



# SD1407

## RF POWER BIPOLAR TRANSISTORS HF SSB APPLICATIONS

### FEATURES SUMMARY

- 30 MHz
- 28 VOLTS
- IMD -30 dB
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT} = 125 \text{ W MIN. WITH } 15 \text{ dB GAIN}$

### DESCRIPTION

The SD1407 is a 28 V epitaxial silicon NPN planar transistor designed primarily for SSB communications. This device utilizes state-of-the-art diffused emitter ballasting for improved ruggedness and reliability.

Figure 1. Package

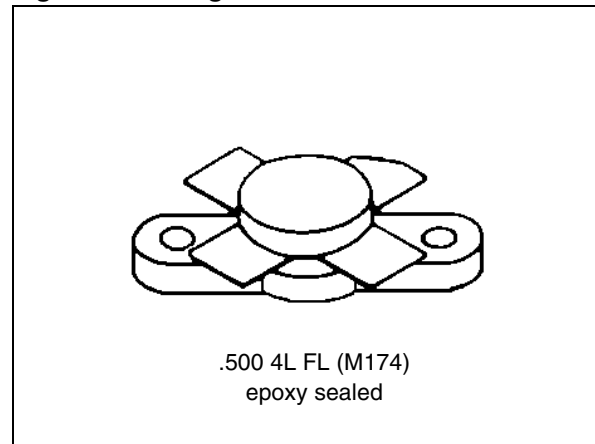


Figure 2. Pin Connection

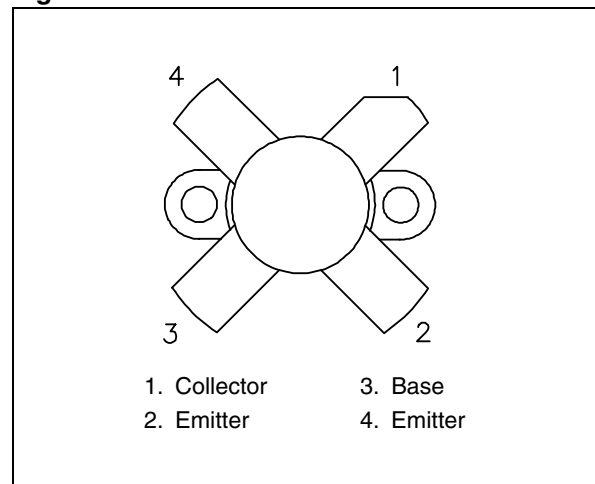


Table 1. Order Codes

Order Codes	Marking	Package	Packaging
SD1407	SD1407	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	65	V
$V_{\text{CEO}}$	Collector-Emitter Voltage	36	V
$V_{\text{EBO}}$	Emitter-Base Voltage	4.0	V
$I_{\text{C}}$	Device Current	20	A
$P_{\text{DISS}}$	Power Dissipation	270	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	0.65	$^{\circ}\text{C/W}$

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

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
$BV_{\text{CBO}}$	$I_{\text{C}} = 100 \text{ mA}; I_{\text{E}} = 0 \text{ mA}$	65	—	—	V
$BV_{\text{CES}}$	$I_{\text{C}} = 100 \text{ mA}; V_{\text{BE}} = 0 \text{ mA}$	65	—	—	V
$BV_{\text{CEO}}$	$I_{\text{C}} = 100 \text{ mA}; I_{\text{B}} = 0 \text{ mA}$	35	—	—	V
$BV_{\text{EBO}}$	$I_{\text{E}} = 10 \text{ mA}; I_{\text{C}} = 0 \text{ mA}$	4.0	—	—	V
$I_{\text{CES}}$	$V_{\text{CE}} = 30 \text{ mA}; I_{\text{E}} = 0 \text{ mA}$	—	—	15	mA
$h_{\text{FE}}$	$V_{\text{CE}} = 5 \text{ V}; I_{\text{C}} = 5 \text{ A}$	10	—	200	—

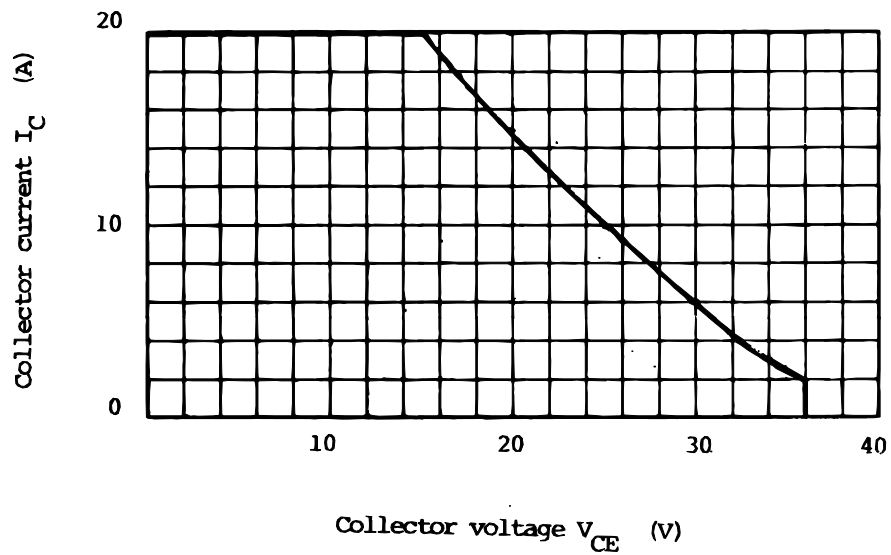
**Table 5. Dynamic**

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
$P_{\text{OUT}}$	$f = 30 \text{ MHz}; P_{\text{IN}} = 3.95 \text{ W}; V_{\text{CE}} = 28 \text{ V}$	125	—	—	W
$G_{\text{P}}$	$f = 30 \text{ MHz}; P_{\text{IN}} = 3.95 \text{ W}; V_{\text{CE}} = 28 \text{ V}$	15	16	—	dB
$\text{IMD}^{(1)}$	$f = 30 \text{ MHz}; V_{\text{CE}} = 28 \text{ V}; I_{\text{CQ}} = 100 \text{ mA}$		-34	-30	dB
$C_{\text{OB}}$	$f = 1 \text{ MHz}; V_{\text{CB}} = 30 \text{ V}$	—	250	—	pF

Note: 1.  $P_{\text{OUT}} = 100\text{W PEP}$ ,  $f_0 = 30 + 30.001 \text{ MHz}$

## TYPICAL PERFORMANCE

Figure 3. Safe Operating Area



## TEST CIRCUIT

Figure 4. Test Circuit

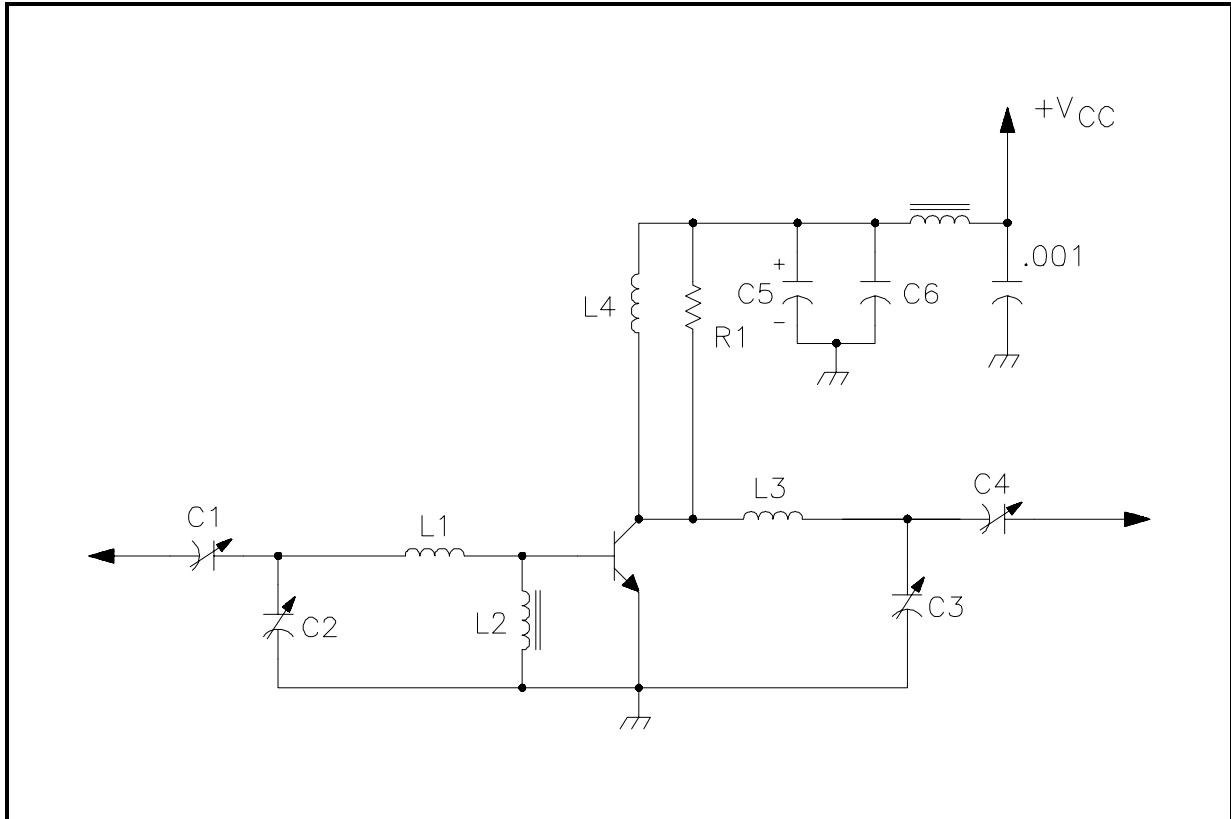


Table 6. Test Circuit

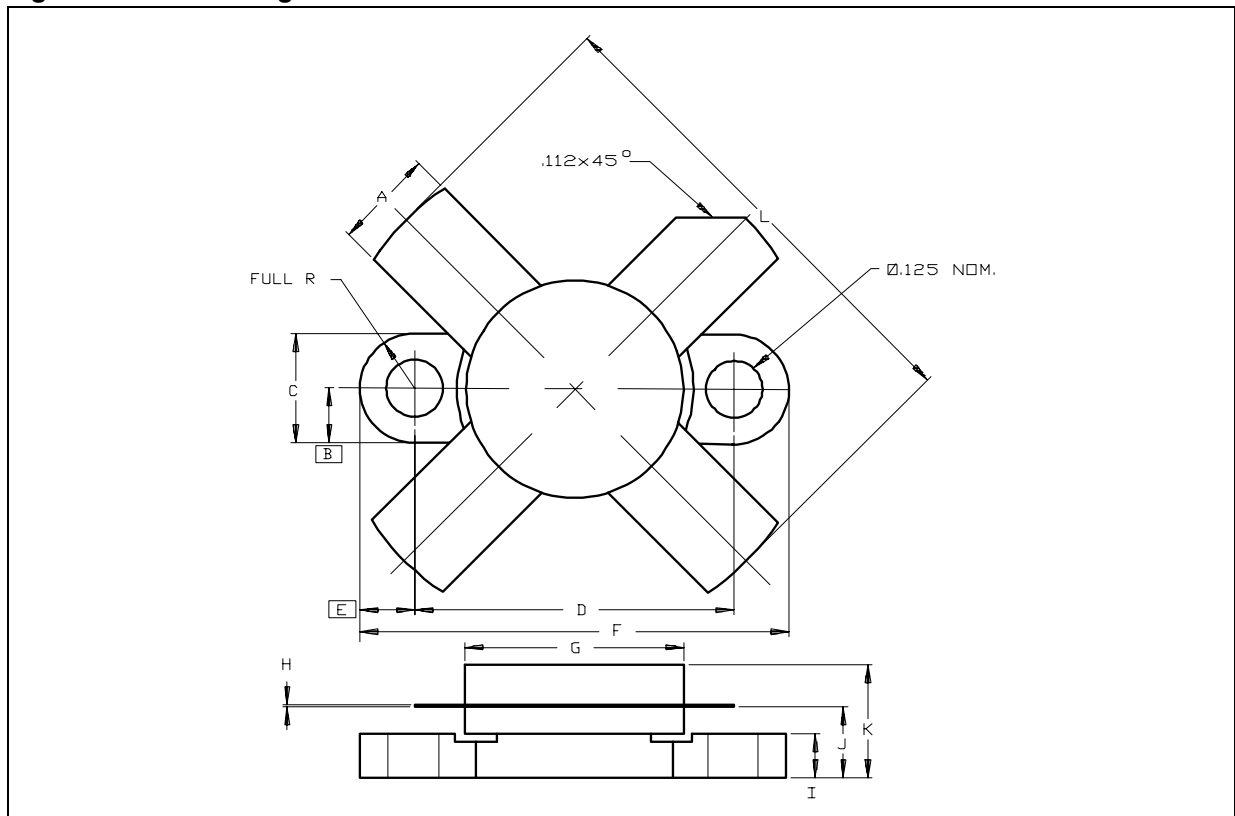
C1,	24 - 200pF Arco 425
C2, C4	50 - 380pF Arco 465
C3	9 - 180pF Arco 463
C5	10 $\mu$ F, Electrolytic, 35Vdc
C6	0.01 $\mu$ F, 100V, Ceramic
L1	4 Turns, #16 AWG, Tinned, 0.40" I.D.
L2, L5	1 Turn, #22 AWG, Tinned, formed with VK-200 #4B Ferroxcube
L4	17 Turns, #18 Enameled Wire Wrapped Around R1
R1	390 $\Omega$ Resistor (2 Watt)

## 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 5. M174 Package Dimensions



Note: Drawing is not to scale.

**REVISION HISTORY**

**Table 8. Revision History**

<b>Date</b>	<b>Revision</b>	<b>Description of Changes</b>
October-1992	1	First Issue
26-May-2004	2	Stylesheet update. No content change.

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