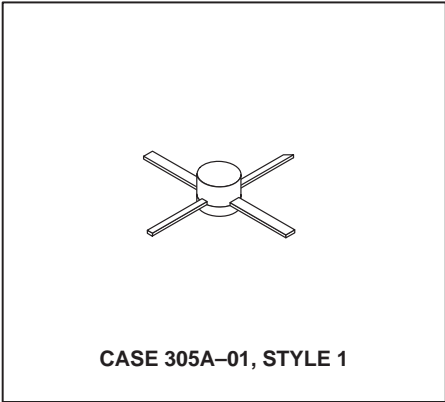


The RF Line NPN Silicon High-Frequency Transistor

... designed for wideband amplifier, driver or oscillator applications in military, mobile, and aircraft radio.

- Specified 28 Volt, 400 MHz Characteristics —
 - Output Power = 1.0 Watt
 - Power Gain = 15 dB Min
 - Efficiency = 45% Typ
- Emitter Ballast and Low Current Density for Improved MTBF
- Common Emitter for Improved Stability



MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--|-----------|-------------|-------------------------------|
| Collector–Emitter Voltage | V_{CEO} | 30 | Vdc |
| Collector–Base Voltage | V_{CBO} | 40 | Vdc |
| Emitter–Base Voltage | V_{EBO} | 3.0 | Vdc |
| Collector Current — Continuous | I_C | 150 | mAdc |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 6.1 35 | Watts mW/ $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | -65 to +150 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|--------------------------------------|-----------------|------|---------------------------|
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 28.5 | $^\circ\text{C}/\text{W}$ |

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted.)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | |
|---|---------------|-----|---|-----|------|
| Collector–Emitter Breakdown Voltage ($I_C = 10 \text{ mAdc}$, $I_B = 0$) | $V_{(BR)CEO}$ | 30 | — | — | Vdc |
| Collector–Emitter Breakdown Voltage ($I_C = 5.0 \text{ mAdc}$, $V_{BE} = 0$) | $V_{(BR)CES}$ | 35 | — | — | Vdc |
| Collector–Base Breakdown Voltage ($I_C = 0.1 \text{ mAdc}$, $I_E = 0$) | $V_{(BR)CBO}$ | 35 | — | — | Vdc |
| Emitter–Base Breakdown Voltage ($I_E = 1.0 \text{ mAdc}$, $I_C = 0$) | $V_{(BR)EBO}$ | 3.0 | — | — | Vdc |
| Collector Cutoff Current ($V_{CE} = 20 \text{ Vdc}$, $I_B = 0$) | I_{CEO} | — | — | 1.0 | mAdc |

(continued)

ELECTRICAL CHARACTERISTICS — continued ($T_C = 25^\circ\text{C}$ unless otherwise noted.)

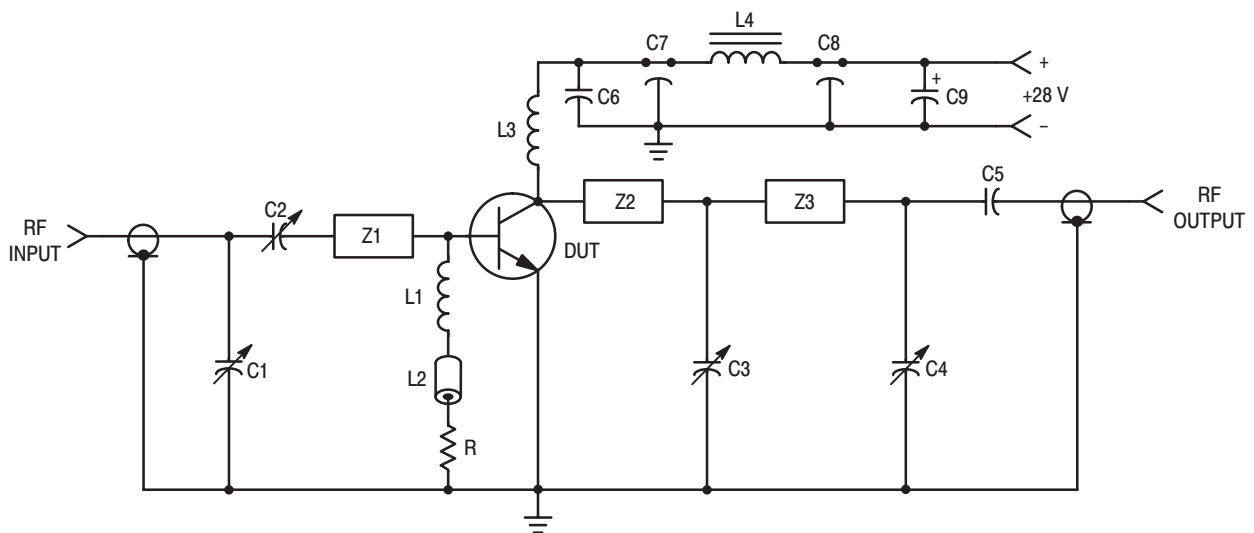
| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|----------|-----|-----|-----|------|
| ON CHARACTERISTICS | | | | | |
| DC Current Gain ($I_C = 100\text{ mA}$, $V_{CE} = 10\text{ Vdc}$) | h_{FE} | 20 | 60 | 150 | — |
| DYNAMIC CHARACTERISTICS | | | | | |
| Current–Gain — Bandwidth Product ($I_C = 100\text{ mA}$, $V_{CE} = 20\text{ Vdc}$, $f = 200\text{ MHz}$) | f_T | — | 2.5 | — | GHz |
| Output Capacitance ($V_{CB} = 28\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$) | C_{ob} | — | 3.5 | 5.0 | pF |

FUNCTIONAL TESTS

| | | | | | |
|---|-----------|----|--------------|---|------|
| Common–Emitter Amplifier Power Gain (1) ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 1.0\text{ W}$, $f = 400\text{ MHz}$) | G_{pe} | 15 | 16 | — | dB |
| Collector Efficiency ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 1.0\text{ W}$, $f = 400\text{ MHz}$) | η | — | 45 | — | % |
| Series Equivalent Input Impedance ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 1.0\text{ W}$, $f = 400\text{ MHz}$) | Z_{in} | — | $6.4 - j4.8$ | — | Ohms |
| Series Equivalent Output Impedance ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 1.0\text{ W}$, $f = 400\text{ MHz}$) | Z_{out} | — | $75 - j45$ | — | Ohms |

NOTE:

- Class C



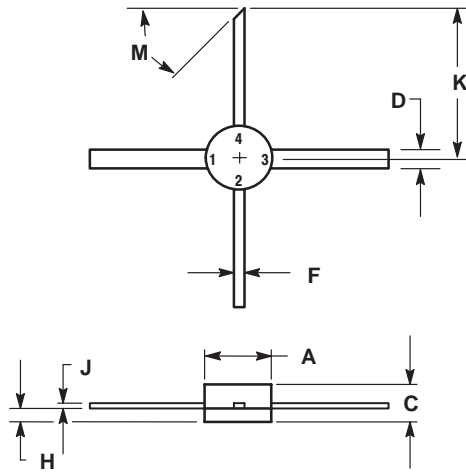
C1, C2, C4 — 1.0–20 pF JOHANSON 9063
 C3 — 1.0–10 pF JOHANSON
 C5 — 150 pF Chip
 C6 — 0.1 μF
 C7, C8 — 680 pF Feedthru
 C9 — 1.0 μF TANTALUM

L1, L3 — 5 Turns, AWG #20, 1/4" I.D.
 L2 — Ferrite Bead, FERROXCUBE
 No. 56–590–65/4B
 L4 — FERROXCUBE VK200–20/4B
 Input/Output Connectors — Type N
 Board — Glass Teflon, $\epsilon = 2.56$, $t = 0.062$ "

R — 4.7 Ohms, 1/4 W
 Z1 — 2.0" x 0.1" MICROSTRIP LINE
 Z2, Z3 — 2.6" x 0.1" MICROSTRIP LINE

Figure 1. 400 MHz Power Gain Test Circuit

PACKAGE DIMENSIONS



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

| DIM | INCHES | | MILLIMETERS | |
|-----|---------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.200 | 0.220 | 5.08 | 5.59 |
| C | 0.095 | 0.130 | 2.41 | 3.30 |
| D | 0.055 | 0.065 | 1.40 | 1.65 |
| F | 0.025 | 0.035 | 0.64 | 0.89 |
| H | 0.040 | 0.050 | 1.02 | 1.27 |
| J | 0.003 | 0.007 | 0.08 | 0.18 |
| K | 0.435 | --- | 11.05 | --- |
| M | 45 °REF | | 45 °REF | |

- STYLE 1:
 PIN 1. EMITTER
 2. BASE
 3. EMITTER
 4. COLLECTOR

**CASE 305A-01
 ISSUE A**

Specifications subject to change without notice.

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