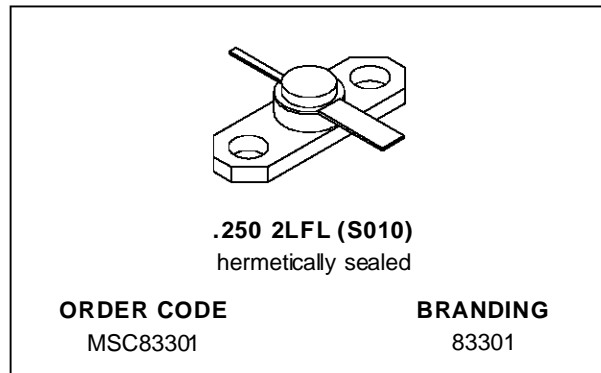


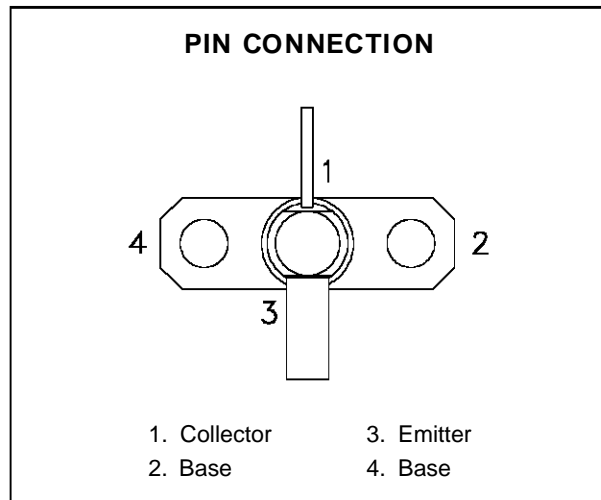
RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- VSWR CAPABILITY $\infty:1$ @ RATED CONDITIONS
- HERMETIC STRIPAC[®] PACKAGE
- $P_{OUT} = 1.0$ W MIN. WITH 7.0 dB GAIN @ 3.0 GHz



DESCRIPTION

The MSC83301 is a common base hermetically sealed silicon NPN microwave power transistor utilizing an overlay, 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 MSC83301 is designed for Class C amplifier/oscillator applications in the 1.0 - 3.0 GHz frequency range.



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

| Symbol | Parameter | Value | Unit |
|------------|---|--------------|-------------|
| P_{DISS} | Power Dissipation* ($T_c \leq 50^{\circ}C$) | 6.0 | W |
| I_c | Device Current* | 200 | mA |
| V_{CC} | Collector-Supply Voltage* | 30 | 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* | 25 | $^{\circ}C/W$ |
|---------------|-----------------------------------|----|---------------|

*Applies only to rated RF amplifier operation

MSC83301

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

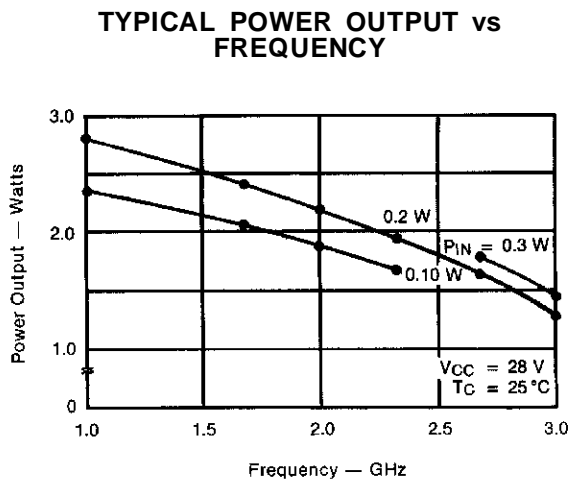
STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|-------------------|-----------------------|-------------------------|-------|------|------|------|
| | | | Min. | Typ. | Max. | |
| BV _{CBO} | I _C = 1 mA | I _E = 0 mA | 45 | — | — | V |
| BV _{EBO} | I _E = 1 mA | I _C = 0 mA | 3.5 | — | — | V |
| BV _{CER} | I _C = 5 mA | R _{BE} = 10 Ω | 45 | — | — | V |
| I _{CBO} | V _{CB} = 28V | | — | — | 0.5 | mA |
| h _{FE} | V _{CE} = 5 V | I _C = 100 mA | 30 | — | 300 | — |

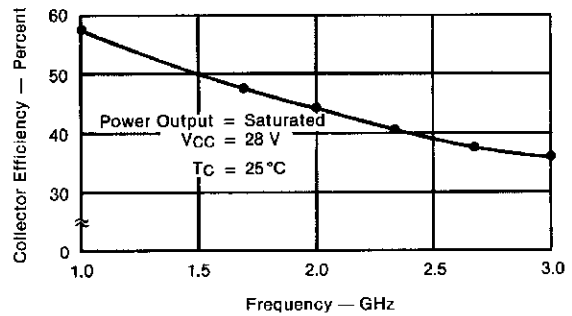
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|------------------|-----------------|--------------------------|------------------------|-------|------|------|------|
| | | | | Min. | Typ. | Max. | |
| P _{OUT} | f = 3.0 GHz | P _{IN} = 0.20 W | V _{CC} = 28 V | 1.0 | 1.3 | — | W |
| η _C | f = 3.0 GHz | P _{IN} = 0.20 W | V _{CC} = 28 V | 33 | 36 | — | % |
| P _G | f = 3.0 GHz | P _{IN} = 0.20 W | V _{CC} = 28 V | 7.0 | 8.1 | — | dB |
| C _{OB} | f = 1 MHz | V _{CB} = 28 V | | — | — | 3.5 | pF |

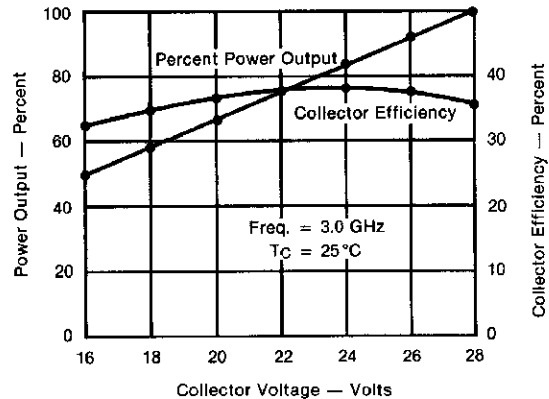
TYPICAL PERFORMANCE



TYPICAL COLLECTOR EFFICIENCY vs FREQUENCY

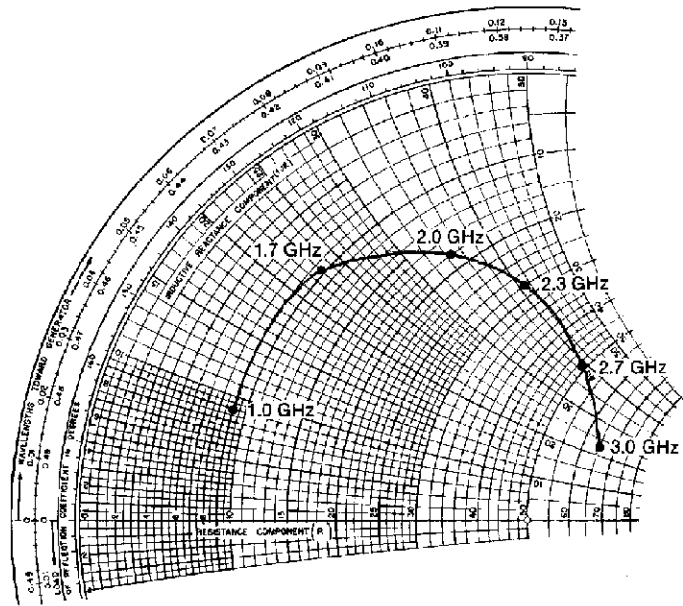
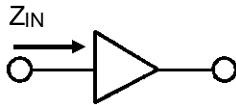


PERCENT POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE



IMPEDANCE DATA

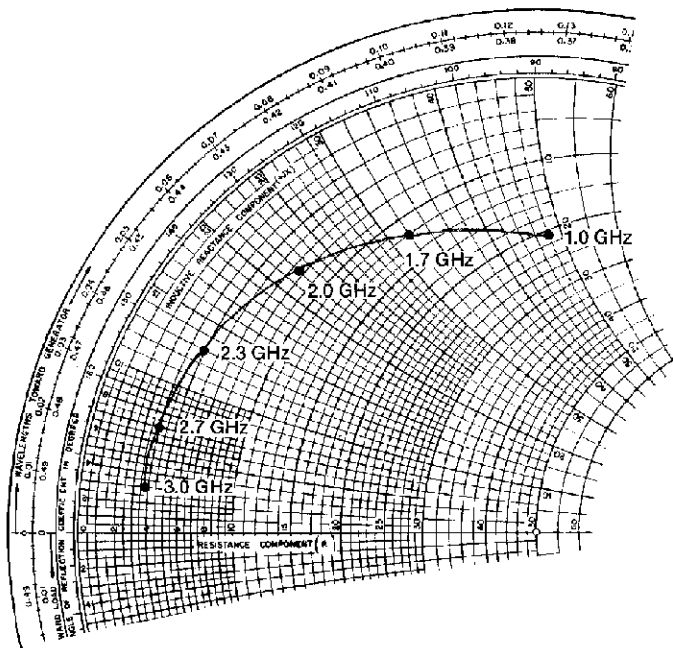
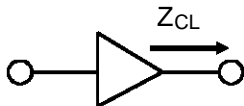
TYPICAL INPUT IMPEDANCE



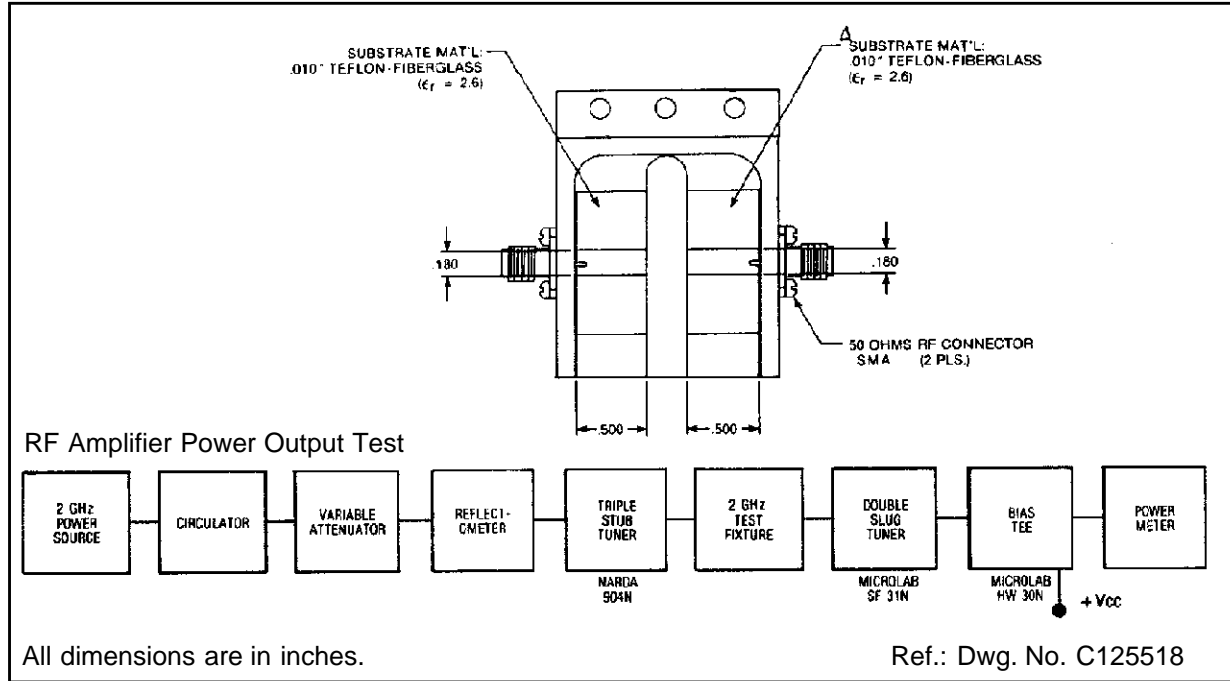
| FREQ. | Z _{IN} (Ω) | Z _{CL} (Ω) |
|---------|---------------------|---------------------|
| 1.0 GHz | 9.0 + j 9.0 | 21.0 + j 48.0 |
| 1.7 GHz | 9.5 + j 23.0 | 12.0 + j 32.0 |
| 2.0 GHz | 18.0 + j 34.5 | 7.5 + j 22.0 |
| 2.3 GHz | 28.0 + j 41.0 | 5.0 + j 13.0 |
| 2.7 GHz | 49.0 + j 39.0 | 4.0 + j 7.0 |
| 3.0 GHz | 65.0 + j 22.0 | 3.8 + j 3.0 |

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

TYPICAL COLLECTOR LOAD IMPEDANCE

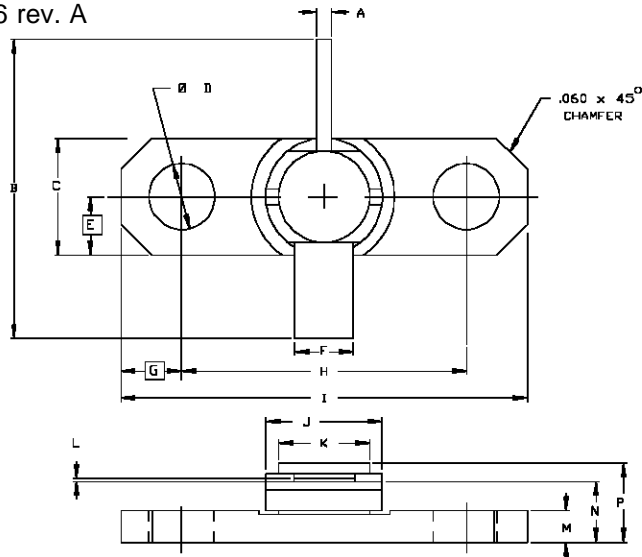


TEST CIRCUIT



PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 12-0216 rev. A



| SGS-THOMSON MICROELECTRONICS | | CONT'D | | | |
|------------------------------|----------------------|----------------------|---|----------------------|----------------------|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .028/0,71 | .032/0,81 | K | .165/4,19 | .185/4,70 |
| B | .740/18,80 | | L | .003/0,08 | .007/0,18 |
| C | .245/6,22 | .255/6,48 | M | .058/1,47 | .068/1,73 |
| D | .128/3,25 | .132/3,35 | N | .119/3,02 | .135/3,43 |
| E | .125/3,18 | | P | .149/3,78 | .187/4,75 |
| F | .110/2,79 | .117/2,97 | | | |
| G | .117/2,97 | | | | |
| H | .560/14,22 | .570/14,48 | | | |
| I | .795/20,19 | .805/20,45 | | | |
| J | .225/5,72 | .235/5,97 | | | |

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