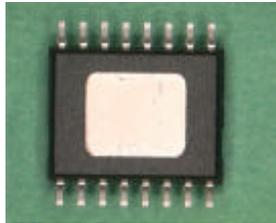


## CATV Ultra-Linear Power Amp

## TGA2801D-EPU-SG



Top View



Bottom View

### Description

The TriQuint TGA2801D-EPU is an ultra-linear, packaged power amplifier which operates from 40MHz to 1000MHz. The amplifier is available in a standard 16 lead SOIC package. The amplifier provides a flat gain along with ultra-low distortion. It also provides a high output power with a low DC power consumption. This amplifier is ideally suited for use in CATV distribution systems or other applications requiring high output powers and extremely low distortion. Demonstration Boards are available.

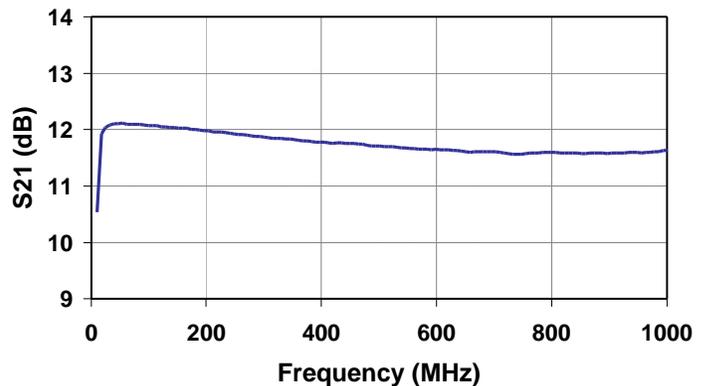
### Primary Applications

- HFC Nodes
- CATV Line Amplifiers
- Head End Equipment

### Key Features and Performance

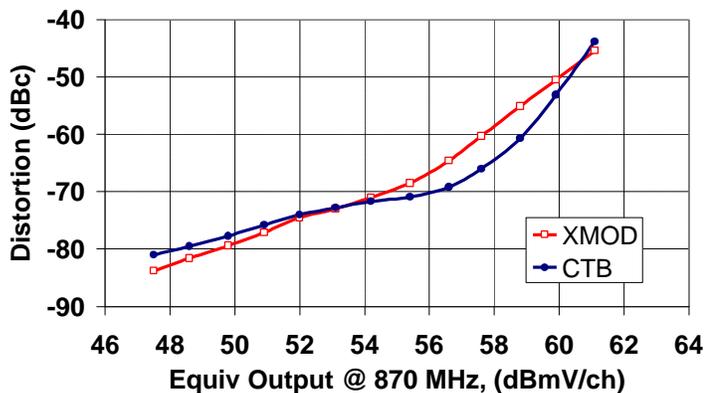
- High Power Compression (P1dB 31.5 dBm typ.)
- Low Cost Surface Mount Package
- Flat Gain
- Ultra-Low Distortion (55dBm IP3 typ.)
- Wide Bandwidth (40MHz - 1GHz)
- Low DC Power Consumption
- Single Supply Bias (+12V)
- Unconditionally Stable
- Proven GaAs Technology

Gain in a Typical Circuit  
w/External Balun Effects Removed



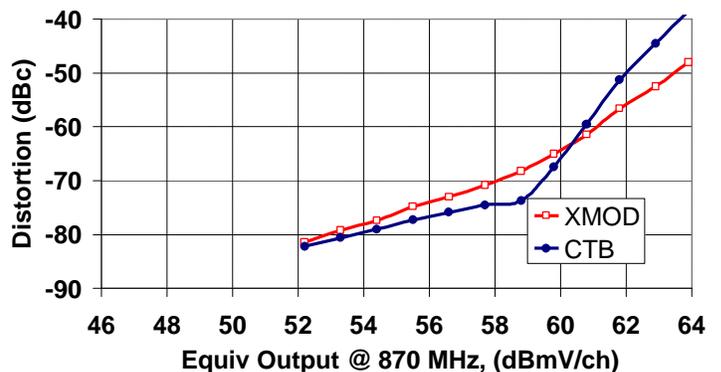
TGA2801D Compression

13.5 dB Tilt to 870 MHz: 110 Ch, no QAM, 550mA



TGA2801D Compression

13.5 dB Tilt to 870 MHz: 79 Ch, QAM to 870 MHz with 6 dB offset, 550mA



Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.

### Maximum Ratings 1/

Symbol	Parameter	Min	Max	Units	Notes
V <sub>DD</sub>	Bias Supply Voltage	0	15	V	
I <sub>DD</sub>	Bias Supply Current		615	mA	<u>2/</u>
P <sub>IN</sub>	RF Input Power		70	dBmV	
T <sub>ASSY</sub>	Assembly Temperature (30 seconds max)		300	°C	
T <sub>STG</sub>	Storage Temperature	-65	150	°C	
T <sub>CASE</sub>	Package Operating Temperature (Heat Slug)	-40	100	°C	

1/ These values reflect maximum operable values for this device. Operating above the recommended values may directly affect MTTF.

2/ Total Current

### DC Specifications

Symbol	Parameter	Typ	Unit
V <sub>DD</sub>	Bias Supply Voltage	12	V
I <sub>DD</sub>	Bias Supply Current	485	mA
V <sub>G1</sub>	Gate 1 Voltage (Pin 7)	0.68	V
V <sub>G2</sub>	Gate 2 Voltage (Pin 2)	4.15	V
V <sub>out1</sub>	RF Output 1 Voltage (Pin 14)	V <sub>DD</sub>	V
V <sub>out2</sub>	RF Output 2 Voltage (Pin 11)	V <sub>DD</sub>	V

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### RF Specifications

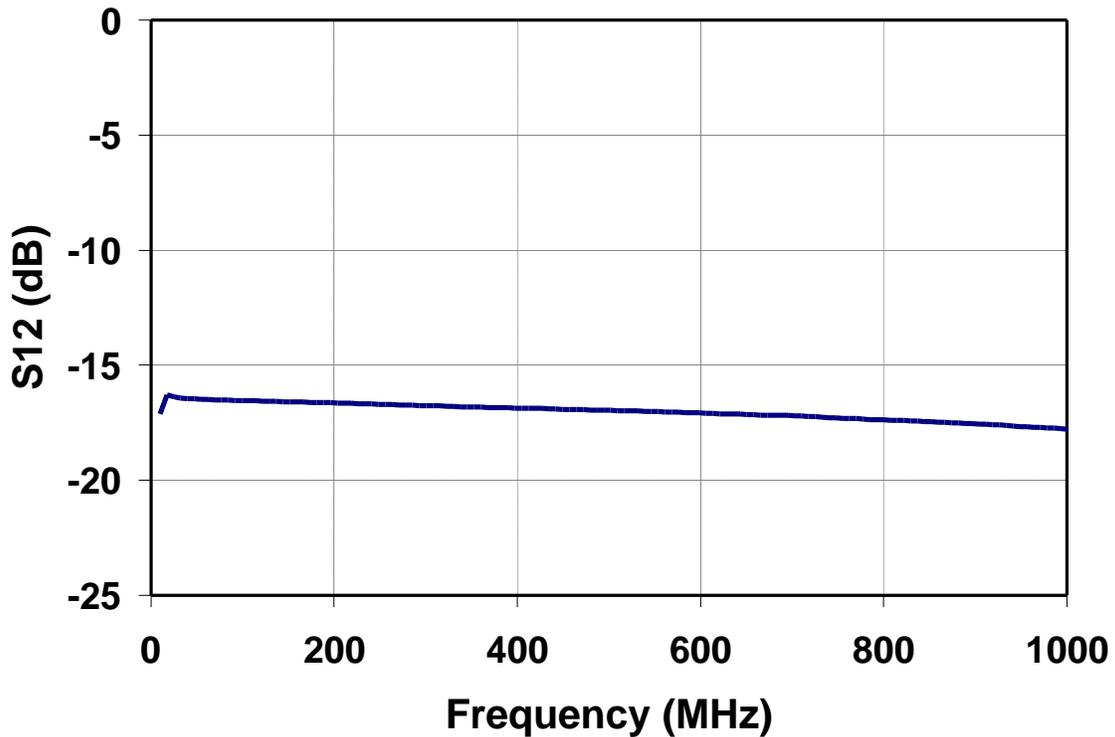
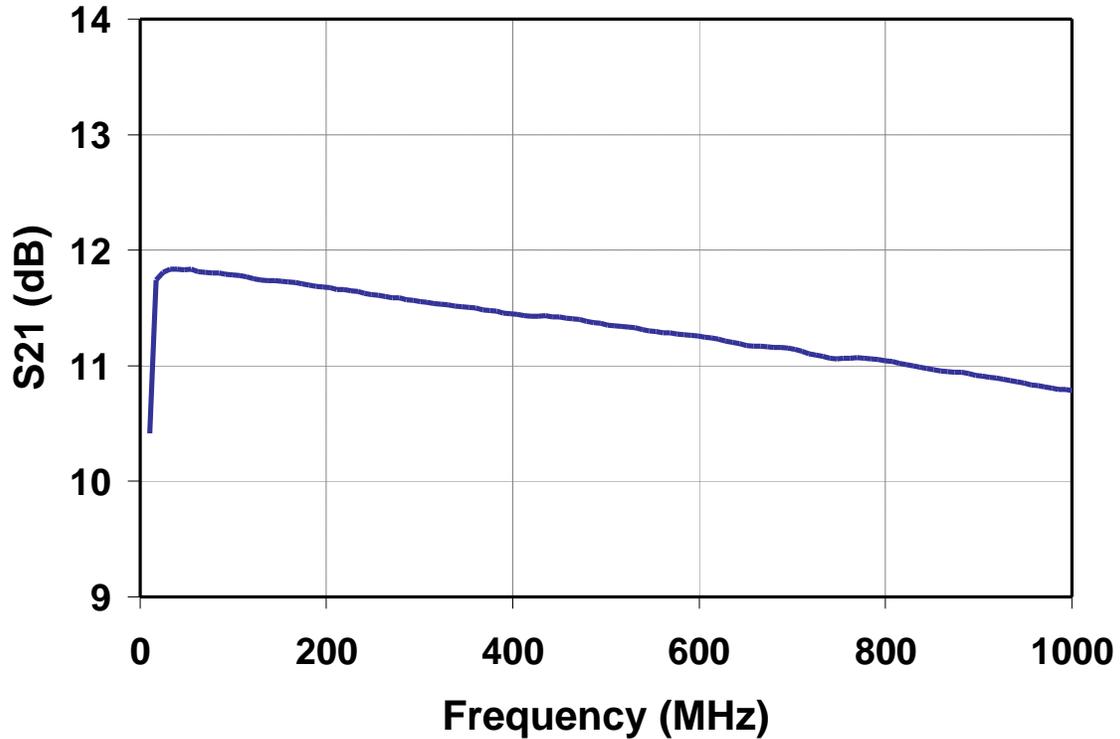
 $T_A=25^{\circ}\text{C}$ ,  $V_{DD}=12\text{V}$ 

Symbol	Parameter	Min	Typ	Max	Units
BW	Bandwidth	40		870	MHz
$S_{21}$	Gain <u>1/</u>		12.0		dB
GF	Gain Flatness <u>1/</u>		$\pm 0.3$		dB
NF	Noise Figure		2.75		dB
$P_{1dB}$	1dB Gain Compression @ 1GHz		31.5		dBm
$IP_3$	Two-Tone, Third-Order Intercept (625 & 700MHz)		55		dBm
CTB	Composite Triple Beat Distortion <u>2/</u>		-80		dBc
CSO	Composite Second Order Distortion <u>2/</u>		-72		dBc
XMOD	Cross Modulation <u>2/</u>		-73		dBc
IRL	Input Return Loss <u>1/ 3/</u>		22		dB
ORL	Output Return Loss <u>1/ 3/</u>		22		dB
$I_D$	Drain Current <u>4/</u>		485	550	mA

- 1/ Measured performance of chip alone. Balun effects have been removed.
- 2/ 112-Channel flat, +44dBmV/channel output
- 3/ Using application circuit on last page
- 4/ Increasing drain current will improve linearity of device

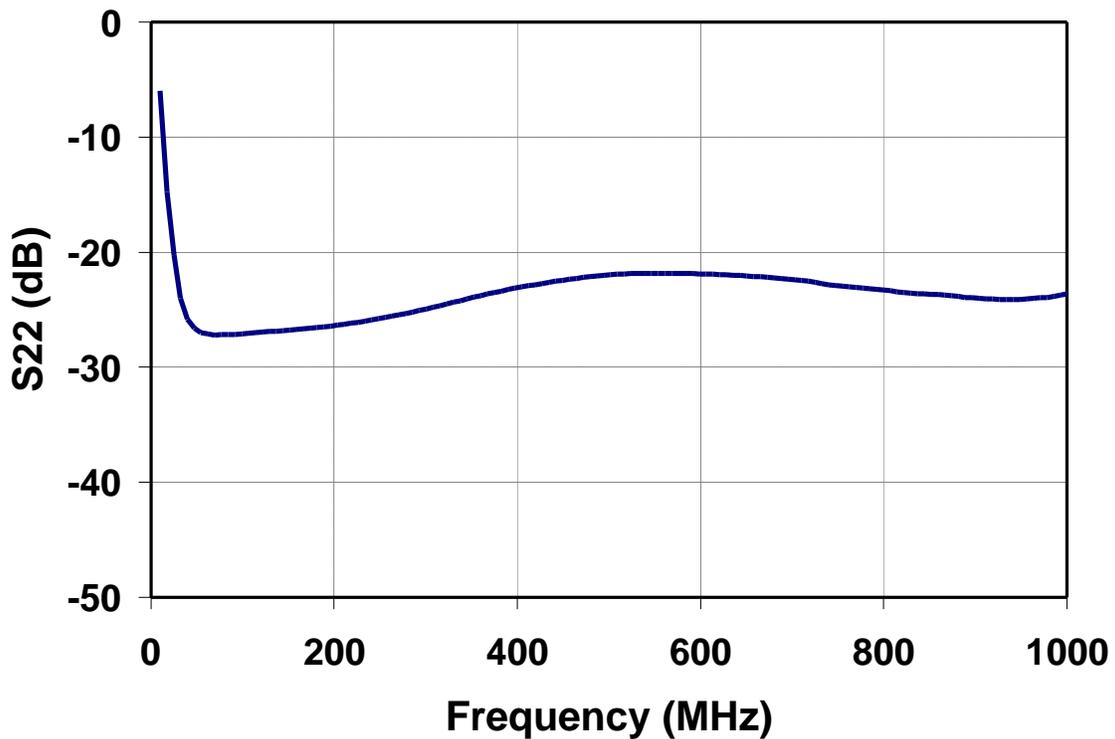
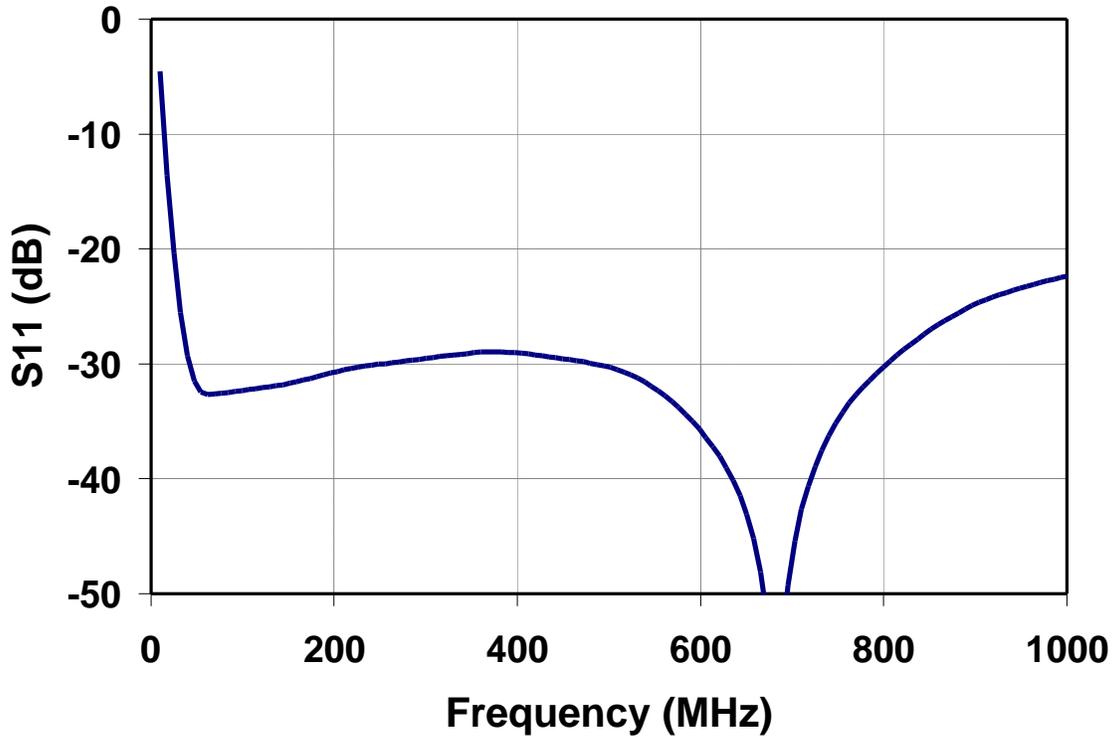
*Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.*

**Typical Measured S-Parameters  
Using Application Circuit**  
(includes effects of external baluns)



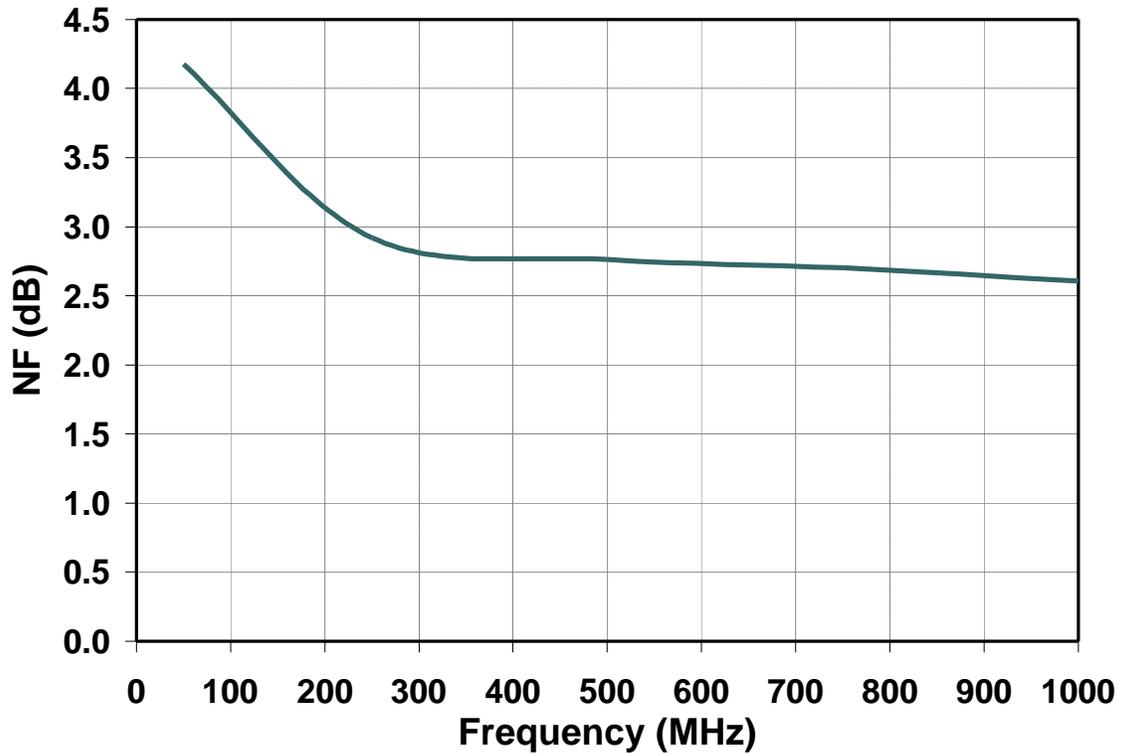
*Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.*

**Typical Measured S-Parameters  
Using Application Circuit**  
(includes effects of external baluns)



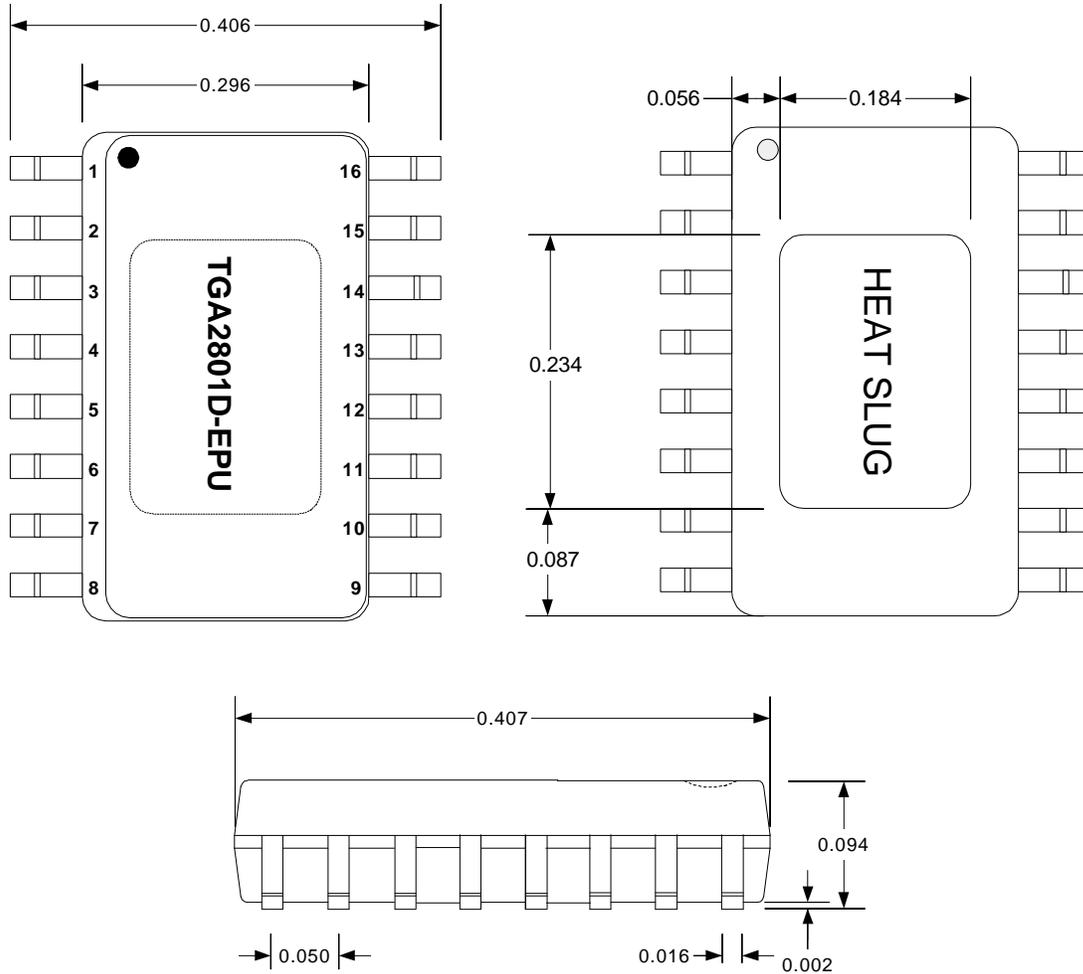
*Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.*

**Typical Measured Performance  
Using Application Circuit**  
(includes effects of external baluns)



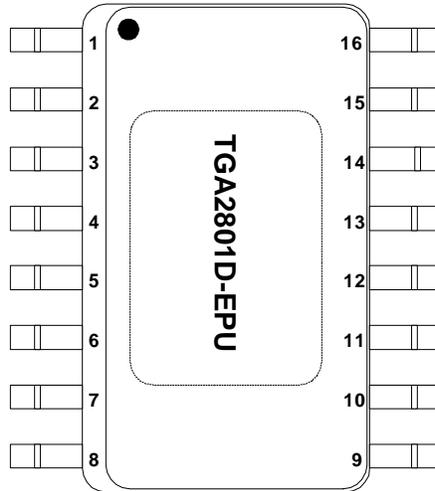
*Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.*

**Mechanical Specifications**



Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.

## Pinout

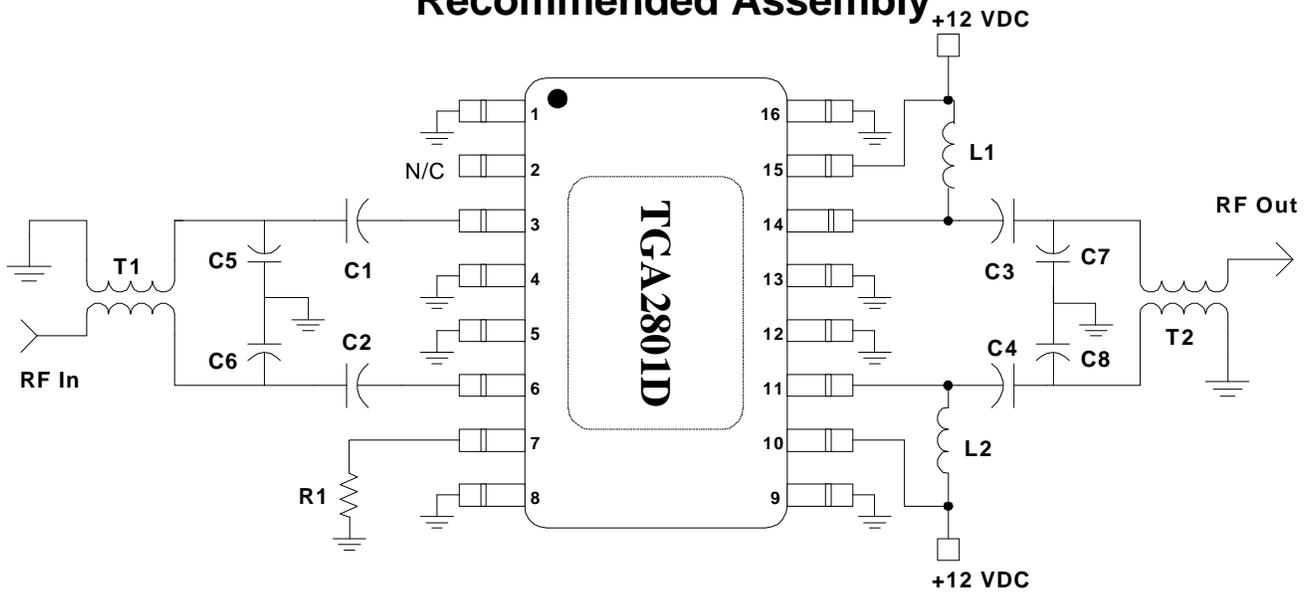


## Pin Description

Pin	Description
1	GND
2	Gate 2: Open Circuit on PC Board
3	RF Input 1
4	GND
5	GND
6	RF Input 2
7	Gate 1: Current Adjust $R_1 = \text{open circuit}$
8	GND
9	GND
10	$V_{DD}$
11	RF Output 2
12	GND
13	GND
14	RF Output 1
15	$V_{DD}$
16	GND

*Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.*

**Recommended Assembly**



**Component Description**

Ref	Description
C1	0.01 $\mu$ F Capacitor
C2	0.01 $\mu$ F Capacitor
C3	300pF Capacitor
C4	300pF Capacitor
C5 - C8	1.0pF - 2.0pF Capacitor <u>3/</u>
L1	390nH Inductor
L2	390nH Inductor
R1	Current Adjust <u>2/</u> R <sub>1</sub> = open circuit
T1	Balun <u>1/</u>
T2	Balun <u>1/</u>

1/ Balun performance impacts amplifier return losses and gain. Best performance can be achieved by winding 34 or 36 gauge bifilar wire around a small binocular core made from low-loss magnetic material. Suitable wire may be obtained from MWS Wire Industries. Core vendors include Ferronics, Fairrite, TDK, and Micrometals.

Alternatively, off-the-shelf baluns can be purchased from a number of vendors including Mini-Circuits (ADTL1-18-75), M/A-COM (ETC1-1-13), and Pulse Engineering (CX2071).

2/ Current can be adjusted by either changing the resistor value or forcing a voltage on pin 7.

3/ Tunes out balun inductance. Selected for best return loss.

*Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.*