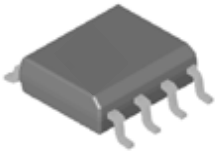
TAT7472A1F

CATV 75 Ω pHEMT Dual RF Amplifier

Applications

- Edge QAM Gain Stage
- MDU Output
- RF Distribution Amplifiers
- AH22 Replacement

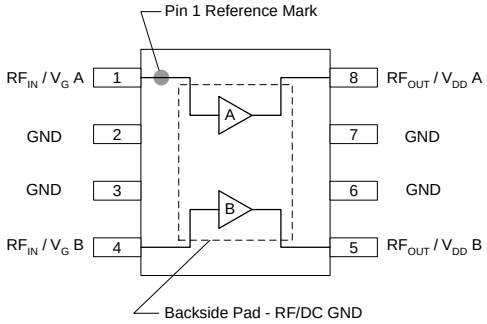


SOIC-8 Package

Product Features

- 75 Ω, 50 MHz to 1218 MHz Bandwidth
- Low Noise Figure: < 3 dB
- pHEMT Device Technology
- SOIC-8 Package
- Enhanced Gain and Bandwidth
- Adjustable Bias

Functional Block Diagram



General Description

The TAT7472A1F is a 75 Ω RF Amplifier designed for CATV use, but capable of operation up to 1218 MHz. The TAT7472 A1F contains two separate amplifiers for push pull applications. It is fabricated using 6-inch GaAs pHEMT technology to optimize performance and cost. Each amplifier contains on-chip active biasing. The bias current set point of each amplifier is adjustable with a single resistor from the input to ground.

Typical supply voltage is +5 V, IMD performance and bandwidth can be enhanced with +5.5 V and +6 V operation.

Pin Configuration

Pin No.	Label
1	RF_{IN} / V_G A
2, 3, 6, 7	GND
4	RF_{IN} / V_G B
5	RF_{OUT} / V_{DD} B
8	RF_{OUT} / V_{DD} A
Backside Pad	RF/DC GND

Ordering Information

Part No.	Description
TAT7472A1F	75 Ω Dual pHEMT Amplifier
TAT7472A1F-EB	50 – 1218 MHz Evaluation Board

Standard T/R size = 1000 pieces on a 7" reel.

Absolute Maximum Ratings

Parameter	Rating
Storage Temperature	−55 to 150 °C
Device Voltage (V_{DD})	+8V
Total Device Current (I_{DD}=I_{DDA}+I_{DDB})	400 mA
Device Current per Amp (I_{DDA} or I_{DDB})	200 mA

Operation of this device outside the parameter ranges given above may cause permanent damage.

Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
Device Voltage (V_{DD})		5.0		V
Device Current (I_{DD})	270	320	370	mA(†)
Case Temperature	−40		+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 − Single Ended in 50 Ohms

Test conditions unless otherwise noted: V_{CC} = +5 V, Temp = +25 °C, 50 Ω System

Parameter	Conditions	Min	Typ	Max	Units
Operational Frequency Range		50		1200	MHz
Test Frequency			800		MHz
Gain			18		dB
Output IP3	Pout = 5 dBm/tone, Δf=10 MHz, 800 MHz		+40		dBm
Device Current (I_{DDA} or I_{DDB})		135	163	185	mA

Typical Performance − Push-Pull Configuration in 75 Ohms

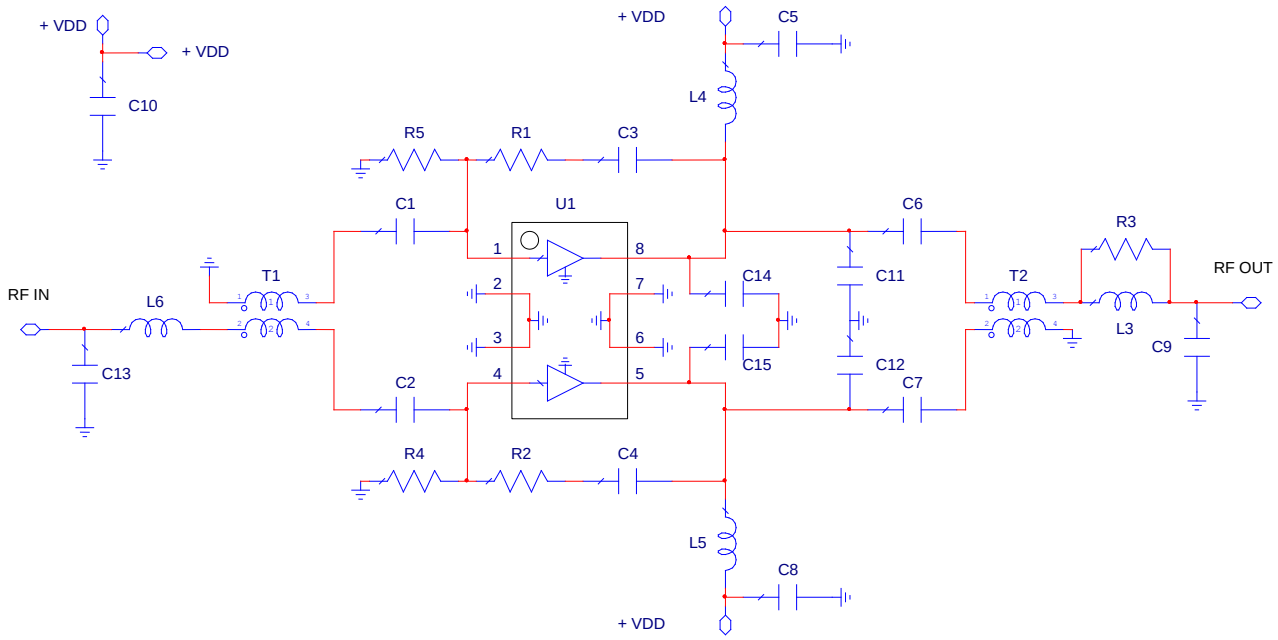
Test conditions unless otherwise noted: V_{CC} = +5 V, Temp.= +25 °C, 75 Ω System.

Parameter	Conditions	Typical Value					Units
Frequency		50	250	450	860	1210	MHz
Gain		15	15	15	15.4	15.4	dB
Input Return Loss		22	25	23	16	15	dB
Output Return Loss		20	22	21	16	13	dB
CTB	+41 dBmV / channel 80 channels + 108 QAM, Flat Loading. 270 mA < I_{DD} < 320 mA	−78	−76	−74	-	-	dBc
CSO		−82	−83	−80	-	-	dBc
CCN		68.5	67.5	65	-	-	dBc
Output P1dB		+24.5	+24.5	+24.7	+24.5	23.5	dBm
Output IP3	Pout= +8 dBm / tone, Δf=10 MHz	+45	+45	+45	+44	+40(2)	dBm
ACPR	62 dBmV output, 1ch	69	68	67.5	64	58(2)	dBc
Noise Figure		2.2	2.3	2.4	2.5	2.7	dB
Total Device Current, I_{DD}		320					mA
Thermal Resistance, θ_{jb}(1)	Junction to base	15					°C/W

Notes:

1. The thermal resistance is referenced from the hottest point of the device junction to the ground paddle
2. Improves with higher Vdd – see performance plots on page 7

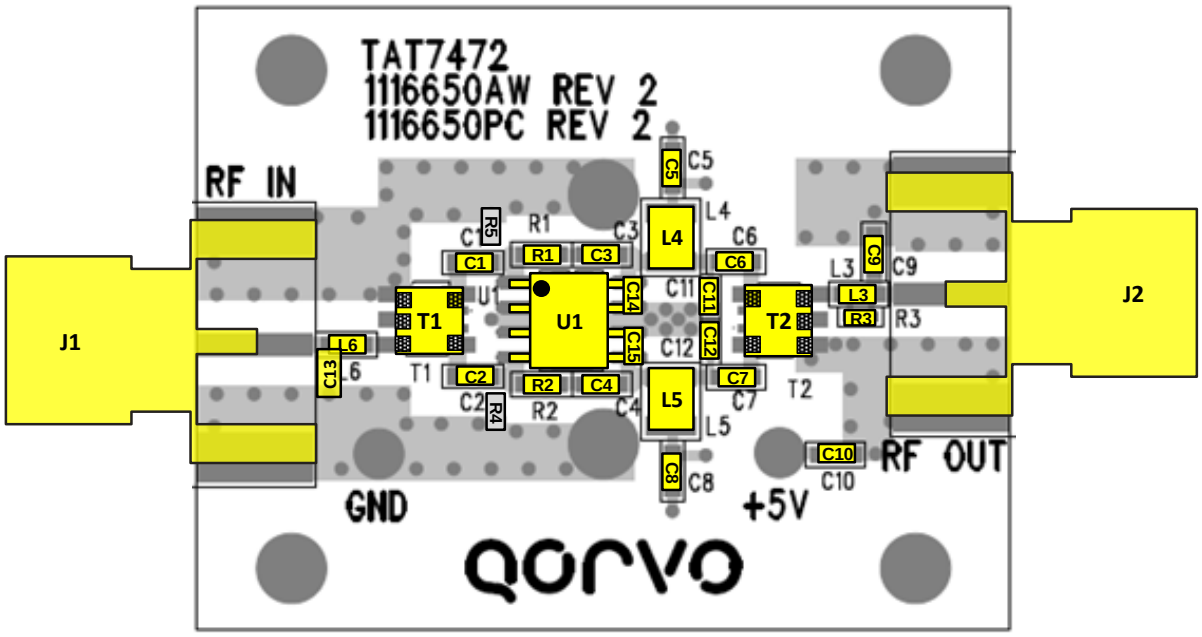
TAT7472A1F-EB Evaluation Board



Current Adjustment

The TAT7472A1H current can be adjusted by R4 & R5. To optimize IMD distortion above 1GHz the device favors a higher supply voltage than 5V. Applying a higher supply voltage will also raise the internal gate voltage at pins 1 & 4, which can be brought down by these resistors, thereby lowering Idd. Since there is little benefit to higher current at higher voltage, lowering the current to offers lower dissipation or the same dissipation as 5V operation.

Typical I_{DD} (mA)		**V_{DD}**				
		5V	**5.25V**	**5.5V**	**5.75V**	**6V**
R4 & R5	**10K Ω**	166 mA	173 mA	185 mA	194 mA	205 mA
	20K Ω	223 mA	237 mA	250 mA	263 mA	276 mA
	30K Ω	252 mA	266 mA	280 mA	294 mA	309 mA



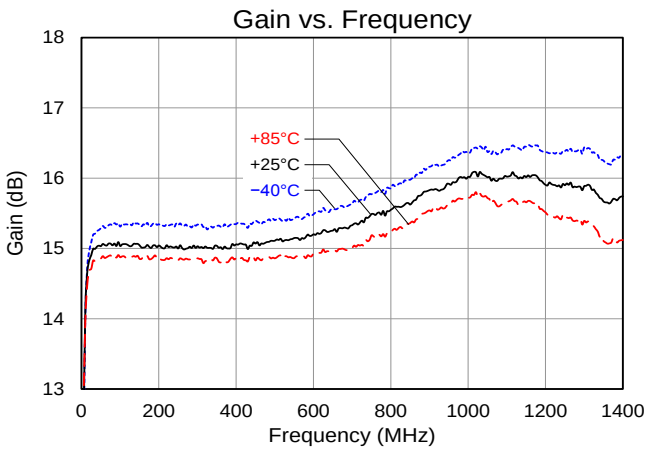
Bill of Material – TAT7472A1F-EB

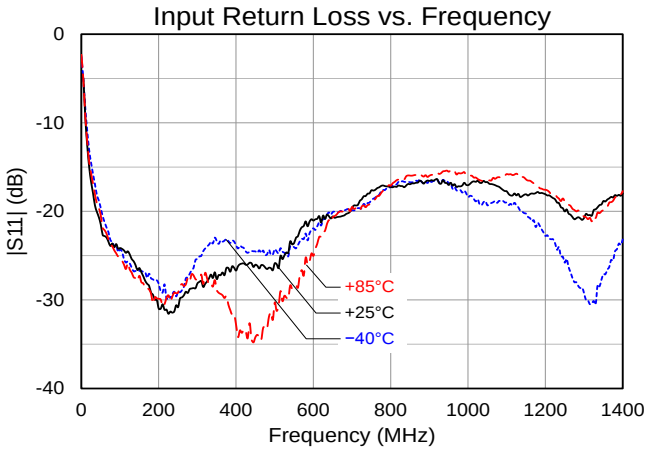
Reference Des.	Value	Description	Manuf.	Part Number
U1	n/a	75 Ω Dual pHEMT Amplifier	Qorvo	TAT7472A1F
L3	5.6 nH	Chip Coil, 0402, 5%	COILCRAFT	0402CS-5N6XJL
L4, L5	680 nH	Chip Coil, 0805, 5%	COILCRAFT	0805CS-681XRB
L6	4.7 nH	Chip Coil, 0402, 5%	COILCRAFT	0402CS-4N7XJL
T1, T2	1:1	75 Ω Balun, 5 – 1200 MHz	MiniRF	RFXF5793
C1 – C8, C10	0.01 uF	Ceramic Cap, 0603, 50 V, X7R, 10%	MURATA	GRM188R71H103KA01D
C9	0.7 pF	Ceramic Cap, 0402, 25 V, NPO, ±0.05 pF	AVX	04023J0R5BBSTR
C11, C12	1.5 pF	Ceramic Cap, 0402, 25 V, NPO, ±0.05 pF	AVX	04023J1R5ABSTR
C13	0.7 pF	Ceramic Cap, 0603, 50 V, NPO, ±0.05 pF	AVX	06035J0R7ABSTR
C14, C15	0.5 pF	Ceramic Cap, 0402, 50 V, NPO, ±0.05 pF	AVX	04025A0R5BAT2A
R1, R2	470 Ω	Thick Film Res, 0402, 1/16W, 1%	ROHM	MCR01MZPF4700
R3	220 Ω	Thick Film Res, 0201, 1/16W, 1%	PANASONIC	ERJ-1GEF221C
J1, J1	75 Ω	Female edge mount connector	Amphenol	531-40039
Heatsink	block	Heatsink for F, connector	Qorvo	1069007
PCB	Rev 2	TAT7472A1F RF EVB	Qorvo	1116650
R4[1], R5[1]	N/L	Do Not Load	N/A	N/A

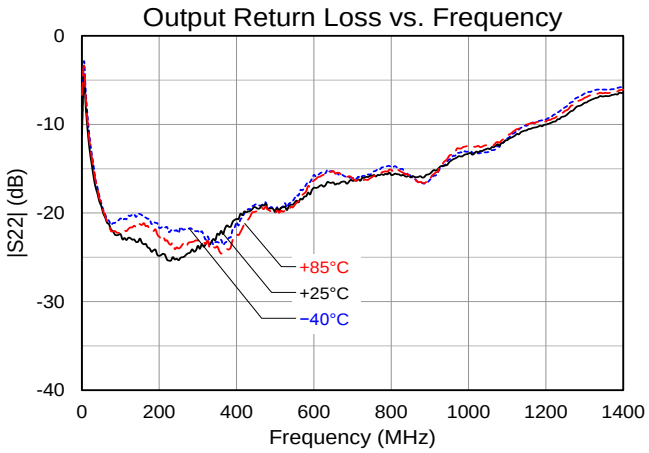
Notes:
1. R3 & R4 allow I_{DD} bias trimming, a lower resistance will reduce I_{DD}

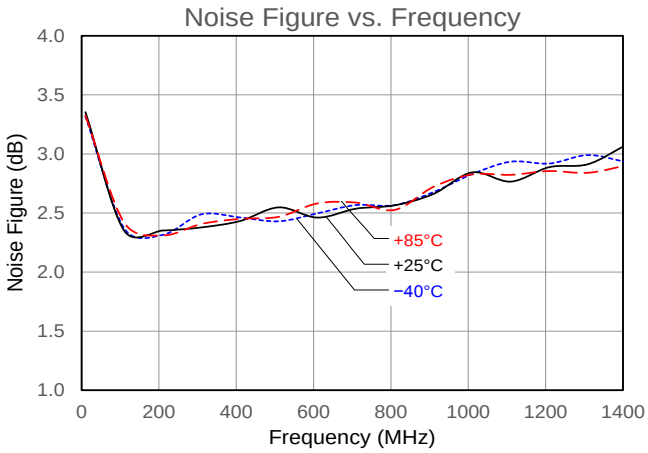
Performance Plots – TAT7472A1F-EB

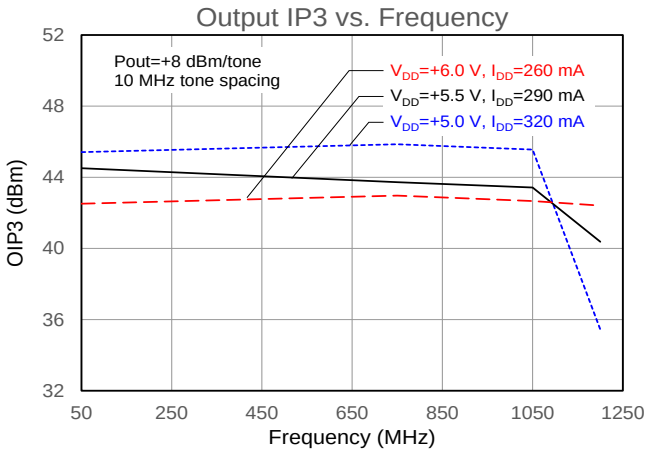
Test conditions unless otherwise noted: V_{DD}=+5 V, I_{DD}=320 mA (typ.), Temp=+25°C

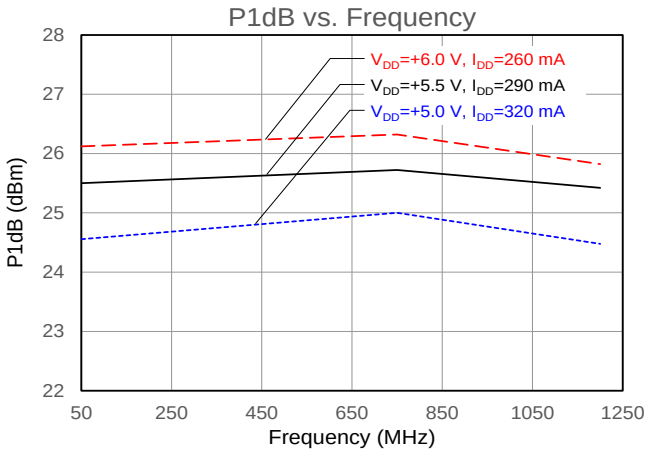






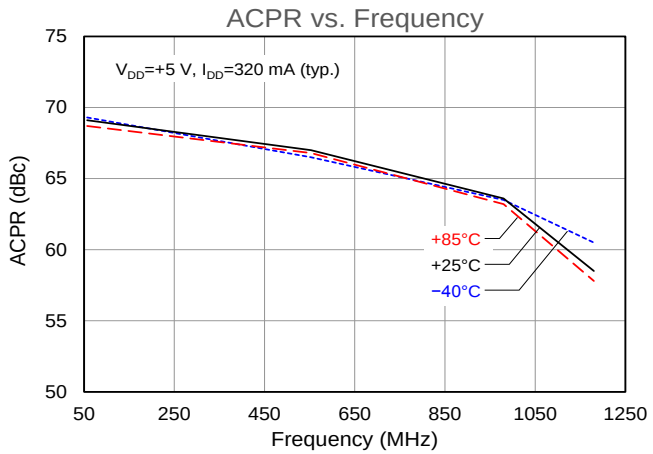


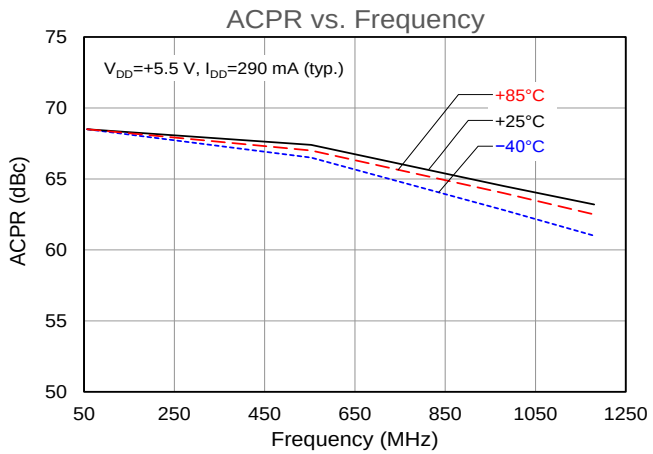


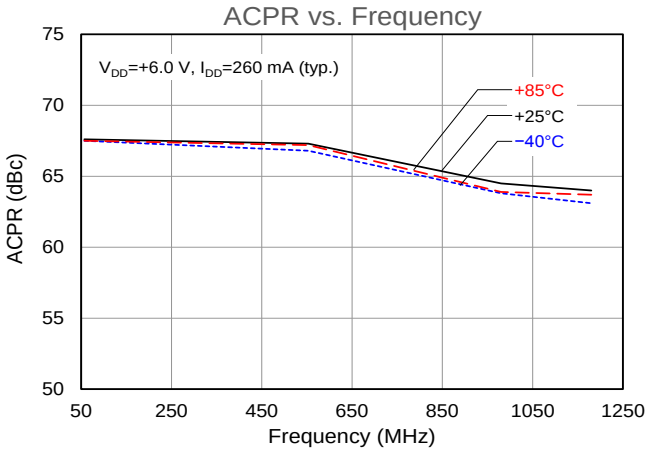


Performance Plots – TAT7472A1F-EB

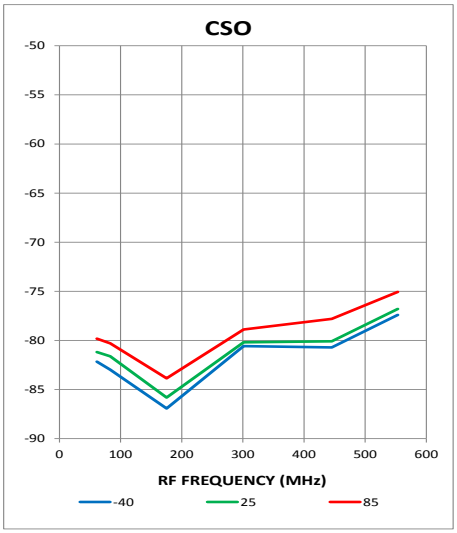
Test conditions unless otherwise noted: Pout = +62 dBmV

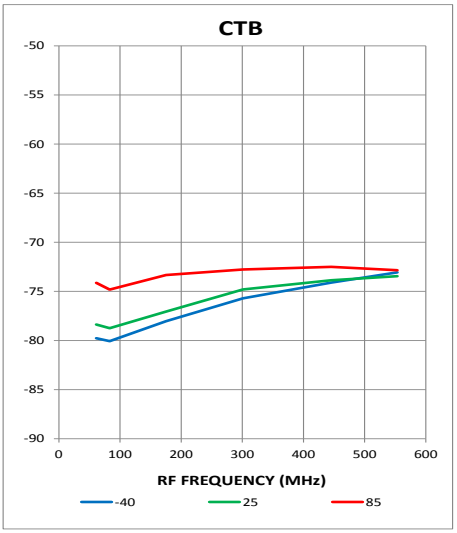


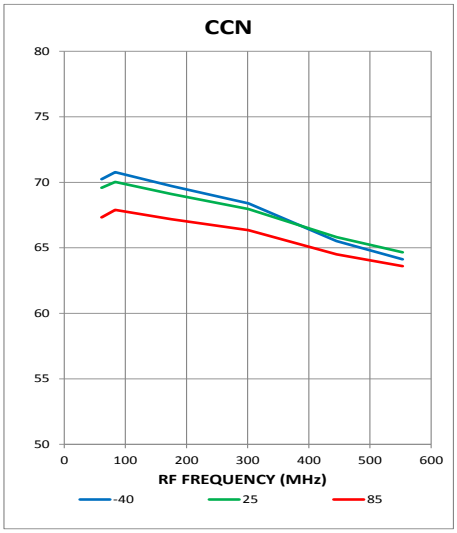




Test conditions unless otherwise noted: V_{DD}=+5 V, Pout = 41dBmV/ch (80ch NTSC + 108QAM), Flat loading

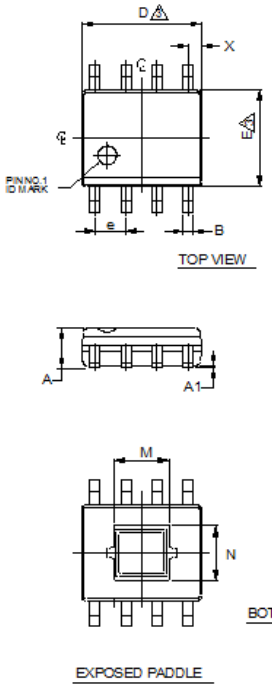






Package Marking and Dimensions

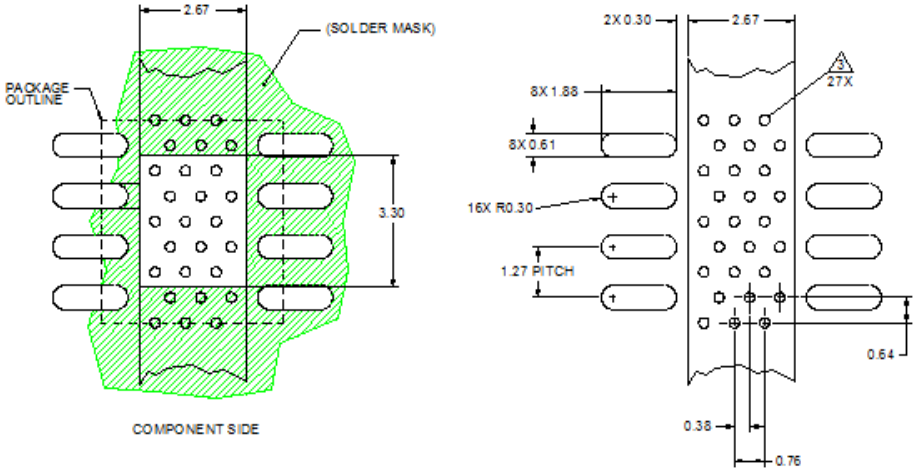
Marking:
Part Number – TAT7472A1F
Lot code – AaXXXX
Year/Week –YYWW



SYMBOL	8 SOIC	
	MIN	MAX
A	0.054	0.068
A1	0.001	0.004
B	0.014	0.019
D	0.189	0.196
E	0.150	0.157
H	0.229	0.244
M	0.087	0.097
N	0.082	0.092
e	0.050 BSC	
C	0.0075	0.0098
L	0.020	0.040
X	0.0215 REF	
θ1	0°	8°
θ2	7° BSC	

NOTE:
1. TOP PACKAGE SURFACE TO BE Ni, Pd, Au PLATING
2. BOTTOM PACKAGE SURFACE TO BE Ni. Pd. Au PLATING
3. DIMENSION ARE EXCLUSIVE MOLD FLASH AND GATE BURR.
4. FOOT LENGTH MEASURING IS BASED ON THE GAUGE PLANE METHOD.

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. We recommend a 0.35mm (#80/.0135") diameter bit for drilling via holes and a final plated thru diameter of 0.25mm (0.010").
4. Ensure good package backside paddle solder attach for reliable operation and best electrical performance.

Product Compliance Information

ESD Sensitivity Ratings

Caution! ESD-Sensitive Device

ESD Rating: Class 1A
Value: ≥ 250 V to <500 V
Test: Human Body Model (HBM)
Standard: JEDEC Standard JESD22-A114

ESD Rating: Class C3
Value: ≥1000 V to < 2000 V
Test: Charged Device Model (CDM)
Standard: JEDEC Standard JESD22-C101

MSL Rating

MSL Rating: Level 3
Test: 260°C convection reflow
Standard: JEDEC Standard IPC/JEDEC J-STD-020

Solderability

Compatible with both lead-free (260°C maximum reflow temperature) and tin/lead (245°C maximum reflow temperature) soldering processes.

Contact plating: NiPdAu

RoHs Compliance

This part is compliant with EU 2002/95/EC RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

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, and information about TriQuint:

Web: www.triquint.com **Tel:** +1.707.526.4498
Email: info-sales@triquint.com **Fax:** +1.707.526.1485

For technical questions and application information:

Email: sjcapplications.engineering@triquint.com

Important Notice

The information contained herein is believed to be reliable. TriQuint makes no warranties regarding the information contained herein. TriQuint assumes no responsibility or liability whatsoever for any of the information contained herein. TriQuint assumes no responsibility or liability whatsoever for the use of the information contained herein. The information contained herein is provided "AS IS, WHERE IS" and with all faults, and the entire risk associated with such information is entirely with the user. All information contained herein is subject to change without notice. Customers should obtain and verify the latest relevant information before placing orders for TriQuint products. The information contained herein or any use of such information does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other intellectual property rights, whether with regard to such information itself or anything described by such information.

TriQuint products are not warranted or authorized for use as critical components in medical, life-saving, or life-sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death.

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:
moschip.ru
moschip.ru_4
moschip.ru_6
moschip.ru_9