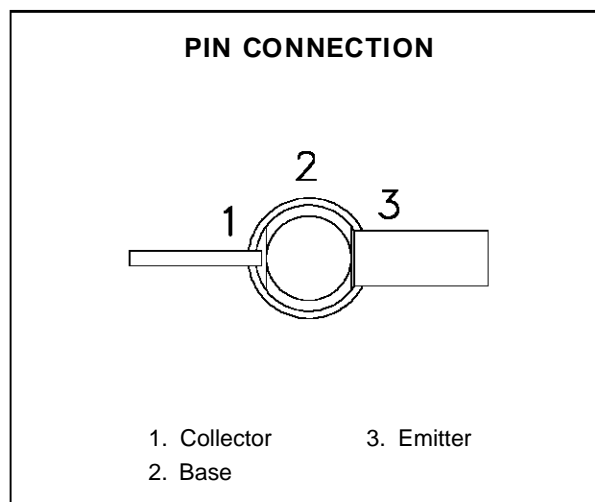
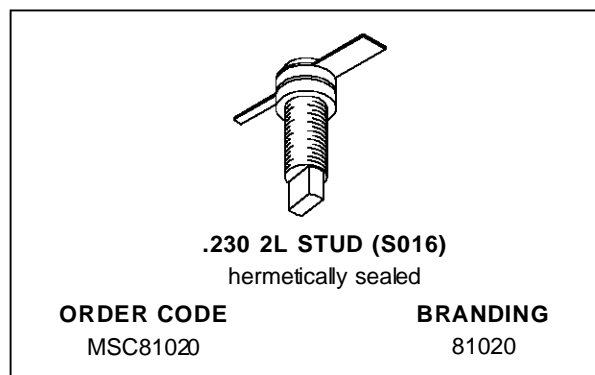


## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

- EMITTER BALLASTED
- REFRACTORY/GOLD METALLIZATION
- LOW THERMAL RESISTANCE
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT} = 20$  W MIN. WITH 10 dB GAIN @ 1 GHz



### DESCRIPTION

The MSC81020 is a common base hermetically sealed silicon NPN microwave transistor utilizing a fishbone emitter ballasted geometry with a refractory/gold metallization system. This device is designed for Class C amplifier applications in the 0.4 - 1.2 GHz frequency range.

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

Symbol	Parameter	Value	Unit
$P_{DISS}$	Power Dissipation*	35	W
$I_C$	Device Current*	1.50	A
$V_{CC}$	Collector-Supply Voltage*	35	V
$T_J$	Junction Temperature	200	$^{\circ}C$
$T_{STG}$	Storage Temperature	- 65 to +200	$^{\circ}C$

### THERMAL DATA

$R_{TH(j-c)}$	Junction-Case Thermal Resistance*	5.0	$^{\circ}C/W$
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\*Applies only to rated RF amplifier operation

# MSC81020

## ELECTRICAL SPECIFICATIONS (T<sub>case</sub> = 25°C)

### STATIC

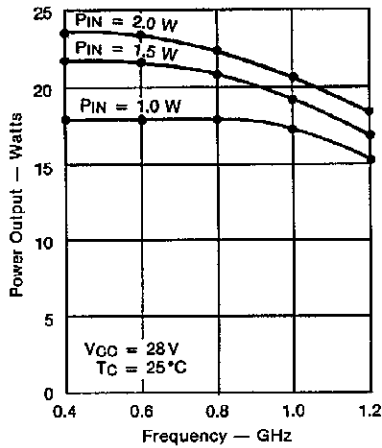
Symbol	Test Conditions		Value			Unit
			Min.	Typ.	Max.	
BV <sub>CBO</sub>	I <sub>C</sub> = 5mA	I <sub>E</sub> = 0mA	45	—	—	V
BV <sub>EBO</sub>	I <sub>E</sub> = 1mA	I <sub>C</sub> = 0mA	3.5	—	—	V
BV <sub>CER</sub>	I <sub>C</sub> = 15mA	R <sub>BE</sub> = 10Ω	45	—	—	V
I <sub>CBO</sub>	V <sub>CB</sub> = 28V		—	—	5.0	mA
h <sub>FE</sub>	V <sub>CE</sub> = 5V	I <sub>C</sub> = 1000mA	15	—	120	—

### DYNAMIC

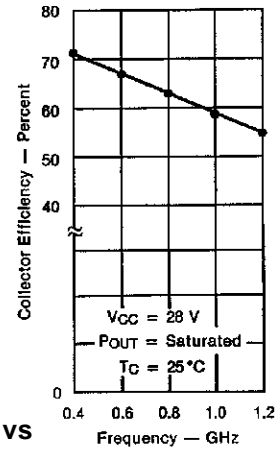
Symbol	Test Conditions			Value			Unit
				Min.	Typ.	Max.	
P <sub>OUT</sub>	f = 1.0 GHz	P <sub>IN</sub> = 2.0 W	V <sub>CC</sub> = 28 V	20	21	—	W
η <sub>C</sub>	f = 1.0 GHz	P <sub>IN</sub> = 2.0 W	V <sub>CC</sub> = 28 V	55	58	—	%
G <sub>P</sub>	f = 1.0 GHz	P <sub>IN</sub> = 2.0 W	V <sub>CC</sub> = 28 V	10	10.2	—	dB
C <sub>OB</sub>	f = 1 MHz	V <sub>CB</sub> = 28 V		—	—	19	pF

### TYPICAL PERFORMANCE

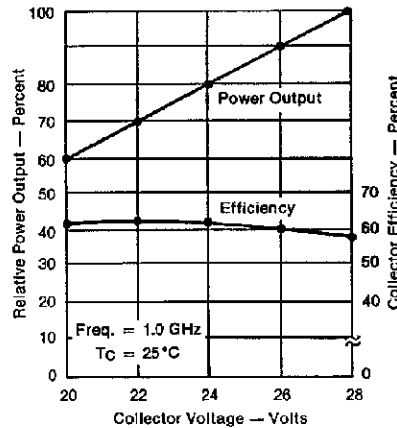
#### POWER OUTPUT vs FREQUENCY



#### COLLECTOR EFFICIENCY vs FREQUENCY

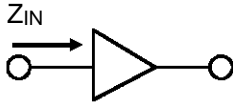


#### RELATIVE POWER OUTPUT vs COLLECTOR VOLTAGE

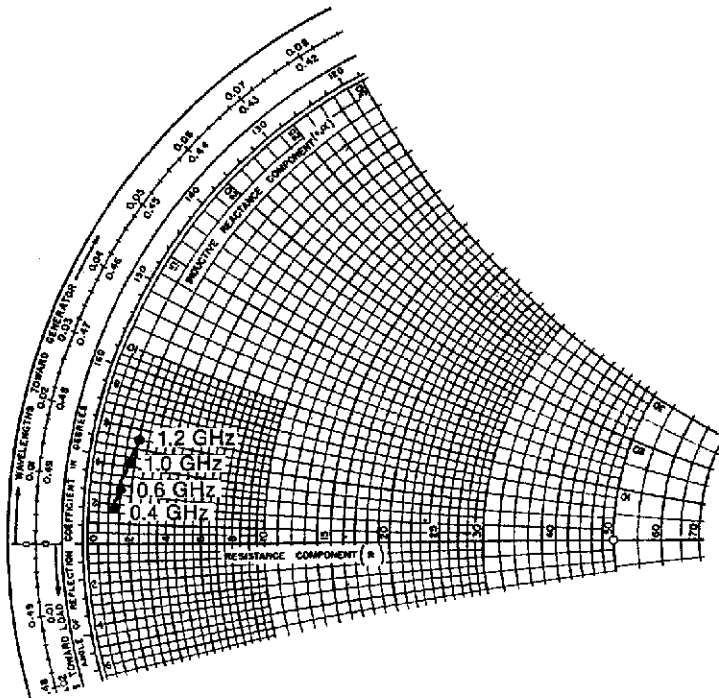


IMPEDANCE DATA

TYPICAL INPUT IMPEDANCE

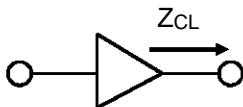


$P_{IN} = 3.0\text{ W}$   
 $V_{CC} = 28\text{ V}$   
 Normalized to 50 ohms

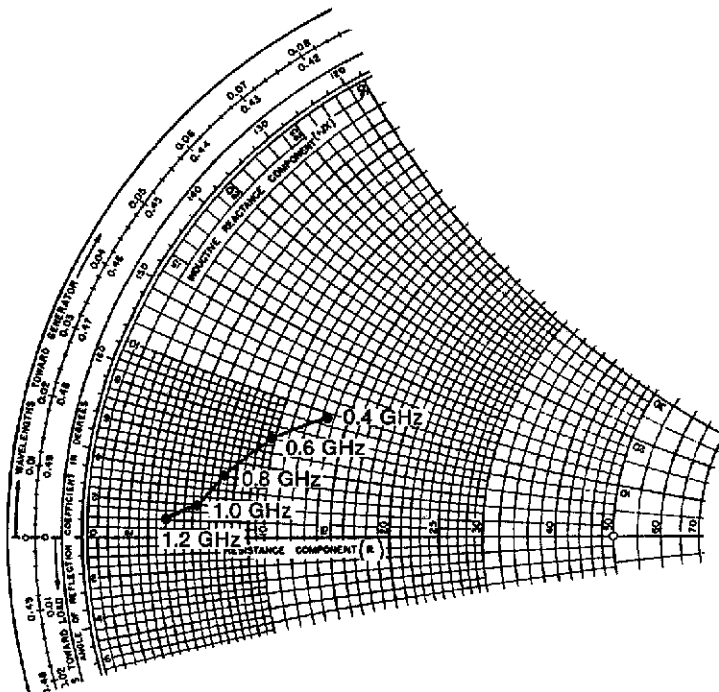


FREQ.	$Z_{IN} (\Omega)$	$Z_{CL} (\Omega)$
0.4 GHz	$1.3 + j 1.7$	$13.3 + j 9.8$
0.6 GHz	$1.5 + j 2.8$	$9.7 + j 7.0$
0.8 GHz	$1.6 + j 3.4$	$7.2 + j 4.0$
1.0 GHz	$1.8 + j 4.2$	$5.8 + j 2.0$
1.2 GHz	$2.0 + j 5.5$	$4.0 + j 1.0$

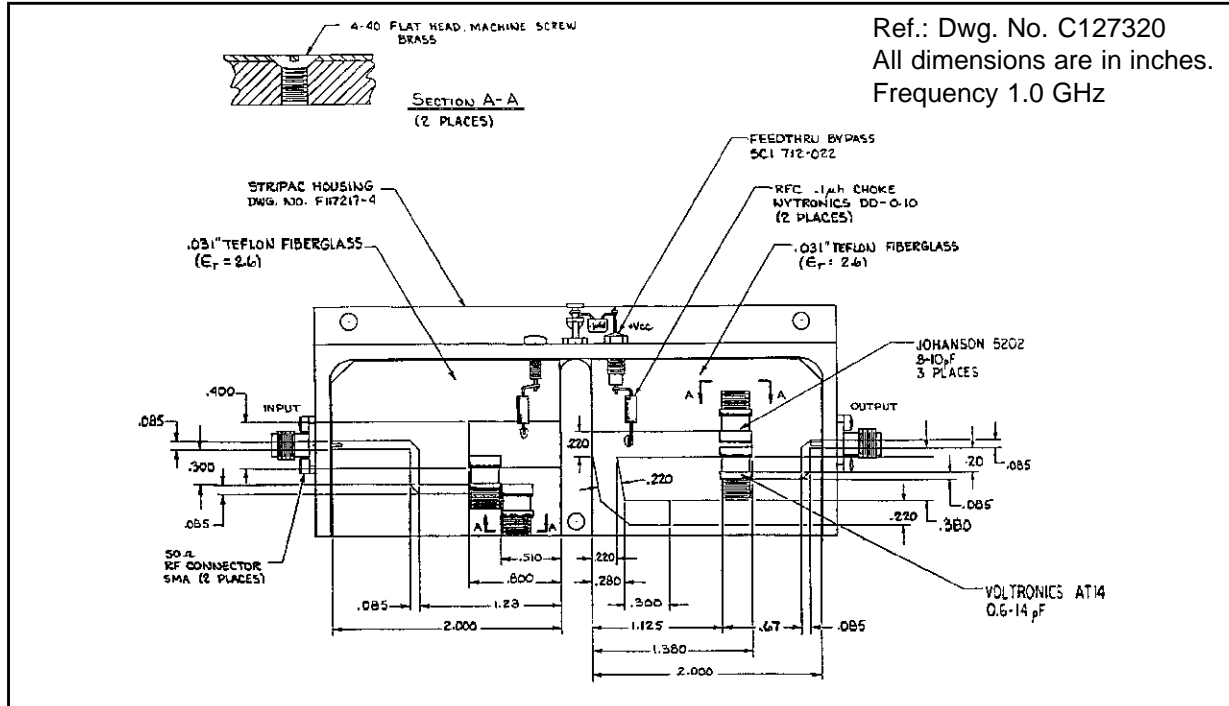
TYPICAL COLLECTOR LOAD IMPEDANCE



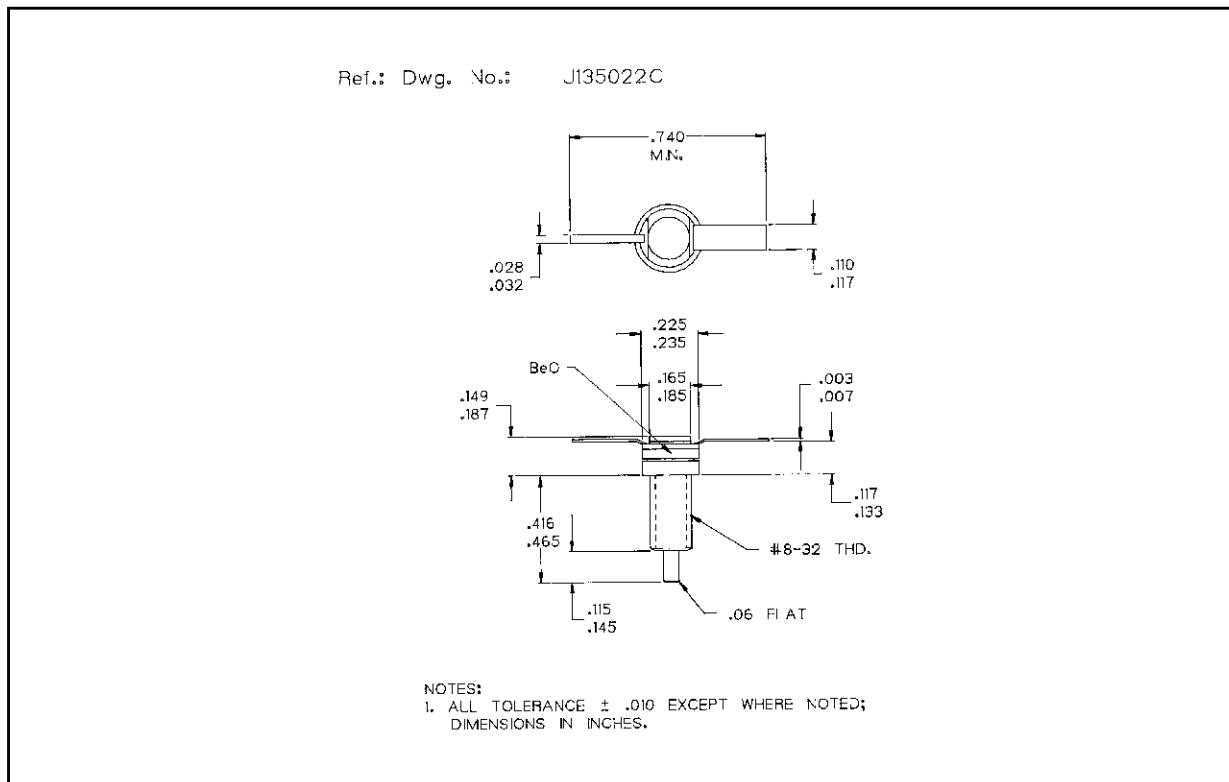
$P_{OUT} = \text{Saturated}$   
 $V_{CC} = 28\text{ V}$   
 Normalized to 50 ohms



TEST CIRCUIT



PACKAGE MECHANICAL DATA



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