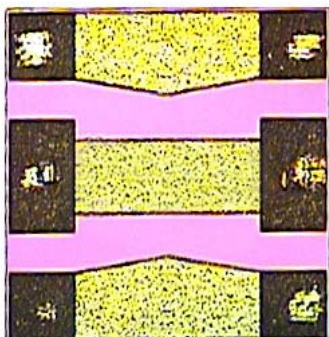
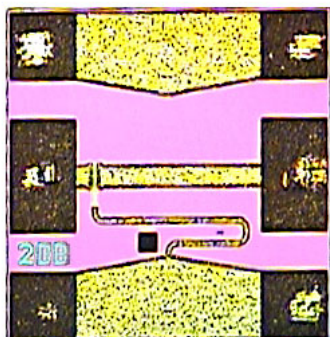


**Wideband Fixed Attenuators**

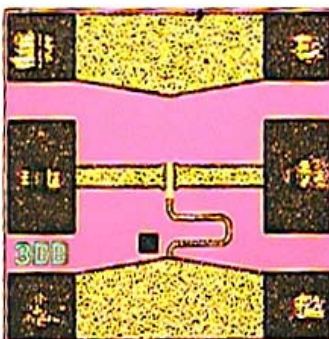
**TGL4201-EPU**



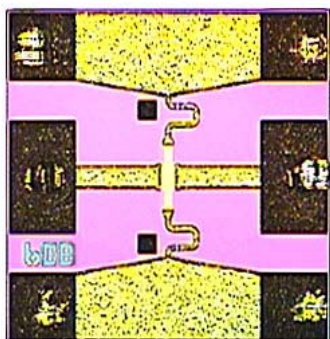
**0 dB Attenuator**



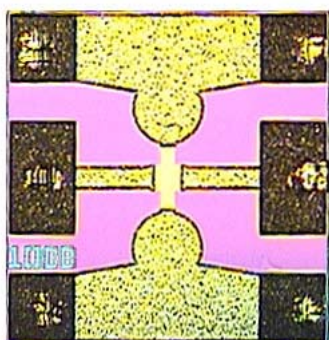
**2 dB Attenuator**



**3 dB Attenuator**



**6 dB Attenuator**



**10 dB Attenuator**

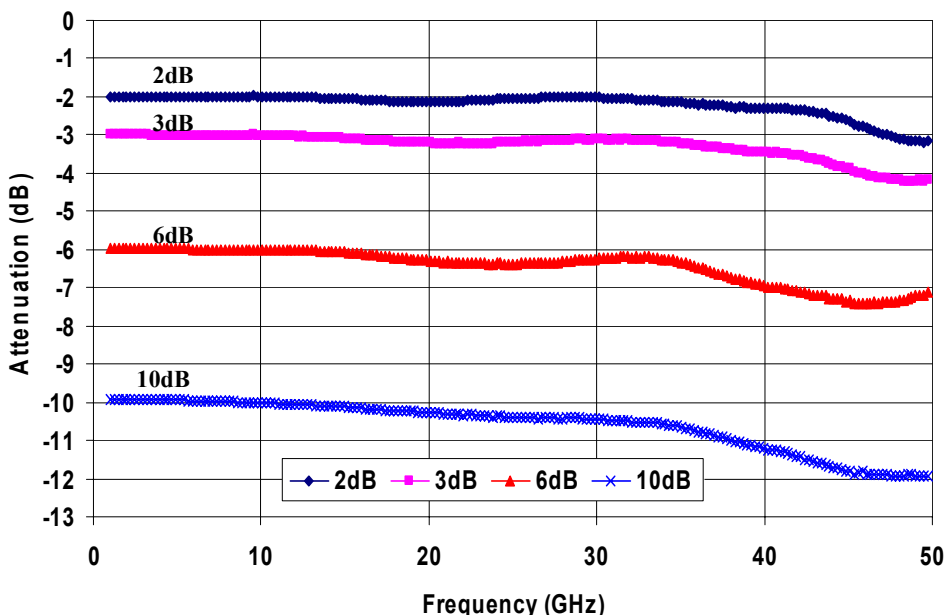
**Key Features and Performance**

- Fixed 0, 2, 3, 6 and 10dB Attenuators
- Broadband Response DC to > 40 GHz
- Excellent Return Loss > 15 dB
- Power Handling > 28 dBm
- On-Chip Grounding Vias
- 3MI Passive Part
- Low Price
- Small size: 0.5 x 0.5 x 0.1 mm (0.02 X 0.02 X 0.004 in)

**Primary Applications**

- Point to Point Radio
- Fiber Optic
- Wideband Military & Space
- Test Equipment

**Typical Electrical Characteristics  
Attenuators Probed in Fixtures**



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 I**  
**ELECTRICAL CHARACTERISTICS**

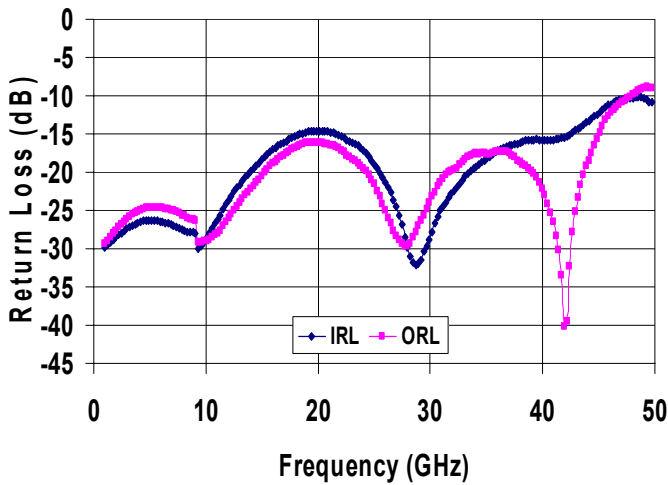
(Ta = 25 °C Nominal)

PARAMETER		TEST CONDITIONS	TYP	UNIT
	Attenuation	DC ~ 40 GHz	0dB for 0dB Attenuator 2dB for 2dB Attenuator 3dB for 3dB Attenuator 6dB for 6dB Attenuator 10dB for 10dB Attenuator	dB
IRL	Input Return Loss	DC ~ 40 GHz	15	dB
ORL	Output Return Loss	DC ~ 40 GHz	15	dB
	Maximum Power*	2 - 18 GHz	> 28	dBm

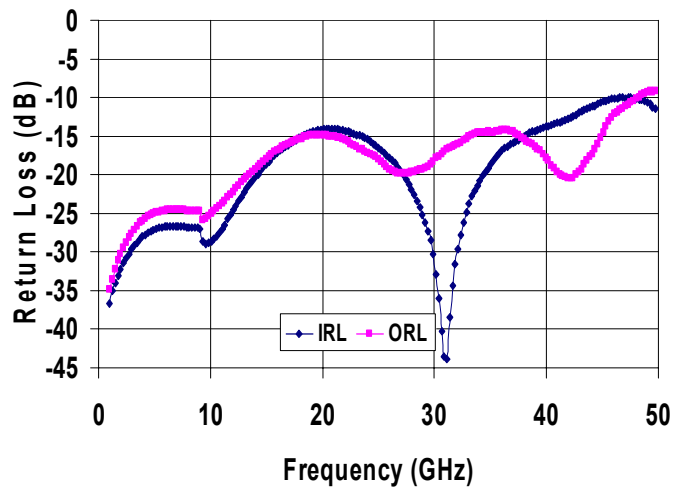
\* This value is a result of burnout tests conducted on fixtured parts. Tests were performed with a fixed 50Ω input and output impedance, continuous wave input power. Failure criteria was a change of 0.5 dB attenuation.

**Typical Measurement Attenuators**  
Attenuators Probed in Fixtures

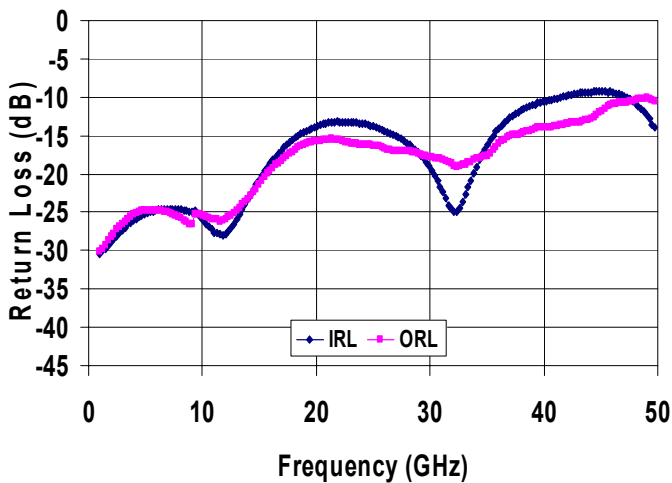
**2 dB Attenuator**



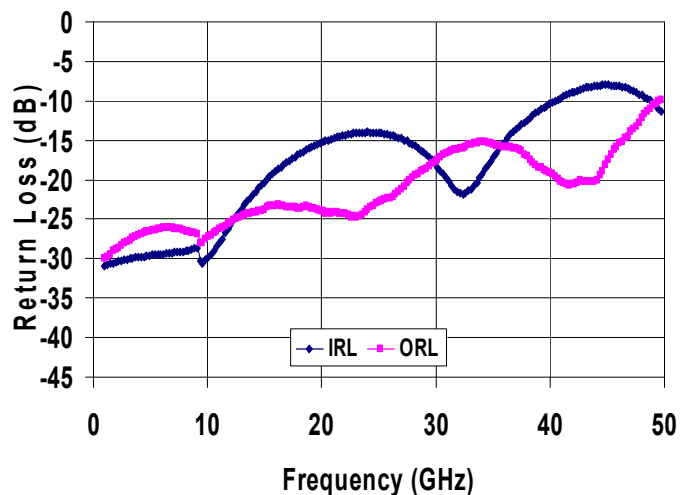
**3 dB Attenuator**



**6 dB Attenuator**

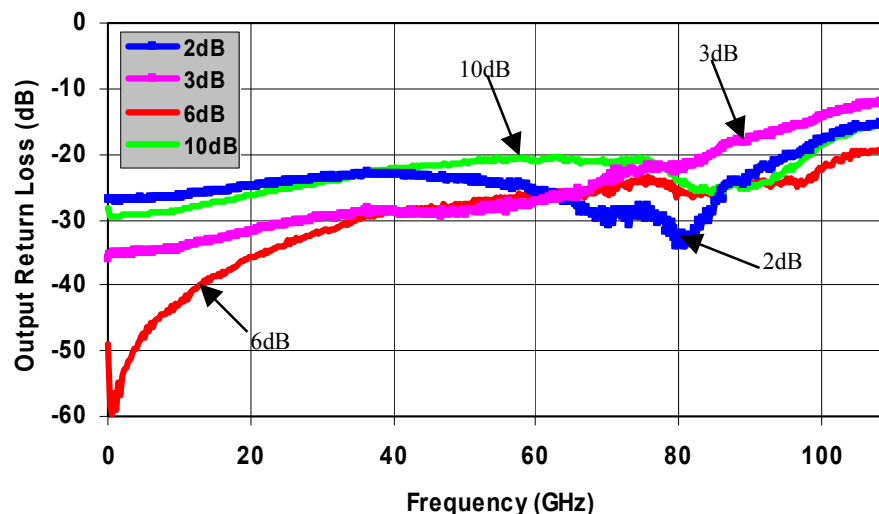
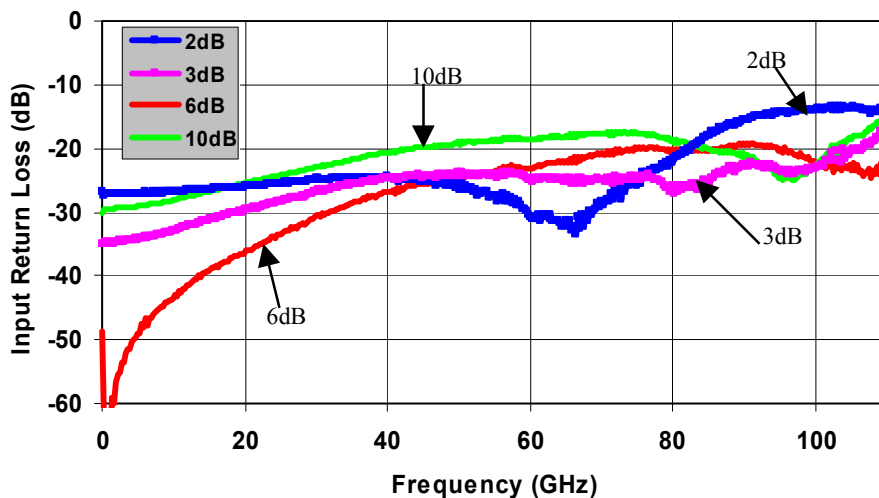
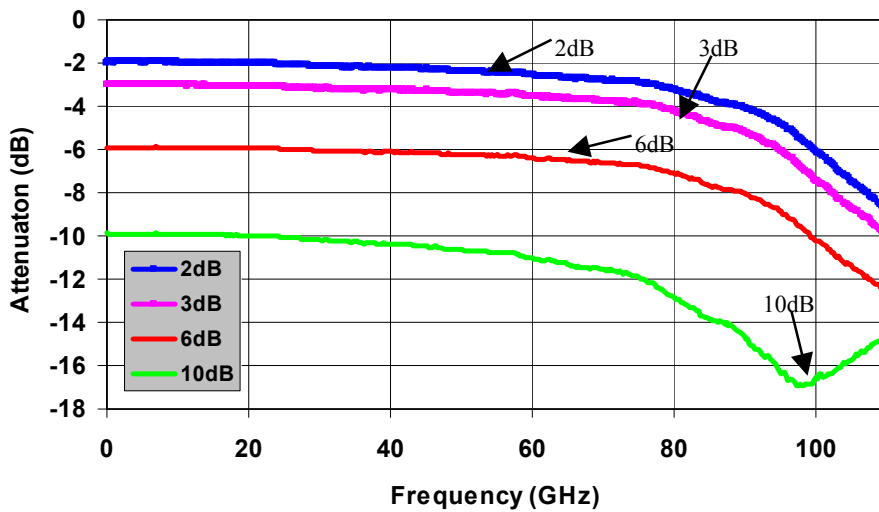


**10 dB Attenuator**



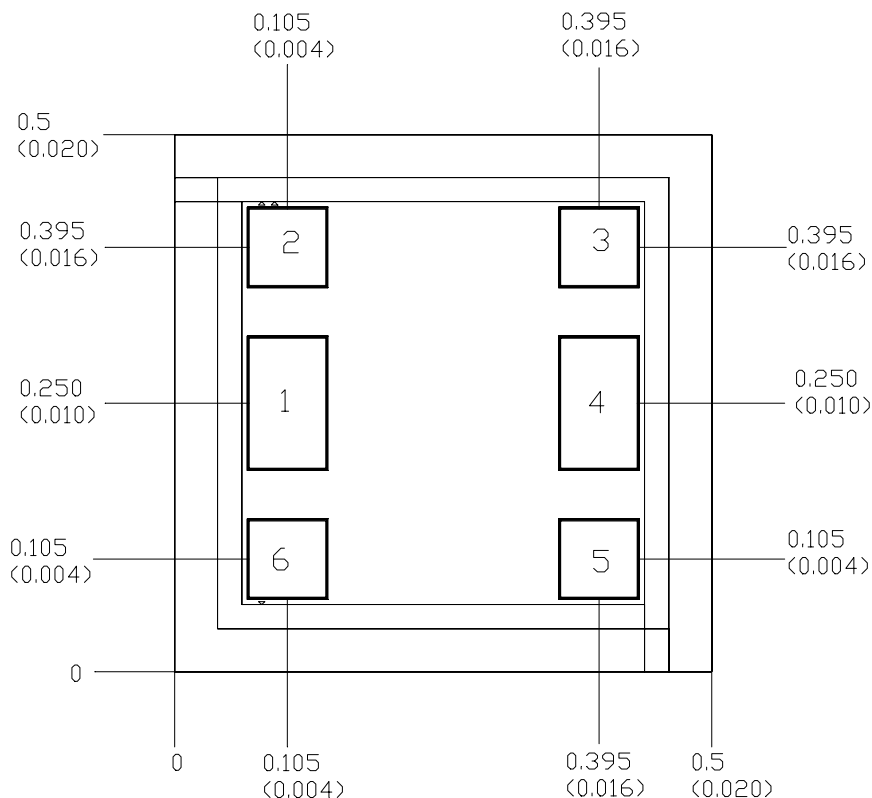
Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice

**Typical Measurement Attenuators**  
**No Bond Wire, Probed from 45 MHz to 110GHz**



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 Drawing**



Units: millimeters (inches)

Thickness: 0.100 (0.004)

Chip edge to bond pad dimensions are shown to center of bond pad

Chip size tolerance: +/- 0.051 (0.002)

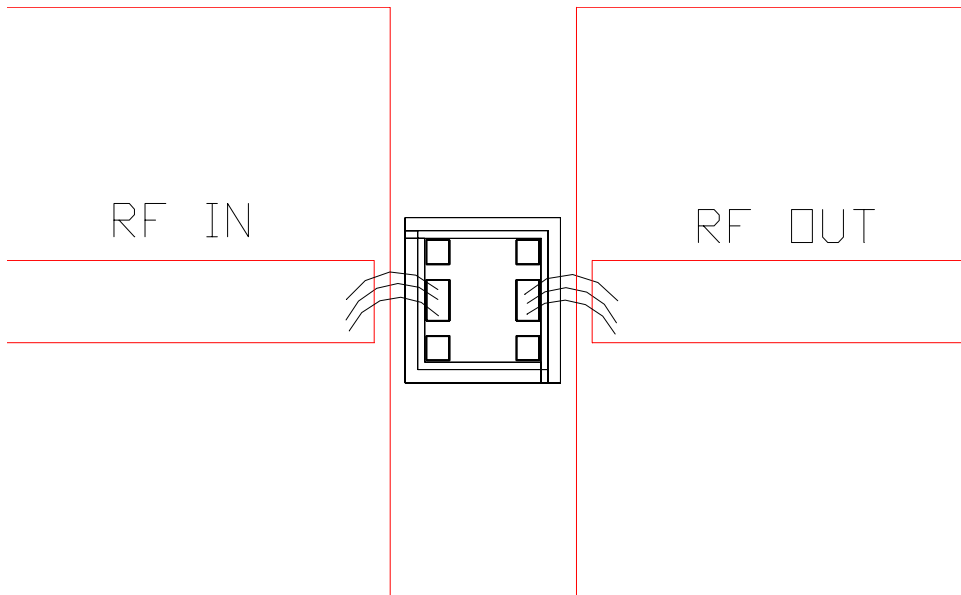
Bond Pad #1:	(RF In)	0.075 x 0.125	(0.003 x 0.005)
Bond Pad #2:	(N/C)*	0.075 x 0.075	(0.003 x 0.003)
Bond Pad #3:	(N/C)*	0.075 x 0.075	(0.003 x 0.003)
Bond Pad #4:	(RF Out)	0.075 x 0.125	(0.003 x 0.005)
Bond Pad #5:	(N/C)*	0.075 x 0.075	(0.003 x 0.003)
Bond Pad #6:	(N/C)*	0.075 x 0.075	(0.003 x 0.003)

\* Note: GND is back side of MMIC

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

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

## Chip Assembly Diagram



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

*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*

## Assembly Process Notes

### Reflow process assembly notes:

- Use AuSn (80/20) solder with limited exposure to temperatures at or above 300°C (30 seconds max).
- 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.
- 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.
- Maximum stage temperature is 200°C.

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

## Ordering Information

PART NUMBER	ATTENUATOR
TGL4201-00-EPU	0 dB Attenuator
TGL4201-02-EPU	2 dB Attenuator
TGL4201-03-EPU	3 dB Attenuator
TGL4201-06-EPU	6 dB Attenuator
TGL4201-10-EPU	10 dB Attenuator

*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*