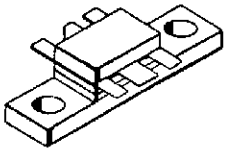
SGS-THOMSON MICROELECTRONICS

SD4017

RF & MICROWAVE TRANSISTORS 806-960 MHz CELLULAR BASE STATIONS

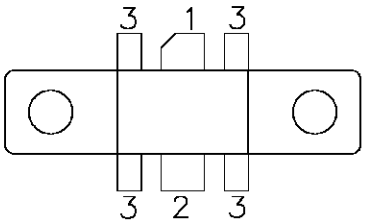
- GOLD METALLIZATION
- DIFFUSED EMITTER BALLASTING
- INTERNAL INPUT MATCHING
- DESIGNED FOR LINEAR OPERATION
- HIGH SATURATED POWER CAPABILITY
- COMMON EMITTER CONFIGURATION
- P_{OUT} = 30 W MIN. WITH 7.5 dB GAIN
- η_C = 55% TYPICAL
- TYPICAL LOAD MISMATCH CAPABILITY:
  20:1 ALL ANGLES RATED CONDITIONS
  10:1 ALL ANGLES @ ± 20% RATED VOLTAGE
- TYPICAL OVERDRIVE SURVIVABILITY
  5 dB



.230 6LFL (M142)
epoxy sealed

ORDER CODE	BRANDING
SD4017	SD4017

PIN CONNECTION



1. Collector
2. Base
3. Emitter

DESCRIPTION

The SD4017 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity class AB operation for cellular base station applications.

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

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	48	V
V_{CEO}	Collector-Emitter Voltage	25	V
V_{EBO}	Collector-Supply Voltage	3.5	V
P_{DISS}	Power Dissipation	88	W
I_C	Device Current	7.5	A
T_J	Junction Temperature	200	°C
T_{STG}	Storage Temperature	– 65 to +150	°C

THERMAL DATA

$R_{TH(j-c)}$	Junction-Case Thermal Resistance	2.0	°C/W

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

STATIC

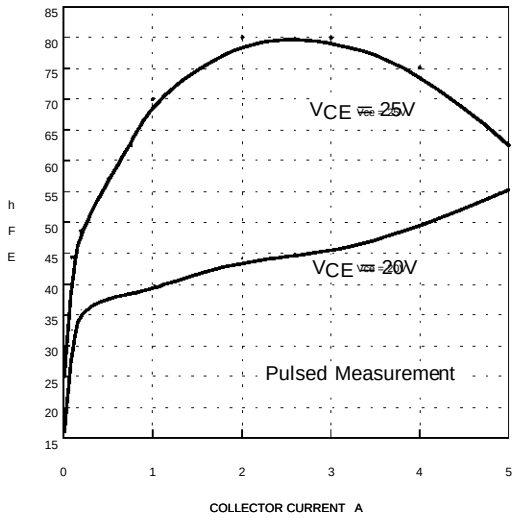
Symbol	Test Conditions		Value			Unit
			Min.	Typ.	Max.	
BV_{CBO}	I_C = 100 mA		48	55	—	V
BV_{EBO}	I_E = 10 mA		3.5	5	—	V
BV_{CEO}	I_C = 40 mA		25	28	—	V
BV_{CER}	I_C = 40 mA	R_{BE} = 150 Ω	30	40	—	V
I_{CBO}	V_{CE} = 24 V		10	—	—	mA
h_{FE}	V_{CE} = 20 V	I_C = 2 A	15	40	100	—

DYNAMIC

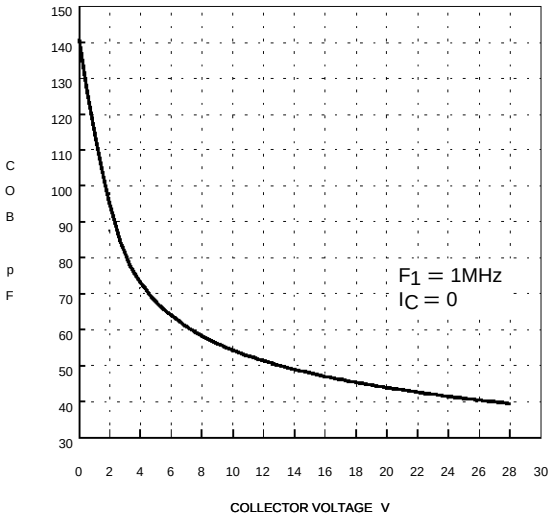
Symbol	Test Conditions			Value			Unit
				Min.	Typ.	Max.	
P_{OUT}	f = 860 MHz	V_{CE} = 25 V	I_{CQ} = 60 mA	30	—	—	W
ηc	f = 860 MHz	V_{CE} = 25 V	I_{CQ} = 60 mA	—	55	—	%
P_G	f = 860 MHz	V_{CE} = 25 V	I_{CQ} = 60 mA	7.5	9	—	dB
C_{OB}	VCB = 25 V	f_o = 1 MHz		—	42	—	pf
IMD_3	P_{OUT} = 30 WPEP	f_1 = 860.0 MHz	f_2 = 860.1 MHz	—	–35	—	dBc
$VSWR_1$	VSWR = 20:1 VSWR = 10:1	V_{CE} = 25 V V_{CE} = 25 V ± 20%		No Degradation in Output Device			Typ.
$VSWR_2$	VSWR = 5:1 P_{IN} = P_{IN} (norm) +3dB	V_{CE} = 25V ± 20%		No Degradation in Output Device			Typ.
OVD	P_{IN}(norm) = +5dB P_{IN}(norm) = +3dB	V_{CE} = 25 V V_{CE} = 25 V ± 20%		No Degradation in Output Device			Typ.

TYPICAL PERFORMANCE

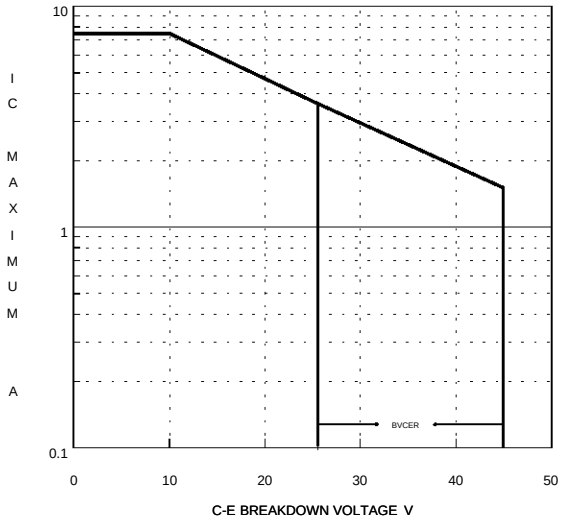
DC CURRENT GAIN vs COLLECTOR CURRENT



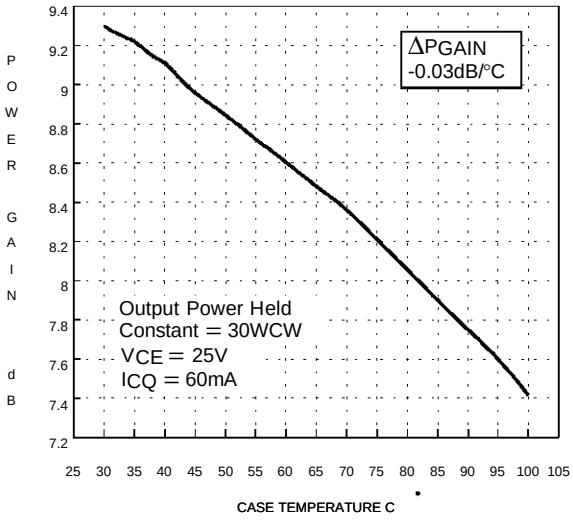
OUTPUT CAPACITANCE vs C-B VOLTAGE



DC SAFE OPERATING AREA

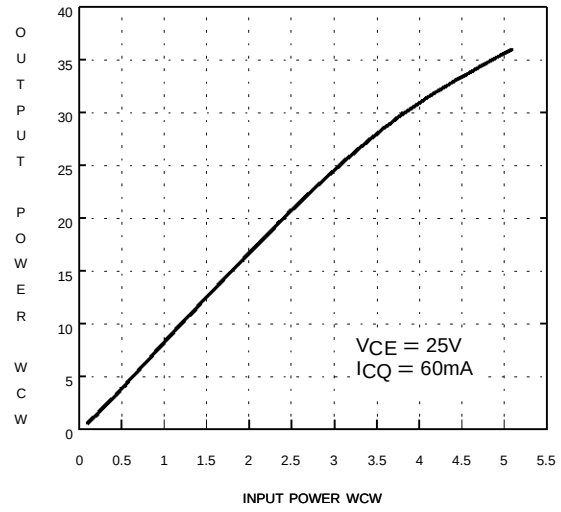


POWER GAIN vs CASE TEMPERATURE

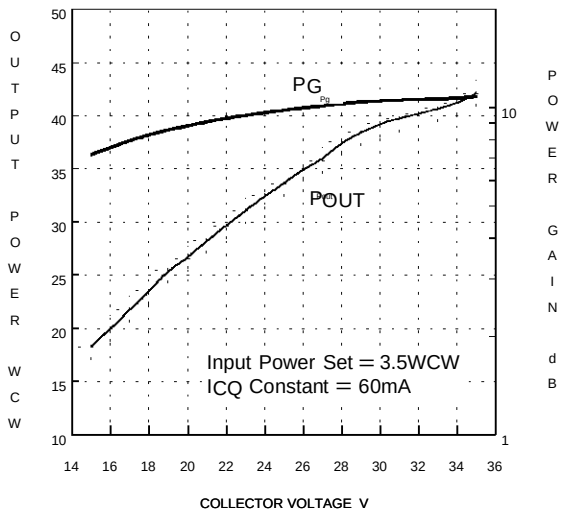


TYPICAL PERFORMANCE (cont'd)

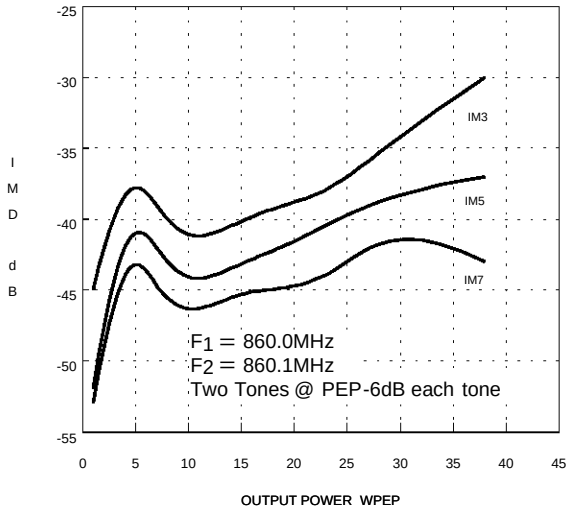
OUTPUT POWER vs INPUT POWER



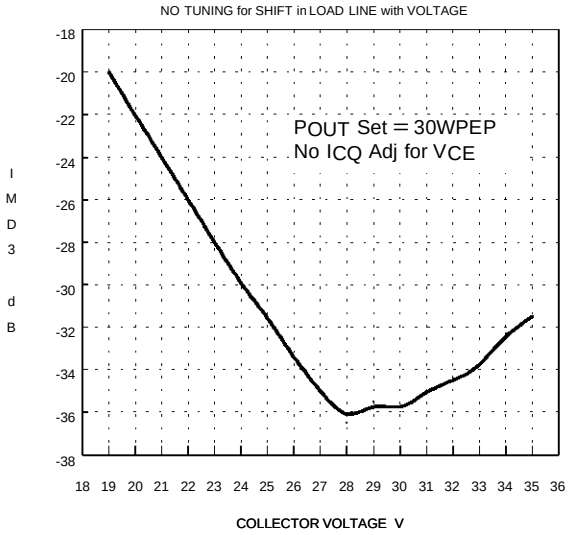
OUTPUT POWER & GAIN vs VOLTAGE



IM DISTORTION vs OUTPUT POWER



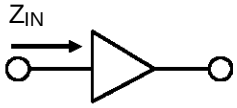
IM3 DISTORTION vs SUPPLY VOLTAGE



IMPEDANCE DATA

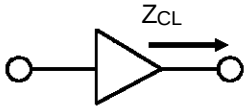
TYPICAL INPUT IMPEDANCE

Z_{IN}

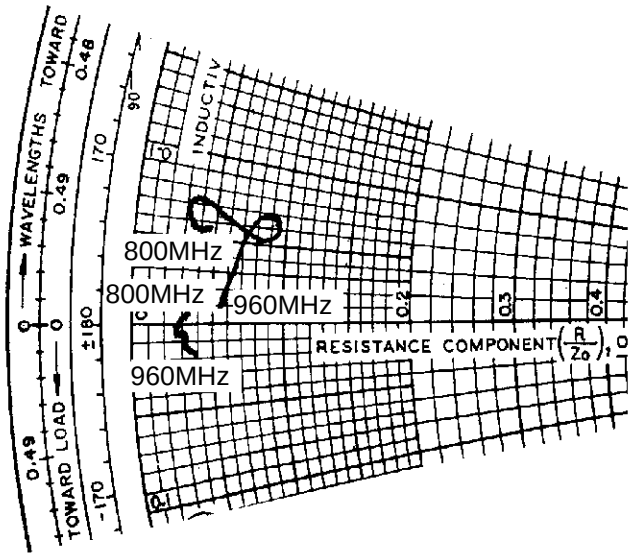


TYPICAL COLLECTOR LOAD IMPEDANCE

Z_{CL}

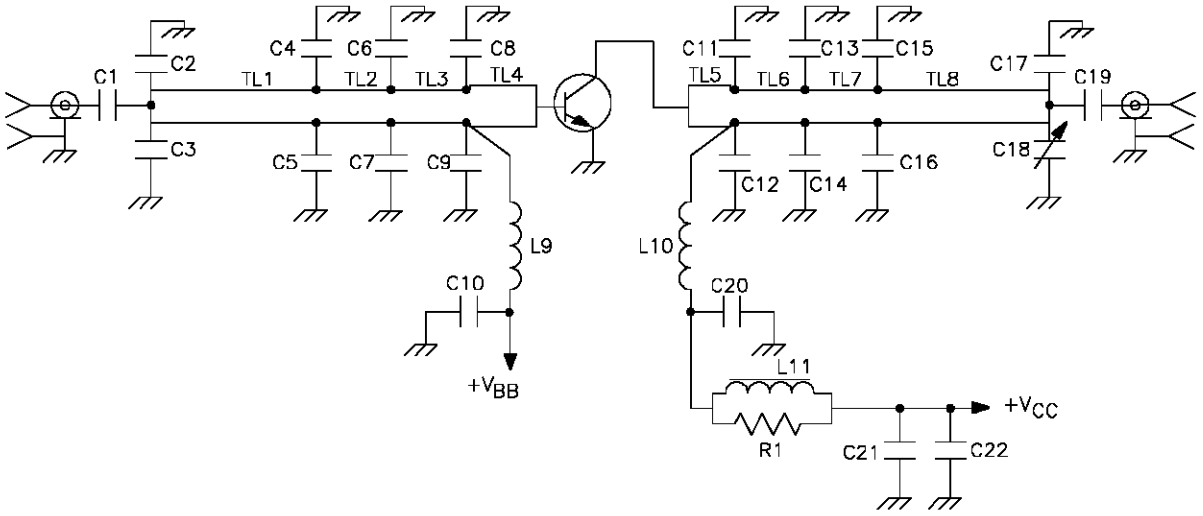


FREQ.	Z_{IN} (Ω)	Z_{CL} (Ω)
800 MHz	4.3 + j 5.8	3.5 + j 0.2
830 MHz	3.2 + j 6.1	3.5 + j 0.1
860 MHz	3.5 + j 7.1	2.9 – j 0.2
900 MHz	5.3 + j 6.4	3.0 – j 0.6
915 MHz	6.1 + j 6.3	3.2 – j 0.7
930 MHz	9.4 + j 6.3	3.2 – j 1.1
945 MHz	6.6 + j 3.0	3.3 – j 1.2
960 MHz	5.9 + j 1.0	3.4 – j 1.5



P_{OUT} = 30W
V_{CE} = 25 V
Normalized to 50 ohms

TEST CIRCUIT

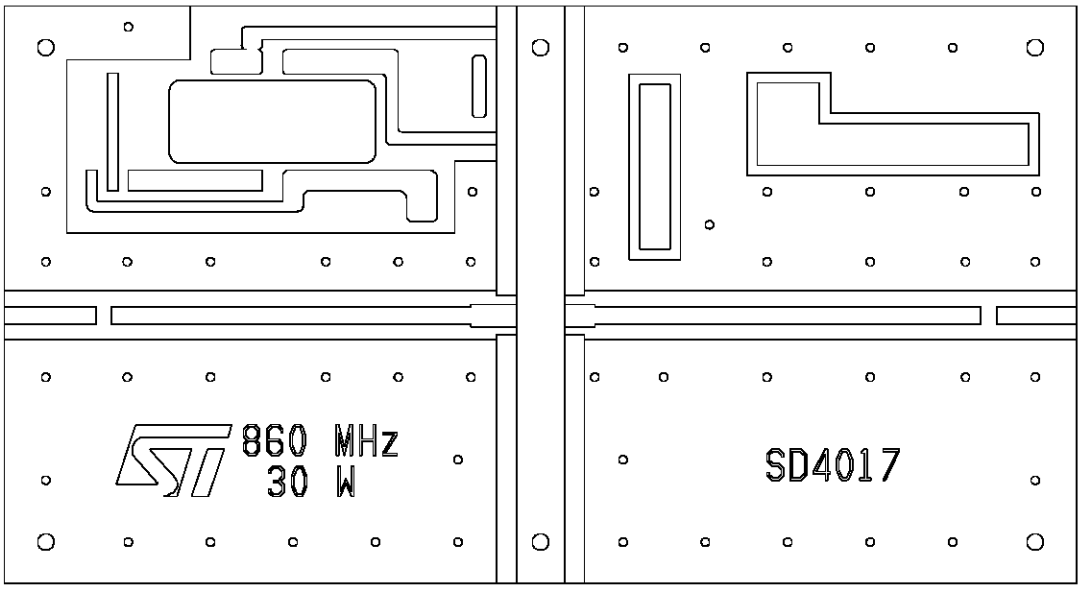


C1, C19 : 33pF ATC 100B Chip Capacitor
C2, C15 : 3.6pF ATC 100B Chip Capacitor
C3 : 4.5pF ATC 100B Chip Capacitor
C4, C16
C17 : 5.0pF ATC 100B Chip Capacitor
C5 : 2.9pF ATC 100B Chip Capacitor
C6, C7 : 1.8pF ATC 100B Chip Capacitor
C8,C9,
C14 : 6.2pF ATC 100B Chip Capacitor
C10,C22 : 300pF ATC 100B Chip Capacitor
C11,C12
C13 : 5.6pF ATC 100B Chip Capacitor
C18 : .5 - 6.0pF Gigatrim Adjustable Capacitor

C20 : 10pF ATC 100B Chip Capacitor
C21 : 10µF (50V) Electrolytic Capacitor
L9 : 4 Turns (tight) I.D. 120mil ENAM Cu 20 AWG
L10 : 4 Turns (tight) I.D. 158mil ENAM Cu 18 AWG
L11 : 1.5 Turns VK-200 Ferrite H.F. Choke
TL1,TL8 : 964 x 85.69 mils (50Ω/36.84°)
TL2,TL3 : 352 x 85.69 mils (50Ω/13.46°)
TL4 : 222 x 109.03 mils (42.6Ω/8.56°)
TL5 : 149 x 109.03 mils (42.6Ω/5.74°)
TL6 : 334 x 85.69 mils (50Ω/12.75°)
TL7 : 500 x 85.69 mils (50Ω/19.13°)

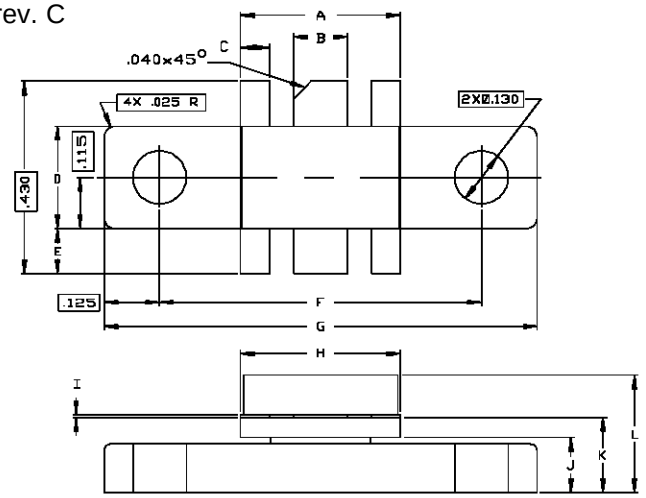
Board MAterial: 1oz Copper 2 sides, Thickness = 31.25mil
Er = 2.55

BOARD LAYOUT



PACKAGE MECHANICAL DATA

Ref. Dwg.No. 12-0142 rev. C



SGS-THOMSON MICROELECTRONICS			CONT'D		
	MINIMUM Inches/mm	MAXIMUM Inches/mm		MINIMUM Inches/mm	MAXIMUM Inches/mm
A	.355/9,02	.365/9,27	K	.160/4,06	.180/4,57
B	.115/2,92	.125/3,18	L	.230/5,84	.260/6,60
C	.075/1,91	.085/2,16			
D	.225/5,72	.235/5,97			
E	.090/2,29	.110/2,79			
F	.720/18,29	.730/18,54			
G	.970/24,64	.980/24,89			
H	.355/9,02	.365/9,27			
I	.004/0,10	.006/0,15			
J	.120/3,05	.130/3,30			

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