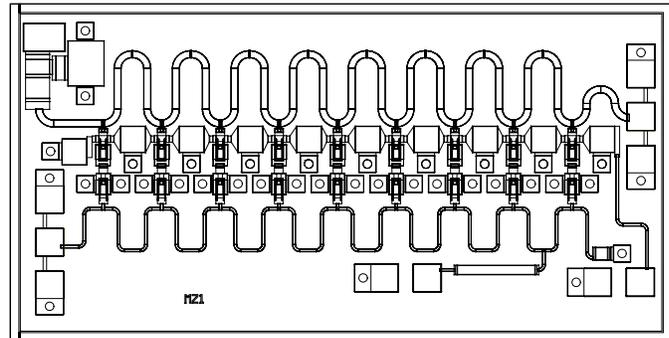


FEATURES

- ◆ DC – 20 GHz Frequency Bandwidth
- ◆ 17dB Small Signal Gain
- ◆ 8 Vpp Output Voltage
- ◆ -12 dB input/output return loss
- ◆ Chip Size: 1.18 x 2.3 mm
- ◆ Minimal Group Delay Variation


DESCRIPTION AND APPLICATIONS

The Filtronic Solid State FMA501 is a medium power pHEMT amplifier that operates from DC to 20 GHz. This nine-stage travelling wave amplifier provides 17 dB nominal small signal gain and 8 V peak-to-peak NRZ output at bit rates to 12.5 Gb/sec. The FMA501 is designed as the output stage for OC-192 MZ modulator driver amplifiers for optical data communication applications, and can be cascaded with the FMA500 Pre-Driver MMIC to provide 30 dB of voltage gain.

ELECTRICAL SPECIFICATIONS @ T_{Ambient} = 25°C

(V_{DD} = +8.0V, V_{GG} = -3.0V; V_{GC} = +1.5V; Z_{IN} = Z_{OUT} = 50Ω)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
3dB Operating Bandwidth	BW			20		GHz
Small Signal Gain	S ₂₁			17		dB
Operating Current	I _{OP}			220		mA
Input Return Loss	S ₁₁			-12		dB
Output Return Loss	S ₂₂			-12		dB
Gain Control	GC	V _{GC} = 0V to 1.5V		6		dB
Group Delay Variation	Δτ _{grp}	Over Bandwidth		±20		ps
Rise/Fall time, 20%-80%	τ _{R/F}			20	30	ps
Output Voltage at Saturation	V _{OUT}	10Gb/sec, NRZ, V _{IN} = 2Vpp		8		V
Saturated Output Power	P _{SAT}	V _{IN} = 2Vpp		25.5		dBm

• ABSOLUTE MAXIMUM RATINGS

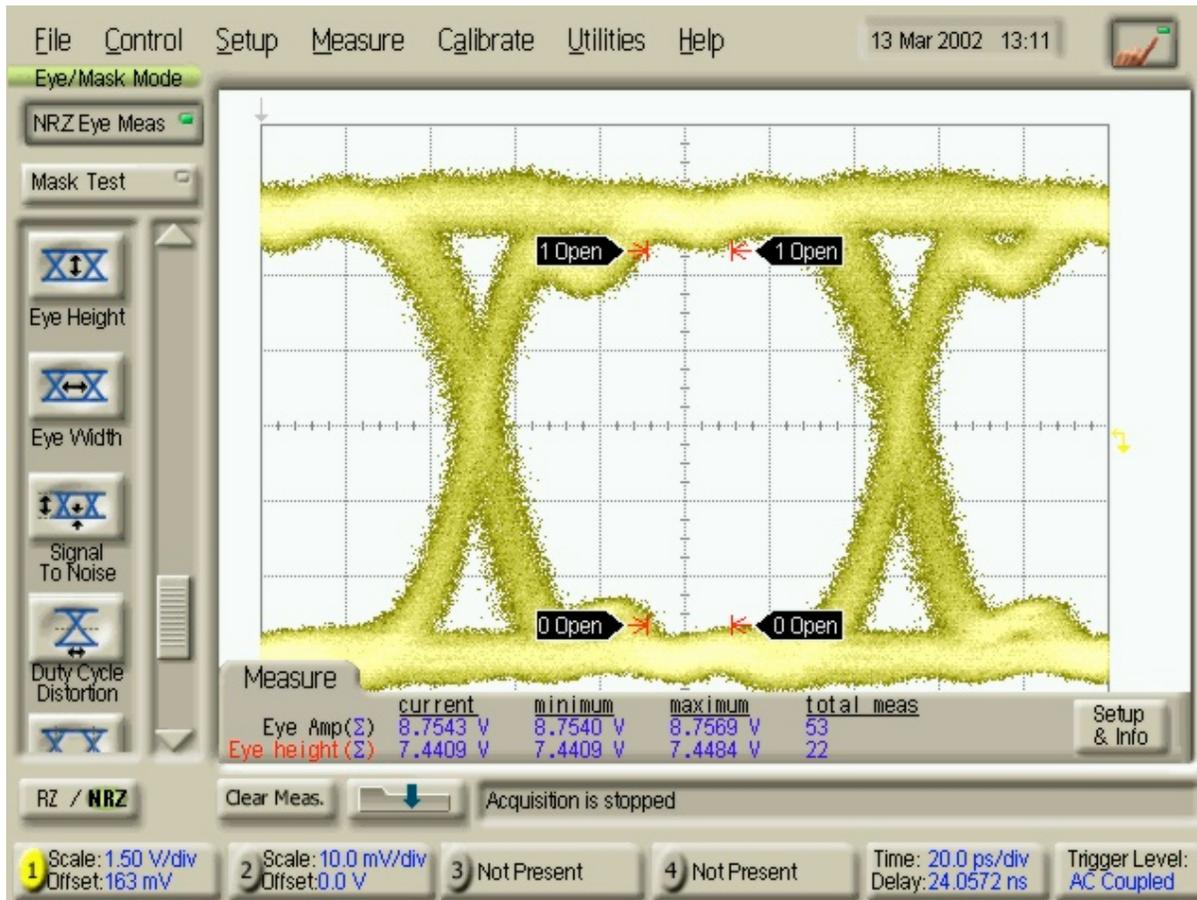
Parameter	Symbol	Test Conditions	Min	Max	Units
Drain Voltage	V_{DD}	$T_{Ambient} = 22 \pm 3 \text{ }^{\circ}\text{C}$		8.5	V
Operating Current	I_{OP}	$T_{Ambient} = 22 \pm 3 \text{ }^{\circ}\text{C}$		250	mA
RF Input Power	P_{IN}	$T_{Ambient} = 22 \pm 3 \text{ }^{\circ}\text{C}$		12	dBm
Channel Operating Temperature	T_{CH}	$T_{Ambient} = 22 \pm 3 \text{ }^{\circ}\text{C}$		150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	—	-65	165	$^{\circ}\text{C}$
Maximum Assembly Temperature (1 min. max.)	T_{MAX}	—		300	$^{\circ}\text{C}$

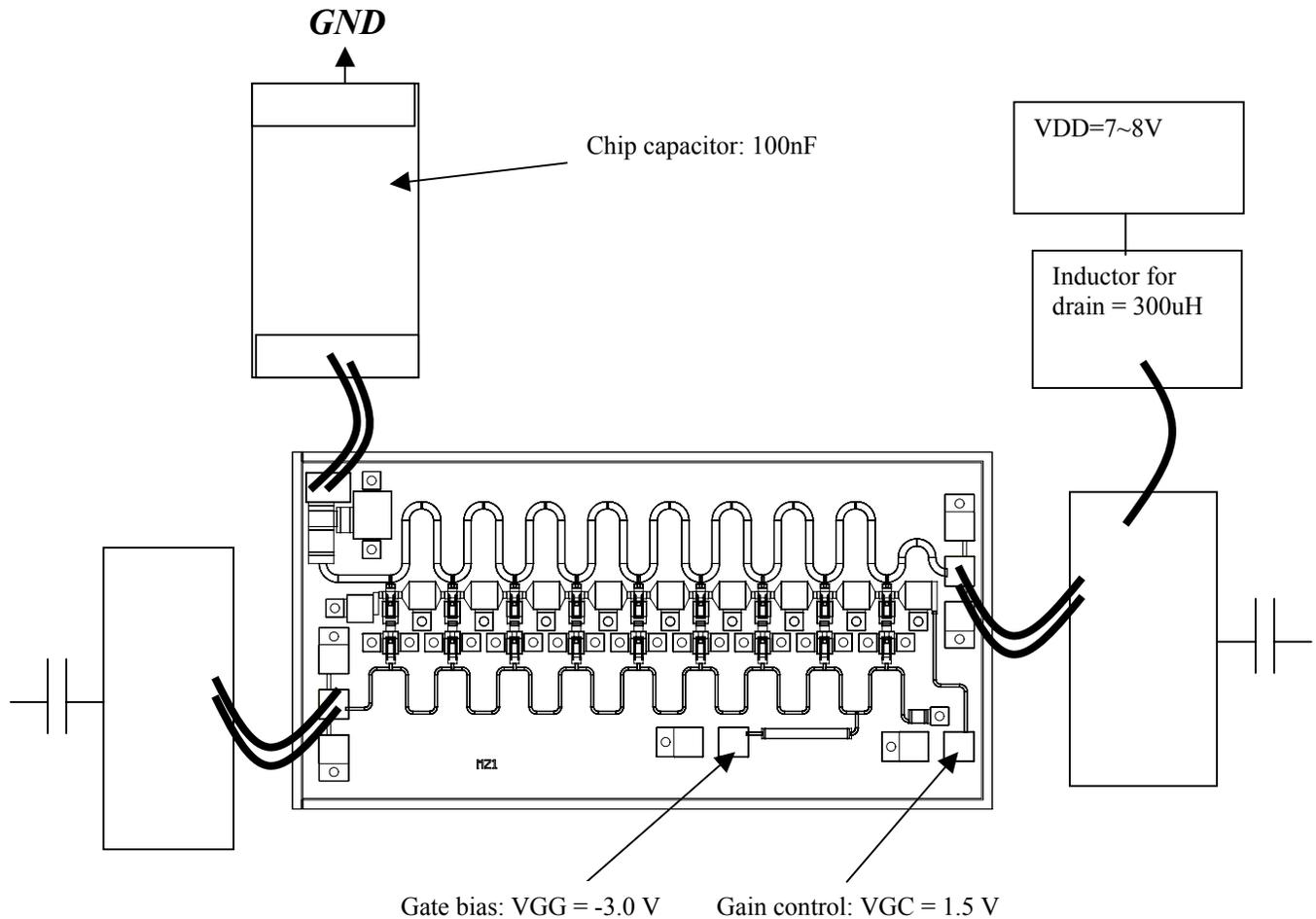
Notes:

- Operating conditions that exceed the Absolute Maximum Ratings could result in permanent damage to the device.
- Recommended Continuous Operating Limits should be observed for reliable device operation.
- This PHEMT is susceptible to damage from Electrostatic Discharge. Proper precautions should be used when handling these devices.

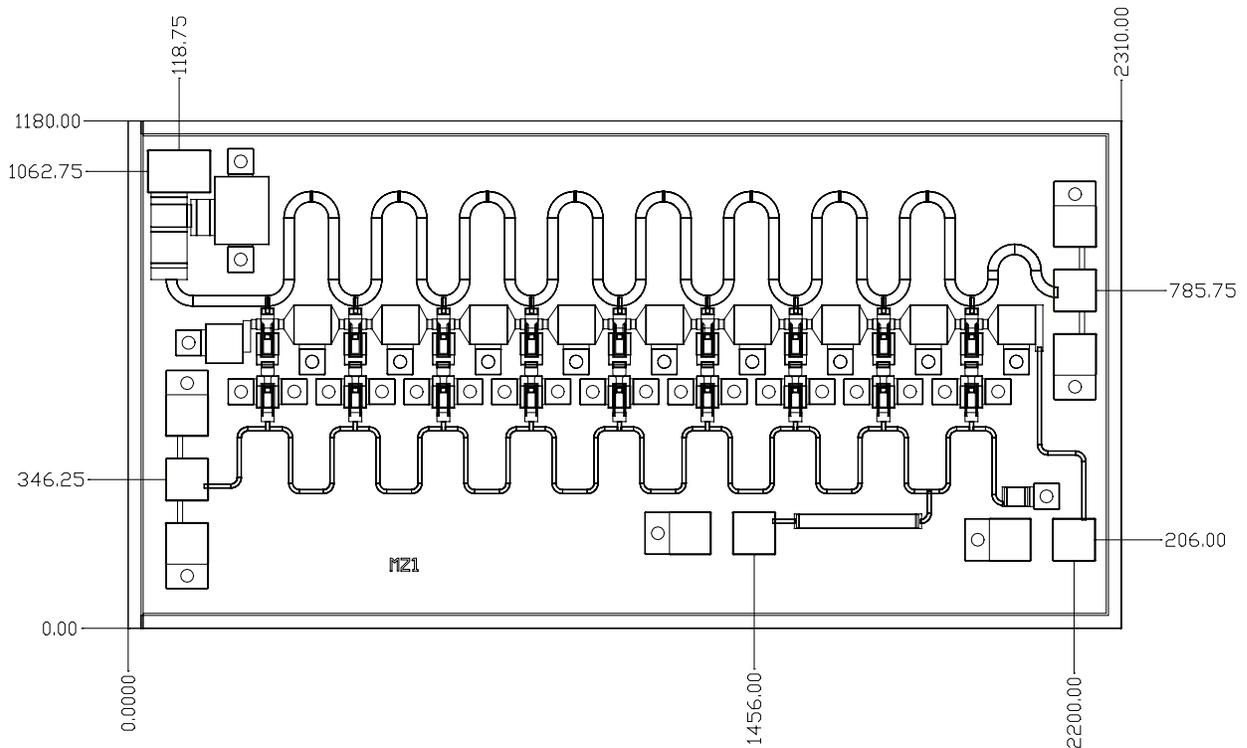
• MEASURED PERFORMANCE: 10 Gb/s NRZ Eye Test

($V_{DD} = +8.0\text{V}$, $V_{GG} = -3.0\text{V}$; $V_{GC} = +1.5\text{V}$; $Z_{IN} = Z_{OUT} = 50\Omega$)



• ASSEMBLY DIAGRAM

Notes:

- Apply VGG first, then VGC and VDD.
- Disconnect VGC first, then VDD and VGG when turning off.
- Recommended lead bond technique is thermocompression wedge bonding with 0.001" (25µm) diameter wire. The bond tool force shall be 35-38 gram. Bonding stage temperature shall be 230-240°C, heated tool (150-160°C) is recommended. Ultrasonic bonding is not recommended.
- The recommended die attach is Ablebond silver epoxy, the stabilize bake temperature is set at 150°C for 45 minutes.
- Bond on bond or stitch bonds acceptable.
- Conductor over conductor acceptable. Conductors must not short.

• MECHANICAL OUTLINE

Notes:

- All units are in microns (μm).
- All pads are $100 \times 100 \mu\text{m}^2$.

• HANDLING PRECAUTIONS

To avoid damage to the devices care should be exercised during handling. Proper Electrostatic Discharge (ESD) precautions should be observed at all stages of storage, handling, assembly, and testing. These devices should be treated as Class 1A (0-500 V). Further information on ESD control measures can be found in MIL-STD-1686 and MIL-HDBK-263.

All information and specifications are subject to change without notice.