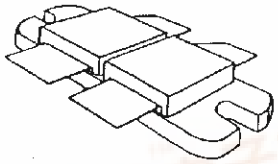
SGS-THOMSON MICROELECTRONICS

SD1680

RF & MICROWAVE TRANSISTORS 800/900 MHz APPLICATIONS

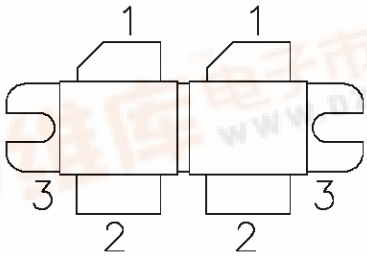
- 915 - 960 MHz
- 24 VOLTS
- CLASS AB PUSH PULL
- INTERNAL INPUT MATCHING
- DESIGNED FOR HIGH POWER LINEAR OPERATION
- HIGH SATURATED POWER CAPABILITY
- GOLD METALLIZATION FOR HIGH RELIABILITY
- DIFFUSED EMITTER BALLAST RESISTORS
- COMMON EMITTER CONFIGURATION
- P_{OUT} = 100 W MIN. WITH 7.0 dB GAIN



2 x .437 x .450 2LFL (M175)
epoxy sealed

ORDER CODE	BRANDING
SD1680	SD1680

PIN CONNECTION



1. Collector
2. Base
3. Emitter

DESCRIPTION

The SD1680 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class AB operation in cellular base station applications.

ABSOLUTE MAXIMUM RATINGS (T_{case} = 25°C)

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	60	V
V_{CEO}	Collector-Emitter Voltage	30	V
V_{EBO}	Emitter-Base Voltage	3.0	V
I_C	Device Current	25	A
P_{DISS}	Power Dissipation	310	W
T_J	Junction Temperature	+200	°C
T_{STG}	Storage Temperature	– 55 to +150	°C

THERMAL DATA

$R_{TH(j-c)}$	Junction-Case Thermal Resistance	0.55	°C/W

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

STATIC

Symbol	Test Conditions		Value			Unit
			Min.	Typ.	Max.	
BV_{CBO}	I_C = 100mA	I_E = 0mA	60	—	—	V
BV_{CEO}	I_C = 100mA	I_B = 0mA	30	—	—	V
BV_{EBO}	I_E = 50mA	I_C = 0mA	3.0	—	—	V
I_{CES}	V_{CE} = 28V	I_E = 0mA	—	—	10	mA
h_{FE}	V_{CE} = 5V	I_C = 3A	15	—	70	—

Tested Per Side

DYNAMIC

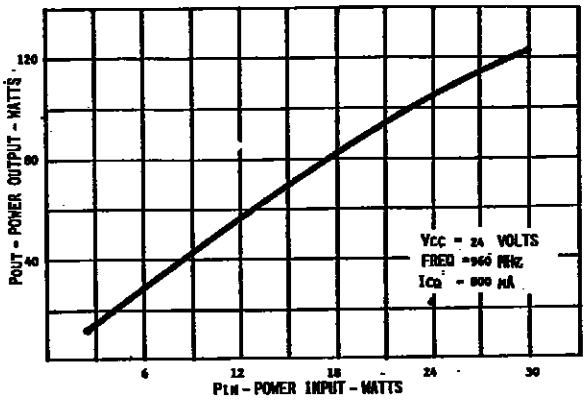
Symbol	Test Conditions			Value			Unit
				Min.	Typ.	Max.	
P_{OUT}*	f = 900 MHz	V_{CE} = 24 V	I_{CQ} = 2 x 300 mA	120	—	—	W
G_P*	f = 900 MHz	V_{CE} = 24 V	I_{CQ} = 2 x 300 mA	7.0	—	—	dB
IMD**	f = 900 MHz	V_{CE} = 24 V	I_{CQ} = 2 x 300 mA	—	–32	—	dBc
η_C	f = 900 MHz	V_{CE} = 24 V	I_{CQ} = 2 x 300 mA	45	—	—	%
C_{OB}	f = 1 MHz	V_{CB} = 28 V		—	—	100	pF

Note: * @ 1 dB Compression

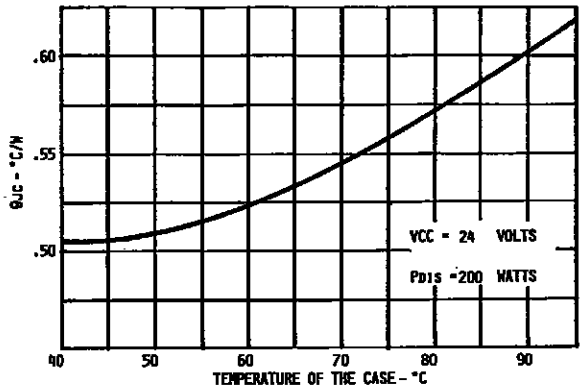
** P_{OUT} = 100W PEP, Δ F = 400KHz (2 tones)

TYPICAL PERFORMANCE

POWER OUTPUT vs POWER INPUT

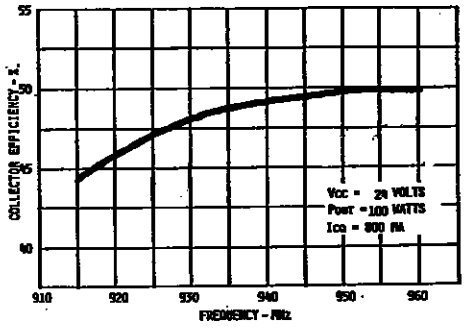


THERMAL RESISTANCE vs CASE TEMPERATURE

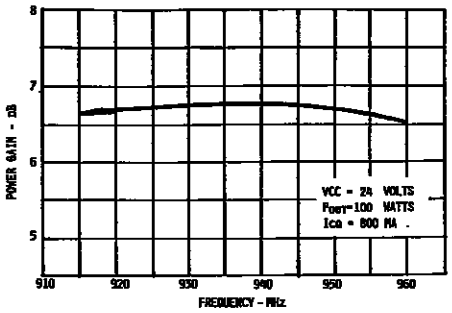


TYPICAL PERFORMANCE (cont'd)

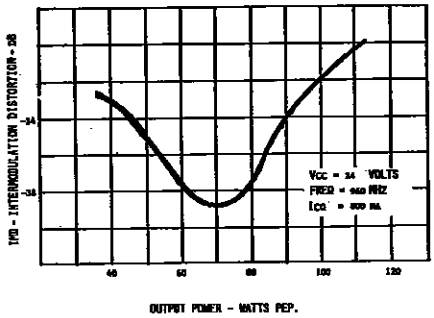
COLLECTOR EFFICIENCY vs FREQUENCY



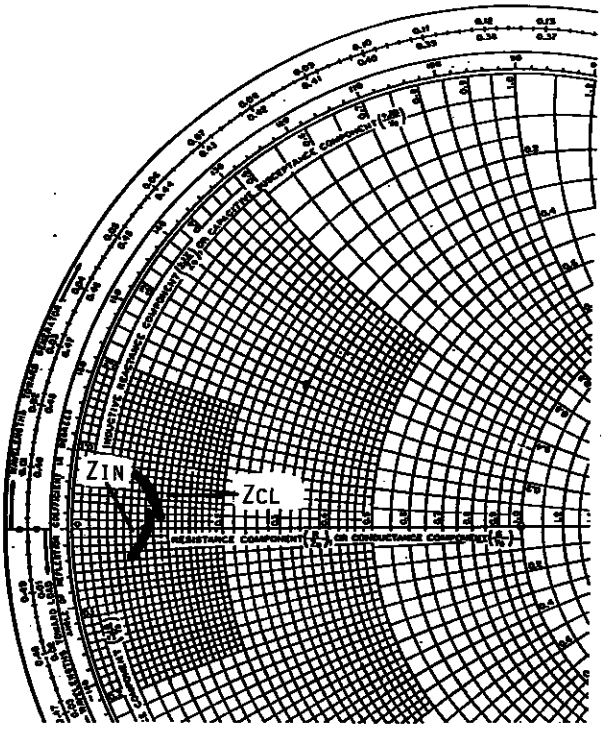
BROADBAND POWER GAIN vs FREQUENCY



INTERMODULATION DISTORTION vs POWER OUTPUT



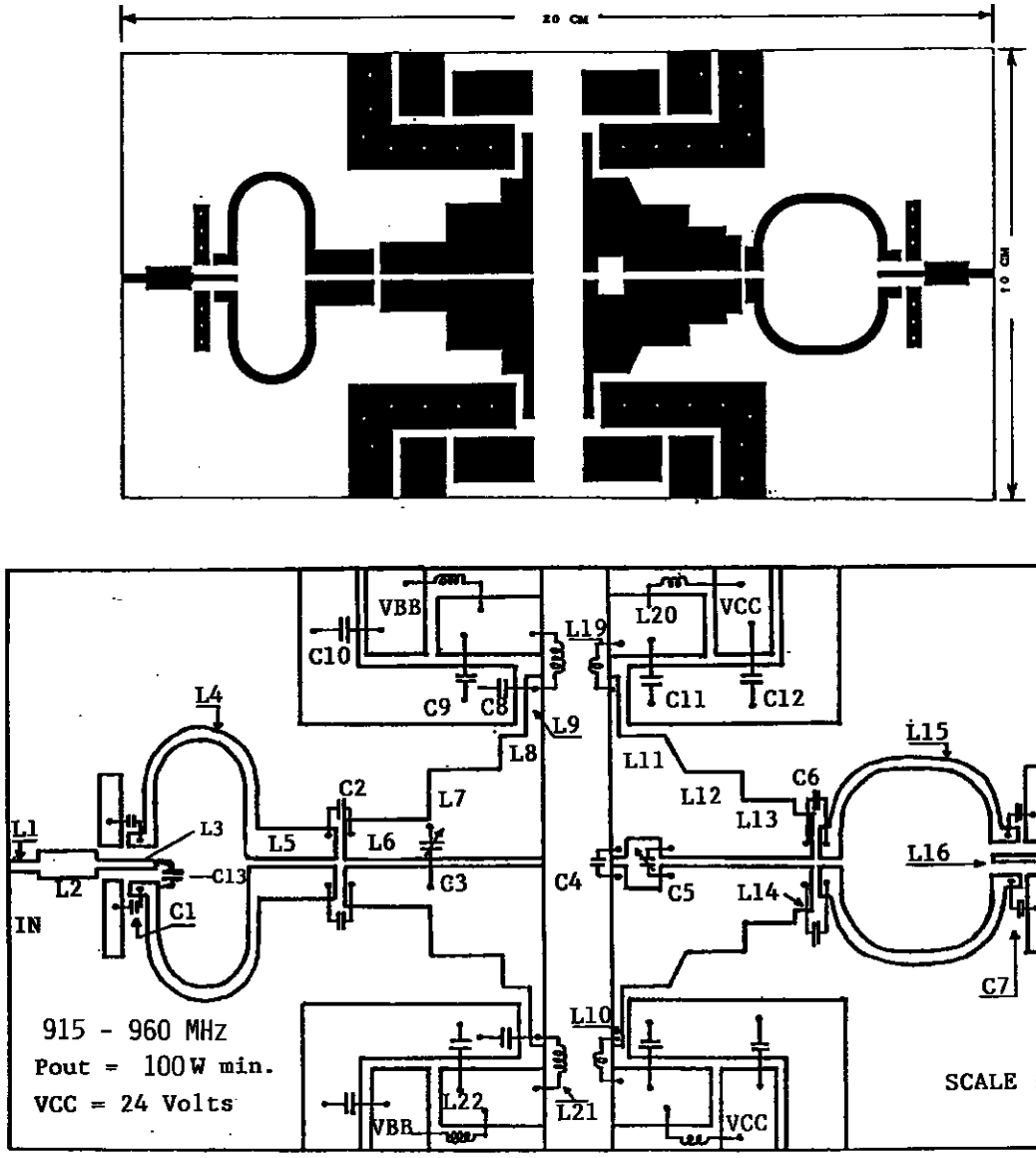
IMPEDANCE DATA



FREQ.	Z_{IN} (Ω)*	Z_{CL} (Ω)**
910 MHz	4.8 + j 0.95	5.0 + j 0.9
930 MHz	4.5 + j 0.0	4.6 + j 1.7
950 MHz	4.3 – j 1.0	4.2 + j 2.6
970 MHz	4.1 – j 1.9	3.8 + j 3.4

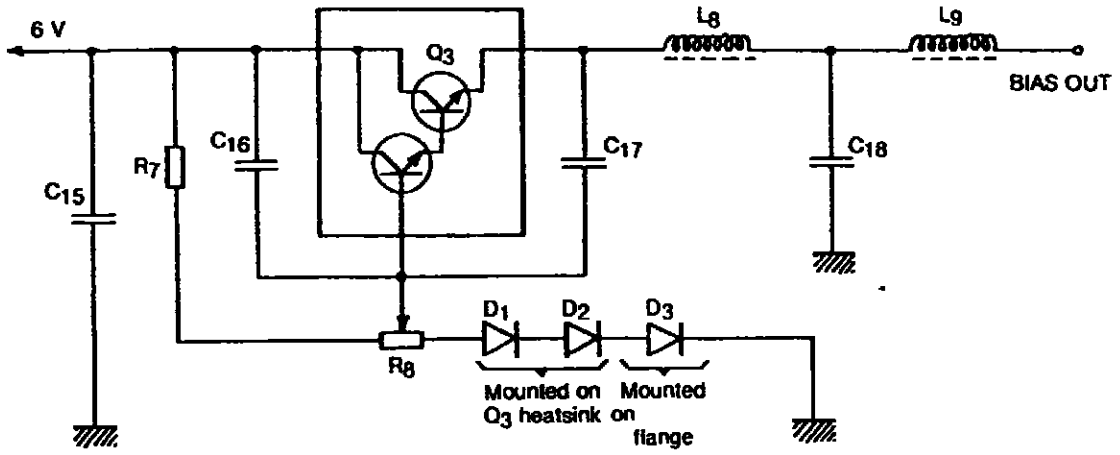
* Base to Base
** Collector to Collector
P_{OUT} = 100W
V_{CC} = 24V
Normalized to 50 Ohms

TEST CIRCUIT



B1, B2	:	Coaxial Cable 25, 43mm
C1, C2	:	330pF, ATC 100B
C3	:	.8 - 8.0pF Johanson Gigatrim
C4	:	2 x 3.6pF + 1.6pF ATC 100B
C5	:	3.3pF ATC 100B + .8 - 8.0pF Johanson Gigatrim
C6, C7	:	330pF, ATC 100B
C8	:	120pF ATC 100B
C9	:	1.5nF, ATC 100B
C10	:	10nF + 47µF, 63V
C11	:	1.5nF, ATC 100B + 10nF
C12	:	470pF + 1.5nF, ATC 100B + 100mF, 63V
C13	:	.4 - 4pF Johanson Gigatrim
Substrate: Teflon Glass, Er = 2.55, 30Mils Thick		
L1, L18	:	Printed Line 50Ω
L2, L17	:	Printed Line 26.7Ω 10mm
L3, L16	:	Printed Line 60Ω 10.5mm
L4, L15	:	Printed Line 50Ω 43mm
L5	:	Printed Line 25Ω 13.5mm
L6	:	Printed Line 21Ω 15mm
L7	:	Printed Line 10.5Ω 12.5mm
L8	:	Printed Line 8Ω 7.5mm
L9, L10	:	Printed Line 50Ω 10mm
L11	:	Printed Line 9.5Ω 10.5mm
L12	:	Printed Line 11Ω 14.5mm
L13	:	Printed Line 15.5Ω 8.5mm
L14	:	Printed Line 19Ω 3.5mm
L19	:	2 Turns, #16 AWG
L20	:	2 Turns, #16 AWG
L21, L22	:	12 Turns, #22 AWG

BIAS VOLTAGE SOURCE



C15 : 10nF + 100nF + 10µF
C16 : 10nF
C17 : 1µF
C18 : 1.2nF + 27nF + 10µF

D1 : AAY 49, Ge Diode Thermally Connected with Q3 Heatsink
D2 : 1N 4005, SI Diode Thermally Connected with Q3 Heatsink
D3 : 1N 4005, SI Diode Thermally Connected with RF Transistors Flange

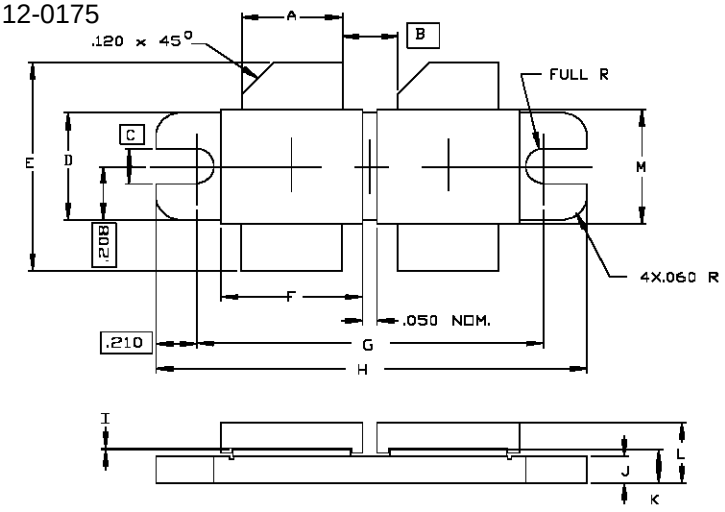
L8, L9 : Ferrite Choke

Q3 : BDX 63B

R7 : 470Ω, 1/2W
R8 : 100Ω, Trimpot

PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0175



SGS-THOMSON MICROELECTRONICS			CONT'D		
	MINIMUM Inches/mm	MAXIMUM Inches/mm		MINIMUM Inches/mm	MAXIMUM Inches/mm
A	.373/9,47	.385/9,78	K	.115/2,92	.135/3,43
B	.190/4,83		L		.250/6,35
C	.130/3,30		M	.445/11,30	.455/11,56
D	.411/10,44	.421/10,69			
E	.825/20,96	.865/21,97			
F	.525/13,34	.535/13,59			
G	1.255/31,88	1.265/32,13			
H	1.675/42,55	1.685/42,80			
I	.002/0,05	.006/0,15			
J	.095/2,41	.105/2,67			