

MEDIUM POWER SILICON MICROWAVE TRANSISTOR

PRODUCT DATA SHEET

FEATURES:

- High Gain Bandwidth Product
 $f_t = 8 \text{ GHz typ @ } I_C = 70 \text{ mA}$

- High Gain
 $|S_{21}|^2 = 14.2 \text{ dB @ } 1.0 \text{ GHz}$
 $8.2 \text{ dB @ } 2.0 \text{ GHz}$

- Dice, Plastic, Hermetic and Surface Mount packages available

PERFORMANCE DATA:

- Electrical Characteristics ($T_A = 25^\circ\text{C}$)

DESCRIPTION AND APPLICATIONS:

Bipolarics' BRF480 is a high performance silicon bipolar transistor intended for medium power linear and Class C applications at VHF, UHF and microwave frequencies in 7.2 and 12V systems. Depending on package type, the BRF480 can operate at up to 0.5W. These applications include high intermod receivers, CATV and instrumentation amplifiers as well as pre-drivers, drivers and final stages in transmitter applications such as cellular telephone. Package options include Dice, SOT-223 Surface Mount, Ceramic Micro-X, 0.145" Plastic SOT-103 and 0.230" power flange package.

Absolute Maximum Ratings:

SYMBOL	PARAMETERS	RATING	UNITS
V_{CBO}	Collector-Base Voltage	25	V
V_{CEO}	Collector-Emitter Voltage	15	V
V_{EBO}	Emitter-Base Voltage	1.5	V
I_C	Collector Current (continuous)	120	mA
I_C^{MAX}	Collector Current (instantaneous)	180	mA
T_J	Junction Temperature	200	$^\circ\text{C}$
$T_{STG}^{(1)}$	Storage Temperature	-65 to 150	$^\circ\text{C}$
θ_{JC}	Thermal Resistance	50	C/W

(1) Depends on package

SYMBOL	PARAMETERS & CONDITIONS $V_{CE} = 8V, I_C = 60 \text{ mA}$, Class A, unless stated	UNIT	MIN.	TYP.	MAX.
f_t	Gain Bandwidth Product	GHz		8.0	
$ S_{21} ^2$	Insertion Power Gain: Micro-X SOT-103 f = 1.0 GHz f = 2.0 GHz	dB dB		14.2 8.2	
P_{1dB}	Power output at 1dB compression: f = 1.0 GHz $I_C = 75 \text{ mA}$	dBm		27.0	
NF	Noise Figure: $V_{CE} = 5V, I_C = 20 \text{ mA}$ f = 1.0 GHz	dB		1.6	
h_{FE}	Forward Current Transfer Ratio: $V_{CE} = 5V, I_C = 15 \text{ mA}$		30	100	300
I_{CBO}	Collector Cutoff Current : $V_{CB} = 8V$	μA			0.4
C_{CB}	Collector Base Capacitance: $V_{CB} = 8V$ f = 1MHz	pF		.75	

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TYPICAL S PARAMETERS: ⁽¹⁾

BIAS CONDITION: $V_{CE} = 8 \text{ V}$, $I_C = 35 \text{ mA}$

S-MATRIX: $Z_G = 50.0 + j 0.0$ $Z_L = 50.0 + j 0.0$

(1) Typical for microwave packages. Does not apply specifically to SOT-223.

FREQ. GHZ	S11		S21		S12		S22		S21 dB
	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang	
0.20000	0.5821	-146	16.78	126	0.0239	42	0.3801	- 86	24.5
0.40000	0.7585	-168	12.30	104	0.0263	48	0.2884	-122	21.8
0.60000	0.7244	-179	8.222	92	0.0354	52	0.2600	-134	18.3
0.80000	0.7413	179	6.456	86	0.0426	56	0.2600	-145	16.2
1.00000	0.7943	176	5.069	83	0.0467	64	0.2371	-147	14.1
1.20000	0.7585	166	4.365	76	0.0543	65	0.2630	-152	12.8
1.40000	0.7161	159	3.715	70	0.0602	67	0.2630	-154	11.4
1.60000	0.7585	156	3.311	68	0.0691	68	0.2691	-158	10.4
1.80000	0.7585	154	3.162	65	0.0724	70	0.2884	-163	10.0
2.00000	0.7585	150	2.630	61	0.0794	71	0.2851	-165	8.4
2.20000	0.7852	141	2.371	55	0.0841	71	0.3235	-177	7.5
2.40000	0.7673	138	2.137	55	0.0870	74	0.3054	-176	6.6
2.60000	0.8222	134	2.018	50	0.0954	73	0.3630	180	6.1
2.80000	0.8222	132	1.819	47	0.1000	73	0.3589	175	5.2
3.00000	0.8511	130	1.757	45	0.1109	76	0.3935	180	4.9
3.20000	0.8317	126	1.566	40	0.1148	73	0.4315	172	3.9
3.40000	0.8413	126	1.479	41	0.1216	75	0.3845	171	3.4
3.60000	0.9120	118	1.428	33	0.1318	75	0.4677	165	3.1
3.80000	0.8128	115	1.273	33	0.1303	74	0.4216	159	2.1
4.00000	0.8709	119	1.258	35	0.1462	76	0.4415	170	2.0
4.20000	0.8609	112	1.122	26	0.1479	72	0.4518	156	1.0

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TYPICAL S PARAMETERS:⁽¹⁾

BIAS CONDITION: $V_{CE} = 8 \text{ V}$, $I_C = 75 \text{ mA}$

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

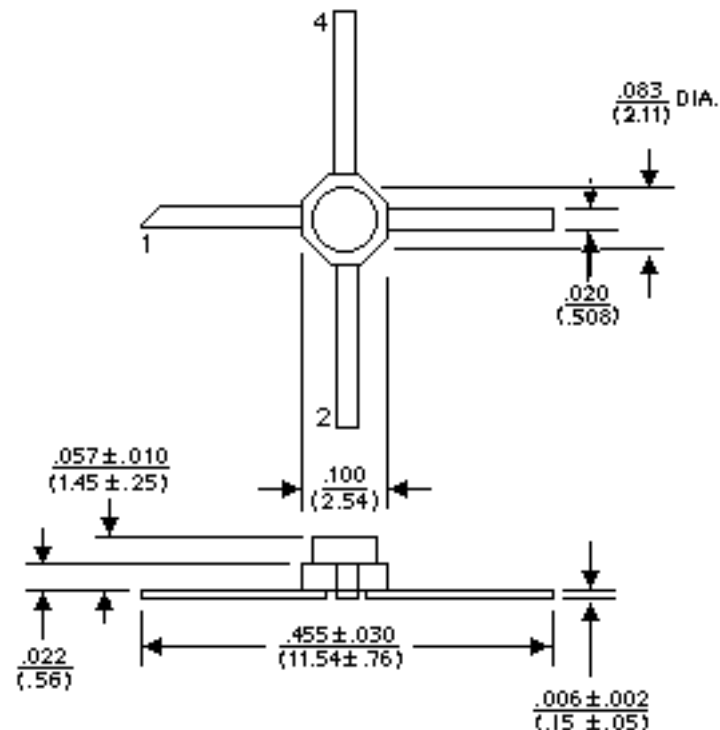
(1) Typical for microwave packages. Does not apply specifically to SOT-223.

FREQ. GHz	S11		S21		S12		S22		S21 dB
	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang	
0.20000	0.6456	-156	17.78	124	0.0169	46	0.3090	-102	25.0
0.40000	0.8128	-136	12.02	102	0.0229	54	0.2630	-136	21.6
0.60000	0.7843	176	8.317	92	0.0288	62	0.2511	-145	18.4
0.80000	0.7952	174	6.456	87	0.0371	68	0.2600	-155	16.2
1.00000	0.7943	172	5.128	83	0.0426	72	0.2371	-155	14.2
1.20000	0.7943	162	4.365	78	0.0506	73	0.2630	-159	12.8
1.40000	0.7478	156	3.715	72	0.0575	73	0.2630	-169	11.4
1.60000	0.7943	154	3.198	70	0.0630	74	0.2722	-164	10.1
1.80000	0.7762	151	2.851	66	0.0707	77	0.2884	-168	9.1
2.00000	0.7673	148	2.570	63	0.0794	77	0.2851	-168	8.2
2.20000	0.7852	139	2.213	58	0.0860	75	0.3235	178	6.9
2.40000	0.7762	136	1.995	59	0.0891	78	0.3090	180	6.0
2.60000	0.8222	132	1.883	54	0.1000	77	0.3845	176	5.5
2.80000	0.8222	131	1.698	51	0.1047	77	0.4265	172	4.6
3.00000	0.8413	129	1.640	49	0.1109	79	0.4073	177	4.3
3.20000	0.8317	128	1.513	45	0.1174	76	0.4073	169	3.6
3.40000	0.8413	125	1.412	46	0.1244	78	0.3801	168	3.0
3.60000	0.9120	117	1.364	37	0.1348	75	0.4677	162	2.7
3.80000	0.8128	114	1.188	17	0.1303	76	0.4168	156	1.5
4.00000	0.8709	118	1.230	18	0.1462	79	0.4365	167	1.8
4.20000	0.8609	111	1.071	30	0.1479	74	0.4415	-154	0.6

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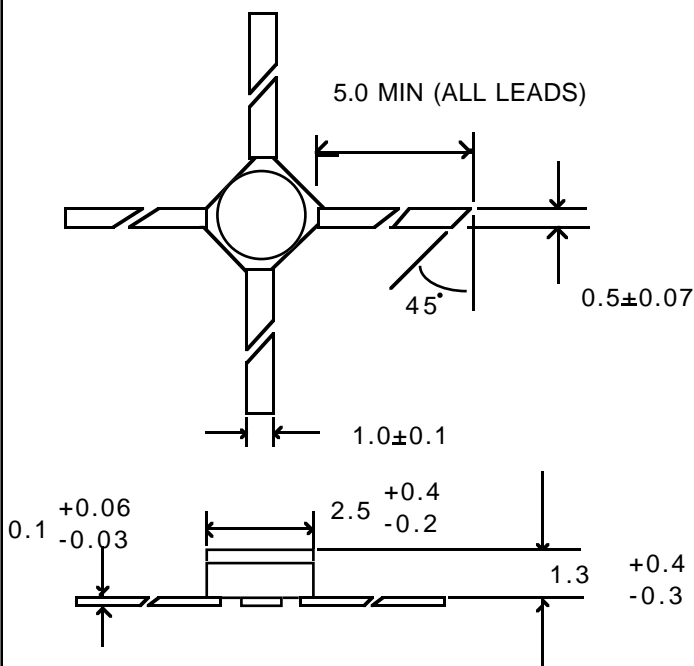
BRF48035

Package Style 35: Micro-X 0.085" Ceramic



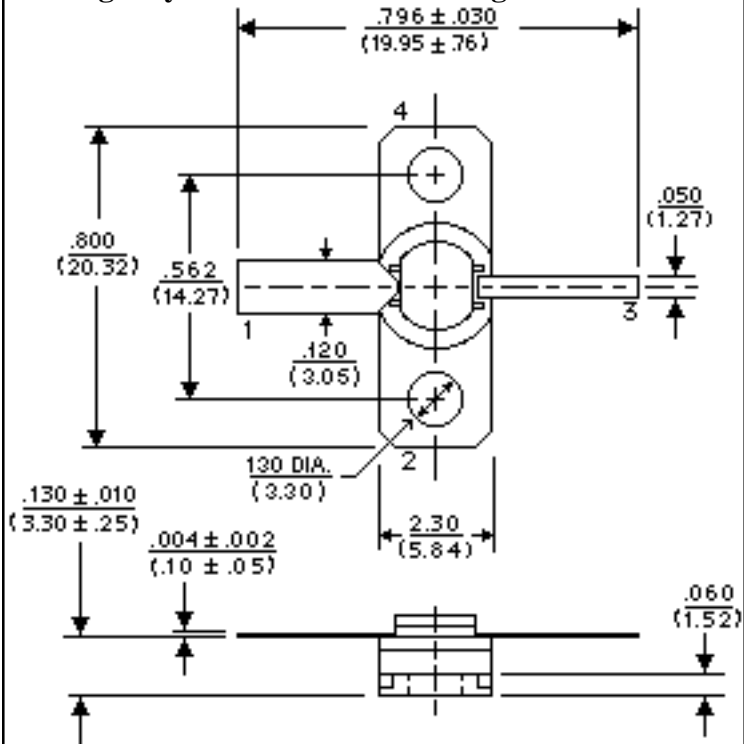
BRF48070

Package Style 70: 0.070" Stripline



BRF48023

Package Style 23: 0.230" BeO Flange

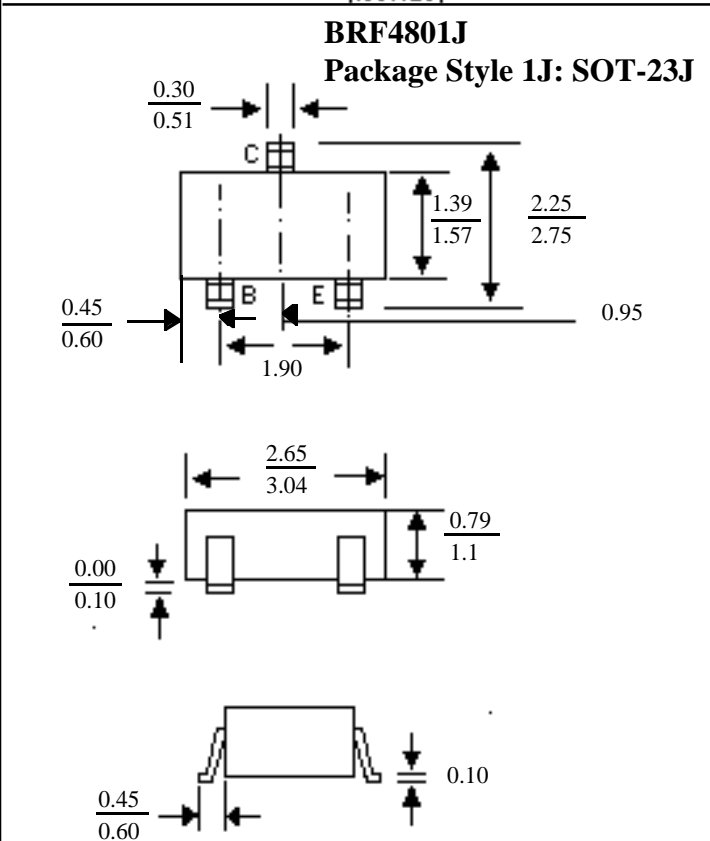
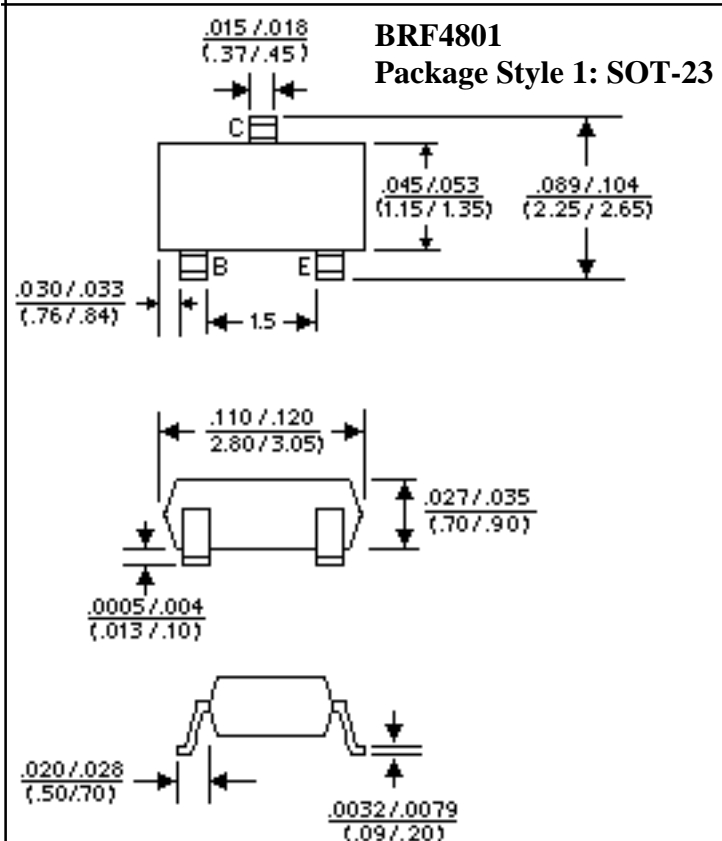
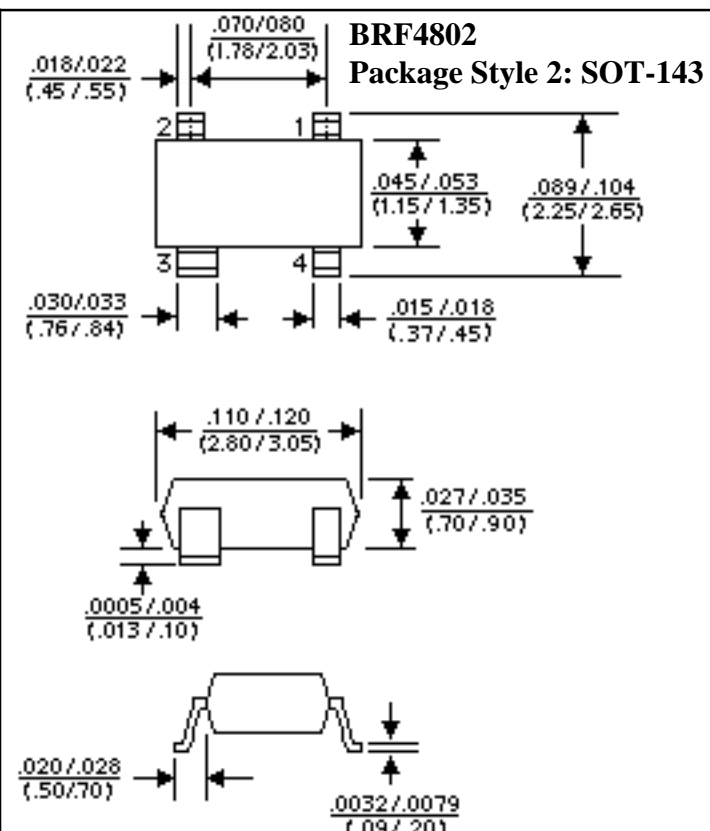
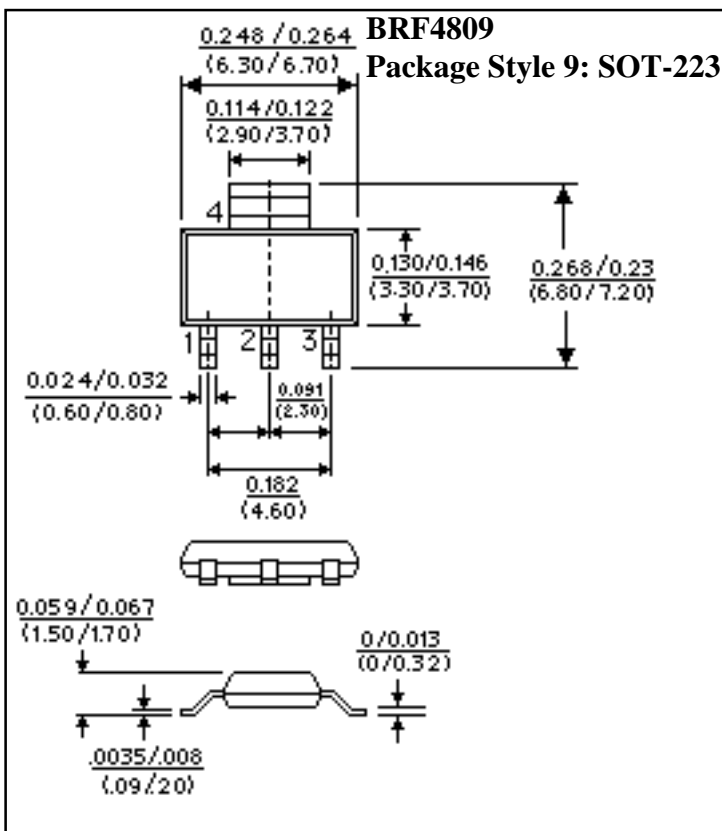


LEAD	1	2	3	4
Package 9	Emitter	Base	Emitter	Collector
Package 14,85,35 & 04	Base	Emitter	Collector	Emitter

NOTES: (unless otherwise specified)

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

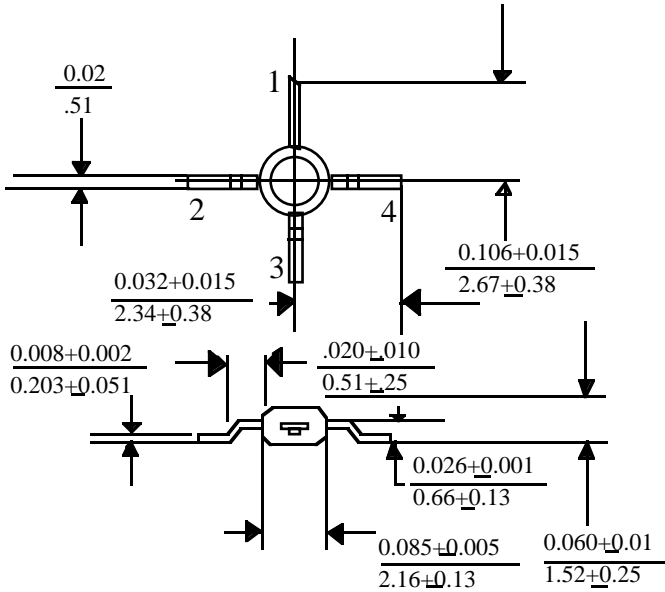
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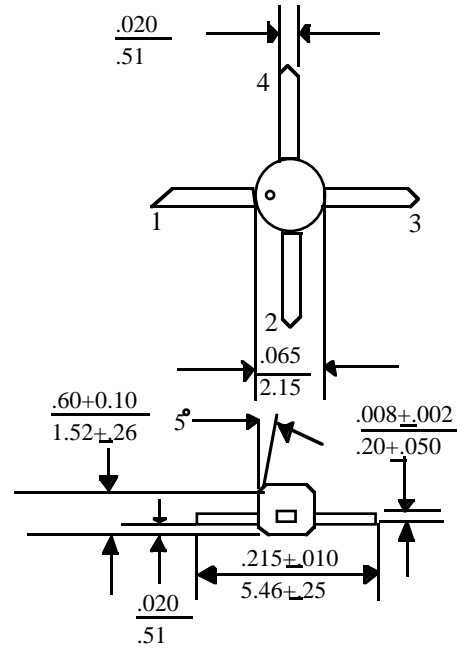
BRF48086

Package Style 86: 85 mil Plastic Micro-X ,
Surface Mount



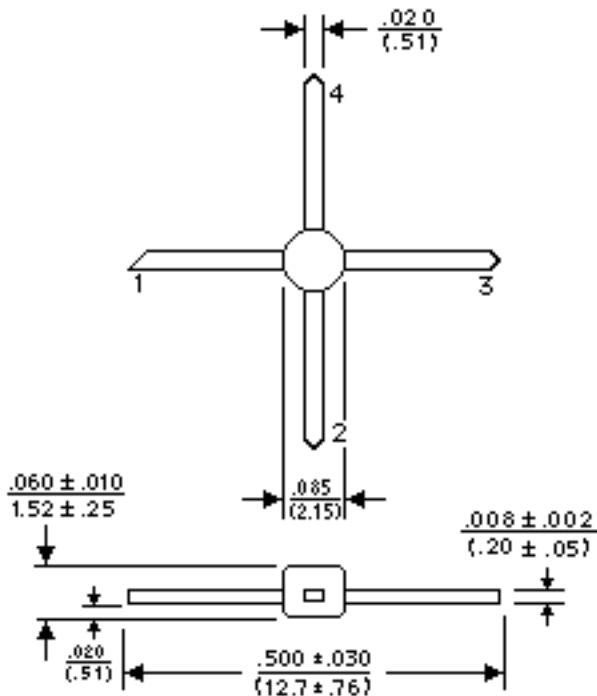
BRF48084

Package Style 84: 85 mil Plastic Micro-X,
Short Lead



BRF48085

Package Style 85: 85 mil Plastic, Micro-X



BRF48004

Package Style 04: 145 mil Plastic Macro-X

