MACOM
an AMP company

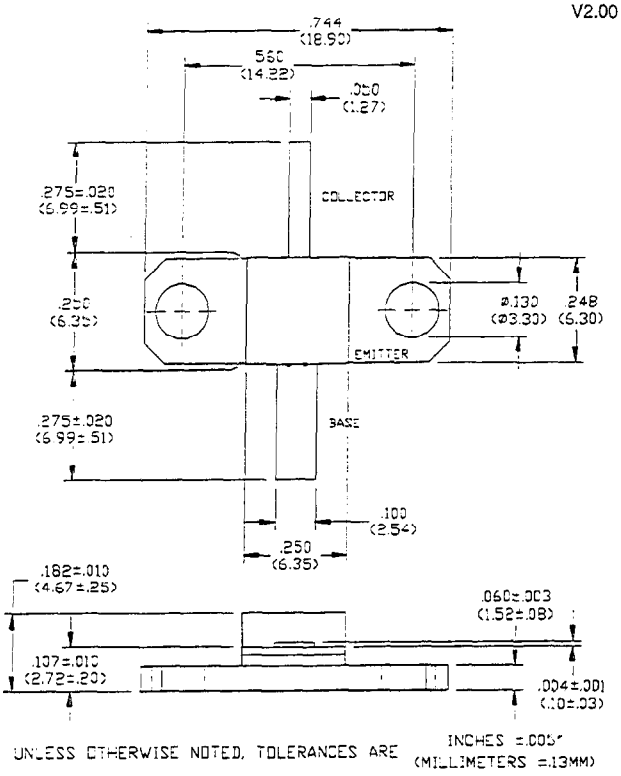
# Wireless Bipolar Power Transistor, 10W
# 1.78 - 1.90 GHz

# PH1819-10

V2.00

## Features

- Designed for Cellular Base Station Applications
- -30 dBc Typ 3rd IMD at 10 Watts PEP
- Common Emitter Configuration
- Internal Input Impedance Matching
- Diffused Emitter Ballasting




## Absolute Maximum Ratings at 25°C

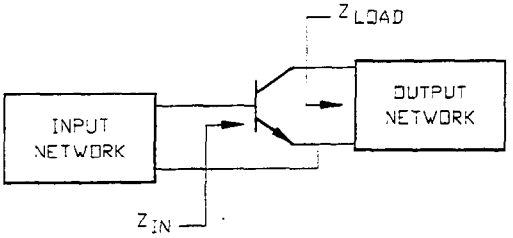
| Parameter | Symbol | Rating | Units |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 65 | V |
| Collector-Emitter Voltage | $V_{CES}$ | 65 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 3.0 | V |
| Collector Current | $I_C$ | 3.0 | A |
| Power Dissipation | $P_D$ | 44 | W |
| Junction Temperature | $T_J$ | 200 | °C |
| Storage Temperature | $T_{STG}$ | -55 to +150 | °C |
| Thermal Resistance | $\theta_{JC}$ | 4.0 | °C/W |

## Electrical Characteristics at 25°C

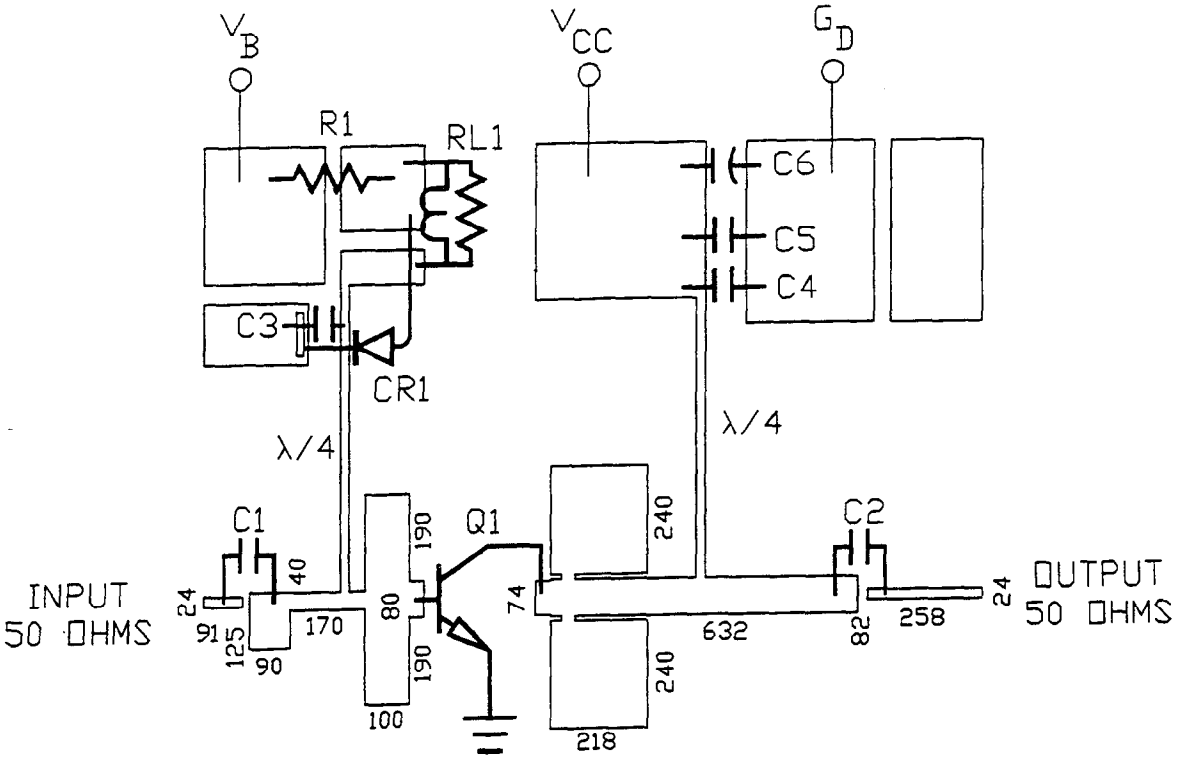
| Parameter | Symbol | Min | Max | Units | Test Conditions |
|---|---|---|---|---|---|
| Collector-Emitter Breakdown Voltage | $BV_{CES}$ | 65 | - | V | $I_C$=10 mA |
| Collector-Emitter Leakage Current | $I_{CES}$ | - | 2.0 | mA | $V_{CE}$=25 V |
| Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | 20 | - | V | $I_C$=10 mA |
| Collector-Emitter Breakdown Voltage | $BV_{CER}$ | 30 | - | V | $I_C$=10 mA, $R_{BE}$=220Ω |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | 3.0 | - | V | $I_B$=10 mA |
| DC Forward Current Gain | $h_{FE}$ | 15 | 120 | - | $V_{CE}$=5 V, $I_C$=250 mA |
| Power Gain | $G_P$ | 9.0 | - | dB | $V_{CC}$=25 V, $I_{CQ}$=100 mA, $P_{OUT}$=10 W, F=1.78 - 1.90 GHz |
| Collector Efficiency | $\eta_C$ | 40 | - | % | $V_{CC}$=25 V, $I_{CQ}$=100 mA, $P_{OUT}$=10 W, F=1.78 - 1.90 GHz |
| Input Return Loss | RL | 10 | - | dB | $V_{CC}$=25 V, $I_{CQ}$=100 mA, $P_{OUT}$=10 W, F=1.78 - 1.90 GHz |
| Load Mismatch Tolerance | VSWR | - | 3.0:1 | - | $V_{CC}$=25 V, $I_{CQ}$=100 mA, $P_{OUT}$=10 W, F=1.78 - 1.90 GHz |
| 3rd Order IMD | $IMD_3$ | - | -28 | dBc | $V_{CC}$=25 V, $I_{CQ}$=100 mA, $P_{OUT}$=10 W PEP, F=1850 MHz, ΔF=100 kHz |

## Typical Optimum Device Impedances

| F(GHz) | $Z_{IN}(\Omega)$ | $Z_{LOAD}(\Omega)$ |
|---|---|---|
| 1.78 | 4.5 + j7.0 | 2.5 + j0.2 |
| 1.85 | 5.0 + j7.3 | 2.5 + j0 |
| 1.90 | 6.0 + j6.1 | 2.6 + 0.2 |



## RF Test Fixture




ARTWORK DIMENSIONS IN MILS

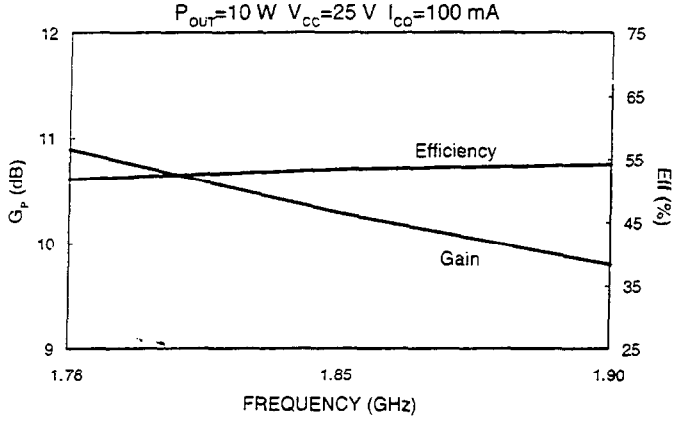
## PARTS LIST

| | |
|---|---|
| C1 C2 C3 C4 | 33 pF ATC SIZE A |
| C5 | 5000 pF |
| C6 | 50 uF 50 VOLTS |
| CR1 | 1N4245 DIODE |
| Q1 | PH1819-10 |
| R1 | 5.1 OHMS 1/4 WATT |
| RL1 | 6T/NO. 24 AWG ON 3 OHM 1/4 WATT |
| BOARD TYPE: | ROGERS 6010.5 .025" THICK, $E_R$ = 10.5 |

## Typical Broadband Performance Curves

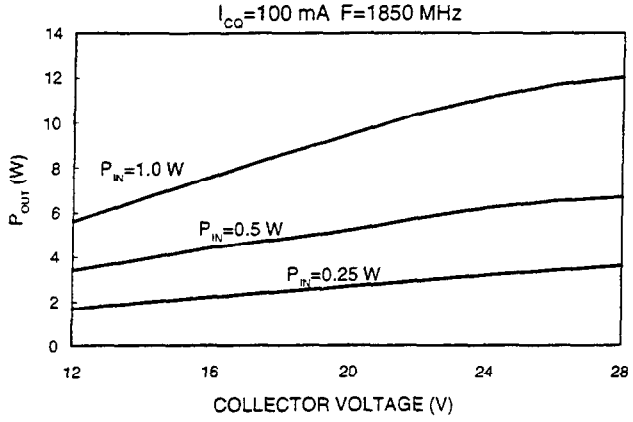
### GAIN-EFFICIENCY vs FREQUENCY

$P_{OUT}$=10 W $V_{CC}$=25 V $I_{CQ}$=100 mA



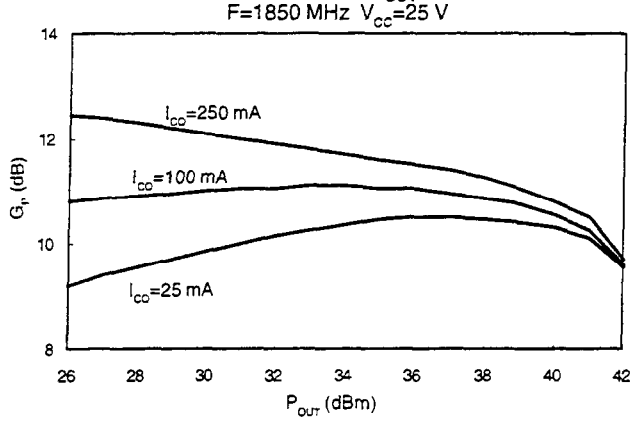

### OUTPUT POWER vs COLLECTOR VOLTAGE

$I_{CQ}$=100 mA F=1850 MHz



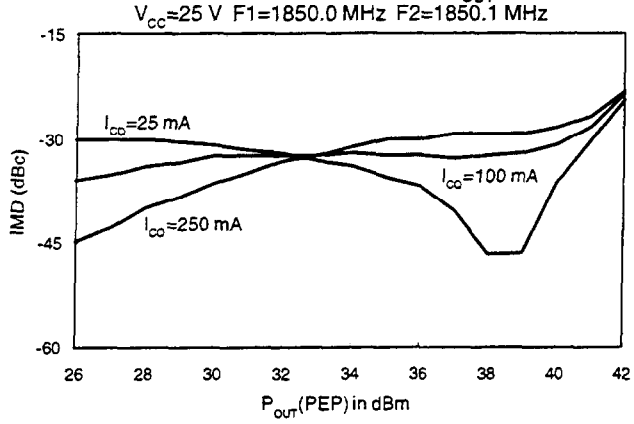

### GAIN vs $P_{OUT}$

F=1850 MHz $V_{CC}$=25 V



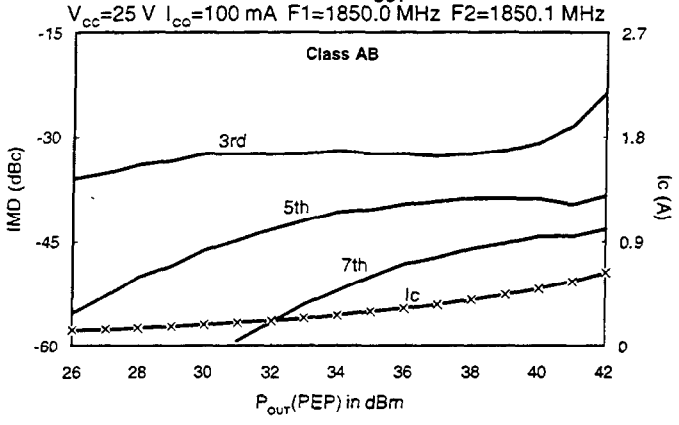

### 3RD ORDER IMD vs $P_{OUT}$

$V_{CC}$=25 V F1=1850.0 MHz F2=1850.1 MHz




### IMD vs $P_{OUT}$

$V_{CC}$=25 V $I_{CQ}$=100 mA F1=1850.0 MHz F2=1850.1 MHz




### IMD vs $P_{OUT}$

$V_{CC}$=25 V $I_{CQ}$=25 mA F1=1850.0 MHz F2=1850.1 MHz