



Spectrum Devices Corporation

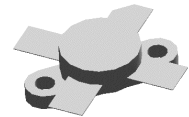
Semiconductor Engineering and Manufacturing

RF & MICROWAVE TRANSISTORS HF SSB APPLICATIONS

HF12-100

FEATURES:

- 30 MHz
- 12.5 Volts
- IMD -30 dB
- Common Emitter
- Gold Metallization
- P_{out} = 100W PEP Min. with 11 dB Gain
- **Improved Collector-Base Breakdown Voltage: 60Volts Min.**
- **Direct replacement for ST SD1487**



**0.500" DIAMETER
SOE PACKAGE**

DESCRIPTION:

The HF12-100 is a 12.5V epitaxial silicon NPN planar transistor designed primarily for HF communications. This device utilizes emitter ballasting to achieve extreme ruggedness under severe operating conditions. The HF12-series products utilize the unique Spectrum Devices' Bipolar process which offers a 67% improvement in collector-base breakdown voltage, enhancing reliability while maintaining RF performance.

ABSOLUTE MAXIMUM RATINGS: ($T_{CASE} = 25^{\circ}C$)

| Symbol | Parameter | Value | Unit |
|------------|---------------------------|-------------|-------------|
| V_{CBO} | Collector-Base Voltage | 60 | V |
| V_{CEO} | Collector-Emitter Voltage | 18 | V |
| V_{EBO} | Emitter-Base Voltage | 4.0 | V |
| I_C | Device Current | 20 | A |
| P_{DISS} | Total Dissipation | 290 | W |
| T_J | Junction Temperature | +200 | $^{\circ}C$ |
| T_{STG} | Storage Temperature | -65 to +150 | $^{\circ}C$ |

THERMAL DATA:

| | | | |
|---------------|----------------------------------|-----|---------------|
| $R_{TH(J-C)}$ | Thermal Resistance Junction-case | 0.6 | $^{\circ}C/W$ |
|---------------|----------------------------------|-----|---------------|

ELECTRICAL SPECIFICATIONS ($T_{CASE} = 25^{\circ}C$)

DC CHARACTERISTICS

| Symbol | Test Conditions | Value | | | Unit |
|------------|---|-------|------|------|------|
| | | Min. | Typ. | Max. | |
| BV_{CBO} | $I_C = 100\text{ mA}$ $I_E = 0\text{ mA}$ | 60 | -- | -- | V |
| BV_{CES} | $I_C = 100\text{ mA}$ $V_{BE} = 0\text{ V}$ | 60 | -- | -- | V |
| BV_{CEO} | $I_C = 100\text{ mA}$ $I_B = 0\text{ mA}$ | 18 | -- | -- | V |
| BV_{EBO} | $I_E = 20\text{ mA}$ $I_C = 0\text{ mA}$ | 4.0 | -- | -- | V |
| I_{CES} | $V_{CE} = 15\text{ V}$ $I_E = 0\text{ mA}$ | -- | -- | 20 | mA |
| h_{FE} | $V_{CE} = 5\text{ V}$ $I_C = 5\text{ A}$ | 10 | -- | 200 | -- |

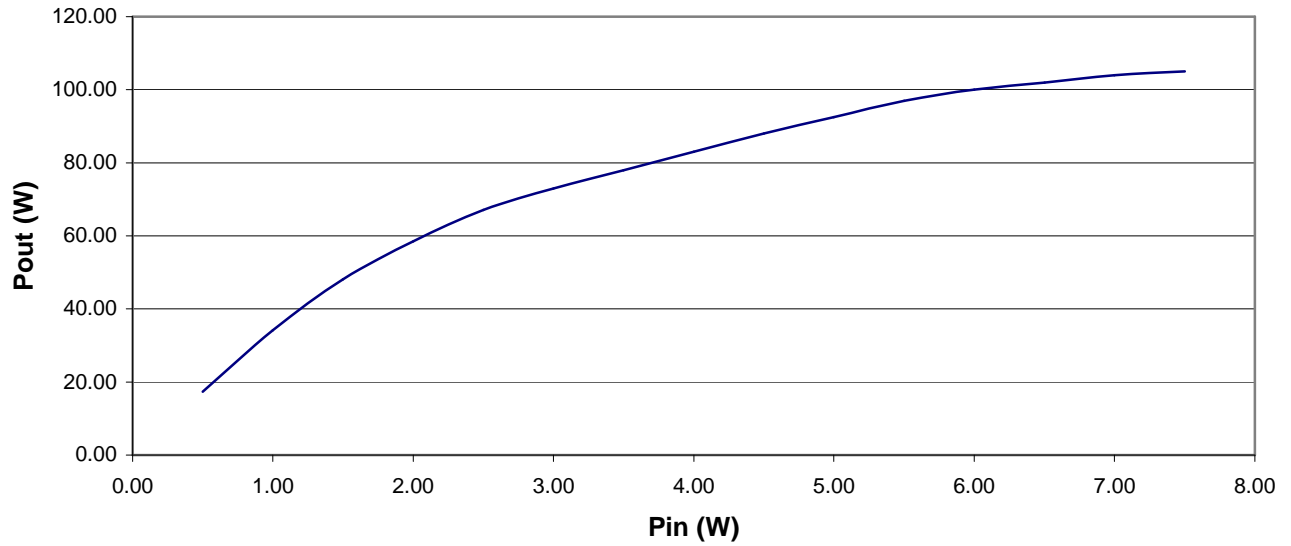
RF CHARACTERISTICS

| Symbol | Test Conditions | Value | | | Unit |
|-----------|--|-------|------|------|------|
| | | Min. | Typ. | Max. | |
| P_{OUT} | $f = 30\text{ MHz}$ $V_{CC} = 12.5\text{ V}$ $I_{CQ} = 150\text{ mA}$ | 100 | -- | -- | W |
| G_P | $P_{out} = 100\text{ W PEP}$ $V_{CC} = 12.5\text{ V}$ $I_{CQ} = 150\text{ mA}$ | 11 | -- | -- | dB |
| IMD* | $P_{out} = 100\text{ W PEP}$ $V_{CC} = 12.5\text{ V}$ $I_{CQ} = 150\text{ mA}$ | -- | -- | -30 | dBc |
| η_C | $P_{out} = 100\text{ W PEP}$ $V_{CC} = 12.5\text{ V}$ $I_{CQ} = 150\text{ mA}$ | 40 | -- | -- | % |
| C_{OB} | $f = 1\text{ MHz}$ $V_{CB} = 12.5\text{ V}$ | -- | 400 | -- | pF |

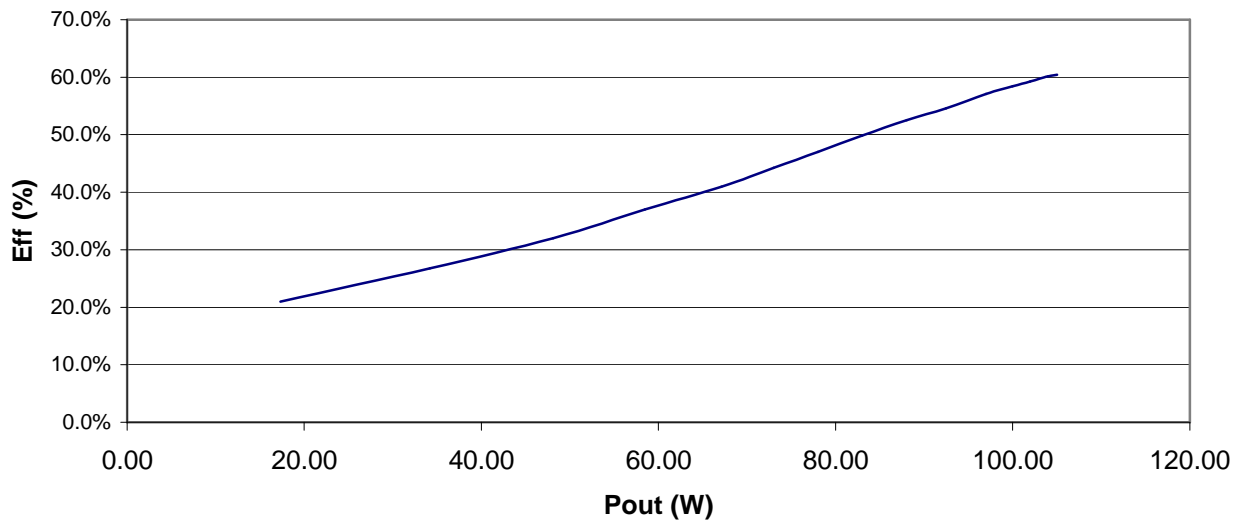
*Conditions $f_1 = 30.00\text{MHz}$ $f_2 = 30.001\text{MHz}$

TYPICAL PERFORMANCE

Power in vs Power Out
Frequency = 30 MHz, Vcc = 12.5 Volts

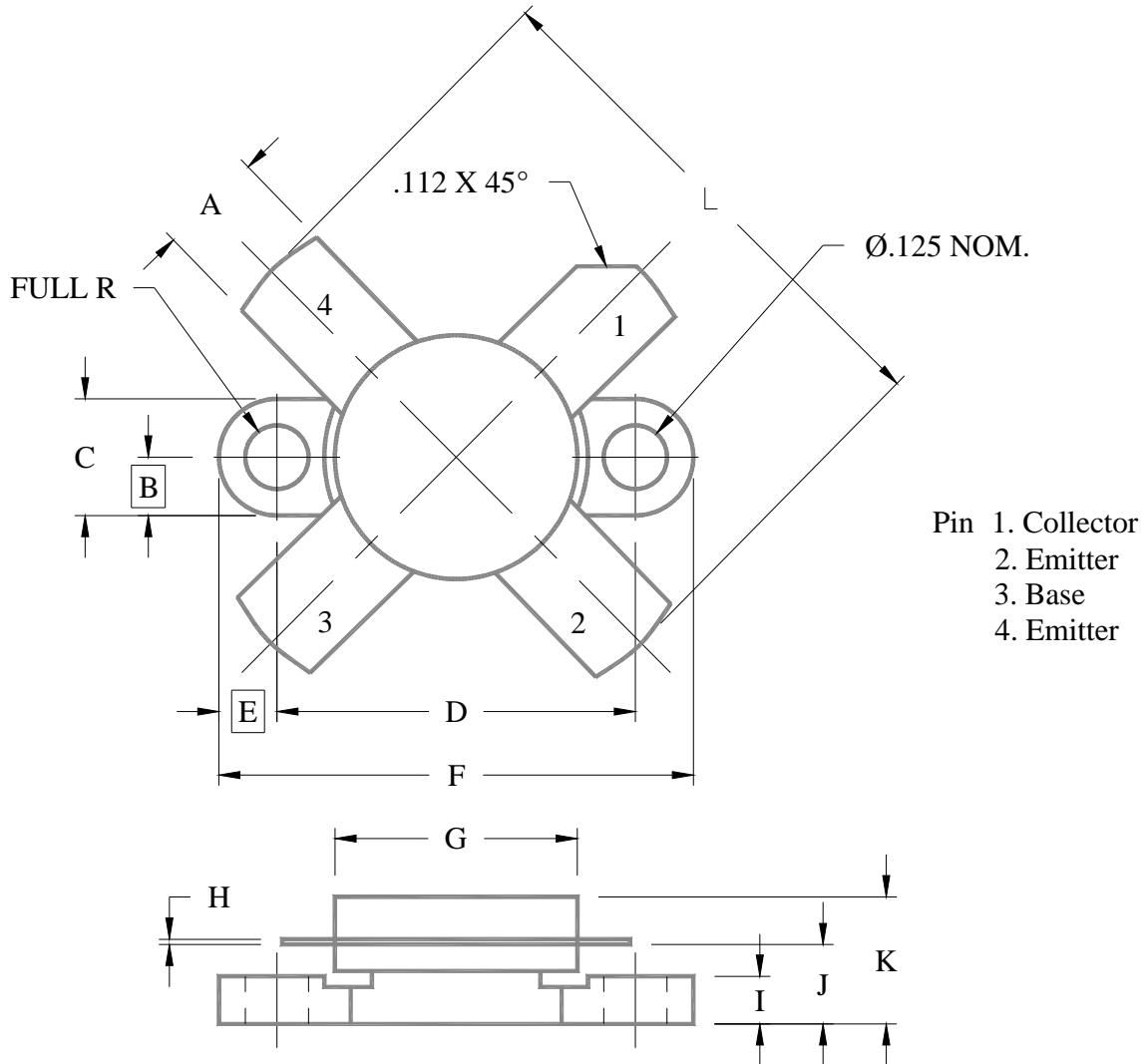


Efficiency vs Power Out
Frequency = 30 MHz, Vcc = 12.5 Volts



PACKAGE MECHANICAL DATA

SOE - 500



| | Minimum Inches/MM | Maximum Inches/MM | | Minimum Inches/MM | Maximum Inches/MM |
|---|----------------------|----------------------|---|----------------------|----------------------|
| A | .220/5.59 | .230/5.84 | G | .495/12.57 | .505/12.83 |
| B | .125/3.18 | | H | .003/0.08 | .007/0.18 |
| C | .245/6.22 | .255/6.48 | I | .090/2.29 | .110/2.79 |
| D | .720/18.28 | .730/18.54 | J | .160/4.06 | .175/4.45 |
| E | .125/3.18 | | K | | .280/7.11 |
| F | .970/24.64 | .980/24.89 | L | | 1.050/26.67 |

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