

M/A-COM Products

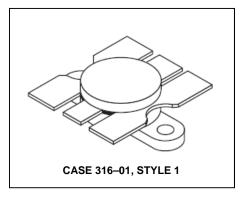
Released - Rev. 07.07

# The RF Line NPN Silicon Power Transistor 100W, 30-200MHz, 28V

Designed primarily for wideband large–signal output amplifier stages in 30–200 MHz frequency range.

- Guaranteed performance at 150 MHz, 28 Vdc Output power = 100 W Minimum gain = 9.0 dB
- Built-in matching network for broadband operation
- 100% tested for load mismatch at all phase angles with 30:1 VSWR
- Gold metallization system for high reliability
- High output saturation power ideally suited for 30 W carrier/120 W
- Peak AM amplifier service
- Guaranteed performance in broadband test fixture

### Product Image



#### MAXIMUM RATINGS

| Rating  | Symbol           | Value       | Unit          |
|---|------------------|-------------|---------------|
| Collector–Emitter Voltage   | V <sub>CEO</sub> | 35          | Vdc           |
| Collector–Base Voltage  | V <sub>CBO</sub> | 65          | Vdc           |
| Emitter–Base Voltage  | V <sub>EBO</sub> | 4.0         | Vdc           |
| Collector Current — Continuous<br>— Peak (10 seconds)                     | Ι <sub>C</sub>   | 12<br>18    | Adc           |
| Total Device Dissipation @ T <sub>C</sub> = 25°C (1)<br>Derate above 25°C | PD               | 270<br>1.54 | Watts<br>W/°C |
| Storage Temperature Range   | T <sub>stg</sub> | -65 to +150 | °C            |

#### THERMAL CHARACTERISTICS

| Characteristic   |  | Symbol           | Max  |     | Unit |
|--|--|------------------|------|-----|------|
| Thermal Resistance, Junction to Case                                       |  | R <sub>θJC</sub> | 0.65 |     | °C/W |
| ELECTRICAL CHARACTERISTICS (T <sub>C</sub> = 25°C unless otherwise noted.) |  |                  |      |     |      |
| Characteristic Symbol  |  | Min              | Тур  | Max | Unit |

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<sup>1</sup> 



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| OFF CHARACTERISTICS  |  |
|--|--|
| Collector–Emitter Breakdown Voltage<br>(I <sub>C</sub> = 100 mAdc, I <sub>B</sub> = 0) |  |
| Collector–Emitter Breakdown Voltage  |  |

| Collector–Emitter Breakdown Voltage<br>(I <sub>C</sub> = 100 mAdc, V <sub>BE</sub> = 0) | V <sub>(BR)CES</sub> | 65  | _ | _   | Vdc  |
|---|----------------------|-----|---|-----|------|
| Collector–Base Breakdown Voltage<br>(I <sub>C</sub> = 100 mAdc, I <sub>E</sub> = 0)     | V <sub>(BR)CBO</sub> | 65  | — | —   | Vdc  |
| Emitter–Base Breakdown Voltage<br>(I <sub>E</sub> = 10 mAdc, I <sub>C</sub> = 0)        | V <sub>(BR)EBO</sub> | 4.0 | _ | —   | Vdc  |
| Collector Cutoff Current<br>(V <sub>CB</sub> = 30 Vdc, I <sub>E</sub> = 0)              | I <sub>CBO</sub>     | —   | _ | 5.0 | mAdc |
| ON CHARACTERISTICS  |                      |     |   |     |      |

V<sub>(BR)CEO</sub>

35

| DC Current Gain                                       | h <sub>FE</sub> | 10 | 25 | 80 | _ |
|---|-----------------|----|----|----|---|
| (I <sub>C</sub> = 5.0 Adc, V <sub>CE</sub> = 5.0 Vdc) |                 |    |    |    |   |

#### NOTE:

(continued)

Vdc

1. This device is designed for RF operation. The total device dissipation rating applies only when the device is operated as an RF amplifier.

#### ELECTRICAL CHARACTERISTICS - continued (T<sub>C</sub> = 25°C unless otherwise noted.)

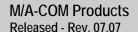
| Characteristic   | Symbol          | Min                            | Тур | Max | Unit |
|--|-----------------|--------------------------------|-----|-----|------|
| DYNAMIC CHARACTERISTICS  |                 |                                |     |     |      |
| Output Capacitance<br>(V <sub>CB</sub> = 28 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)  | C <sub>ob</sub> | _                              | 150 | 175 | pF   |
| FUNCTIONAL TESTS (Figure 2)  |                 |                                |     |     |      |
| Common–Emitter Amplifier Power Gain<br>(V <sub>CC</sub> = 28 Vdc, P <sub>out</sub> = 100 W, f = 150 MHz, I <sub>C</sub> (Max) = 6.5 Adc) | G <sub>PE</sub> | 9.0                            | 10  | _   | dB   |
| Collector Efficiency<br>(V <sub>CC</sub> = 28 Vdc, P <sub>out</sub> = 100 W, f = 150 MHz, I <sub>C</sub> (Max) = 6.5 Adc)                | η               | 55                             | 60  | _   | %    |
| Load Mismatch<br>(V <sub>CC</sub> = 28 Vdc, P <sub>out</sub> = 100 W CW, f = 150 MHz,<br>VSWR = 30:1 all phase angles)                   | Ψ               | No Degradation in Output Power |     |     |      |

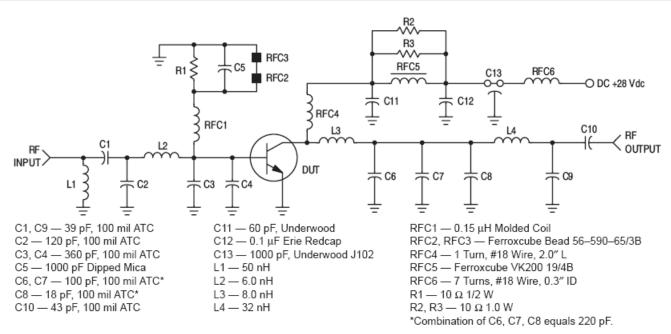
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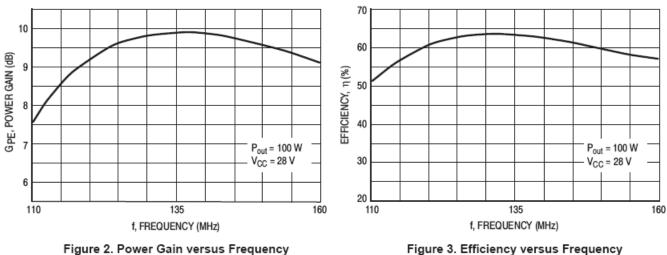


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2. Power Gain versus Freque Broadband Test Fixture

igure 3. Efficiency versus Frequency Broadband Test Fixture

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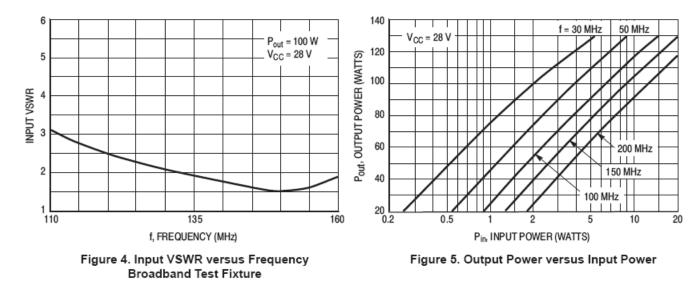
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### TYPICAL PERFORMANCE CURVES

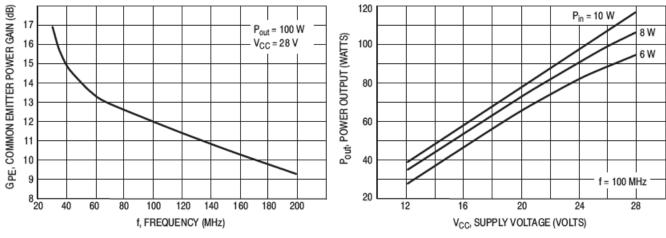


Figure 6. Power Gain versus Frequency

Figure 7. Power Output versus Supply Voltage

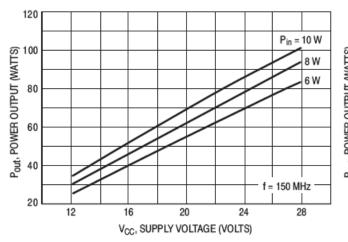
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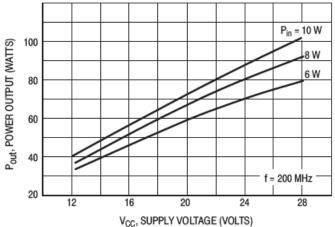
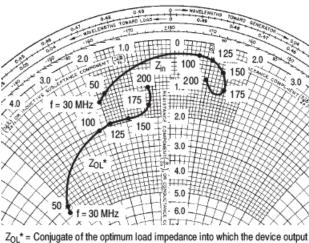


Figure 8. Power Output versus Supply Voltage





| V <sub>CC</sub> = 28 V, P <sub>out</sub> = 100 W |                         |                           |  |  |
|--|-------------------------|---------------------------|--|--|
| f<br>MHz   | Z <sub>in</sub><br>OHMS | Z <sub>OL</sub> *<br>OHMS |  |  |
| 30   | 1.2 – j2.0              | 4.3 – j5.0                |  |  |
| 50   | 1.0 – j1.8              | 4.0 – j4.9                |  |  |
| 100  | 0.3 + j0.7              | 2.0 - j2.3                |  |  |
| 125  | 0.3 + j1.0              | 1.9 - j1.9                |  |  |
| 150  | 0.6 + j1.3              | 1.9 - j1.3                |  |  |
| 175  | 1.0 + j1.5              | 1.6 - j0.6                |  |  |
| 200  | 0.9 + j1.0              | 1.1 – j0.6                |  |  |

Z<sub>OL</sub>\* = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and frequency.



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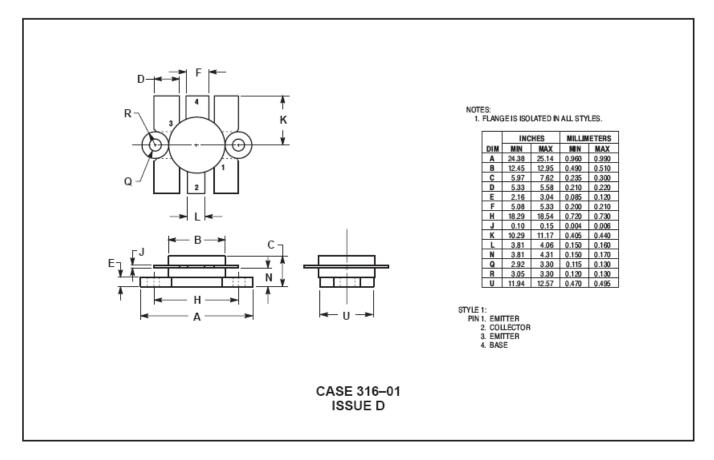
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PACKAGE DIMENSIONS



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