

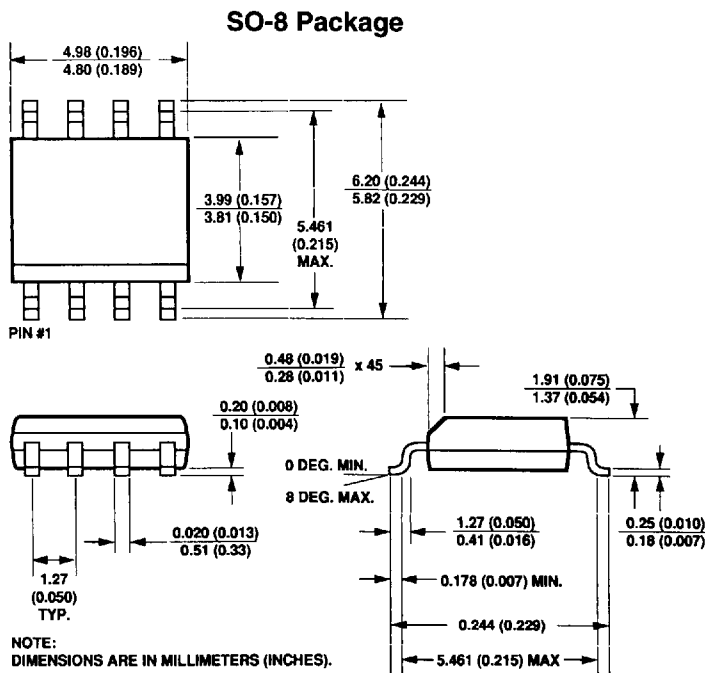
**Features**

- RF-IF Conversion Gain From 0.05 - 5 GHz
- IF Conversion Gain From DC to 1 GHz
- Low Power Dissipation: 65 mW at  $V_{CC} = 5\text{ V typ.}$
- Single Polarity Bias Supply:  $V_{CC} = 4\text{ to }8\text{ V}$
- Load-insensitive Performance
- Conversion Gain Flat Over Temperature
- Low LO Power Requirements: -5 dBm typical
- Low Cost Plastic Surface Mount Package

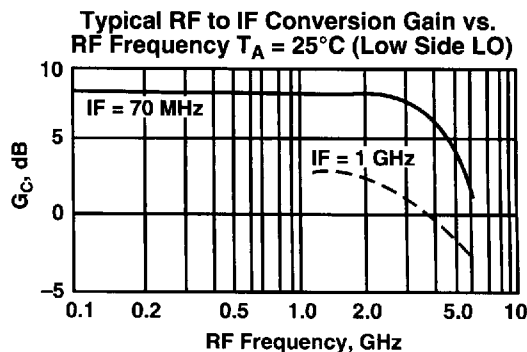
**Description**

The IAM-81008 is a complete low power-consumption double-balanced active mixer housed in a miniature low cost plastic surface mount package. It is designed for narrow or wide bandwidth commercial and industrial applications having RF inputs up to 5 GHz. Operation at RF and LO frequencies less than 50 MHz can be achieved using optional external capacitors to ground. The IAM-81008 is particularly well suited for applications that require load-insensitive conversion and good spurious signal suppression with minimum LO and bias power consumption. Typical applications include frequency down conversion, modulation, demodulation and phase detection. Markets include fiber-optics, GPS satellite navigation, mobile radio, and battery powered communications receivers.

The IAM series of Gilbert multiplier-based frequency converters is fabricated using HP's 10 GHz,  $f_T$ , 25 GHz  $f_{MAX}$  ISOSAT™-I silicon bipolar process. This process uses nitride self alignment, submicrometer lithography, trench isolation, ion implantation, gold metallization and polyimide inter-metal dielectric and scratch protection to achieve excellent performance, uniformity and reliability.



08A: PLASTIC SO-8



**Electrical Specifications<sup>1</sup>,  $T_A = 25^\circ\text{C}$**

Symbol	Parameters and Test Conditions: $V_{CC} = 5\text{ V}$ , $Z_0 = 50\ \Omega$ , LO = -5 dBm, RF = -20 dBm	Units	Min.	Typ.	Max.
$G_C$	Conversion Gain RF = 2 GHz, LO = 1.75 GHz	dB	6.0	8.5	10
$f_{3\text{ dB RF}}$	RF Bandwidth ( $G_C$ 3 dB Down) IF = 250 MHz	GHz		3.5	
$f_{3\text{ dB IF}}$	IF Bandwidth ( $G_C$ 3 dB Down) LO = 2 GHz	GHz		0.6	
$P_{1\text{ dB}}$	IF Output Power at 1 dB Gain Compression RF = 2 GHz, LO = 1.75 GHz	dBm		-6	
$IP_3$	IF Output Third Order Intercept Point RF = 2 GHz, LO = 1.75 GHz	dBm		3	
NF	SSB Noise Figure RF = 2 GHz, LO = 1.75 GHz	dB		17	
VSWR	RF Port VSWR $f = 0.05\text{ to }3.5\text{ GHz}$			1.5:1	
	LO Port VSWR $f = 0.05\text{ to }3.5\text{ GHz}$			2.0:1	
	IF Port VSWR $f < 1\text{ GHz}$			1.5:1	
$RF_{if}$	RF Feedthrough at IF Port RF = 2 GHz, LO = 1.75 GHz	dBc		-25	
$LO_{if}$	LO Leakage at IF Port LO = 1.75 GHz	dBm		-25	
$LO_{rf}$	LO Leakage at RF Port LO = 1.75 GHz	dBm		-30	
$I_{CC}$	Supply Current	mA	10	13	16

NOTES: 1. The recommended operating voltage range for this device is 4 to 8 V. Typical performance as a function of voltage is on the following page.

# IAM-81008, Silicon Bipolar MMIC 5 GHz Active Double Balanced Mixer/IF Amp

## Absolute Maximum Ratings

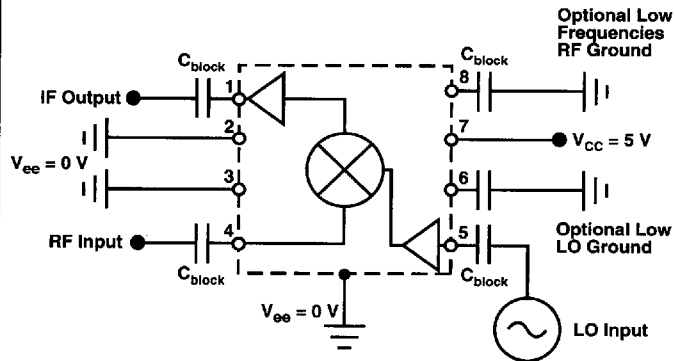
Parameter	Absolute Maximum <sup>1</sup>
Device Voltage	10V
Power Dissipation <sup>2, 3</sup>	300 mW
RF Input Power	+14 dBm
LO Input Power	+14 dBm
Junction Temperature	150°C
Storage Temperature	-65 to 150°C

Thermal Resistance<sup>2</sup>:  $\theta_{jc} = 225^\circ\text{C/W}$

### Notes:

1. Permanent damage may occur if any of these limits are exceeded.
2.  $T_{CASE} = 25^\circ\text{C}$ .
3. Derate at 4.4 mW/°C for  $T_c > 82^\circ\text{C}$ .

## Typical Biasing Configuration and Functional Block Diagram



Note: No external baluns are required.

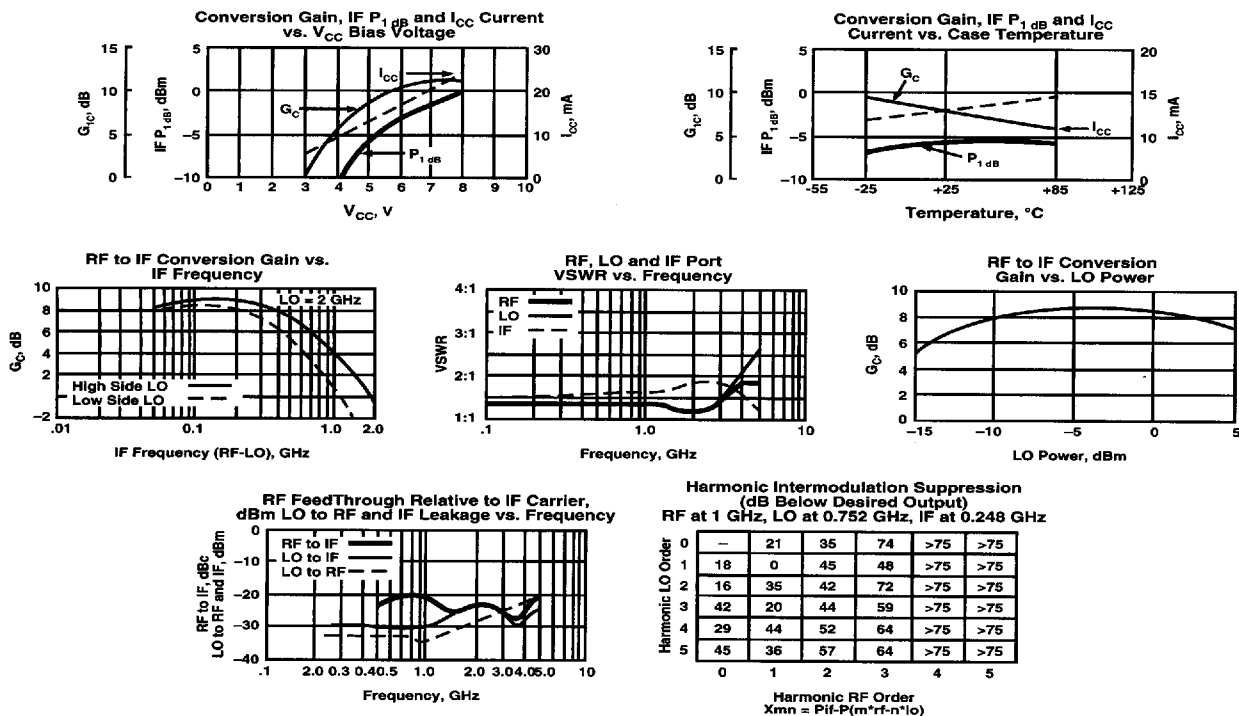
**Typical Performance,  $T_A = 25^\circ\text{C}$ ,  $V_{CC} = 5\text{V}$ ,  
RF: -20 dBm at 2 GHz, LO: -5 dBm at 1.75 GHz**  
(Unless otherwise noted)

## Part Number Ordering Information

Part Number	Devices Per Reel	Reel Size
IAM-81008-TR1	1000	7"
IAM-81008-TR2	4000	13"

For more information, see "Tape and Reel Packaging for Semiconductor Devices", in current catalog.

## Small Graph Guide



**Harmonic Intermodulation Suppression (dB Below Desired Output)**  
RF at 1 GHz, LO at 0.752 GHz, IF at 0.248 GHz

Harmonic LO Order	0	1	2	3	4	5
0	-	21	35	74	>75	>75
1	18	0	45	48	>75	>75
2	16	35	42	72	>75	>75
3	42	20	44	59	>75	>75
4	29	44	52	64	>75	>75
5	45	36	57	64	>75	>75

Harmonic RF Order  $X_{mn} = P_{if} - P(m'rf - n'lo)$



For more information: United States: call your local HP sales office listed in your telephone directory. Ask for a Components representative. Canada: (416) 206-4725 Europe: (44) 276-685753 Asia Pacific/Australia: (65) 290-6360 Japan: (81 3) 3331-6111

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