TAT7460

75Ω CATV 16.5dB Gain 50-2600MHz Amplifier

Product Overview

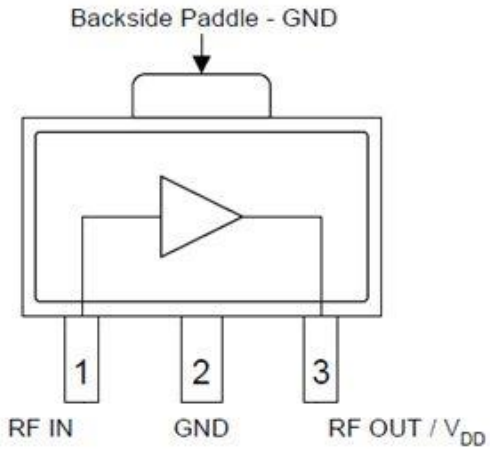
The TAT7460 is a GaAs pHEMT single ended RF amplifier IC featuring 16.5dB of flat gain. This IC is design to support CATV application from 50 to 2600MHz using a single 5V supply. The TAT7460 is offered in a SOT-89 package for convenient layout and design in set top and infrastructure projects for 75Ω CATV and satellite applications.

SOT-89 Package

Key Features

- 50 – 2600 MHz bandwidth
- 2.4 dB Noise Figure <1600 MHz
- Extremely Flat Gain Response
- Low Power Consumption: 100 mA at 5 V

Functional Block Diagram



Applications

- CATV Distribution Amplifiers
- Multi-Dwelling Units
- Drop Amplifiers
- Single-ended Gain Blocks
- FTTH Receivers

Ordering Information

Part Number	Ordering Info	Description
TAT7460 Sample	1074914	75Ω pHEMT Amplifier
TAT7460	1074911	1,000 pieces on 7” Reel
TAT7460 EVB	1074915	50 – 2600 MHz Evaluation Board

Absolute Maximum Ratings

Parameter	Rating
Storage Temperature	−65 to +150 °C
Device Voltage (V_D)	+10.0 V

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.

Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit
Device Voltage (V_{DD})	4.5	5.0	6.5	V
Device Current (I_{DD})		100	120	mA
Case Temperature	0		+85	°C
Tj for >10^6 hours MTTF			+150	°C

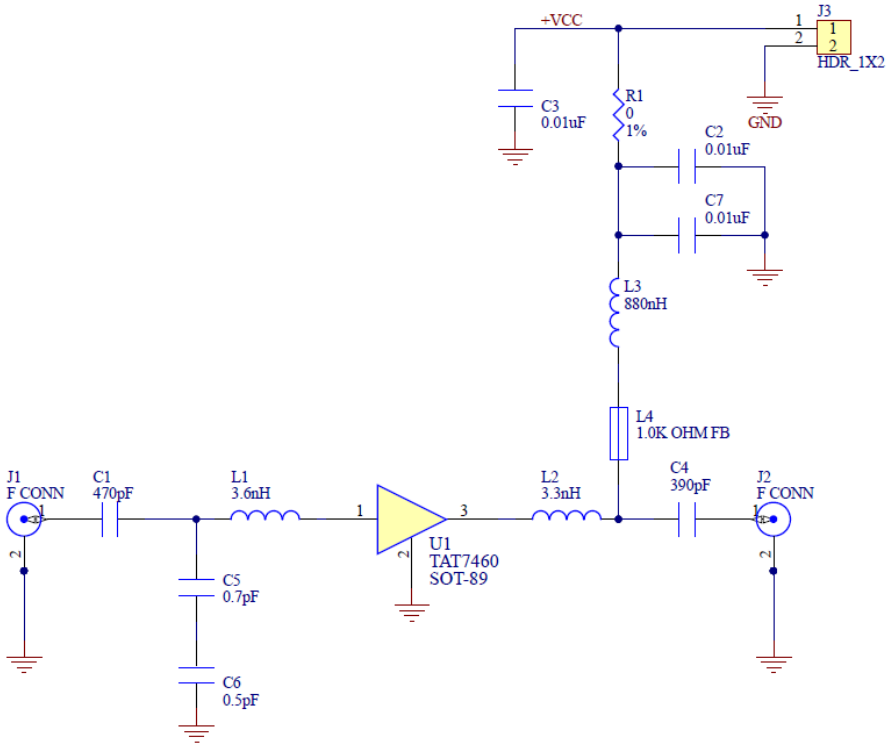
Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

Electrical Specifications

Parameter	Conditions (1)	Min	Typical	Max	Units
Operational Frequency Range		50		2600	MHz
Gain		16.1	16.5		dB
Gain Flatness			+/- 0.5		dB
Input Return Loss			18		dB
Output Return Loss			18		dB
CSO	30 dBmV / channel at output 80 channels flat		-61		dBc
CTB			-72		dBc
XMOD			-71		dBc
Output IP2	Pout = +5 dBm / tone Δf = 6 MHz, 325MHz	+56.2	+58		dBm
Output IP3		+31.1	+36		dBm
Output P1dB			+20.5		dBm
Noise Figure	50 – 1600 MHz		2.5		dB
Device Current (I_{DD})			100	120	mA
Thermal Resistance, θ_{jc}	Junction to case		51		°C/W

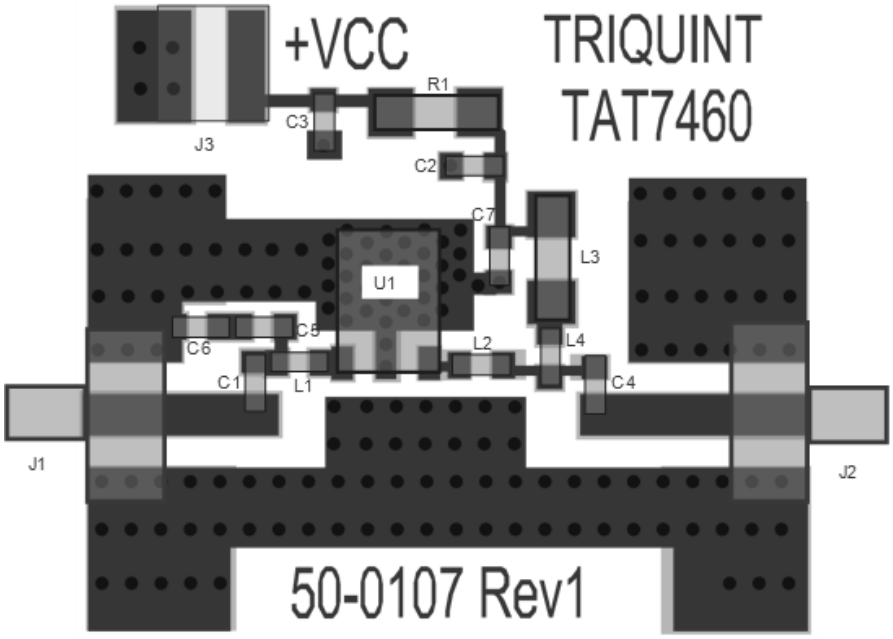
Notes:
1. Test conditions unless otherwise noted: V_{DD} = +5.0 V, Temp = +25 °C, Freq = 50 – 2600 MHz

Evaluation Board Schematic, 50-2600MHz



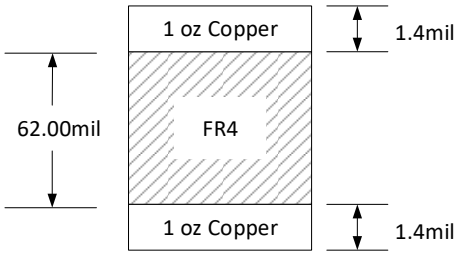
Reference Designator	Description	Manufacturer	Part Number
U1	75 Ω pHEMT Amplifier	Qorvo	TAT7460
PCB	50-2600MHz Evaluation Board	TTM	50-0107
C1	CAP, 470pF, 5%, 25V, C0G, 0603	Kemet	C0603C471J3GACTU
C2, C3, C7	CAP, 0.01uF, 10%, 50V, X7R, 0603, LF	Murata	GRM188R71H103KA01D
C4	CAP, 390pF, 5%, 25V, C0G, 0603	Kemet	C0603C391J3GACTU
C5	CAP, 0.7PF, +/-0.05pF, 50V, 0603	AVX	06035J0R7ABSTR
C6	CAP 0.5pF ±0.1PF 250V 0603	Murata	GQM1875C2ER50BB12D
L1	IND, 0603, 3.6NH, 5%	Coilcraft, Inc	0603CS-3N6XJL
L2	IND, 0603, 3.3NH, 5%	Coilcraft, Inc	0603CS-3N3X_L_
L3	IND, 1206, 880NH, +-5%	Gowanda	LQH31HNR88J03
L4	Ferrite Bead, 0402, 200mA, 1.0 kΩ	Murata	BLM15AG102SN1
R1	RES, 0 OHM, 1206	Kamaya	RMC1/8JPTP
J1, J2	CONN. 75 OHM, EDGE LAUNCH F	Lighthorse Technologies	LTI-FSF55NT-P
J3	CONN, HDR, RT ANG, 2 PIN, 0.100", T/H	Molex	022-28-8021

Evaluation Board Layout (50 – 2600 MHz)

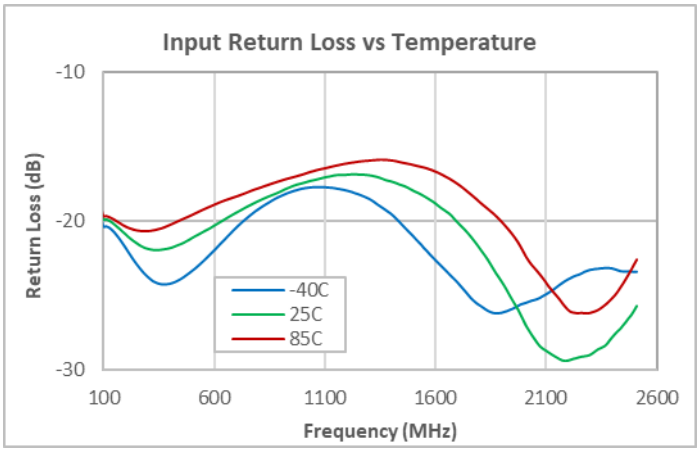


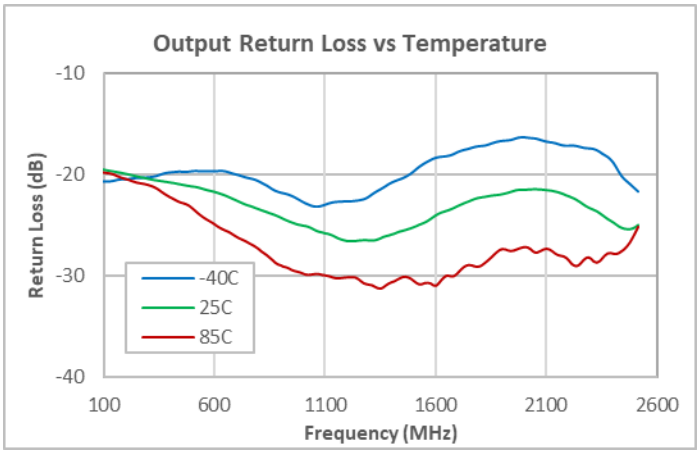
EVB PCB Material and Stack-up

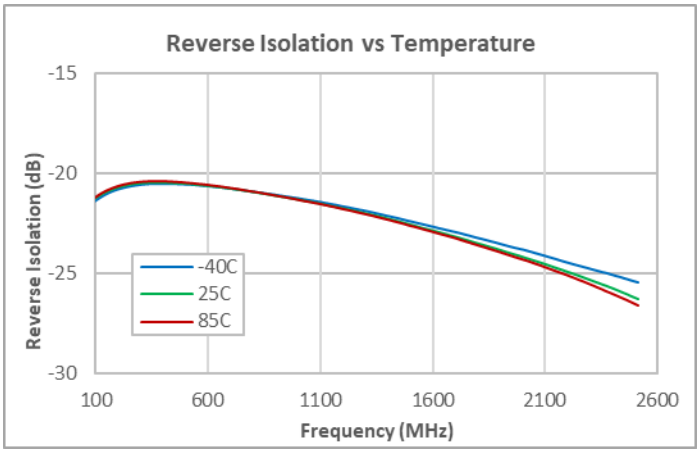
Board Material: 0.062" FR4, ε_r=4.2
Plating: 1oz Copper

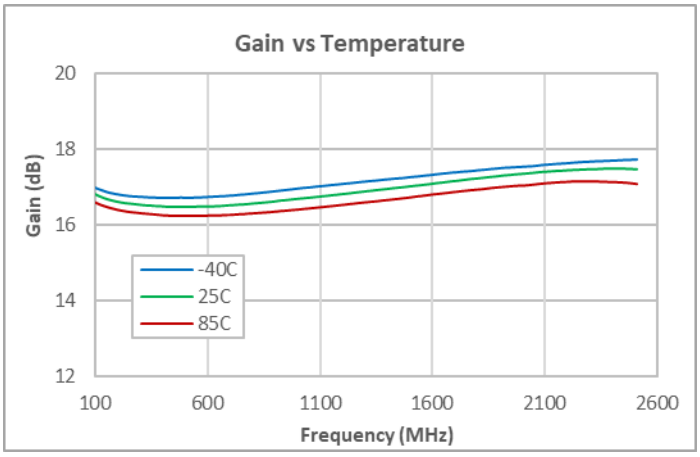


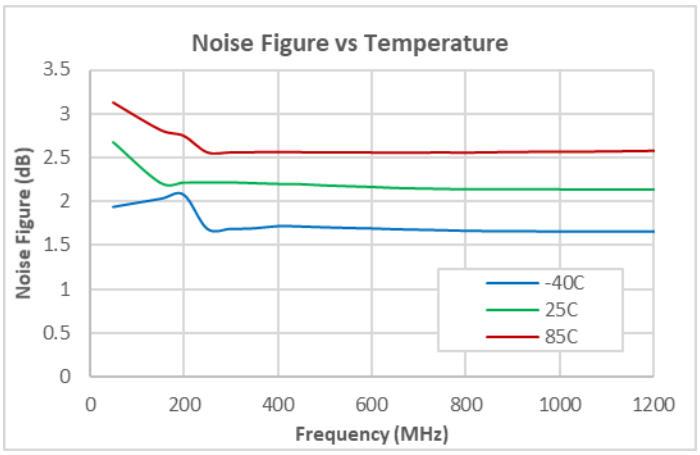
Performance Plots

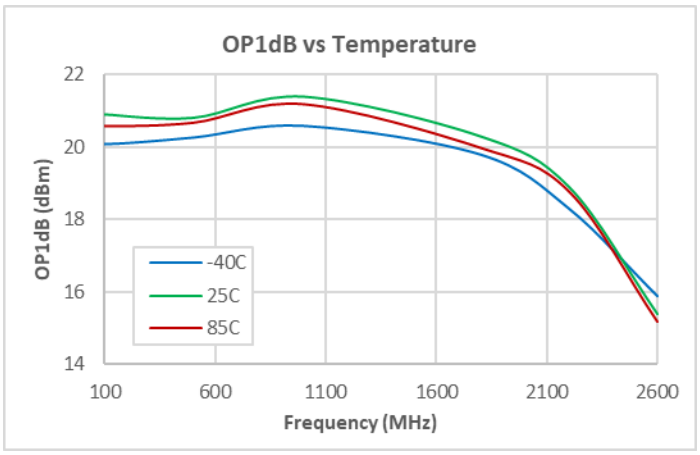






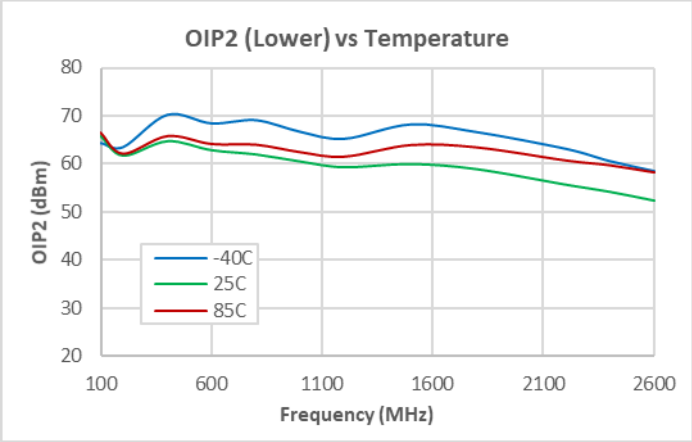


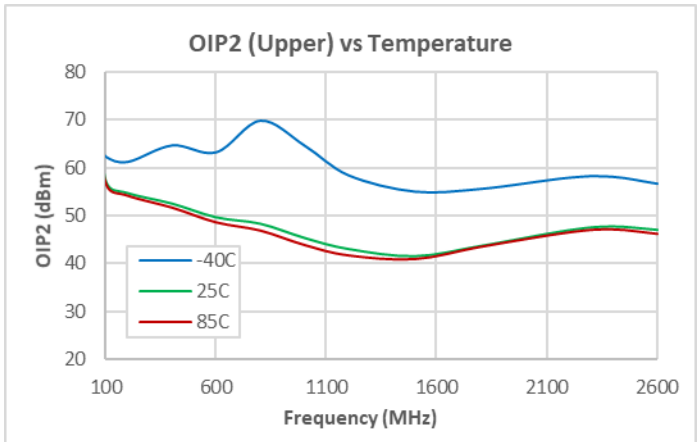


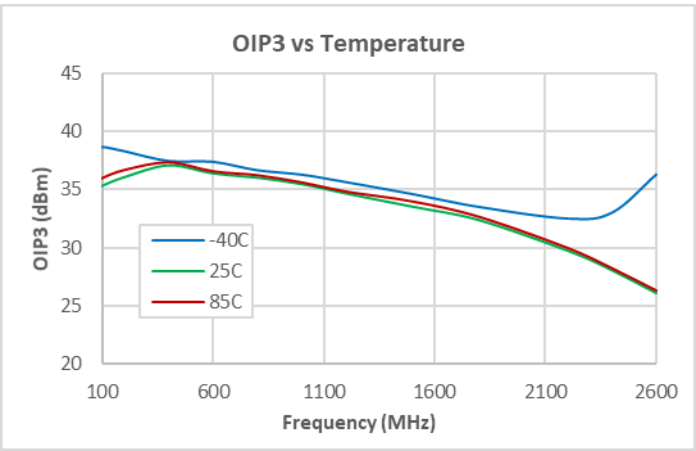


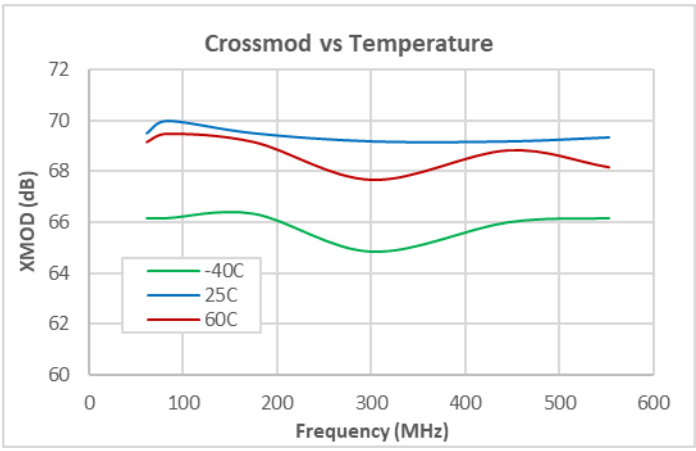
Test conditions unless otherwise noted: V_{DD} = +5 V, I_{DD} = 100 mA, Temp = +25°C

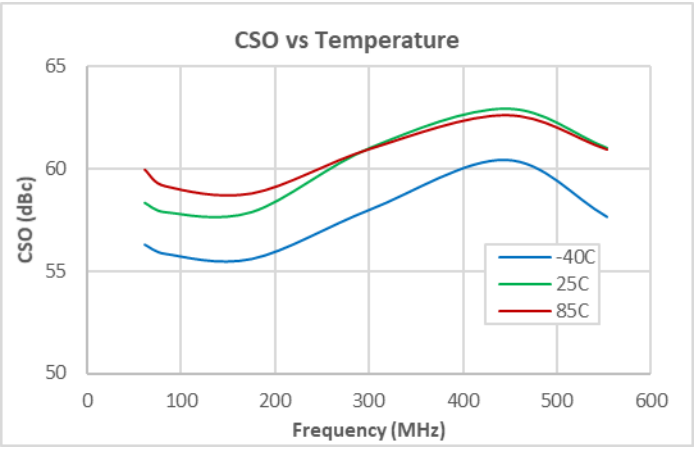
Performance Plots

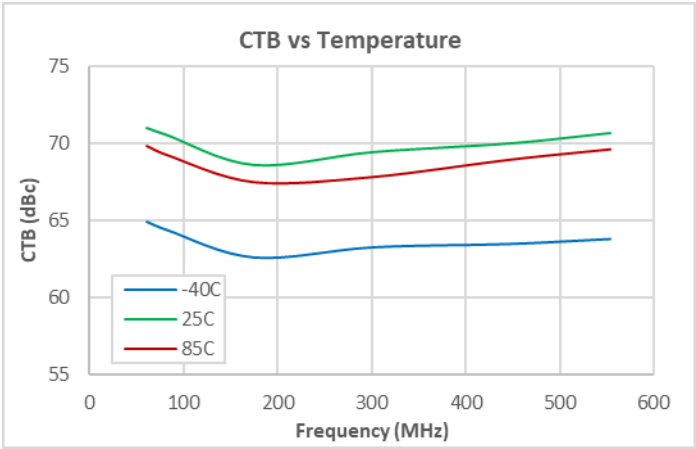








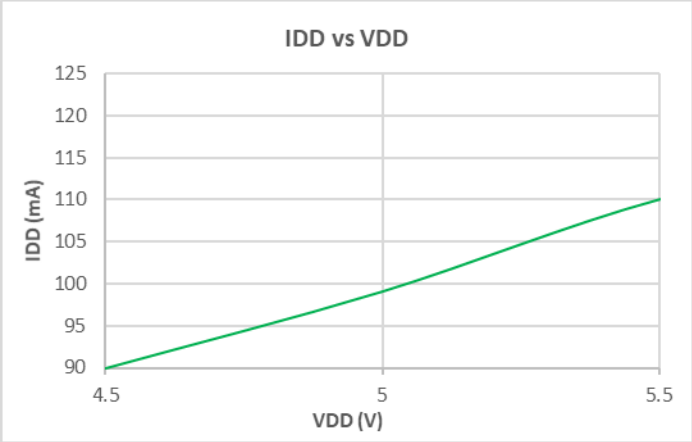


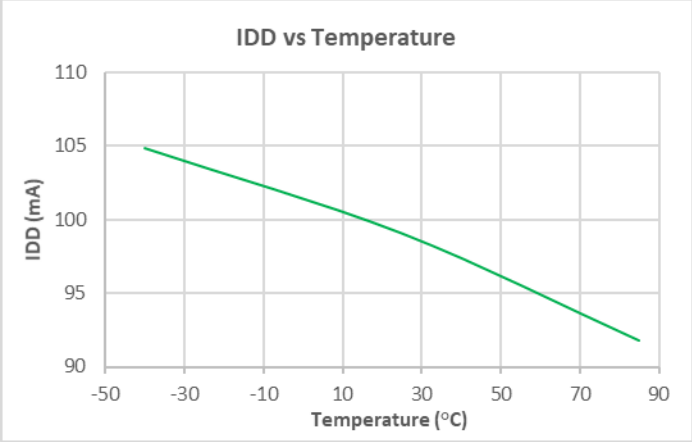


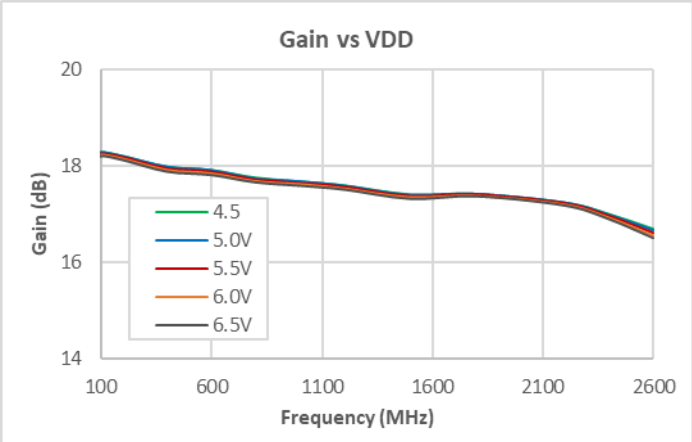
Notes:

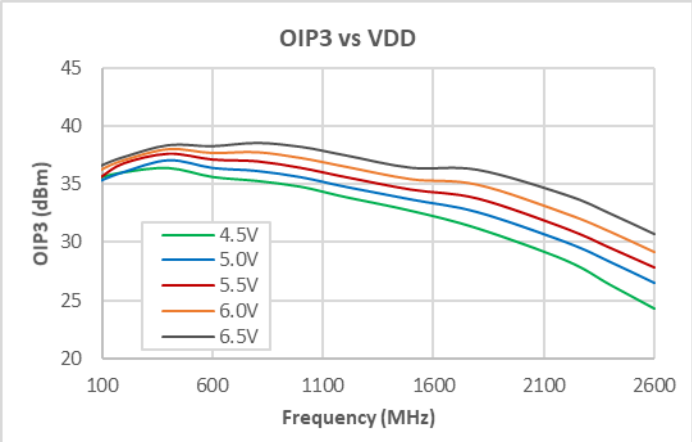
1. Test conditions unless otherwise noted: V_{DD} = +5 V, I_{DD} = 100 mA, Temp = +25°C
2. OIP2/OIP3: 5dBm/tone, 6MHz spacing
3. CSO/CTB/XMOD: 80 Channels NTSC, Flat Tilt, 30dBmV/Ch Output

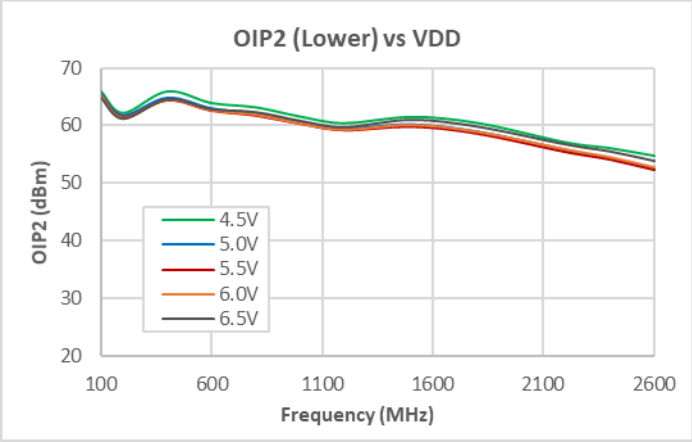
Performance Plots

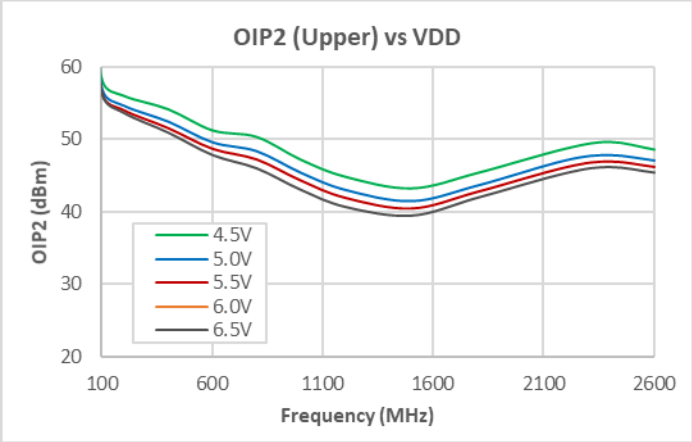












Notes:

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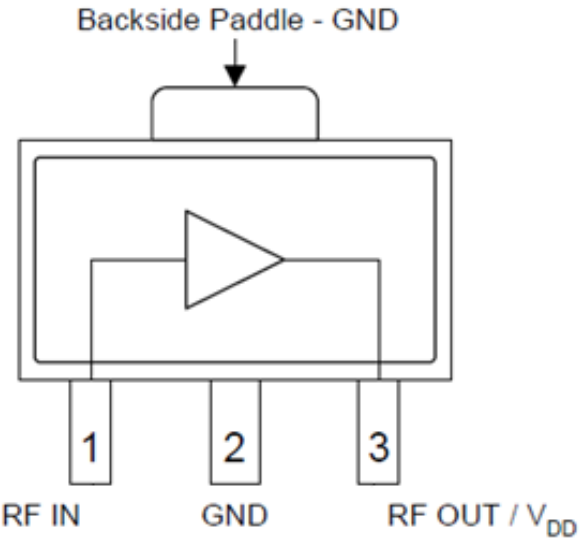
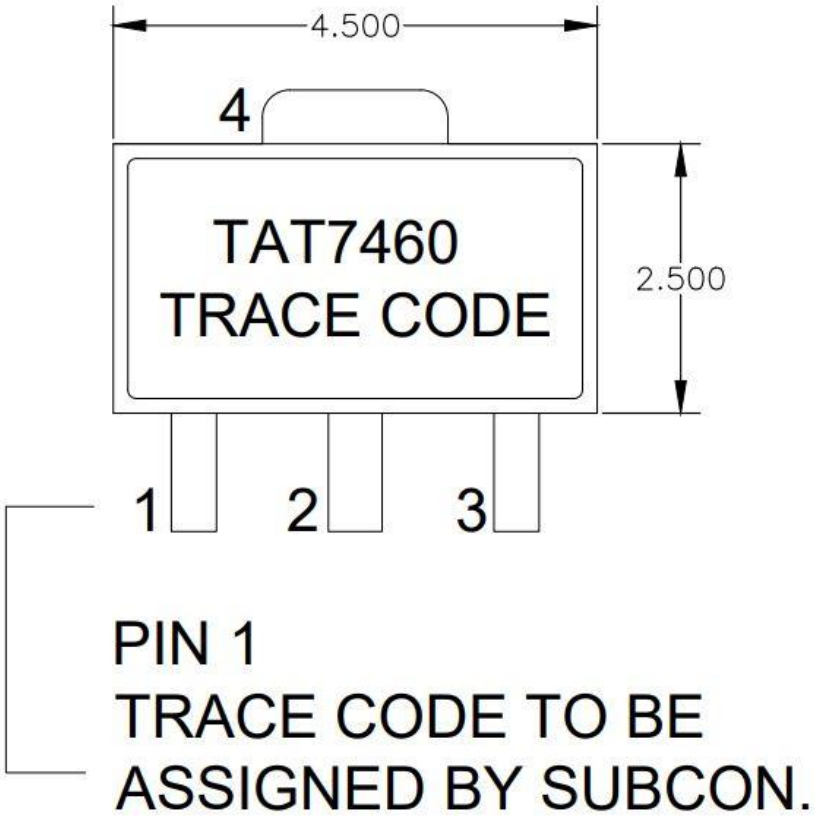
2. OIP2/OIP3: 5dBm/tone, 6MHz spacing

Pin Configuration and Description

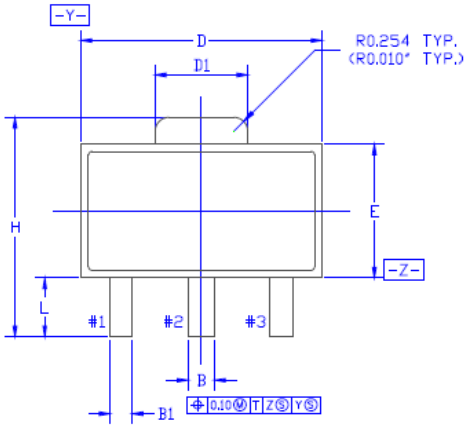


Pin Number	Label	Description
1	RF IN	RF input pin. DC blocking capacitor required.
2	GND	Ground connection.
3	RF OUT	RF output and bias pin. VDD bias choke required.
Backside Paddle	GND	Ground. Use recommended via pattern to minimize inductance and thermal resistance. See PCB Mounting Pattern for suggested footprint.

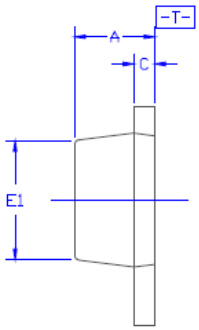
Package Marking



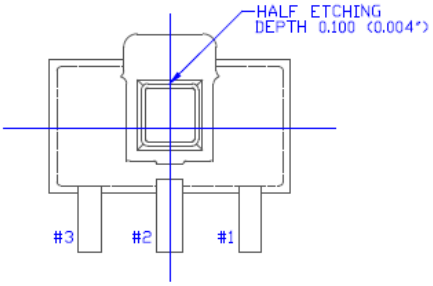
Package Outline



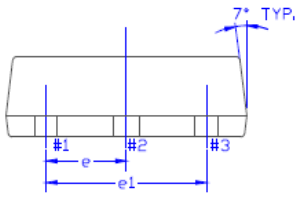
TOP VIEW



SIDE VIEW



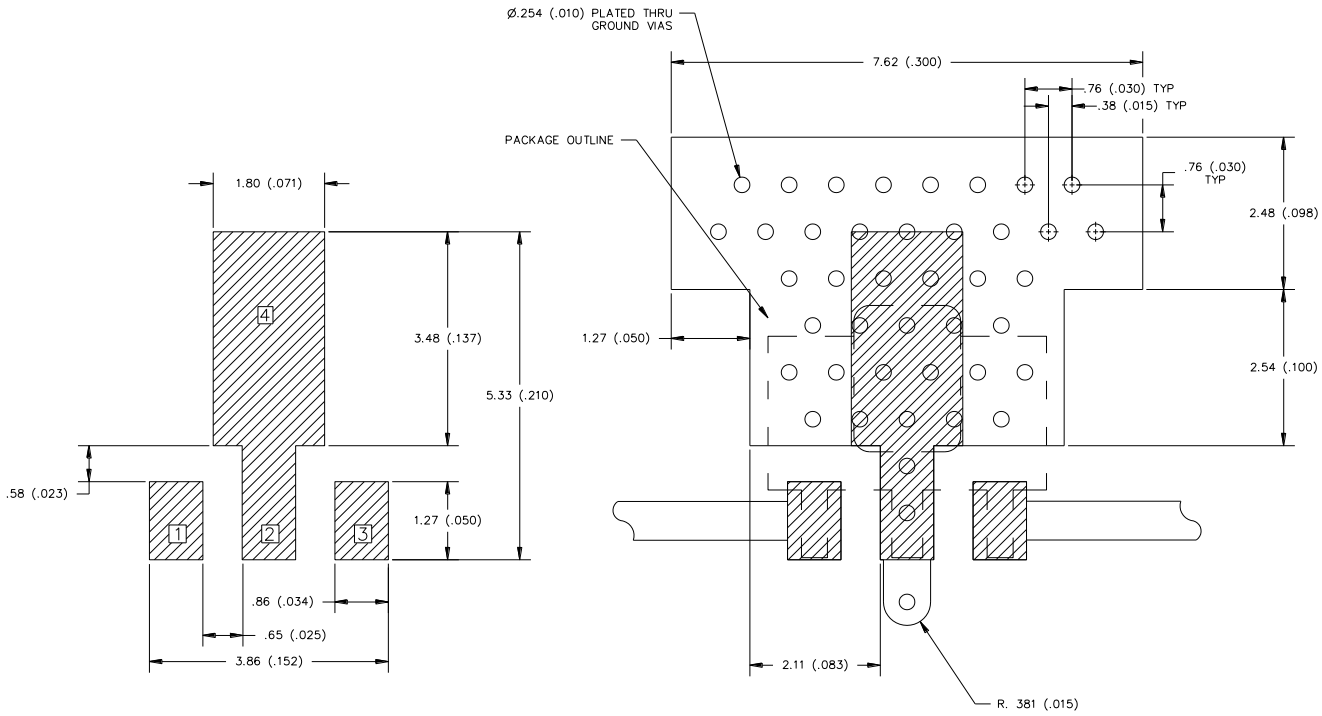
BOTTOM VIEW



SIDE VIEW

SYMBOL	Common					
	DIMENSIONS MILLIMETER			DIMENSIONS INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	1.40	1.50	1.60	0.055	0.059	0.063
B	0.44	0.50	0.56	0.017	0.020	0.022
B1	0.36	0.42	0.48	0.014	0.017	0.019
C	0.35	0.40	0.44	0.014	0.016	0.017
D	4.40	4.50	4.60	0.173	0.177	0.181
D1	1.62	1.73	1.83	0.064	0.068	0.072
E	2.30	2.50	2.60	0.091	0.098	0.102
E1	2.13	2.20	2.29	0.084	0.087	0.090
e	1.50 BSC.			0.059 BSC.		
e1	3.00 BSC.			0.118 BSC.		
H	3.95	4.10	4.25	0.156	0.161	0.167
L	0.90	1.10	1.20	0.035	0.043	0.047

PCB Mounting Pattern



Notes:

1. Ground / thermal vias are critical for the proper performance of this device. Vias should use a .35 mm (#80/.0135") diameter drill and have a final, plated thru diameter of .25 mm (.010").
2. Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
3. RF trace width depends upon the PC board material and construction.

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1A (250V to < 500V)	ANSI/ESDA/JEDEC JS-001
ESD – Charged Device Model (CDM)	Class C3 (≥1000V)	ANSI/ESDA/JEDEC JS-002
MSL – Moisture Sensitivity Level	Level 5a	IPC/JEDEC J-STD-020

Caution!
ESD-Sensitive
Device

Solderability

Compatible with both lead-free (260 °C max. reflow temp.) soldering process.
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 ($C_{15}H_{12}Br_40_2$) 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

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