

捷多邦,专业PCB打样工厂,24小时加急出货 Advance Product Information September 27, 2004

10Gb/s Wide Dynamic Range Differential TIA TGA4817-EPU



Preliminary Measured Performance



10.0Gb/s, 2³¹-1 PRBS, I_{PD} = 95 uA RMS



Key Features and Performance

- 3200Ω Single-Ended Transimpedance
- > 9 GHz 3dB Bandwidth
- > 1.6mA RMS Input Overload Current
- 11pA/ √Hz Input Noise Current
- Rx Signal Indicator (RSSI)
- 0.15µm 3MI pHEMT Technology
- Bias Conditions: 3.3V, 70mA
- Chip dimensions: 1.20 x 1.20 x 0.10 mm (0.047 x 0.047 x 0.004 in)

Primary Applications

 OC-192/STM-64 Fiber Optic Systems





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TABLE I MAXIMUM RATINGS

Symbol	Parameter <u>1</u> /	Value	Notes
V ⁺	Positive Supply Voltage	5.5 V	<u>2</u> /
I ⁺	Positive Supply Current (Quiescent)	80 mA	<u>2</u> /
P _{IN}	Input Continuous Wave Power	14.5 dBm	<u>2</u> /
PD	Power Dissipation	0.44 W	<u>2</u> /
Т _{СН}	Operating Channel Temperature	117 °C	4/ 5/
Τ _M	Mounting Temperature (30 Seconds)	320 °C	
T _{STG}	Storage Temperature	-65 to 117 °C	

- 1/ These ratings represent the maximum operable values for this device.
- 2/ Current is defined under no RF drive conditions. Combinations of supply voltage, supply current, input power, and output power shall not exceed P_D.
- <u>3</u>/ When operated at this power dissipation with a base plate temperature of 70 °C, the median life is 1 E+6 hours.
- 4/ These ratings apply to each individual FET.
- 5/ Junction operating temperature will directly affect the device median time to failure (T_M). For maximum life, it is recommended that junction temperatures be maintained at the lowest possible levels.





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TABLE II

RF CHARACTERIZATION TABLE

 $(T_A = 25^{\circ}C, Nominal)$ $(V^+ = 3.3V, I^+ = 70mA) <u>1</u>/$

Parameter	Typical	Unit	Notes
Single-Ended Transimpedance (1GHz)	3200	Ω	<u>2</u> / <u>3</u> /
3dB Transimpedance Bandwidth	9	GHz	<u>2</u> / <u>3</u> /
Low Frequency 3dB Cut-Off	< 40	kHz	<u>4</u> /
Transimpedance Ripple (1 to 7GHz)	1.5	dBpp	<u>2</u> / <u>3</u> /
Group Delay Variation (1 to 7GHz)	±15	ps	<u>2</u> / <u>3</u> /
Ave Eq. Noise Current (1 to 7GHz)	11	pA/√Hz	<u>3</u> /
Output Return Loss (0.1 to F3dB)	12	dB	<u>2</u> / <u>3</u> /
Input Overload Current	1.6	mA RMS	<u>5</u> /
Sensitivity	10	uA RMS	<u>5</u> /
Single-Ended Limited Output Voltage	600	mVpp	

- <u>1</u>/ 50 Ω Single-Ended Output Impedance
- <u>2</u>/ Photodiode& Bond Wire Model: CPD = 0.2pF, RPD = 15Ω , LBW = 1.0 nH
- 3/ RF Output Interconnect Inductance: 0.42nH
- 4/ External Bypass Capacitors Required (see assembly drawing)
- <u>5</u>/ 10GBit/s, 2³¹-1 PRBS, BER < 10⁻¹²

TABLE III THERMAL INFORMATION

Parameter	Test Conditions	Т _{сн} (°С)	R _{θJC} (°C/W)	T _M (HRS)
R _{0JC} Thermal Resistance (channel to backside of carrier)	V ⁺ = 3.3 V I ⁺ = 70 mA Pdiss = 0.231 W	74	17.3	1.1 E+8

Note: Assumes eutectic attach using 1.5 mil 80/20 AuSn mounted to a 20 mil CuMo Carrier at 70°C baseplate temperature.

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Typical Fixtured Performance Optical Eye 10Gbps PRBS 2³¹-1



Photodiode Current = 9.5 uA RMS



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.





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Advance Product Information September 27, 2004 **TGA4817-EPU Mechanical Drawing**



Bond pad #1	(RF In)	0.079 x 0.100 (0.003 x 0.004)	
Bond pad #2	(C Bypass)	0.160 x 0.180 (0.006 x 0.007)	
Bond pad #3	(V+)	0.079 x 0.079 (0.003 x 0.003)	
Bond pad #4	(FBIN)	0.079 x 0.079 (0.003 x 0.003)	
Bond pad #5	(+ RF Out)	0.079 x 0.100 (0.003 x 0.004)	
Bond pad #6	(- RF Out)	0.079 x 0.100 (0.003 x 0.004)	
Bond pad #7	(FBIN)	0.079 x 0.079 (0.003 x 0.003)	ALTERNATE
Bond pad #8	(RSSI)	0.079 x 0.079 (0.003 x 0.003)	

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Chip Assembly & Bonding Diagram



Recommended Components

C1,C2	AVX:	0402YC393KAT2A
C1,C2	Presidio:	VL4040X7R363M16VH5

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

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Assembly Process Notes

Reflow process assembly notes:

- Use AuSn (80/20) solder with limited exposure to temperatures at or above 300 °C for 30 sec
- 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.
- Devices with small pad sizes should be bonded with 0.0007-inch wire.
- Maximum stage temperature is 200 °C.

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