SD4011

RF POWER BIPOLAR TRANSISTORS
UHF TV/LINEAR APPLICATIONS

FEATURES SUMMARY

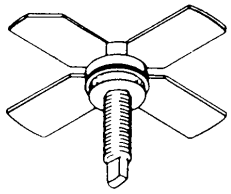
- GOLD METALLIZATION
- INTERNAL INPUT MATCHING
- COMMON EMITTER
- OVERLAY GEOMETRY
- CLASS A OPERATION
- METAL/CERAMIC PACKAGE
- P_{OUT} = 4 W MIN. WITH 8 dB GAIN

DESCRIPTION

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

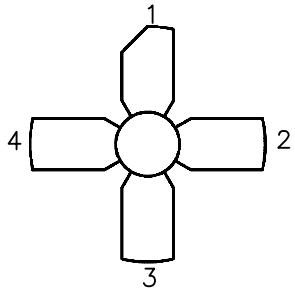
Suitable for a variety of other UHF linear applications, SD4011 is supplied in an industry-standard .280 stud package.

Figure 1. Package



.280 4L STUD (M122)
epoxy sealed

Figure 2. Pin Connection



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

Table 1. Order Codes

Order Codes	Marking	Package	Packaging
SD4011	SD4011	M122	BLACK CARDBOARDS

Table 2. Absolute Maximum Ratings (T_{case} = 25°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	°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	5.5	°C/W

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

Table 4. Static

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
BV_{CBO}	I_C = 5 mA; I_E = 0 mA	65	—	—	V
BV_{EBO}	I_E = 5 mA; I_C = 0 mA	3.5	—	—	V
BV_{CES}	I_C = 10 mA; V_{BE} = 0 V	65	—	—	V
BV_{CEO}	I_C = 5 mA; I_B = 0 mA	20	—	—	V
I_{CBO}	V_{CB} = 40 V; I_E = 0 mA	—	—	1.0	mA
h_{FE}	V_C = 5 V; I_C = 800 mA	20	—	200	—

Table 5. Dynamic

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
P_{OUT}	f = 860 MHz; V_{CE} = 25 V; I_C = 850 mA	4	—	—	W
G_P	f = 860 MHz; V_{CE} = 25 V; I_C = 850 mA	8.0	—	—	dB
IMD_3	f = 860 MHz; V_{CE} = 25 V; I_C = 850 mA	–60	—	—	dBc
C_{OB}	f = 1 MHz; V_{CE} = 25 V	—	13	20	pF

Note: P_{IN} = 0.63

TYPICAL PERFORMANCE

Figure 3. Intermodulation Distortion vs Power Output

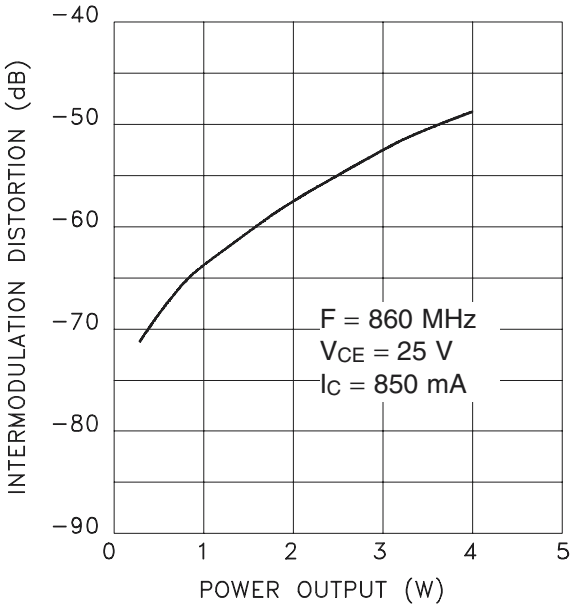
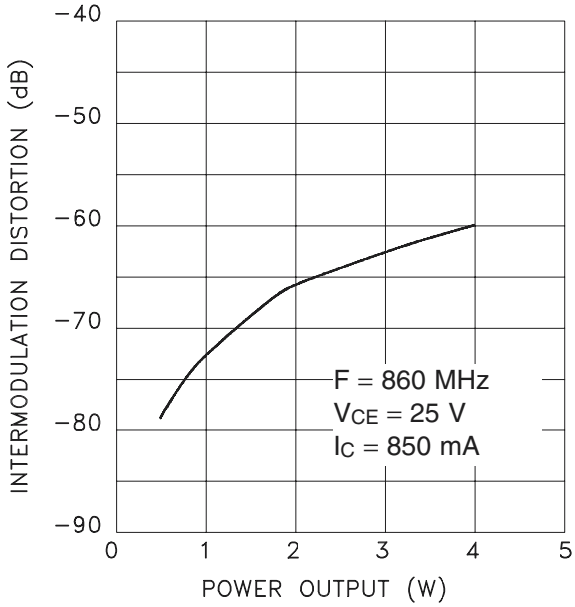


Figure 4. Intermodulation Distortion (3 Tones) vs Power Output



IMPEDANCE DATA

Figure 5. Impedance Data

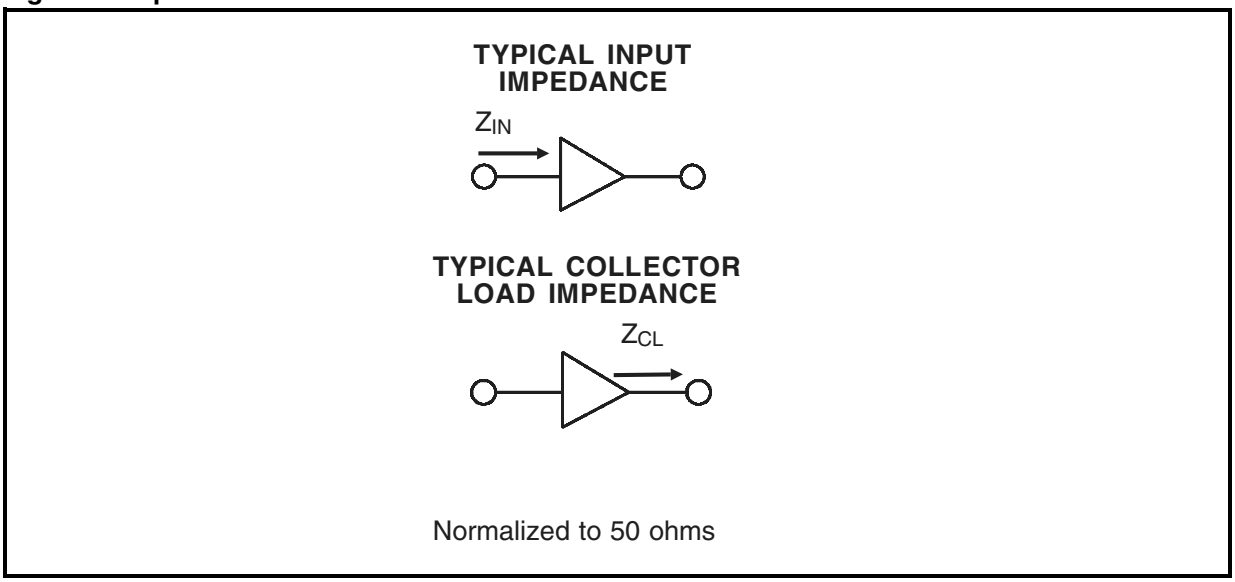


Table 6. Impedance Data

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

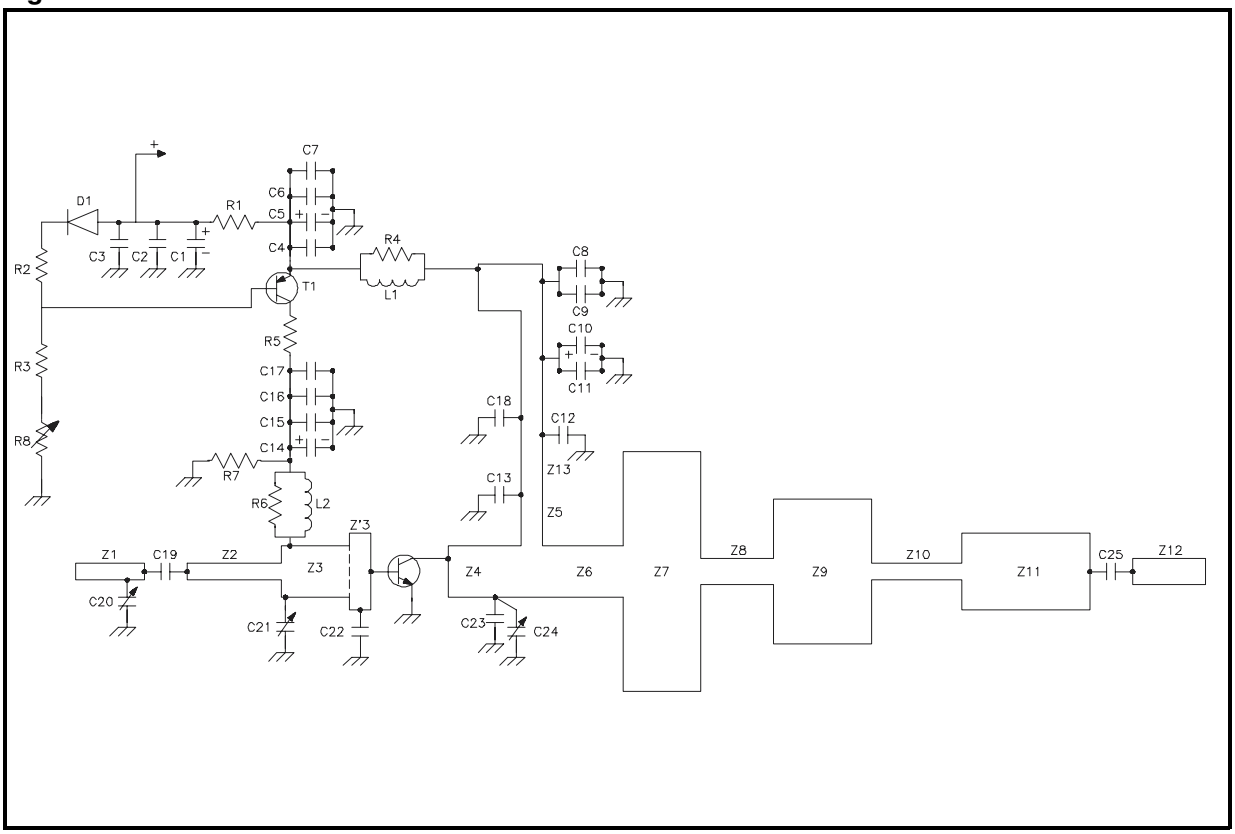


Table 7. Test Circuit

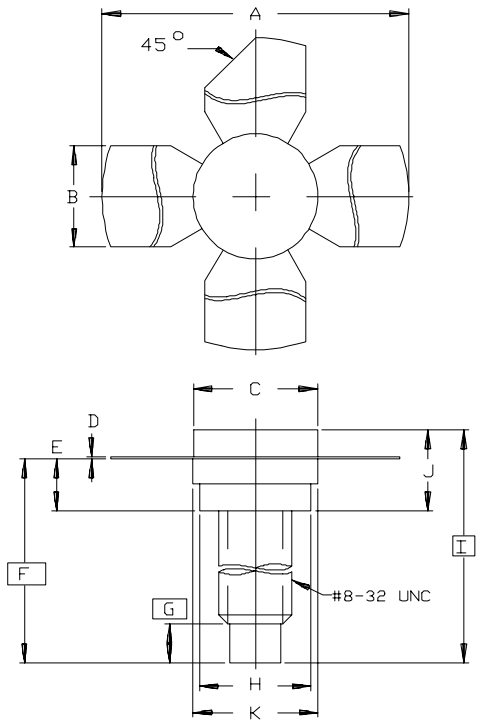
C1	22µF - 63V - Sprague
C2, C6, C8, C15,	4.7nF Chip LCC
C3, C7, C9, C11, C16	100nF Chip LCC
C4, C10	4.7µF - 40V - Sprague
C5, C14	4.7µF - 63V - Sprague
C12, C17, C18	470pF Chip LCC
C13, C25	47pF ATC 100B
C19	47pF ATC 100A
C20	0.5 - 4.5pF Adjustable Airtronic
C21, C24	0.8 - 5pF Adjustable Johanson
C22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