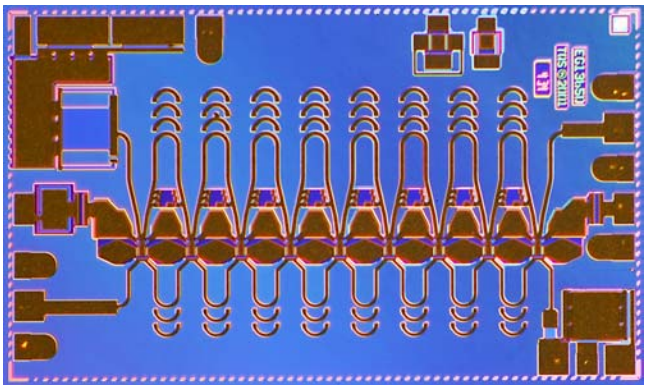
DC-25GHz MPA with AGC TGA4802-EPU

OC-192 12.5Gb/s Inverted RZ Lithium Niobate Modulator Driver



Key Features and Performance

- 0.25um pHEMT Technology
- DC - 18GHz Linear BW
- DC - 25GHz Saturated Power BW
- 15dB Small Signal Gain
- 15ps Edge Rates (20/80)
- 8Vpp Electrical Eye
- Low Power Dissipation
- Chip Dimensions 3.3mm x 2.0mm

Primary Applications:

- 12.5Gb/s IRZ Modulator Driver

Description

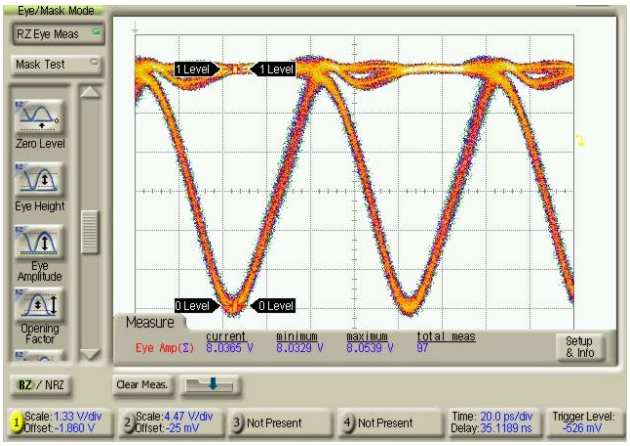
The TriQuint TGA4802EPU is a medium power wideband AGC amplifier that typically provides 12dB saturated midband gain with 6dB AGC range. Typical input and output return loss is <10dB. Typical Noise Figure is 1.5dB at 3GHz. Typical saturated output power is 23dBm. Small signal 3dB BW is 18GHz with saturated power performance to 25GHz. RF ports are DC coupled enabling the user to customize system corner frequencies.

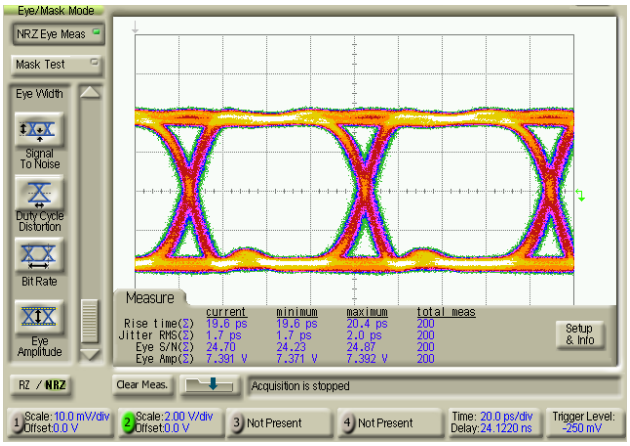
The TGA4802 is an excellent choice for 12.5Gb/s optical RZ transmit applications. The TGA4802 is capable of driving a single Lithium Niobate Mach-Zehnder optical modulator with electrical Inverted-Return-to-Zero (IRZ) data. In addition, the TGA4802 may also be used as a receive AGC amplifier.

Drain bias may be applied through the output port for best efficiency or through the on-chip drain termination. A cascaded pair demonstrated 8Vpp output voltage swing with 700mV at the input when stimulated with 12.5Gb/s 2^31-1prbs IRZ & NRZ data.

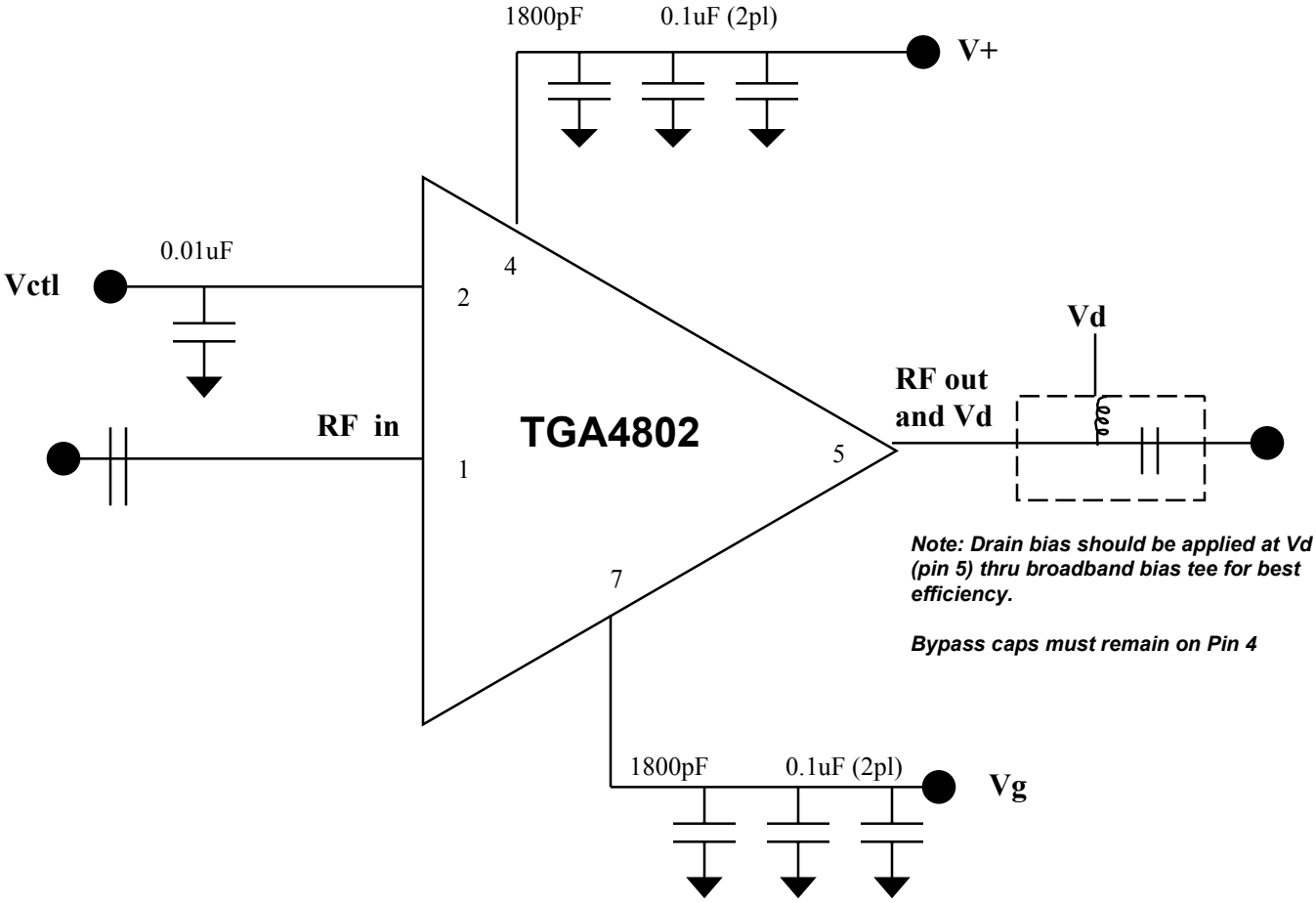
The TGA4802 requires off-chip decoupling and blocking components. Each device is 100% DC and RF tested on-wafer to ensure performance compliance. The device is available in die form. Evaluation boards are also available.

Measured 12.5Gb/s Data:





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.



Note: Drain bias should be applied at Vd (pin 5) thru broadband bias tee for best efficiency.

Bypass caps must remain on Pin 4

Bias Procedure

1) Make sure no RF power is applied to the device before continuing.
2) Pinch off device by setting Vg to –1.5V.
3) Raise V_D to 7.0V while monitoring drain current. Current should be zero.

   NOTE: *V_D bias should be applied to the RF output port via a bias tee for best efficiency.*
4) Raise Vctl to 1V (no greater than 1.5V).
5) For IRZ: Set Vg = -1V. For NRZ: Adjust V_{G1} more positive until drain current reaches 150mA.
6) Apply RF power.
7) Adjust Vctl for amplitude and Vg for symmetry.

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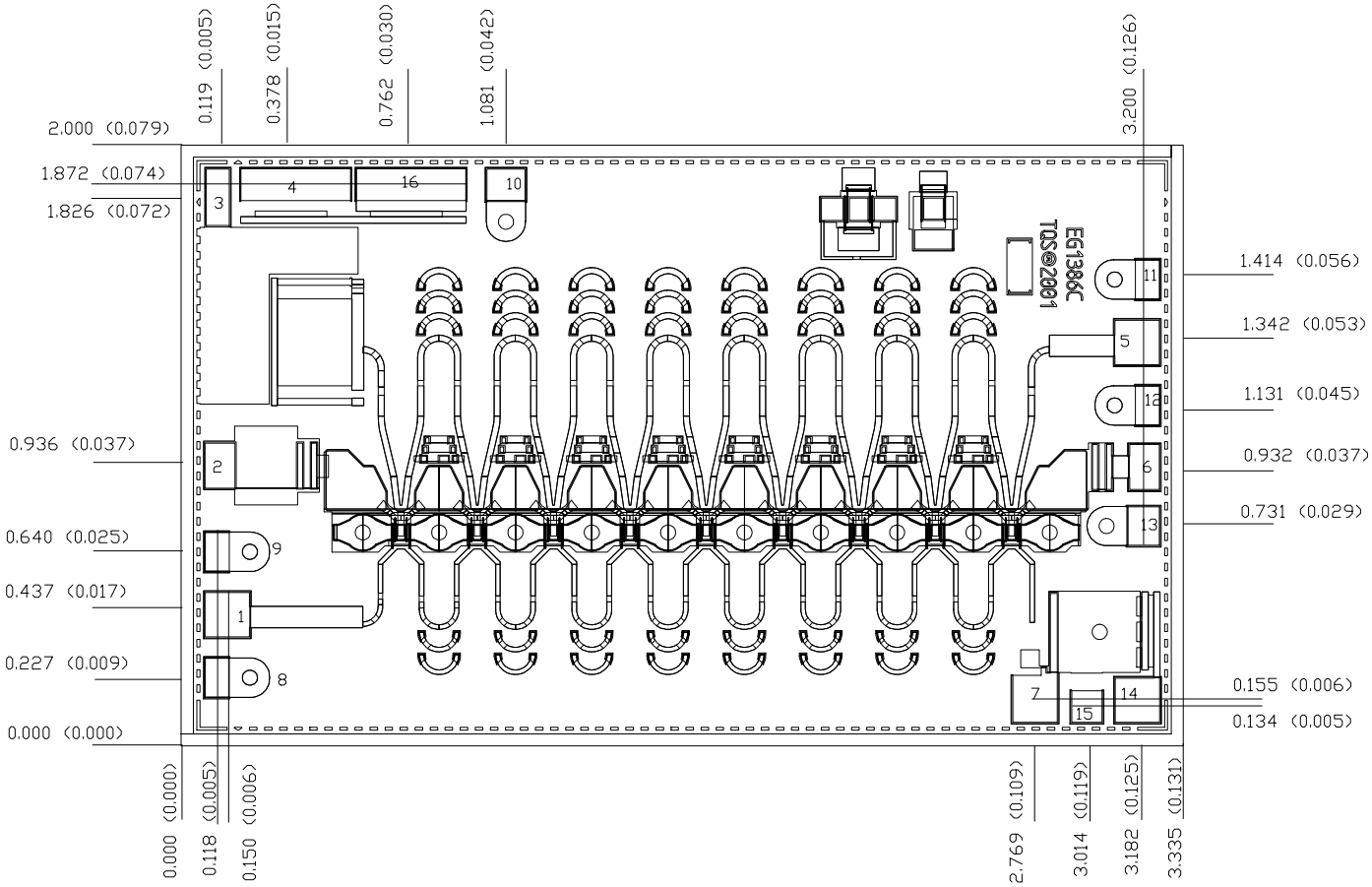
Mechanical Drawing



Units: millimeters (inches)
Thickness: 0.1016 (0.004)
Chip edge to bond pad dimensions are shown to center of bond pad
Chip size tolerance: +/- 0.051 (0.002)

Bond pad #1	(RF In)	0.145 x 0.145 (0.006 x 0.006)
Bond pad #2	(Vctrl)	0.145 x 0.100 (0.006 x 0.004)
Bond pads #3,8,9,10,11,12,13,15	(Gnd)	0.145 x 0.100 (0.006 x 0.004)
Bond pad #4	(V+)	0.365 x 0.100 (0.014 x 0.008)
Bond pad #5	(RF Out)	0.145 x 0.145 (0.006 x 0.006)
Bond pad #6	(Vctrl aux)	0.100 x 0.145 (0.004 x 0.006)
Bond pad #7	(Vg)	0.145 x 0.145 (0.006 x 0.006)
Bond pad #14	(Vg aux)	0.145 x 0.145 (0.006 x 0.006)
Bond pad #16	(V+ aux)	0.365 x 0.100 (0.014 x 0.008)

GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.

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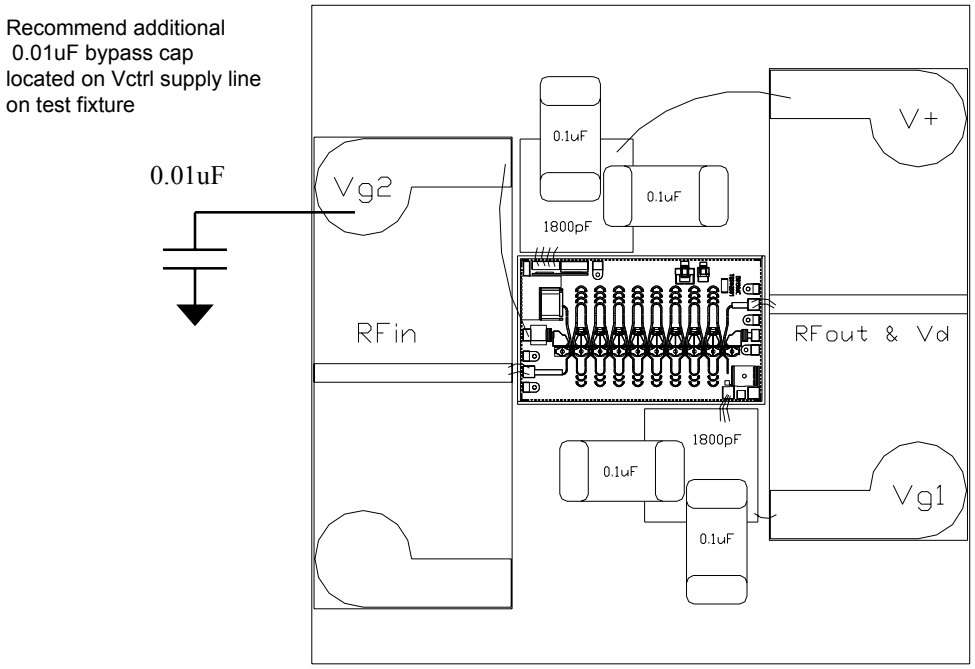

Reflow process assembly notes:

- Use AuSn (80/20) solder with limited exposure to temperatures at or above 300°C.
- An alloy station or conveyor furnace with reducing atmosphere should be used.
- No fluxes should be utilized.
- Coefficient of thermal expansion matching is critical for long-term reliability.
- Devices must be stored in a dry nitrogen atmosphere.

Component placement and adhesive attachment assembly notes:

- Vacuum pencils and/or vacuum collets are the preferred method of pick up.
- Air bridges must be avoided during placement.
- The force impact is critical during auto placement.
- Organic attachment can be used in low-power applications.
- Curing should be done in a convection oven; proper exhaust is a safety concern.
- Microwave or radiant curing should not be used because of differential heating.
- Coefficient of thermal expansion matching is critical.

Interconnect process assembly notes:

- Thermosonic ball bonding is the preferred interconnect technique.
- Force, time, and ultrasonics are critical parameters.
- Aluminum wire should not be used.
- Discrete FET devices with small pad sizes should be bonded with 0.0007-inch wire.
- Maximum stage temperature is 200°C.

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