

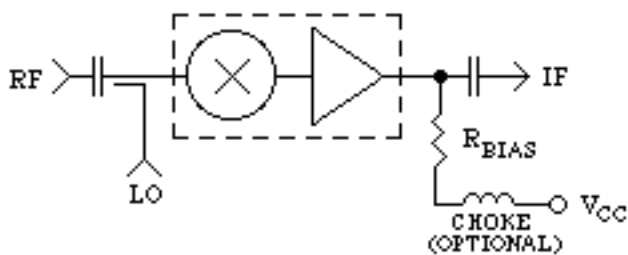
SILICON BIPOLAR MMIC FREQUENCY CONVERTER

PRODUCT DATA SHEET

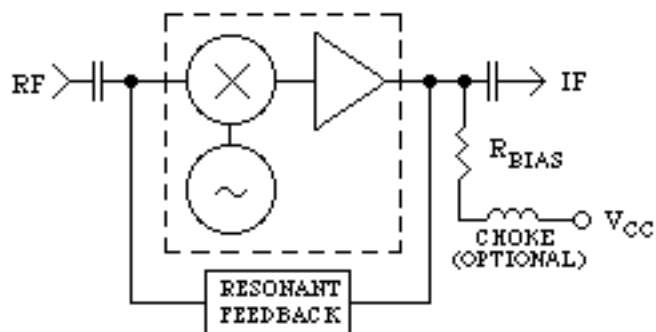
FEATURES:

- Up or down conversion with conversion gain
- RF input from 0.5 to 8.0 GHz
- Low phase noise self-oscillating LO with external tank
- Down converted IF output from DC to 2.0 GHz

2 Port Active Mixer



Self Oscillating Mixer



DESCRIPTION AND APPLICATIONS:

Bipolarics' BM8 is a silicon bipolar MMIC which functions as a frequency converter for input frequencies (RF and LO) as high as 8.0 GHz and IF output frequencies as high as 2.0 GHz. Depending on input frequency either up conversion or down conversion if possible. At low VHF conversion gain is as high as 20 dB. Typical conversion gain at microwave frequencies is 6-10 dB depending on RF and IF.

RF and LO signals can be injected at the device input. The BM8 will self oscillate with a resonant feedback (LC, dielectric resonator, etc.) from output to input. LO-RF and LO-IF rejection can be achieved with simple external filters. Conversion gain is very consistent. The BM8 is well suited to cost or size constrained applications such as satellite MATV and TVRO block converters, GPS navigation and Inmarsat receivers, communications and radar systems.

Biasing requires only a fixed positive supply greater than 8.5V and an external current stabilizing resistor. The BM8 is available in a 0.070" Hermetic Stripline, 0.085" Hermetic Micro-X or low cost 0.085" Plastic Micro-X package.

ELECTRICAL SPECIFICATIONS:

- $T_A = 25^\circ\text{C}$, $I_D = 36 \text{ mA}$, $Z_0 = 50 \Omega$, $RF_{IN} = 4.2 \text{ GHz @ } -20 \text{ dBm}$, $LO_{IN} = 5.15 \text{ G @ } +5 \text{ dBm}$ injected at Pin 1

SYMBOL	PARAMETERS/CONDITIONS	UNITS	MIN	TYP	MAX
G_C	Conversion Gain $f_F = 950 \text{ MHz}$	dB	6.5	9.0	
P_{1dB}	IF Power Output at 1 dB compression	dBm		9.0	
IP_3	IF 3rd Order Intercept Point	dBm		16.0	
NF	Single Sideband Noise Figure $f = 4.2 \text{ GHz}$	dB		12.5	
VSWR	Input VSWR $f = 0.5 \text{ to } 5.0 \text{ GHz}$ Output VSWR $f = 0.5 \text{ to } 5.0 \text{ GHz}$			2.4:1 2.0:1	
V_d	Device Voltage at Pin 3	V	7.0	7.8	8.5
dV/dT	Device Voltage Temperature Coefficient	mV/ $^\circ\text{C}$		-17.0	

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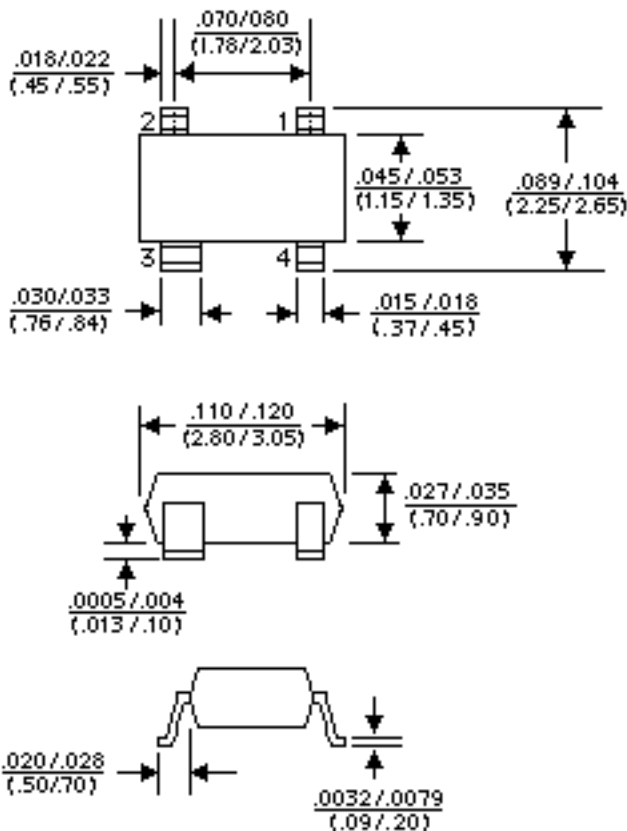
TYPICAL S PARAMETERS:

BIAS CONDITION: $V_{CE} = 7.8 \text{ V}$, $I_C = 36\text{mA}$

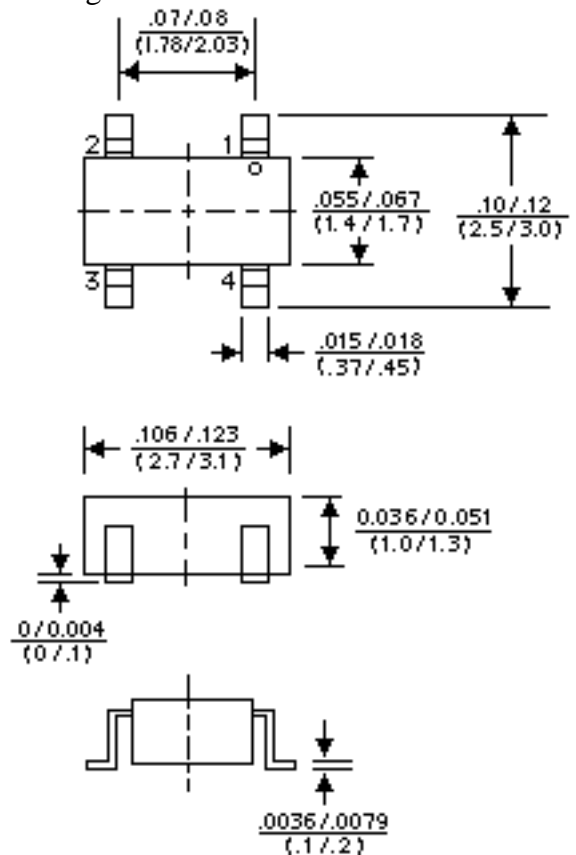
S-MATRIX: $Z_S = 50.0 + J 0.0$ $Z_L = 50.0 + J 0.0$

FREQ. GHz	S11		S21		S12		S22		S21 dB
	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang	
0.20	0.3162	-59	29.17	147	0.0298	45	0.4073	-82	29.3
0.50	0.2398	-111	15.13	118	0.0524	58	0.3388	-136	23.6
1.00	0.3090	-161	8.511	91	0.0803	62	0.3427	-153	18.6
1.50	0.2398	-162	6.165	82	0.1244	68	0.3427	-160	15.8
2.00	0.3235	170	4.623	70	0.1496	64	0.3672	-161	13.3
2.50	0.5370	164	4.073	60	0.1778	60	0.3715	-165	12.2
3.00	0.4265	158	3.388	53	0.2065	56	0.3019	-158	10.6
3.50	0.6025	158	0.3019	42	0.2137	58	0.2951	-155	9.6
4.00	0.5370	164	2.722	38	0.2238	63	0.3162	-130	8.7

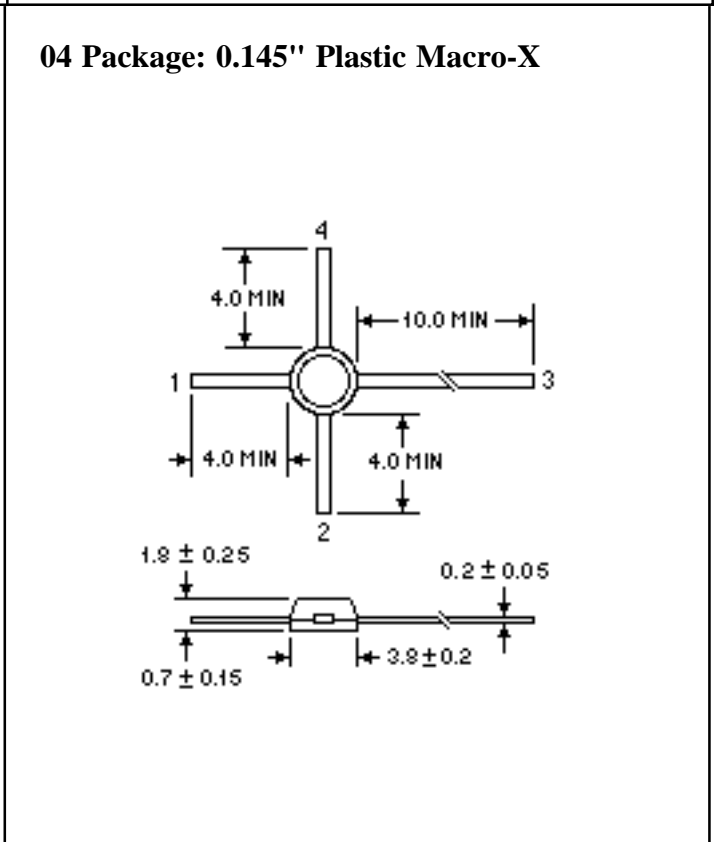
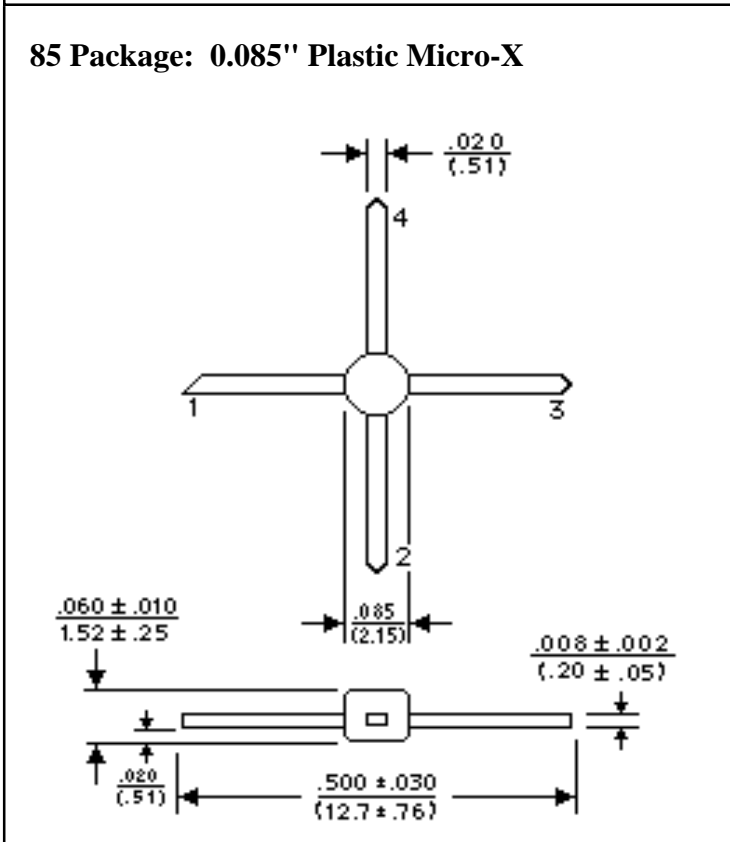
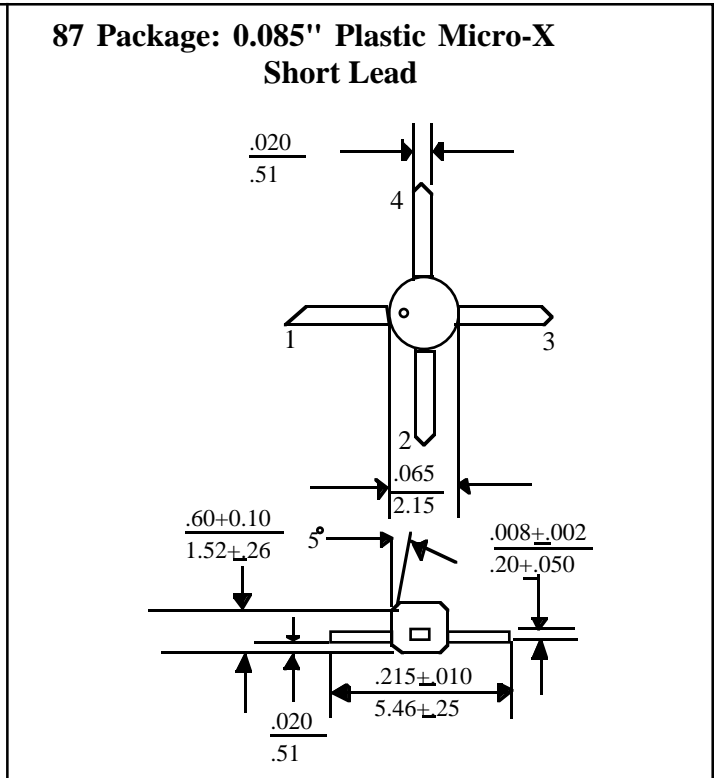
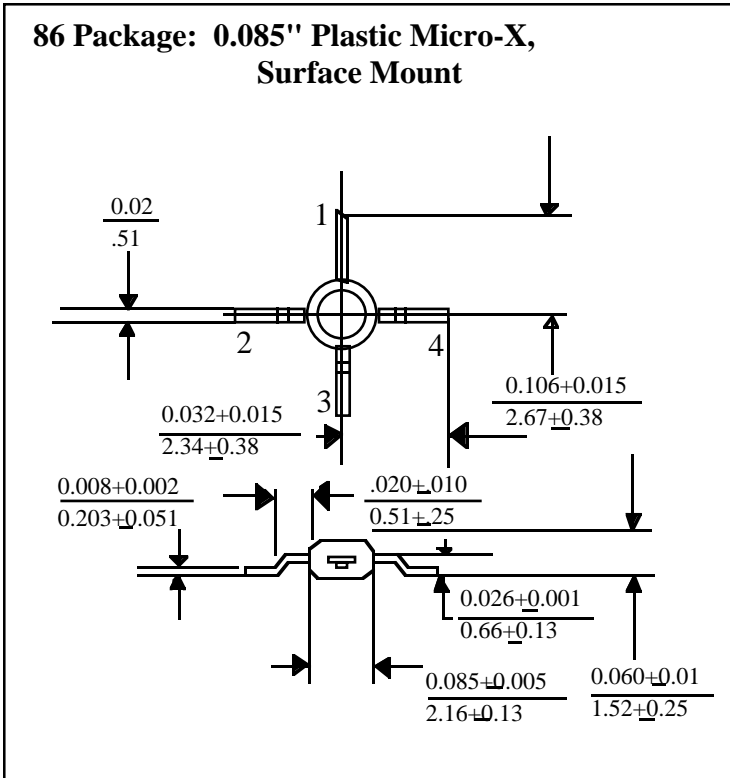
14 Package: SOT-143



14J Package: SOT-143J

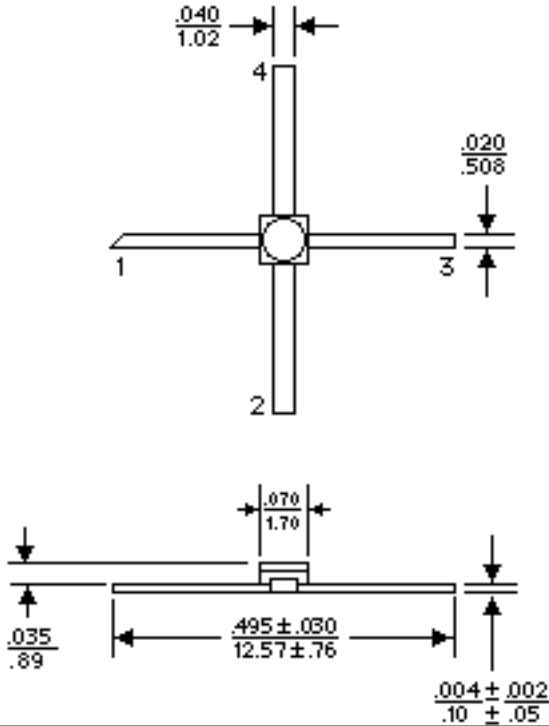


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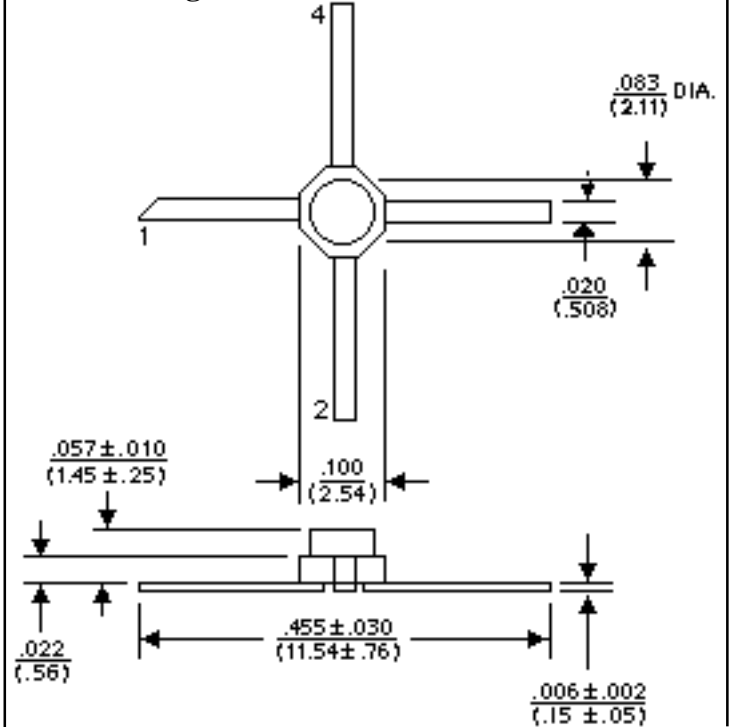


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70 Package: 0.070" Hermetic Stripline



35 Package: 0.085" Ceramic Micro-X



NOTES: (unless otherwise specified)

1. Dimensions are $\frac{\text{in}}{(\text{mm})}$
2. Tolerances:
 - in .xxx = $\pm .005$
 - mm .xx = $\pm .13$
3. All dimensions nominal; subject to change without notice

LEAD	1	2	3	4
Silicon Bipolar Transistor	Base	Emitter	Collector	Emitter

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