# SGS-THOMSON MICROELECTRONICS

# STM1645-10

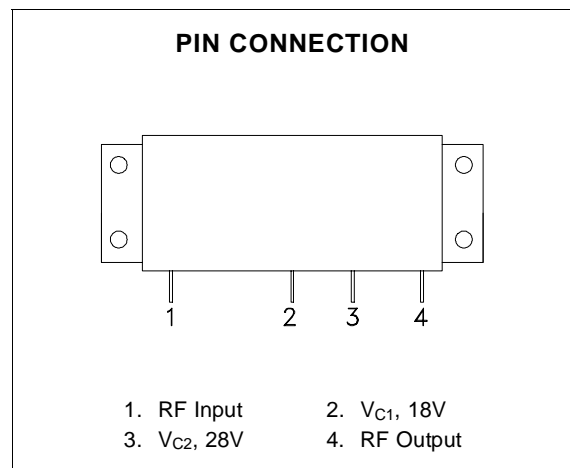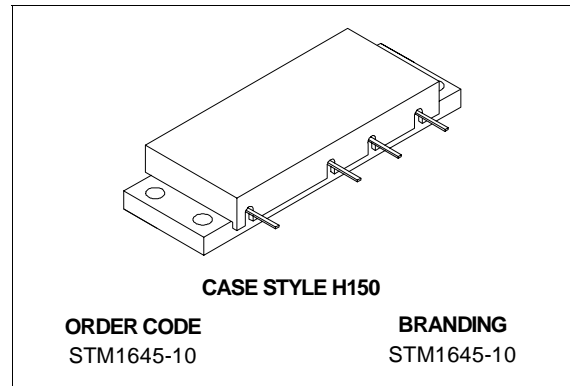## RF POWER MODULES
## SATELLITE COMMUNICATIONS APPLICATIONS

- SATELLITE COMMUNICATIONS AMPLIFIER
- 1625 - 1665 MHz
- 18/28 VOLTS
- INPUT/OUTPUT 50 OHMS
- $P_{OUT}$ = 10 W MIN.
- GAIN = 30 dB MIN.

**CASE STYLE H150**

| ORDER CODE | BRANDING |
|---|---|
| STM1645-10 | STM1645-10 |

**PIN CONNECTION**



| | |
|---|---|
| 1. RF Input | 2. $V_{C1}$, 18V |
| 3. $V_{C2}$, 28V | 4. RF Output |

### DESCRIPTION

The STM1645-10 module is designed for high power satellite communication applications in the 1.6 GHz frequency range operating at 28 Volts.
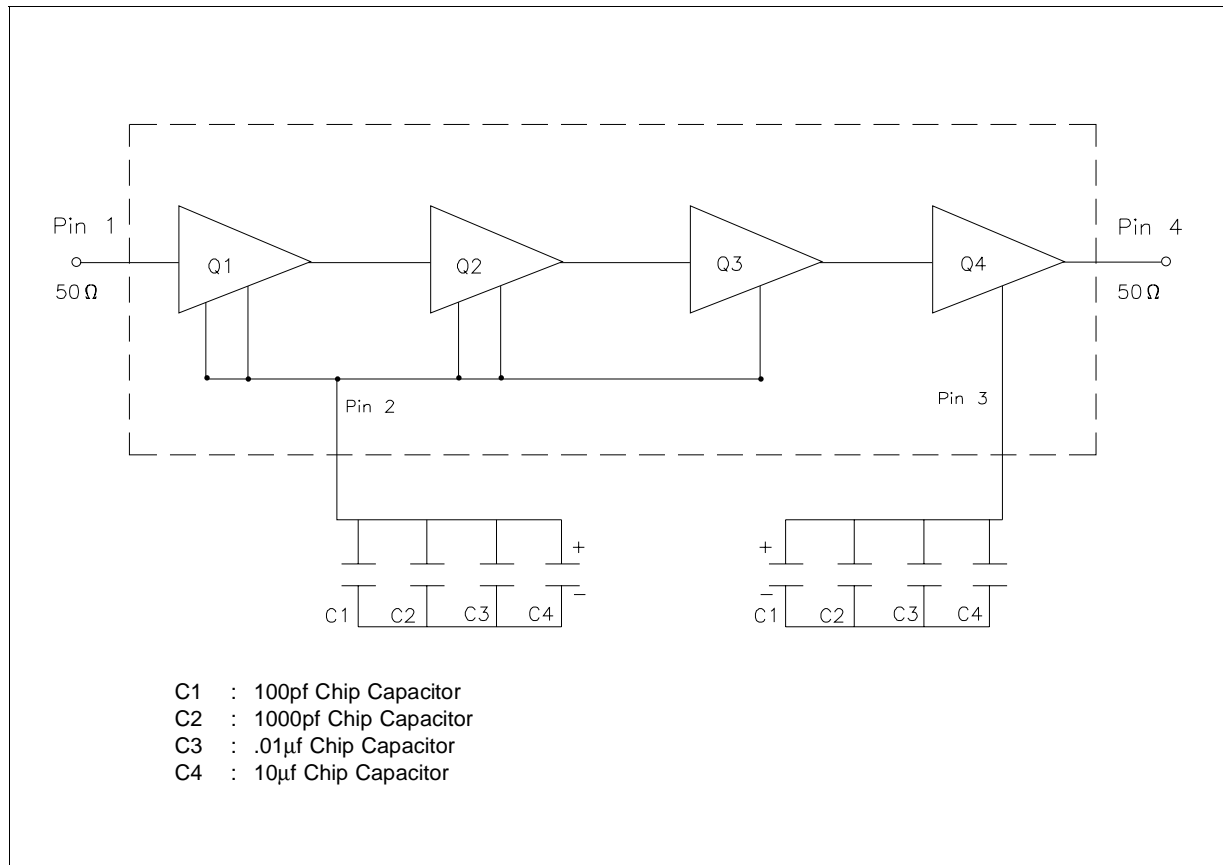
### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{C1}$ | DC Supply Voltage | 20 | Vdc |
| $V_{C2}$ | DC Supply Voltage | 32 | Vdc |
| $P_{IN}$ | RF Input Power | 20 | mW |
| $P_{OUT}$ | RF Output Power | 16 | W |
| $T_{STG}$ | Storage Temperature | − 40 to +100 | °C |
| $T_C$ | Operating Case Temperature | − 35 to +70 | °C |

## ELECTRICAL SPECIFICATIONS (T$_{case}$ = 25 °C, V$_{C1*}$ = 18 V, V$_{C2}$ = 28 V)

| Symbol | Parameter | Test Conditions | | Value | | | Unit |
|--------|-----------|-----------------|---|------|------|------|------|
| | | | | Min. | Typ. | Max. | |
| BW | Frequency Range | | | 1625 | — | 1665 | MHz |
| P$_{IN}$ | Input Power | P$_{OUT}$ = 10 W | | — | — | 10.0 | dBm |
| G$_P$ | Power Gain | P$_{OUT}$ = 10 W | | 30 | — | — | dB |
| η | Efficiency | P$_{OUT}$ = 10 W | | 30 | 35 | — | % |
| H | Harmonics | P$_{OUT}$ = 10 W reference | | — | −45 | −40 | dBc |
| Z$_{IN}$ | Input Impedance | P$_{OUT}$ = 10 W | Z$_G$, Z$_L$ = 50Ω | — | 1.5:1 | 2.0:1 | VSWR |
| — | Load Mismatch | VSWR = 10:1    V = 28 Vdc P$_{OUT}$ = 10 W | | No Degradation in Output Power | | | |

*Note: V$_{C1}$ = 18V Regulated ± 1%
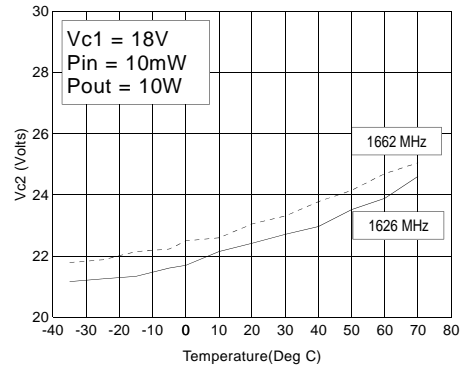
## D.C. TEST FIXTURE BYPASSING



C1  :  100pf Chip Capacitor
C2  :  1000pf Chip Capacitor
C3  :  .01μf Chip Capacitor
C4  :  10μf Chip Capacitor

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## TYPICAL PERFORMANCE

### POWER OUTPUT vs FREQUENCY



### VC2 vs FLANGE TEMPERATURE

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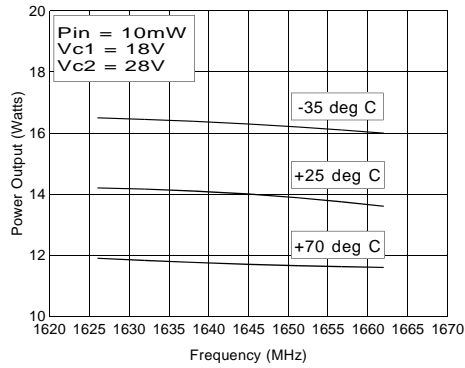
## APPLICATIONS RECOMMENDATIONS

### OPERATION LIMITS

The STM1645-10 power module should never be operated under any condition which exceeds the Absolute Maximum Ratings presented on this data sheet. Nor should the module be operated continuously at any of the specified maximum ratings. If the module is to be subjected to one or more of the maximum rating conditions, care must be taken to monitor other parameters which may be affected.

### DECOUPLING

Failure to properly decouple any of the voltage supply pins mayl result in oscillations at certain operating frequencies. Therefore, it is recommended that these pins be bypassed as indicated in the Module DC and Test Fixture Configuration drawing of this data sheet.

### POWER CONTROL

The recommed method of power control for the STM1645-10 is to set $P_{IN}$ = 10mW, $V_{C1}$ = 18V and $V_{C2}$ = 28 volts nominal at a flange temperature of 25°C to achieve an output power of 10 watts. Varing $V_{C2}$ will allow stable power control over a wide range of flange temperature. The current consumption of $V_{C2}$ is typically 850mA to 900mA for 10 watts power ouput.

### MODULE MOUNTING

To insure adequate thermal transfer from the module to the heatsink, it is recommended that a satisfactory thermal compound such as Dow Corning 340, Wakefield 120-2 or equivalent be applied between the module flange and the heatsink.
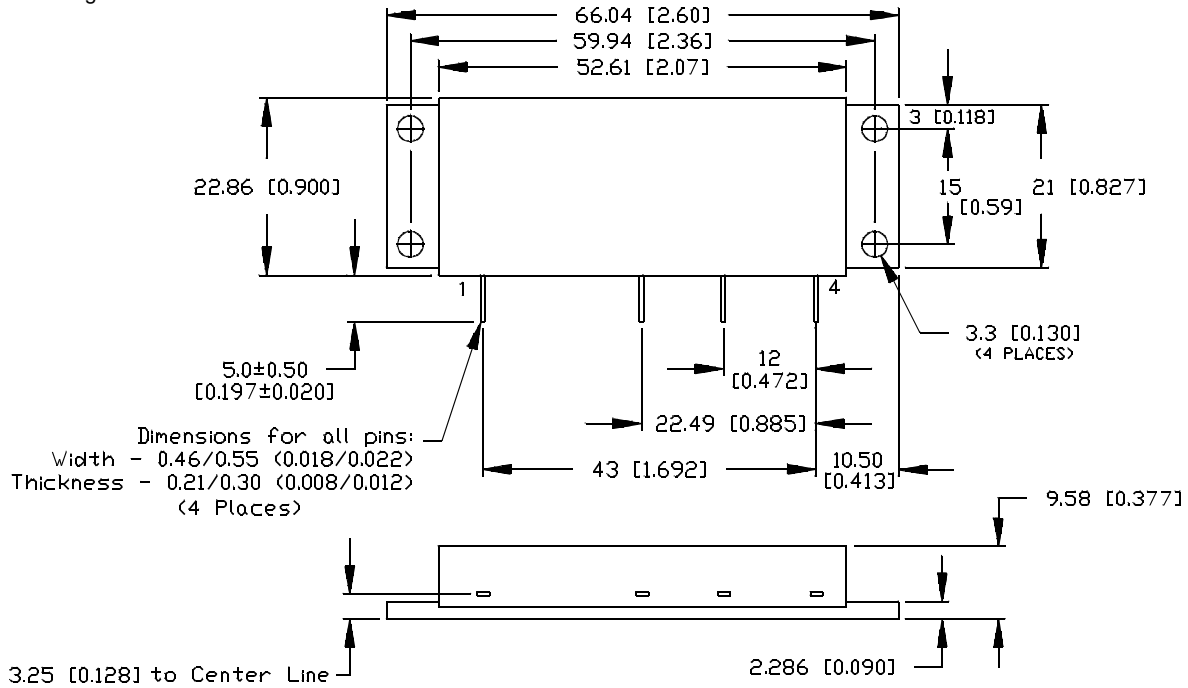
The heatsink mounting surface under the module should be flat to within ± 0.05mm (± 0.002 inch). The module should be mounted to the heatsink using 3 mm (or 4-40) or equivalent screws torqued to 5-6 kg-cm (4-6 in-lb).

The module leads should be attached to equipment PC board using 180°C solder applied to the leads with a properly grounded soldering iron tip, not to exceed 195°C, applied a minimum of 2mm (0.080 inch) from the body of the module for a duration not to exceed 15 seconds per lead. It is imperative that no other portion of the module, other than the leads, be subjected to temperatures in excess of 100°C (maximum storage temperature), for any period of time, as the plastic moulded cover, internal components and sealing adhesives may be adversely affected by such conditions.

Due to the construction techniques and materials used within the module, reflow soldering of the flange heatsink or leads, is not recommended.

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## PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 1018019 rev. D



66.04 [2.60]
59.94 [2.36]
52.61 [2.07]

22.86 [0.900]

3 [0.118]

15 [0.59]    21 [0.827]

1          4

3.3 [0.130]
(4 PLACES)

5.0±0.50
[0.197±0.020]

Dimensions for all pins:
Width - 0.46/0.55 (0.018/0.022)
Thickness - 0.21/0.30 (0.008/0.012)
(4 Places)

12
[0.472]

22.49 [0.885]

43 [1.692]

10.50
[0.413]

9.58 [0.377]

3.25 [0.128] to Center Line

2.286 [0.090]

NOTES:
   All tolerances ±0.25mm [±0.010in] unless otherwise specified.
   Numbers in [ ] are inches.

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