



SD4011

RF POWER BIPOLAR TRANSISTORS UHF TV/LINEAR APPLICATIONS

FEATURES SUMMARY

- GOLD METALLIZATION
- INTERNAL INPUT MATCHING
- COMMON EMITTER
- OVERLAY GEOMETRY
- CLASS A OPERATION
- METAL/CERAMIC PACKAGE
- $P_{OUT} = 4 \text{ W MIN. WITH } 8 \text{ dB GAIN}$

DESCRIPTION

The SD4011 is a gold metallized NPN silicon bipolar device optimized for Class A operation in TV Band IV/V.

Suitable for a variety of other UHF linear applications, SD4011 is supplied in an industry-standard .280 stud package.

Figure 1. Package

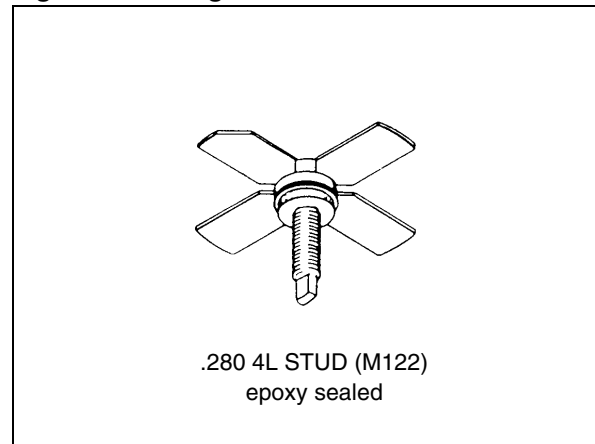


Figure 2. Pin Connection

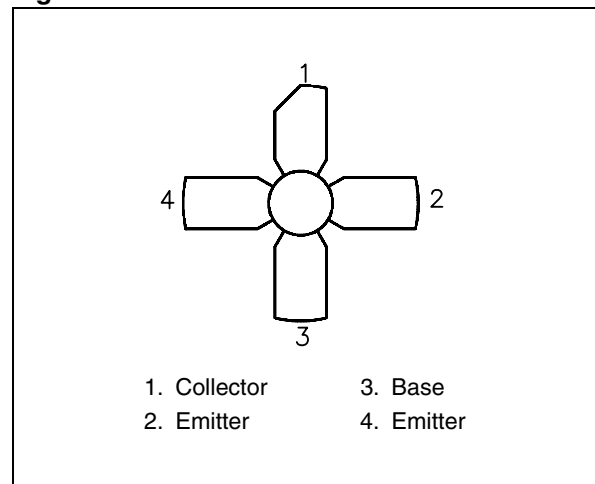


Table 1. Order Codes

Order Codes	Marking	Package	Packaging
SD4011	SD4011	M122	BLACK CARDBOARDS

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

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	65	V
V_{CES}	Collector-Emitter Voltage	65	V
V_{EBO}	Emitter-Base Voltage	3.5	V
I_{C}	Device Current	1.59	A
P_{DISS}	Power Dissipation	31.8	W
T_{J}	Junction Temperature	+200	$^{\circ}\text{C}$
T_{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	5.5	$^{\circ}\text{C/W}$

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

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
BV_{CBO}	$I_{\text{C}} = 5 \text{ mA}; I_{\text{E}} = 0 \text{ mA}$	65	—	—	V
BV_{EBO}	$I_{\text{E}} = 5 \text{ mA}; I_{\text{C}} = 0 \text{ mA}$	3.5	—	—	V
BV_{CES}	$I_{\text{C}} = 10 \text{ mA}; V_{\text{BE}} = 0 \text{ V}$	65	—	—	V
BV_{CEO}	$I_{\text{C}} = 5 \text{ mA}; I_{\text{B}} = 0 \text{ mA}$	20	—	—	V
I_{CBO}	$V_{\text{CB}} = 40 \text{ V}; I_{\text{E}} = 0 \text{ mA}$	—	—	1.0	mA
h_{FE}	$V_{\text{C}} = 5 \text{ V}; I_{\text{C}} = 800 \text{ mA}$	20	—	200	—

Table 5. Dynamic

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
P_{OUT}	$f = 860 \text{ MHz}; V_{\text{CE}} = 25 \text{ V}; I_{\text{C}} = 850 \text{ mA}$	4	—	—	W
G_{P}	$f = 860 \text{ MHz}; V_{\text{CE}} = 25 \text{ V}; I_{\text{C}} = 850 \text{ mA}$	8.0	—	—	dB
IMD_3	$f = 860 \text{ MHz}; V_{\text{CE}} = 25 \text{ V}; I_{\text{C}} = 850 \text{ mA}$	-60	—	—	dBc
C_{OB}	$f = 1 \text{ MHz}; V_{\text{CE}} = 25 \text{ V}$	—	13	20	pF

Note: $P_{\text{IN}} = 0.63$

TYPICAL PERFORMANCE

Figure 3. Intermodulation Distortion vs Power Output

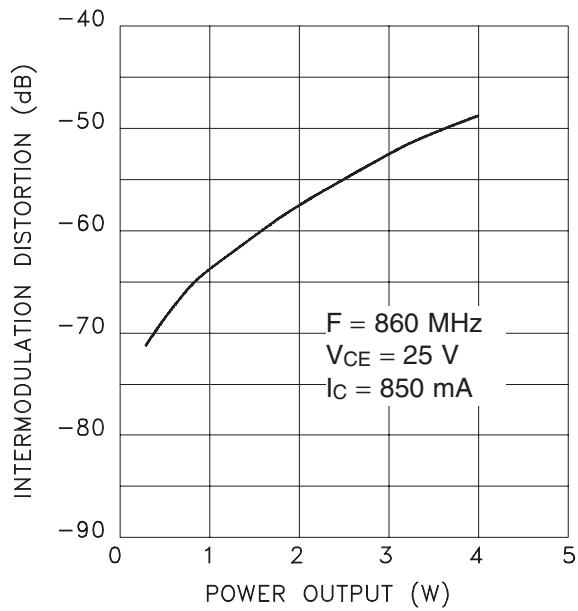
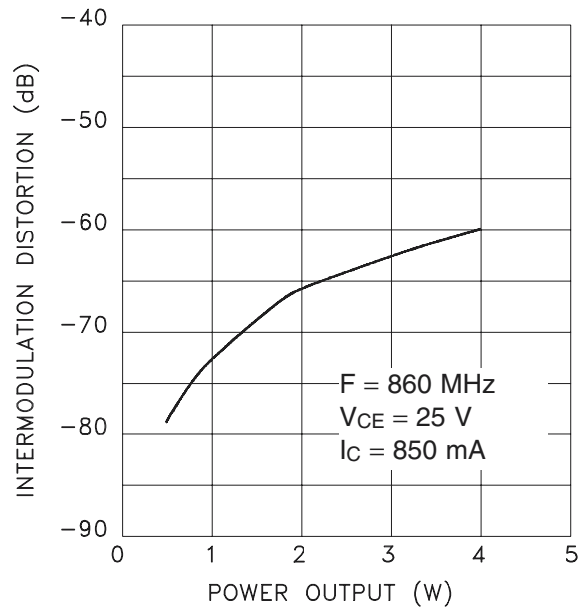


Figure 4. Intermodulation Distortion (3 Tones) vs Power Output



IMPEDANCE DATA

Figure 5. Impedance Data

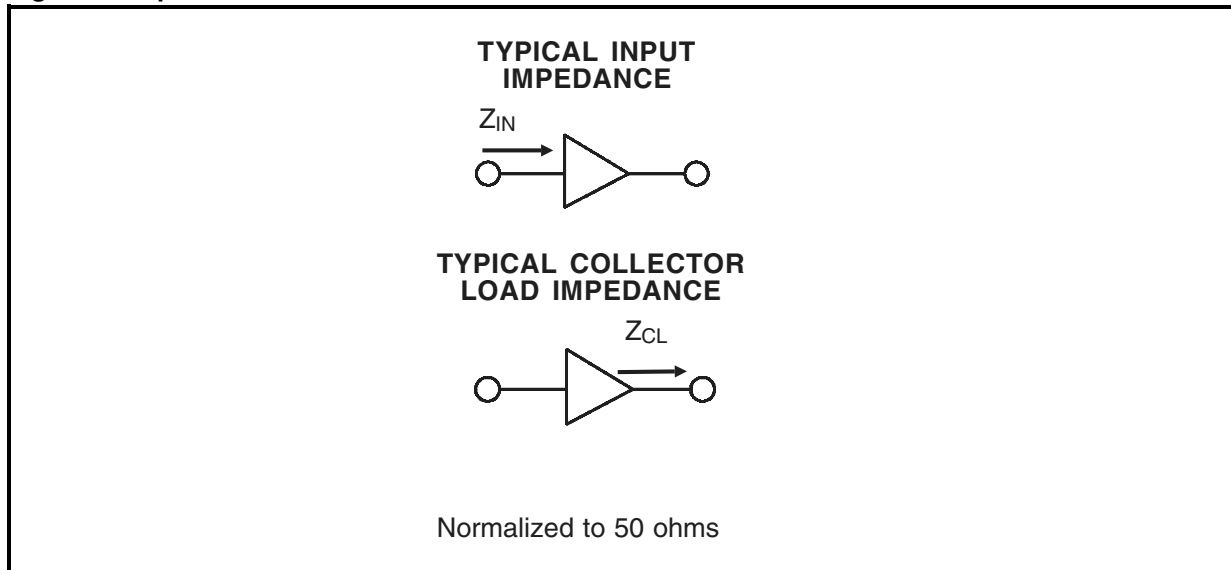


Table 6. Impedance Data

FREQ.	Z_{IN} (Ω)	Z_{CL} (Ω)
470 MHz	$2.26 + j 1.67$	$11.30 + j 5.23$
600 MHz	$1.93 + j 1.96$	$10.65 + j 2.91$
700 MHz	$1.40 + j 2.38$	$8.41 + j 6.07$
860 MHz	$1.19 + j 3.45$	$5.63 + j 4.17$

TEST CIRCUIT

Figure 6. Test Circuit

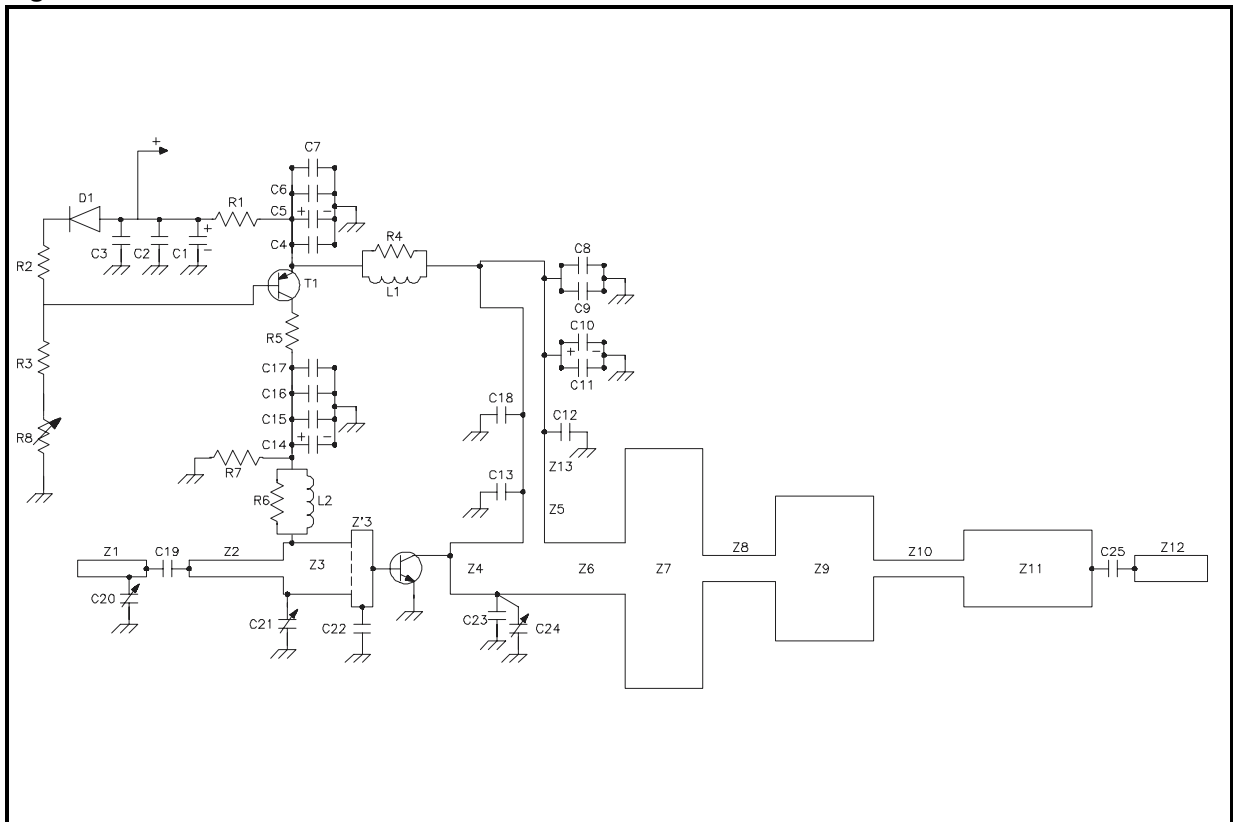


Table 7. Test Circuit

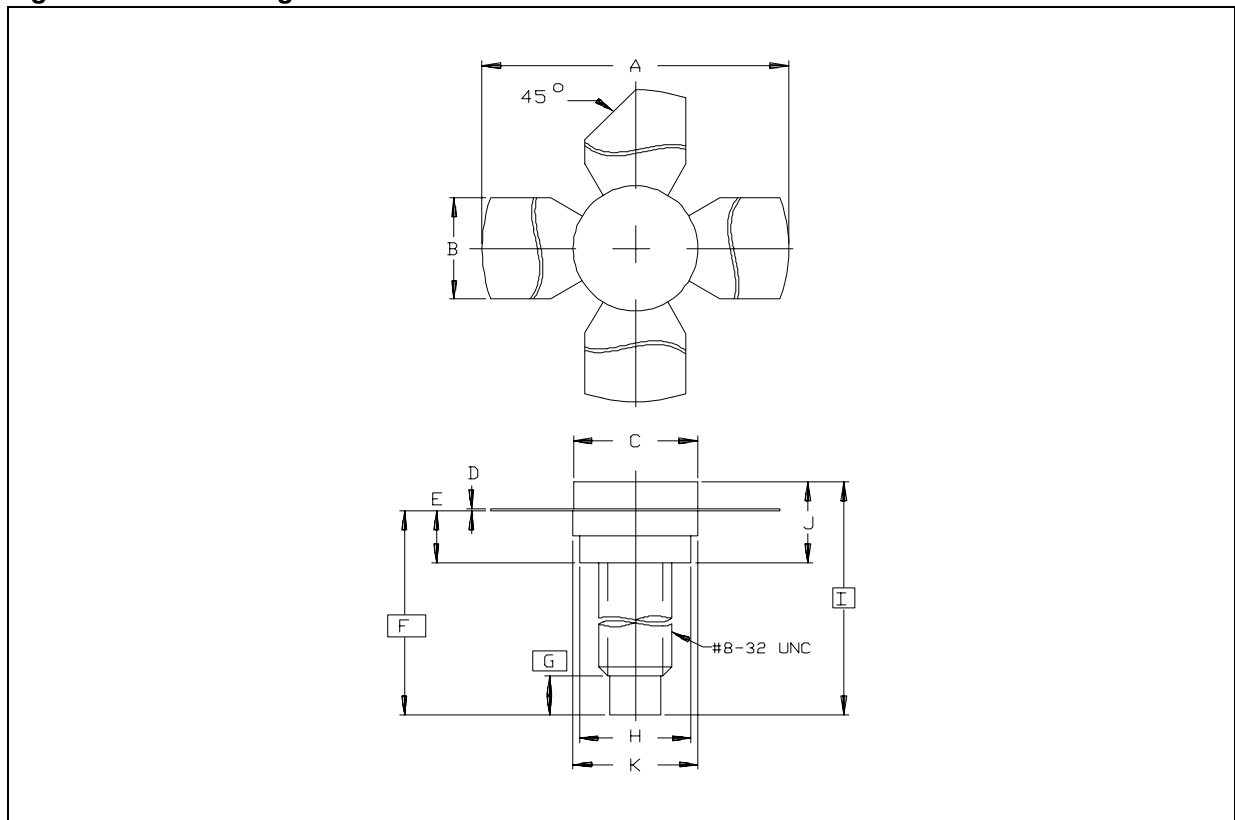
C1	22 μ F - 63V - Sprague
C2, C6, C8, C15,	4.7nF Chip LCC
C3, C7, C9, C11, C16	100nF Chip LCC
C4, C10	4.7 μ F - 40V - Sprague
C5, C14	4.7 μ F - 63V - Sprague
C12, C17, C18	470pF Chip LCC
C13, C25	47pF ATC 100B
C19	47pF ATC 100A
C20	0.5 - 4.5pF Adjustable Airtronic
C21, C24	0.8 - 5pF Adjustable Johanson
C22	10pF ATC 100A
C23	15pF ATC 100B
D1	1N 4001 or 1N 914
L1	6 Turns - Wire Dia. 5/10 on 2.5mm Internal Dia.
L2	10 to 12 Turns on R6 - Wire Dia. 5/10
R1	2.2 Ω - 3W - Sfernice
R2	100 Ω - 1/2W
R3	510 Ω - 1/2W
R4, R6	100 Ω - 1/2W
R5, R7	56 Ω - 1W
R8	3.3k Ω Adjustable
T1	BDX 54 B
Z1	50 Ω transmission line - length 18mm
Z2	50 Ω transmission line - length 22mm
Z3	16,4 Ω transmission line - length 12mm
Z'3	10,5 Ω transmission line - length 3.5mm
Z4	20 Ω transmission line - length 13mm
Z5	50 Ω transmission line - length 2.5mm
Z6	20 Ω transmission line - length 23mm
Z7	4 Ω transmission line - length 8% λ g at 860MHz
Z8	55 Ω transmission line - length 7.5% λ g at 860MHz
Z9	7.5 Ω transmission line - length 8% λ g at 860MHz
Z10	100 Ω transmission line - length 8% λ g at 860MHz
Z11	20 Ω transmission line - length 8% λ g at 860MHz
Z12	50 Ω transmission line - length 5mm
Z13	50 Ω transmission line - length 12mm

PACKAGE MECHANICAL

Table 8. M122 Mechanical Data

Symbol	millimeters			inches		
	Min	Typ	Max	Min	Typ	Max
A	25.65		26.80	1.010		1.055
B	5.59		5.84	0.220		0.230
C	6.86		7.24	0.270		0.285
D	0.08		0.18	0.003		0.007
E	2.97		3.48	0.117		0.137
F		14.53			0.572	
G		3.30			0.130	
H	6.22		6.48	0.245		0.255
I		16.26			0.640	
J	4.45		5.51	0.175		0.217
K	6.99		7.24	0.275		0.285

Figure 7. M122 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.

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