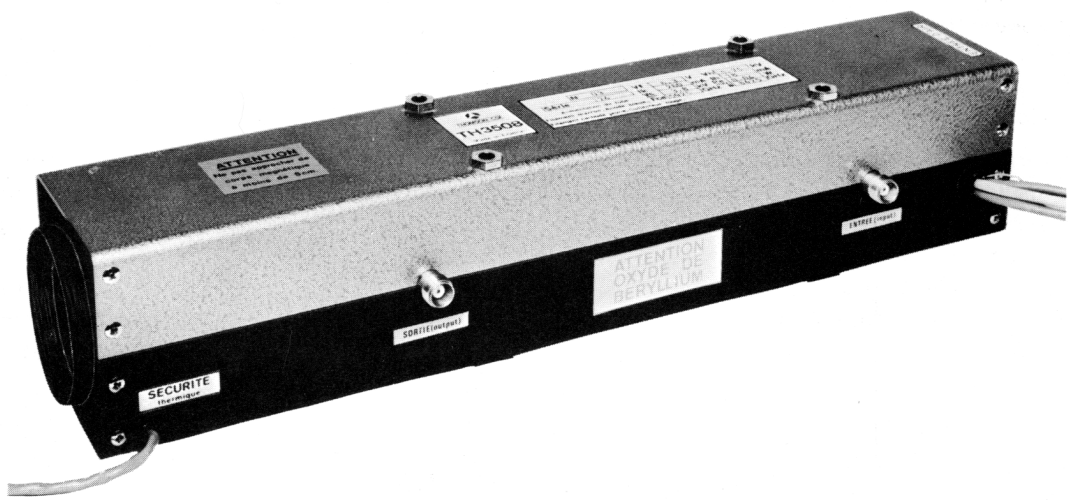
TH 3508
250 W CW TRAVELING WAVE TUBE

Features

- Specially designed for communications-satellite earth stations
- More than 250 Watts of CW power in C Band
- PPM-focused, for reduced power consumption and simple forced-air cooling
- Rugged all metal-and-ceramic construction, with a copper helix brazed to berylium-oxide support rods
- Compact and light weight
- Highly reliable and offers long tube life.



The TH 3508 is a high-gain, medium-power traveling-wave tube, designed for transmitter use in satellite-communications-system earth stations operating in the 5. 925 to 6. 425 GHz band.

Featuring a brazed copper helix slow-wave structure, the TH 3508 is especially well-suited for multicarrier operation in low-cost, smaller capacity INTELSAT IV-type earth stations, either fixed or transportable. Careful matching of its coupling elements and lossy sections has resulted in a TWT providing wideband operation with nearly flat gain, very low group-delay distortion and small AM/PM conversion distortion.

If operated in the normal depressed-collector configuration, the TH 3508 has a minimum overall efficiency of 25 %, with typical efficiency on the order of 30 %.

Air-cooled, the TH 3508 requires a minimum cooling-air flow of only 47 liters a second (100 cu.ft./min.).

The dispenser-type cathode, made of specially treated barium-impregnated tungsten, ensures long tube life. In addition, tube life can be further prolonged because the electron-gun design allows readjusting the cathode current as the tube ages, without changing the helix voltage.

Presently in use in the French earth station at Pleumeur-Bodou, the TH 3508 has already achieved several thousands of hours of successful operation.

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GROUPEMENT TUBES ELECTRONIQUES

GENERAL CHARACTERISTICS

Electrical

Frequency range	5. 925	to	6. 425	GHz
Output power, at saturation		⩾	250	W
Efficiency (depressed collector)		⩾	25	%
Gain, at rated power		⩾	35	dB
Gain slope, small signal		⩽	0. 05	dB/MHz
AM/PM Conversion		⩽	8	°/dB
Noise figure			30	dB
Noise measured in a 4 KHz window		⩽	− 35	dBm
Heater voltage			6. 3	V
Heater current	2. 3	to	2. 6	A
Cathode current	240	to	300	mA
Anode voltage	4. 4	to	5. 4	kV
Collector voltage	2. 8	to	4. 0	kV

Mechanical

Operating position	Any
Dimensions	See outline drawing
Weight, approximate	2. 5 kg
RF connections	Coaxial, TNC female
Power-supply connections	Flying leads
Thermal-switch connections	Flying leads
Cooling	Forced air

ABSOLUTE RATINGS
(non-simultaneous)

	Min.	Max.	Units
Heater surge current	−	5	A
Heater voltage	6. 2	6. 4	V
Warm-up time	3	−	mn
Anode voltage	−	1. 1 V_a (nom)	kV
Anode current	− 1	+ 3	mA
Drive power	−	P_d (nom.) + 3 dB	mW
Helix voltage	−	V_h (nom.) + 0. 1	kV
Helix current	−	1. 5 I_h (nom.)	mA
Load VSWR	−	2. 5 : 1	
Collector voltage	See note (1)	4. 5	kV
Collector dissipation	−	1. 2	kW
Cooling air flow (2)	47	−	l/s
Inlet cooling air temperature	− 40	+ 50	°C
Distance from magnetic materials	5	−	cm

(1) The difference between the helix voltage and the collector voltage shall not exceed 5 kV.

(2) At normal atmospheric pressure : 1013 millibars.

TYPICAL OPERATION

Single-carrier mode

Frequency	6. 175	GHz
Drive power	11	mW
Output power	280	W
Gain :		
- saturated	44	dB
- small signal	48	dB
Efficiency	30	%
Maximum gain variation over the band, saturated	1	dB
Gain slope, maximum	0. 02	dB/MHz
Noise measured in a 4 - kHz window	− 60	dBm
Heater voltage	6. 3	V
Heater current	2. 42	A
Cathode current	260	mA
Anode voltage	4. 7	kV
Anode current	0	mA
Helix voltage	5. 75	kV
Helix current	20	mA
Collector voltage	3. 8	kV
Collector current	240	mA

Multi-carrier mode

First carrier frequency, F_1	6. 125	GHz
Second carrier frequency, F_2	6. 130	GHz
Drive power, per carrier	0. 5	mW
Output power, per carrier	35	W
Intermodulation products	$\leqslant$ − 22	dB
AM/PM conversion	$\leqslant$ 1. 3	°/dB
Maximum gain variation over the band, small signal	1	dB

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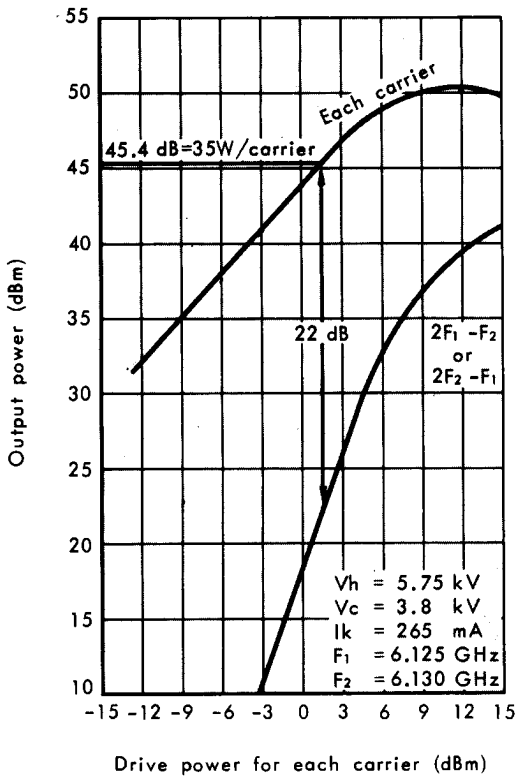
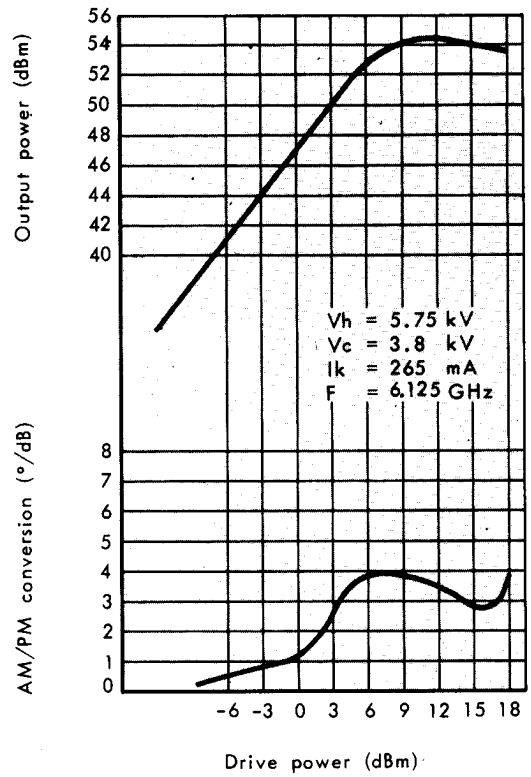
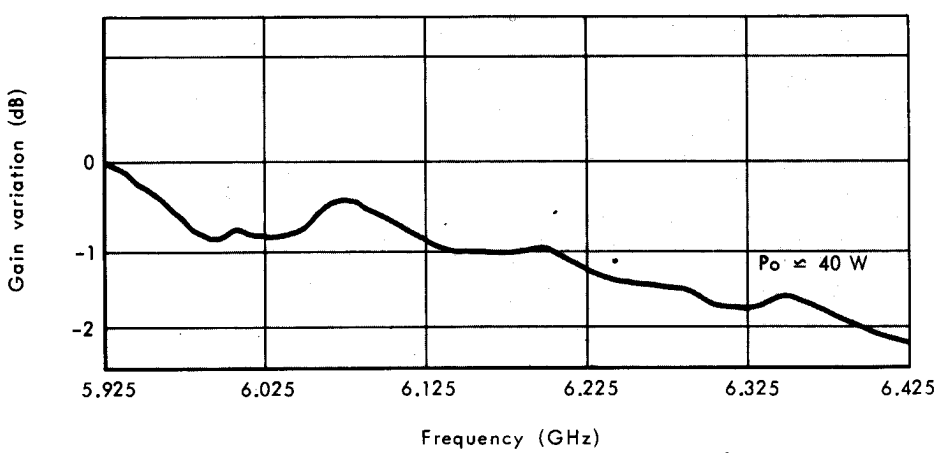
THIRD - ORDER
INTERMODULATION PRODUCTS

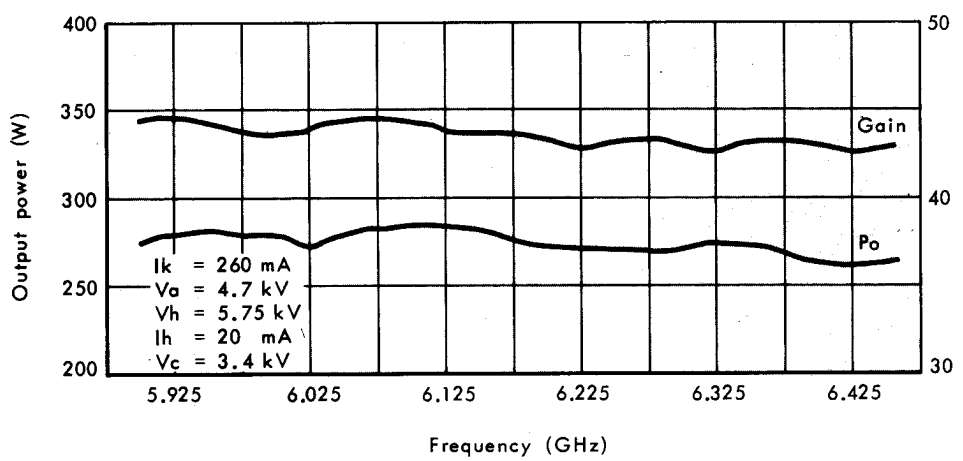


OUTPUT POWER AND AM/PM CONVERSION
VERSUS DRIVE POWER



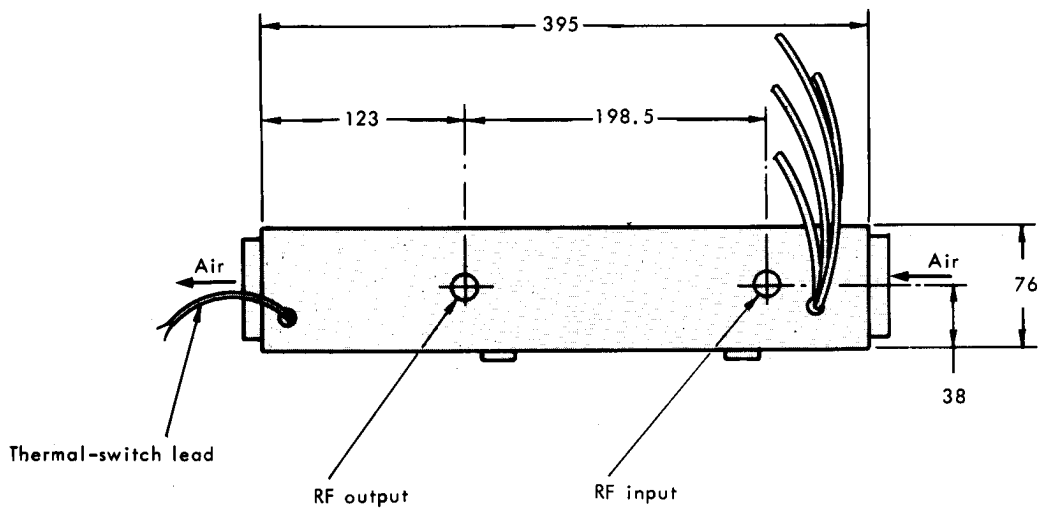


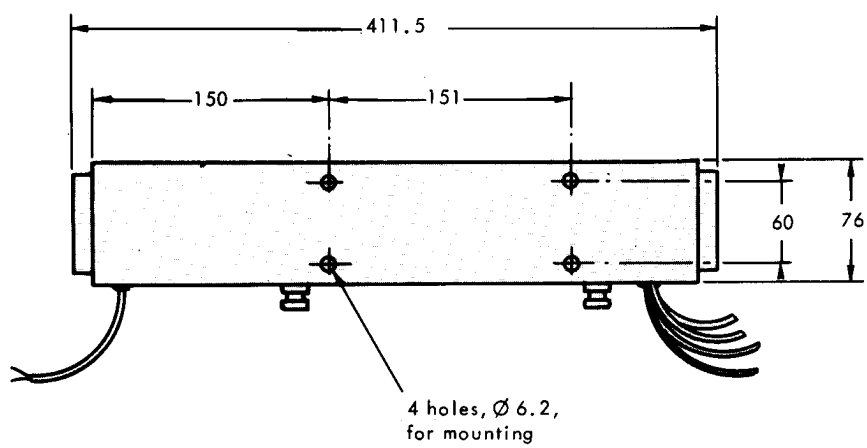
SMALL - SIGNAL GAIN
VARIATIONS
(Drive power = 0.85 mW)

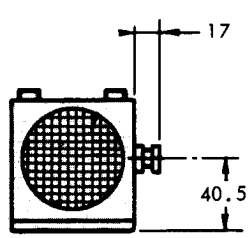


OUTPUT POWER
AND
SATURATED GAIN
VERSUS FREQUENCY

OUTLINE DRAWING







LEADS	
Yellow	Heater-cathode
Brown	Heater
Blue	Anode
Ground	Helix and tube body
Red	Collector

Dimensions nominal, in mm.

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