

XT3910



GaAs MMIC Driver Amplifier 22GHz~38GHz

Rev 1.1

Features

- Frequency : 22GHz~38GHz
- Gain: 15dB
- Output P_{1dB}: 24dBm
- Supply Voltage: +5~+6V
- Balanced Amplifier
- Die Size: 2mm×1.25mm×0.1mm

Typical Applications

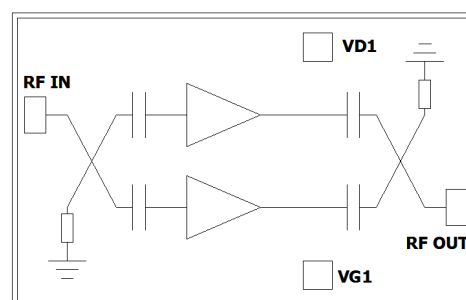
- T/R Module
- Point-to-Point Radios
- SATCOM
- Military and Space
- Test and Measurement
- LO Driver

General Description

The XT3910 is a wideband GaAs MMIC driver amplifier which operates between 22GHz~38GHz. The XT3910 is a balanced amplifier that has good input and output return loss when amplifier is turn off or on.

The XT3910 offers full passivation for increased reliability and moisture protection.

Functional Diagram



Electrical Performance (T_A=25°C, V_D=+5V, I_D=250mA, Z₀=50Ω)

Parameter	Min.	Typ.	Max.	Units
Frequency Range	22~38			GHz
Gain	11	15	—	dB
Gain Flatness	—	±1.5	—	dB
Reverse Isolation	—	-40	—	dB
Input/Output Return Loss	—	-13	—	dB
Noise Figure	—	6.5	—	dB
Output Power for 1 dB Compression (OP _{1dB})	—	24	—	dBm
Drain Voltage(V _D)	5	—	6	V
Supply Current(I _D)	—	250	450	mA

Absolute Maximum Ratings

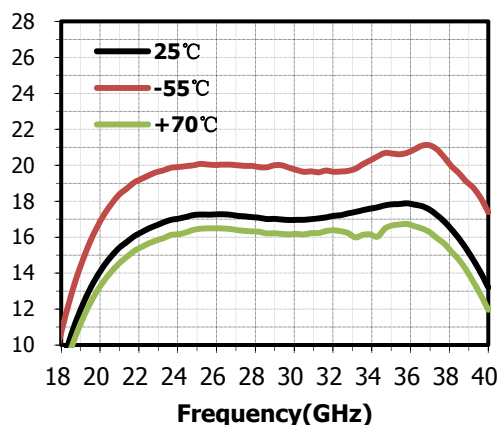
Maximum Input Power	+14dBm	Operating Temperature	-55°C~+85°C
Junction Temperature	+150°C	Storage Temperature	-65°C~+150°C
Maximum V _D	+6.5V	Maximum V _G	-1.2V

Typical Performance Curve

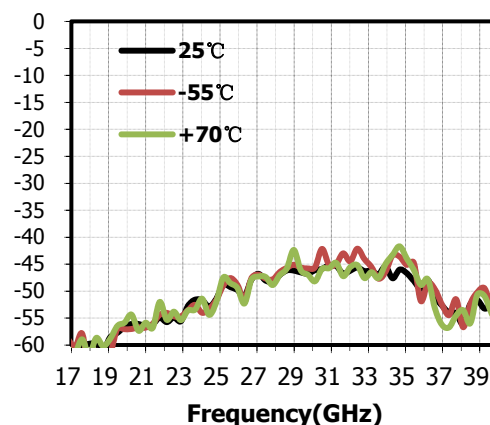
Data Based on the On-Wafer RF Probe Test Results

*Bias Conditions: $V_D = 5V$, $I_D = 250mA$

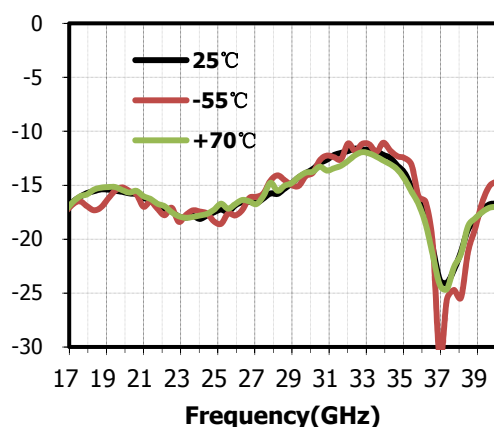
Small Signal Gain(dB) vs.Temperature



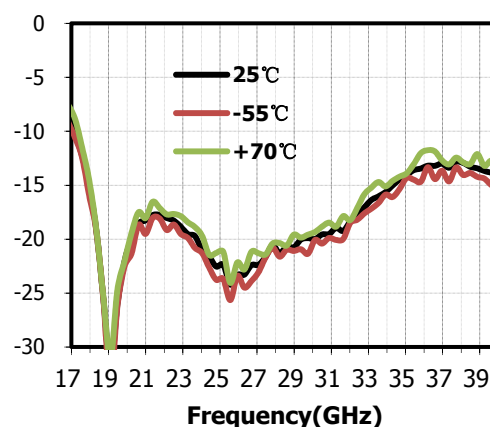
Reverse Isolation(dB) vs.Temperature



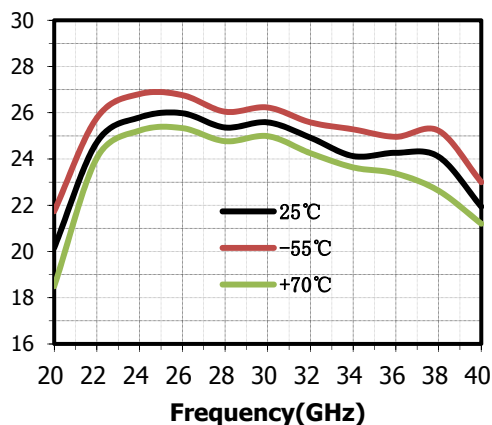
Input Return Loss(dB) vs.Temperature



Output Return Loss(dB) vs.Temperature

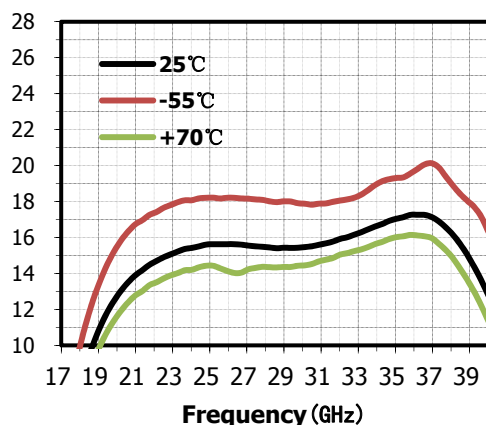


OP₁dB vs.Temperature

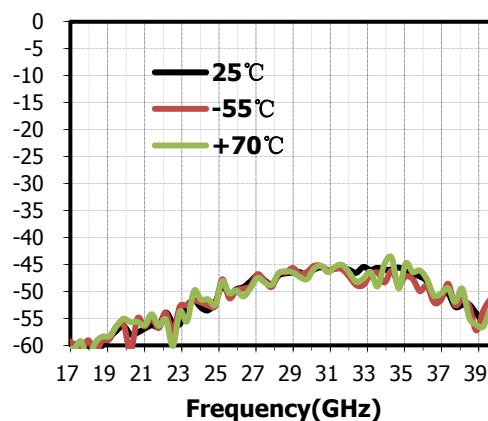


*Bias Conditions: $V_D = 6V$, $I_D = 250mA$

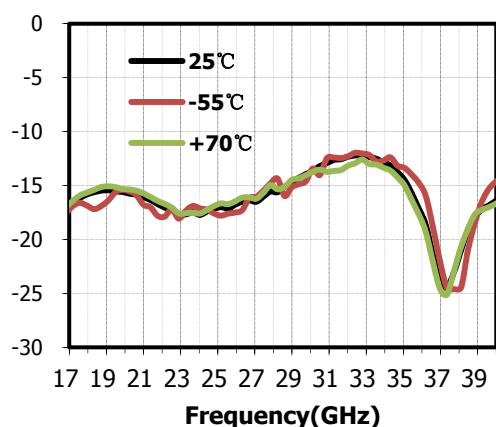
Small Signal Gain(dB) vs.Temperature



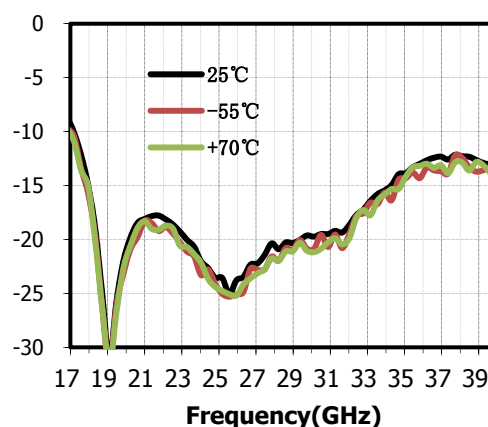
Reverse Isolation(dB) vs.Temperature



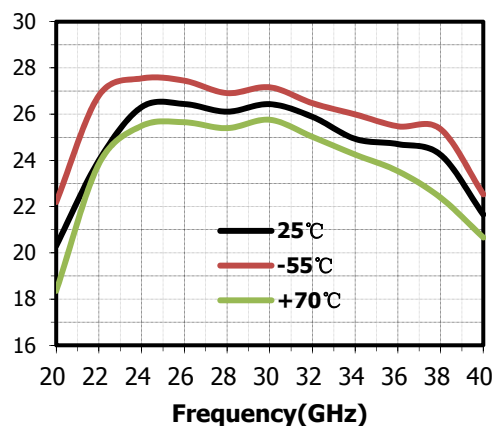
Input Return Loss(dB) vs.Temperature



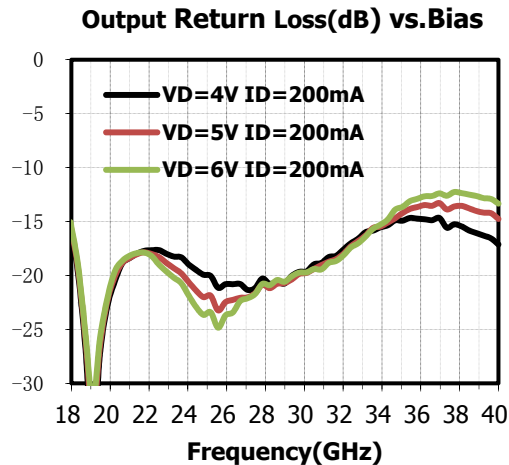
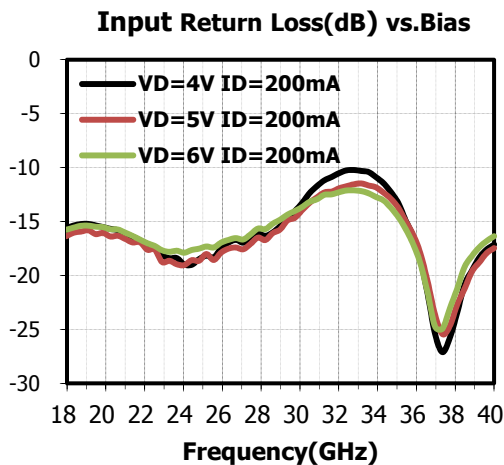
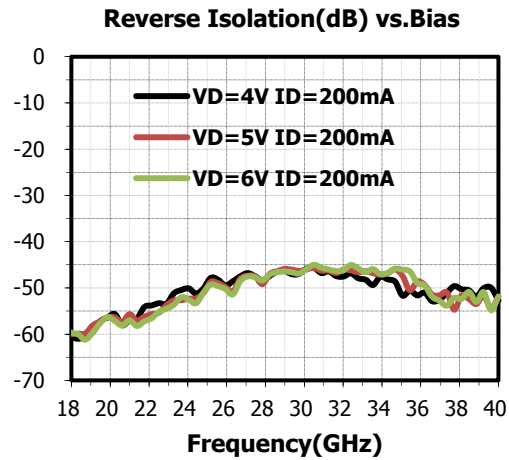
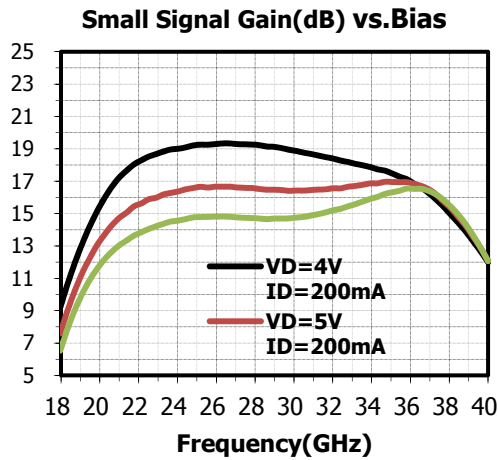
Output Return Loss(dB) vs.Temperature



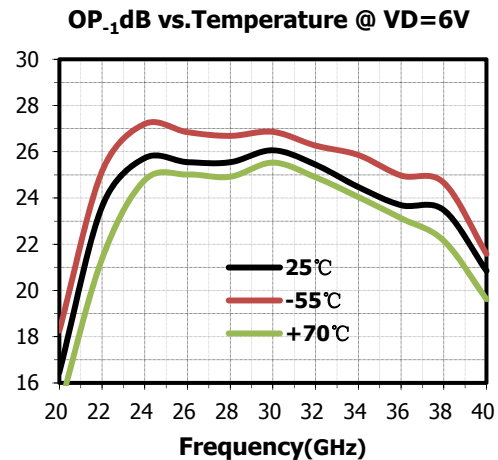
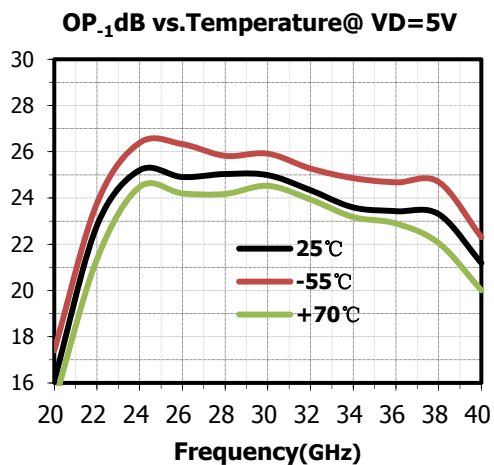
OP₁ dB vs.Temperature



*Bias Conditions: $V_D = 4 \sim 6V$, $I_D = 200mA$, $T_A = 25^\circ C$



*OP₁dB vs. Bias Conditions : $V_D = 5 \sim 6V$, $I_D = 200mA$



XT3910

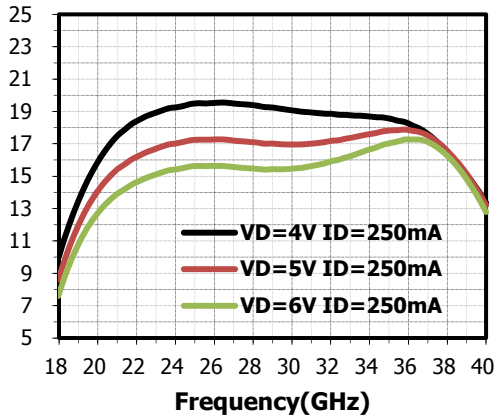


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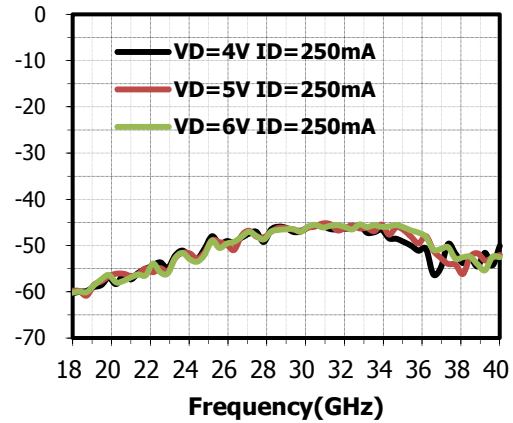
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*Bias Conditions: $V_D = 4 \sim 6V$, $I_D = 250mA$, $T_A = 25^\circ C$

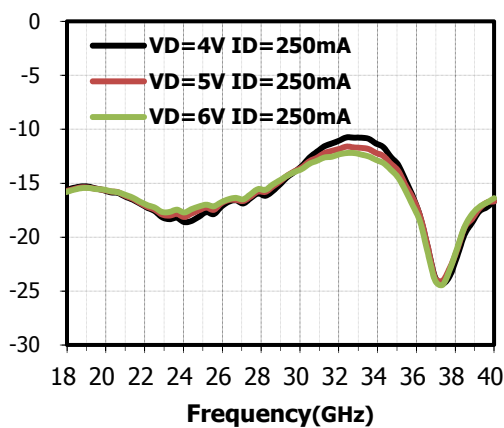
Small Signal Gain(dB) vs.Bias



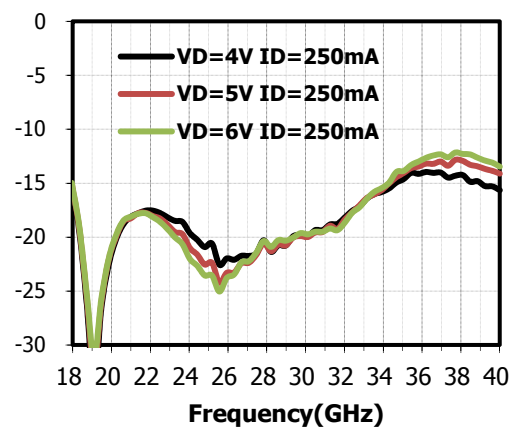
Reverse Isolation(dB) vs.Bias



Input Return Loss(dB) vs.Bias



Output Return Loss(dB) vs.Bias

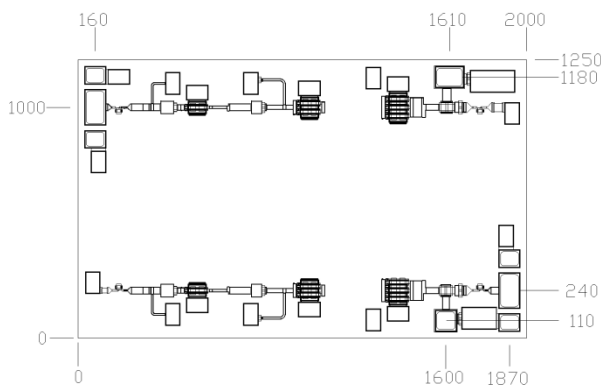


Die Outline

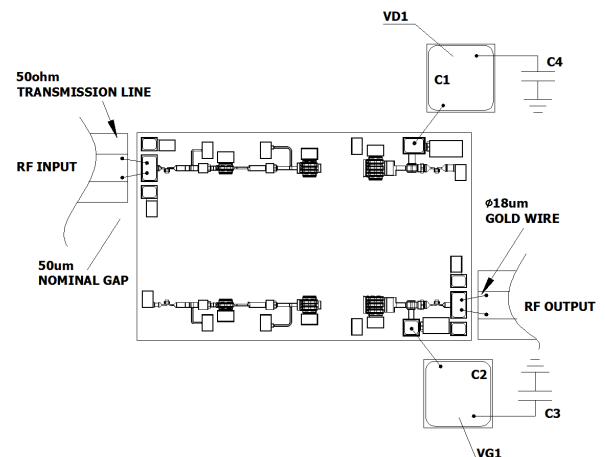
(all dimensions in um)

RF /VG Bonding pad size:100x100um

VD bonding pas size :150x100um



Assembly Diagram



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Components List

Reference Des.	Value	Part Number	Manuf.	Size
C3、C4	2.2uF	0603YD225KAT2A	AVX	0603
C1、C2	100pF	-	ANY	SLC

Notes

1. The XT3910 is biased with a positive drain supply and negative gate supply.
when the drain voltage is set to 5 V. The recommended gate voltage is set to -0.5~-0.7 V.
2. RF connections should be made as short as possible to reduce the inductive effect of the bond wire. Use of a 0.8 mil thermosonic wedge bonding is highly recommended as the loop height will be minimized. The RF input and output require a double bond wire as shown.
3. The backside of the XT3910 is RF ground. Die attach should be accomplished with electrically and thermally conductive epoxy only.
4. Bypass caps C3, C4 should be placed no farther than 1.5mm from the amplifier.

Attention:

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

