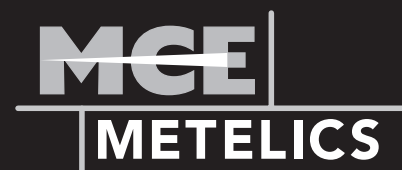


MMA710-SOT89

Darlington HBT Amplifier

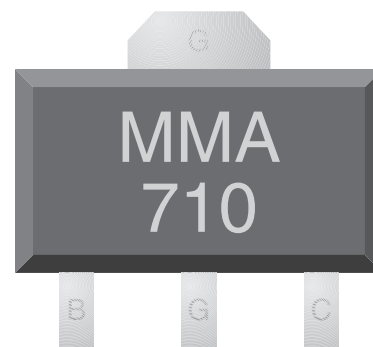


FEATURES

- 100 KHz to 4 GHz Bandwidth
- +21 dBm Output Power at P-1dB Compression
- +35 dBm Third Order Intercept

The MMA710 is a packaged InGaP Heterojunction Bipolar Transistor (HBT) Darlington amplifier in a low cost SOT-89 surface mount package. The amplifier maintains flat gain to 4 GHz and has excellent input and output matching.

The MMA710 is ideally suited for Cellular/PCS, 2.5/3 G, WLL, MMDS, Instrumentation systems and other applications where flat gain and good intercept are required. Custom packages and die options are available. Consult the factory for details.



Application notes are available
at www.metelics.com.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Test Conditions	Typical @ +7 VDC	Maximum	Units
Gain	SSG	Vcc = 7.0V	12.0		dB
Output Power	P-1dB	Vcc = 7.0V	+21		dBm
ACPR (W-CDMA)	ACPR	Vcc = 7.0V +12 dbm output 2140 MHz, 5 MHz offset	56		dB
Input Match	VSWR1	Vcc = 7.0V	1.50:1	2.00:1	
Output Match	VSWR2	Vcc = 7.0V, 10 MHz - 2.2 GHz	1.80:1	2.00:1	
Output Match	VSWR2	Vcc = 7.0V, 2.2 GHz - 4 GHz		3.50:1	
Noise Figure	NF	Vcc = 7.0V	6.5	7	dB
DC Current	Icc	Vcc = 7.0V	95	110	mA

1. Ta = +25° C, Frequency: 10 MHz to 4,000 MHz, 50 ohm system
2. OIP3 measured with two tones at an output power of 0 dBm/tone. Tone separation of 1.2288 MHz.

ABSOLUTE MAXIMUM RATINGS

Parameter	Rating
Operating Case Temperature	-40°C to +85°C
Storage Temperature	-40°C to +125°C
Junction Temperature	+230°C
Thermal Resistance	70°C/W
Supply Voltage, Vcc	8.00 V
Input RF Power (continuous)	+13 dBm

Operation of this device above any of these parameters may cause permanent damage.

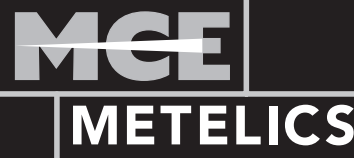


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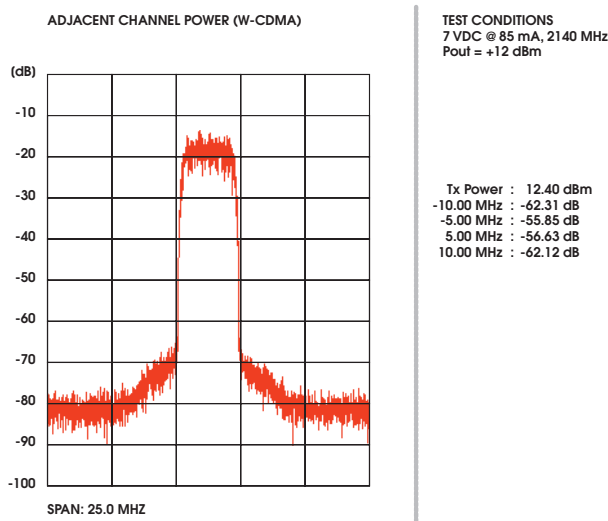
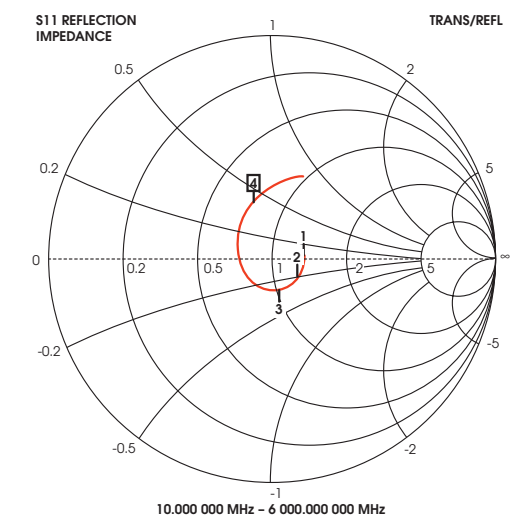
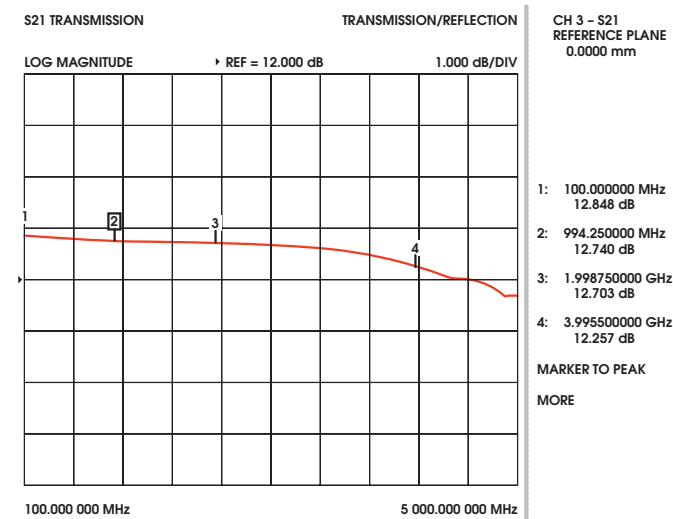
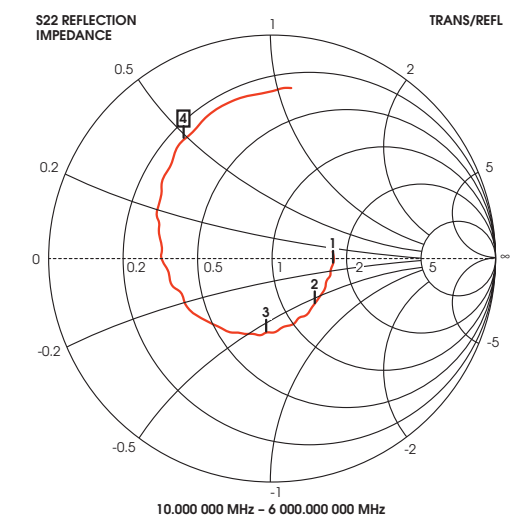
MMA710-SOT89

Darlington HBT Amplifier



SWEPT DATA

Application notes are available at www.metelics.com.

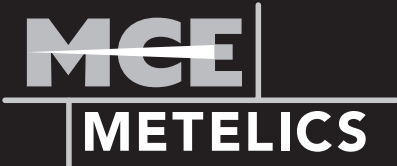


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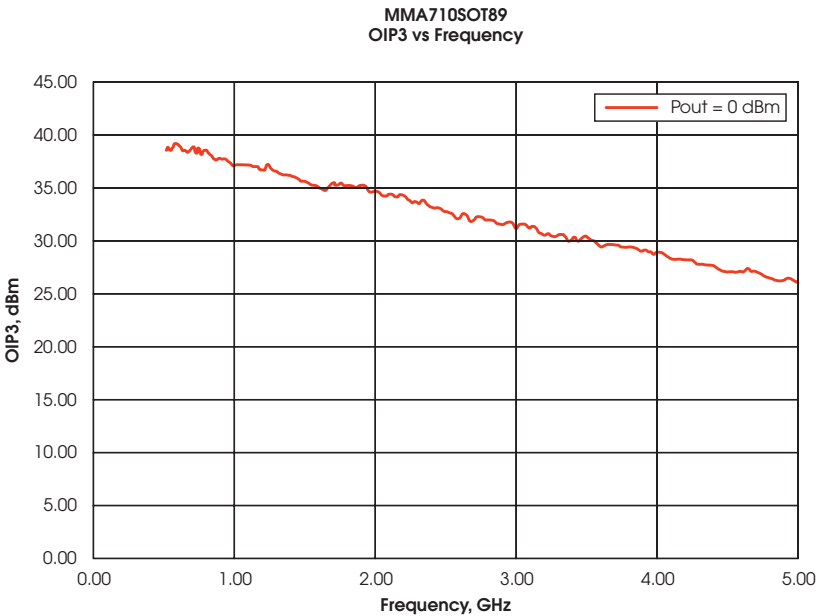
MMA710-SOT89

Darlington HBT Amplifier



SWEPT DATA

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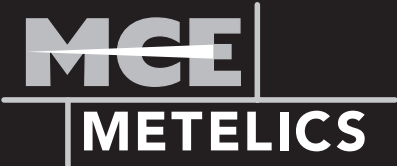


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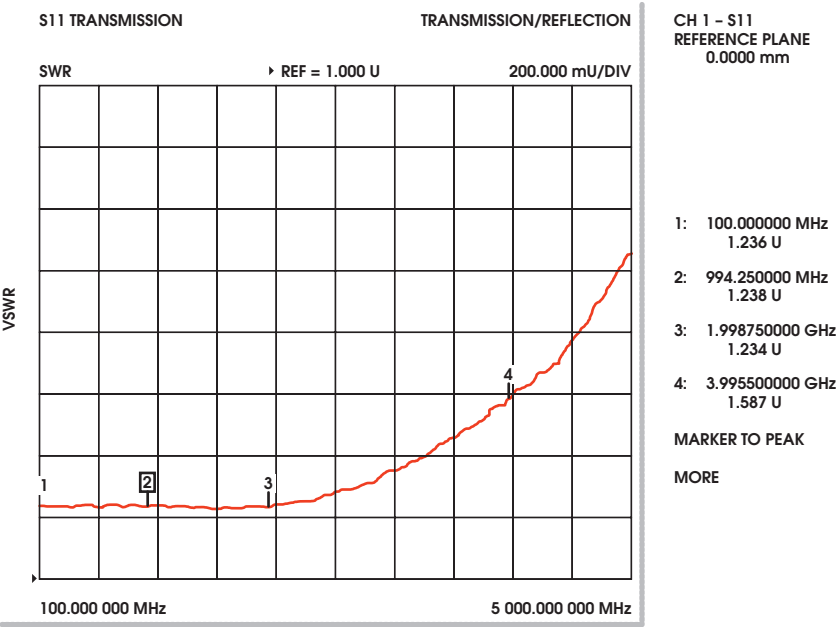
MMA710-SOT89

Darlington HBT Amplifier



SWEPT DATA

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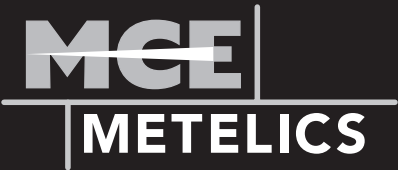


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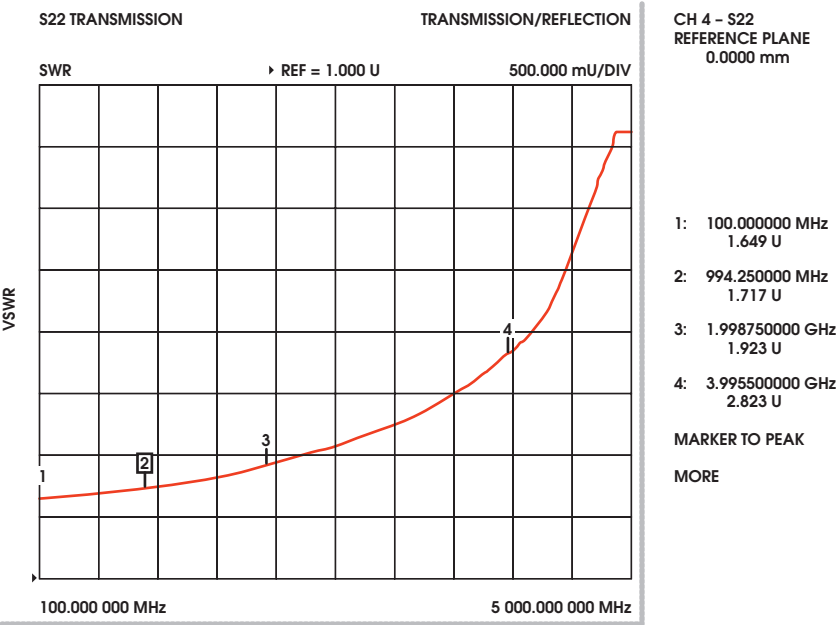
MMA710-SOT89

Darlington HBT Amplifier



SWEPT DATA

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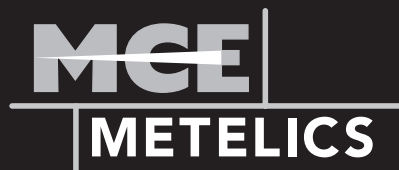


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MMA710-SOT89

Darlington HBT Amplifier



SMALL SIGNAL S PARAMETERS

V_{cc} = 7.00 VDC, I_{cc} = 89 mA

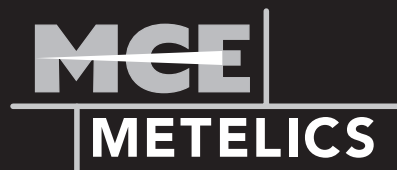
Application notes are available at www.metelics.com.

Freq. GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.0450	0.213	-3.739	4.302	-179.262	0.120	-5.715	0.356	0.610
0.0948	0.238	-4.961	4.216	177.723	0.125	-0.509	0.375	-4.676
0.1447	0.237	-5.964	4.239	178.105	0.126	0.988	0.367	-3.377
0.1946	0.231	-4.470	4.250	176.526	0.123	0.005	0.375	-6.026
0.2445	0.229	-7.446	4.253	175.770	0.123	0.817	0.371	-7.167
0.2944	0.229	-5.562	4.314	174.203	0.124	1.201	0.379	-10.144
0.3443	0.237	-9.109	4.274	173.055	0.125	0.576	0.379	-11.460
0.3942	0.230	-9.798	4.273	172.548	0.125	-0.088	0.378	-13.167
0.4441	0.234	-10.491	4.295	171.156	0.124	0.280	0.378	-15.038
0.4939	0.228	-12.488	4.265	170.207	0.125	1.167	0.382	-16.510
0.5438	0.236	-13.729	4.264	169.347	0.124	0.853	0.377	-18.276
0.5937	0.234	-15.325	4.275	168.399	0.125	0.852	0.387	-19.692
0.6436	0.237	-16.330	4.286	167.272	0.124	1.032	0.380	-21.415
0.6935	0.233	-17.781	4.294	166.523	0.125	1.436	0.388	-22.737
0.7434	0.235	-18.867	4.279	165.513	0.126	1.598	0.383	-24.578
0.7933	0.240	-19.473	4.297	164.825	0.126	1.688	0.392	-25.730
0.8432	0.239	-21.561	4.297	163.790	0.124	1.709	0.387	-27.324
0.8930	0.241	-24.255	4.272	161.992	0.125	0.788	0.395	-29.723
0.9429	0.236	-24.074	4.281	160.654	0.126	0.761	0.387	-31.751
0.9928	0.239	-26.770	4.310	160.288	0.126	1.129	0.400	-32.811
1.0427	0.241	-27.306	4.298	158.966	0.126	1.135	0.393	-34.830
1.0926	0.246	-28.878	4.319	158.095	0.126	1.161	0.405	-35.970
1.1425	0.245	-28.730	4.323	157.295	0.125	1.280	0.401	-37.835
1.1924	0.245	-31.250	4.346	156.252	0.127	1.272	0.413	-38.838
1.2423	0.247	-32.125	4.347	155.203	0.126	1.581	0.406	-40.937
1.2921	0.251	-34.128	4.372	154.040	0.127	1.756	0.421	-41.979
1.3420	0.254	-34.955	4.387	153.297	0.127	1.412	0.414	-43.844
1.3919	0.253	-37.141	4.389	152.195	0.128	1.779	0.427	-45.119
1.4418	0.258	-37.016	4.395	151.176	0.129	2.159	0.422	-46.809
1.4917	0.258	-38.994	4.396	150.367	0.129	2.062	0.434	-47.972
1.5416	0.259	-40.110	4.402	149.151	0.130	1.956	0.429	-49.704
1.5915	0.259	-41.219	4.412	148.366	0.129	2.239	0.442	-50.814
1.6414	0.264	-42.299	4.407	147.279	0.131	2.310	0.436	-52.615
1.6912	0.264	-44.556	4.439	146.206	0.131	2.317	0.451	-53.840
1.7411	0.261	-45.161	4.433	145.319	0.131	2.268	0.441	-55.325
1.7910	0.266	-47.283	4.438	144.559	0.133	2.348	0.459	-56.674
1.8409	0.268	-47.619	4.464	143.532	0.132	2.595	0.453	-58.078
1.8908	0.274	-49.327	4.480	142.797	0.132	2.835	0.472	-59.435
1.9407	0.273	-49.473	4.458	141.620	0.133	2.954	0.461	-60.753
1.9906	0.276	-51.778	4.505	140.774	0.134	3.314	0.481	-62.225
2.0405	0.280	-52.600	4.487	139.498	0.135	3.263	0.472	-63.574
2.0903	0.278	-53.998	4.519	138.787	0.135	3.427	0.492	-64.897

Freq. GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2.1402	0.282	-53.929	4.509	137.764	0.135	3.460	0.484	-65.731
2.1901	0.283	-55.906	4.531	136.654	0.136	3.285	0.502	-67.542
2.2400	0.288	-56.538	4.539	135.688	0.136	3.993	0.495	-68.296
2.2899	0.290	-58.729	4.584	134.845	0.137	4.279	0.515	-70.079
2.3398	0.293	-59.296	4.563	133.746	0.138	4.325	0.505	-70.671
2.3897	0.296	-60.982	4.569	132.518	0.138	4.282	0.523	-72.483
2.4396	0.299	-56.484	4.553	138.157	0.141	10.492	0.522	-65.547
2.4894	0.303	-57.853	4.560	137.165	0.141	10.456	0.539	-67.499
2.5393	0.302	-58.677	4.571	135.952	0.141	10.849	0.530	-68.173
2.5892	0.306	-60.380	4.581	134.954	0.143	11.173	0.549	-70.306
2.6391	0.311	-60.346	4.599	134.071	0.142	11.253	0.542	-70.378
2.6890	0.313	-62.435	4.620	133.062	0.145	11.390	0.562	-72.362
2.7389	0.314	-62.222	4.631	131.891	0.144	11.724	0.557	-72.681
2.7888	0.318	-64.424	4.654	130.923	0.145	11.834	0.575	-74.771
2.8387	0.324	-65.154	4.651	130.002	0.147	12.104	0.572	-74.931
2.8885	0.318	-66.618	4.656	128.971	0.147	11.998	0.585	-77.046
2.9384	0.328	-66.859	4.651	127.789	0.148	12.235	0.581	-77.505
2.9883	0.326	-69.322	4.682	126.913	0.149	12.163	0.597	-79.462
3.0382	0.334	-69.868	4.680	125.723	0.150	12.178	0.594	-79.722
3.0881	0.333	-71.051	4.710	124.809	0.151	12.456	0.614	-81.770
3.1380	0.338	-71.626	4.682	123.560	0.152	12.379	0.605	-82.138
3.1879	0.340	-72.762	4.706	122.418	0.154	12.396	0.622	-84.333
3.2378	0.342	-73.324	4.712	121.602	0.154	12.418	0.617	-84.332
3.2876	0.345	-76.444	4.738	120.260	0.156	12.075	0.634	-86.939
3.3375	0.346	-75.558	4.722	119.441	0.156	12.232	0.631	-86.636
3.3874	0.351	-77.858	4.752	118.100	0.158	12.429	0.646	-89.025
3.4373	0.352	-77.945	4.739	117.142	0.158	12.445	0.645	-88.930
3.4872	0.355	-80.173	4.760	115.628	0.159	12.253	0.659	-91.475
3.5371	0.354	-80.469	4.738	114.741	0.160	12.189	0.653	-91.117
3.5870	0.359	-82.325	4.752	113.649	0.161	12.436	0.668	-93.535
3.6369	0.366	-82.546	4.785	112.506	0.162	12.667	0.669	-93.452
3.6867	0.364	-84.239	4.790	111.099	0.164	12.329	0.683	-96.198
3.7366	0.367	-84.540	4.804	110.041	0.164	12.238	0.679	-95.720
3.7865	0.371	-86.574	4.794	108.857	0.167	12.106	0.692	-98.099
3.8364	0.372	-86.684	4.764	107.873	0.167	12.294	0.690	-97.850
3.8863	0.377	-88.128	4.815	106.820	0.170	12.323	0.706	-100.222
3.9362	0.376	-89.018	4.762	105.711	0.170	12.224	0.699	-99.927
3.9861	0.378	-90.139	4.776	104.305	0.171	11.997	0.710	-102.427
4.0360	0.385	-90.927	4.768	103.445	0.173	12.266	0.714	-102.224
4.0858	0.386	-92.753	4.805	102.053	0.174	11.798	0.723	-104.753
4.1357	0.391	-93.223	4.788	100.812	0.175	11.710	0.720	-104.637
4.1856	0.390	-95.036	4.770	99.353	0.177	11.714	0.730	-107.240

MMA710-SOT89

Darlington HBT Amplifier



SMALL SIGNAL S PARAMETERS

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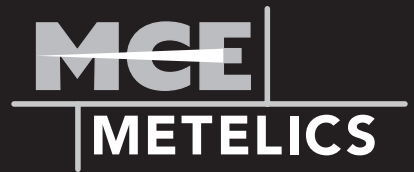
Vcc = 7.00 VDC, Icc = 89 mA

Freq. GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
4.2355	0.393	-95.038	4.752	98.539	0.178	11.736	0.734	-106.819
4.2854	0.394	-96.630	4.751	96.942	0.180	11.366	0.741	-109.467
4.3353	0.397	-97.308	4.747	95.827	0.180	11.253	0.742	-109.363
4.3852	0.398	-99.667	4.758	94.105	0.181	10.854	0.749	-112.317
4.4351	0.396	-99.421	4.695	93.596	0.182	10.871	0.750	-111.589
4.4849	0.401	-101.641	4.730	91.920	0.184	10.080	0.758	-114.409
4.5348	0.404	-101.340	4.696	91.034	0.184	10.232	0.754	-114.073
4.5847	0.399	-103.086	4.675	89.482	0.187	9.949	0.760	-116.626
4.6346	0.403	-104.379	4.686	88.388	0.188	9.585	0.765	-116.684
4.6845	0.406	-106.015	4.688	87.149	0.188	9.329	0.770	-118.934
4.7344	0.409	-106.214	4.654	86.123	0.190	9.253	0.774	-118.848
4.7843	0.409	-107.713	4.634	84.580	0.191	8.787	0.774	-121.247
4.8342	0.410	-108.851	4.605	83.617	0.193	8.649	0.775	-121.319
4.8840	0.412	-110.508	4.598	82.148	0.193	8.147	0.781	-123.631
4.9339	0.409	-110.943	4.577	81.082	0.194	8.053	0.781	-123.719
4.9838	0.411	-112.829	4.525	79.657	0.196	7.519	0.781	-125.980
5.0337	0.413	-113.191	4.527	78.430	0.197	7.647	0.786	-125.836
5.0836	0.416	-114.673	4.515	77.068	0.198	7.374	0.790	-127.995
5.1335	0.412	-115.508	4.485	75.971	0.199	7.190	0.788	-127.821
5.1834	0.415	-116.910	4.462	74.758	0.201	6.423	0.793	-130.095
5.2333	0.415	-117.094	4.446	73.746	0.201	6.575	0.794	-129.935
5.2831	0.412	-119.431	4.415	72.183	0.202	5.763	0.794	-132.262
5.3330	0.417	-119.808	4.384	71.120	0.203	6.053	0.793	-131.923
5.3829	0.413	-120.873	4.359	69.863	0.204	5.420	0.792	-134.029
5.4328	0.416	-122.048	4.321	68.836	0.205	5.259	0.797	-134.139
5.4827	0.418	-122.706	4.323	67.694	0.206	4.673	0.798	-136.070
5.5326	0.410	-123.711	4.255	66.608	0.206	4.699	0.791	-136.057
5.5825	0.416	-125.151	4.269	65.341	0.208	4.014	0.799	-138.068
5.6324	0.410	-125.492	4.217	64.273	0.207	4.216	0.798	-137.899
5.6822	0.410	-126.885	4.192	63.033	0.210	3.389	0.801	-139.898
5.7321	0.414	-127.290	4.169	61.894	0.209	3.322	0.799	-140.189
5.7820	0.407	-128.950	4.102	60.586	0.209	2.542	0.785	-142.140
5.8319	0.412	-129.110	4.085	59.837	0.210	2.470	0.795	-141.953
5.8818	0.409	-131.106	4.057	58.292	0.212	1.538	0.786	-144.090
5.9317	0.408	-131.544	4.022	57.754	0.211	1.875	0.789	-143.770
5.9816	0.408	-132.598	3.981	56.409	0.212	0.916	0.781	-145.636
6.0315	0.404	-132.908	3.965	55.334	0.211	0.836	0.786	-145.853
6.0813	0.405	-134.221	3.924	54.073	0.213	0.405	0.779	-147.658
6.1312	0.402	-134.380	3.871	53.072	0.213	0.152	0.781	-147.602
6.1811	0.400	-136.034	3.858	51.861	0.214	-0.365	0.774	-149.536
6.2310	0.401	-135.931	3.815	50.885	0.214	-0.235	0.776	-149.439
6.2809	0.396	-137.419	3.771	49.754	0.214	-1.260	0.765	-151.149

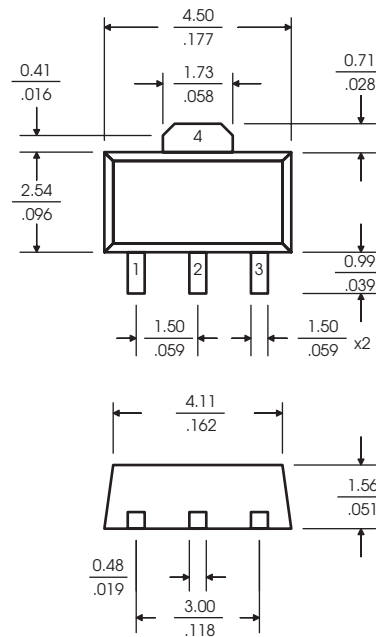
Freq. GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
6.3308	0.395	-137.621	3.737	49.106	0.215	-1.024	0.770	-150.883
6.3807	0.395	-139.241	3.712	47.580	0.214	-1.608	0.760	-152.651
6.4306	0.391	-139.249	3.668	46.946	0.215	-1.664	0.761	-152.549
6.4804	0.389	-140.238	3.640	45.696	0.216	-2.217	0.754	-154.381
6.5303	0.388	-140.760	3.613	44.825	0.215	-2.252	0.758	-154.141
6.5802	0.388	-141.594	3.578	43.720	0.215	-2.915	0.745	-155.715
6.6301	0.382	-142.123	3.537	43.010	0.216	-2.778	0.750	-155.827
6.6800	0.384	-143.291	3.517	41.797	0.217	-3.616	0.741	-157.216
6.7299	0.377	-143.049	3.477	41.219	0.217	-3.198	0.743	-157.015
6.7798	0.375	-144.788	3.440	40.026	0.218	-3.692	0.732	-158.413
6.8297	0.374	-145.275	3.402	39.343	0.217	-4.048	0.737	-158.491
6.8795	0.373	-146.105	3.355	38.167	0.217	-4.254	0.721	-159.725
6.9294	0.370	-146.372	3.336	37.439	0.217	-4.330	0.729	-159.632
6.9793	0.368	-147.171	3.289	36.514	0.218	-4.787	0.713	-161.077
7.0292	0.363	-148.196	3.244	34.411	0.218	-6.554	0.718	-163.108

MMA710-SOT89

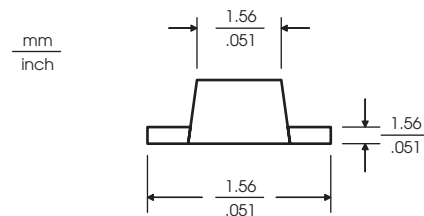
Darlington HBT Amplifier



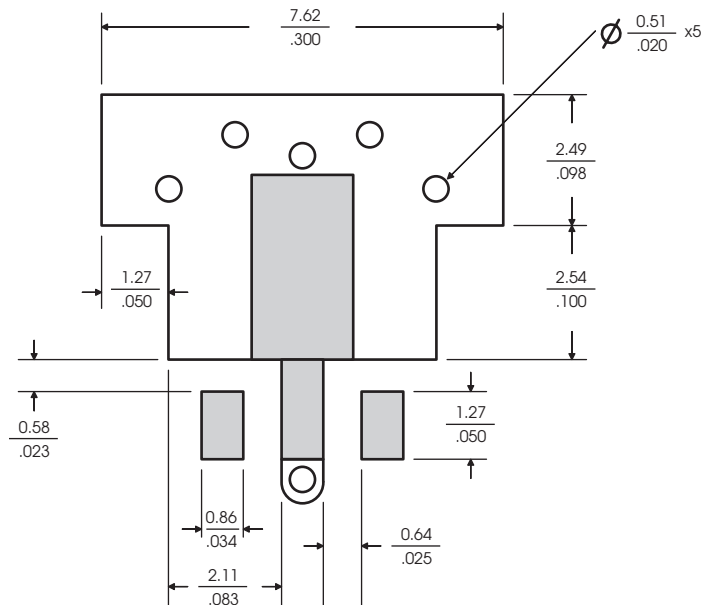
OUTLINE DRAWING



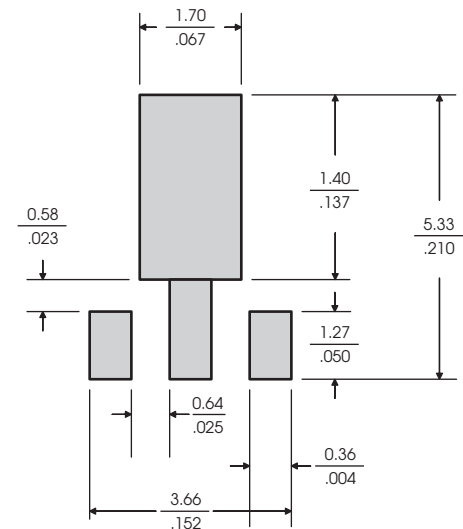
Function	Pin Number
Input/Base	1
DC/RF Ground	2
Output/Collector	3
DC/RF Ground	4



MOUNTING CONFIGURATION



LAND PATTERN



ORDERING INFORMATION

Bulk Part Number: MMA710-SOT89

Tape and Reel Part Number: MMA710-SOT89TR

Evaluation Board: MMA710-SOT89EB

Application notes are available
at www.metelics.com.



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