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T124001 – Wideband OC-192 RF Amplifier

The 10 Gb/s high-output driver is an ultra wideband RF amplifier designed specifically for driving Lithium-Niobate External Modulators in OC-192/STM-64 fiber optic communication networks.

The T124001 driver utilizes Gallium Arsenide Monolithic Microwave Integrated Circuits (MMICs) with innovative circuit techniques to achieve high output level and broad bandwidth. Variable gain control and input pins for modulation injection are included as standard features.

Pin specifications
- +11V – as per +ve supply voltage and current
- -5V – as per –ve supply voltage and current
- VGAIN – as per control voltage (-10V – 0V)
- DET, REF – detected voltage output
- BIAS – voltage -7V – +23V, current 0A

Key features
- Designed for use with OC-192/STM-64 systems
- High output power and voltage: 8V peak-peak at 10 GHz into 50 ohms
- Wide bandwidth to 15 GHz
- Input for 10 dB gain control and modulation injection
- Low gain ripple
- Proven reliability
- Compact package, hermitically sealed model available

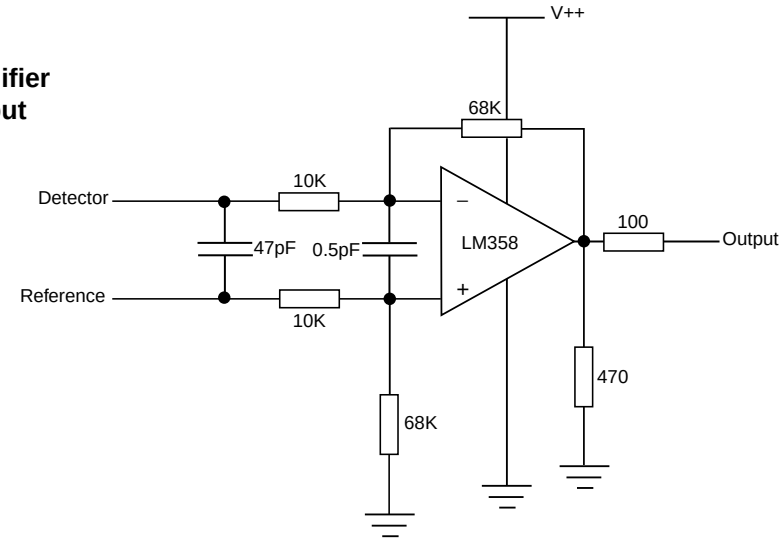
Application Note

Negative supply voltage of the wideband amplifier must be applied prior to the positive supply during power up and removed after the positive supply during power down. If the positive supply voltage is applied without the negative supply voltage, then the maximum drain current will be drawn by the MMICs inside the amplifier. This may result in permanent damage to the MMICs.

The amplifier will survive short term exposure (a few seconds) to a positive supply without the negative voltage. However, this is not recommended since it may affect long term reliability.
The wideband amplifiers will operate at the maximum gain condition if the 'V.Gain' pin is either not connected or connected to 0V. Gain control is achieved by applying a voltage between 0V & -10V to the 'V. Gain' pin. Maximum gain corresponds to 0V and minimum gain corresponds to -10V. Modulation of up to 200kHz can be applied to the same pin to provide a modulated RF signal for use in maintaining the optical modulator at quadrature bias.

Detector output gives a dc voltage that reflects the amplifier's RF output voltage. The reference output is employed to minimize the temperature variation of the detector output. It is not necessary to connect the detector and reference pins for normal amplifier operation. A schematic for an external differential operational amplifier circuit is shown in **Fig. 1**. This can be used in conjunction with the detector and reference outputs to obtain a temperature compensated signal.

Fig. 1
External Differential Operational Amplifier for temperature compensated dc output



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Electrical specification (case temperature = +25ºC)

Parameter	Units	Minimum	Typical	Maximum
Frequency	-	30kHz	-	15GHz
Gain (variable)				
30 KHz - 10 GHz	db	13-23	16-26	-
10 GHz - 15 GHz	db	10-20	14-24	-
Control voltage (variable gain)				
Direct to gate	V	-	-1.0- + 1.6	-
Via nominal 1k) resitor	V	-	-10-0	
Gain Ripple				
30 kHz - 10 GHz	dB	-	± 1.5	± 2.5
10 GHz - 15 GHz	dB	-	± 3.5	± 4.0
Input VSWR				
30 kHz - 10 GHz	-	-	1.6:1	1.9:1
10 GHz - 15 GHz	-	-	1.9:1	2.5:1
Output VSWR				
30 kHz - 10 GHz	-	-	2.0:1	3.0:1
10 GHz - 15 GHz	-	-	3.0:1	6.0:1
Output power at P1dB				
100 kHz - 10 GHz	dBm	20	22	-
10 GHz - 15 GHz	dBm	19	21	-
Output power (saturated)				
100 kHz - 10 GHz	dBm	21	23	-
10 GHz - 15 GHz	dBm	20	22	-
Group delay (2-10 GHz)	ps	-	± 25	± 50
Noise figure (2-15 GHz)	dB	-	8	11
Pulse response (7.5 Vpp output):				
Overshoot/undershoot	%	-	5	10
Droop	%	-	3	10
Rise time	ps	-	35	40
+ve dc supply voltage	V	+9.5	+11	+11.5
+ve dc supply current	mA	-	500	600
-ve dc supply voltage	V	-4.5	-5	-5.5
-ve dc supply current	mA	-	15	20
Operating temperature range	°C	-5	-	+70
Relative humidity	%	-	-	95