



SD1490

RF POWER BIPOLAR TRANSISTORS TV/LINEAR APPLICATIONS

FEATURES SUMMARY

- 470 - 860 MHz
- 28 VOLTS
- CLASS A PUSH PULL
- DESIGNED FOR HIGH POWER LINEAR OPERATION
- HIGH SATURATED POWER CAPABILITY
- GOLD METALLIZATION
- DIFFUSED EMITTER BALLAST RESISTORS
- COMMON EMITTER CONFIGURATION
- INTERNAL INPUT MATCHING
- $P_{OUT} = 25 \text{ W MIN. WITH } 9.0 \text{ dB GAIN}$

DESCRIPTION

The SD1490 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class A operation in UHF and Band IV, V television transmitters and transposers.

Figure 1. Package

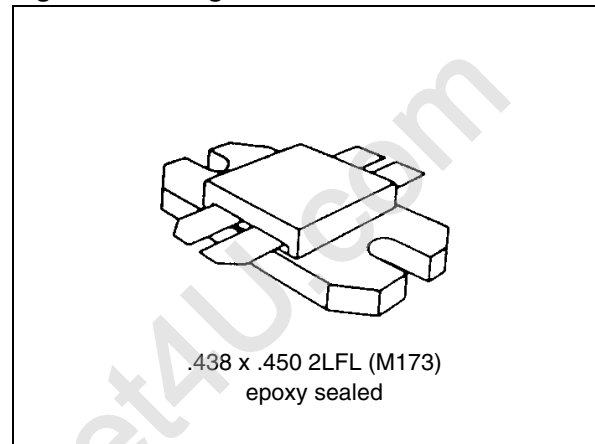


Figure 2. Pin Connection

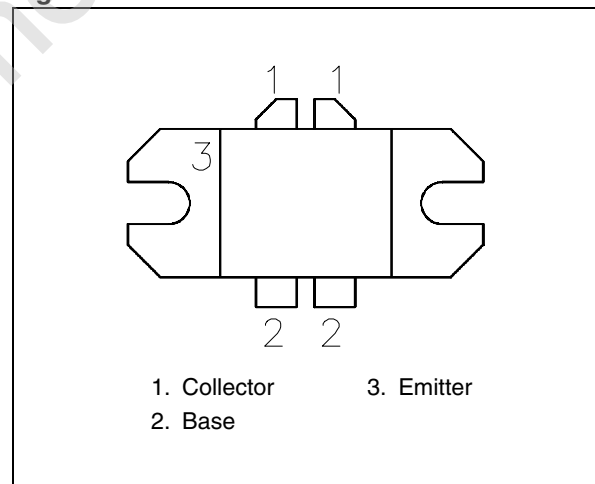


Table 1. Order Codes

Order Codes	Marking	Package	Packaging
SD1490	SD1490	M173	PLASTIC TRAYS

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

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	45	V
V_{CEO}	Collector-Emitter Voltage	30	V
V_{EBO}	Emitter-Base Voltage	3.0	V
I_{C}	Device Current	8	A
P_{DISS}	Power Dissipation	135	W
T_{J}	Junction Temperature	+200	$^{\circ}\text{C}$
T_{STG}	Storage Temperature	- 50 to +150	$^{\circ}\text{C}$

Table 3. Thermal Data

Symbol	Parameter	Value	Unit
$R_{\text{TH(j-c)}}$	Junction-Case Thermal Resistance	1.3	$^{\circ}\text{C/W}$

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

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
BV_{CBO}	$I_{\text{C}} = 50 \text{ mA}; I_{\text{E}} = 0 \text{ mA}$	45	—	—	V
BV_{CEO}	$I_{\text{C}} = 200 \text{ mA}; I_{\text{B}} = 0 \text{ mA}$	30	—	—	V
BV_{EBO}	$I_{\text{E}} = 10 \text{ mA}; I_{\text{C}} = 0 \text{ mA}$	3.0	—	—	V
I_{CEO}	$V_{\text{CE}} = 25 \text{ V}; I_{\text{E}} = 0 \text{ mA}$	—	—	5	mA
h_{FE}	$V_{\text{CE}} = 5 \text{ V}; I_{\text{C}} = 3 \text{ A}$	10	—	80	—

Table 5. Dynamic

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
P_{OUT}	$f = 860 \text{ MHz}; V_{\text{CE}} = 25 \text{ V}; I_{\text{C}} = 3.2 \text{ A}$	25	—	—	W
G_{P}	$f = 860 \text{ MHz}; V_{\text{CE}} = 25 \text{ V}; I_{\text{C}} = 3.2 \text{ A}$	8.0	—	—	dB
CMOD	$f = 860 \text{ MHz}; V_{\text{CE}} = 25 \text{ V}; P_{\text{REF}} = 25 \text{ W}$	—	—	20	%
$\text{IMD}_3^{(1)}$	$f = 860 \text{ MHz}; V_{\text{CE}} = 25 \text{ V}; P_{\text{REF}} = 25 \text{ W}$	—	—	-45	dB
C_{OB}	$f = 1 \text{ MHz}; V_{\text{CB}} = 28 \text{ V}$	—	70	—	pF

Note: 1. 3 Tone Testing (-8, -10, -16 dB Relative to P_{REF})

TYPICAL PERFORMANCE

Figure 3. Power Output vs Power Input

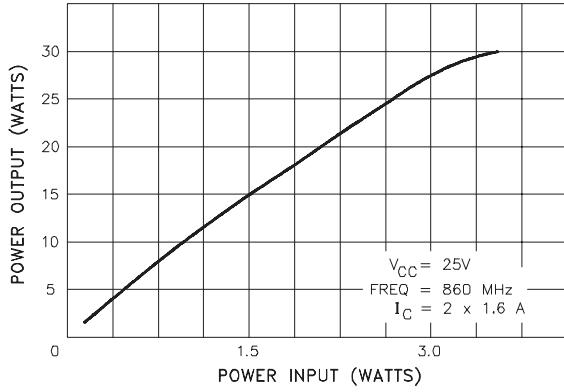


Figure 4. Broadband Power Gain vs Frequency

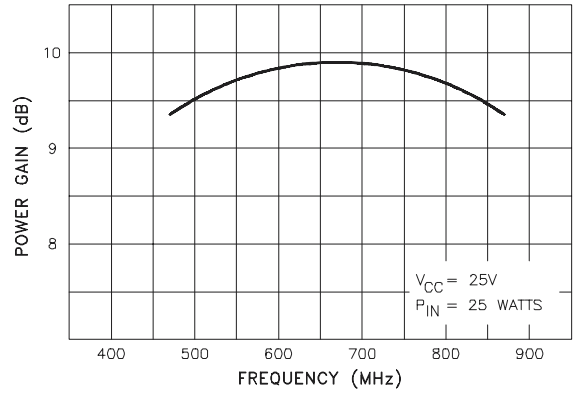


Figure 5. Thermal Resistance vs Case Temperature

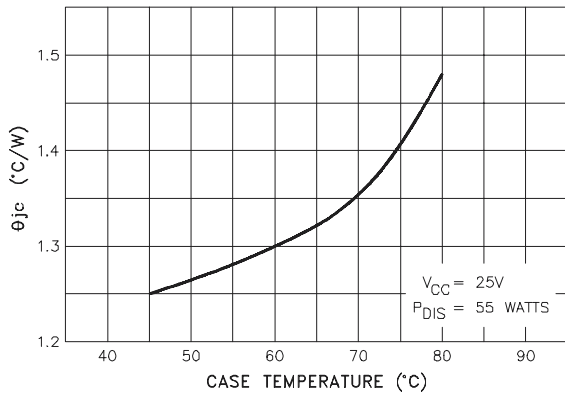
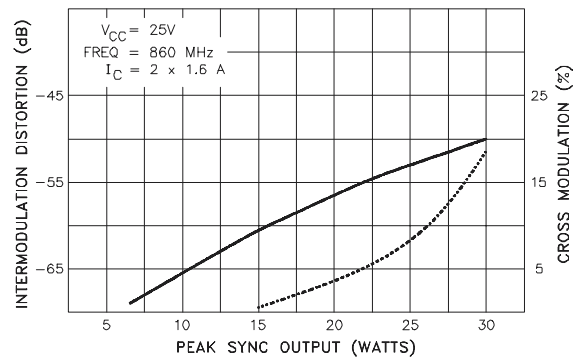


Figure 6. Cross Modulation & Intermodulation vs Peak Sync Output



IMPEDANCE DATA

Figure 7. Impedance Data

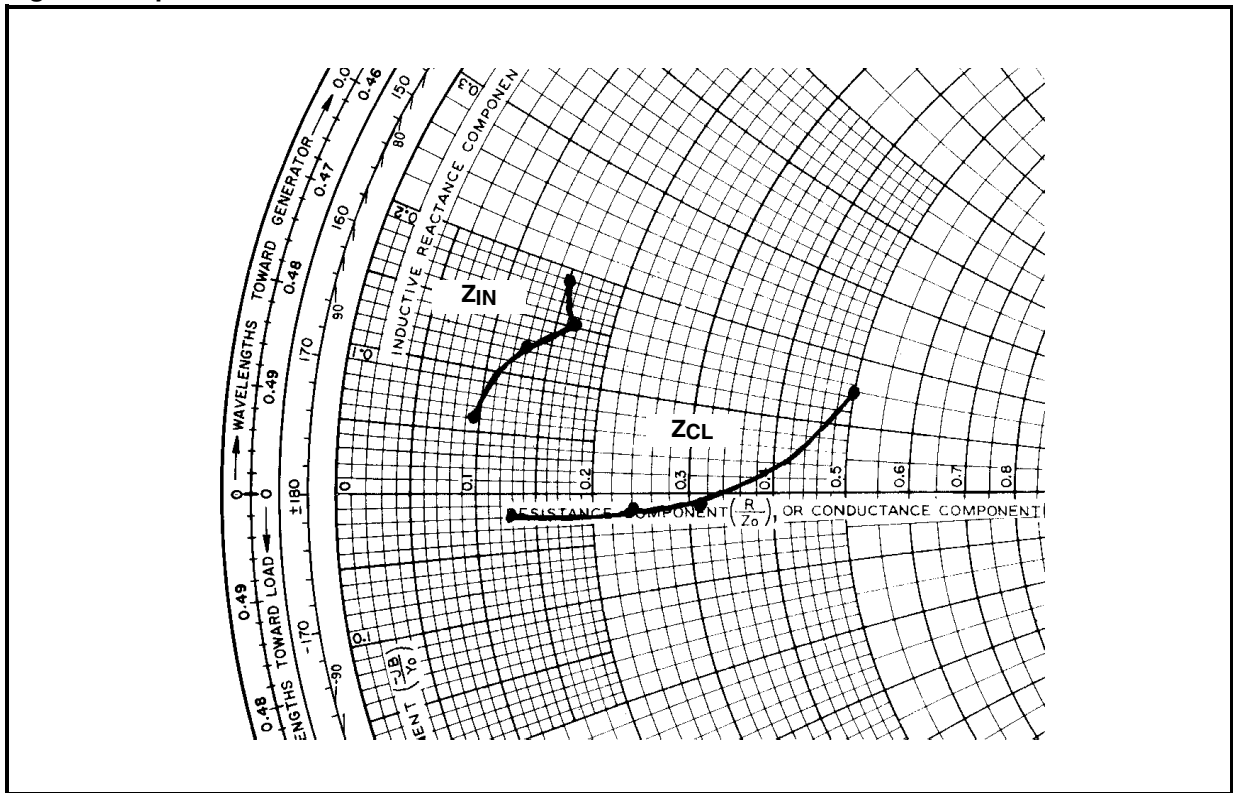


Table 6. Impedance Data

FREQ.	Z_{IN} (Ω)	Z_{CL} (Ω)
470 MHz	$7.5 + j 9.5$	$25 + j 17.5$
590 MHz	$8.2 + j 7.5$	$15.6 - j 0.13$
710 MHz	$6.6 + j 6.2$	$11.9 - j 0.28$
860 MHz	$4.7 + j 3.0$	$6.7 - j 0.38$

Note: $P_{OUT} = 25$ W
 $V_{CE} = 25$ V
 $I_C = 3.2$ A
 Normalized to 50 Ohms

TEST CIRCUIT

Figure 8. Test Circuit

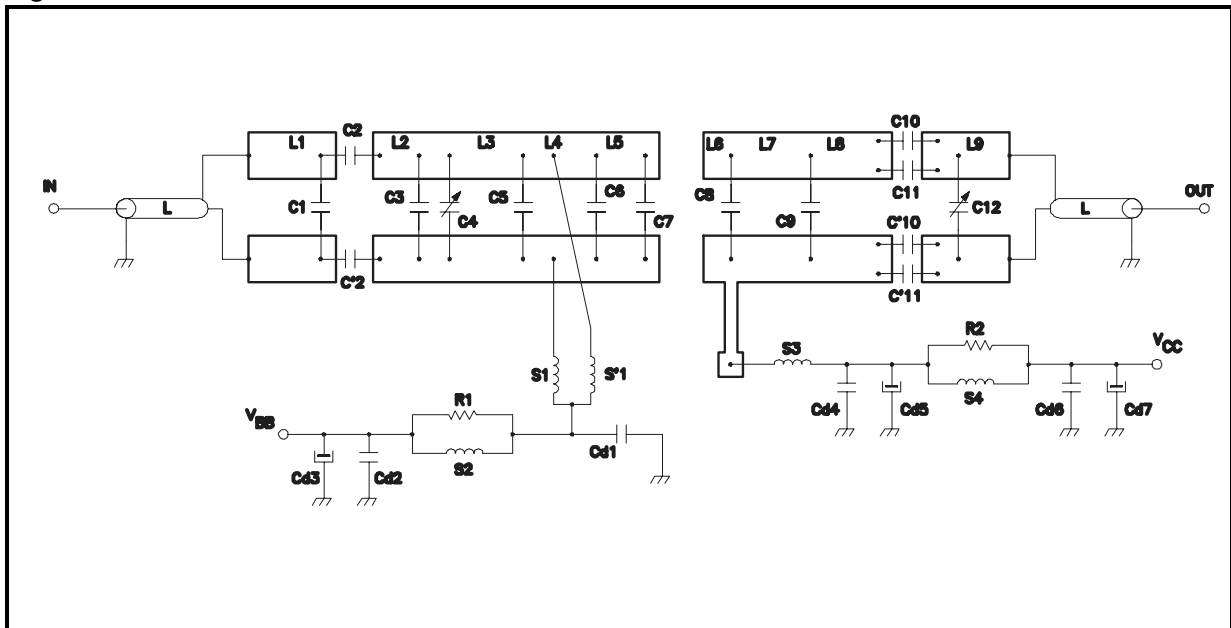
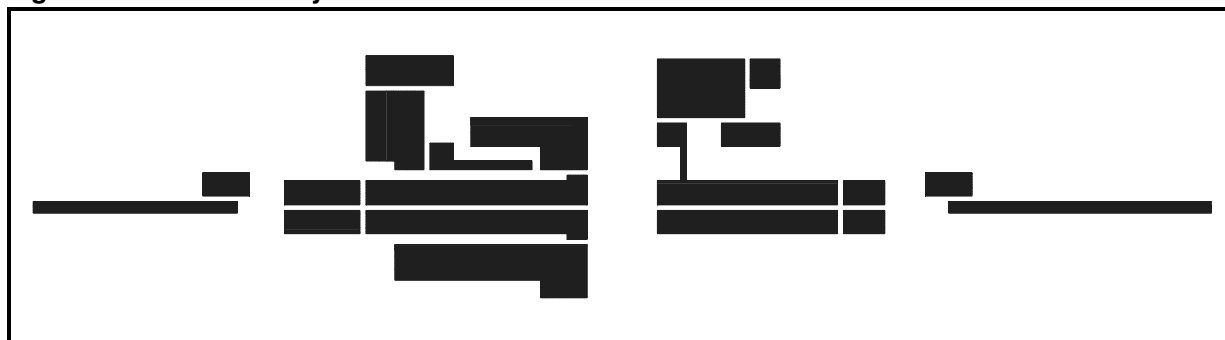


Table 7. Test Circuit

C1	1.5pF ATC 100A
C2, C'2	100pF ATC 100A
C3, C12	.5 - 4.5pF Airtronic Adjustable
C4, C5	2.7pF ATC 100A
C6	10pF ATC 100A
C7	18pF ATC 100A
C8	6.8pF ATC 100A
C9	1.5pF ATC 100A + 1.8pF ATC 100A
C10, C'10	100pF ATC 100A
C11, C'11	120pF ATC 100A
Cd1	100pF ATC 100A
Cd2	47pF AATC 100B + 1000pF ATC 100B
Cd3	500 μ F 25V
Cd4	100pF ATC 100A
Cd5	22 μ F 35V
Cd6	1000pF ATC 100B
Cd7	47 μ F 63V
L	Coaxial Cable $Z_0 = 50\Omega$ Length $\lambda/4$ at 680 MHz
L1	Printed Transmission Line $Z_0 = 25\Omega$ Length 12mm
L2	Printed Transmission Line $Z_0 = 25\Omega$ Length 12mm
L3	Printed Transmission Line $Z_0 = 25\Omega$ Length 10mm
L4	Printed Transmission Line $Z_0 = 25\Omega$ Length 9mm
L5	Printed Transmission Line $Z_0 = 25\Omega$ Length 5.5mm
L6	Printed Transmission Line $Z_0 = 25\Omega$ Length 6mm
L7	Printed Transmission Line $Z_0 = 25\Omega$ Length 14.5mm
L8	Printed Transmission Line $Z_0 = 25\Omega$ Length 10mm
L9	Printed Transmission Line $Z_0 = 25\Omega$ Length 7mm
R1	150 Ω 1/4 W
R2	51 Ω 1/4 W
S1, S'1	10 Turns of .35mm Wire on 2mm Diameter
S2	9 Turns of .35mm Wire on R1
S3	2 Turns of .8mm Wire on 4mm Diater
S4	5 Turns of .8mm Wire on R2
Board	$\epsilon_r = 2.55$, .020" Thick

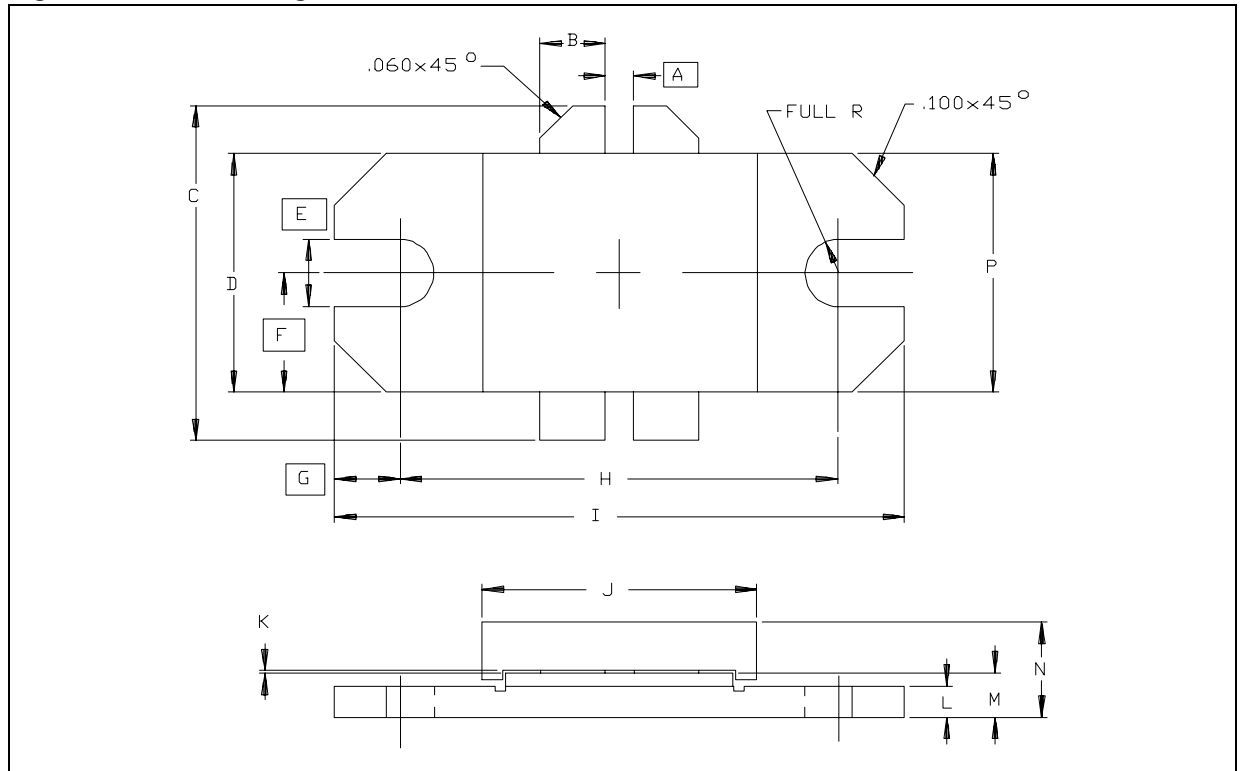
Figure 9. Test Circuit Layout

PACKAGE MECHANICAL

Table 8. M173 Mechanical Data

Symbol	millimeters			inches		
	Min	Typ	Max	Min	Typ	Max
A		1.40			0.55	
B	3.05		3.30	0.120		0.130
C			19.94			0.785
D	11.56		11.81	0.455		0.465
E		3.18			0.125	
F		5.84			0.230	
G		3.25			0.128	
H	21.28		21.59	0.838		0.850
I	27.81		28.07	1.095		1.105
J	13.34		13.59	0.525		0.535
K	0.05		0.15	0.002		0.006
L	1.40		1.65	0.055		0.065
M	2.03		2.41	0.080		0.095
N			4.95			0.195
P	11.56		11.81	0.455		0.465

Figure 10. M173 Package Dimensions



Note: Drawing is not to scale.

REVISION HISTORY**Table 9. Revision History**

Date	Revision	Description of Changes
June-1993	1	First Issue
3-June-2004	2	Stylesheet update. No content change.

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