



# SD1460

## RF POWER BIPOLAR TRANSISTORS FM BROADCAST APPLICATIONS

### FEATURES SUMMARY

- 108 MHz
- 28 VOLTS
- EFFICIENCY 75%
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT} = 150 \text{ W MIN. WITH } 9.2 \text{ dB GAIN}$

### DESCRIPTION

The SD1460 is a 28 V gold metallized epitaxial silicon NPN planar transistor designed for VHF FM broadcast transmitters. This device utilizes diffused emitter resistors to achieve infinite VSWR at rated operating conditions.

Figure 1. Package

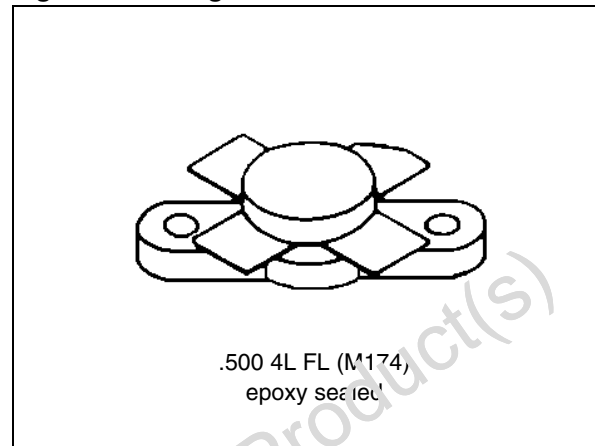


Figure 2. Pin Connection

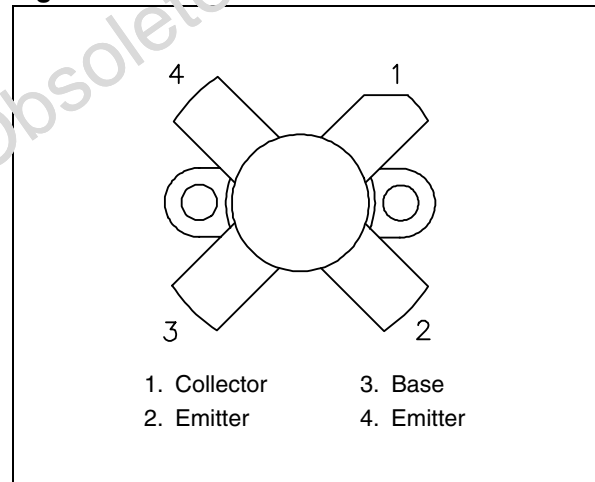


Table 1. Order Codes

| Order Codes | Marking | Package | Packaging     |
|-------------|---------|---------|---------------|
| SD1460      | SD1460  | M174    | PLASTIC TRAYS |

**Table 2. Absolute Maximum Ratings ( $T_{\text{case}} = 25^{\circ}\text{C}$ )**

| Symbol            | Parameter                 | Value        | Unit               |
|-------------------|---------------------------|--------------|--------------------|
| $V_{\text{CBO}}$  | Collector-Base Voltage    | 60           | V                  |
| $V_{\text{CEO}}$  | Collector-Emitter Voltage | 25           | V                  |
| $V_{\text{CES}}$  | Collector-Emitter Voltage | 60           | V                  |
| $V_{\text{EBO}}$  | Emitter-Base Voltage      | 4.0          | V                  |
| $I_{\text{C}}$    | Device Current            | 16           | A                  |
| $P_{\text{DISS}}$ | Power Dissipation         | 230          | W                  |
| $T_{\text{J}}$    | Junction Temperature      | +200         | $^{\circ}\text{C}$ |
| $T_{\text{STG}}$  | Storage Temperature       | - 65 to +150 | $^{\circ}\text{C}$ |

**Table 3. Thermal Data**

| Symbol               | Parameter                        | Value | Unit                 |
|----------------------|----------------------------------|-------|----------------------|
| $R_{\text{TH(j-c)}}$ | Junction-Case Thermal Resistance | 0.75  | $^{\circ}\text{C/W}$ |

**ELECTRICAL SPECIFICATIONS ( $T_{\text{case}} = 25^{\circ}\text{C}$ )****Table 4. Static**

| Symbol            | Test Conditions  | Value |      |      | Unit |
|-------------------|--|-------|------|------|------|
|                   |  | Min.  | Typ. | Max. |      |
| $BV_{\text{CBO}}$ | $I_{\text{C}} = 100 \text{ mA}; I_{\text{E}} = 0 \text{ mA}$ | 60    | —    | —    | V    |
| $BV_{\text{CER}}$ | $I_{\text{C}} = 100 \text{ mA}; R_{\text{BE}} = 10 \Omega$   | 55    | —    | —    | V    |
| $BV_{\text{CEO}}$ | $I_{\text{C}} = 100 \text{ mA}; I_{\text{B}} = 0 \text{ mA}$ | 25    | —    | —    | V    |
| $BV_{\text{EBO}}$ | $I_{\text{E}} = 20 \text{ mA}; I_{\text{C}} = 0 \text{ mA}$  | 4.0   | —    | —    | V    |
| $h_{\text{FE}}$   | $V_{\text{CE}} = 5 \text{ V}; I_{\text{C}} = 1 \text{ A}$    | 20    | —    | 150  | —    |

**Table 5. Dynamic**

| Symbol            | Test Conditions   | Value |      |      | Unit |
|-------------------|---|-------|------|------|------|
|                   |   | Min.  | Typ. | Max. |      |
| $P_{\text{OUT}}$  | $f = 108 \text{ MHz}; P_{\text{IN}} = 18 \text{ W}; V_{\text{CE}} = 28 \text{ V}$ | 150   | —    | —    | W    |
| $G_{\text{P}}$    | $f = 108 \text{ MHz}; P_{\text{IN}} = 18 \text{ W}; V_{\text{CE}} = 28 \text{ V}$ | 9.2   | —    | —    | dB   |
| $\eta_{\text{c}}$ | $f = 108 \text{ MHz}; P_{\text{IN}} = 18 \text{ W}; V_{\text{CE}} = 28 \text{ V}$ | 70    | —    | —    | %    |
| $C_{\text{OB}}$   | $f = 1 \text{ MHz}; V_{\text{CB}} = 28 \text{ V}$                                 | —     | —    | 150  | pF   |

TYPICAL PERFORMANCE

Figure 3. Power Output vs Power Input

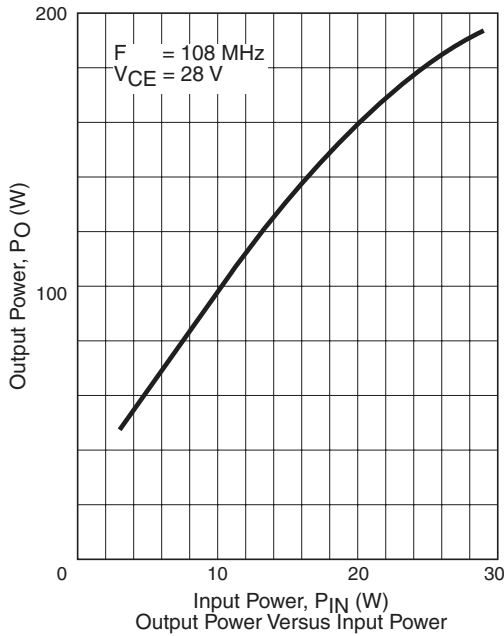
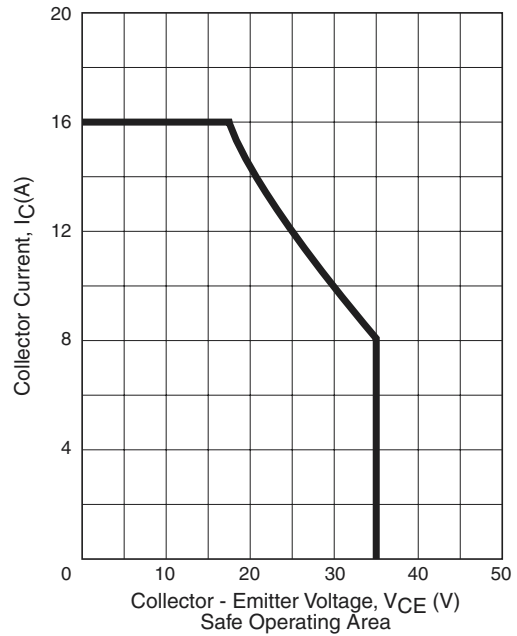


Figure 4. Safe Operating Area



IMPEDANCE DATA

Figure 5. Typical Input Impedance

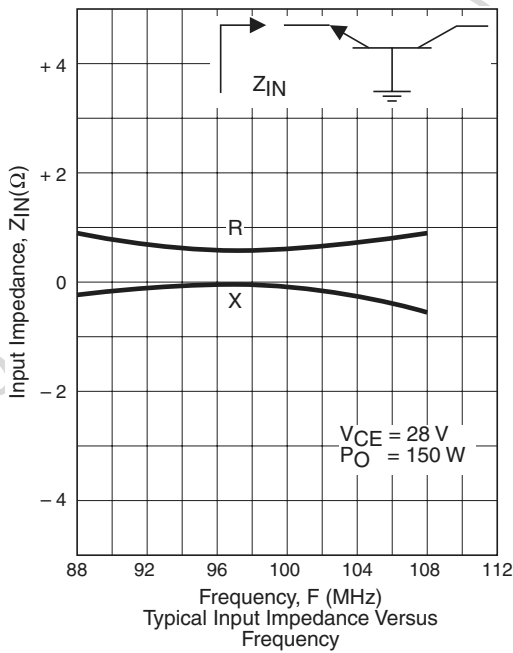
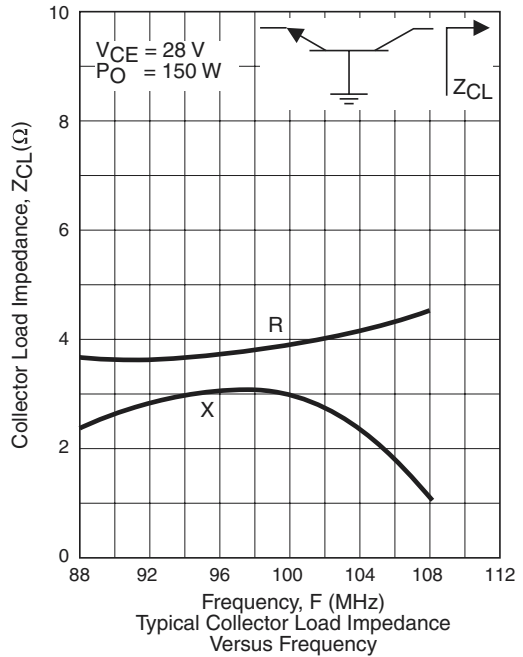


Figure 6. Typical Collector Load Impedance



TEST CIRCUIT

Figure 7. Test Circuit

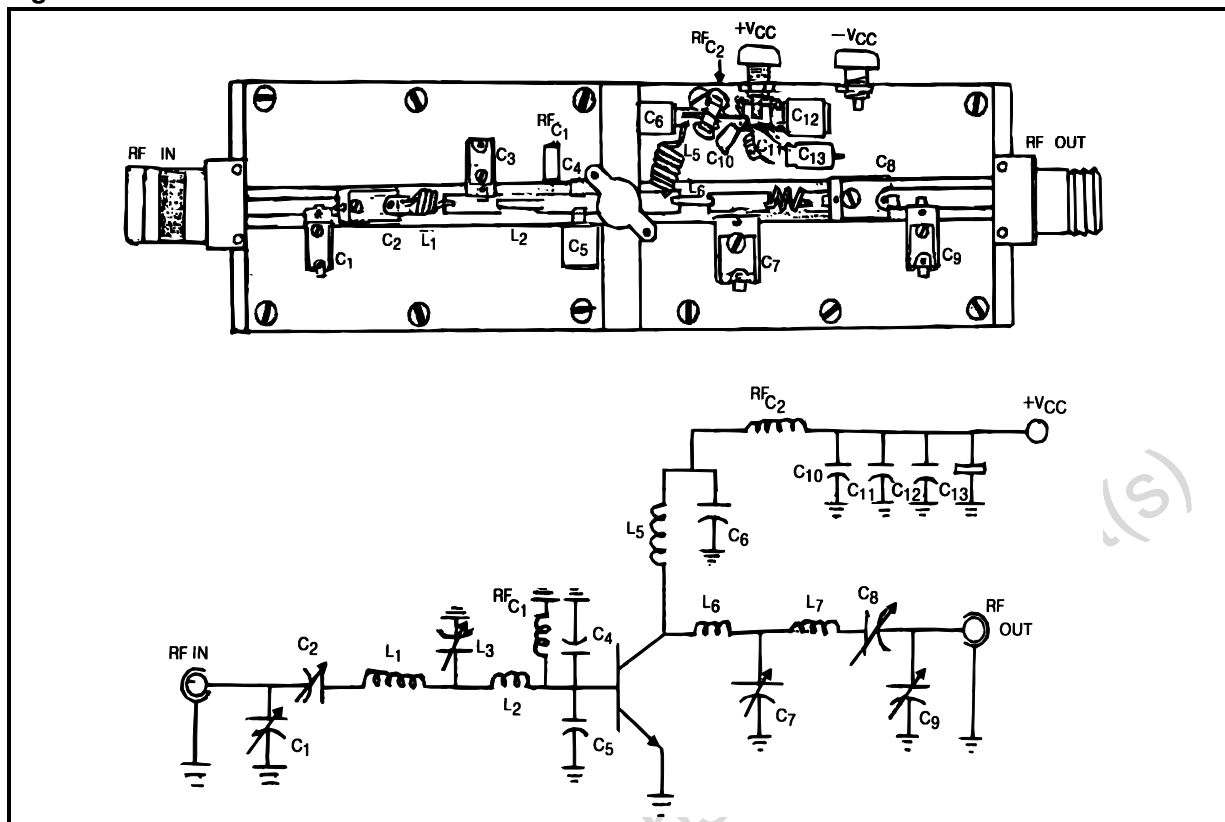


Table 6. Test Circuit

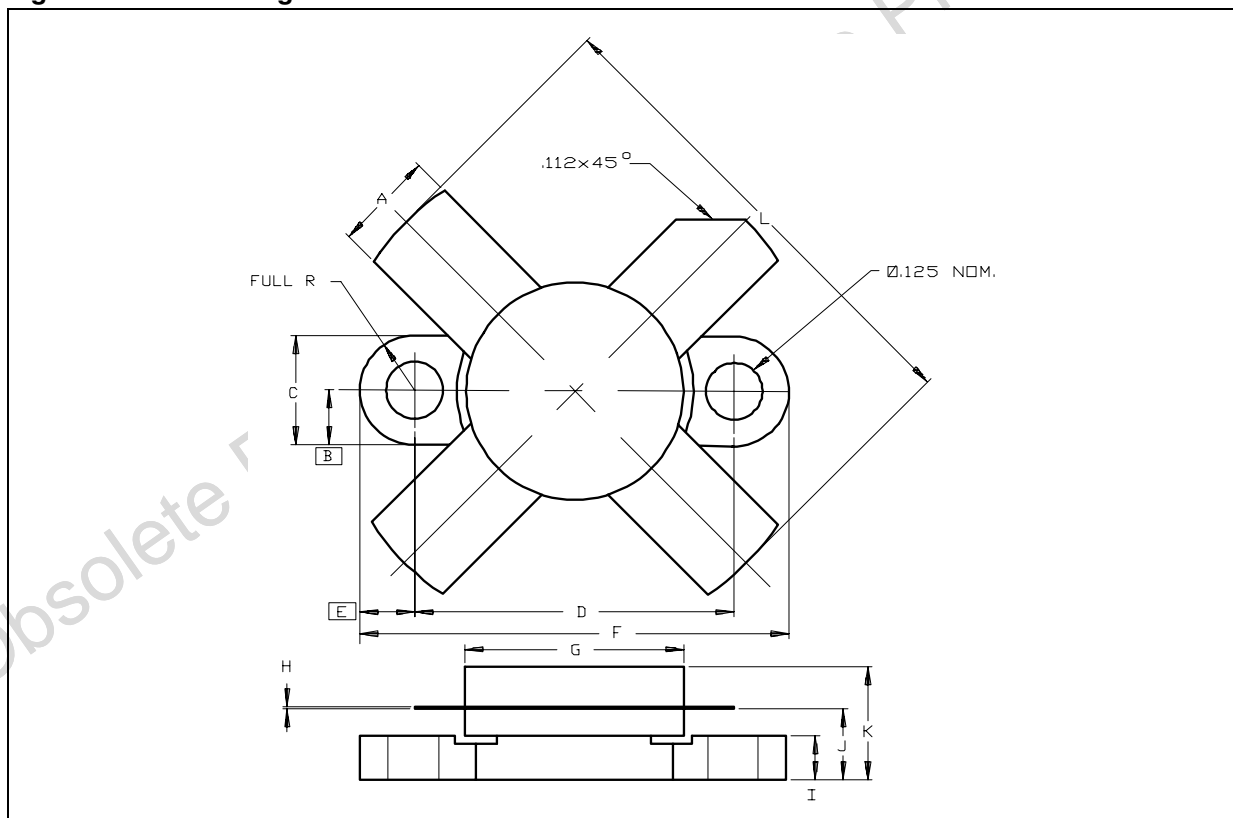
|                |  |
|----------------|--|
| C1, C2, C3, C9 | 24 - 200pF Variable, Arco 425                |
| C4             | 470pF ATC 125 mil. Sq. Chip                  |
| C5             | 470pF Unelco, 400 mil. Sq.                   |
| C6             | 1000pF Unelco, 400 mil Sq.                   |
| C7             | 50 - 380pF Variable, Arco 465                |
| C8             | 25 - 280pF Variable, Arco 464                |
| C10            | .1μF 50V, Erie Disc                          |
| C11            | .01μF 50V, Erie Disc                         |
| C12            | 1000pF Unelco, 400 mil Sq.                   |
| C13            | 100μF 35V, Sprague Electrolytic              |
| L1             | 3 Turns, #16 AWG, .225" I.D.                 |
| L2             | #14 AWG, Length .335", Height .400"          |
| L5             | 5 1/2 Turns, #16 AWG Enameled .270" I.D.     |
| L6             | #14 AWG, Length .300", Height .335"          |
| L7             | 3 Turns, #16 AWG, Length .300", Height .335" |
| RFC 1          | VK200 19/4B (1 winding) Ferroxcube Choke     |
| RFC 2          | 6 Turns, #16 AWG Enamel on T50-2 Torroid     |
| Board Material | 3-M-K-6098 1/16" Thick                       |

## PACKAGE MECHANICAL

Table 7. M174 Mechanical Data

| Symbol | millimeters |      |       | inches |       |       |
|--------|-------------|------|-------|--------|-------|-------|
|        | Min         | Typ  | Max   | Min    | Typ   | Max   |
| A      | 5.59        |      | 5.84  | 0.220  |       | 0.230 |
| B      |             | 3.18 |       |        | 0.125 |       |
| C      | 6.22        |      | 6.48  | 0.245  |       | 0.255 |
| D      | 18.28       |      | 18.54 | 0.720  |       | 0.730 |
| E      |             | 3.18 |       |        | 0.125 |       |
| F      | 24.64       |      | 24.89 | 0.970  |       | 0.980 |
| G      | 12.57       |      | 12.83 | 0.495  |       | 0.505 |
| H      | 0.08        |      | 0.18  | 0.003  |       | 0.007 |
| I      | 2.29        |      | 2.79  | 0.090  |       | 0.110 |
| J      | 4.06        |      | 4.45  | 0.160  |       | 0.175 |
| K      |             |      | 7.11  |        |       | 0.280 |
| L      |             |      | 26.67 |        |       | 1.050 |

Figure 8. M174 Package Dimensions



Note: Drawing is not to scale.

**REVISION HISTORY**

**Table 8. Revision History**

| Date          | Revision | Description of Changes                |
|---------------|----------|---------------------------------------|
| November-1992 | 1        | First Issue                           |
| 10-June-2004  | 2        | Stylesheet update. No content change. |

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