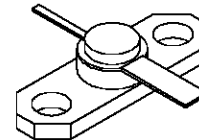


## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER BALLASTED
- VSWR CAPABILITY  $\infty:1$  @ 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**

MSC83305

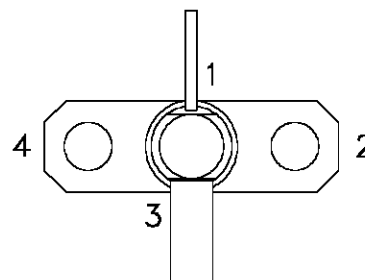
**BRANDING**

83305

### 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.

### PIN CONNECTION



1. Collector

2. Base

3. Emitter

4. Base

### ABSOLUTE MAXIMUM RATINGS ( $T_{case} = 25^{\circ}\text{C}$ )

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

### THERMAL DATA

$R_{TH(j-c)}$	Junction-Case Thermal Resistance*	8.5	$^{\circ}\text{C/W}$
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\*Applies only to rated RF amplifier operation

## MSC83305

### ELECTRICAL SPECIFICATIONS ( $T_{\text{case}} = 25^{\circ}\text{C}$ )

#### STATIC

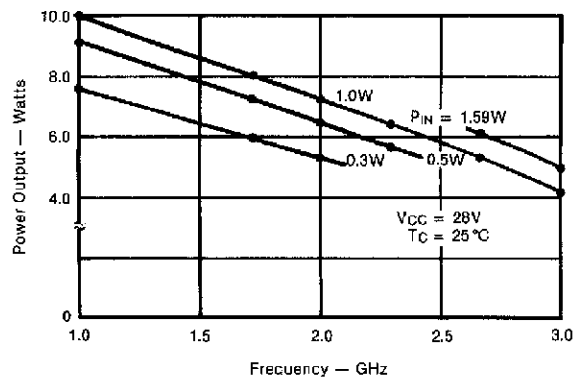
Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
$BV_{\text{CBO}}$	$I_{\text{C}} = 1\text{mA}$ $I_{\text{E}} = 0\text{mA}$	45	—	—	V
$BV_{\text{EBO}}$	$I_{\text{E}} = 1\text{mA}$ $I_{\text{C}} = 0\text{mA}$	3.5	—	—	V
$BV_{\text{CER}}$	$I_{\text{C}} = 5\text{mA}$ $R_{\text{BE}} = 10\Omega$	45	—	—	V
$I_{\text{CBO}}$	$V_{\text{CB}} = 28\text{V}$	—	—	0.5	mA
$h_{\text{FE}}$	$V_{\text{CE}} = 5\text{V}$ $I_{\text{C}} = 500\text{mA}$	30	—	300	—

#### DYNAMIC

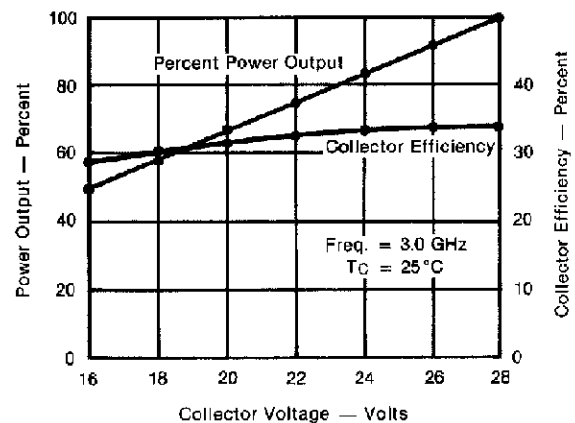
Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
$P_{\text{OUT}}$	$f = 3.0\text{ GHz}$ $P_{\text{IN}} = 1.59\text{ W}$ $V_{\text{CC}} = 28\text{ V}$	4.5	5.0	—	W
$\eta_{\text{C}}$	$f = 3.0\text{ GHz}$ $P_{\text{IN}} = 1.59\text{ W}$ $V_{\text{CC}} = 28\text{ V}$	30	33	—	%
$G_{\text{P}}$	$f = 3.0\text{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

#### TYPICAL PERFORMANCE

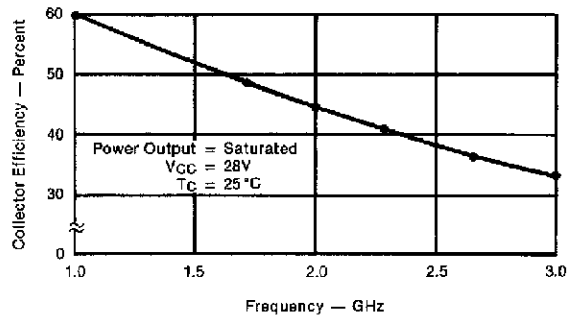
##### POWER OUTPUT vs FREQUENCY



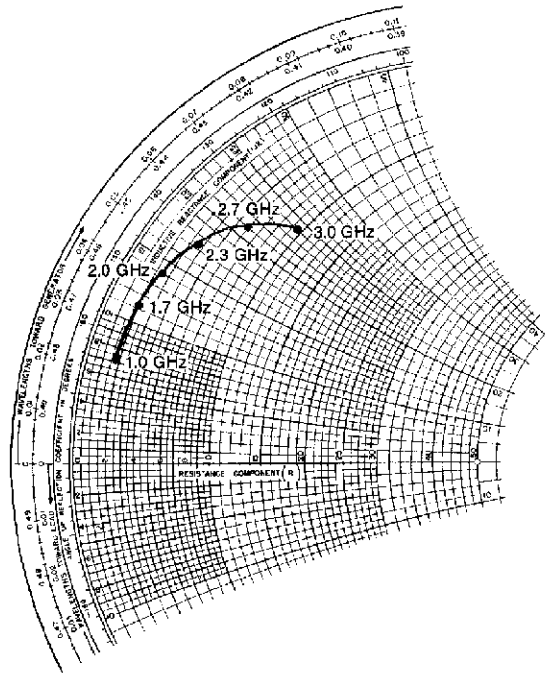
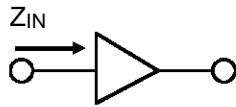
##### PERCENT POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE



##### COLLECTOR EFFICIENCY vs FREQUENCY

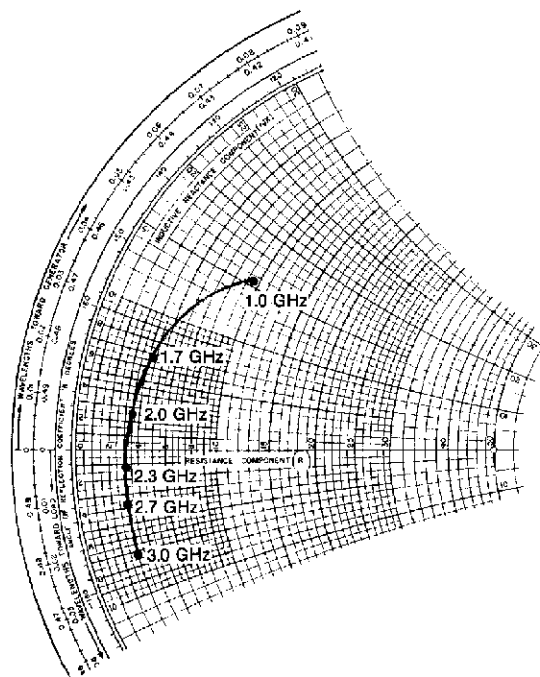
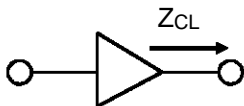


## IMPEDANCE DATA

TYPICAL INPUT  
IMPEDANCE

FREQ.	$Z_{IN} (\Omega)$	$Z_{CL} (\Omega)$
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	$9.5 + j 24.0$	$3.0 - j 7.2$

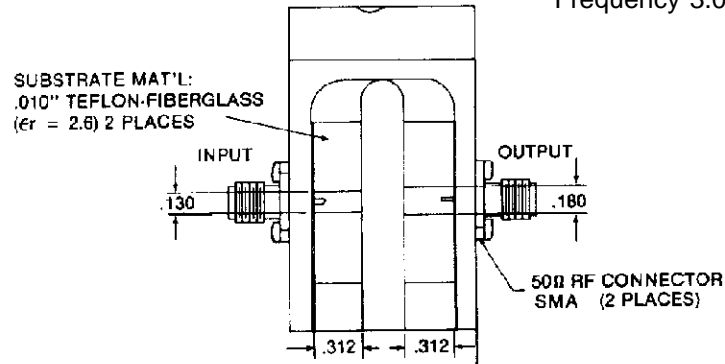
$P_{OUT}$  = Saturated  
 $V_{CC}$  = 28V  
 Normalized to 50 ohms

TYPICAL COLLECTOR  
LOAD IMPEDANCE

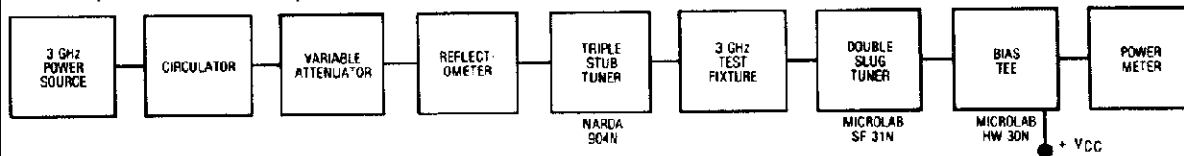
## TEST CIRCUIT

Ref.: Dwg. No. C125562

All dimensions are in inches.  
Frequency 3.0 GHz

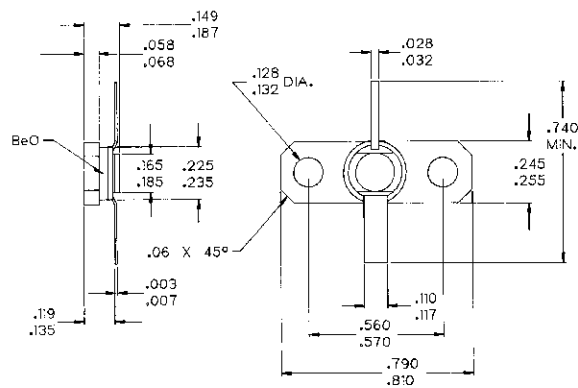


### RF Amplifier Power Output Test



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



#### NOTES:

1. ALL TOLERANCE  $\pm .010$  EXCEPT WHERE NOTED;  
DIMENSIONS IN INCHES.

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