MACOM an AMP company

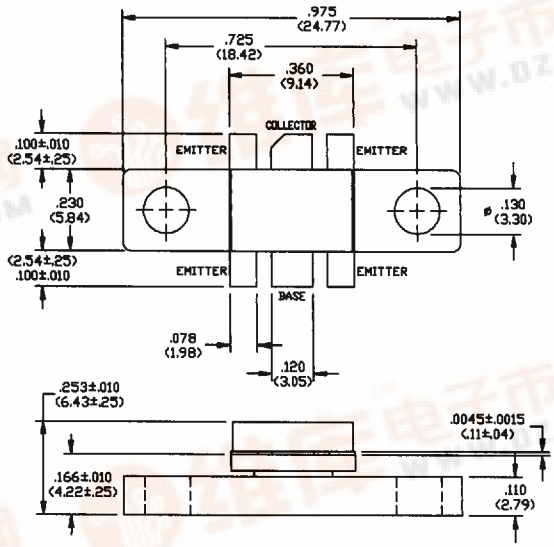
Wireless Bipolar Power Transistor, 4W 850 - 960 MHz

PH0810-4

V2.00

Features

- NPN Silicon Microwave Power Transistor
- Designed for Linear Amplifier Applications
- Class AB: -30dBc Typ 3rd IMD at 4 Watts PEP
- Common Emitter Configuration
- Internal Input Impedance Matching
- Diffused Emitter Ballasting Resistors
- Gold Metallization System



UNLESS OTHERWISE NOTED, TOLERANCES ARE INCHES ±.005" (MILLIMETERS ±.13MM)

Absolute Maximum Ratings at 25°C

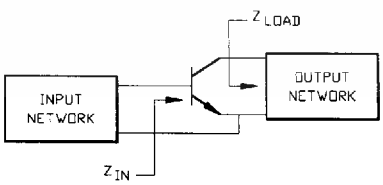
Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CES}	60	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	0.7	A
Total Power Dissipation	P_{TOT}	19.5	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	7.5	°C/W

Electrical Characteristics at 25°C

Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Emitter Breakdown Voltage	BV_{CES}	60	-	V	I_C=5 mA
Collector-Emitter Leakage Current	I_{CES}	-	2.0	mA	V_{CE}=24.0 V
Collector-Emitter Breakdown Voltage	BV_{CEO}	22	-	V	I_C=5 mA
Emitter-Base Breakdown Voltage	BV_{EBO}	3.0	-	V	I_B=2.5 mA
DC Forward Current Gain	h_{FE}	15	120	-	V_{CE}=5.0 V, IC=0.1 A
Power Gain	G_P	14	-	dB	V_{CC}=24 V, I_{CQ}=30 mA, P_{OUT}=4 W, F=900 MHz
Collector Efficiency	η_C	45	-	%	V_{CC}=24 V, I_{CQ}=30 mA, P_{OUT}=4 W, F=900 MHz
Input Return Loss	RL	10	-	dB	V_{CC}=24 V, I_{CQ}=30 mA, P_{OUT}=4 W, F=900 MHz
Load Mismatch Tolerance	VSWR-T	-	10:1	-	V_{CC}=24 V, I_{CQ}=30 mA, P_{OUT}=4 W PEP, F=900 MHz, ΔF=100 kHz
3rd Order IMD	IMD_3	-	-30	dBc	V_{CC}=24 V, I_{CQ}=30 mA, P_{OUT}=4 W PEP, F=900 MHz, ΔF=100 kHz

Typical Optimum Device Impedances

F(MHz)	$Z_{IN}(\Omega)$	$Z_{LOAD}(\Omega)$
850	3.0 + j3.5	10.6 + j15.9
900	4.0 + j2.4	11.2 + j16.9
960	3.0 + j1.0	11.3 + j17.5



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Typical S-Parameters

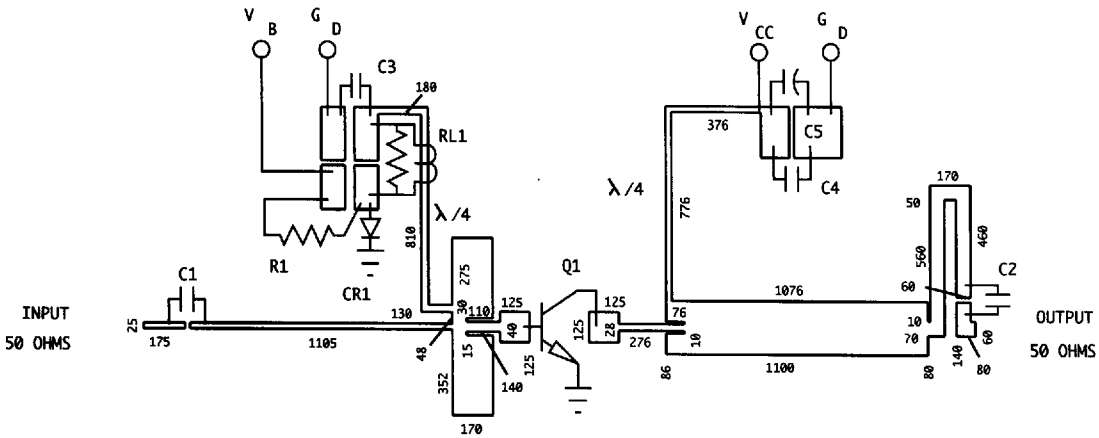
V_{CC}=25 V, I_{CQ}=200 mA

	S11		S21		S12		S22	
f(MHz)	Mag	Phase	Mag	Phase	Mag	Phase	Mag	Phase
50	0.771	-153.4	21.6	122.4	0.265	-102.1	0.016	20.3
150	0.868	-172.4	8.3	91.5	0.243	-134.1	0.016	11.2
250	0.871	-177.8	5.1	78.2	0.277	-135.4	0.017	2.7
350	0.868	179.3	3.9	67.2	0.302	-130.6	0.016	7.4
450	0.858	177.6	3.2	55.5	0.368	-124.1	0.018	-8.0
550	0.846	176.6	2.8	42.0	0.491	-118.9	0.019	-16.8
650	0.834	176.4	2.6	24.7	0.672	-118.9	0.020	-34.1
750	0.828	177.5	2.3	2.2	0.865	-126.1	0.016	-54.9
850	0.849	178.4	1.8	-23.8	1.0	-141.2	0.010	-89.4
950	0.882	177.6	1.2	-47.7	1.0	-153.6	0.009	-161.3
1050	0.905	175.6	0.817	-65.9	1.0	-165.1	0.009	132.8
1150	0.915	173.6	0.505	-78.5	0.869	-170.1	0.015	108.4
1250	0.918	171.8	0.306	-87.6	0.834	-174.6	0.018	93.5
1350	0.918	170.1	0.176	-92.9	0.79	-175.5	0.022	89.5
1450	0.917	168.1	0.087	-94.3	0.767	-175.2	0.027	83.6
1550	0.912	165.7	0.036	-76.9	0.793	-175.4	0.032	80.5

V_{CC}=25 V, I_{CQ}=300 mA

	S11		S21		S12		S22	
f(MHz)	Mag	Phase	Mag	Phase	Mag	Phase	Mag	Phase
50	0.777	-153.3	22.1	121.7	0.294	-105.2	0.014	17.9
150	0.868	-172.6	8.4	91.2	0.253	-142.9	0.017	18.9
250	0.870	-177.9	5.2	78.2	0.258	-137.9	0.015	7.8
350	0.865	179.2	3.9	67.2	0.309	-134.1	0.018	-1.0
450	0.856	177.4	3.2	55.4	0.362	-129.4	0.017	-3.4
550	0.844	176.5	2.9	42.1	0.485	-119.3	0.020	-14.3
650	0.829	176.4	2.6	24.7	0.680	-120.2	0.018	-33.4
750	0.824	177.5	2.3	1.7	0.887	-126.8	0.016	-49.4
850	0.847	178.5	1.9	-24.9	1.0	-141.2	0.009	-93.9
950	0.880	177.7	1.3	-48.8	1.0	-155.3	0.006	-165.9
1050	0.904	175.7	0.820	-66.6	0.968	-164.8	0.012	141.8
1150	0.914	173.6	0.508	-79.1	0.864	-170.6	0.015	115.1
1250	0.919	171.8	0.304	-87.4	0.828	-174.9	0.019	96.5
1350	0.917	170.0	0.178	-92.4	0.805	-176.5	0.022	86.2
1450	0.916	168.0	0.090	-93.3	0.769	-174.3	0.025	83.6
1550	0.912	165.7	0.032	-71.5	0.782	-177.6	0.032	78.5

RF Test Fixture



ARTWORK DIMENSIONS IN MILS

PARTS LIST

C1 C2 C3	100 pF ATC SIZE A
C4	5000 pF ATC SIZE B
C5	50 uF 50 VOLTS
CR1	DIODE CATHODE MECHANICALLY ATTACHED TO FLANGE (HARRIS 1N4245)
Q1	PH0810-4
R1	5 OHMS 1/4 WATT
RL1	10T/NO. 22 AWG ON 3.1 OHM 1/4 WATT
BOARD TYPE	ROGERS 6010.5 .025" THICK, E_R = 10.5