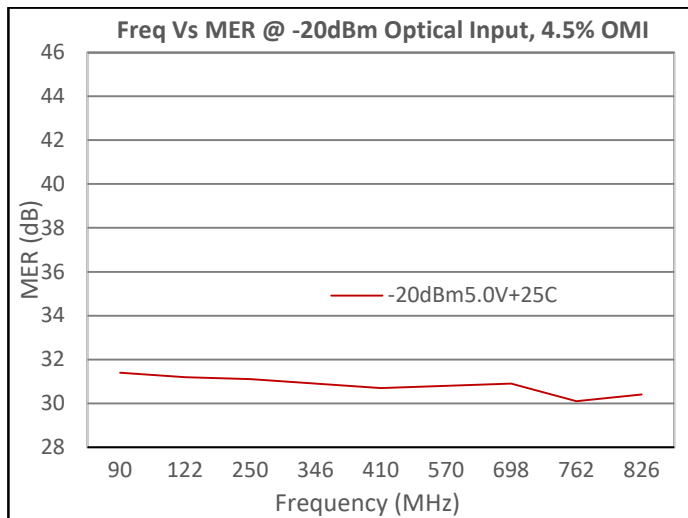
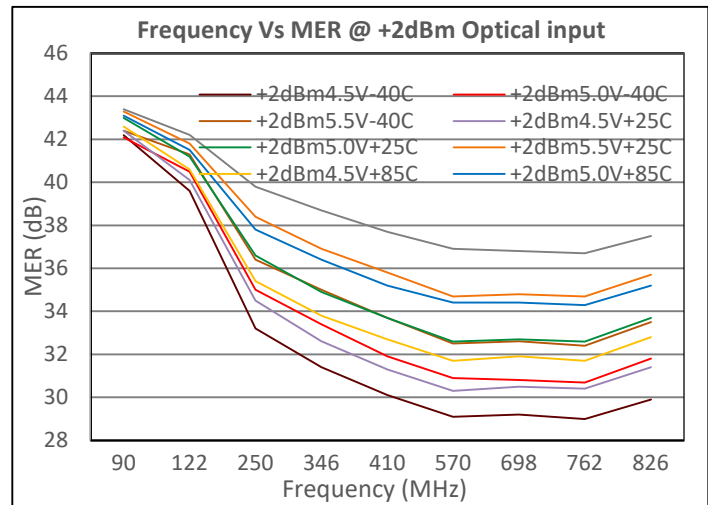
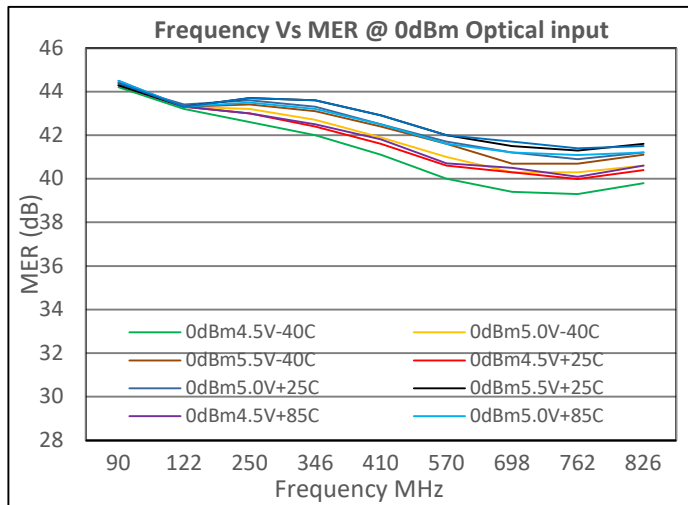
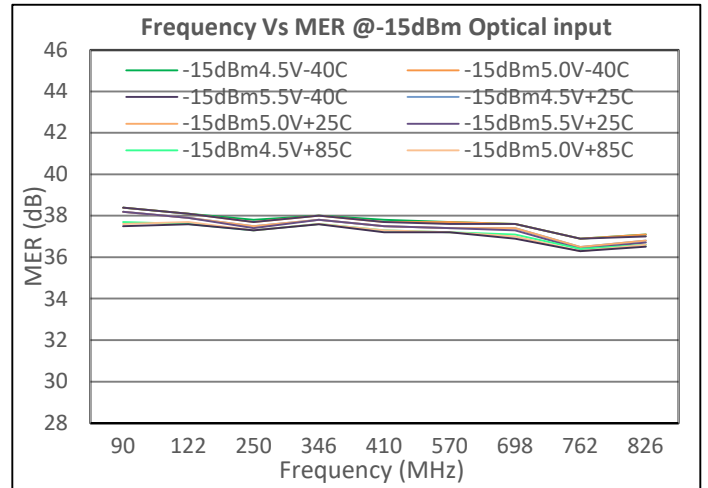
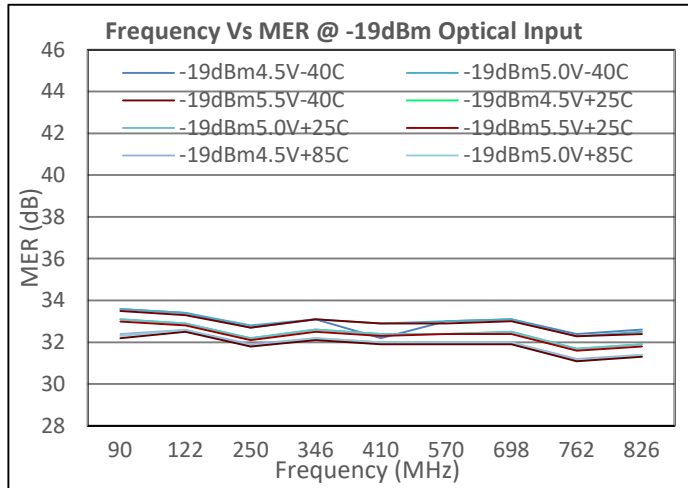
Typical Performance

Test conditions unless otherwise stated: T = +25 °C, V_{DD} = +5 V, OMI=4.5%

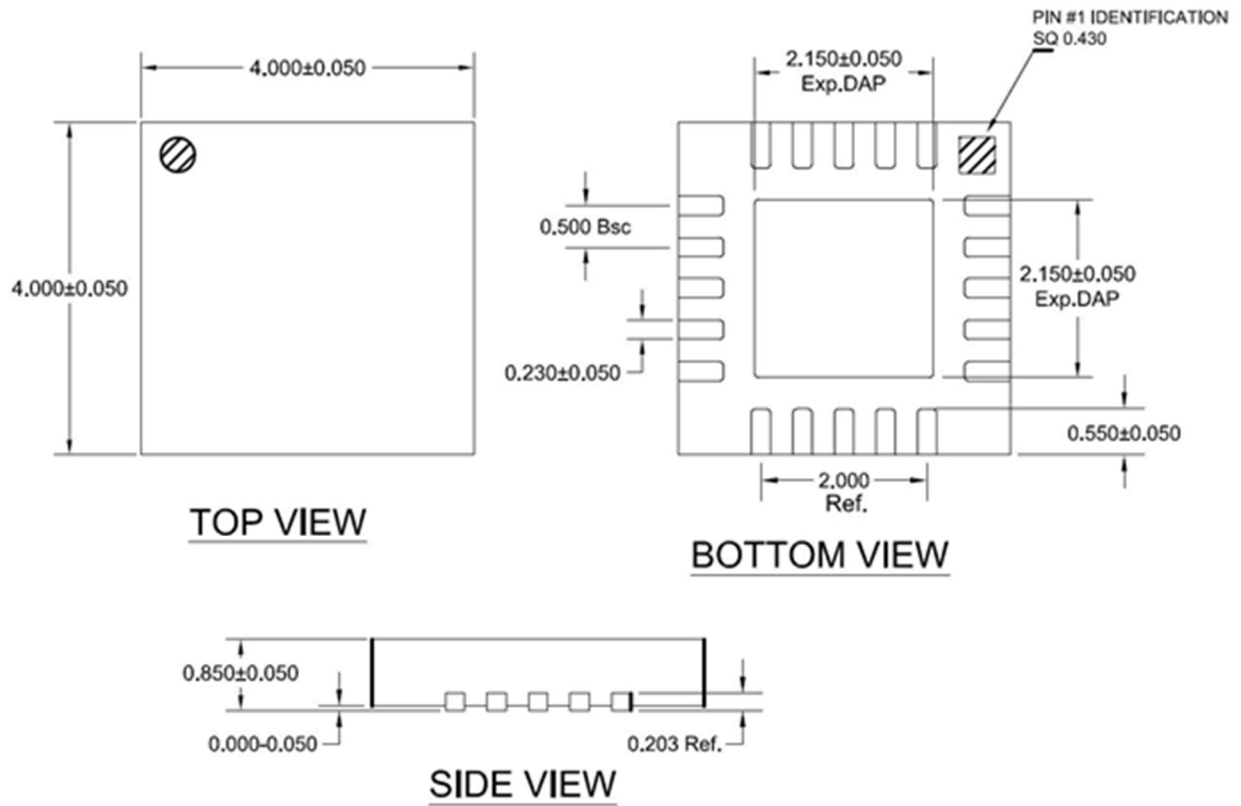


Typical Performance

Test conditions unless otherwise stated: T = +25 °C, V_{DD} = +5 V, OMI=4.5%

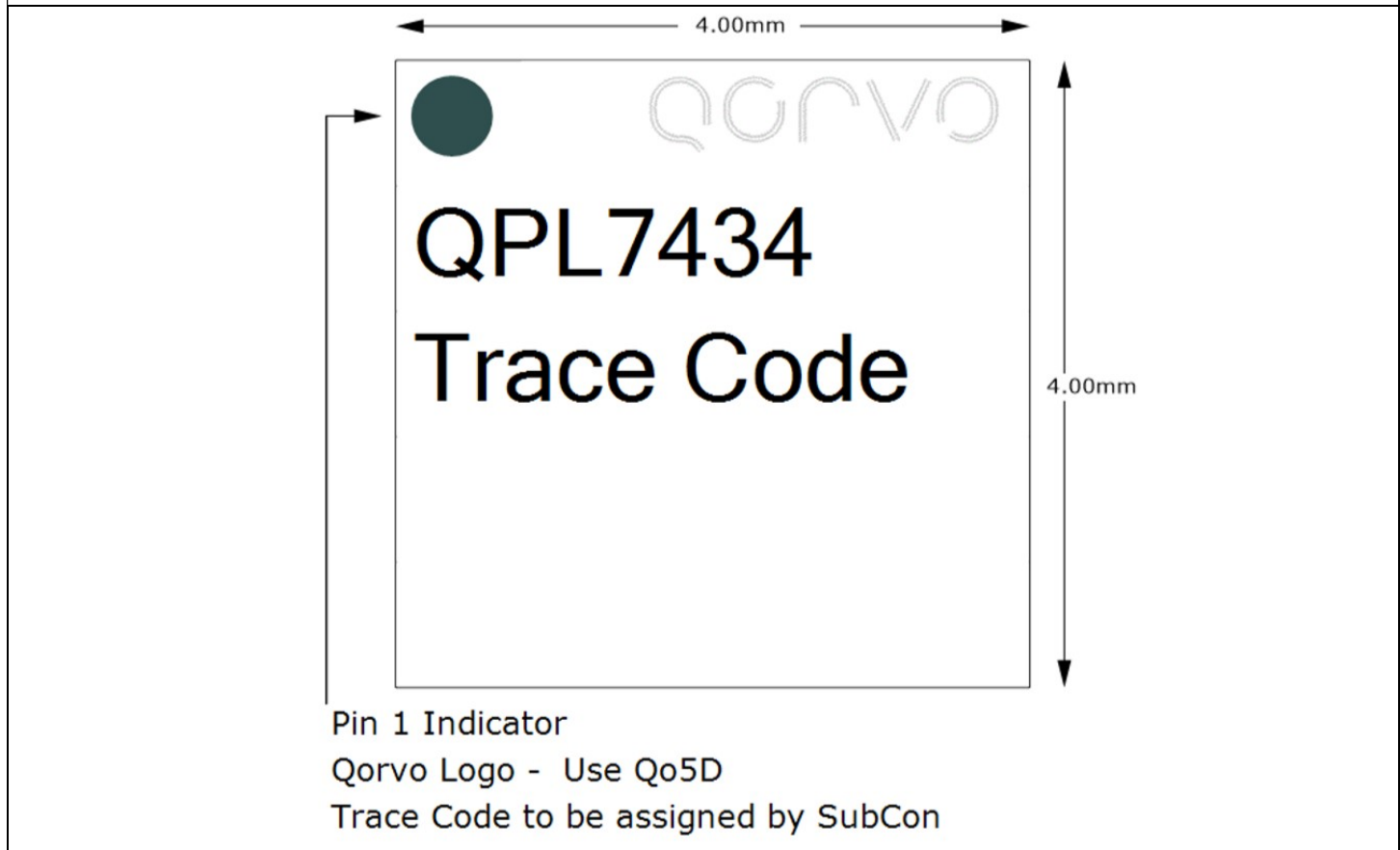


Package Dimensions



Notes:
1. Dimensions in millimeters

Package Marking



Pin Configuration and Description

Pin	Name	Description
1	TIA IN A	Input to the TIA
2	NC	Not Connected
3	GND	Connect to Ground
4	NC	Not Connected
5	TIA IN B	Input to the TIA
6	GND	Connect to Ground
7	GND	Connect to Ground
8	GND	Connect to Ground
9	GND	Connect to Ground
10	GND	Connect to Ground
11	OUT B	Output of the TIA
12	GND	Connect to Ground
13	GND	Connect to Ground
14	GND	Connect to Ground
15	OUT A	Output of the TIA
16	GND	Connect to Ground
17	GND	Connect to Ground
18	GND	Connect to Ground
19	GND	Connect to Ground
20	GND	Connect to Ground

