



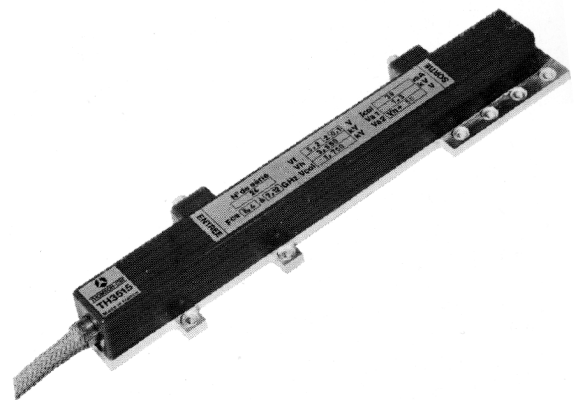
THOMSON-CSF
GROUPEMENT TUBES ELECTRONIQUES

DATA TEH 4397
TH 3515
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TH 3515 HIGH-PERFORMANCE C-BAND TRAVELING-WAVE TUBE

FEATURES :

- Designed specifically for tomorrow's line-of-sight microwave links, carrying up to 2700 telephone channels.
- Exceptional linearity and noise characteristics.
- Delivers a minimum of 20 W of carrier power at saturation.
- Incorporates long-life space-TWT technology and gives high efficiency.
- PPM - focused and cooled by simple conduction.



Description

The TH 3515 traveling-wave tube has been developed to serve as the power amplifier in new, high-capacity microwave links over line-of-sight routes. Able to amplify a signal carrying up to 2700 telephone channels, or television or high bit-rate data, this TWT is designed to operate in the 6.4 to 7.2-GHz band. Its minimum output power at saturation is 20 watts, and its minimum gain 33 dB. The operating band can be appreciably enlarged with a small output power reduction.

An important feature of this new tube is its low noise factor, which does not exceed 24 dB. Further, as shown in Figure 1, it easily meets a stringent specification concerning the admissible minimum signal-to-noise ratio. Even more important, this superior noise performance is achieved with an impregnated-tungsten cathode, of the type developed for our satellite-carried TWT's. The consequences for the expected reliability and long-life capacity of the TH 3515 are obvious.

Designed to operate with its collector depressed about two kilovolts below the helix, the tube has a typical efficiency of 25 %. It also has a nearly flat gain characteristic (Figure 3) and very low AM/PM conversion. Employing PPM beam focusing (Ticonal TM 1500), the TH 3515 is fully cooled by simple conduction also.

This state-of-the-art TWT is also available with a matched solid-state power supply, in a compact, justment-free TWTA configuration, eliminating all tube/power-supply interface problems for the equipment designer. Contact THOMSON-CSF for more information.

GENERAL CHARACTERISTICS

Electrical (1)

Operating-frequency range	6.4 - 7.2	GHz
Output power at saturation	min. 20	W
Gain	min. 33	dB
Noise factor	max. 24	dB
AM/PM Conversion	max. 5	°/dB
Input/output cold VSWR	1.7 : 1	
Heater voltage	5 - 6	V
Heater current	0.5 - 0.8	A
Helix voltage	3.6 - 3.9	kV
Helix current	2	mA
Anode 1 voltage	1.8	kV
Anode 2 voltage	Vh + (50 to 150)	V
Anode current	- 0.5 to + 0.5	mA
Collector voltage	1.7 - 2.0	kV

(1) All voltages referred to the cathode.

Mechanical

Operating position	Any
Dimensions	See Outline Drawing
Weight, approx.	700 grams
RF Connections	OSM
Power-supply connections	Shielded cable
Cooling	By conduction

ABSOLUTE RATINGS (2)

	Min.	Max.	Units
Heater voltage	4.8	6.5	V
Heater surge current	—	1	A
Warm-up time	3	—	mn.
Ambient temperature	- 10	+ 50	°C
Helix voltage	3.5	4.0	kV
Helix current	—	3	mA
Anode 1 voltage	—	2	kV
Anode current	- 1	+ 1	mA
Collector voltage	1.6	2.5	kV
Collector current	—	55	mA
Collector dissipation	—	130	W
Drive power	—	100	mW
Load VSWR	—	2 : 1	

(2) No single rating is to be exceeded.

TYPICAL OPERATION

Operating frequency	7	GHz	Anode 1	1.5	kV
Drive power	5	mW	Anode 2	Vh+50	V
Output power	21	W	Helix voltage	3.75	kV
Gain	35	dB	Helix current	0.6	mA
Heater voltage	5.5	V	Collector voltage	1.75	kV
Heater current	0.65	A	Collector current	45	mA

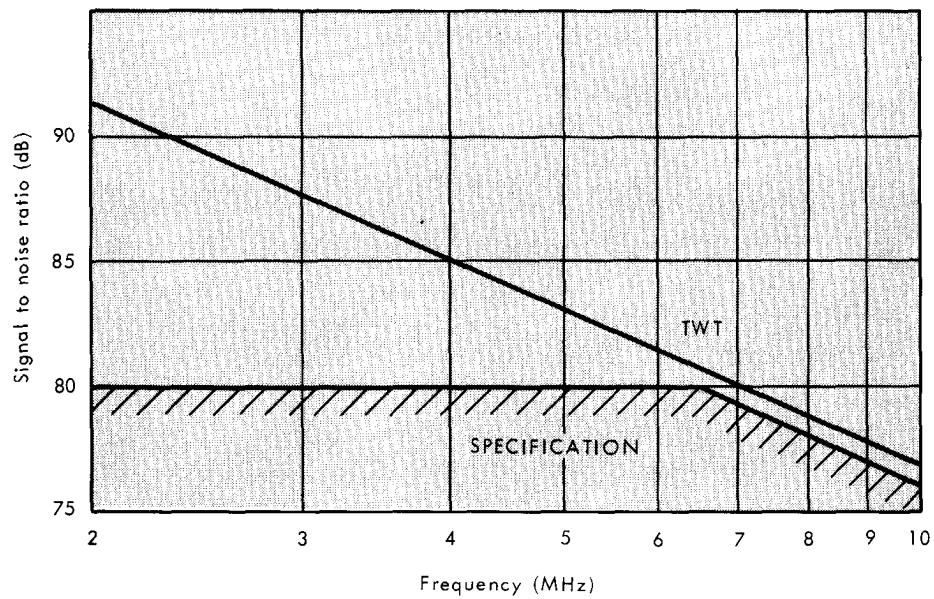


FIGURE 1 - Noise measured in a 4 kHz window, with respect to a signal causing a 140 kHz rms excursion of the carrier frequency.

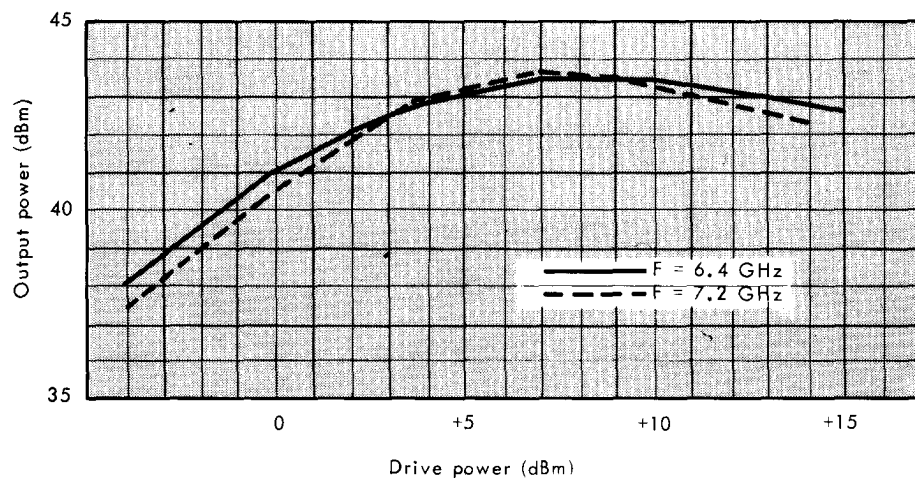


FIGURE 2 - RF Transfer curves at each end of the band.

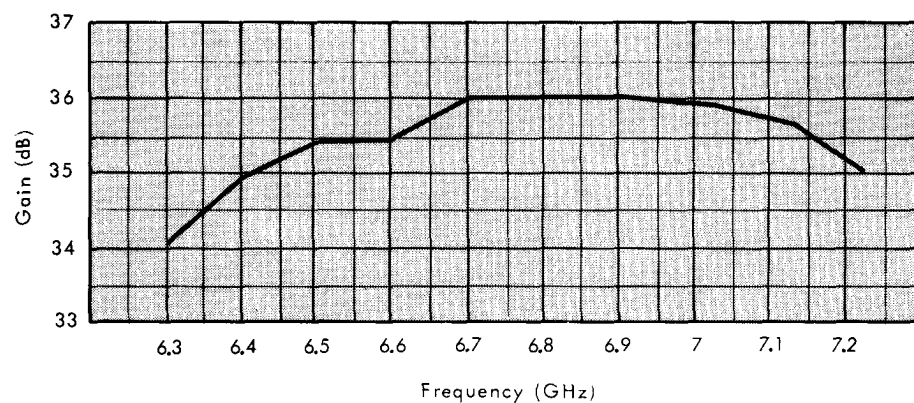


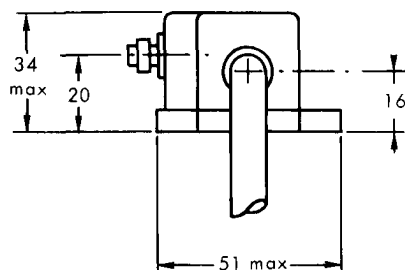
FIGURE 3 - Gain flatness at saturation.



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OUTLINE DRAWING

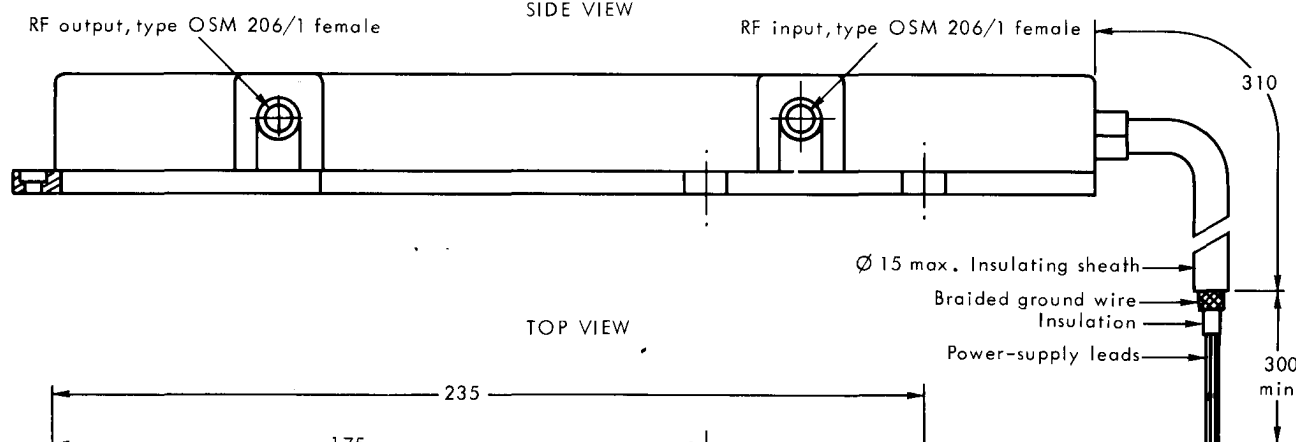
RIGHT VIEW



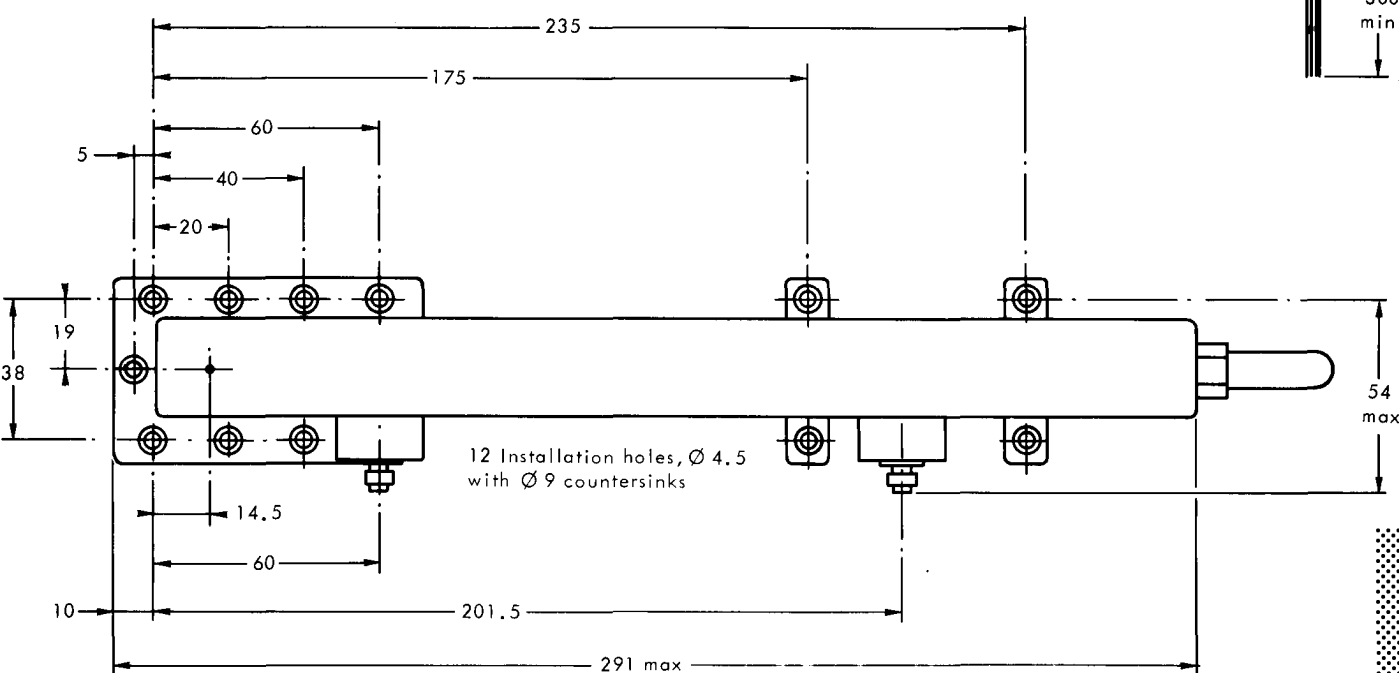
POWER-SUPPLY LEAD COLOR CODE

Filament	Brown
Filament-cathode	Yellow
Anode 1	Blue
Anode 2	Green
Helix-ground	Orange
Collector	Red

SIDE VIEW



TOP VIEW



Dimensions in mm, nominal except those marked " max " or " min ".