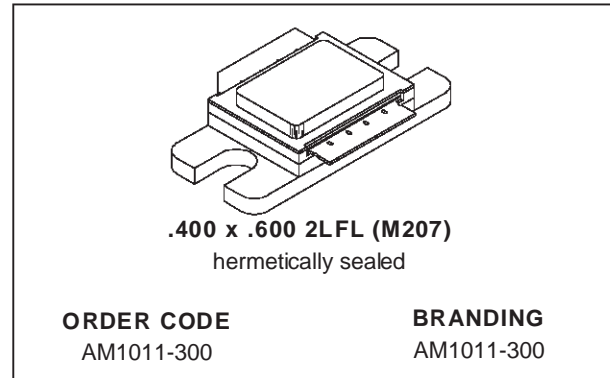


RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

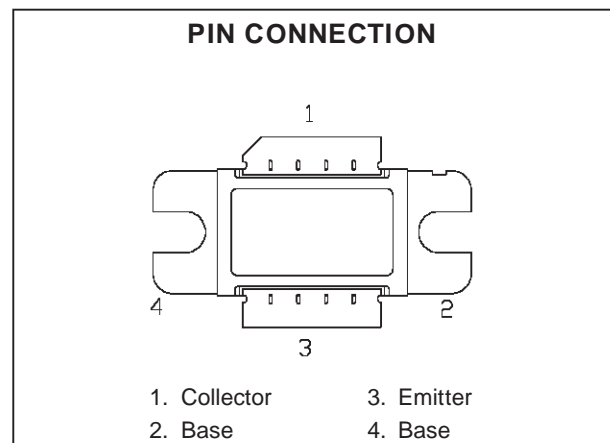
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTING
- LOW RF THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT} = 325$ W MIN. WITH 7.7 dB GAIN
- 1030/1090 MHZ OPERATION



DESCRIPTION

The AM1011-300 is a rugged, Class C common base device specifically designed for new Mode-S interrogator and transponder applications.

Minimal amplitude droop over the heavy Mode-S pulse burst is guaranteed by a thermal design incorporating an overlay site-ballasted die geometry.



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

| Symbol | Parameter | Value | Unit |
|------------|--|--------------|-------------|
| P_{DISS} | Power Dissipation ($T_C \leq 100^{\circ}C$)* | 1070 | W |
| I_C | Device Current* | 36 | A |
| V_{CC} | Collector-Supply Voltage* | 43 | V |
| T_J | Junction Temperature (Pulsed RF operation) | +250 | $^{\circ}C$ |
| T_{STG} | Storage Temperature | - 65 to +200 | $^{\circ}C$ |

THERMAL DATA

| | | | |
|---------------|-----------------------------------|------|---------------|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.14 | $^{\circ}C/W$ |
|---------------|-----------------------------------|------|---------------|

*Applies only to rated RF amplifier operation.

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

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|------------|------------------------|-----------------------|-------|------|------|------|
| | | | Min. | Typ. | Max. | |
| BV_{CBO} | $I_C = 75\text{ mA}$ | $I_E = 0\text{ mA}$ | 65 | — | — | V |
| BV_{CES} | $I_C = 75\text{ mA}$ | $V_{BE} = 0\text{ V}$ | 65 | — | — | V |
| BV_{EBO} | $I_C = 25\text{ mA}$ | $I_C = 0\text{ mA}$ | 3.0 | — | — | V |
| I_{CES} | $V_{CE} = 40\text{ V}$ | $V_{BE} = 0\text{ V}$ | — | — | 30 | mA |
| h_{FE} | $V_{CE} = 5\text{ V}$ | $I_C = 10\text{ A}$ | 10 | — | — | — |

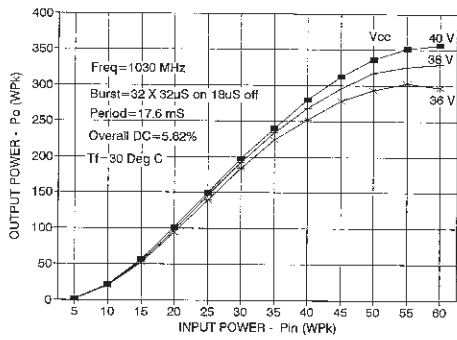
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|-----------|-----------------------|--------------------------|------------------------|-------|------|------|------|
| | | | | Min. | Typ. | Max. | |
| P_{OUT} | $f = 1090\text{ MHz}$ | $P_{IN} = 55\text{ W}$ | $V_{CC} = 40\text{ V}$ | 325 | 350 | — | W |
| hc | $f = 1090\text{ MHz}$ | $P_{OUT} = 325\text{ W}$ | $V_{CC} = 40\text{ V}$ | 40 | 45 | — | % |
| GP | $f = 1090\text{ MHz}$ | $P_{OUT} = 325\text{ W}$ | $V_{CC} = 40\text{ V}$ | 7.7 | 8.0 | — | dB |

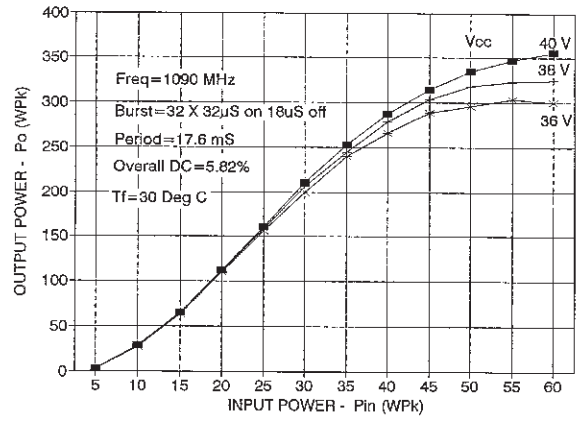
Pulse Conditions: Pulse width = 200 μ s, Duty Cycle = 5%, are equivalent to the following pulse burst conditions:
 Mode-S Interrogator (freq = 1030MHz)
 32 pulses, 32 μ s on, 18 μ s off, burst period = 17.6ms
 long term duty = 5.82%

TYPICAL PERFORMANCE

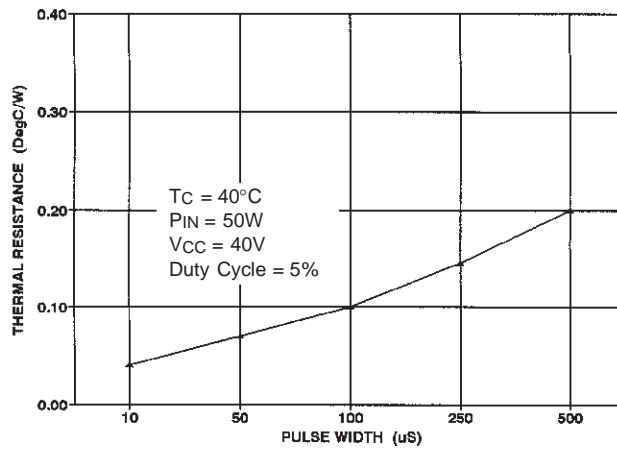
POWER OUTPUT vs POWER INPUT @ 1030 MHz



POWER OUTPUT vs POWER INPUT @ 1090 MHz

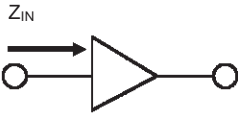


MAXIMUM THERMAL RESISTANCE vs PULSE WIDTH

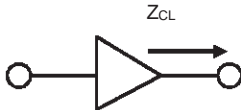


IMPEDANCE DATA

TYPICAL INPUT IMPEDANCE



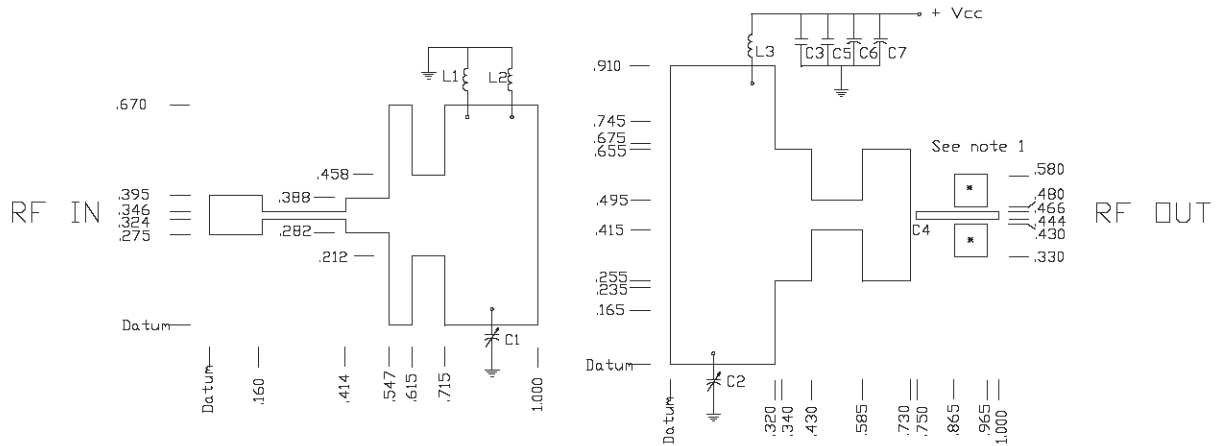
TYPICAL COLLECTOR LOAD



| FREQ. | Z _{IN} (Ω) | Z _{CL} (Ω) |
|----------|---------------------|---------------------|
| 1030 MHz | 0.7 + j 4.1 | 0.78 - j 2.4 |
| 1090 MHz | 0.65 + j 4.2 | 0.4 - j 2.4 |

P_{IN} = 55W

TEST CIRCUIT

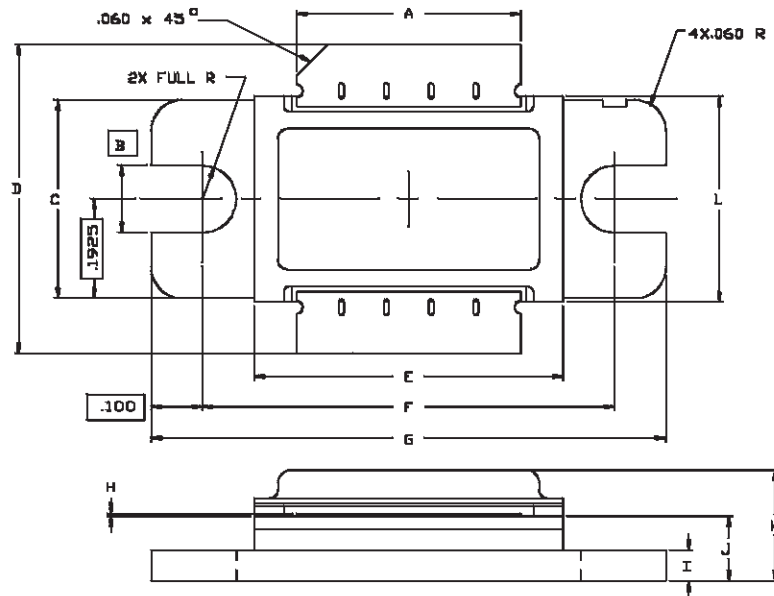


- C1 : 0.8-8.0 pf Johanson Gigatrim
- C2 : 0.6-4.5 pf Johanson Gigatrim
- C3,C4 : 100 pf Chips
- C5 : 47 pf Chip
- C6 : 10 uF Tantalum,50 V
- C7 : 100 uF Electrolytic,63 V
- L1,L2 : Straps 0.300" long,0.100" wide and 0.005" thick
- L3 : 3 Turns #24 wire,0.085" ID
- Substrate : Er=10.2 H=0.025"

- Notes:
1. Freq=1030/1090 MHz
* denotes areas to be connected for 1030 MHz operation only.
 2. Power supply should have at least 5 Joules (6600 uF) of energy storage.
 3. Air cooling required.
 4. All dimensions are in inches.

PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 12-0207
UDCS No. 1011408 rev B



| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|------------------------------|----------------------|----------------------|--------|----------------------|----------------------|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .435/11,05 | .445/11,30 | K | | .230/5,84 |
| B | .130/3,30 | | L | .395/10,03 | .407/10,34 |
| C | .380/9,65 | .390/9,91 | | | |
| D | .570/14,48 | .630/16,00 | | | |
| E | .590/14,99 | .610/15,49 | | | |
| F | .790/20,07 | .810/20,57 | | | |
| G | .995/25,27 | 1.010/25,65 | | | |
| H | .003/0,08 | .006/0,13 | | | |
| I | .055/1,40 | .065/1,65 | | | |
| J | .115/2,92 | .130/3,30 | | | |

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