

# 50-900 MHz High Dynamic Range Amplifier

April 2008 - Rev 23-Apr-08

Mimix  
BROADBAND™

CMM6003-SC  
RoHS

## Features

- ✕ 50 to 900 MHz Frequency Range
- ✕ +41 dBm Output IP3
- ✕ -71 dBc CTB
- ✕ -48 dBc CSO
- ✕ 1.6 dB Noise Figure (@ 450 MHz)
- ✕ 17 dB Gain
- ✕ 22 dBm P1dB
- ✕ RoHS Compliant SOT-89 SMT Package
- ✕ Single Power Supply
- ✕ +3V to +5V Voltage Rail
- ✕ MTBF > 100 Years
- ✕ Ideal for CATV Applications

## Description

The CMM6003-SC is a high dynamic range amplifier suitable for cable TV applications between 50 and 900 MHz. The combination of gain flatness, bandwidth, low noise figure and high third order intercept point make it ideal for cable modem, CATV distribution and laser diode driver applications. The CMM6003-SC can operate directly from 5V or 3.3V supply voltage in 75 ohm systems. The device is manufactured using a highly reliable GaAs MESFET technology with an MTBF of over 100 years at a mounting temperature of +85°C. All devices are 100% RF (at 800MHz) and DC tested and they come in an RoHS compliant SOT-89 package which provides excellent electrical stability and low thermal resistance.



## Absolute Maximum Ratings

Supply Voltage	+6.0 V
RF Input Power*	+10 dBm
Storage Temperature	-55°C to 150°C
Junction Temperature	150°C
Operating Temperature	-40°C to +85°C
Thermal Resistance	59° C/W

Operation of this device above any of these parameters may cause damage.  
\*Operation with more than 10 dBm of input power may cause 2 dB degradation in OIP3 performance.

## Electrical Characteristics

Unless otherwise specified, the following specifications are guaranteed at room temperature in a Mimix test fixture.

Parameter	Condition	Min	Typ	Max	Units
Frequency Range		50	800	900	MHz
Gain	Externally matched	15	17	18	dB
Input Return Loss	Externally matched		-11		dB
Output IP3			+41		dBm
Noise Figure	@ 50 MHz		3.3		dB
Noise Figure	@ 800 MHz		1.9		dB
Output P1dB			22		dBm
Operating Current Range		120	150	180	mA
Supply Voltage			5.0		V

Notes:

1. T = 25°C, Vdd = 5.0, Frequency = 800 MHz, 50 Ohm system

2. OIP3 measured with two tones at output power of 5 dBm/tone separated by 10 MHz.

## Typical Parameters

Parameter	Typical			Units
Frequency Range	100	450	900	MHz
Gain	17.5	17.2	16.3	dB
Input Return Loss	-12	-12	-11	dB
Output Return Loss	-16	-16	-13	dB
Output P1dB	23	23.6	23.8	dBm
Output IP3	40	39	37	dBm
Output IP2	52	52	52	dBm
Noise Figure	3.5	1.6	2	dB
CTB	-72			dBc
CSO	-48			dBc
Xmod	-65			dBc
Supply Voltage	5	5	5	V
Current	150	150	150	mA

Notes:

1. Typical values reflect performance in recommended application circuit.

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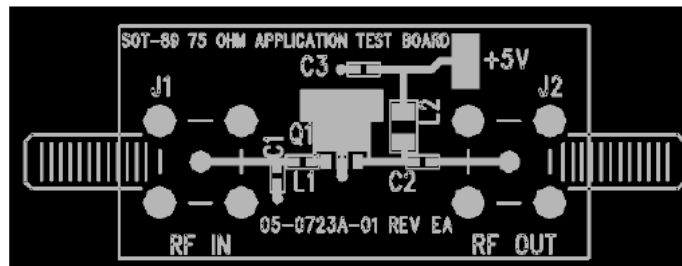
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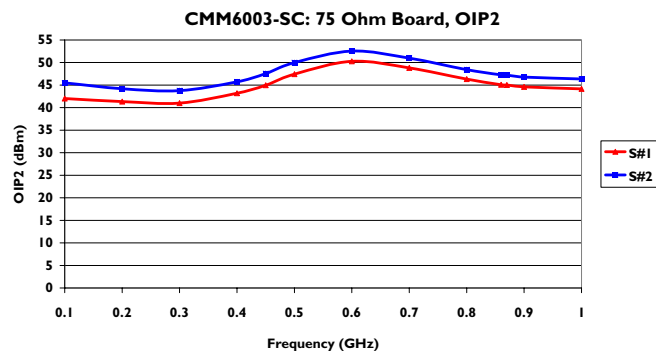
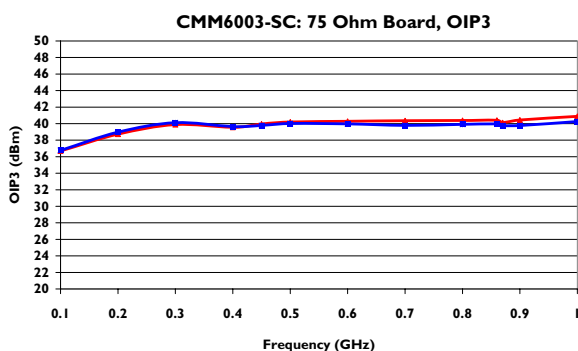
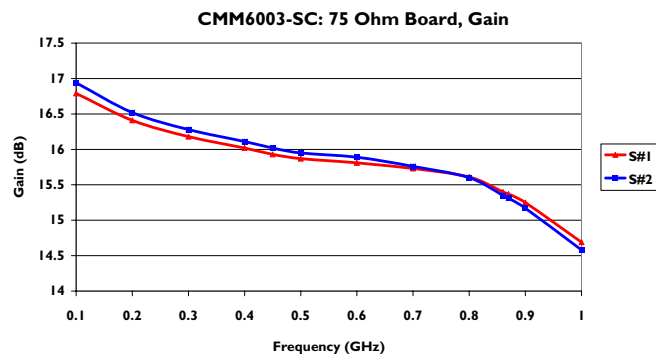
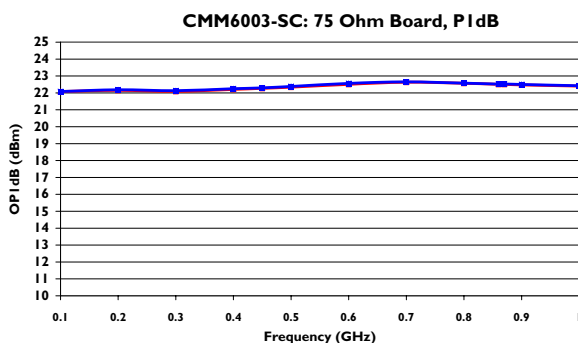
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## Application Circuit: (75Ω)

Frequency	MHz	100	450	870
Gain	dB	17.5	17.2	16.3
Input Return Loss	dB	-12	-12	-11
Output Return Loss	dB	-16	-16	-13
Output P1 dB	dBm	23	23.6	23.8
Output IP3	dBm	40	39	37
Output IP2	dBm	52	52	52
Noise Figure	dB	3.5	1.6	2
CTB	dBc	-72		
CSO	dBc	-48		
Xmod	dBc	-65		
Supply Voltage	V	5	5	5
Current	mA	150	150	150



Ref Designator	Value	Size
C1,C2,C3	1000 pF	0603
L1	12 nH	0603
L2	270 nH	0603



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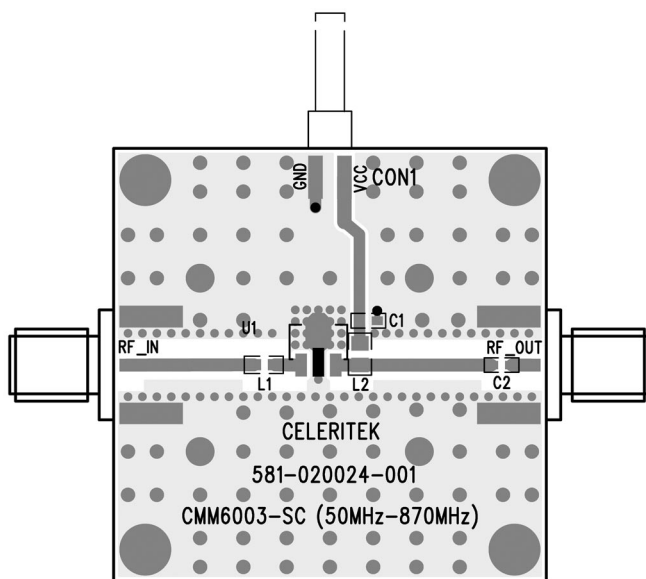
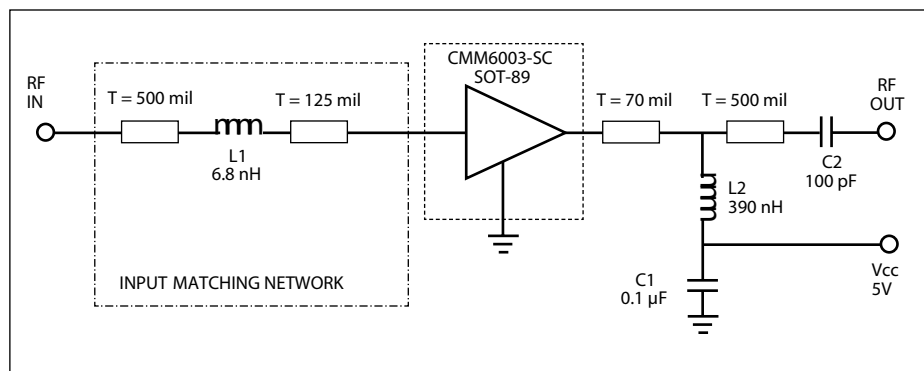
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## Application Circuit: (50Ω)

Parameter	Typical			Units
Frequency Range	450	800	870	MHz
Gain	17.2	16.5	16.25	dB
Input Return Loss	-12.0	-11.5	-10.5	dB
Output Return Loss	-16	-14	-13	dB
Output IP3	+396	+41	+41	dBm
Output P1dB	23.6	23.7	23.8	dBm
Noise Figure	1.6	1.9	2.0	dB

Notes:

1. Typical values reflect performance in recommended application circuit.



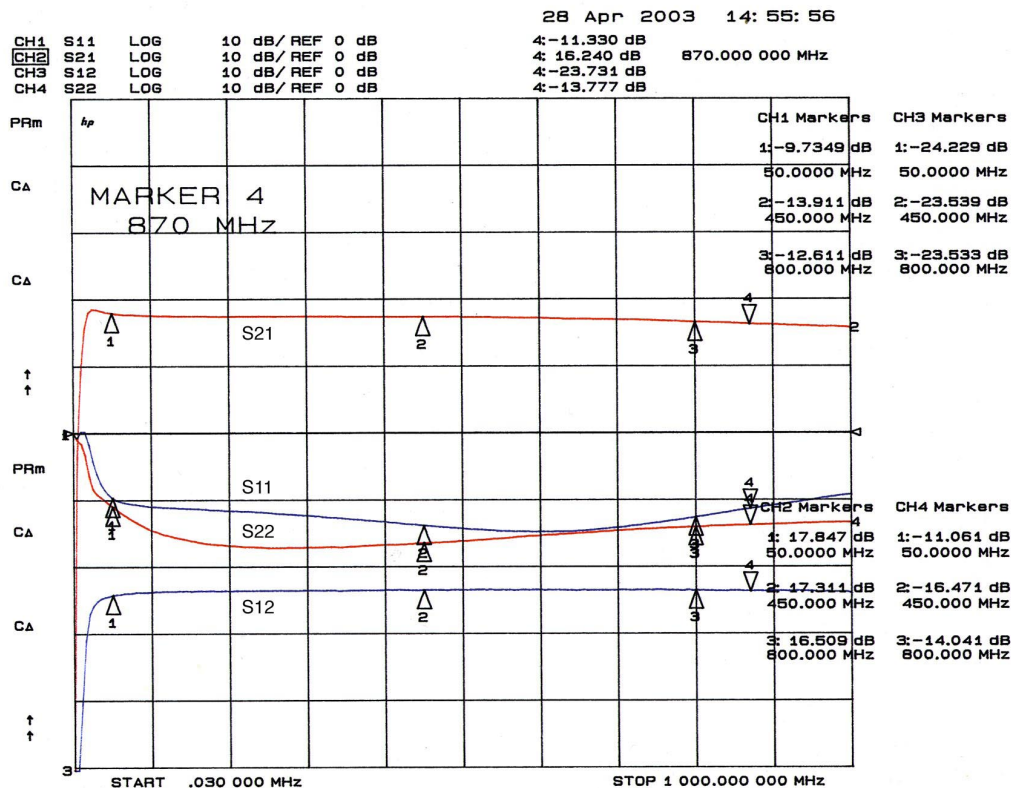
Ref Designator	Value	Description	Size
C1	0.1 μF	VITR 0.1 μF 25V CER CAP 0603 X7R 10%	0603
C2	100 pF	0603CG101J9B20 T/R	0603
L1	6.8 nH	TOKO LL 1608-F6N8J	0603
L2	390 nH	Coilcraft 0805CS-391XJBC	0603

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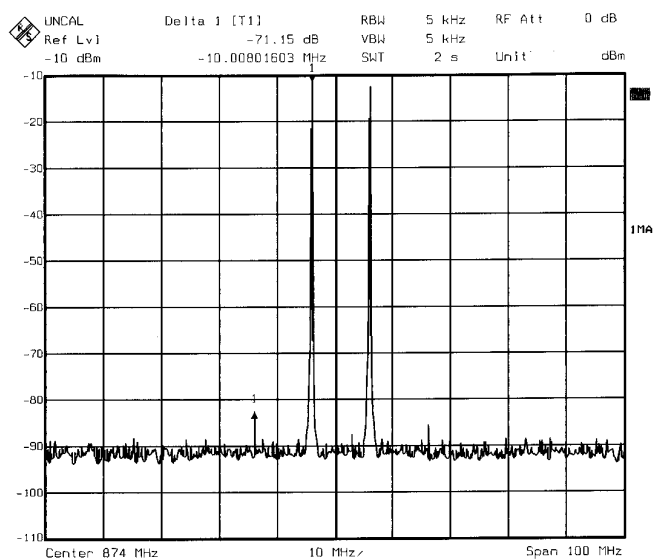
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## S-Parameters vs. Frequency



IP3 measured with 2 tones at an output power of 10 dBm/tone separated by 10 MHz



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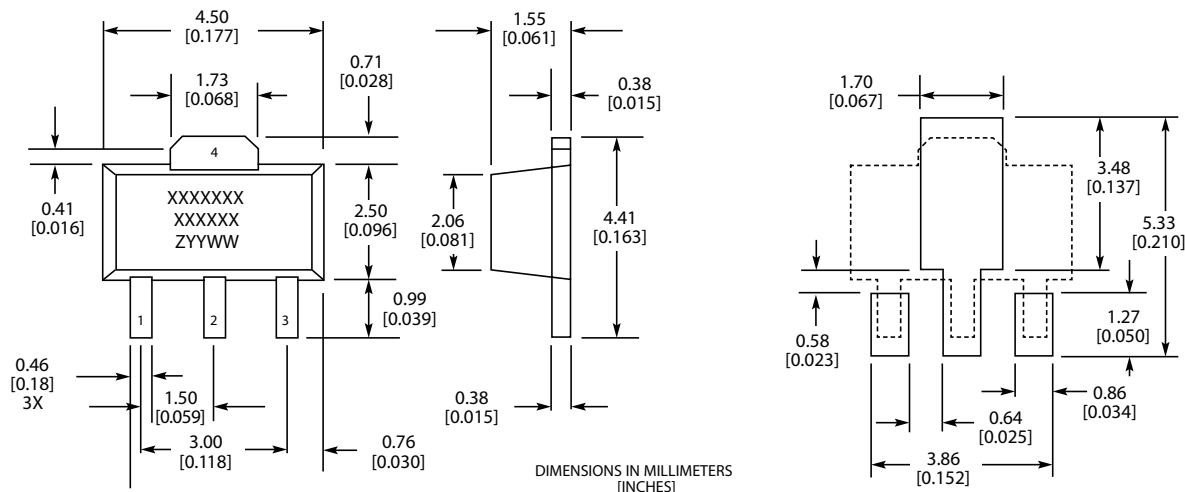
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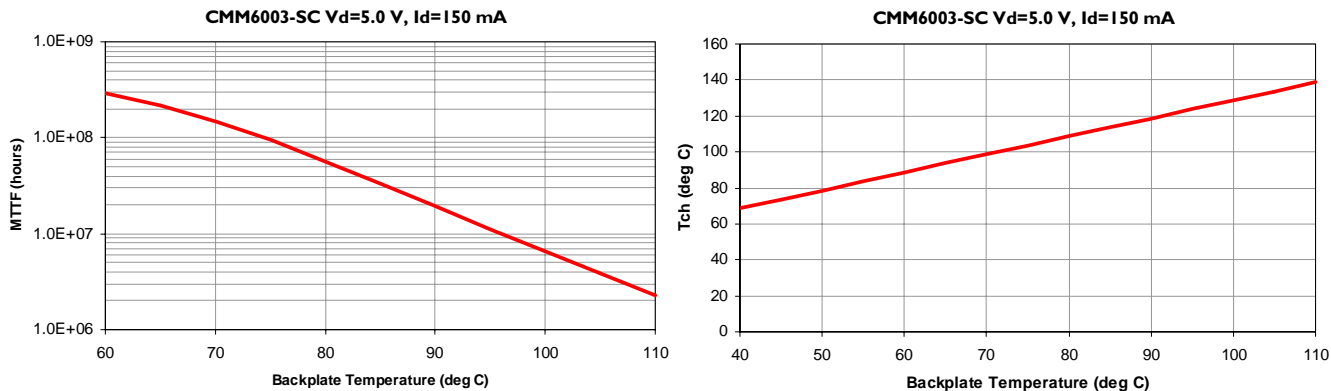
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## Physical Dimensions



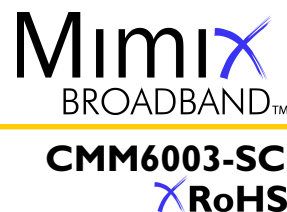
## MTTF

These numbers were calculated based on accelerated life test information received from the fabrication foundry and measured thermal resistance.



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## Handling and Assembly Information

**CAUTION!** - Mimix Broadband MMIC Products contain gallium arsenide (GaAs) which can be hazardous to the human body and the environment. For safety, observe the following procedures:

- Do not ingest.
- Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.
- Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.

**Life Support Policy** - Mimix Broadband's products are not authorized for use as critical components in life support devices or systems without the express written approval of the President and General Counsel of Mimix Broadband. As used herein: (1) Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user. (2) A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

**Package Attachment** - This packaged product from Mimix Broadband is provided as a rugged surface mount package compatible with high volume solder installation. Care should be taken not to apply heavy pressure to the top or base material to avoid package damage. Vacuum tools or other suitable pick and place equipment may be used to pick and place this part. Care should be taken to ensure that there are no voids or gaps in the solder connection so that good RF, DC and ground connections are maintained. Voids or gaps can eventually lead not only to RF performance degradation, but reduced reliability and life of the product due to thermal stress.

**Mimix Lead-Free RoHS Compliant Program** - Mimix has an active program in place to meet customer and governmental requirements for eliminating lead (Pb) and other environmentally hazardous materials from our products. All Mimix RoHS compliant components are form, fit and functional replacements for their non-RoHS equivalents. Lead plating of our RoHS compliant parts is 100% matte tin (Sn) over copper alloy and is backwards compatible with current standard SnPb low-temperature reflow processes as well as higher temperature (260°C reflow) "Pb Free" processes.

## Ordering Information

### Part Number for Ordering

CMM6003-SC-0G00

CMM6003-SC-0G0T

PB-CMM6003-SC-0000

PB-CMM6003-SC-00A0

### Description

Matte Tin plated RoHS compliant SOT-89 surface-mount power package in bulk quantity

Matte Tin plated RoHS compliant SOT-89 surface-mount power package in tape and reel

50 Ohm Evaluation Board

75 Ohm Evaluation Board

We also offer the plastic package with SnPb (Tin-Lead) or NiPdAu plating. Please contact your regional sales manager for more information regarding different plating types.