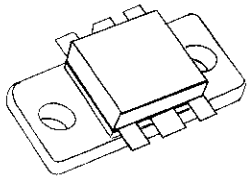
SGS-THOMSON MICROELECTRONICS

SD4701

RF & MICROWAVE TRANSISTORS CELLULAR BASE STATION APPLICATIONS

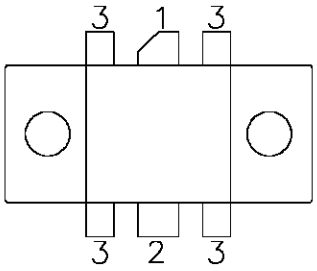
- DESIGNED FOR CLASS AB LINEAR OPERATION
- COMMON EMITTER
- INTERNAL INPUT/OUTPUT MATCHING
- 26 VOLT, 960 MHz PERFORMANCE:
  P_{OUT} = 45 W MIN.
  GAIN = 8.5 dB MIN.
  COLLECTOR EFFICIENCY 50% MIN.
- INHERENT RUGGEDNESS:
  LOAD MISMATCH TOLERANCE OF 5:1 MIN. VSWR
  3 dB OVERDRIVE CAPABILITY



.400 x .425 6LFL (M169)
epoxy sealed

ORDER CODE	BRANDING
SD4701	SD4701

PIN CONNECTION



1. Collector
2. Base
3. Emitter

DESCRIPTION

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_{CER}	Collector-Emitter Voltage	40	V
V_{EBO}	Emitter-Base Voltage	3.5	V
I_C	Device Current	10	A
P_{DISS}	Power Dissipation	145	W
T_J	Junction Temperature	+200	°C
T_{STG}	Storage Temperature	– 65 to +150	°C

THERMAL DATA

$R_{TH(j-c)}$	Junction-Case Thermal Resistance	1.2	°C/W

SD4701

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

STATIC

Symbol	Test Conditions		Value			Unit
			Min.	Typ.	Max.	
BV_{CBO}	I_C = 60 mA	I_E = 0 mA	60	—	—	V
BV_{CEO}	I_C = 60 mA	I_B = 0 mA	30	—	—	V
BV_{CER}	I_C = 60 mA	R_{BE} = 75 Ω	40	—	—	V
BV_{EBO}	I_E = 10 mA	I_C = 0 mA	3.5	—	—	V
I_{CER}	V_{CE} = 26 V	R_{BE} = 75 Ω	—	—	15	mA
h_{FE}	V_{CE} = 10 V	I_C = 1 A	15	—	100	—

DYNAMIC

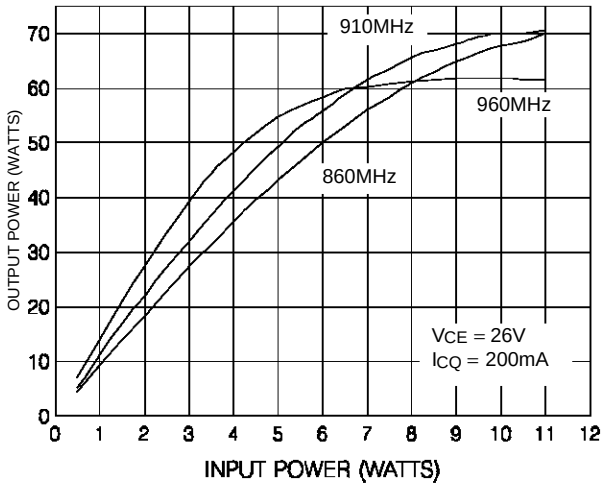
Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
C_{OB}	f = 1 MHz V_{CB} = 26 V For Information Only - This Device is Collector Matched	—	55	—	pF
P_{IN}	f = 960 MHz V_{CE} = 26 V I_{CQ} = 200 mA P_{OUT} = 45 W	—	5	6.3	W
P_{OUT}	f = 960 MHz V_{CE} = 26 V I_{CQ} = 200 mA P_{IN} = 6.3 W	45	55	—	W
G_P	f = 960 MHz V_{CE} = 26 V I_{CQ} = 200 mA P_{OUT} = 45 W	8.5	9.5	—	dB
η_C	f = 960 MHz V_{CE} = 26 V I_{CQ} = 200 mA P_{OUT} = 45 W	50	55	—	%
Load Mismatch	f = 960 MHz V_{CE} = 26 V I_{CQ} = 200 mA P_{OUT} = 45 W VSWR = 5:1 MIN. @ All Phase Angles	No Degradation in Device Performance			
OVD	f = 960 MHz V_{CE} = 26 V I_{CQ} = 200 mA Set P_{OUT} = 45 W; Increase P_{IN} 3dB	No Degradation in Device Performance			
*IMD_3	V_{CE} = 26 V P_{OUT} = 46.5 dBm (45.0W) PEP I_{CQ} = 200 mA	—	–32	—	dBT**

*Note: f_1 = 900.00MHz @ 40.5dBm
f_2 = 900.01MHz @ 40.5dBm

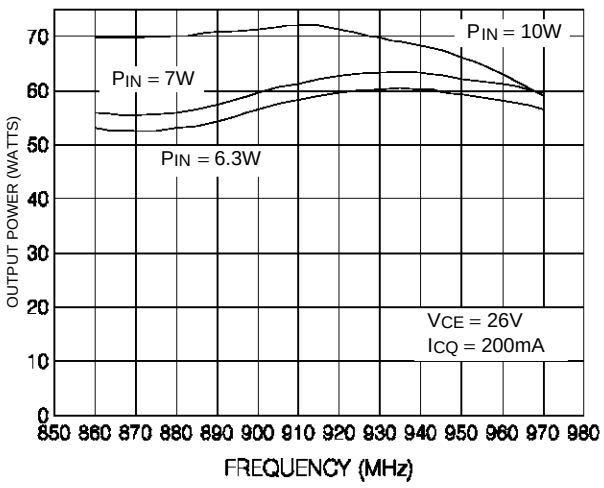
** dBT, in dB, referenced to tone level

TYPICAL PERFORMANCE

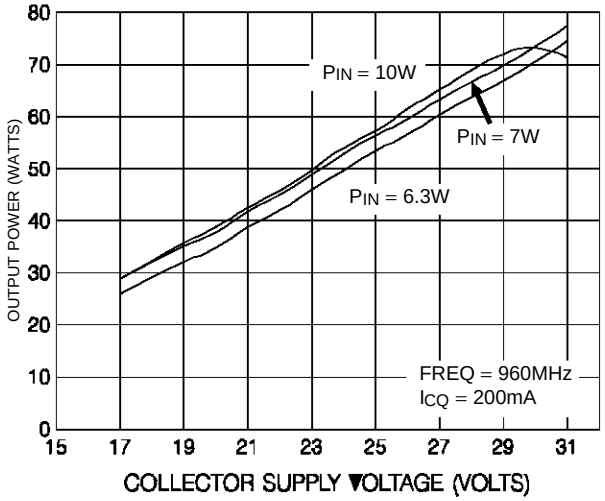
POWER OUTPUT vs POWER INPUT



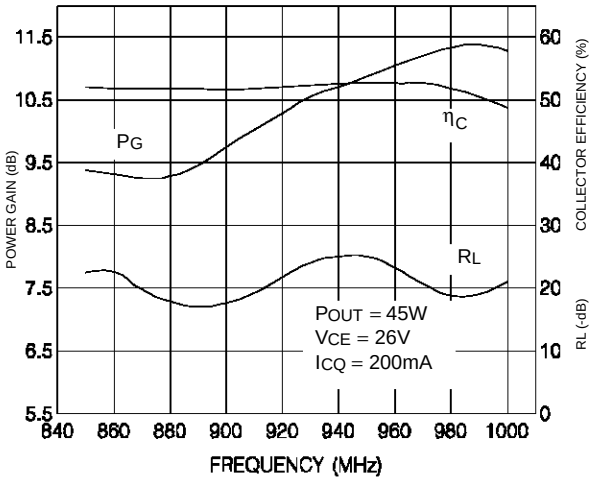
POWER OUTPUT vs FREQUENCY



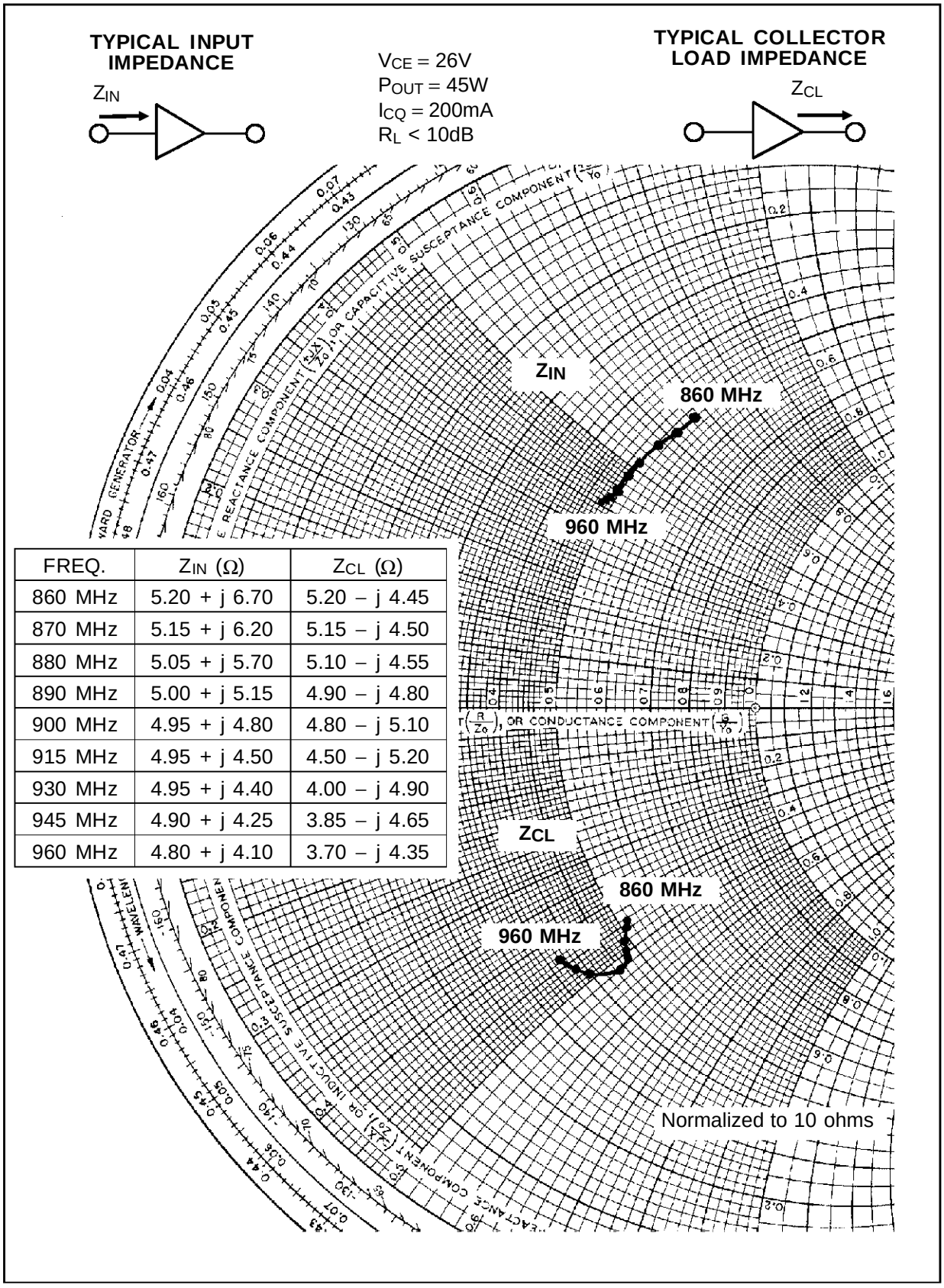
POWER OUTPUT vs SUPPLY VOLTAGE



BROADBAND PERFORMANCE

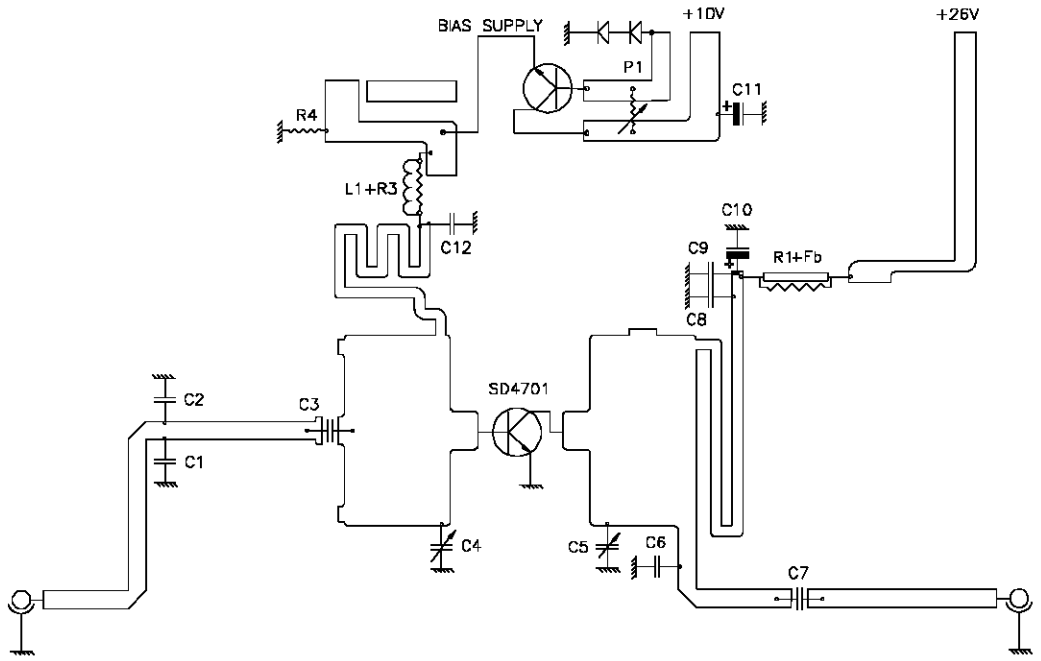


IMPEDANCE DATA



FREQ.	Z_{IN} (Ω)	Z_{CL} (Ω)
860 MHz	5.20 + j 6.70	5.20 – j 4.45
870 MHz	5.15 + j 6.20	5.15 – j 4.50
880 MHz	5.05 + j 5.70	5.10 – j 4.55
890 MHz	5.00 + j 5.15	4.90 – j 4.80
900 MHz	4.95 + j 4.80	4.80 – j 5.10
915 MHz	4.95 + j 4.50	4.50 – j 5.20
930 MHz	4.95 + j 4.40	4.00 – j 4.90
945 MHz	4.90 + j 4.25	3.85 – j 4.65
960 MHz	4.80 + j 4.10	3.70 – j 4.35

TEST CIRCUIT

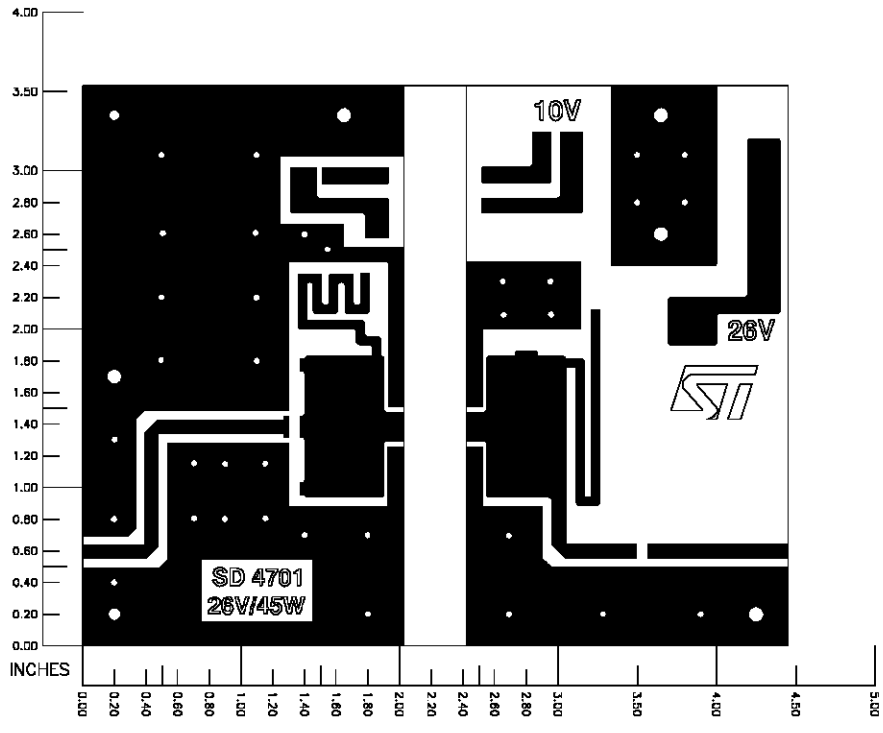


C1, C2	:	1.3 pF ATC 100B Chip Capacitor
C3, C7	:	430 pF ATC 100B Chip Capacitor
C4, C5	:	0.6 - 4.5 pF Johanson Variable Capacitor
C6	:	0.7 pF ATC 100B Chip Capacitor
C8	:	470 pF ATC 100B Chip Capacitor
C9, C12	:	221 pF ATC 100B Chip Capacitor
C10, C11	:	47µF, 50V, Electrolytic Capacitor

L1	:	5 Turns #22 AWG 0.16" I.D. 1T:1 Air Choke
R1 + Fb	:	11 Ω 1/8W Resistor + FB VK-200
R3	:	11 Ω 1/8W Resistor
R4	:	100 Ω 1/8W Resistor
P1	:	1kΩ, 1 Turn Potentiometer

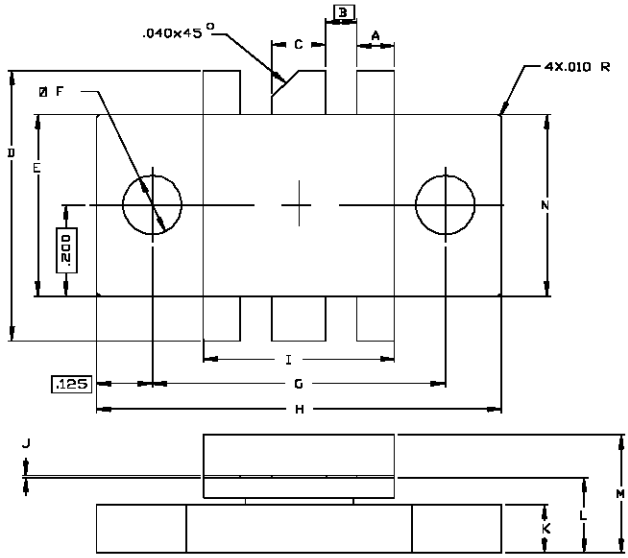
Board Material: 1 oz = 2 sides, Thickness 31.25 mils, Er = 2.55

TEST CIRCUIT PHOTOMASTER



PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0169



SGS-THOMSON MICROELECTRONICS		
	MINIMUM Inches/mm	MAXIMUM Inches/mm
A	.078/1,98	.088/2,24
B	.120/3,05	
C	.115/2,92	.125/3,18
D	.580/14,73	.620/15,75
E	.395/10,03	.405/10,29
F	.125/3,18	
G	.720/18,29	.730/18,54
H	.970/24,64	.980/24,89
I	.420/10,67	.430/10,92
J	.002/0,05	.007/0,18

CONT'D		
	MINIMUM Inches/mm	MAXIMUM Inches/mm
K	.105/2,67	.115/2,92
L	.159/4,04	.175/4,45
M		.280/7,11
N	.395/10,03	.408/10,36