SD1477

RF POWER BIPOLAR TRANSISTORS
VHF MOBILE APPLICATIONS

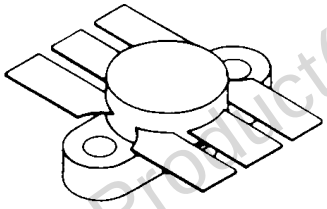
FEATURES SUMMARY

- 175 MHz
- 12.5 VOLTS
- COMMON EMITTER
- P_{OUT} = 100 W MIN. WITH 6.0 dB GAIN

DESCRIPTION

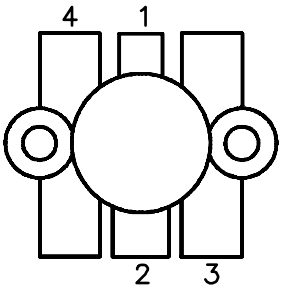
The SD1477 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for VHF FM communications. This device utilizes diffused emitter resistors to withstand extremely high VSWR under rated operating conditions, and is internally input matched to optimize power gain and efficiency over the 136 - 175 MHz band.

Figure 1. Package



.500 6L FL (M111)
epoxy sealed

Figure 2. Pin Connection



1. Collector
2. Base
3. Emitter
4. Emitter

Table 1. Order Codes

Order Codes	Marking	Package	Packaging
SD1477	SD1477	M111	PLASTIC TRAYS

Table 2. Absolute Maximum Ratings (T_{case} = 25°C)

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	36	V
V_{CEO}	Collector-Emitter Voltage	18	V
V_{CES}	Collector-Emitter Voltage	36	V
V_{EBO}	Emitter-Base Voltage	4.0	V
I_C	Device Current	20	A
P_{DISS}	Power Dissipation	270	W
T_J	Junction Temperature	+200	°C
T_{STG}	Storage Temperature	– 65 to +150	°C

Table 3. Thermal Data

Symbol	Parameter	Value	Unit
$R_{TH(j-c)}$	Junction-Case Thermal Resistance	0.65	°C/W

ELECTRICAL SPECIFICATIONS (T_{case} = 25°C)

Table 4. Static

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
BV_{CBO}	I_C = 50 mA; I_E = 0 mA	36	—	—	V
BV_{CES}	I_C = 100 mA; V_{BE} = 0 V	36	—	—	V
BV_{CEO}	I_C = 100 mA; I_B = 0 mA	18	—	—	V
BV_{EBO}	I_E = 10 mA; I_C = 0 mA	4.0	—	—	V
I_{CES}	V_{CE} = 15 V; I_E = 0 mA	—	—	15	mA
h_{FE}	V_{CE} = 5 V; I_C = 5 A	10	—	—	—

Table 5. Dynamic

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
P_{OUT}	f = 175 MHz; P_{IN} = 25 W; V_{CC} = 12.5 V	100	—	—	W
G_P	f = 175 MHz; P_{IN} = 25 W; V_{CC} = 12.5 V	6.0	—	—	dB
C_{OB}	f = 1 MHz; V_{CB} = 12.5 V	—	350	—	pF

TYPICAL PERFORMANCE

Figure 3. Power Output vs Frequency

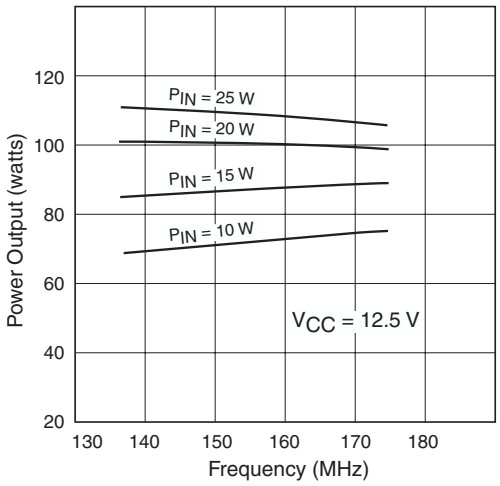
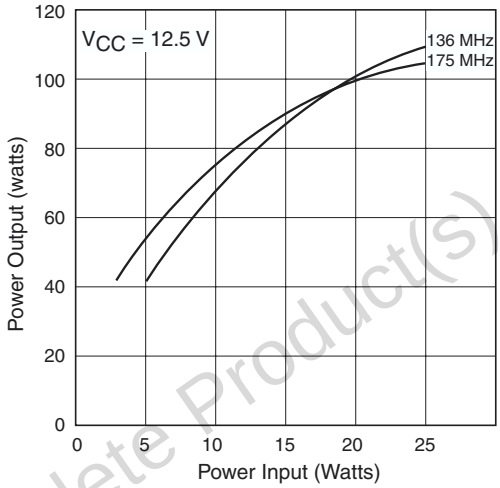


Figure 4. Power Output vs Power Input



IMPEDANCE DATA

Figure 5. Typical Input Impedance

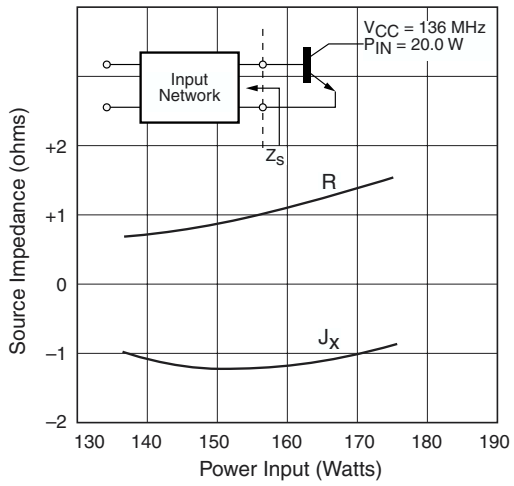


Figure 6. Typical Collector Load Impedance

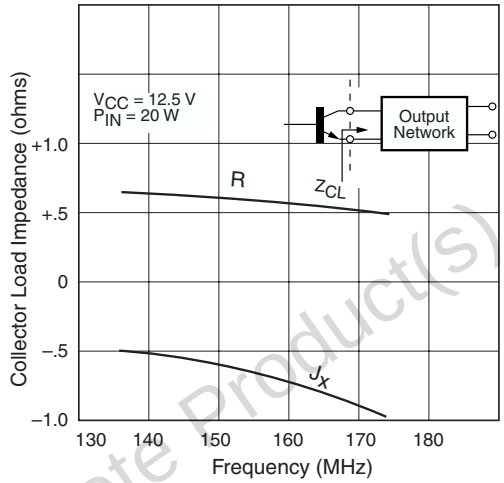


Table 6. Impedance Data

FREQ.	Z_{IN} (Ω)	Z_{CL} (Ω)
175 MHz	1.5 – j 0.9	0.5 – j 1.0

TEST CIRCUIT

Figure 7. Test Circuit

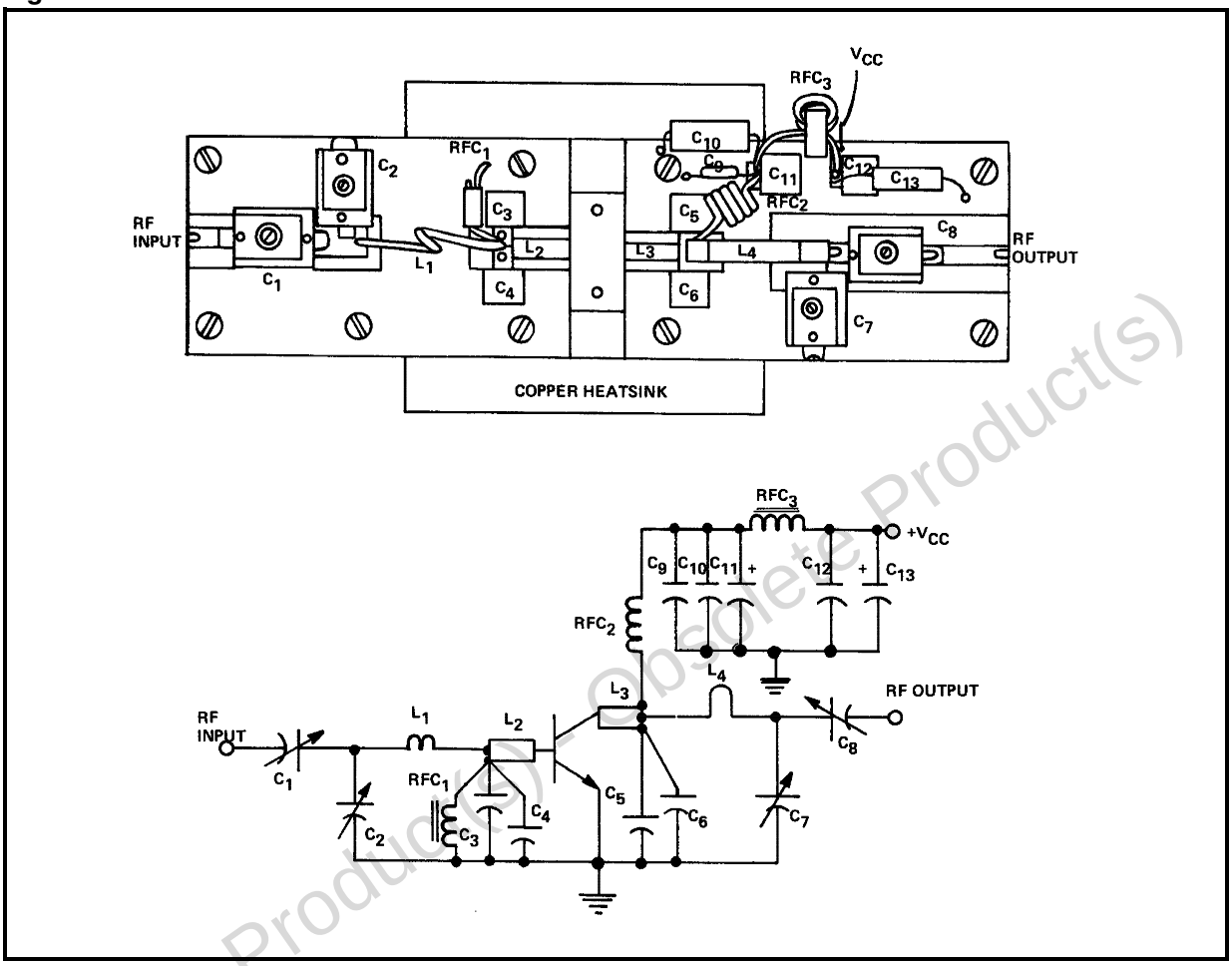
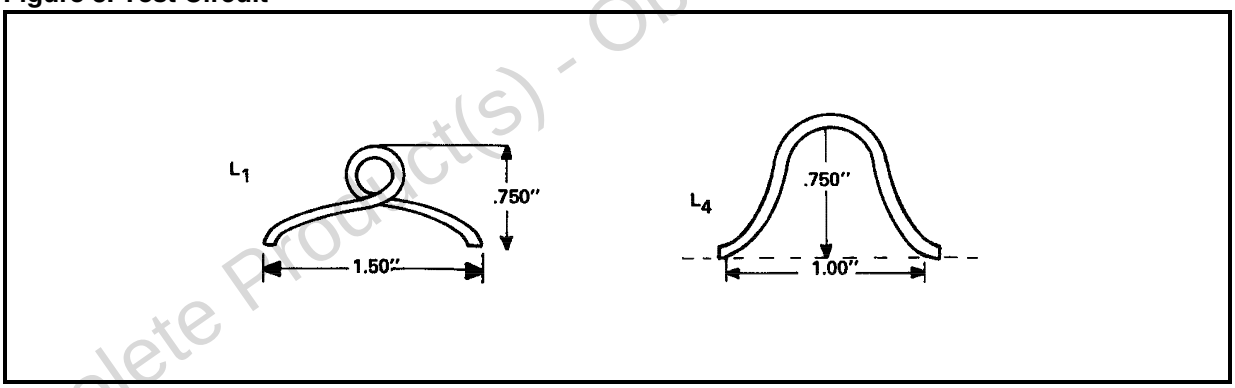


Table 7. Test Circuit

C1, C2	Arco 462 5 - 80pF
C3, C4	Unelco 100pF, 350V
C5, C6	Unelco 120pF, 350V
C7, C8	Arco 463 9 - 180pF
C9, C12	Unelco 1000pF, 350V
C10	Erie .15µF, 200V Red Cap
C11	25µF, 25V Electrolytic
C13	10µF, 25V Electrolytic
L1	1 Turn, #12, 1/4" I.D.
L2, L3	1/2" 50Ω Stripline (.180" Wide)
L4	1/8" Thick Copper Strap 1/4" Wide
RCF1	1 1/2 Turns on Ferroxcube VK200/19-B
RCF2	4 Turn #16 Enamel, 3/8" I.D., 3/8" Long
RCF3	4 Turns #16 Enamel on T50-2 Torroid
Board Material	3M-K6098, 1/16" Thick

Figure 8. Test Circuit

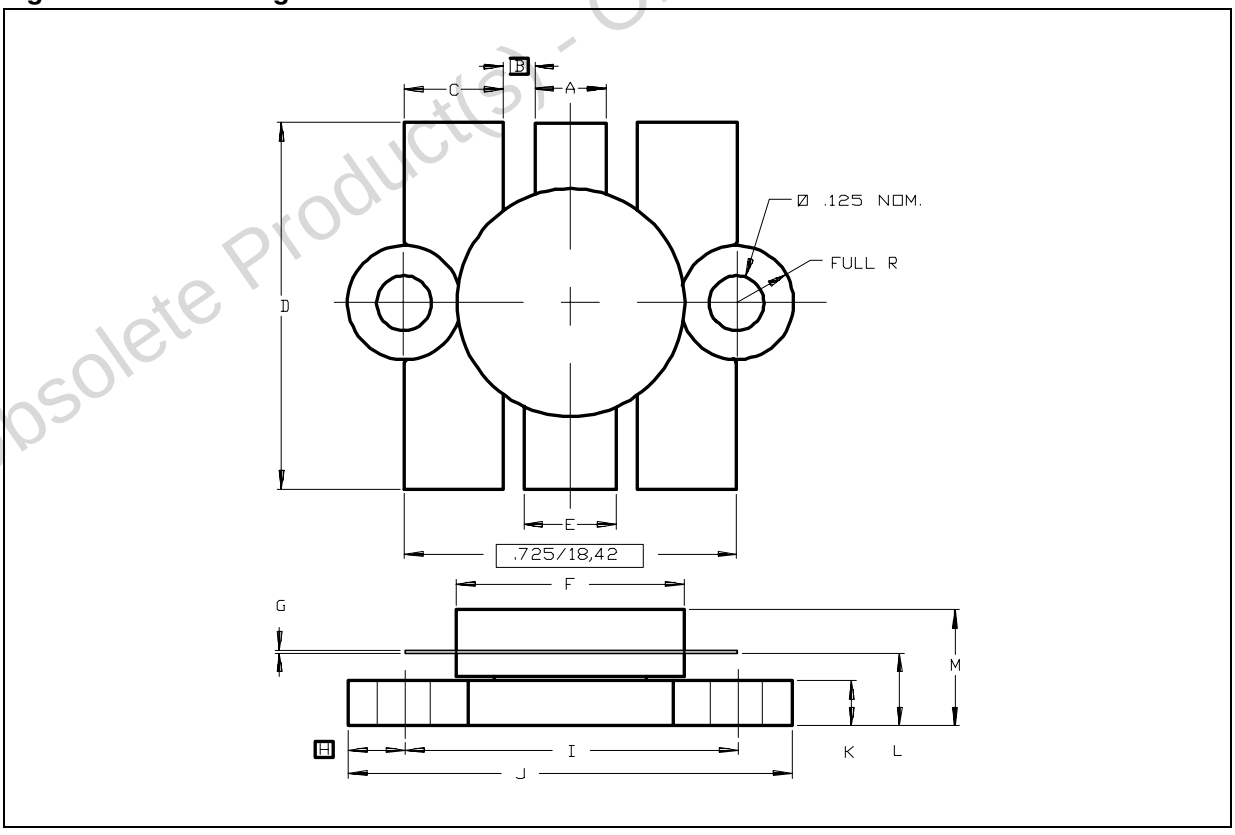


PACKAGE MECHANICAL

Table 8. M111 Mechanical Data

Symbol	millimeters			inches		
	Min	Typ	Max	Min	Typ	Max
A	3.43		4.06	0.150		0.160
B		1.14			0.045	
C	5.33		5.59	0.210		0.220
D	21.21		21.97	0.835		0.865
E	5.08		5.33	0.200		0.210
F	12.45		12.95	0.490		0.510
G	0.08		0.18	0.003		0.007
H		3.18			0.125	
I	18.29		18.54	0.720		0.730
J	24.64		24.89	0.970		0.980
K	2.41		2.67	0.095		0.105
L	3.81		4.32	0.150		0.170
M			7.11			0.280

Figure 9. M111 Package Dimensions



Note: Drawing is not to scale.

REVISION HISTORY

Table 9. Revision History

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