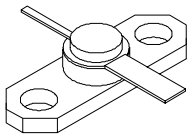
SGS-THOMSON MICROELECTRONICS

MSC83305

RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

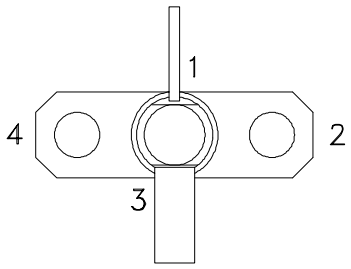
- REFRACTORY/GOLD METALLIZATION
- EMITTER BALLASTED
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- P_{OUT} = 4.5 W MIN. WITH 4.5 dB GAIN @ 3.0 GHz



.250 2LFL (S010)
hermetically sealed

ORDER CODE	BRANDING
MSC83305	83305

PIN CONNECTION



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

DESCRIPTION

The MSC83305 is a common base hermetically sealed silicon NPN microwave power transistor utilizing an emitter site ballasted geometry with a refractory gold metallization system. This device is capable of withstanding an infinite load VSWR at any phase angle under rated conditions. The MSC83305 was designed for Class C amplifier/oscillator applications in the 1.0 - 3.0 GHz frequency range.

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

Symbol	Parameter	Value	Unit
P_{DISS}	Power Dissipation* ($T_C \leq 50°C$)	17.6	W
I_C	Device Current*	700	mA
V_{CC}	Collector-Supply Voltage*	30	V
T_J	Junction Temperature	200	°C
T_{STG}	Storage Temperature	– 65 to +200	°C

THERMAL DATA

$R_{TH(j-c)}$	Junction-Case Thermal Resistance*	8.5	°C/W

*Applies only to rated RF amplifier operation

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

STATIC

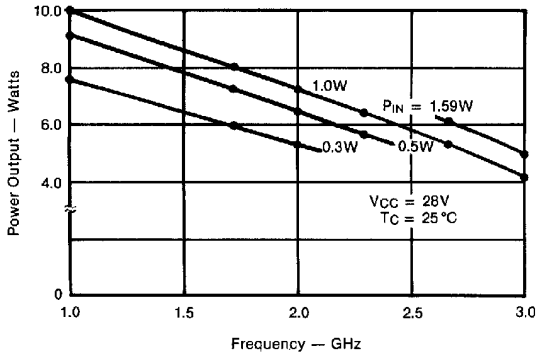
Symbol	Test Conditions		Value			Unit
			Min.	Typ.	Max.	
BV_{CBO}	I_C = 1mA	I_E = 0mA	45	—	—	V
BV_{EBO}	I_E = 1mA	I_C = 0mA	3.5	—	—	V
BV_{CER}	IC = 5mA	R_{BE} = 10Ω	45	—	—	V
I_{CBO}	V_{CB} = 28V		—	—	0.5	mA
h_{FE}	V_{CE} = 5V	I_C = 500mA	30	—	300	—

DYNAMIC

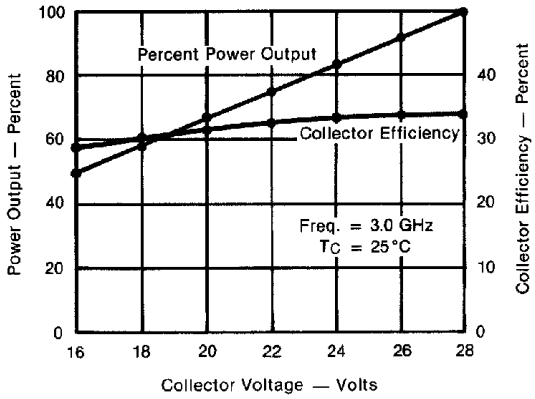
Symbol	Test Conditions			Value			Unit
				Min.	Typ.	Max.	
P_{OUT}	f = 3.0 GHz	P_{IN} = 1.59 W	V_{CC} = 28 V	4.5	5.0	—	W
η_C	f = 3.0 GHz	P_{IN} = 1.59 W	V_{CC} = 28 V	30	33	—	%
G_P	f = 3.0 GHz	P_{IN} = 1.59 W	V_{CC} = 28 V	4.5	5.0	—	dB
C_{OB}	f = 1 MHz	V_{CB} = 28 V		—	—	7.5	pF

TYPICAL PERFORMANCE

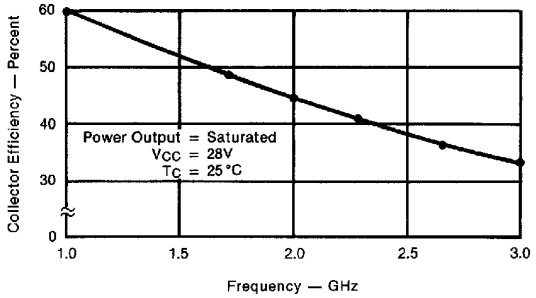
POWER OUTPUT vs FREQUENCY



PERCENT POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE

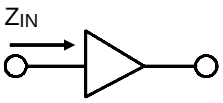


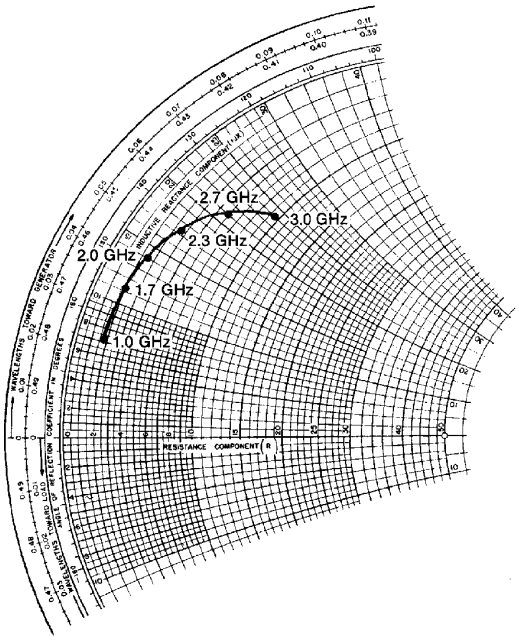
COLLECTOR EFFICIENCY vs FREQUENCY



IMPEDANCE DATA

TYPICAL INPUT IMPEDANCE

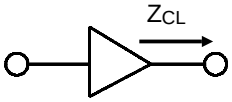


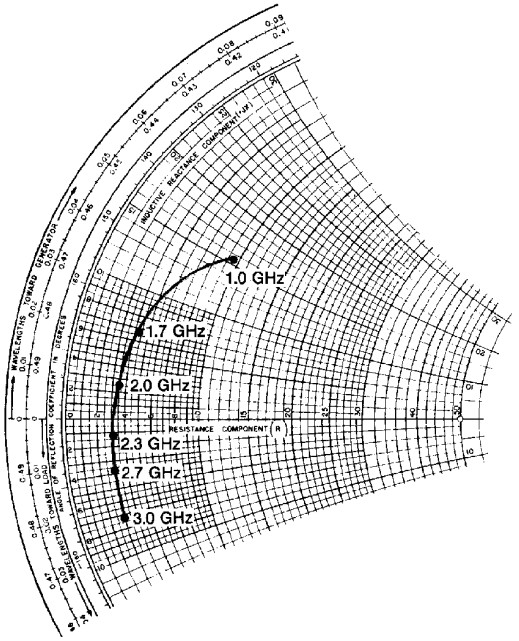


FREQ.	Z_{IN} (Ω)	Z_{CL} (Ω)
1.0 GHz	1.7 + j 7.2	9.5 + j 15.5
1.7 GHz	2.0 + j 11.2	4.2 + j 6.7
2.0 GHz	2.4 + j 14.0	3.5 + j 2.5
2.3 GHz	3.6 + j 17.4	3.1 – j 1.2
2.7 GHz	6.0 + j 21.0	3.0 – j 3.8
3.0 GHz	9.5 + j 24.0	3.0 – j 7.2

P_{OUT} = Saturated
V_{CC} = 28V
Normalized to 50 ohms

TYPICAL COLLECTOR LOAD IMPEDANCE

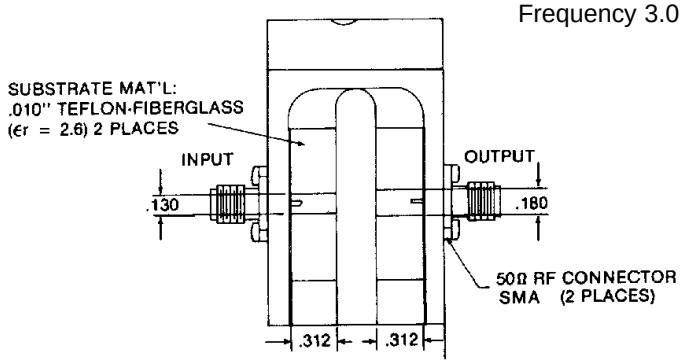




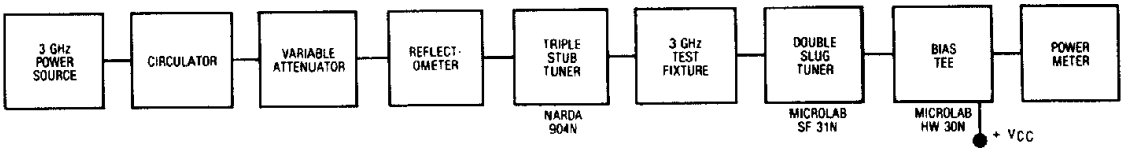
TEST CIRCUIT

Ref.: Dwg. No. C125562

All dimensions are in inches.
Frequency 3.0 GHz

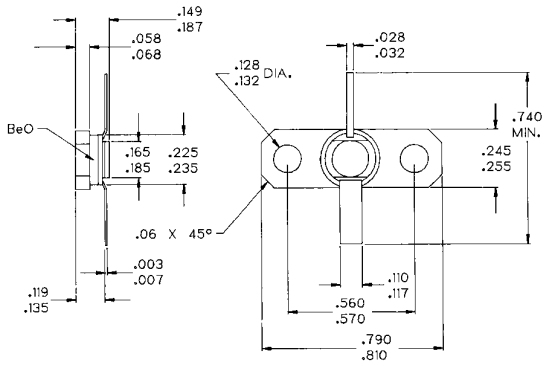


RF Amplifier Power Output Test



PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.