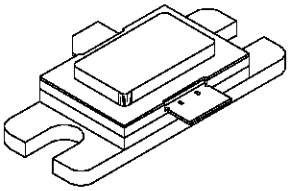
SGS-THOMSON MICROELECTRONICS

# AM1011-500

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

- $P_{OUT}$ = 500 W MIN. WITH 8.5 dB MIN. GAIN
- 10:1 LOAD VSWR CAPABILITY @ 10μS., 1% DUTY
- SIXPAC™ HERMETIC METAL/CERAMIC PACKAGE
- EMITTER SITE BALLASTED OVERLAY GEOMETRY
- REFRACTORY/GOLD METALLIZATION
- LOW THERMAL RESISTANCE
- INTERNAL INPUT/OUTPUT MATCHING
- CHARACTERIZED UNDER 32μS.,2% DUTY CYCLE PULSE CONDITIONS



**.400 x .600 2LFL (M198)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1011-500 | 1011-500 |

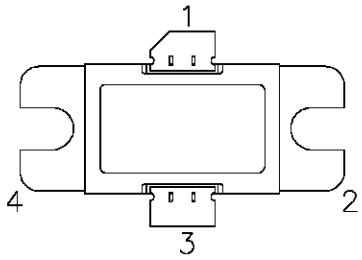
### DESCRIPTION

The AM1011-500 device is a high power Class C transistor specifically designed for L-Band Avionic applications involving high pulse burst duty cycles.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM1011-500 is supplied in the SIXPAC™ Hermetic metal/ceramic package with internal input/output matching structures.

**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* ($T_C \leq 100°C$) | 1,360 | W |
| $I_C$ | Device Current* | 27 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.11 | °C/W |

*Applies only to rated RF amplifier operation

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

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50 mA | $I_E$ = 0 mA | 70 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 30 mA | $I_C$ = 0 mA | 3.0 | — | — | V |
| $BV_{CES}$ | $I_C$ = 50 mA | $V_{BE}$ = 0 V | 70 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0 V | $V_{CE}$ = 50 V | — | — | 40 | mA |
| $h_{FE}$ | $V_{CE}$ = 5 V | $I_C$ = 1.0 A | 10 | — | 200 | — |

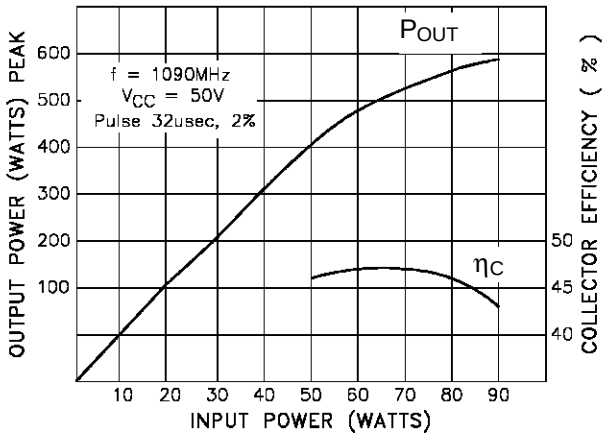
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1090 MHz | $P_{IN}$ = 70 W | $V_{CC}$ = 50 V | 500 | — | — | W |
| hc | f = 1090 MHz | $P_{OUT}$ = 500 W | $V_{CC}$ = 50 V | 40 | — | — | % |
| $G_P$ | f = 1090 MHz | $P_{OUT}$ = 500 W | $V_{CC}$ = 50 V | 8.5 | — | — | dB |
| Load Mismatch | $P_{OUT}$ = 500 W Peak<br>F = 1090MHz<br>$V_{CC}$ = 50 V | VSWR = 10:1, 10µS, 1% Duty<br>VSWR = 5:1, 32µS, 2% Duty | | No Degradation in Output Power | | | |

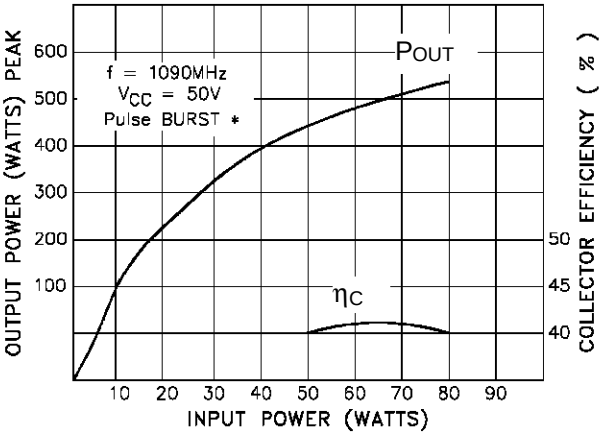
Note: Pulse Width = 32µSec, Duty Cycle = 2%

**TYPICAL PERFORMANCE**

**POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT**




**POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT**




* Pulse Burst conditions:
128 µSec train, 0.5 µSec on,
0.5 µSec off; with a period of 6.4 msec.

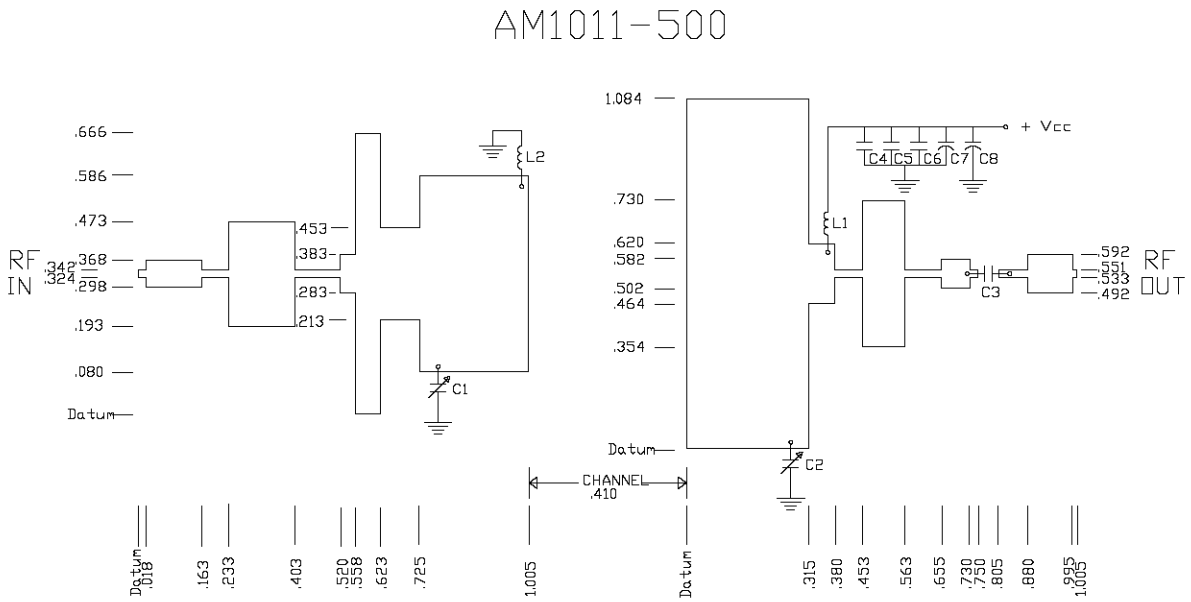
## IMPEDANCE DATA

| FREQ. | $Z_{IN}(\Omega)$ | $Z_{CL}(\Omega)$ |
|---|---|---|
| 1030 MHz | 4.35 + j 6.97 | 1.38 – j 4.08 |
| 1090 MHz | 4.38 + j 2.75 | .874 – j 3.55 |
| 1120 MHz | 4.69 + j 2.95 | 1.3 – j 4.97 |

$P_{IN}$ = 70W

$V_{CC}$ = 50V

## TEST CIRCUIT



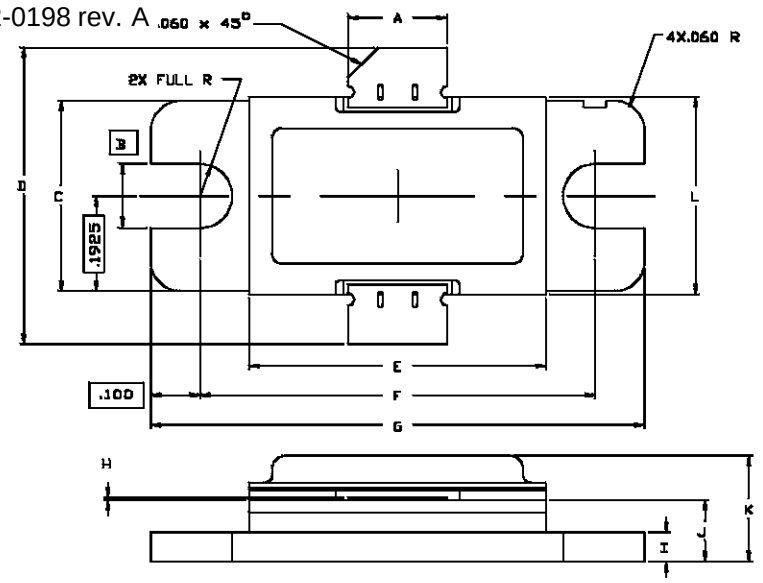

C1 : 0.8-8.0 pf Gigatrim
C2 : 0.6-4.5 pf Gigatrim
C3 : 100 pf ATC Chip
C4 : 39 pf ATC Chip
C5 : 91 pf ATC Chip
C6 : .1 uf ceramic cap
C7 : 100 uf Electrolytic,63 V
C8 : 6600 uf Electrolytic external storage cap

L1 : 1 turn, #22 AWG
L2 : Strap - shim stock, .300 long, .125 wide, .005 thick
Substrate : Er = 10.2, H = 0.025

Notes:
1. Freq = 1090 MHz
2. All dimentions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 12-0198 rev. A




| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .195/4,95 | .205/5,21 | K | | .230/5,84 |
| B | .130/3,30 | | L | .393/9,98 | .407/10,34 |
| C | .380/9,65 | .390/9,91 | | | |
| D | .570/14,48 | | | | |
| E | .593/15,06 | .607/15,42 | | | |
| F | .790/20,07 | .810/20,57 | | | |
| G | .995/25,27 | 1.005/25,53 | | | |
| H | .002/0,05 | .006/0,15 | | | |
| I | .055/1,40 | .065/1,65 | | | |
| J | .110/2,79 | .130/3,30 | | | |