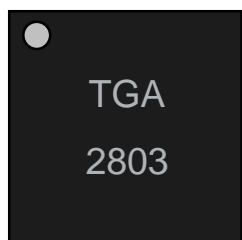
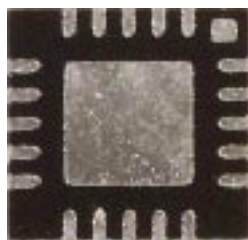


## CATV TIA/Gain Block



Top View

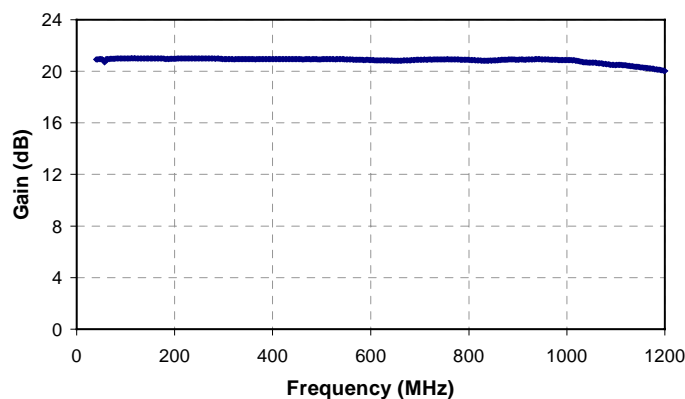


Bottom View

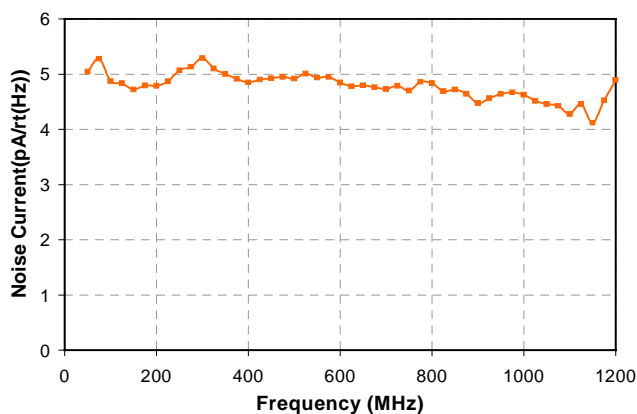
### Description

The TriQuint TGA2803-EPU is an ultra-linear, packaged TIA/Gain Block which operates from 40MHz to 1000MHz. The amplifier is available in a standard 4x4 mm 20 lead MLP package. The amplifier provides flat gain along with ultra-low distortion. It also provides high output power with low DC power consumption. This amplifier is ideally suited for use in CATV distribution systems or other applications requiring extremely low noise and distortion. Demonstration Boards are available.

**Typical 75  $\Omega$  Gain  
w/External Balun Losses Removed**



**Input Referred Current Noise  
with High Impedance source**



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.

## TGA2803-EPU-SM

### Key Features and Performance

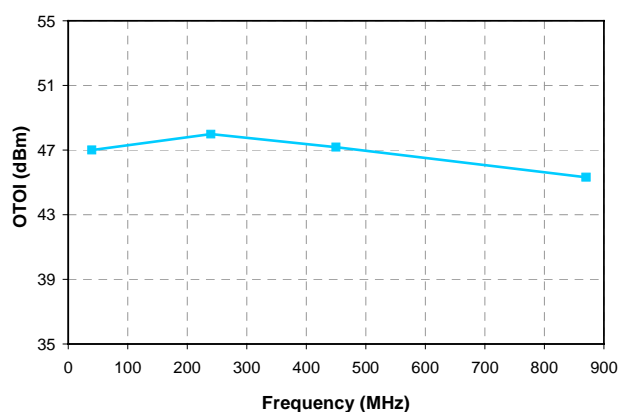
- Low Cost 4 x 4 mm Surface Mount Package
- 20 dB Flat Gain
- 800  $\Omega$  Transimpedance \*
- <5pA/  $\sqrt{\text{Hz}}$  Equivalent Input Noise Current \*
- 1.5 dB 75  $\Omega$  Noise Figure
- Ultra-Low Distortion (45dBm IP3 typ.)
- Wide Bandwidth (40MHz - 1GHz)
- Low DC Power Consumption
- Single Supply Bias (+8V)
- Proven GaAs Technology

\* Includes 1:1 balun, No photodiode or auto-transformer

### Primary Applications

- HFC Nodes
- CATV Line Amplifiers
- Head End Equipment

**75  $\Omega$  Output TOI**



**Table I**  
**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		500	mA	<u>1/</u> <u>2/</u>
P <sub>IN</sub>	RF Input Power		77	dBmV	<u>3/</u>
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	110	°C	

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

2/ Total Current

3/ Total Input Power

**Table II**  
**DC Specifications**

Symbol	Parameter	Typ	Unit
V <sub>DD</sub>	Bias Supply Voltage	8	V
I <sub>DD</sub>	Bias Supply Current	350	mA
V <sub>G1</sub>	Gate 1 Voltage (Pin 19)	0.90	V
V <sub>G2</sub>	Gate 2 Voltage (Pin 7)	2.66	V
V <sub>out1</sub>	RF Output 1 Voltage (Pin 14/15)	V <sub>DD</sub>	V
V <sub>out2</sub>	RF Output 2 Voltage (Pin 11/12)	V <sub>DD</sub>	V

*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.*

**Table III**  
**RF Specifications 1/**  
 $T_A=25^{\circ}\text{C}$ ,  $V_{DD}=8\text{V}$

Symbol	Parameter	Min	Typ	Max	Units	Note
BW	Bandwidth	40		870	MHz	
$S_{21}$	Power Gain		20		dB	<u>2/</u>
GF	Gain Flatness		$\pm 0.3$		dB	<u>2/</u>
NF	Noise Figure		1.5		dB	<u>2/</u>
TZ	Transimpedance		800		$\Omega$	
$I_n$	Equivalent Input Current Noise		5		pA/rtHz	<u>3/</u>
$IP_3$	Two-Tone, Third-Order Intercept (450 MHz)		46		dBm	
IRL	Input Return Loss		16		dB	
ORL	Output Return Loss		20		dB	
$I_D$	Drain Current		350		mA	<u>4/</u>
P1dB	Output Power at P1dB (450 MHz)		27		dBm	

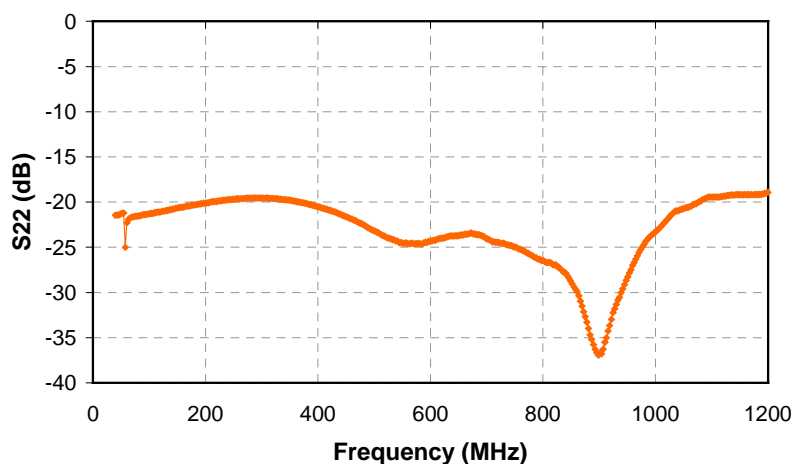
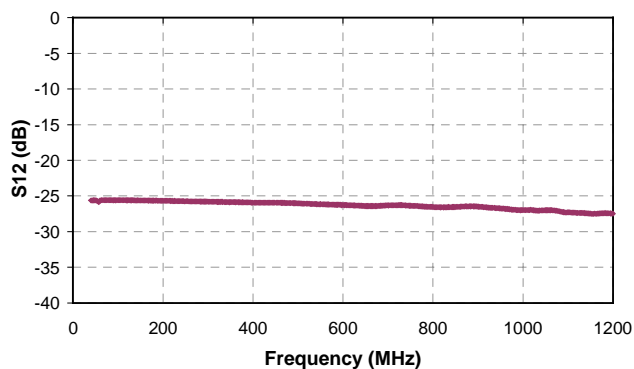
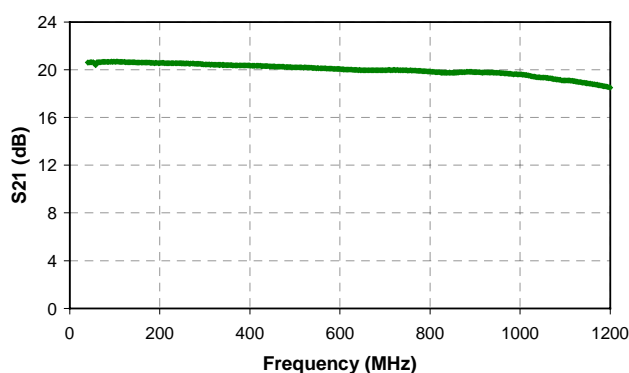
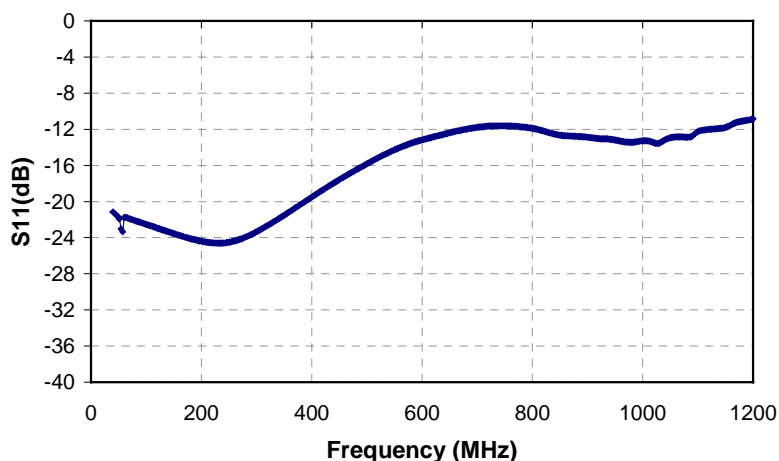
1/ Using electrical application circuit on pg. 8

2/ 1:1 Balun losses have been removed from the measurement

3/ Measured with open-circuited input

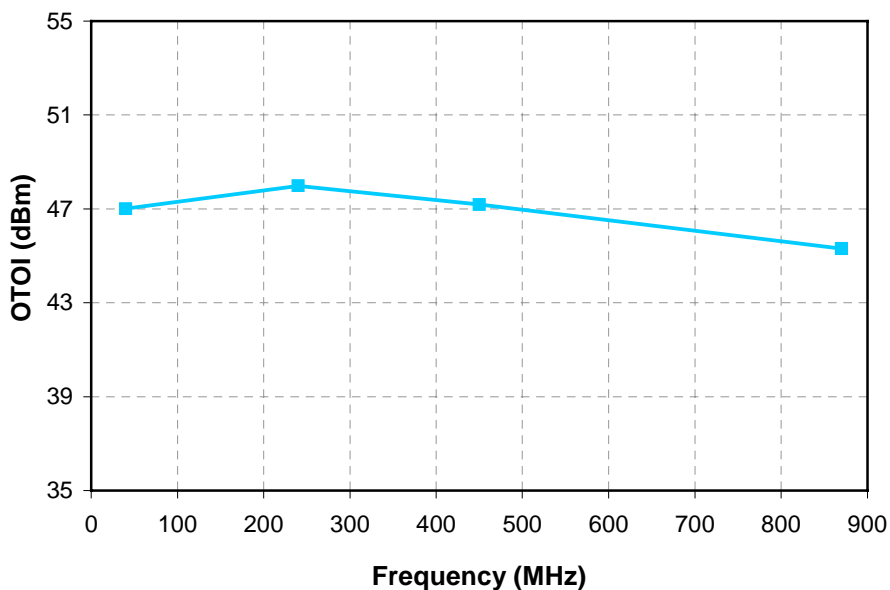
4/ Increasing drain current will improve linearity of device

## Typical Measured S-Parameters (75 $\Omega$ ) Using Application Circuit (includes effects of external baluns)

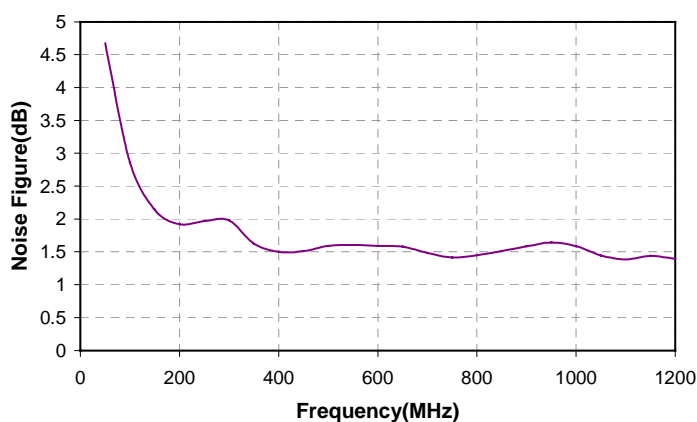
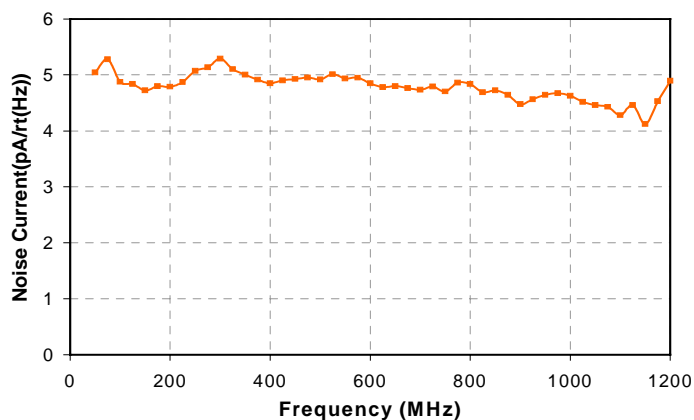


*Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.*

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

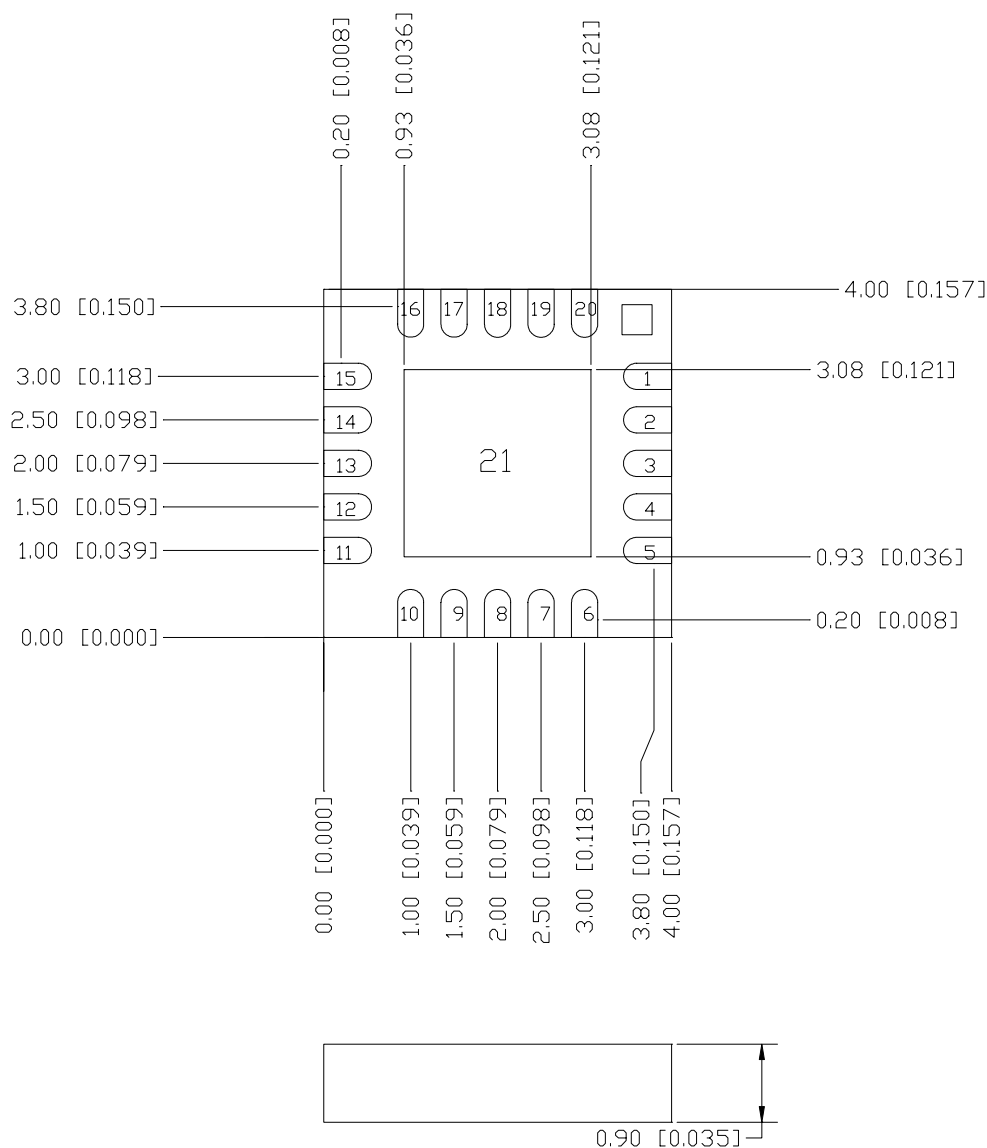


### Input balun losses removed



*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.*

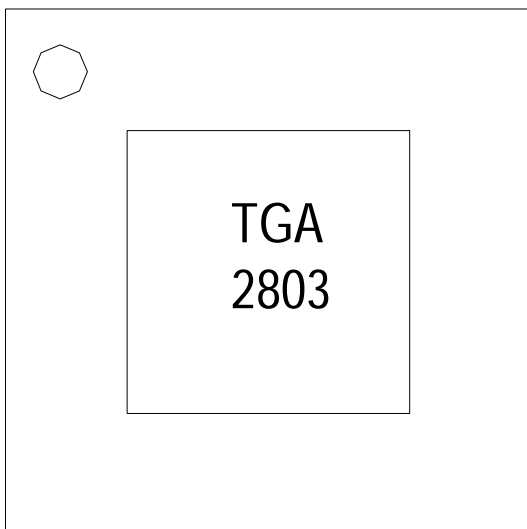
## Mechanical Specifications



Units: millimeters (inches)

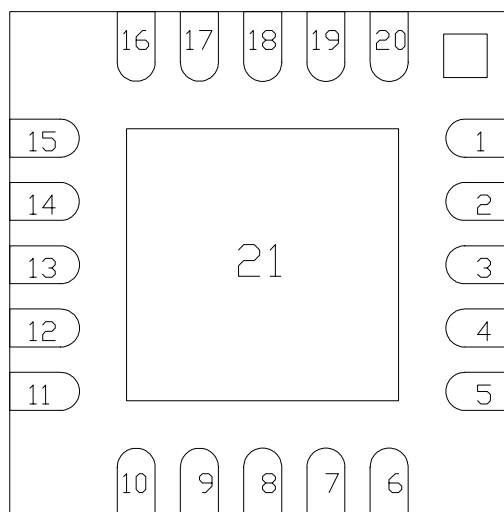
Package Tolerance  $\pm 0.10$  (0.004)

## Pinout



**Top Side**

Dot indicates Pin 1



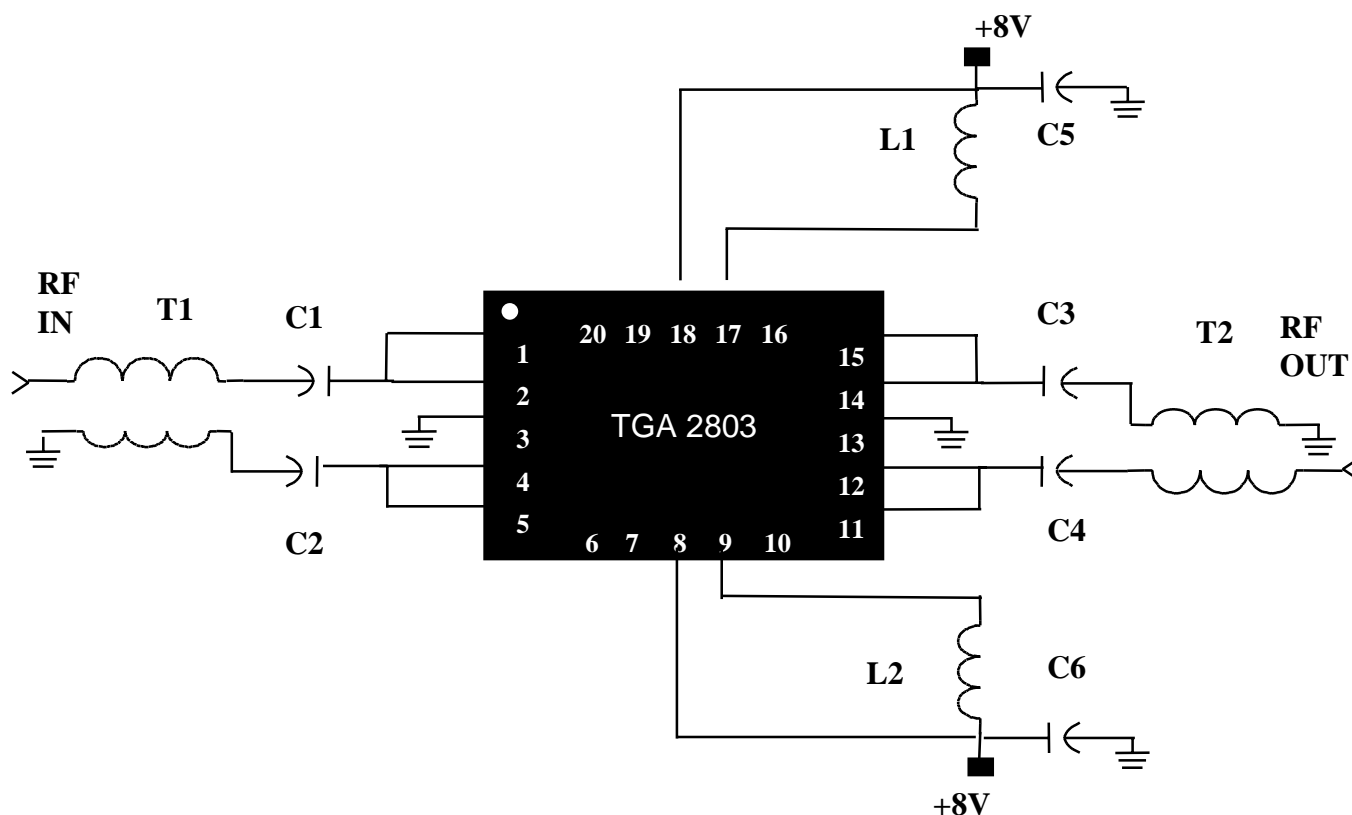
**Bottom Side**

Pin	Description	Pin	Description
1	RF Input 1	11	RF Output 2
2	RF Input 1	12	RF Output 2
3	NC	13, 21	GND
4	RF Input 2	14	RF Output 1
5	RF Input 2	15	RF Output 1
6	NC	16	NC
7	VG2 (Optional)	17	VDD (choked)
8	VDD	18	VDD
9	VDD (choked)	19	VG1 (Optional)
10	Isense <u>1/</u>	20	NC

**1/** Bias current monitor:  $I_{\text{bias}} = V_{\text{Pin 10}} / 4\Omega$

*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 Electrical Assembly



### Component Description

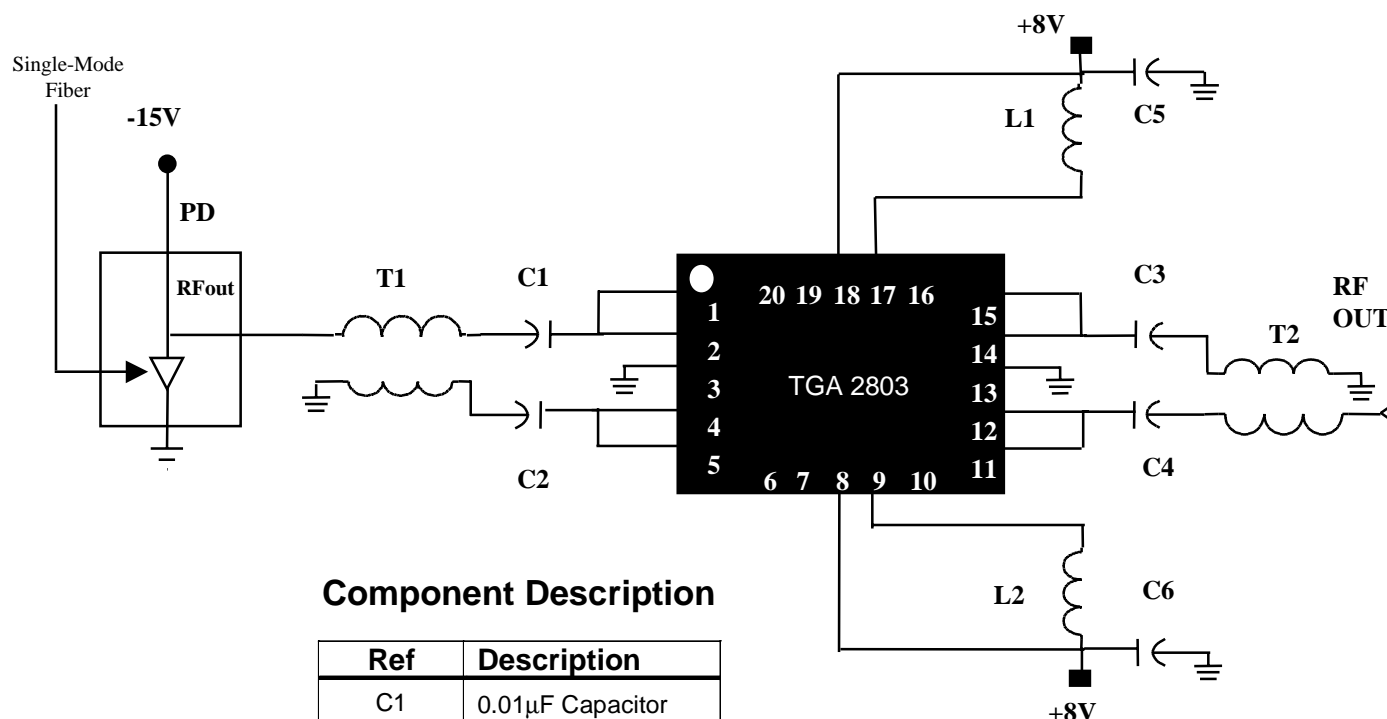
Ref	Description
C1	0.01 $\mu$ F Capacitor
C2	0.01 $\mu$ F Capacitor
C3	470pF Capacitor
C4	470pF Capacitor
C5	270pF Capacitor
C6	270pF Capacitor
L1	820nH Inductor
L2	820nH Inductor
T1	Balun <u>1/</u>
T2	Balun <u>1/</u>

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).



## Recommended Electro-Optical Assembly



### Component Description

Ref	Description
C1	0.01µF Capacitor
C2	0.01µF Capacitor
C3	470pF Capacitor
C4	470pF Capacitor
C5	270pF Capacitor
C6	270pF Capacitor
L1	820nH Inductor
L2	820nH Inductor
T1	Balun <u>1/</u>
T2	Balun <u>1/</u>
PD	Broadband Photodiode <u>2/</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/ Emcore 2609C Broadband Photodiode Module is recommended. The module includes a 4:1 impedance transformer.

*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.*