



# SD1446

## RF POWER BIPOLAR TRANSISTORS UHF MOBILE APPLICATIONS

### FEATURES SUMMARY

- 50 MHz
- 12.5 VOLTS
- EFFICIENCY 55%
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT} = 70 \text{ W MIN. WITH } 10 \text{ dB GAIN}$

### DESCRIPTION

The SD1446 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for land mobile transmitter applications. This device utilizes emitter ballasting and is extremely stable and capable of withstanding high VSWR under operating conditions.

Figure 1. Package

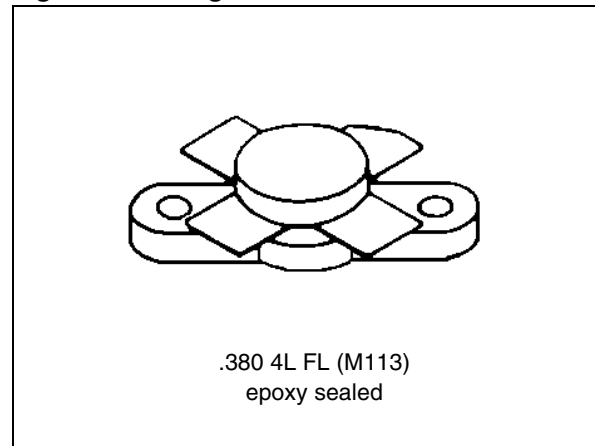


Figure 2. Pin Connection

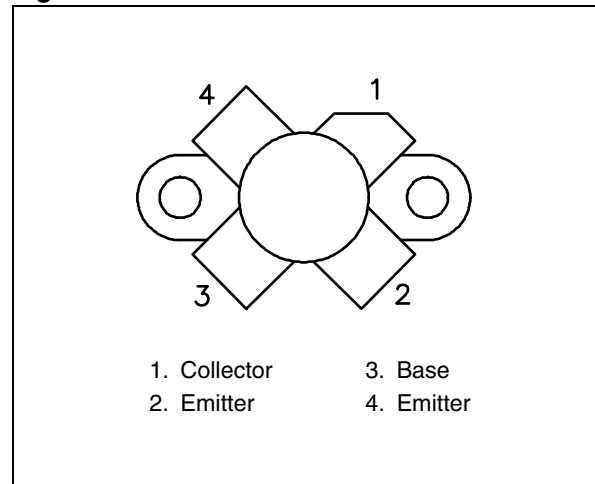


Table 1. Order Codes

Order Codes	Marking	Package	Packaging
SD1446	SD1446	M113	PLASTIC TRAYS

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

Symbol	Parameter	Value	Unit
$V_{\text{CBO}}$	Collector-Base Voltage	36	V
$V_{\text{CEO}}$	Collector-Emitter Voltage	18	V
$V_{\text{EBO}}$	Emitter-Base Voltage	3.5	V
$I_{\text{C}}$	Device Current	12.0	A
$P_{\text{DISS}}$	Power Dissipation	183	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	1.05	$^{\circ}\text{C/W}$

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

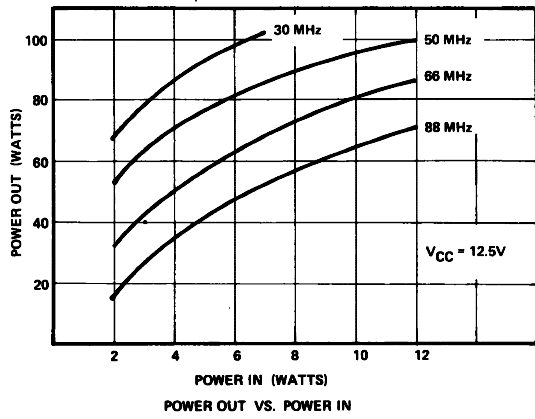
Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
$BV_{\text{CBO}}$	$I_{\text{C}} = 50 \text{ mA}; I_{\text{E}} = 0 \text{ mA}$	36	—	—	V
$BV_{\text{CES}}$	$I_{\text{C}} = 100 \text{ mA}; V_{\text{BE}} = 0 \text{ V}$	36	—	—	V
$BV_{\text{CEO}}$	$I_{\text{C}} = 50 \text{ mA}; I_{\text{B}} = 0 \text{ mA}$	18	—	—	V
$BV_{\text{EBO}}$	$I_{\text{E}} = 10 \text{ mA}; I_{\text{C}} = 0 \text{ mA}$	3.5	—	—	V
$I_{\text{CES}}$	$V_{\text{CE}} = 15 \text{ V}; I_{\text{E}} = 0 \text{ mA}$	—	—	10	mA
$h_{\text{FE}}$	$V_{\text{CE}} = 5 \text{ V}; I_{\text{C}} = 5 \text{ A}$	10	—	—	—

**Table 5. Dynamic**

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
$P_{\text{OUT}}$	$f = 50 \text{ MHz}; P_{\text{IN}} = 7 \text{ W}; V_{\text{CE}} = 12.5 \text{ V}$	70	—	—	W
$G_{\text{P}}$	$f = 50 \text{ MHz}; P_{\text{IN}} = 7 \text{ W}; V_{\text{CE}} = 12.5 \text{ V}$	10	—	—	dB
$\eta_{\text{c}}$	$f = 50 \text{ MHz}; P_{\text{IN}} = 7 \text{ W}; V_{\text{CE}} = 12.5 \text{ V}$	—	55	—	%
$C_{\text{OB}}$	$f = 1 \text{ MHz}; V_{\text{CB}} = 12.5 \text{ V}$	—	—	300	pF

TYPICAL PERFORMANCE

Figure 3. Power Output vs Power Input



IMPEDANCE DATA

Figure 4. Typical Input Impedance

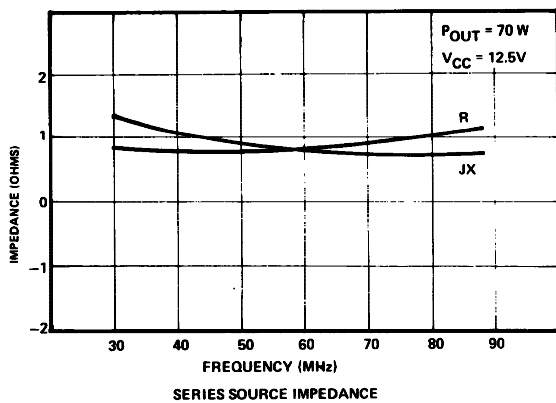


Figure 5. Typical Collector Load Impedance

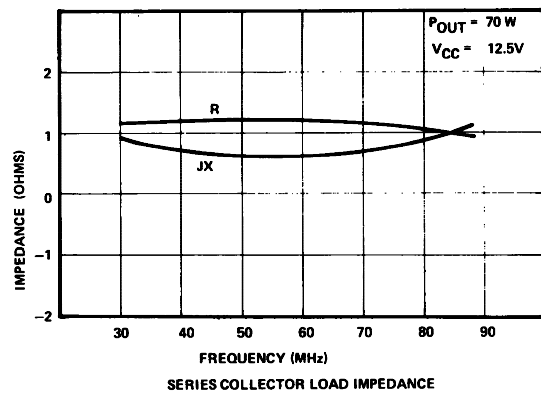


Table 6. Impedance Data (1)

FREQ.	$Z_{IN} (\Omega)$	$Z_{CL} (\Omega)$
50 MHz	$0.8 + j 0.9$	$1.2 + j 0.6$

Note: 1.  $P_{OUT} = 70W$ ;  $V_{CE} = 12.5 V$

## TEST CIRCUIT

Figure 6. Test Circuit

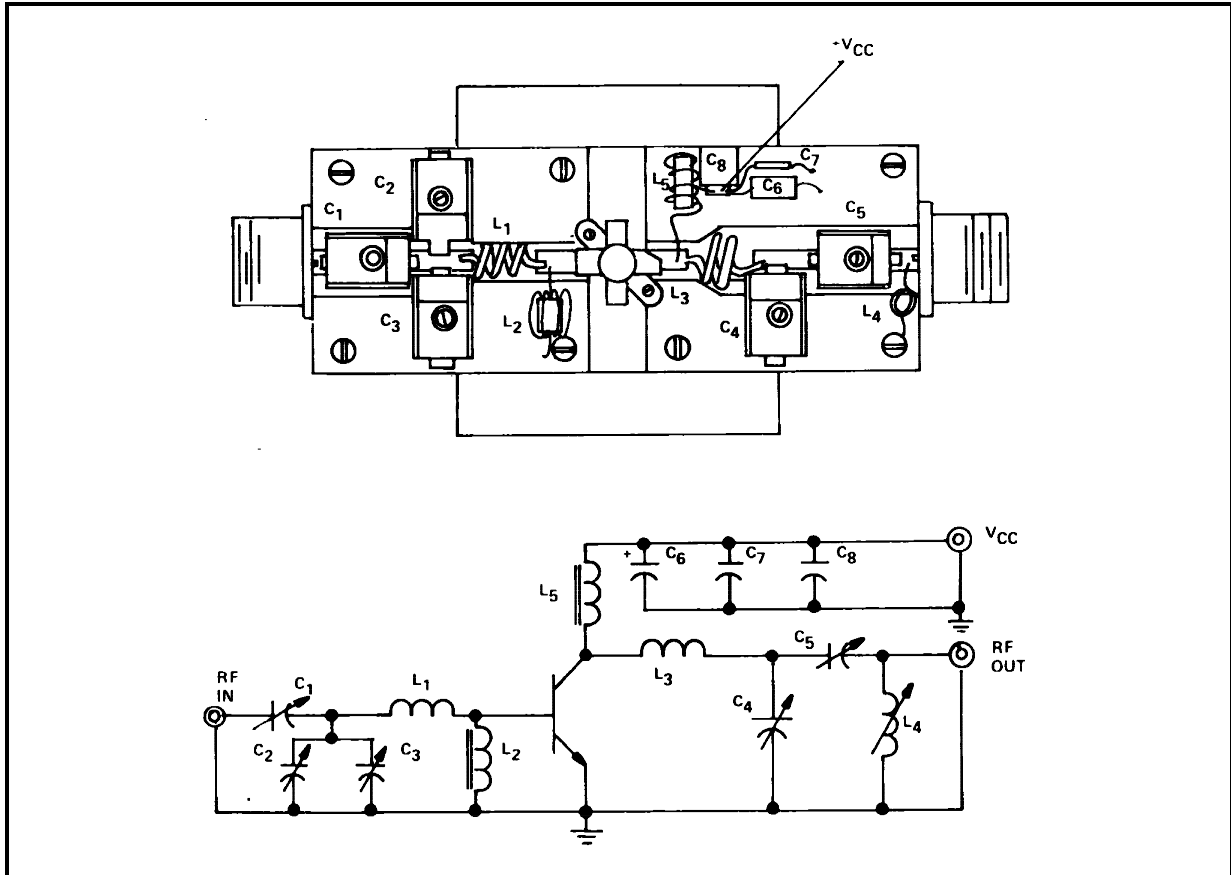


Table 7. Test Circuit

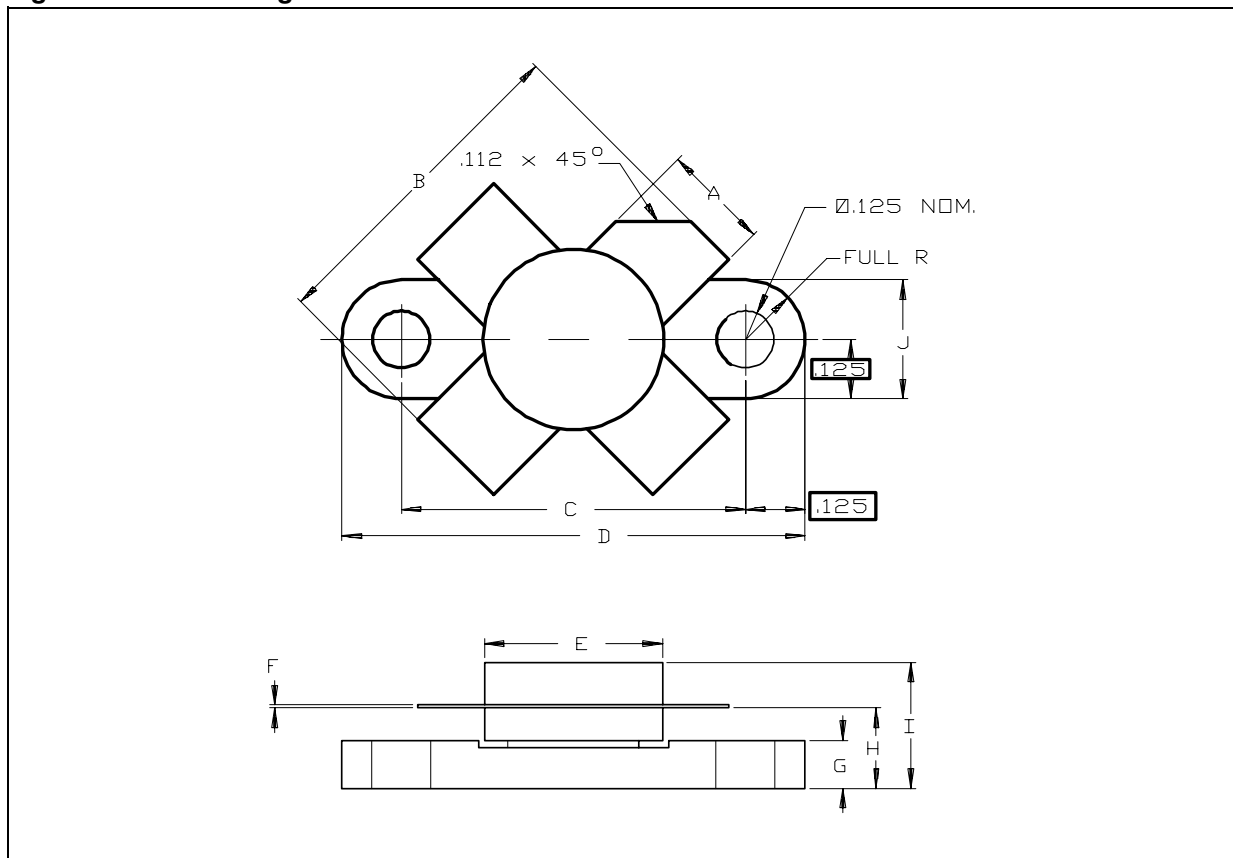
C1, C4	50 - 380pF Arco 465
C2	110 - 580pF Arco 467
C3	140 - 680pF Arco 468
C5	9 - 180pF Arco 463
C6	10 $\mu$ F, 35Vdc, Electrolytic
C7	.01 $\mu$ F Erie
C8	1000pF Unelco
L1	2 1/2 Turns, #14 Awg, Tinned, 1/4" I.D. Loose Wound
L2	10 Turns, #28 AWG, Enameled on Ferroxcube Sleeve #3B
L3	1 1/2 Turns, #12 AWG, Tinned, 3/8" I.D. Loose Wound
L4	8 Turns, #18 AWG on 1/4" I.D. Coil form 1/2" Length with Ferrite Slug
L5	11 Turns, #16 AWG, Enameled on Torroid, Micrometals, T50-2
Board Material	Double Sided Copper 1/16" Thick

## PACKAGE MECHANICAL

Table 8. M113 Mechanical Data

Symbol	millimeters			inches		
	Min	Typ	Max	Min	Typ	Max
A	5.59		5.84	0.220		0.230
B	19.94			0.785		
C	18.29		18.54	0.720		0.730
D	24.64		24.89	0.970		0.980
E			9.78			0.385
F	0.10		0.15	0.004		0.006
G	2.16		2.67	0.085		0.105
H	4.06		4.57	0.160		0.180
I			7.11			0.280
J	6.10		6.48	0.240		0.255

Figure 7. M113 Package Dimensions



Note: Drawing is not to scale.

**REVISION HISTORY**

**Table 9. Revision History**

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

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics.  
All other names are the property of their respective owners

© 2004 STMicroelectronics - All rights reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan -  
Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States

[www.st.com](http://www.st.com)