The RF Line NPN Silicon Power Transistor
25W(PEP), 30MHz, 28V

Designed for high gain driver and output linear amplifier stages in 1.5 to 30 MHz HF/SSB equipment.

- Specified 28 V, 30 MHz characteristics —
  - Output power = 25 W (PEP)
  - Minimum gain = 22 dB
  - Efficiency = 35%
- Intermodulation distortion @ 25 W (PEP) —IMD = –30 dB (max)
- 100% tested for load mismatch at all phase angles with 30:1 VSWR
- Class A and AB characterization
- BLX 13 equivalent

MAXIMUM RATINGS

<table>
<thead>
<tr>
<th>Rating</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector–Emitter Voltage</td>
<td>$V_{CEO}$</td>
<td>35</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector–Base Voltage</td>
<td>$V_{CEO}$</td>
<td>65</td>
<td>Vdc</td>
</tr>
<tr>
<td>Emitter–Base Voltage</td>
<td>$V_{EBO}$</td>
<td>4.0</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector Current — Continuous</td>
<td>$I_C$</td>
<td>3.0</td>
<td>Adc</td>
</tr>
<tr>
<td>Withstand Current — 5 s</td>
<td>—</td>
<td>6.0</td>
<td>Adc</td>
</tr>
<tr>
<td>Total Device Dissipation @ $T_C = 25^\circ C (1)$</td>
<td>$P_D$</td>
<td>70</td>
<td>Watts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.4</td>
<td>W/C</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>$T_{stg}$</td>
<td>–65 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

THERMAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Resistance, Junction to Case</td>
<td>$R_{JJC}$</td>
<td>2.5</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

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

OFF CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector–Emitter Breakdown Voltage ($I_C = 50 \text{ mAdc}, I_E = 0$)</td>
<td>$V_{BRE/CEO}$</td>
<td>35</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector–Base Breakdown Voltage ($I_C = 50 \text{ mAdc}, I_E = 0$)</td>
<td>$V_{BRE/CBO}$</td>
<td>65</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Emitter–Base Breakdown Voltage ($I_E = 10 \text{ mAdc}, I_C = 0$)</td>
<td>$V_{BRE/EBO}$</td>
<td>4.0</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector Cutoff Current ($V_{CE} = 26 \text{ Vdc}, V_{BE} = 0$)</td>
<td>$I_{CES}$</td>
<td>—</td>
<td>10</td>
<td>mAdc</td>
<td></td>
</tr>
</tbody>
</table>

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

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## 25W(PEP), 30MHz, 28V

**Rev. V1**

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

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
</table>

#### ON CHARACTERISTICS

| DC Current Gain (I<sub>C</sub> = 1.0 A dc, V<sub>CBE</sub> = 5.0 V dc) | h<sub>FE</sub> | 10 | 35 | — | — |

#### DYNAMIC CHARACTERISTICS

| Output Capacitance (V<sub>CBE</sub> = 30 V dc, I<sub>E</sub> = 0, f = 1.0 MHz) | C<sub>dc</sub> | — | 60 | 80 | pF |

#### FUNCTIONAL TESTS (SSB)

| Common–Emitter Amplifier Gain (V<sub>CC</sub> = 28 V dc, P<sub>out</sub> = 25 W (PEP), f<sub>1</sub> = 30 MHz, f<sub>2</sub> = 30.001 MHz, I<sub>CO</sub> = 25 mA) | G<sub>FE</sub> | 22 | 25 | — | dB |

| Collector Efficiency (V<sub>CC</sub> = 28 V dc, P<sub>out</sub> = 25 W (PEP), f<sub>1</sub> = 30 MHz, f<sub>2</sub> = 30.001 MHz, I<sub>CO</sub> = 25 mA) | η | 35 | — | — | % |

| Intermodulation Distortion (2) (V<sub>CC</sub> = 28 V dc, P<sub>out</sub> = 25 W (PEP), f<sub>1</sub> = 30 MHz, f<sub>2</sub> = 30.001 MHz, I<sub>CO</sub> = 25 mA) | IMD<sub>(2)</sub> | — | −35 | −30 | dB |

| Load Mismatch (V<sub>CC</sub> = 28 V dc, P<sub>out</sub> = 25 W (PEP), f<sub>1</sub> = 30 MHz, f<sub>2</sub> = 30.001 MHz, I<sub>CO</sub> = 25 mA, VSWR 3.1 at All Phase Angles) | ψ | No Degradation in Output Power |

#### CLASS A PERFORMANCE

| Intermodulation Distortion (2) and Power Gain (V<sub>CC</sub> = 28 V dc, P<sub>out</sub> = 8.0 W (PEP), f<sub>1</sub> = 30 MHz, f<sub>2</sub> = 30.001 MHz, I<sub>CO</sub> = 2.2 A dc) | G<sub>FE</sub> | — | 23.5 | — | dB |

| IMD<sub>(2)</sub> | — | −40 | — |

| IMD<sub>(2S)</sub> | — | −55 | — |

### NOTE:

2. To Mil–Std–1311 Version A, Test Method 2204B, Two Tone, Reference each Tone.
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C1, C2 — ARCO 469, 190–790 pF
C3, C4 — ARCO 464, 25–280 pF
C5 — 120 pF Dipped Mica
C6, C7 — 100 μF, 15 Vdc
C8 — 680 pF F.T. Allen Bradley
C9 — 1.0 μF 35 V Tantalum
CR1 — 1N4997

L1 — 3 Tums #16 0.25" ID
L2 — 6 Tums #16 0.5" ID
L3 — 7 Tums #20 0.38" ID
L4 — 10 μH Molded Choke Delevan
RFC1 — Ferroxcube VK200/20-4B
RFC2 — 3-Ferroxcube 566306S-3B
RF — Input/Output Connectors UG53 A/jx
R1 — 10 Ω 1/2 Watt 10%

Adjust Bias (Base) for IcQ = 20 mA with No RF Applied

Figure 1. 30 MHz Linear Test Circuit
The RF Line NPN Silicon Power Transistor
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Figure 2. Output Power versus Input Power

Figure 3. Output Power versus Supply Voltage

Figure 4. Power Gain versus Frequency

Figure 5. Intermodulation Distortion versus Output Power
MRF426

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Figure 6. DC Safe Operating Area

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Figure 7. Output Capacitance versus Frequency

Figure 8. Output Resistance versus Frequency

Figure 9. Series Equivalent Input Impedance
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