# 2N6080

## The RF Line

4.0 W – 175 MHz

RF POWER TRANSISTOR

NPN SILICON

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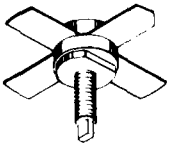
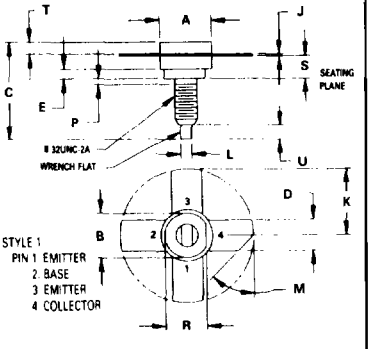
### NPN SILICON RF POWER TRANSISTOR

. . . designed for 12.5 Volt VHF large-signal power amplifier applications required in military and industrial equipment operating to 300 MHz.

- Specified 12.5 Volt, 175 MHz Characteristics –
  Output Power = 4.0 W
  Minimum Gain = 12 dB
  Efficiency = 50%
- Characterized with Series Equivalent Large-Signal Impedance Parameters






NOTES
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

| DIM | MILLIMETERS MIN | MAX | INCHES MIN | MAX |
|---|---|---|---|---|
| A | 9.40 | 9.78 | 0.370 | 0.385 |
| B | 8.13 | 8.38 | 0.320 | 0.330 |
| C | 17.02 | 20.07 | 0.670 | 0.790 |
| D | 5.46 | 5.97 | 0.215 | 0.235 |
| E | 1.78 | — | 0.070 | — |
| J | 0.08 | 0.18 | 0.003 | 0.007 |
| K | 12.45 | — | 0.490 | — |
| L | 1.40 | 1.78 | 0.055 | 0.070 |
| M | 45° NOM | | 45° NOM | |
| P | — | 1.27 | — | 0.050 |
| R | 7.59 | 7.80 | 0.299 | 0.307 |
| S | 4.01 | 4.52 | 0.158 | 0.178 |
| T | 2.11 | 2.54 | 0.083 | 0.100 |
| U | 2.49 | 3.35 | 0.098 | 0.132 |

**CASE 145A-09**

***MAXIMUM RATINGS**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Emitter Voltage | $V_{CEO}$ | 18 | Vdc |
| Collector-Base Voltage | $V_{CBO}$ | 36 | Vdc |
| Emitter-Base Voltage | $V_{EBO}$ | 4.0 | Vdc |
| Collector Current – Continuous | $I_C$ | 1.0 | Adc |
| Total Device Dissipation @ $T_C$ = 25°C (2)<br>Derate above 25°C | $P_D$ | 12<br>68.5 | Watts<br>mW/°C |
| Storage Temperature Range | $T_{stg}$ | -65 to +200 | °C |
| Stud Torque (1) | – | 6.5 | in. lb. |

*Indicates JEDEC Registered Data.
(1) For repeated assembly use 5 in lb.
(2) These devices are designed for RF operation. The total device dissipation rating applies only when the devices are operated as RF amplifiers.

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***ELECTRICAL CHARACTERISTICS** ($T_C$ = 25°C unless otherwise noted.)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| Collector-Emitter Breakdown Voltage ($I_C$ = 10 mAdc, $I_B$ = 0) | $V_{(BR)CEO}$ | 18 | – | – | Vdc |
| Collector-Emitter Breakdown Voltage ($I_C$ = 5.0 mAdc, $V_{BE}$ = 0) | $V_{(BR)CES}$ | 36 | – | – | Vdc |
| Emitter-Base Breakdown Voltage ($I_E$ = 1.0 mAdc, $I_C$ = 0) | $V_{(BR)EBO}$ | 4.0 | – | – | Vdc |
| Collector Cutoff Current ($V_{CE}$ = 15 Vdc, $V_{BE}$ = 0, $T_C$ = +55°C) | $I_{CES}$ | – | – | 5.0 | mAdc |
| Collector Cutoff Current ($V_{CB}$ = 15 Vdc, $I_E$ = 0) | $I_{CBO}$ | – | – | 0.25 | mAdc |
| **ON CHARACTERISTICS** | | | | | |
| DC Current Gain ($I_C$ = 0.25 Adc, $V_{CE}$ = 5.0 Vdc) | $h_{FE}$ | 5.0 | – | – | – |
| **DYNAMIC CHARACTERISTICS** | | | | | |
| Output Capacitance ($V_{CB}$ = 15 Vdc, $I_E$ = 0, f = 0.1 MHz) | $C_{ob}$ | – | 15 | 20 | pF |
| **FUNCTIONAL TEST** | | | | | |
| Common-Emitter Amplifier Power Gain ($P_{out}$ = 4.0 W, $V_{CC}$ = 12.5 Vdc, f = 175 MHz) | $G_{PE}$ | 12 | – | – | dB |
| Collector Efficiency ($P_{out}$ = 4.0 W, $V_{CC}$ = 12.5 Vdc, f = 175 MHz) | $\eta$ | 50 | – | – | % |

*Indicates JEDEC Registered Data.

**FIGURE 1 – 175 MHz TEST CIRCUIT**

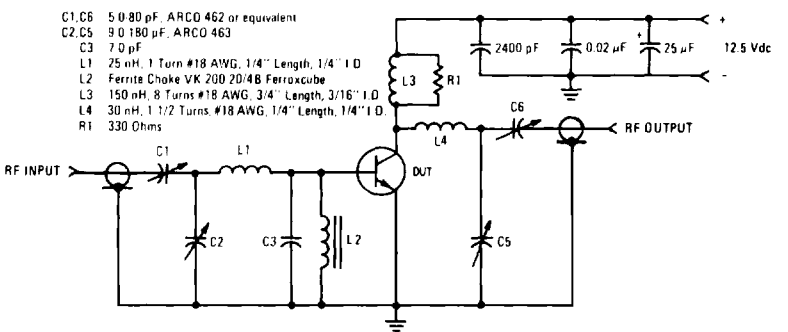


FIGURE 2 – OUTPUT POWER versus INPUT POWER

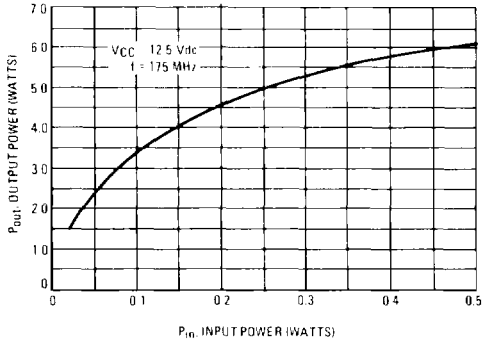



FIGURE 3 – OUTPUT POWER versus FREQUENCY

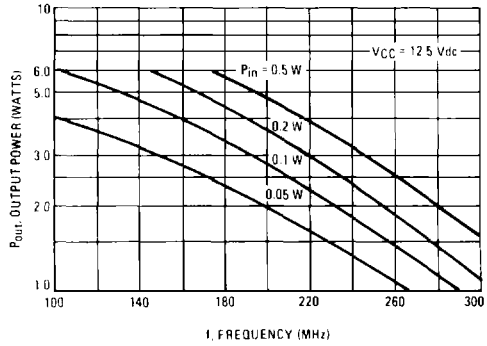



FIGURE 4 – OUTPUT POWER versus SUPPLY VOLTAGE

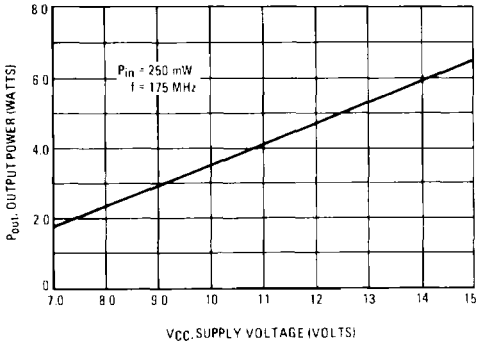
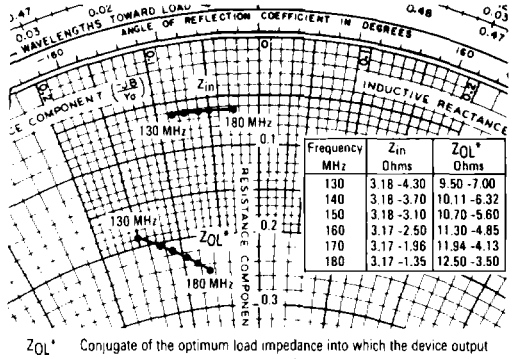



FIGURE 5 – SERIES EQUIVALENT IMPEDANCE




| Frequency MHz | $Z_{in}$ Ohms | $Z_{OL}^*$ Ohms |
|---|---|---|
| 130 | 3.18 -4.30 | 9.50 -7.00 |
| 140 | 3.18 -3.70 | 10.11 -6.32 |
| 150 | 3.18 -3.10 | 10.70 -5.60 |
| 160 | 3.17 -2.50 | 11.30 -4.85 |
| 170 | 3.17 -1.96 | 11.94 -4.13 |
| 180 | 3.17 -1.35 | 12.50 -3.50 |

$Z_{OL}^*$ Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and frequency.