TAT7461

75 Ω RF Amplifier (50 – 1000MHz)

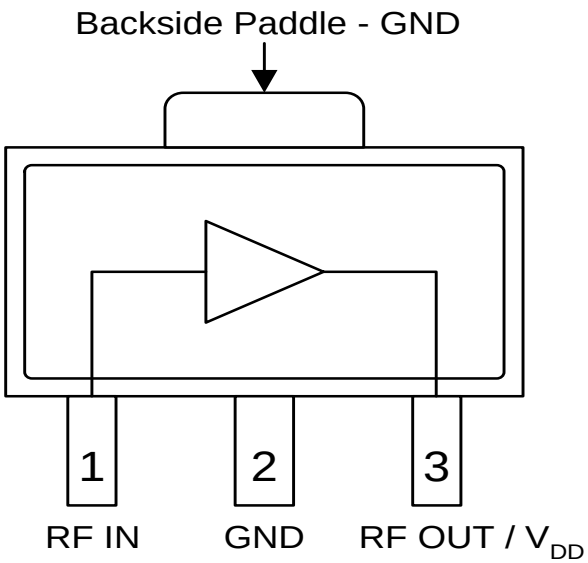
Product Overview

The TAT7461 is a 75 Ohm RF Amplifier designed for CATV applications to 1000 MHz. The balance of low noise and distortion provides an outstanding solution for drop and distribution amplifiers.

The TAT7461 is fabricated using 6-inch GaAs pHEMT technology to optimize performance and cost. On-chip negative feedback provides excellent gain and return loss stability. The TAT7461 also uses an on-chip active bias for consistent bias current and repeatable performance. Simple external tuning allows the TAT7461 to achieve excellent return loss.

SOT-89 Package

Functional Block Diagram



Top View

Key Features

- 75 Ohm, 50-1000 MHz Bandwidth
- pHEMT Device Technology
- On-Chip Active Bias and Negative Feedback
- Low Noise: < 2.6 dB to 1000 MHz
- Low Distortion: CSO -68 CTB -90 dBc
  (at Pout = +26 dBmV/ch, 80 ch flat loading)
- 16.1 dB Typical Gain
- +42 dBm Typical OIP3
- +22 dBm Typical P1dB
- 2.2 dB Typical NF and < 2.6 dB up to 1000 MHz
- Unconditionally Stable
- Low Power Consumption: +6.0 V, 139 mA
- SOT-89 package

Applications

- Distribution Amplifiers
- Multi Dwelling Units
- Drop Amplifiers
- Single Ended Gain Block

Ordering Information

Part Number	Description
1074893	7” Reel with 1000 pieces
TAT7461SB	Sample bag with 5 pieces
TAT7461SR	7” Reel with 100 pieces
TAT7461EVB-01	Evaluation Board

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage (V_{DD})	+10 V
Maximum Input Level	+27 dBm
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.

Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
V_{DD}		+6.0		V
I_{DD}	110	139	162	mA
T_{CASE}	−40		+85	°C
Tj for >10^6 hours MTTF			+150	°C

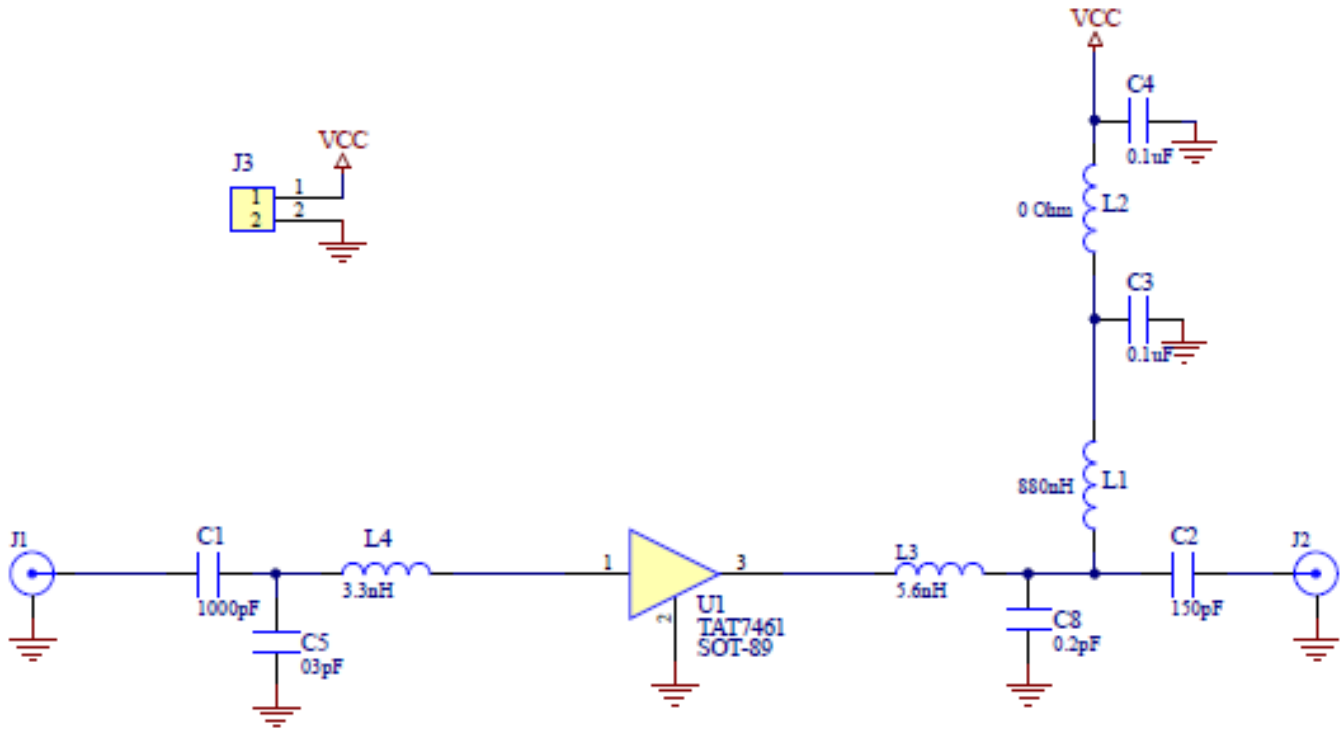
Electrical performance is measured under conditions noted in the electrical specifications table. Specifications are not guaranteed over all recommended operating conditions.

Electrical Specifications

Parameter	Condition	Min	Typ	Max	Unit
Supply Voltage (V_{DD})			6		V
Supply Current (I_{DD})		110	139	162	mA
Frequency Range		50		1000	MHz
Gain			16.1		dB
Gain Flatness			±0.1		dB
CSO	+26 dBmV/ch at output, 80 ch. flat		-68		dBc
CTB	+26 dBmV/ch at output, 80 ch. flat		-90		dBc
Input Return Loss			23		dB
Output Return Loss			23		dB
Noise Figure			2.2		dB
OIP2	Pout = +5 dBm/tone, Δf = 1 MHz		+61		dBm
OIP3	+12 dBm / tone output, Δf=6MHz, Full Band		+42		dBm
Thermal Resistance, Θ_{JC}	Module (Junction to case)		57		˚C/W

Note: Typical performance is for the following conditions: Temp = +25 °C, V_{DD} = +6 V, I_{DD}=139mA, 75 Ω system, Full band unless otherwise noted

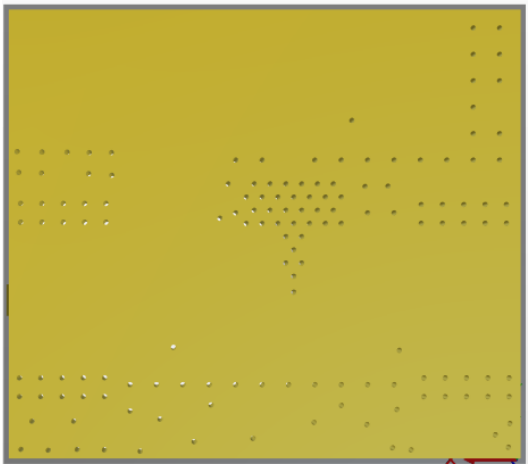
Evaluation Board Schematic 50 MHz – 1000 MHz



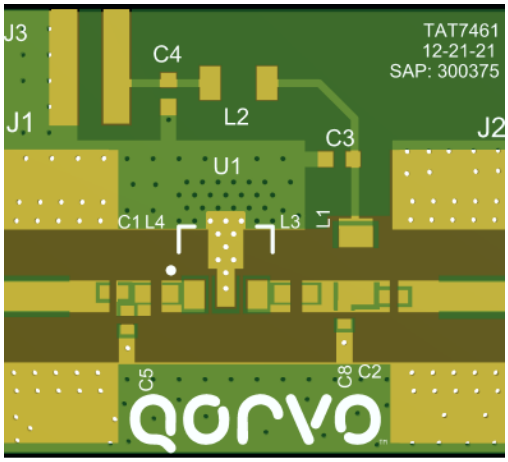
Evaluation Board Bill of Materials: 6V

Ref Des	Description	Manufacturer	Part Number
U1	75 Ω High Linearity pHEMT Amplifier	Qorvo	TAT7461SB
C1	CAP, 1000pF, 0402, 10 %	Kemet	C0402C102K5GACTU
C2	CAP, 150pF, 0402, 5 %	AVX1	04025A151JAT2A
C3, C4	CAP, 0.01uF, 0402, 10 %	Capax Technologies	0603X103K1015
C5	CAP, 0.3pF, 0402, +/- .05pF	AVX1	04023J0R3ABSTR
C8	CAP, 0.2pF, 0402, +/- .05pF	AVX1	04023J0R2ABSTR
L1	IND, 880nH, 1206	Murata1	LQH31HNR88K
L2	RES, 0 Ω ,1206	KOA Speer Electronics, Inc.	RK73Z2BTTD
L3	IND, 5.6nH, 0603	Coilcraft	0603CS-3N3XGRW
L4	IND, 3.3nH, 0603	Coilcraft	0603CS-5N6XGRW
J1, J2	75 Ω F connector	Lighthorse	FSF55MGT-P-10A (1)
J3	Conn, HDR, RT Angle, 2 Pin	Molex	022-28-8021

Evaluation Board PCB Front and Back Side (50 – 1000 MHz)



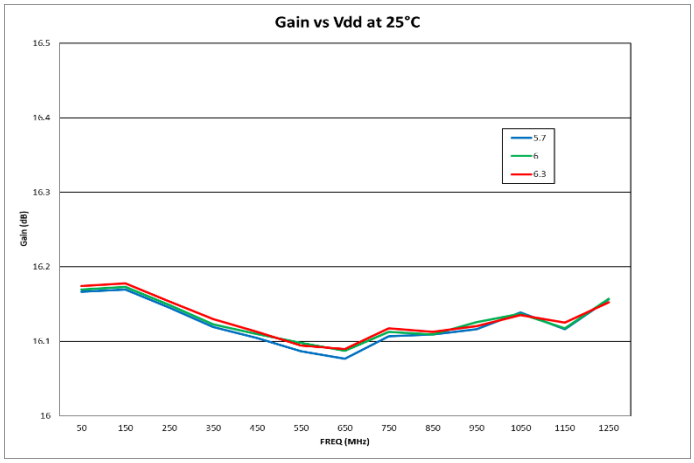
Back side of PCB

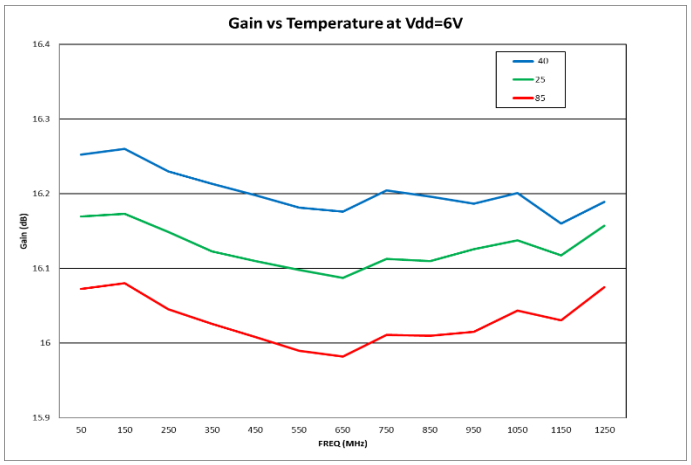


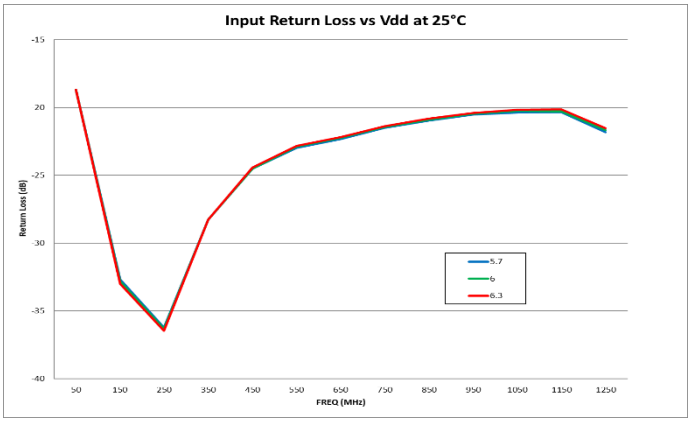
Front side of PCB

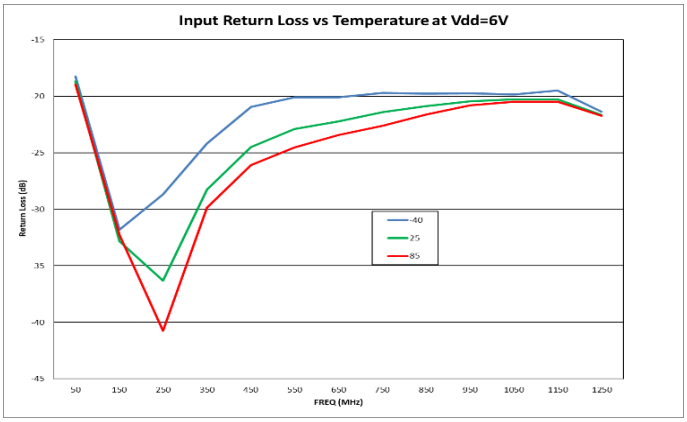
Test conditions unless otherwise noted: Vdd = +6V, Idd = 139 mA (typ.)

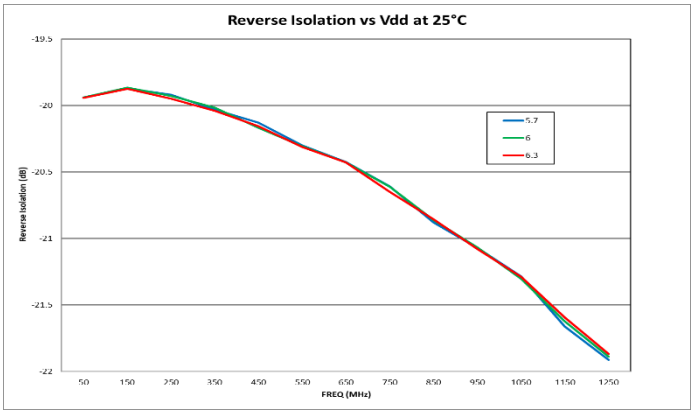
Typical Performance Data

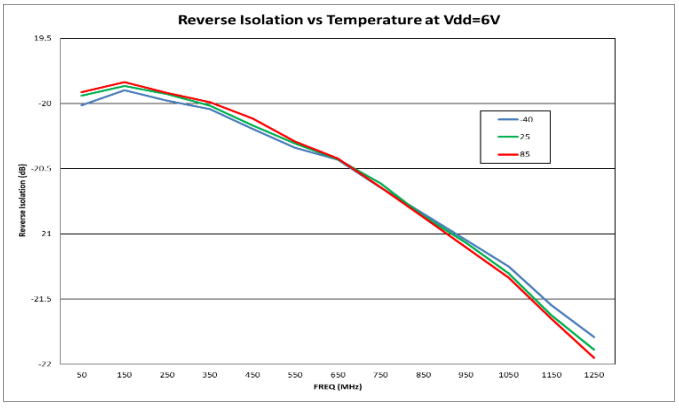






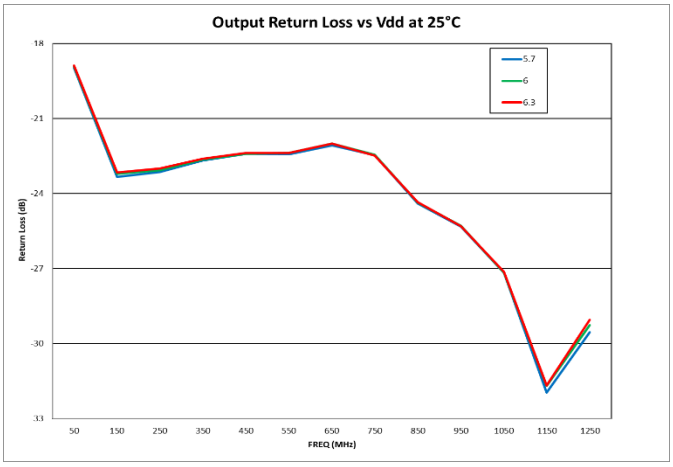


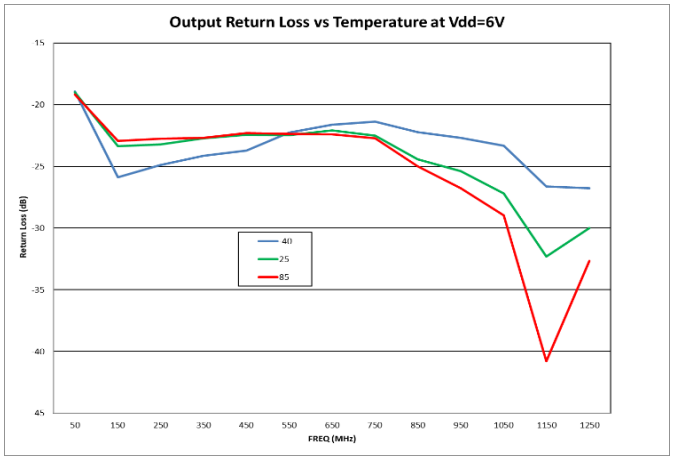


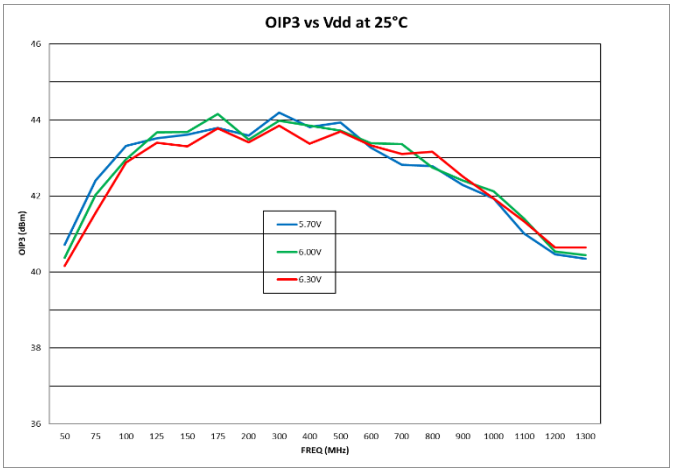


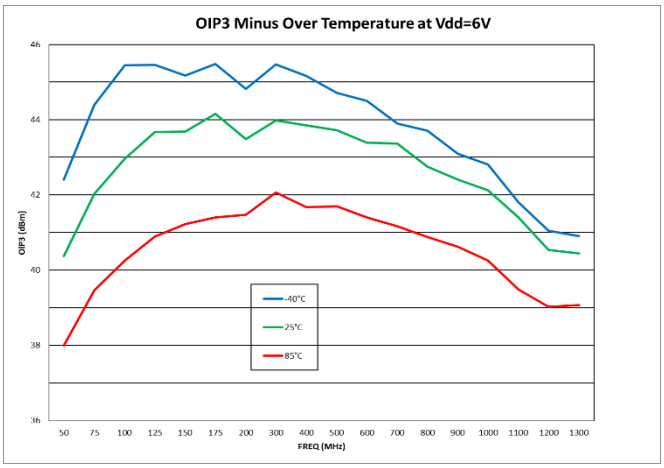
Test conditions unless otherwise noted: Vdd = +6V, Idd = 139 mA (typ.)

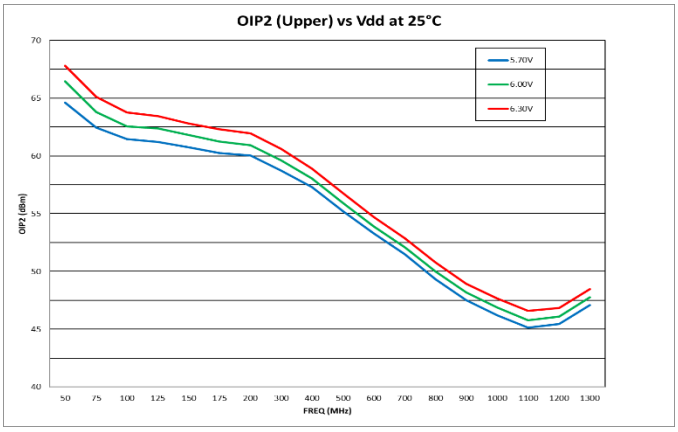
Typical Performance Data Continued

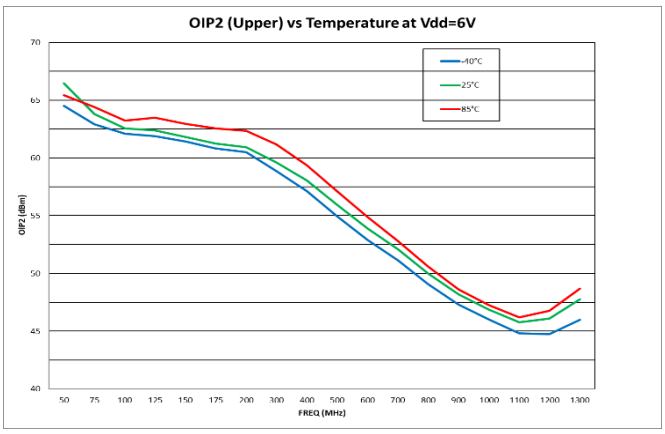






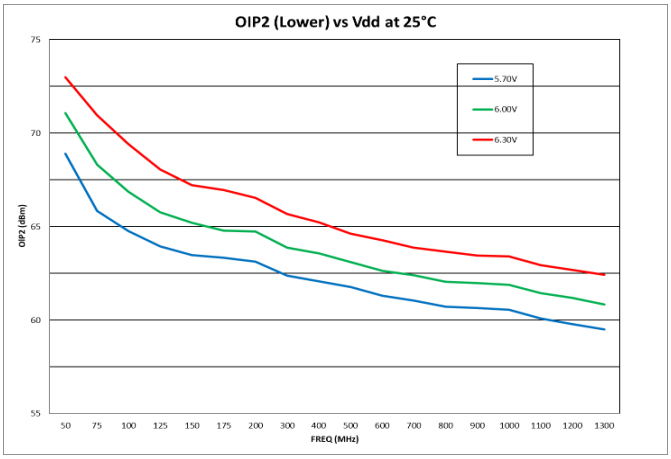


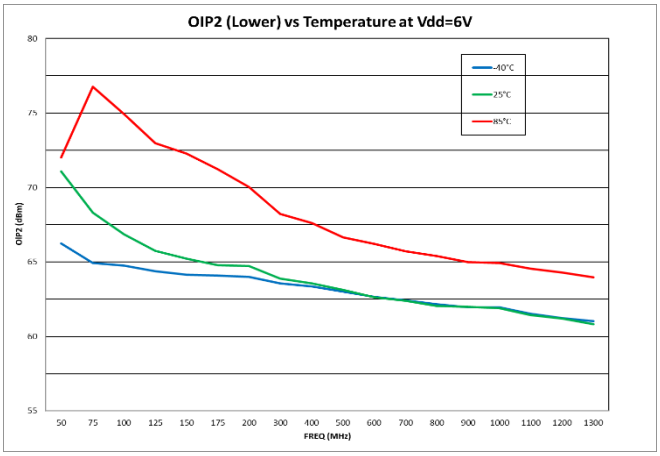


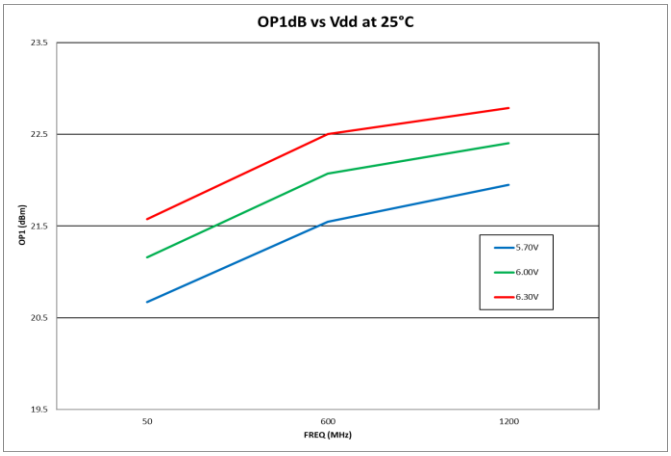


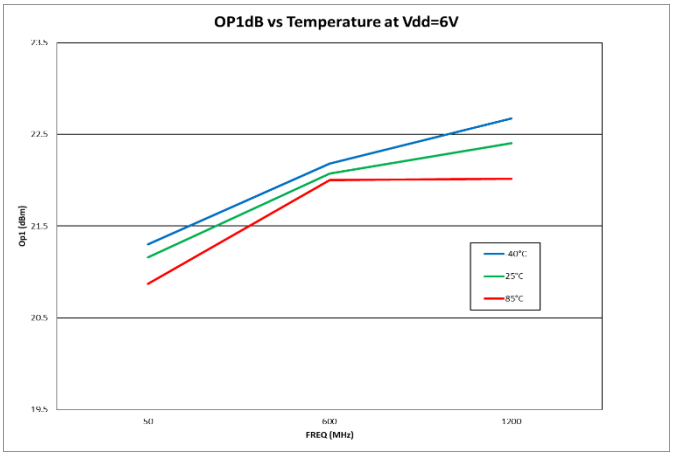
Test conditions unless otherwise noted: Vdd = +6V, Idd = 139 mA (typ.)

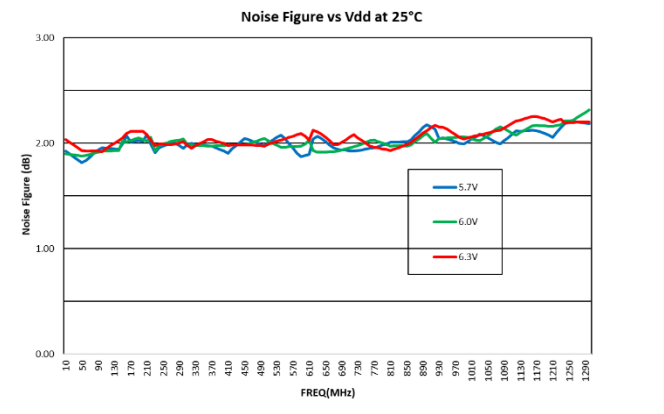
Typical Performance Data Continued

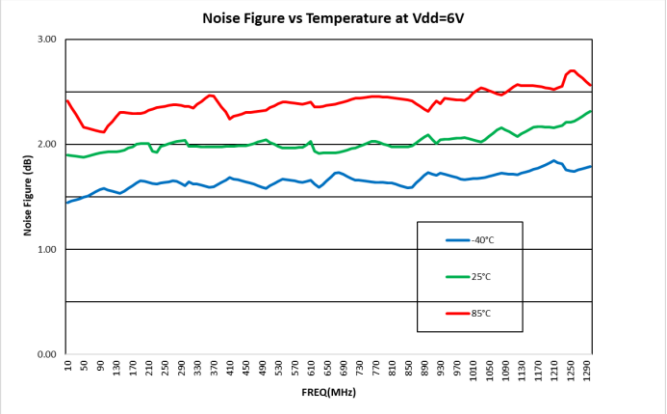






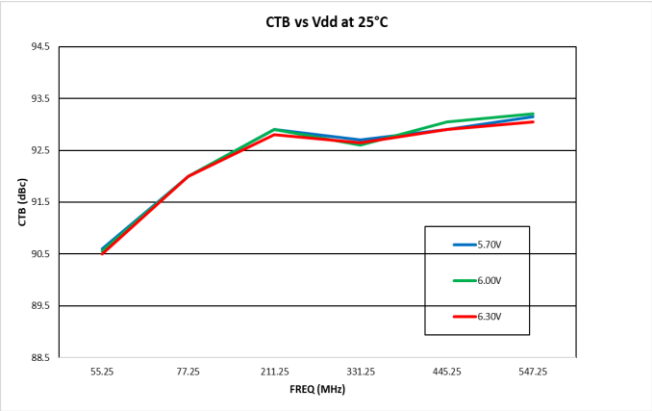


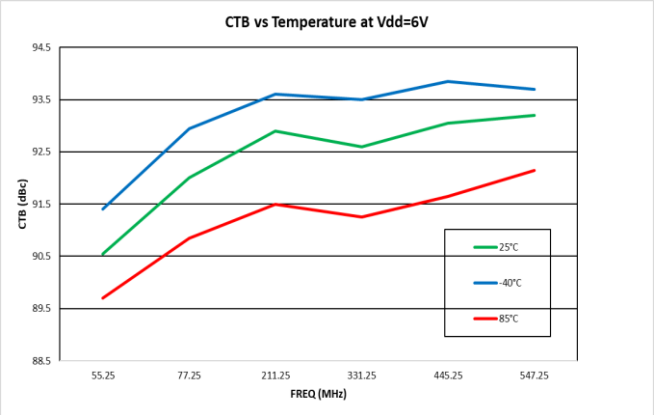


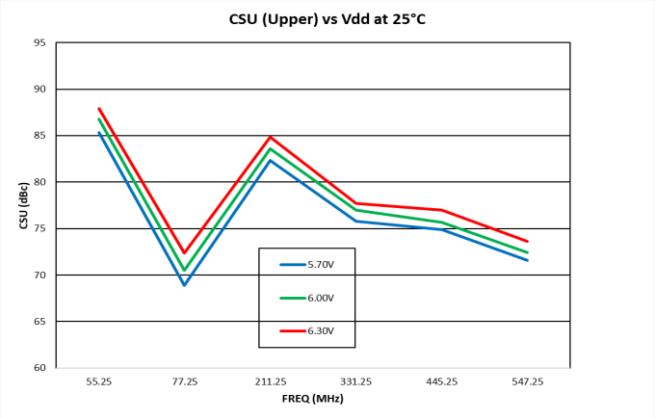


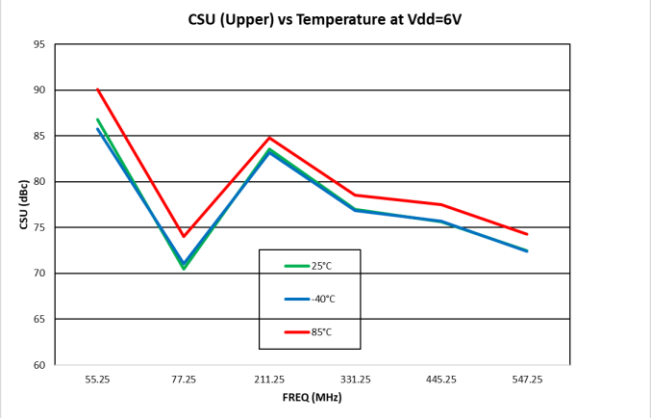
Test conditions unless otherwise noted: Vdd = +6V, Idd = 139 mA (typ.)

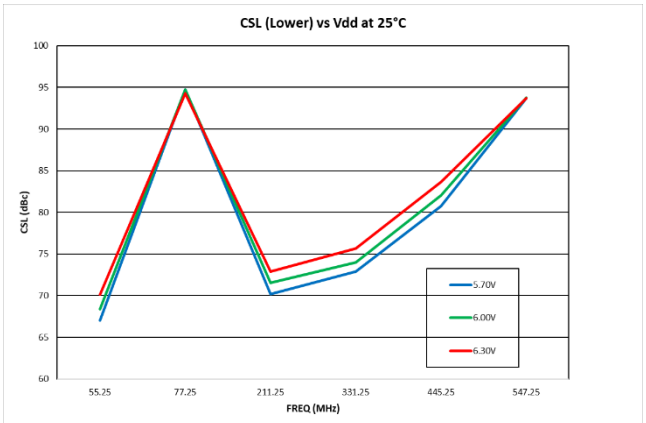
Typical Performance Data Continued

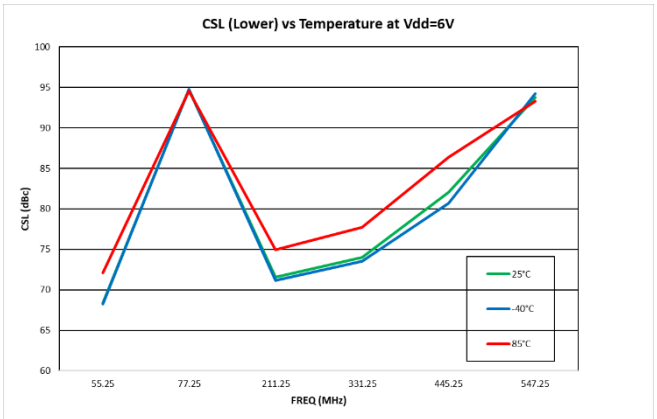






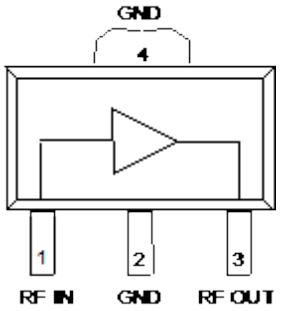




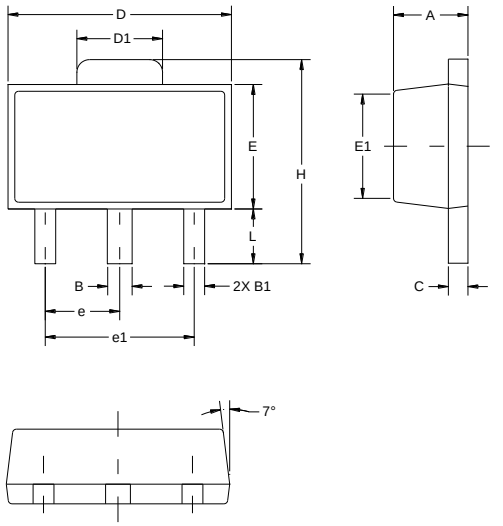


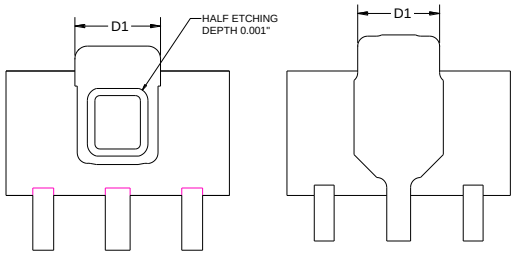
Pin Configuration

Pin Number	Label
1	RF IN
2	GND
3	RF Out / Vdd
Backside Paddle	GND



Package Outline





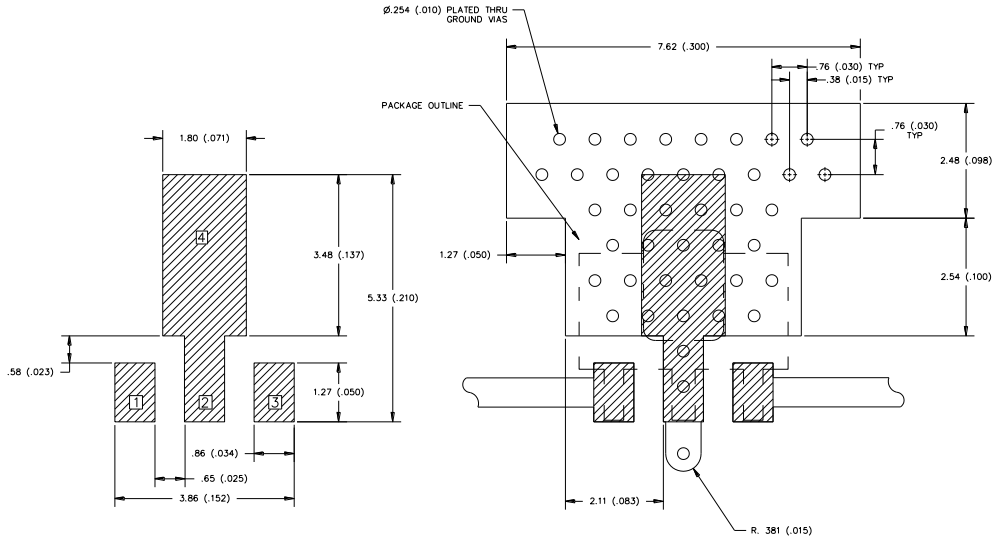
Alternate Backside Patterns - Reflow Compatible
(Part may be supplied with either pattern)

SYMBOL	MIN	TYP	MAX
A	1.40 (.055)	1.50 (.059)	1.60 (.063)
B	.44 (.017)	.50 (.020)	.56 (.022)
B1	.36 (.014)	.42 (.0165)	.48 (.019)
C	.35 (.014)	.40 (.016)	.44 (.017)
D	4.40 (.173)	4.50 (.177)	4.60 (.181)
D1	1.62 (.064)	1.73 (.068)	1.83 (.072)

SYMBOL	MIN	TYP	MAX
E	2.29 (.090)	2.50 (.098)	2.60 (.102)
E1	2.13 (.084)	2.20 (.087)	2.29 (.090)
e		1.50 BSC (.059)	
e1		3.00 BSC (.118)	
H	3.94 (.155)	4.10 (.161)	4.25 (.167)
L	.89 (.035)	1.10 (.043)	1.20 (.047)

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

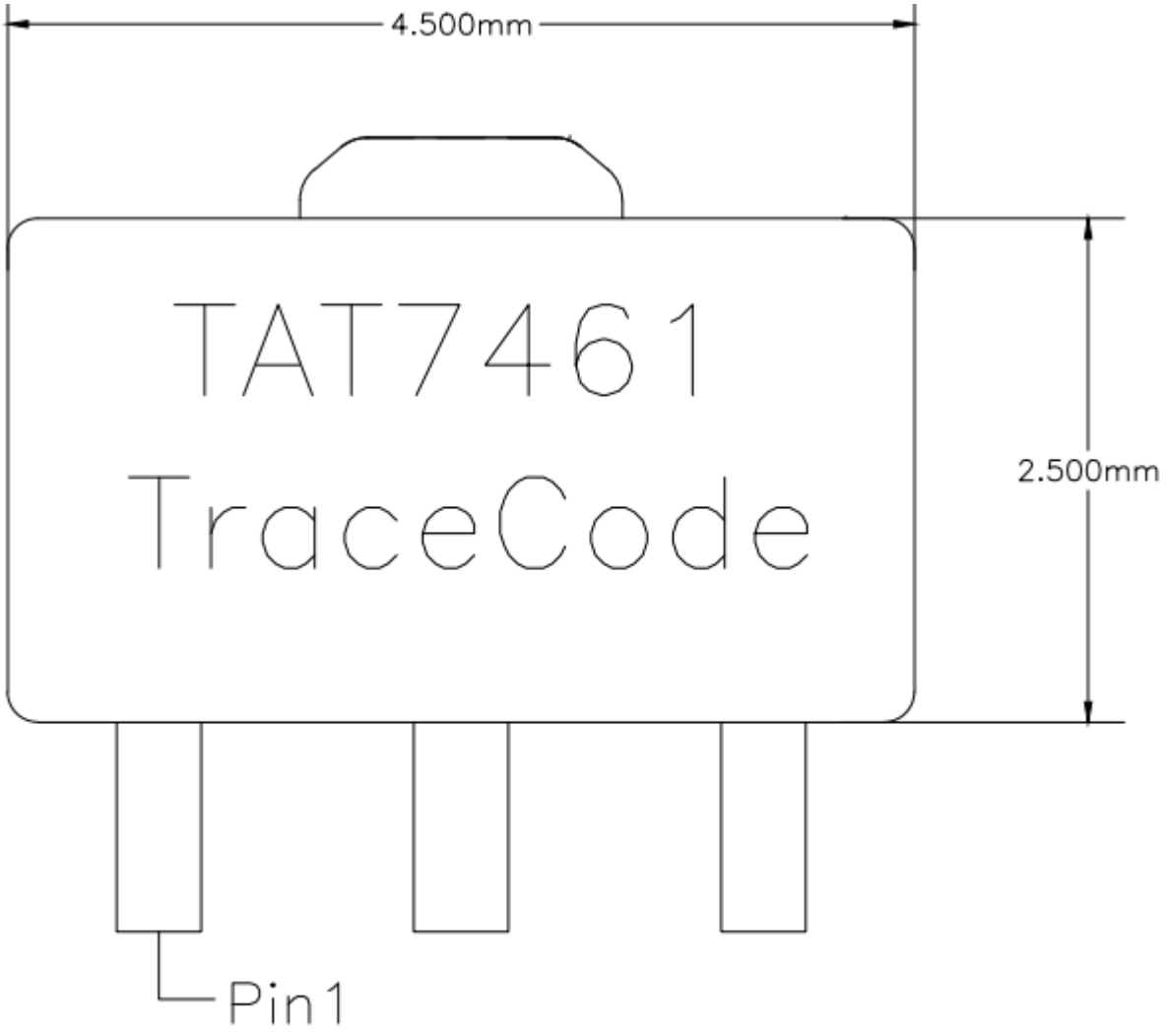
PCB Mounting Pattern



Notes:

1. All dimensions are in millimeters. Angles are in degrees
2. Use 1 oz. copper minimum for top and bottom layer metal
3. Vias are required under the backside paddle of this device for proper RF/DC grounding and thermal dissipation.
4. We recommend a 0.35 mm (#80/0.0135”) diameter bit for drilling via holes and a final plated thru diameter of 0.25 mm (0.10”).
5. Ensure good package backside paddle solder attach for reliable operation and best electrical performance.

Package Marking



Line 1 – Part Number
Line 2 – Short Trace Code (Upto 4 Characters)
Trace Code to be assigned by Sub Con

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1B (500V to < 1000V)	ANSI/ESDA/JEDEC JS-001
ESD – Charged Device Model (CDM)	Class C3 (≥1000V)	ANSI/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 ($C_{15}H_{12}Br_4O_2$) 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

Important Notice

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