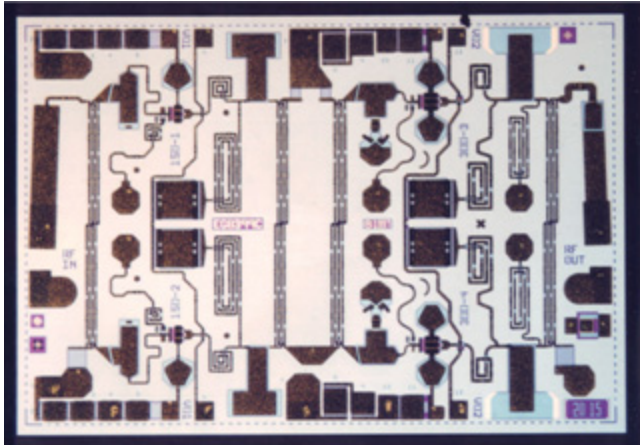


8 - 18 GHz Wideband Driver Amplifier

TGA8399C

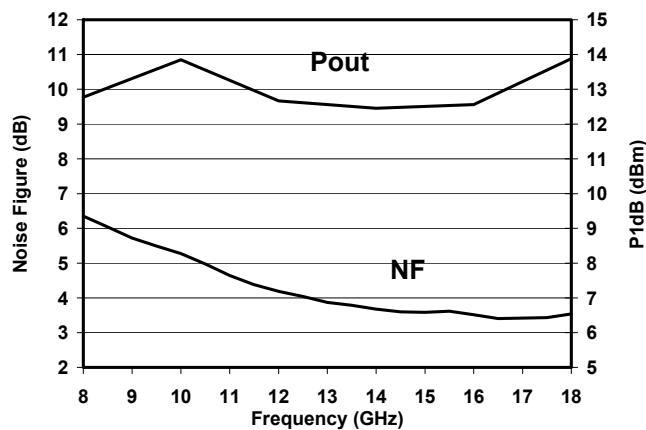
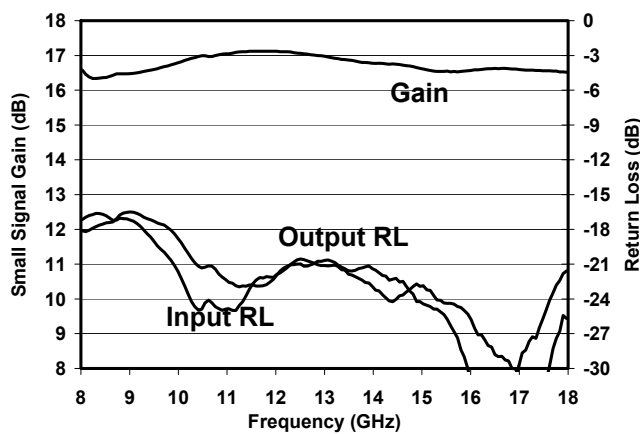


Chip Dimensions: 3.5mm x 2.4mm x 0.1 mm

Key Features and Performance

- Two Stage Driver Amplifier
- 0.25µm pHEMT 2MI Technology
- 8-18 GHz Frequency Range
- 13 dBm Nominal Pout
- 17 dB Nominal Gain
- Balanced In/Out for Low VSWR
- 4.5V @ 50mA Self Bias
- Chip Dimensions: 3.5mm x 2.4mm x 0.1 mm

Fixtured Measured Performance



Primary Applications

- X and Ku band Driver
- Point-to-Point Radio

Note: Datasheet is subject to change without notice.

TABLE I
MAXIMUM RATINGS

Symbol	Parameter 1/	Value	Notes
V^+	Positive Supply Voltage	8 V	2/
I^+	Positive Supply Current	180 mA	2/
$ I_G $	Gate Supply Current	3.52 mA	
P_{IN}	Input Continuous Wave Power	17.0 dBm	2/
P_D	Power Dissipation	0.94 W	2/, 3/
T_{CH}	Operating Channel Temperature	150 °C	4/, 5/
T_M	Mounting Temperature (30 seconds)	320 °C	
T_{STG}	Storage Temperature	-65 °C to 150 °C	

1/ These ratings represent the maximum operable values for this device.

2/ Combinations of supply voltage, supply current, input power, and output power shall not exceed P_D .

3/ When operated at this bias condition with a base plate temperature of 70 °C, the median life is 1 E+6 hours.

4/ 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.

5/ These ratings apply to each individual FET.

TABLE II
DC PROBE TESTS
($T_A = 25\text{ }^\circ\text{C}$, Nominal)

Symbol	Parameter	Minimum	Maximum	Value
V_P	Pinch-off Voltage	-1.5	-0.5	V
BVGS	Breakdown Voltage gate-source	-30	-8	V
BVGD	Breakdown Voltage gate-drain	-30	-8	V

TABLE III
RF CHARACTERIZATION TABLE
($T_A = 25\text{ }^\circ\text{C}$, Nominal)
 $V_d = 5\text{ V}$

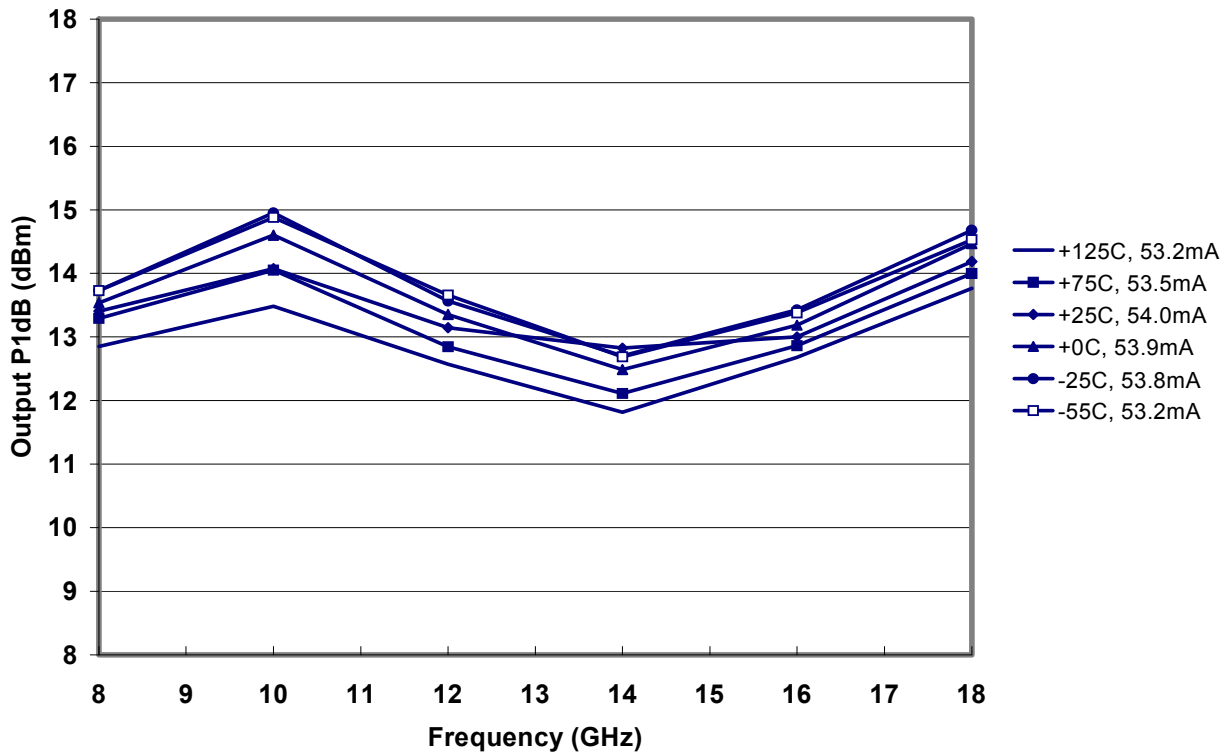
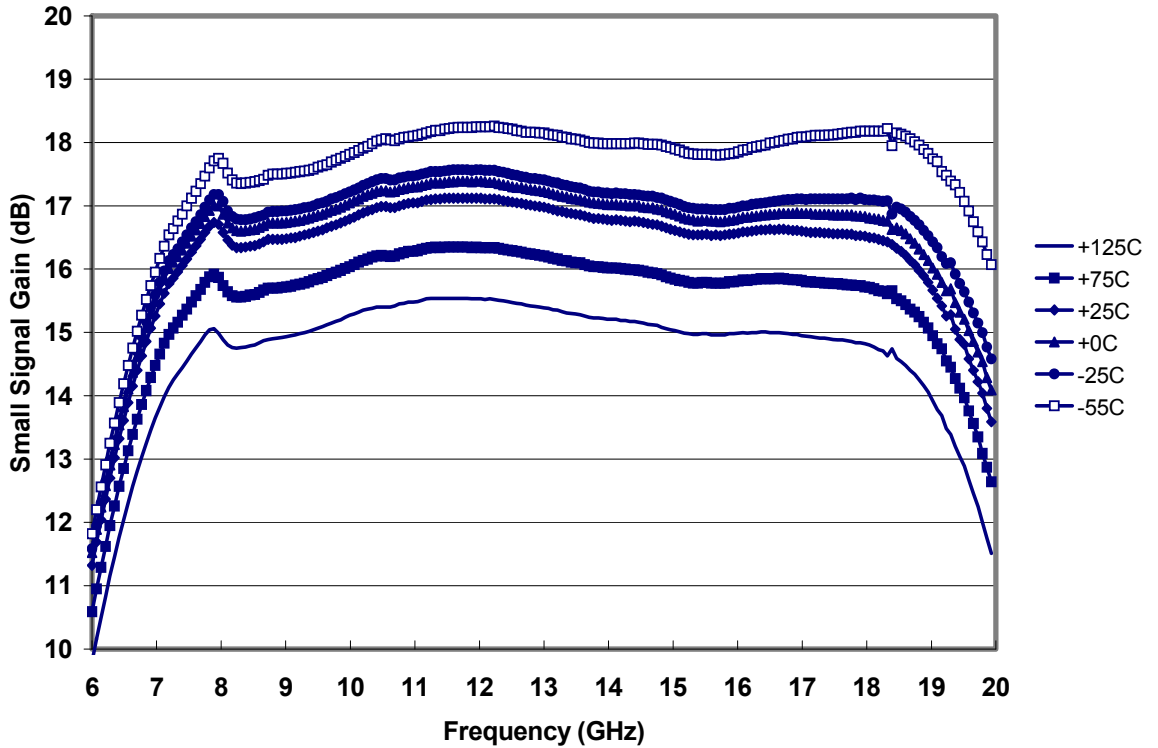
Symbol	Parameter	Test Condition	Limit			Units
			Min	Nom	Max	
Gain	Small Signal Gain	F = 8 – 18 GHz	12	16	---	dB
IRL	Input Return Loss	F = 8 – 18 GHz	---	-18	-12	dB
ORL	Output Return Loss	F = 8 – 18 GHz	---	-20	-12	dB

TABLE IV
THERMAL INFORMATION

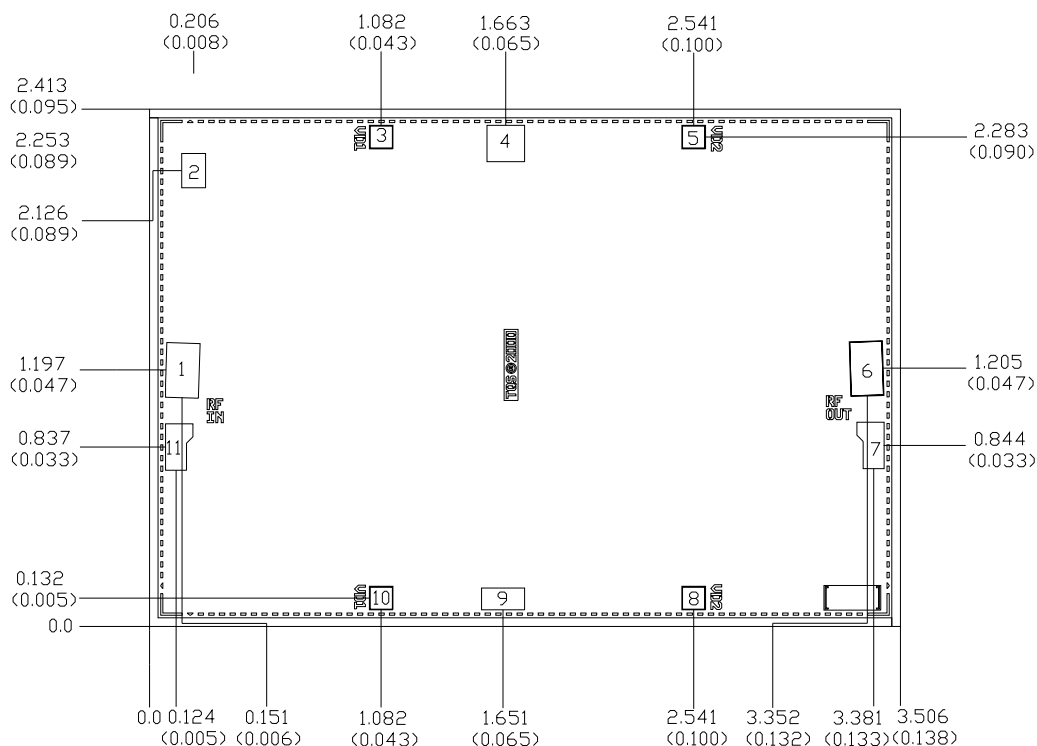
Parameter	Test Conditions	T_{CH} ($^\circ\text{C}$)	$R_{\theta JC}$ ($^\circ\text{C/W}$)	T_M (Hours)
$R_{\theta JC}$ Thermal Resistance (channel to backside of carrier)	$V_d = 4.5\text{ V}$ $I_d = 50\text{ mA}$ $P_{diss} = 0.225\text{ W}$	89	85	4.1 E+8

Note: Assumes eutectic attach using 1.5 mil 80/20 AuSn mounted to a 20 mil CuMo Carrier at 70 $^\circ\text{C}$ baseplate temperature. Worst case condition with no RF applied, 100% of DC power is dissipated.

TGA8399C Performance vs. Temperature



Mechanical Drawing



Units: millimeters (inches)

Thickness: 0.150 (0.006) (reference only)

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

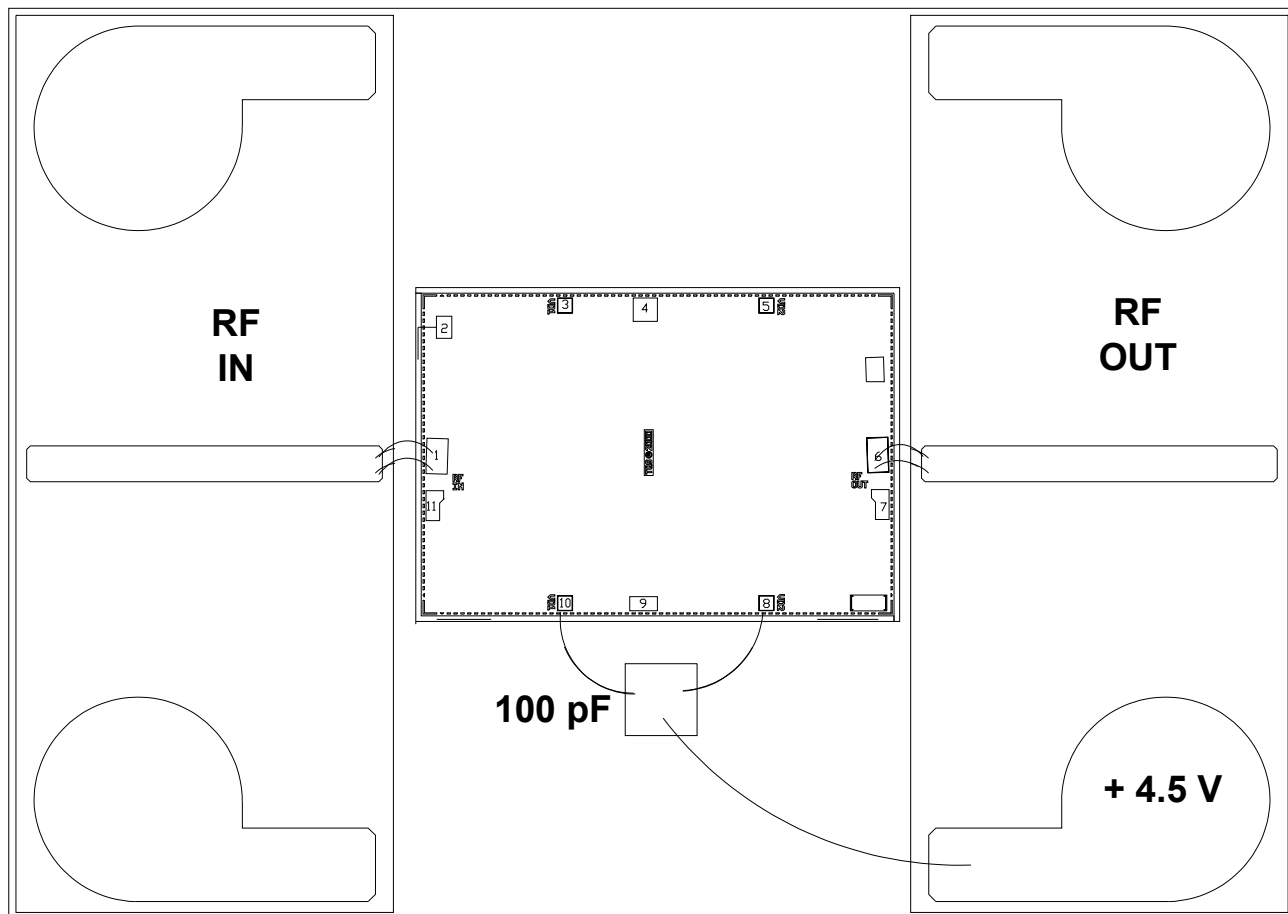
Chip size tolerance: +/- 0.051 (0.002)

GND IS BACKSIDE OF MMIC

Bond Pad #1 (RF Input)	0.155 x 0.255 (0.006 x 0.010)
Bond Pad #2 (GND)	0.111 x 0.160 (0.004 x 0.006)
Bond Pad #3,#10 (VD1)	0.110 x 0.110 (0.004 x 0.004)
Bond Pad #4 (GND)	0.170 x 0.175 (0.007 x 0.007)
Bond Pad #5,#8 (VD2)	0.110 x 0.110 (0.004 x 0.004)
Bond Pad #6 (RF Output)	0.155 x 0.255 (0.006 x 0.010)
Bond Pad #7,#11 (GND)	0.098 x 0.217 (0.004 x 0.009)
Bond Pad #9 (GND)	0.102 x 0.200 (0.004 x 0.008)

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

Recommended Assembly Layout



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

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 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.
- 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.

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