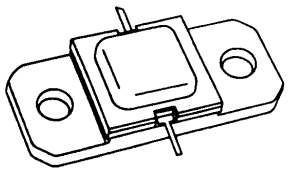
SGS-THOMSON MICROELECTRONICS

# AM82731-003

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 10:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT IMPEDANCE MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 3.0 W. MIN. WITH 5.7 dB GAIN
- BANDWIDTH = 400 MHz



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM 82731-003 | 82731-3 |

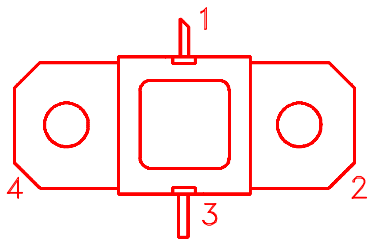
### DESCRIPTION

The AM82731-003 device is a medium power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and can withstand a 10:1 output VSWR. Low RF thermal resistance, refractory/gold metallization, and automatic wire bonding techniques ensure high reliability and product consistency.

The AM82731-003 is supplied in the hermetic metal/ceramic package with internal input/output impedance matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION




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

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

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 23 | W |
| $I_C$ | Device Current* | 0.9 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 34 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH}(j\text{-}c)$ | Junction-Case Thermal Resistance | 6.5 | °C/W |

*Applies only to rated RF amplifier operation

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

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 2mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | $I_C$ = 2mA | $R_{BE}$ = 10Ω | 50 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 30V | | — | — | 2.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 200mA | 10 | — | — | — |

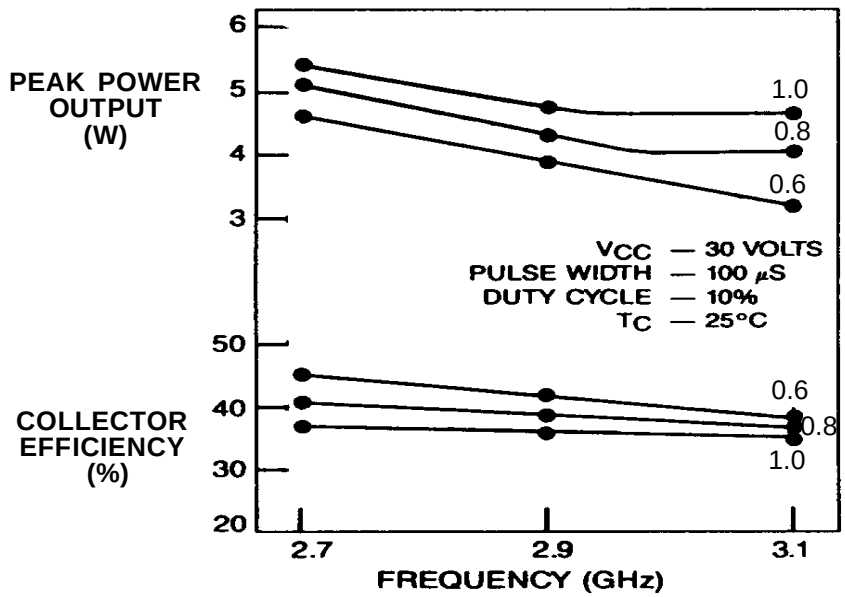
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.7 — 3.1GHz | $P_{IN}$ = 0.8W | $V_{CC}$ = 30V | 3.0 | 4.0 | — | W |
| $\eta_C$ | f = 2.7 — 3.1GHz | $P_{IN}$ = 0.8W | $V_{CC}$ = 30V | 27 | 37 | — | % |
| $G_{PB}$ | f = 2.7 — 3.1GHz | $P_{IN}$ = 0.8W | $V_{CC}$ = 30V | 5.7 | 7.0 | — | dB |

Note: Pulse Width = 100µS
Duty Cycle = 10%

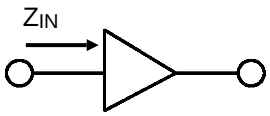
## TYPICAL PERFORMANCE

**TYPICAL BROADBAND PERFORMANCE**

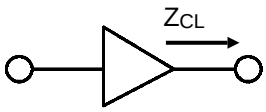


## IMPEDANCE DATA

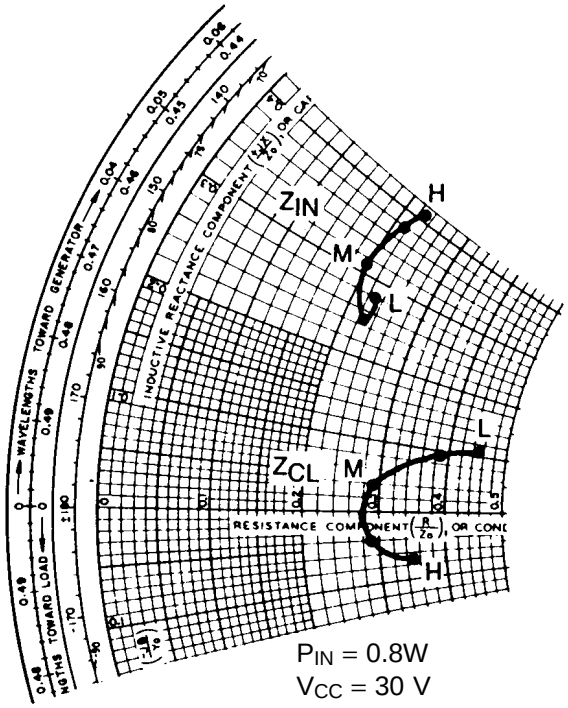
**TYPICAL INPUT IMPEDANCES**




**TYPICAL COLLECTOR LOAD IMPEDANCES**

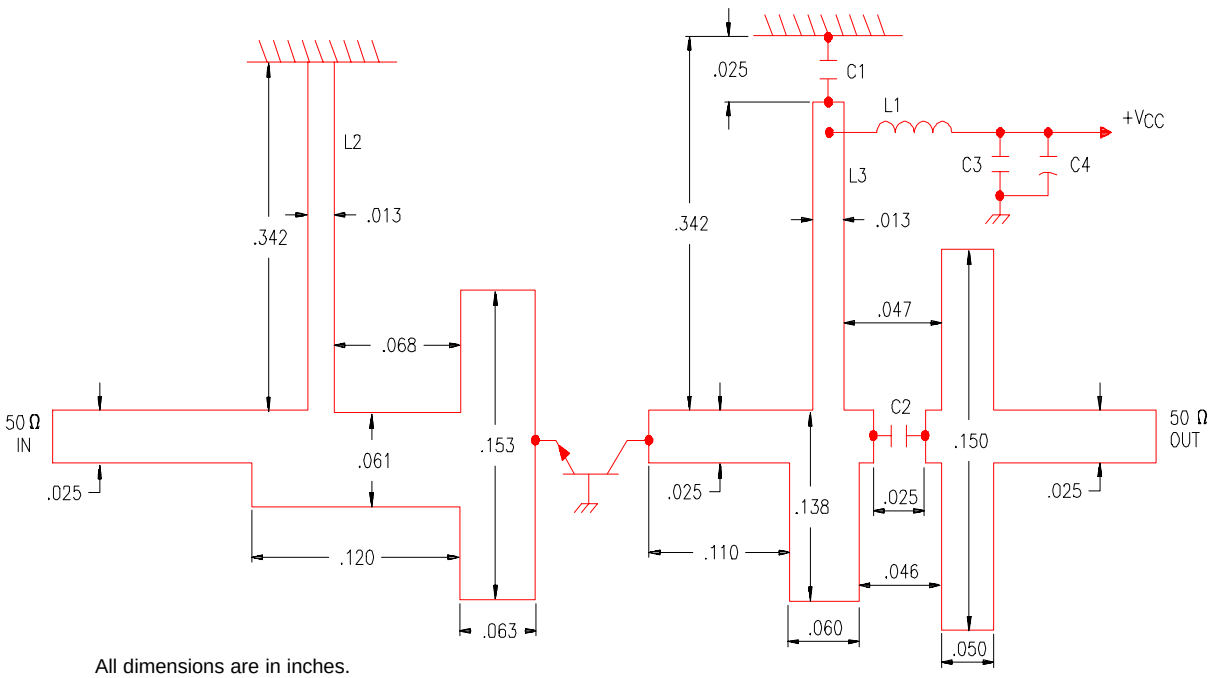



| FREQ. | $Z_{IN}(\Omega)$ | $Z_{CL}(\Omega)$ |
|---|---|---|
| L = 2.7 GHz | 11.5 + j 14.0 | 22.5 + j 5.5 |
| • = 2.9 GHz | 11.5 + j 12.5 | 19.5 + j 5.0 |
| M = 3.1 GHz | 10.0 + j 15.5 | 14.5 + j 2.0 |
| • = 3.3 GHz | 11.0 + j 19.0 | 14.5 – j 2.0 |
| H = 3.5 GHz | 11.0 + j 20.5 | 17.5 – j 3.5 |




$P_{IN}$ = 0.8W
$V_{CC}$ = 30 V
Normalized at 50 ohms

## TEST CIRCUIT

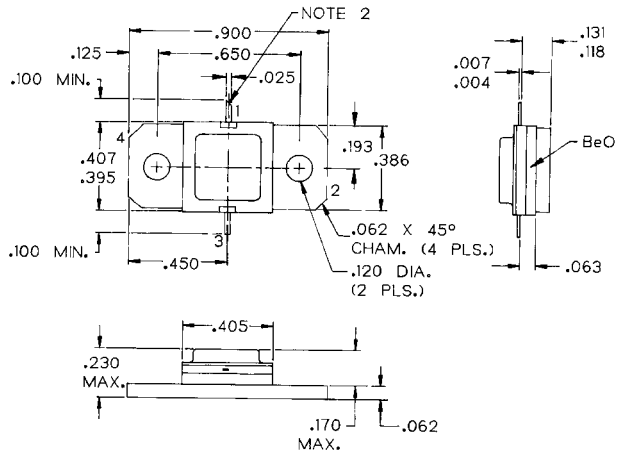



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$ (Er = 9.6)

C1 : 100 pF Microwave Chip Capacitor
C2 : 100 pF Microwave Chip Capacitor
(Note: Capacitor is mounted on its thin side)
C3 : 1500 pF, RF Feedthru
C4 : 100 µF, Electrolytic Capacitor
L1 : No. 32 Wire, 0.500 Inch Long
L2 : Printed RF Choke
L3 : Printed RF Choke

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.