



NEW! Multi-Channel

CMTDA1-16

Cryogenic 16-Channel Differential Amplifier Array

KEY FEATURES

- 16-Differential Amplifiers in a single package
- AC and DC Coupled Versions
- Single Supply for AC Coupled Version
- Dual Supply Required for DC Coupled Version
- Fully Differential Input/Output
- Integrated Bias Tees for SNSPD
- MMIC Based

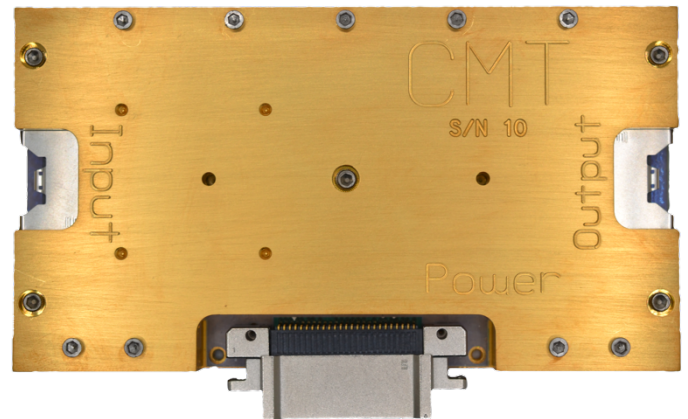
TYPICAL

SPECIFICATIONS

- 3 MHz to 1.5 GHz (Usable to 2GHz)
- Typical Gain
 - 22 dB
- Return loss all ports
 - <-10 dB
- Noise temperature
 - 10-13 Kelvin
- Typical Bias
 - 3V @ 5 mA per amplifier

APPLICATIONS

- ✓ Long range space craft communications
- ✓ Long range communication networks such as cloud data and back haul systems
- ✓ Medical imaging
- ✓ Quantum communications



Description

Cosmic Microwave Technology, Inc. has developed a 16-channel cryogenic, low noise differential amplifiers primarily for integration with Superconducting Nanowire Single Photon Detectors (SNSPD). The assembly consists of 16 differential amplifiers in a single package. The differential RF I/O connections are made through Samtec ARC6 high speed connectors. Each differential amplifier includes 4 independent bias tees used to bias and monitor the SNSPD.

The structure of the SNSPD consists of a meandering line embedded on a super-conducting material that is cooled to 1K. The meandering line structure is inherently differential. As a photon strikes the SNSPD, both a positive and negative spike is generated. The differential amplifier allows detection of both pulses.

The low noise of the differential amplifier will result in reducing the timing jitter of the pulses and dramatically improve the performance of the optical links. Higher data rates are achievable resulting in higher resolution images.

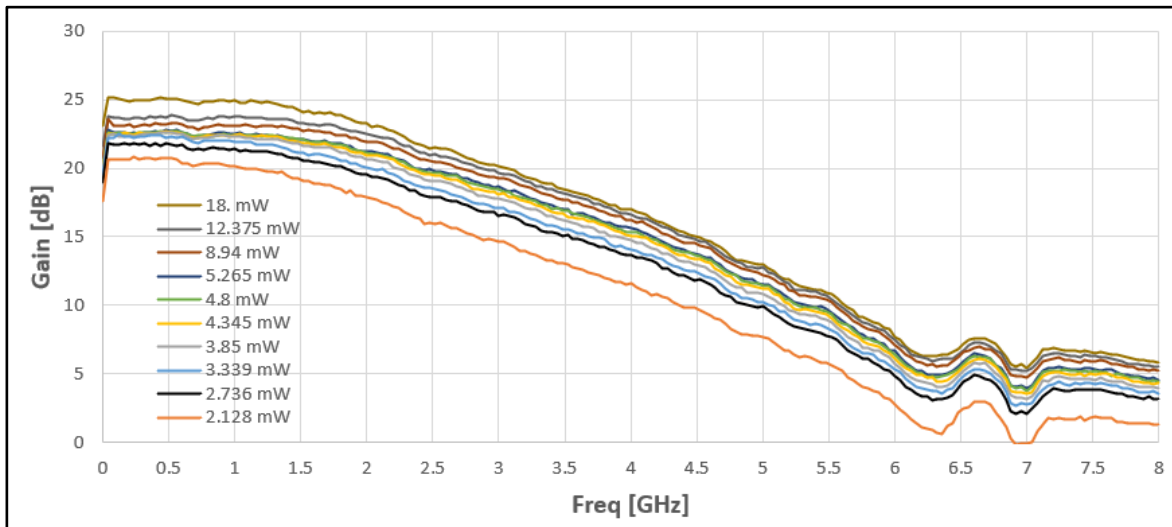
Currently, two versions of the cryogenic differential amplifiers are available. The AC coupled version is self-biasing and requires only a single supply voltage. This bias arrangement is simple to implement.

A DC coupled version is also available. This version is suited for high data rates since the DC offset caused by AC coupling integration is eliminated.

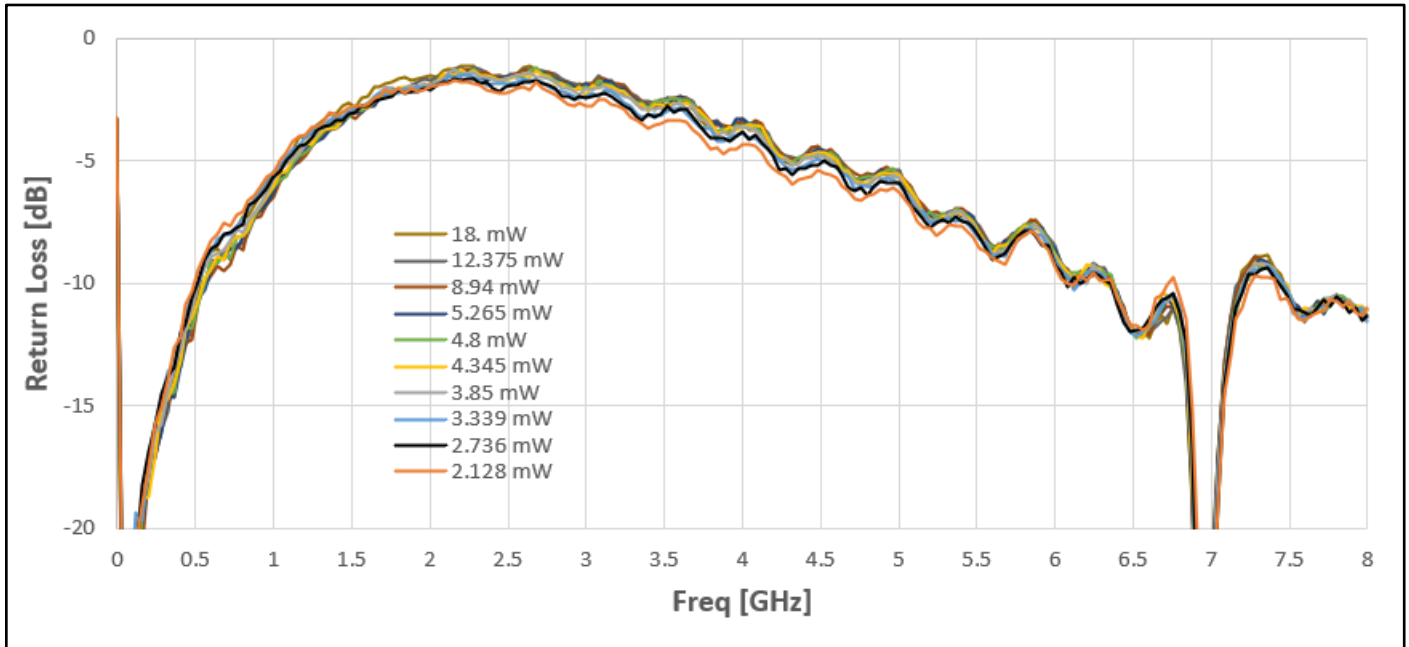
Electrical Specifications @ 4 K

Description	Typical	Minimum	Maximum
RF Frequency	.01-1.5 GHz	0.01 GHz	1.5 GHz
Gain	21 dB	21dB ± 2 dB	
Noise Temperature	< 16 K	16 K	13 K
IRL (-20log S ₁₁)	-12 dB	< -10 dB	
ORL (-20log S ₂₂)	-15 dB	< -10 dB	
DC Voltage	1.0 V	0.8 V	3 V
DC Current	3.8 mA/Amp	2.7 mA/Amp	5.26 mA/Amp

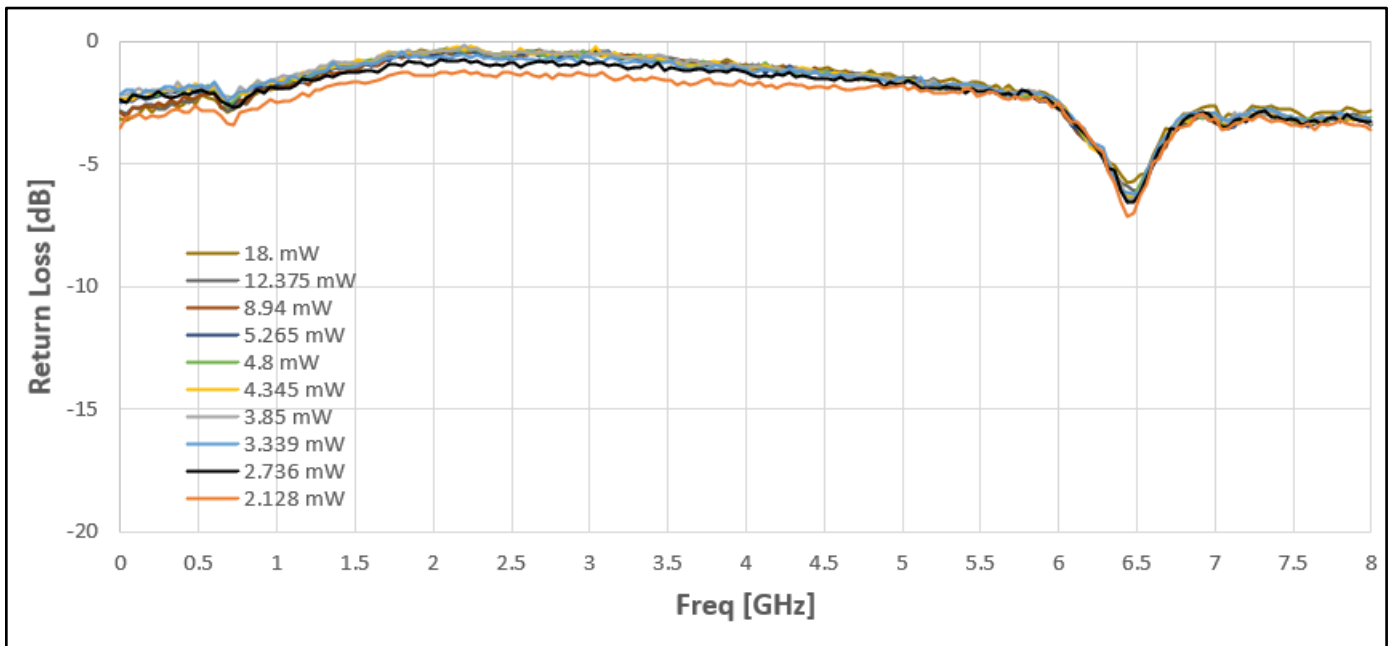
Typical Differential Gain Versus Frequency (Ta = 4 K)



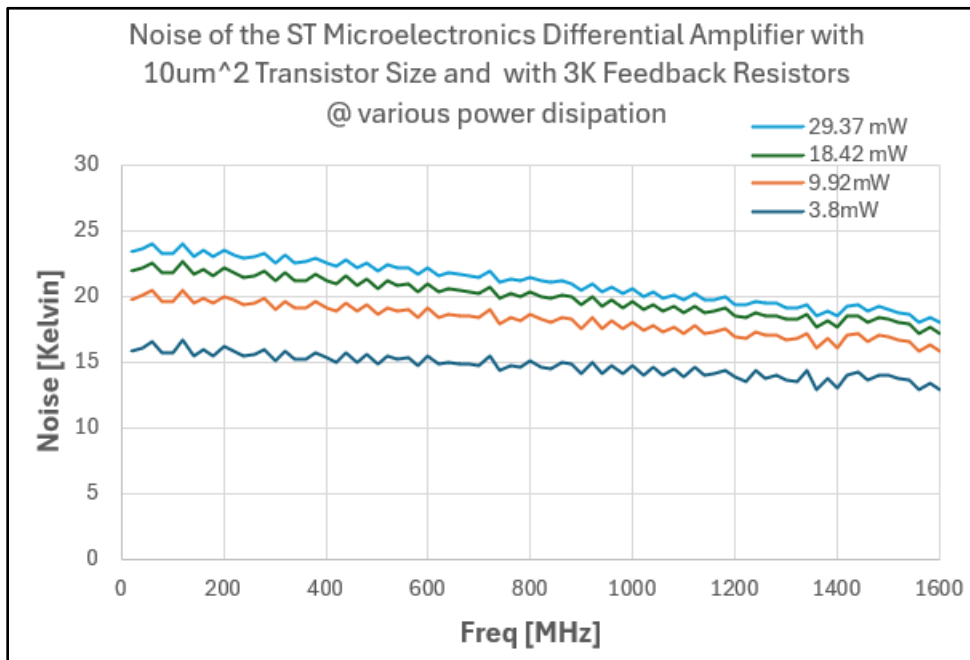
Typical Differential Input Return Loss (Ta = 4 K)



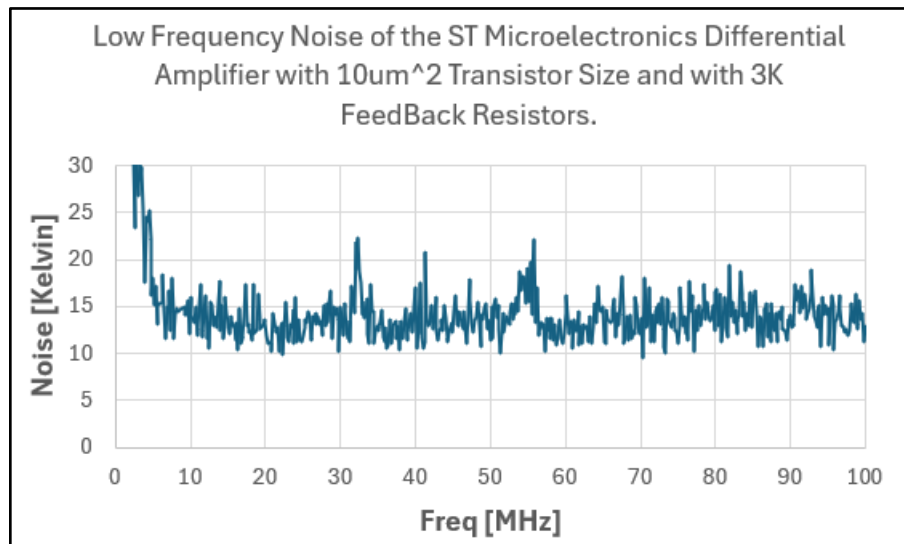
Typical Differential Output Return Loss (Ta = 4 K)



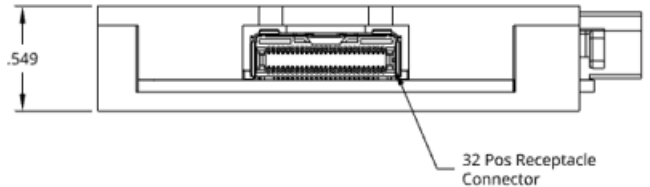
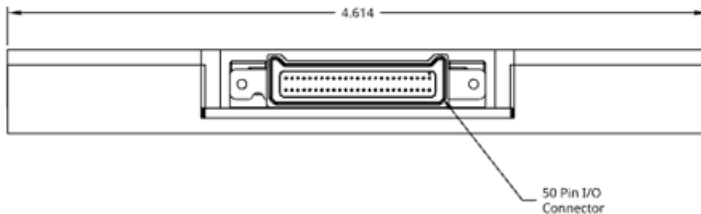
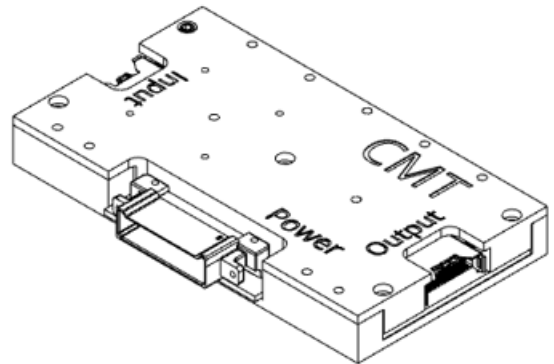
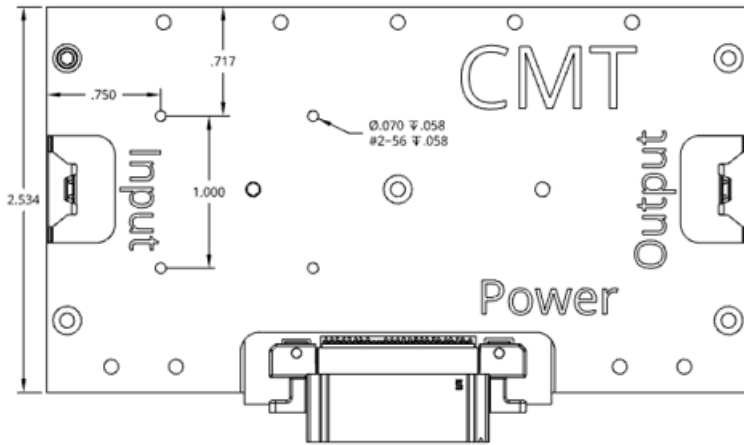
Typical Differential Noise—High Frequency (Ta = 4 K)



Typical Differential Noise—Low Frequency (Ta = 4 K)



Online Drawing



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Specifications are subject to change without notice. Information supplied by CMT is accurate and reliable to the best of our knowledge.