

Wireless Bipolar Power Transistor, 2W

1.78 - 1.90 GHz

PH1819-2

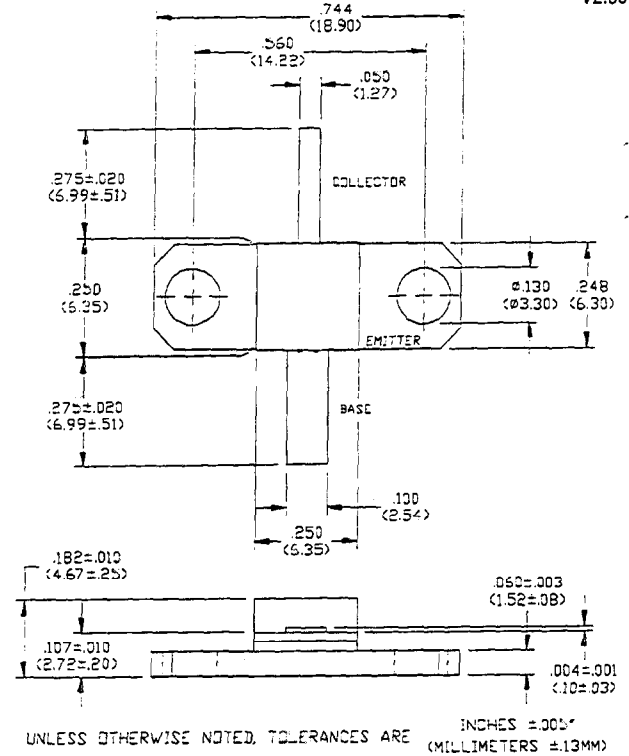
V2.00

Features

- Designed for Cellular Base Station Applications
- Class AB: -34 dBc Typ 3rd IMD at 2 Watts PEP
- Class A: +43 dBm Typ 3rd Order Intercept Point
- Common Emitter Configuration
- Internal Input Impedance Matching
- Diffused Emitter Ballasting

Absolute Maximum Ratings at 25°C

| Parameter | Symbol | Rating | Units |
|---------------------------|---------------|-------------|-------|
| Collector-Base Voltage | V_{CBO} | 65 | V |
| Collector-Emitter Voltage | V_{CES} | 65 | V |
| Emitter-Base Voltage | V_{EBO} | 3.0 | V |
| Collector Current | I_C | 2.0 | A |
| Power Dissipation | P_D | 13.5 | W |
| Junction Temperature | T_J | 200 | °C |
| Storage Temperature | T_{STG} | -55 to +150 | °C |
| Thermal Resistance | θ_{JC} | 13 | °C/W |

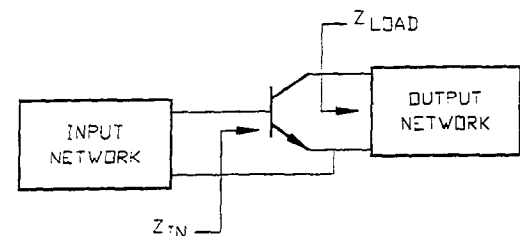


Electrical Characteristics at 25°C

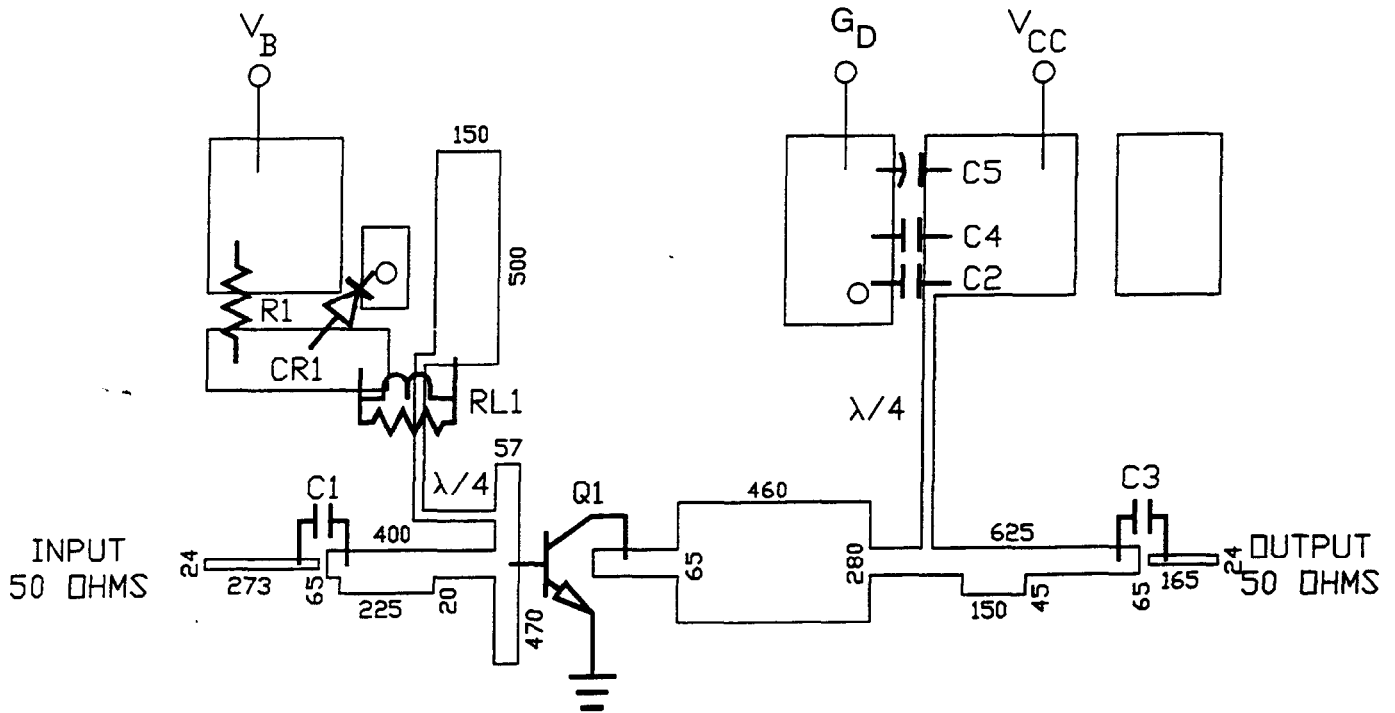
| Parameter | Symbol | Min | Max | Units | Test Conditions |
|-------------------------------------|------------------|-----|-----|-------|---|
| Collector-Emitter Breakdown Voltage | BV_{CES} | 65 | - | V | $I_C=5\text{ mA}$ |
| Collector-Emitter Leakage Current | I_{CES} | - | 1.0 | mA | $V_{CE}=25\text{ V}$ |
| Collector-Emitter Breakdown Voltage | BV_{CEO} | 22 | - | V | $I_C=5\text{ mA}$ |
| Collector-Emitter Breakdown Voltage | BV_{CER} | 30 | - | V | $I_C=5\text{ mA}, R_{BE}=220\ \Omega$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | 3.0 | - | V | $I_E=5\text{ mA}$ |
| DC Forward Current Gain | h_{FE} | 15 | 120 | - | $V_{CE}=5\text{ V}, I_C=200\text{ mA}$ |
| Power Gain | G_P | 10 | - | dB | $V_{CC}=25\text{ V}, I_{CC}=25\text{ mA}, P_{OUT}=2.0\text{ W}, F=1.78, 1.85, 1.90\text{ GHz}$ |
| Collector Efficiency | η_C | 35 | - | % | $V_{CC}=25\text{ V}, I_{CC}=25\text{ mA}, P_{OUT}=2.0\text{ W}, F=1.78, 1.85, 1.90\text{ GHz}$ |
| Input Return Loss | RL | 10 | - | dB | $V_{CC}=25\text{ V}, I_{CC}=25\text{ mA}, P_{OUT}=2.0\text{ W}, F=1.78, 1.85, 1.90\text{ GHz}$ |
| Load Mismatch Tolerance | VSWR-T | - | 5:1 | - | $V_{CC}=25\text{ V}, I_{CC}=25\text{ mA}, P_{OUT}=2.0\text{ W}, F=1.78, 1.85, 1.90\text{ GHz}$ |
| 3rd Order IMD | IMD ₃ | - | -32 | dBc | $V_{CC}=25\text{ V}, I_{CC}=25\text{ mA}, P_{OUT}=2.0\text{ W PEP}, F=1850\text{ MHz}, \Delta F=100\text{ kHz}$ |

Typical Optimum Device Impedances

| F(GHz) | $Z_{IN}(\Omega)$ | $Z_{LOAD}(\Omega)$ |
|--------|------------------|--------------------|
| 1.78 | $6.6 + j10.0$ | $6.0 + j12.0$ |
| 1.85 | $8.4 + j10.1$ | $5.7 + j11.0$ |
| 1.90 | $9.5 + j9.9$ | $5.0 + j9.0$ |



RF Test Fixture



ARTWORK DIMENSIONS IN MILS

PARTS LIST

| | | | |
|-------------|----|----|--|
| C1 | C2 | C3 | 33 pF ATC SIZE A |
| C4 | | | 5000 pF |
| C5 | | | 4.7 uF 63 VOLTS |
| CR1 | | | 1N914B DIODE |
| Q1 | | | PH1819-2 |
| R1 | | | 5 OHMS 1/4 WATT |
| RL1 | | | 6T/NO. 24 AWG ON 3 OHM 1/4 WATT |
| BOARD TYPE: | | | ROGERS 6010.5 .025" THICK, $\epsilon_R = 10.5$ |

Specifications Subject to Change Without Notice.

9-180

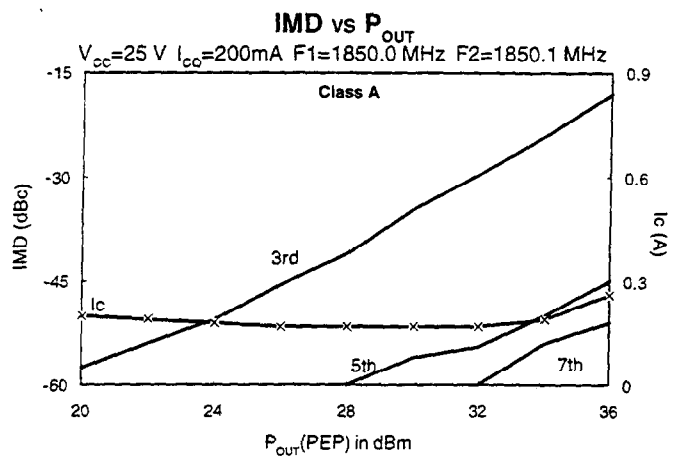
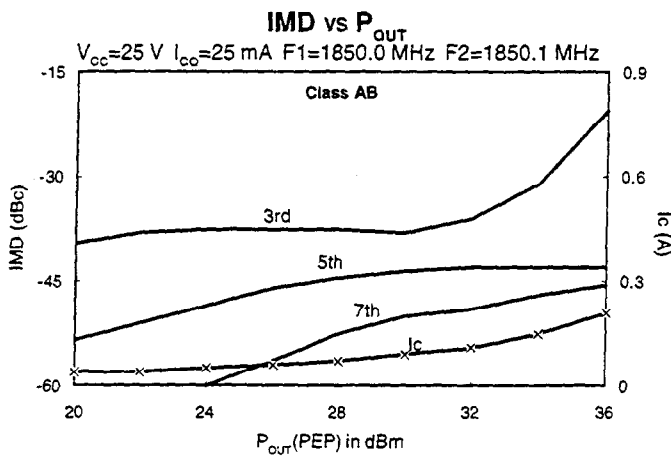
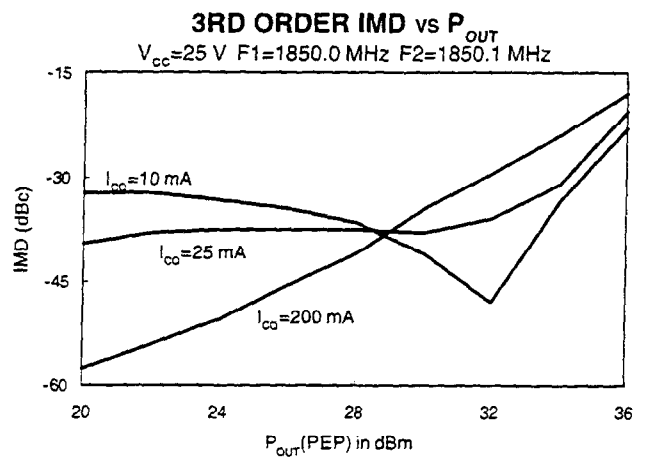
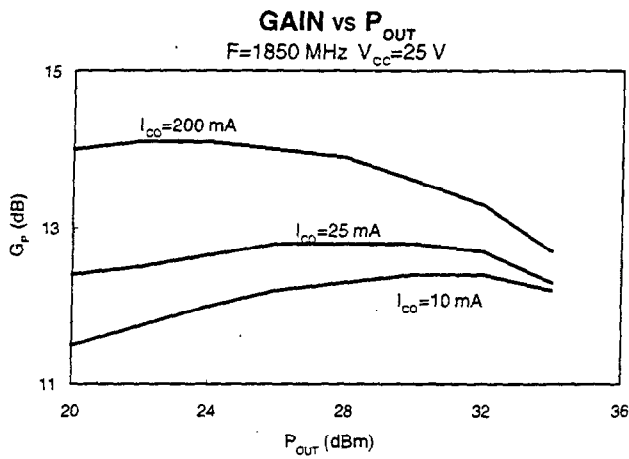
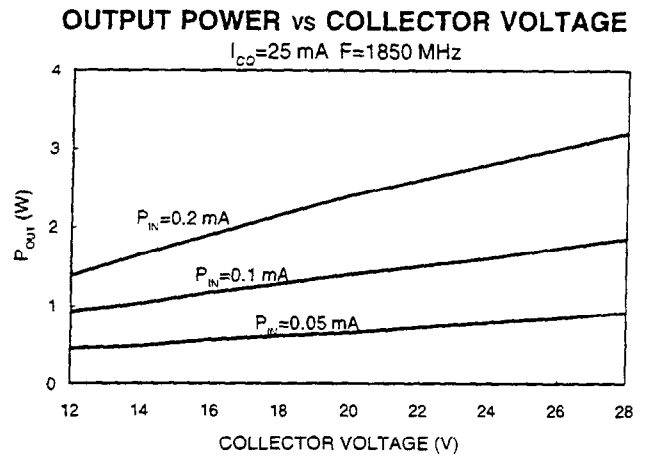
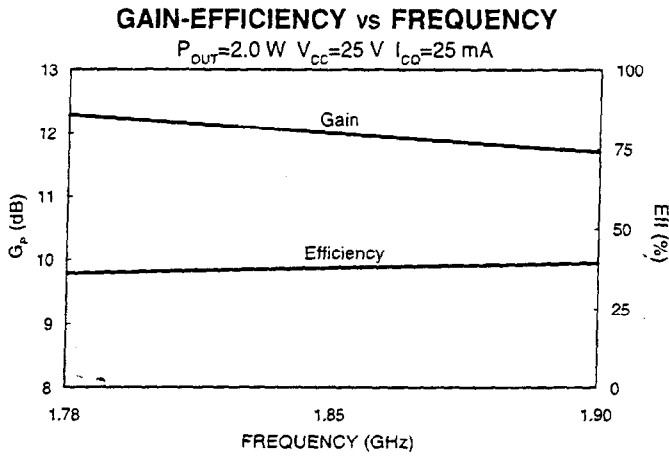
M/A-COM, Inc.

North America: Tel. (800) 366-2266
Fax (800) 618-8883

Asia/Pacific: Tel. +81 (03) 3226-1671
Fax +81 (03) 3226-1451

Europe: Tel. +44 (1344) 869 595
Fax +44 (1344) 300 020

Typical Performance Curves



Typical S-Parameters

 $V_{CC}=25\text{ V}$, $I_{CO}=200\text{ mA}$

| f(MHz) | S11 | | S21 | | S12 | | S22 | |
|--------|------|--------|-------|-------|-------|--------|------|--------|
| | Mag | Phase | Mag | Phase | Mag | Phase | Mag | Phase |
| 100 | 1.10 | 171.5 | 23.80 | 120.3 | 0.012 | -7.4 | 0.32 | -74.5 |
| 200 | 0.75 | 175.1 | 12.15 | 92.1 | 0.014 | -4.7 | 0.22 | -89.6 |
| 300 | 0.79 | -177.9 | 7.79 | 81.2 | 0.016 | -4.5 | 0.20 | -95.7 |
| 400 | 0.84 | -177.4 | 5.77 | 74.4 | 0.016 | -9.8 | 0.23 | -98.7 |
| 500 | 0.87 | -178.5 | 4.65 | 68.4 | 0.017 | -3.7 | 0.26 | -100.5 |
| 600 | 0.89 | 179.8 | 3.96 | 62.6 | 0.018 | -5.9 | 0.27 | -101.4 |
| 700 | 0.89 | 178.3 | 3.49 | 56.7 | 0.018 | -0.7 | 0.29 | -104.4 |
| 800 | 0.91 | 177.4 | 3.08 | 51.1 | 0.019 | -2.7 | 0.33 | -103.3 |
| 900 | 0.91 | 175.4 | 2.89 | 45.4 | 0.017 | -3.4 | 0.36 | -111.0 |
| 1000 | 0.91 | 174.1 | 2.74 | 38.9 | 0.019 | -0.9 | 0.40 | -114.6 |
| 1100 | 0.89 | 171.5 | 2.64 | 28.9 | 0.024 | -6.1 | 0.46 | -117.3 |
| 1200 | 0.87 | 171.7 | 2.45 | 22.8 | 0.024 | -13.6 | 0.53 | -120.8 |
| 1300 | 0.86 | 170.8 | 2.35 | 15.7 | 0.023 | -18.3 | 0.57 | -122.3 |
| 1400 | 0.86 | 170.3 | 2.32 | 7.6 | 0.026 | -21.1 | 0.63 | -145.5 |
| 1450 | 0.85 | 170.1 | 2.30 | 3.4 | 0.026 | -22.9 | 0.65 | -126.2 |
| 1500 | 0.84 | 169.9 | 2.27 | -1.2 | 0.025 | -22.3 | 0.66 | -127.6 |
| 1550 | 0.83 | 169.7 | 2.26 | -6.4 | 0.026 | -31.0 | 0.68 | -129.1 |
| 1600 | 0.82 | 169.7 | 2.24 | -11.5 | 0.030 | -37.3 | 0.71 | -131.9 |
| 1650 | 0.82 | 170.0 | 2.22 | -16.6 | 0.029 | -43.2 | 0.72 | -133.6 |
| 1700 | 0.81 | 170.5 | 2.19 | -22.4 | 0.027 | -48.5 | 0.73 | -137.6 |
| 1750 | 0.80 | 171.1 | 2.14 | -28.4 | 0.025 | -52.2 | 0.76 | -140.1 |
| 1800 | 0.80 | 171.5 | 2.11 | -35.5 | 0.026 | -60.2 | 0.76 | -143.9 |
| 1850 | 0.80 | 171.9 | 2.05 | -40.7 | 0.027 | -60.1 | 0.81 | -147.5 |
| 1900 | 0.81 | 172.6 | 1.99 | -47.4 | 0.024 | -67.1 | 0.81 | -150.1 |
| 2000 | 0.82 | 173.6 | 1.83 | -60.7 | 0.024 | -80.8 | 0.86 | -155.5 |
| 2100 | 0.84 | 174.5 | 1.61 | -74.0 | 0.020 | -94.0 | 0.88 | -160.0 |
| 2200 | 0.88 | 174.2 | 1.40 | -84.6 | 0.019 | -104.7 | 0.87 | -164.5 |
| 2300 | 0.90 | 173.6 | 1.21 | -94.7 | 0.016 | -128.7 | 0.86 | -168.1 |