

DESCRIPTION

The SD1006 is a silicon NPN transistor designed to be utilized in broadband and linear amplifier circuitry requiring low noise and low intermodulation distortion. The SD1006 is suitable for use in CATV driver stages in trunk line, bridge and line extender amplifiers.

FEATURES

- * High current-gain bandwidth product (f_T) (1500MHz min.)
- * Low noise figure
- * Low output capacitance ($C_{ob} = 3.5\text{pF max}$ @ $V_{CB} = 30\text{V D.C.}$)
- * Low cross modulation, low intermodulation distortion

f_T	=	1.5GHz
X-MOD	=	-57dB
NF	=	2.7dB (Typ.)
GVE	=	6.8dB



Case : CB-7 (TO 39)

ABSOLUTE RATINGS	t case = 25°C		SYMBOLS	VALUES	UNITS
Collector-Base Voltage			V_{CBO}	50.0	V
Collector-Emitter Voltage			V_{CEO}	30.0	V
Emitter-Base Voltage			V_{EBO}	5.0	V
Collector Current (Max.)			I_C	0.4	A
Total Device Dissipation at +25°C			P_{tot}	3.5	W
Storage and Junction Temperatures			T_{stg}	-65 to +200	°C
			T_j	+200	°C

Junction Case Thermal Resistance	$R_{th(j-c)}$	50.0	°C/W
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September 1981 - 1/4

ELECTRICAL CHARACTERISTICS $t_{\text{case}} = 25^{\circ}\text{C}$

STATIC

Symbols	Values			Units	Test Conditions	
	Min.	Typ.	Max.			
BV_{CEO}^*	30.0	-	-	V	$I_{\text{C}} = 5\text{mA}$	$I_{\text{B}} = 0$
BV_{CBO}^*	50.0	-	-	V	$I_{\text{C}} = 0.1\text{mA}$	$I_{\text{E}} = 0$
BV_{EBO}	5.0	-	-	V	$I_{\text{E}} = 0.1\text{mA}$	$I_{\text{C}} = 0$
I_{CEO}	-	-	0.1	mA	$V_{\text{CB}} = 28.0\text{V}$	$I_{\text{B}} = 0$
h_{FE}	30.0	-	300.0	-	$V_{\text{CE}} = 15.0\text{V}$	$I_{\text{C}} = 50\text{mA}$

*Pulsed through 25 mH Inductor

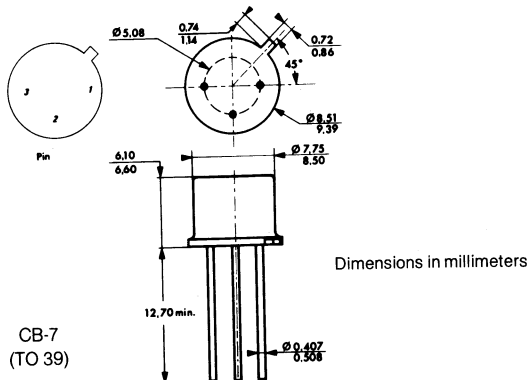
DYNAMIC

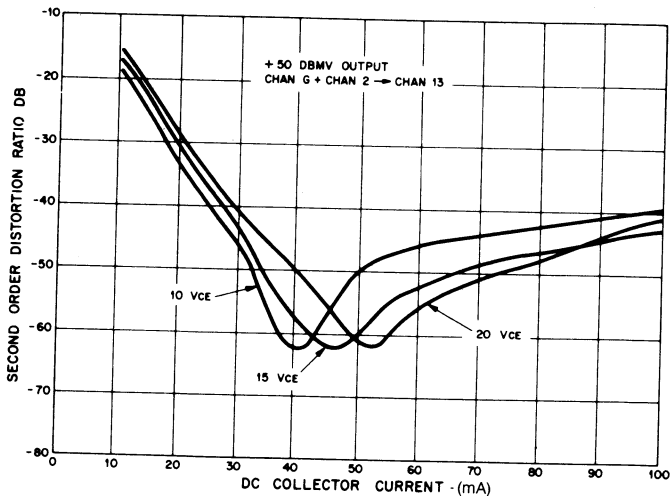
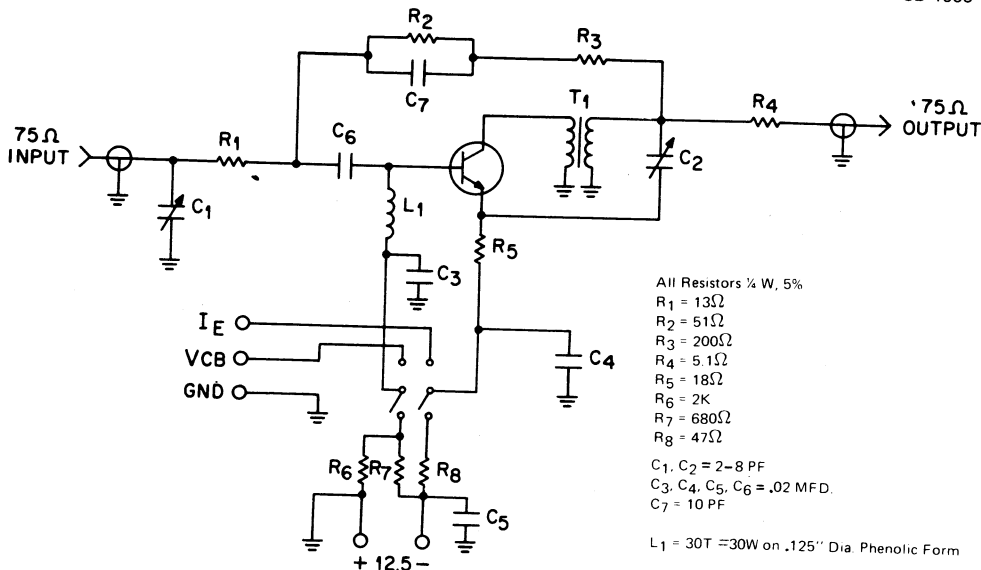
Symbols	Values			Units	Test Conditions		
	Min.	Typ.	Max.				
NF_{NB}	-	2.7	-	dB	$f = 200\text{MHz}$	$V_{\text{CE}} = 10.0\text{V}$	$I_{\text{C}} = 10\text{mA}$
NF_{BB}	-	7.0	8.0	dB	$f = 216\text{MHz}$	$V_{\text{CE}} = 15.0\text{V}$	$I_{\text{C}} = 50\text{mA}$
G_{VE}	6.8	7.2	-	dB	$f = 260\text{MHz}$	$V_{\text{CE}} = 15.0\text{V}$	$I_{\text{C}} = 50\text{mA}$
X-MOD **	-	-60.0	-57.0	dB	$V_{\text{CE}} = 15.0\text{V}$	$I_{\text{C}} = 50\text{mA}$	$P_{\text{o}} = +45\text{dBmV}$
2nd OD ***	-	-60.0	-57.0	dB	$V_{\text{CE}} = 15.0\text{V}$	$I_{\text{C}} = 50\text{mA}$	$P_{\text{o}} = +45\text{dBmV}$
C_{ob}	-	2.5	3.5	pF	$f = 1\text{MHz}$	$V_{\text{CB}} = 30.0\text{V}$	$I_{\text{E}} = 0$
C_{ib}	-	8.0	10.0	pF	$f = 1\text{MHz}$	$V_{\text{EB}} = 0.5\text{V}$	$I_{\text{C}} = 0$
f_{T}	1500.0	1800.0	-	MHz	$f = 200\text{MHz}$	$V_{\text{CE}} = 15.0\text{V}$	$I_{\text{C}} = 50\text{mA}$

**12 Channel Flat -- NCTA Channel 2 through 12 100% Mod (sq. wave) Channel 13CW

***Channel 2 and Channel G Intermod Product on Channel 13

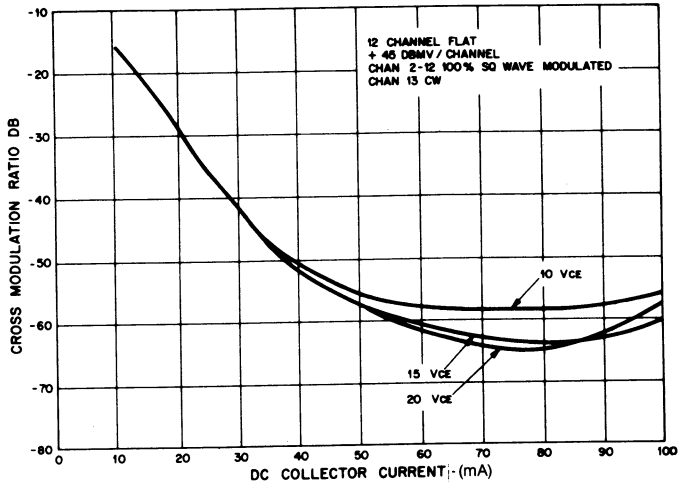
CASE DESCRIPTION



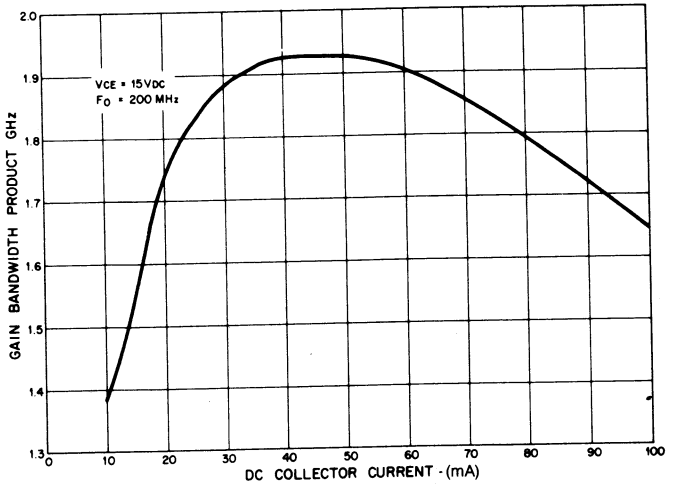


SECOND ORDER DISTORTION vs Ic
 + 50 DBMV OUTPUT
 CHAN. G + CHAN 2 → CHAN 13

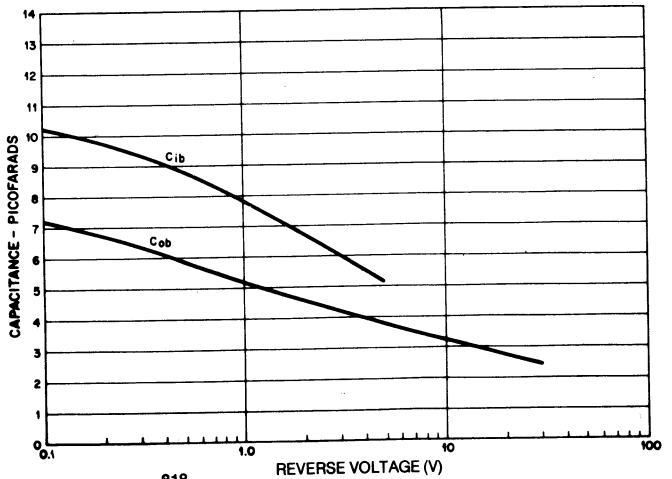
CROSS MODULATION vs I_c
 12 CHANNEL FLAT
 + 45 DBM/CHANNEL
 CHAN 2-12 100% SQ WAVE
 MODULATED
 CHAN 13 CW



F(t) vs I_c



CAPACITANCE
 VS REVERSE VOLTAGE



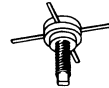
DESCRIPTION

The SD1007-1 is an epitaxial silicon NPN planar transistor which employs a multi-emitter electrode design. The SD1007-1 was designed for high frequency CATV, MATV amplifier applications. It is suitable for driver or output stages. It employs dual electrically matched interdigitated chips for equal current sharing at high current levels.

FEATURES

- * High gain bandwidth product, f_T
- * Low intermodulation, cross-modulation
- * High power gain
- * Low noise figure

$f_T = 1.2 \text{ GHz}$
 $X\text{-MOD} = -60 \text{ dB}$



Case : CB-307 (TO 117)

ABSOLUTE RATINGS	t case = 25°C		
	SYMBOLS	VALUES	UNITS
Collector-Base Voltage	V_{CBO}	40.0	V
Collector-Emitter Voltage	V_{CEO}	30.0	V
Emitter-Base Voltage	V_{EBO}	3.5	V
Collector Current (Max.)	I_C	0.8	A
Total Device Dissipation at +25°C	P_{tot}	10.0	W
Storage and Junction Temperatures	T_{stg}	-65 to +150	°C
	T_j	+200	°C

Junction Case Thermal Resistance	$R_{th(j-c)}$	17.5	°C/W
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September 1981 - 1/2

ELECTRICAL CHARACTERISTICS $t_{\text{case}} = 25^{\circ}\text{C}$

STATIC

Symbols	Values			Units	Test Conditions
	Min.	Typ.	Max.		
BV_{CEO}^*	30.0	-	-	V	$I_{\text{C}} = 10\text{mA}$ $I_{\text{B}} = 0$
BV_{CBO}^*	40.0	-	-	V	$I_{\text{C}} = 0.2\text{mA}$ $I_{\text{E}} = 0$
BV_{EBO}	4.0	-	-	V	$I_{\text{E}} = 0.2\text{mA}$ $I_{\text{C}} = 0$
I_{CEO}	-	-	0.2	mA	$V_{\text{CE}} = 28.0\text{V}$ $I_{\text{B}} = 0$
h_{FE}	30.0	150.0	300.0	-	$V_{\text{CE}} = 20.0\text{V}$ $I_{\text{C}} = 100\text{mA}$

* Pulsed through 25 mH Inductor

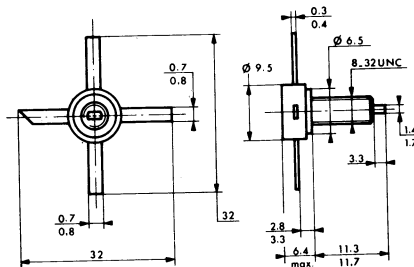
DYNAMIC

Symbols	Values			Units	Test Conditions
	Min.	Typ.	Max.		
X-MOD **	-	-63.0	-60.0	dB	$V_{\text{CE}} = 22.0\text{V}$ $I_{\text{C}} = 125\text{mA}$ $P_{\text{O}} = +50\text{dBmV}$
2ND OD***	-	-60.0	-55.0	dB	$V_{\text{CE}} = 22.0\text{V}$ $I_{\text{C}} = 125\text{mA}$ $P_{\text{O}} = +50\text{dBmV}$
C_{ob}	-	-	8.0	pF	$f = 1\text{MHz}$ $V_{\text{CE}} = 30.0\text{V}$ $I_{\text{E}} = 0$
C_{ib}	-	-	24.0	pF	$f = 1\text{MHz}$ $V_{\text{EB}} = 0.5\text{V}$ $I_{\text{C}} = 0$

**12 Channel Flat -- NCTA Channel 2 through 12 100% Mod (sq. wave) Channel 13 CW

***Channel 2 + Channel G Intermod Product on Channel 13

CASE DESCRIPTION



Dimensions in millimeters

CB-307
(TO 117)

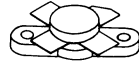
DESCRIPTION

The SD1078 is a 28 volt epitaxial silicon NPN planar transistor designed primarily for SSB communications. This device utilizes emitter ballasting to achieve extreme ruggedness under severe operating conditions.

FEATURES

- * 15dB gain at 30MHz and 80W (CW/PEP)
- * Emitter ballasting
- * Withstands severe mismatch
- * Low inductance stripline package

Frequency = 30 MHz
Power Out = 80 Watts
Voltage = 28.0 Volts
Power Gain = 15.0 dB



Case : CB-290 (.500 4LFL)

ABSOLUTE RATINGS	t case = 25°C	SYMBOLS	VALUES	UNITS
Collector-Base Voltage		V_{CBO}	65.0	v
Collector-Emitter Voltage		V_{CEO}	36.0	v
Emitter-Base Voltage		V_{EBO}	4.0	v
Collector Current (Max.)		I_C	15.0	A
Total Device Dissipation at +25°C		P_{tot}	220.0	W
Storage and Junction Temperatures		T_{stg}	-65 to +150	°C
		T_j	+200	°C

Junction Case Thermal Resistance	$R_{th(j-c)}$	0.8	°C/W
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September 1981 - 1/2

ELECTRICAL CHARACTERISTICS $t_{\text{case}} = 25^{\circ}\text{C}$

STATIC

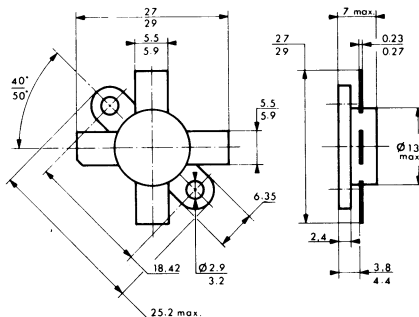
Symbols	Values			Units	Test Conditions
	Min.	Typ.	Max.		
V_{CEO}^*	36.0	-	-	V	$I_{\text{C}} = 100\text{mA}$ $I_{\text{B}} = 0$
V_{CES}^*	65.0	-	-	V	$I_{\text{C}} = 100\text{mA}$ $V_{\text{BE}} = 0$
V_{EBO}	4.0	-	-	V	$I_{\text{E}} = 10\text{mA}$ $I_{\text{C}} = 0$
I_{CES}	-	-	20.0	mA	$V_{\text{CE}} = 30.0\text{V}$ $V_{\text{BE}} = 0$
h_{FE}	10.0	50.0	-	-	$V_{\text{CE}} = 5.0\text{V}$ $I_{\text{C}} = 5\text{A}$

* Pulsed through 25 mH Inductor

DYNAMIC

Symbols	Values			Units	Test Conditions
	Min.	Typ.	Max.		
P_{o}	80.0	-	-	W	$f = 30\text{MHz}$ $V_{\text{CE}} = 28.0\text{V}$
P_{g}	15.0	16.0	-	dB	$f = 30\text{MHz}$ $V_{\text{CE}} = 28.0\text{V}$
IMD	-	-32.0	-28.0	dB	$f = 30\text{MHz}$ $V_{\text{CE}} = 28.0\text{V}$ $P_{\text{o}} = 80.0\text{W}$ $I_{\text{CQ}} = 75\text{mA}$
C_{ob}	-	200.0	-	pF	$f = 1\text{MHz}$ $V_{\text{CB}} = 28.0\text{V}$ $I_{\text{E}} = 0$

CASE DESCRIPTION

Dimensions
in millimetersCB-290
(.500 4LFL)

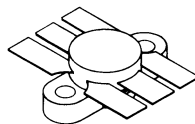
DESCRIPTION

The SD1089 is a 12.5 volt epitaxial silicon NPN planar transistor designed primarily for UHF communications. This device utilizes "Tuned Q" technology which employs a matching network on the input to optimize gain and maximize bandwidth.

FEATURES

- * Designed for UHF military and commercial equipment
- * 40.0 watts (min) with greater than 4.25dB gain
- * Withstands infinite VSWR under operating conditions
- * "Tuned Q" technology
- * Impedance matched

Frequency = 470 MHz
Power Out = 40 Watts
Voltage = 12.5 Volts
Power Gain = 4.25 dB



Case : CB-297 (.500 6LFL)

ABSOLUTE RATINGS	t case = 25°C	SYMBOLS	VALUES	UNITS
Collector-Base Voltage		V _{CBO}	36.0	V
Collector-Emitter Voltage		V _{CEO}	16.0	V
Emitter-Base Voltage		V _{EBO}	4.0	V
Collector Current (Max.)		I _C	7.0	A
Total Device Dissipation at +25°C		P _{tot}	100.0	W
Storage and Junction Temperatures		T _{stg}	-65 to +150	°C
		T _j	+200	°C

Junction Case Thermal Resistance	R _{th(j-c)}	1.75	°C/W
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September 1981 - 1/4

ELECTRICAL CHARACTERISTICS $t_{\text{case}} = 25^{\circ}\text{C}$

STATIC

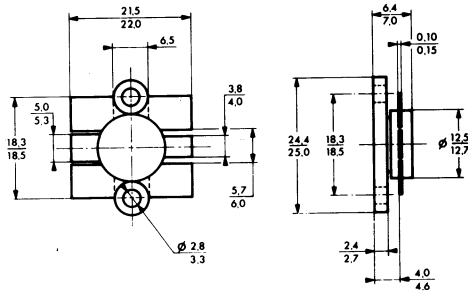
Symbols	Values			Units	Test Conditions
	Min.	Typ.	Max.		
BV_{CEO}^*	16.0	-	-	V	$I_{\text{C}} = 50 \text{ mA}$ $I_{\text{B}} = 0$
BV_{CES}^*	36.0	-	-	V	$I_{\text{C}} = 20 \text{ mA}$ $V_{\text{BE}} = 0$
BV_{EBO}	4.0	-	-	V	$I_{\text{E}} = 5 \text{ mA}$ $I_{\text{C}} = 0$
I_{CBO}	-	-	5.0	mA	$V_{\text{CB}} = 15.0 \text{ V}$ $I_{\text{E}} = 0$
h_{FE}	20.0	-	-	-	$V_{\text{CE}} = 5.0 \text{ V}$ $I_{\text{C}} = 250 \text{ mA}$

*Pulsed through 25 mH Inductor

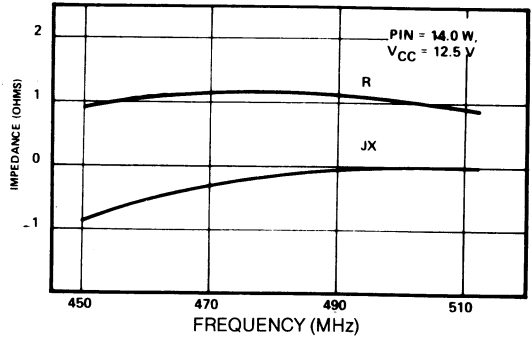
DYNAMIC

Symbols	Values			Units	Test Conditions
	Min.	Typ.	Max.		
P_{o}	40.0	-	-	W	$f = 470 \text{ MHz}$ $V_{\text{CE}} = 12.5 \text{ V}$
P_{g}	4.25	-	-	dB	$f = 470 \text{ MHz}$ $V_{\text{CE}} = 12.5 \text{ V}$
Z_{s}		$2.1 -j 3.4$		ohms	$f = 470 \text{ MHz}$ $V_{\text{CE}} = 12.5 \text{ V}$ $P_{\text{i}} = 14 \text{ W}$
Z_{c1}		$1.2 -j 0.4$		ohms	$f = 470 \text{ MHz}$ $V_{\text{CE}} = 12.5 \text{ V}$ $P_{\text{i}} = 14 \text{ W}$
C_{ob}		85.0	-	pF	$f = 1 \text{ MHz}$ $V_{\text{CE}} = 12.5 \text{ V}$ $I_{\text{E}} = 0$

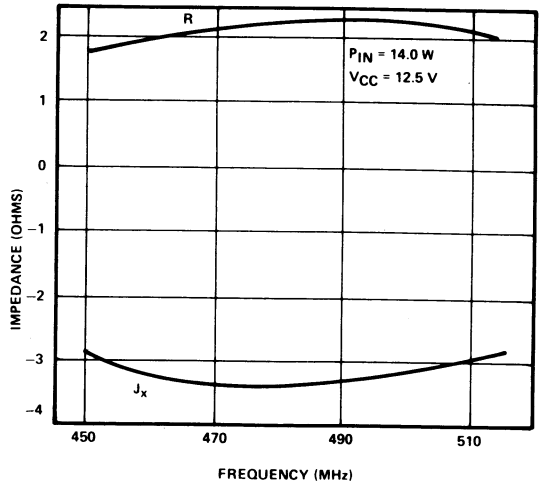
CASE DESCRIPTION

Dimensions
in millimetersCB-297
(.500 6LFL)

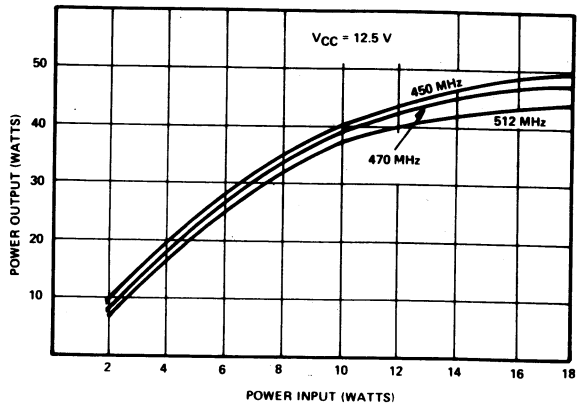
**SERIES COLLECTOR LOAD
IMPEDANCE VS. FREQUENCY**



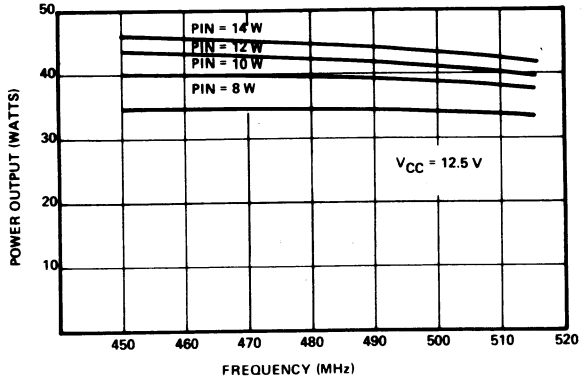
**SERIES INPUT IMPEDANCE
VS. FREQUENCY**



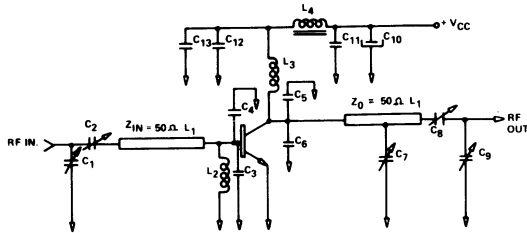
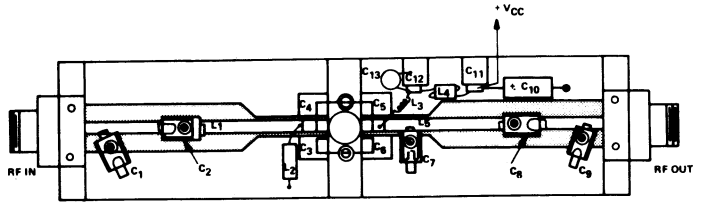
**POWER OUTPUT
VS. POWER INPUT**



POWER OUTPUT VS. FREQUENCY



TEST CIRCUIT



- C1, C7, C9 — 1.5 – 20. pf ARCO 402
 C2 — 3 – 35 pf ARCO 403
 C8 — 2 – 25 pf ARCO 421
 C3, C4, C6 — 22 pf UNELCO
 C5 — 10 pf UNELCO
 C10 — 35 mfd. elect.
 C11 — 390 pf UNELCO
 C12 — 1000 pf UNELCO

- C13 — .01 mfd. disc.
 L2 — 2.2 μ hy choke
 L3 — 7 turns No. 22 Wire .125 ID
 L4 — Choke VK-200
 L1 — 50 Ω line on .062 thk. 3M material, 2.0' long
 L5 — 50 Ω line on .062 thk. 3M material, 1.75' long

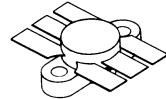
DESCRIPTION

The SD1098 is a 12.5 volt epitaxial silicon NPN planar transistor designed primarily for 800 MHz Mobile Communications. This device is internally input matched in the common base configuration for extremely broadband performance and optimum gain characteristics.

Frequency = 836MHz
Power Out = 25Watts
Voltage = 12.5Volts
Power Gain = 5.0dB

FEATURES

- * Designed for 800MHz Mobile Communications equipment
- * 25.0 watts (min) with greater than 5dB gain @ 836 MHz
- * Withstands infinite VSWR at rated operating conditions
- * Common base configuration
- * Internal input matched "Tuned Q"



Case : CB-296 (.380 6LFL)

ABSOLUTE RATINGS	t case = 25°C	SYMBOLS	VALUES	UNITS
Collector-Base Voltage		V _{CBO}	36.0	V
Collector-Emitter Voltage		V _{CEO}	16.0	V
Emitter-Base Voltage		V _{EBO}	4.0	V
Collector Current (Max.)		I _C	10.0	A
Total Device Dissipation at +25°C		P _{tot}	75.0	W
Storage and Junction Temperatures		T _{stg}	-65 to +150	°C
		T _j	+ 200	°C

Junction Case Thermal Resistance	R _{th(j-c)}	2.3	°C/W
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September 1981 - 1/4

ELECTRICAL CHARACTERISTICS $t_{\text{case}} = 25^{\circ}\text{C}$

STATIC

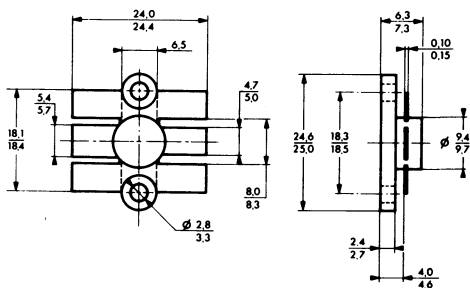
Symbols	Values			Units	Test Conditions
	Min.	Typ.	Max.		
V_{CEO^*}	16.0	-	-	V	$I_{\text{C}} = 50\text{mA}$ $I_{\text{B}} = 0$
V_{CES^*}	36.0	-	-	V	$I_{\text{C}} = 50\text{mA}$ $V_{\text{BE}} = 0$
V_{EBO}	4.0	-	-	V	$I_{\text{E}} = 10\text{mA}$ $I_{\text{C}} = 0$
I_{CBO}	-	-	10.0	mA	$V_{\text{CB}} = 15.0\text{V}$ $I_{\text{E}} = 0$
h_{FE}	20.0	-	-	-	$V_{\text{CE}} = 6.0\text{V}$ $I_{\text{C}} = 1.0\text{A}$

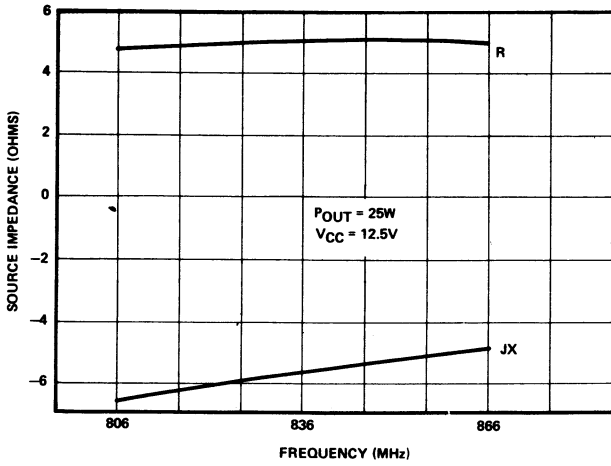
*Pulsed through 25 mH Inductor

DYNAMIC

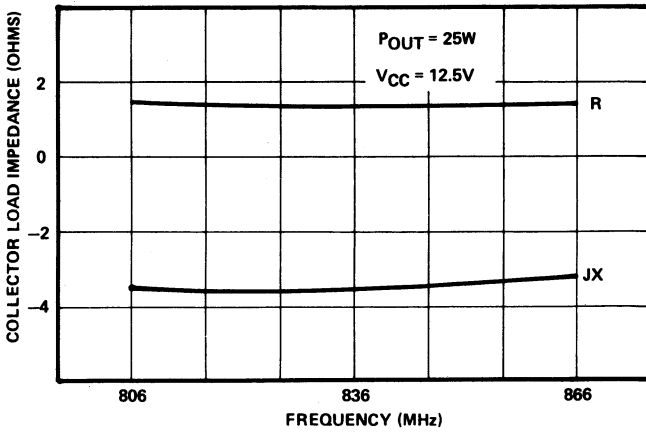
Symbols	Values			Units	Test Conditions
	Min.	Typ.	Max.		
P_{O}	25.0	-	-	W	$f = 836\text{MHz}$ $V_{\text{CE}} = 12.5\text{V}$
P_{g}	5.0	-	-	dB	$f = 836\text{MHz}$ $V_{\text{CE}} = 12.5\text{V}$
Z_{s}		4.9- j 5.8		ohms	$f = 836\text{MHz}$ $V_{\text{CE}} = 12.5\text{V}$ $P_{\text{O}} = 25\text{W}$
Z_{c1}		1.4- j 3.5		ohms	$f = 836\text{MHz}$ $V_{\text{CE}} = 12.5\text{V}$ $P_{\text{O}} = 25\text{W}$
C_{ob}	-	-	65.0	pF	$F = 1\text{MHz}$ $V_{\text{CB}} = 12.5\text{V}$ $I_{\text{E}} = 0$

CASE DESCRIPTION

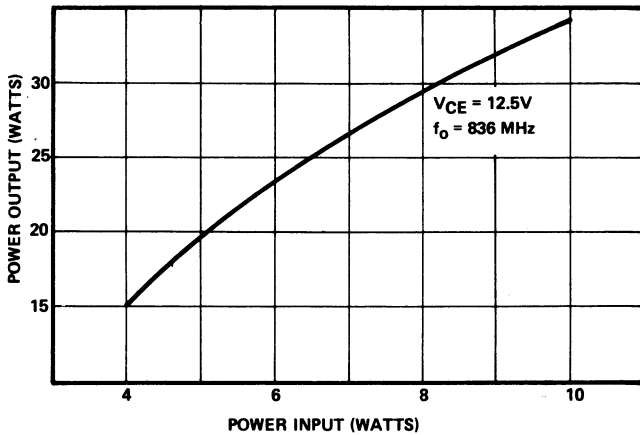
Dimensions
in millimetersCB-296
(380 6LFL)



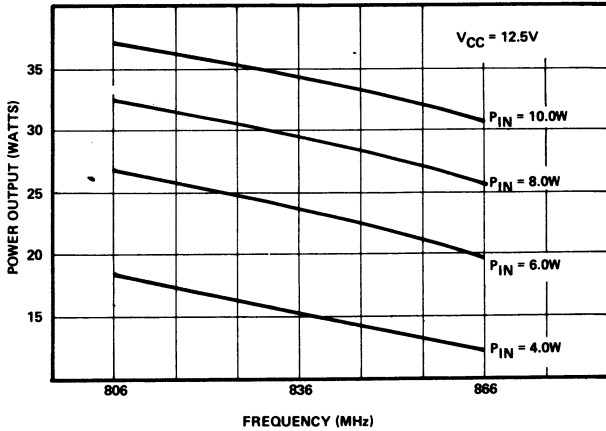
SERIES SOURCE IMPEDANCE VS. FREQUENCY



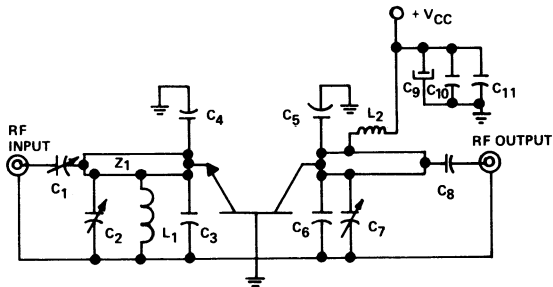
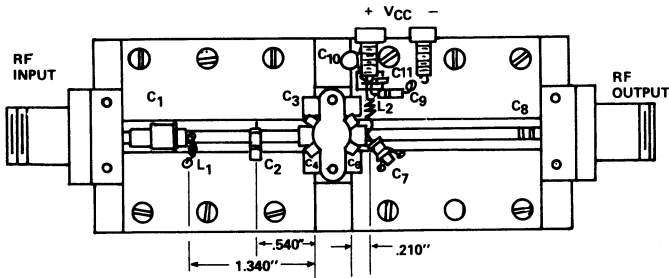
SERIES COLLECTOR LOAD IMPEDANCE VS. FREQUENCY



POWER OUTPUT VS. POWER INPUT



POWER OUTPUT VS. FREQUENCY



COMPONENTS LIST

C1	VOLTRONIC .8-10 pf	L1	3 TURNS, AWG #22, CLOSE WD, 3/32" I.D.
C2	JOHANSON, 6-6 pf	L2	4 1/2 TURNS, AWG #22, CLOSE WD, 3/32" I.D.
C3, C4	ATC 5.6 pf CHIP 100B	Z1	.140" WIDE X 1.340" LONG, 1/32" THICK
C5, C6	ATC 10 pf CHIP 100B		BOARD MATERIAL - 3M-K-6098
C7	VOLTRONIC .8-10 pf	Z2	.105" WIDE X 1.710" LONG, 1/32" THICK
C8	ATC 250 pf CHIP 100B		BOARD MATERIAL - 3M-K-6098
C9	4.7 μ f ELECTROLYTIC		
C10	.01 μ f ERIE DISK		
C11	ATC 510 pf CHIP 100B		