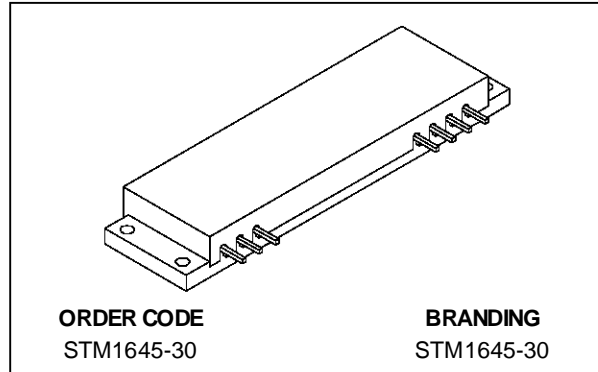


## RF POWER MODULE SATELLITE COMMUNICATIONS APPLICATIONS

PRELIMINARY DATA

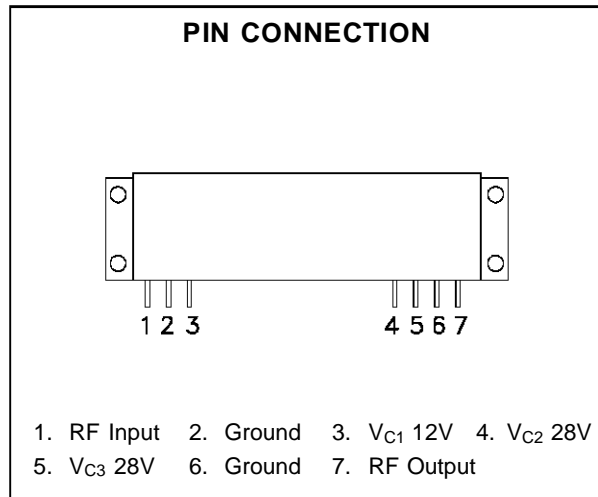
- CLASS C SATELLITE COMMUNICATIONS AMPLIFIER
- 1625 - 1665 MHz
- 28 VOLTS
- INPUT/OUTPUT 50 OHMS
- $P_{OUT} = 30 \text{ W MIN.}$
- GAIN = 35 dB MIN.



### DESCRIPTION

The STM1645-30 hybrid RF power module is designed for high power satellite communications application in the 1.6 GHz frequency range.

High  $f_T$ , gold metallized silicon microwave power devices, optimized for use in STM1645-30, are employed to provide high gain and efficiency while ensuring excellent reliability.



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

Symbol	Parameter	Value	Unit
V	DC Supply Voltage	30	Vdc
$P_{IN}$	RF Input Power ( $P_{OUT} \leq 30 \text{ W}$ )	20	mW
$T_{STG}$	Storage Temperature	- 40 to +100	$^\circ C$
$T_C$	Operating Case Temperature	- 35 to +70	$^\circ C$

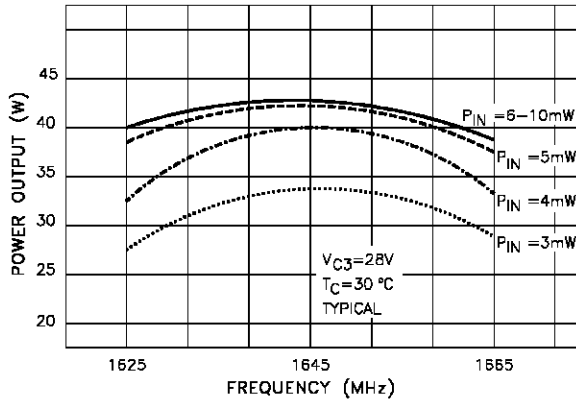
**ELECTRICAL SPECIFICATIONS** ( $T_{\text{case}} = 25\text{ }^{\circ}\text{C}$ ,  $V_{\text{C1}} = 12\text{ V}$ ,  $V_{\text{C2}}$ ,  $V_{\text{C3}} = 28\text{ V}$ )

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
BW	Frequency Range		1625	—	1665	MHz
$P_{\text{OUT}}$	Power Output	$P_{\text{IN}} = \leq 10\text{ mW}$	30	35	40	W
$G_{\text{P}}$	Power Gain	$P_{\text{OUT}} = 30\text{ W}$	35	35.5	—	dB
$\eta$	Efficiency	$P_{\text{OUT}} = 30\text{ W}$	40	—	—	%
$Z_{\text{IN}}$	Input Impedance	$P_{\text{OUT}} = 30\text{ W}$ $Z_{\text{G}}, Z_{\text{L}} = 50\Omega$	—	1.5:1	2:1	VSWR
H	Harmonics	$P_{\text{OUT}} = 30\text{ W}$ reference	—	-45	-40	dB
—	$\Delta P_{\text{OUT}}$ vs $T_{\text{CASE}}$	$T_{\text{C}} = -35^{\circ}\text{C}$ to $+70^{\circ}\text{C}$	—	—	2	dB
—	$\Delta P_{\text{OUT}}$ vs Frequency	$f = 1625 - 1665\text{ MHz}$	—	—	1	dB
—	Load Mismatch	VSWR = 10:1 $V = 28\text{Vdc}$ $P_{\text{OUT}} = 30\text{ W}$	No Degradation in Output Power			
—	$P_{\text{OUT}}$ Control Range	$P_{\text{OUT}} = 30\text{ W}$	8	10	—	dB
—	Stability	$P_{\text{OUT}} = 5$ to $30\text{ W}^*$ $T_{\text{C}} = -35^{\circ}\text{C}$ to $+70^{\circ}\text{C}$ Load VSWR = 3:1, any phase	All Spurious outputs more than 60dB below carrier			

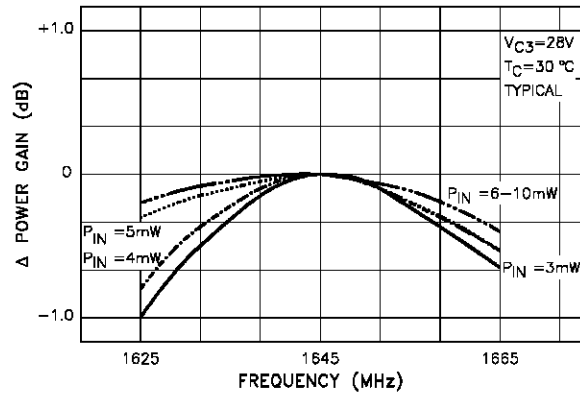
\*Note:  $P_{\text{OUT}}$  adjusted by varying  $V_{\text{C3}}$

TYPICAL PERFORMANCE

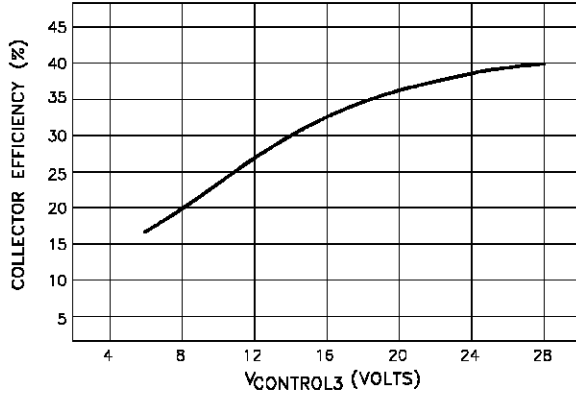
POWER OUTPUT vs FREQUENCY & POWER INPUT



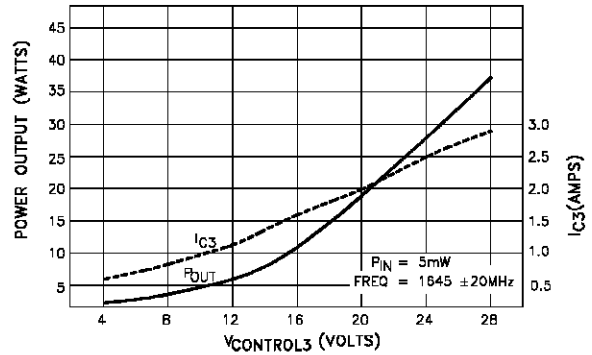
POWER GAIN vs FREQUENCY & POWER INPUT



$V_{CONTROL}$  vs COLLECTOR EFFICIENCY



$V_{CONTROL}$  vs POWER OUTPUT &  $I_{C3}$  (TYPICAL)



**APPLICATIONS RECOMMENDATIONS****OPERATION LIMITS**

The STM1645-30 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 will 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.

**MODULE MOUNTING**

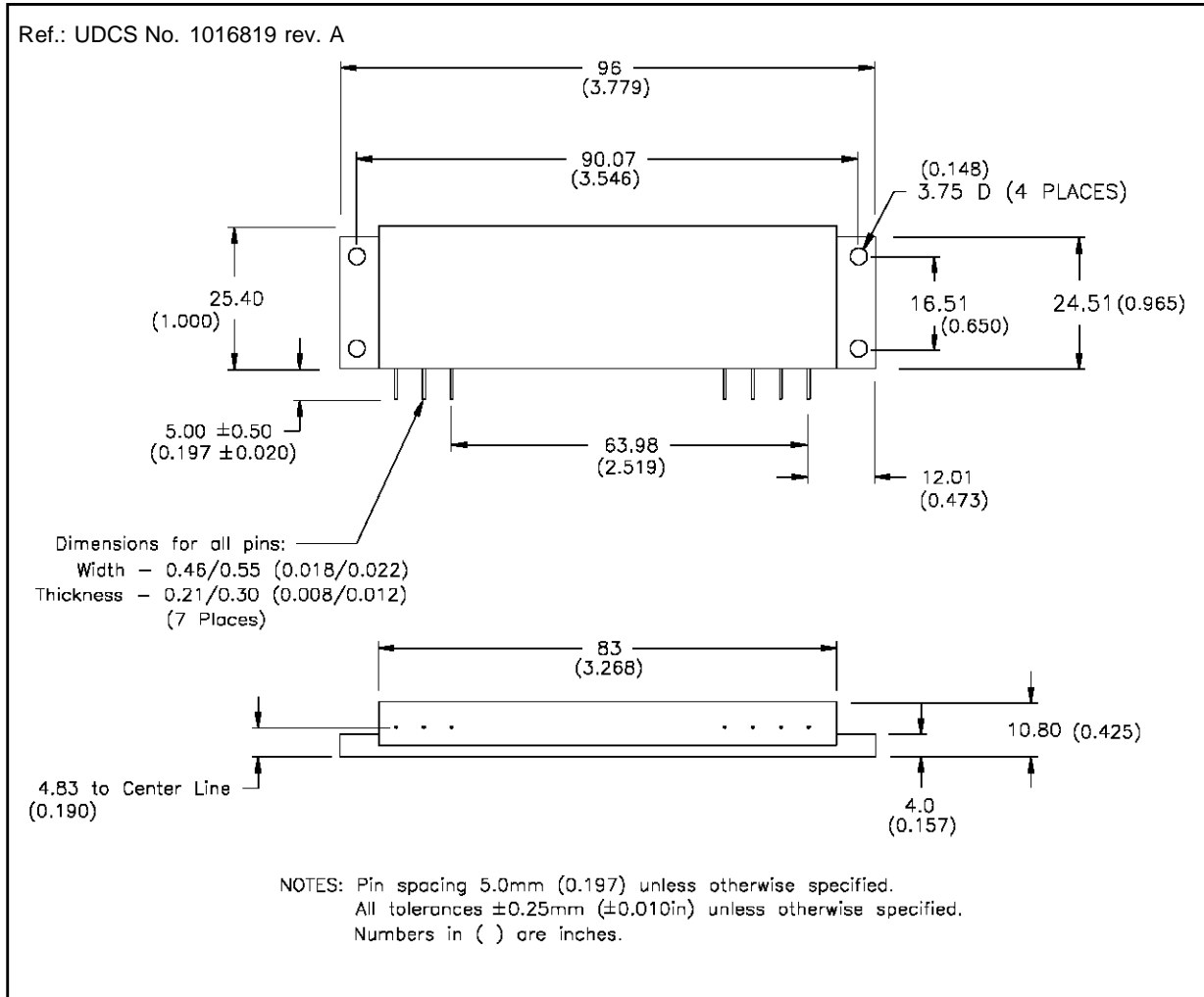
To insure adequate thermal transfer from the module to the heatsink, it is recommended that a satisfactory thermal compound such as Dow Corning 340, Wakefield 120-2 or equivalent be applied between the module flange and the heatsink.

The heatsink mounting surface under the module should be flat to within  $\pm 0.05\text{mm}$  ( $\pm 0.002$  inch). The module should be mounted to the heatsink using 3.5 mm (or 6-32) 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 2 mm (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.

**PACKAGE MECHANICAL DATA**



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