30 kHz-30 GHz GaAs MMIC Optical Modulator Driver Amplifier

August 2006 - Rev 02-Aug-06

CMM2030-BD

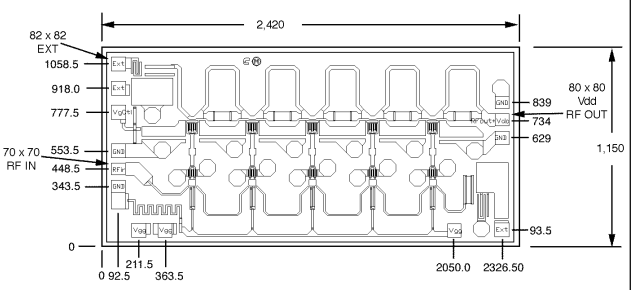
Features

- ❑ Small Size
- ❑ High Gain: 12 dB Typical
- ❑ P1dB = +18 dBm, Typical
- ❑ 30 kHz to 30 GHz Bandwidth
- ❑ Low Gain Ripple: 1.0 dB pp Typical
- ❑ Sub 0.25 Micron PHEMT
- ❑ Low DC Power Consumption

Applications

- ❑ Input Stage Driver for $LiNb0_3$ Modulator Driver Amplifier @ OC-192
- ❑ Medium Power Linear Gain Block for Broadband Systems
- ❑ Receive Amplifier for OC-192

Chip Diagram



Units in Microns

Description

The CMM2030-BD is a precision GaAs MMIC, medium power amplifier and is part of Celeritek's family of WideFiber™ products for optical communications applications.

The CMM2030-BD optical driver amplifier gives fiber optic system designers a unique combination of wideband frequency coverage, along with a flat response and very low internal jitter. It is a precision PHEMT GaAs MMIC medium power amplifier with +18 dBm @ P1dB. It operates from 30 kHz to 32 GHz with 12 dB linear gain. Low internal jitter makes it especially well suited for high speed digital data applications.

It is an excellent choice as an input stage amplifier for Lithium Niobate (Mach-Zehnder) external modulator driver amplifiers for OC-192/STM64 metropolitan and long-haul dense wave-division multiplexed optical networking applications and other high speed applications.

When used as an amplifier to drive Celeritek's CMM3030-BD as much as 7.5 V peak-to-peak can be achieved.

CMM2030-BD amplifiers are shipped in Gel Pack from Celeritek's foundry.

Specifications (T_A = 25°C, V_{DD} = 5V) (On-Wafer Probe)

Parameters	Units	Min	Typ	Max
Frequency Range	—	30 kHz		30.0 GHz
Small Signal Gain	dB	10.0	12.0	
Gain Flatness	±dB		0.6	
Input VSWR	—		1.8:1	
Output VSWR	—		1.7:1	
Power Output (@1 dB Gain Compression) @ 9 GHz	dBm		+18.0	
Current	mA		100	150

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Absolute Maximum Ratings

Parameter	Rating
Drain Voltage	12 V
Gate Voltage	-5 V
Drain Current	375 mA
Continuous Power Dissipation	3.0 W
Channel Temperature	+175°C
Storage Temperature	-65°C to +175°C
Mounting Temperature	+320°C
Input Power	+23 dBm

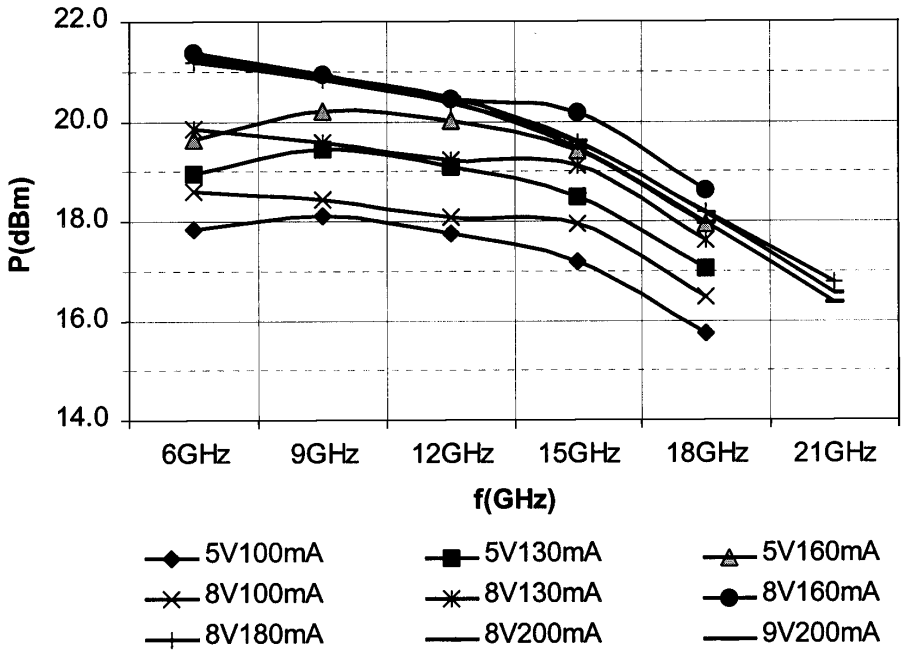
Die Attach and Bonding Procedures

Die Attach: Eutectic die attach is recommended. For eutectic die attach: Preform: AuSn (80% Au, 20% Sn); Stage Temperature: 290°C, ±5°C; Handling Tool: Tweezers; Time: 1 min or less.

Wire Bonding: Wire Size: 0.7 to 1.0 mil in diameter (prestressed); Thermocompression bonding is preferred over thermosonic bonding. For thermocompression bonding: Stage Temperature: 250°C; Bond Tip Temperature: 150°C; Bonding Tip Pressure: 18 to 40 gms depending on size of wire.

Typical Performance

P1dB vs Frequency



Performance Optimization

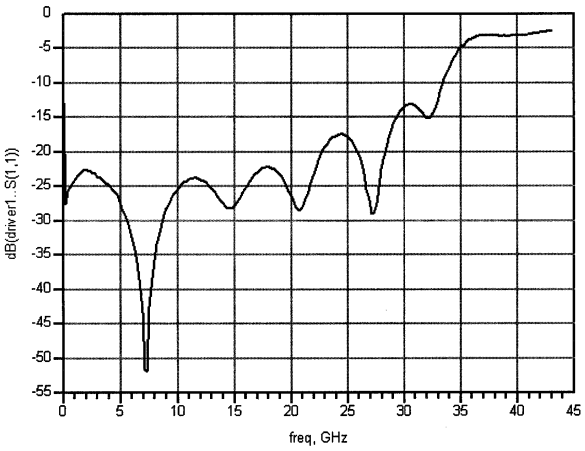
Using the Gain-Ctl facility of the CMM2030-BD, output power may be increased by application of 1.2 to 1.8 Volts to the Bias Control pad. If the Gain-Ctl facility is not used, a fixed voltage at the Bias Control pad can be implemented by connecting a off-chip parallel resistor to the pad which will lower the output voltage accordingly.

If Bias Control voltage is decreased further than those lowest values given in the tables, both gain and output power will start to drop.

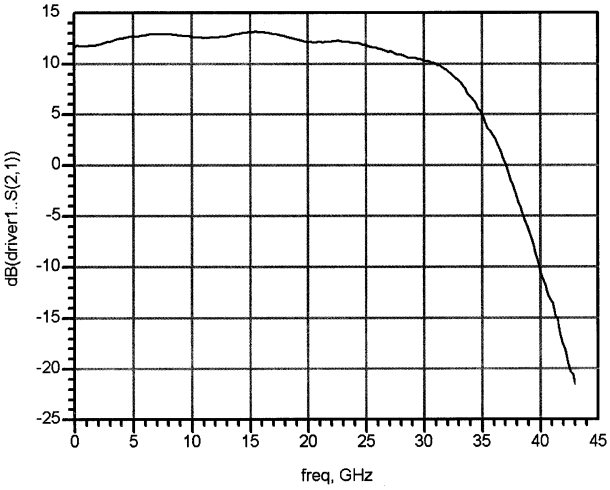
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Typical Performance

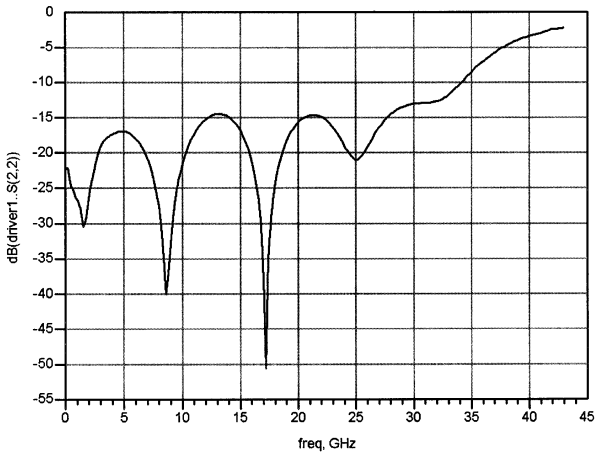
S11 vs Frequency



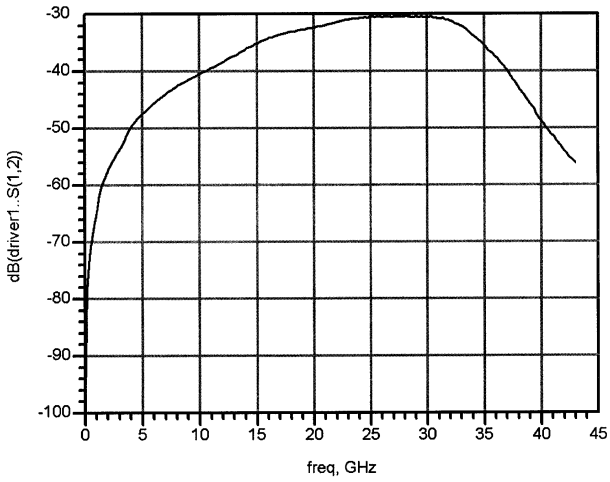
S21 vs Frequency



S22 vs Frequency



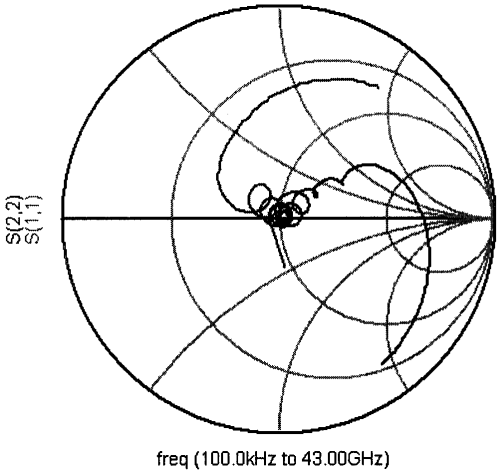
S12 vs Frequency



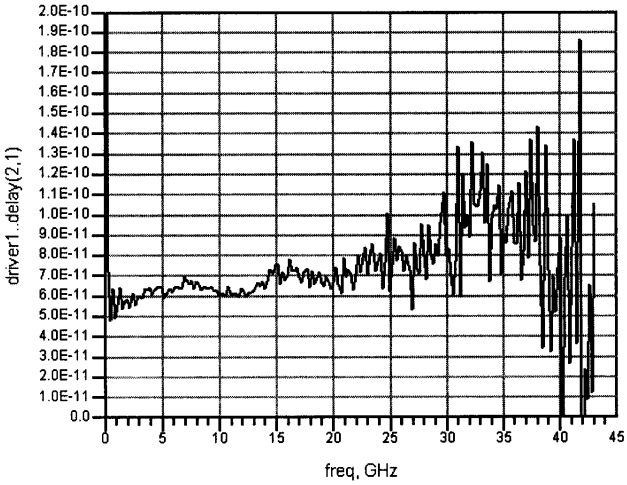
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Typical Performance

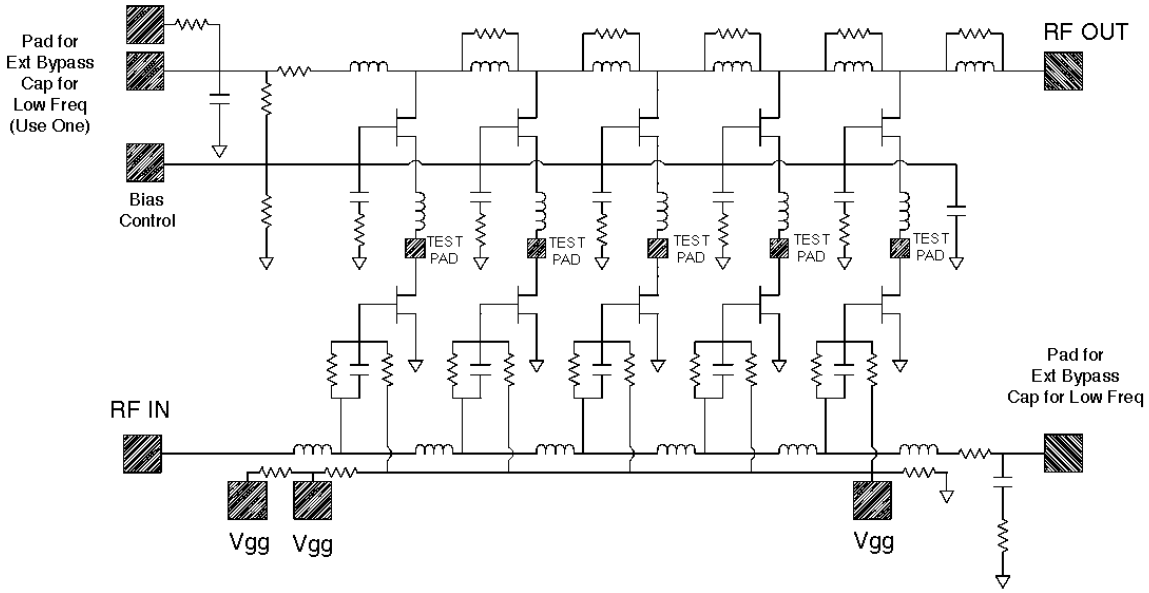
S22 & S11 vs Frequency



Gain Delay vs Frequency



Schematic Diagram



Ordering Information

Part Number for Ordering	Description
CMM2030-BD	**Optical Modulator Driver Amplifier**

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