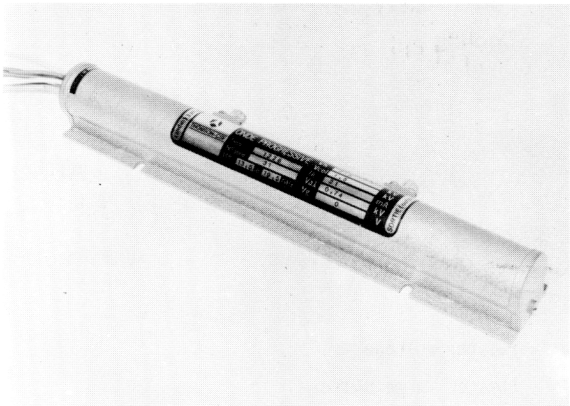
# TH 3522
# TRAVELING WAVE TUBE

The TH 3522 is a medium-power, traveling wave tube designed for microwave radio-link applications. Operating in C band, in the range 5.9 to 7.2 GHz, it delivers more than 7 watts of CW power at the output with minimum gain equal to 30 dB.

A periodic permanent magnet beam-focusing assembly is an integral part of the TH 3522. This compact and lightweight TWT is cooled by conduction alone.

The TH 3522 TWT is used in the TH 20034, a lightweight, compact, adjustment-free microwave amplifier. Of sturdy construction, it is intended for use in airborne and other mobile equipment, and in microwave radio links.



## GENERAL CHARACTERISTICS

### Electrical

| | | |
|---|---|---|
| Frequency range | 5.9 to 7.2 | GHz |
| Output power , min | 7 | W |
| Gain at rated power, min. | 30 | dB |
| Gain ripple, max. | ± 0.5 | dB |
| Gain slope, max. | ± 0.02 | dB/MHz |
| Efficiency, min. | 16 | % |
| Noise figure, max. | 28 | dB |
| Output hot VSWR, max. | 2.5 : 1 | |
| AM/PM conversion, max. | 4 | °/dB |
| Heater current | 0.3 - 0.6 | A |
| Anode voltage | 0.6 - 1.2 | kV |
| Helix voltage | 2.7 - 3.2 | kV |
| Collector voltage | 1.3 - 1.55 | kV |
| Collector current, max. | 28 | mA |

THOMSON-CSF
GROUPEMENT TUBES ELECTRONIQUES

## Mechanical

| | |
|---|---|
| Operating position | Any |
| Dimensions | See outline drawing |
| Weight (approx.) | 650 g |
| RF connections | OSM 206/1 |
| Power-supply connections | Flying leads |
| Cooling | By conduction |

## ABSOLUTE RATINGS

(non-simultaneous)

| | Min. | Max. | Units |
|---|---|---|---|
| Heater voltage | 6.0 | 6.6 | V |
| Heater surge current | - | 1.2 | A |
| Warm-up time | 3 | - | mn |
| Anode voltage | - | $V_a$ (nom) +200 | V |
| Anode current | - | 2 | mA |
| Drive power | - | 50 | mW |
| Helix voltage (1) | $V_h$-250 | $V_h$ +250 | V |
| Helix current | - | 2 | mA |
| Collector voltage (2) | $V_c$-200 | $V_c$ +200 | V |
| Collector current | - | 28 | mA |
| Collector dissipation | - | 45 | W |
| Ambient temperature | -10 | +120 | °C |
| Load VSWR | - | 2.5 : 1 | |

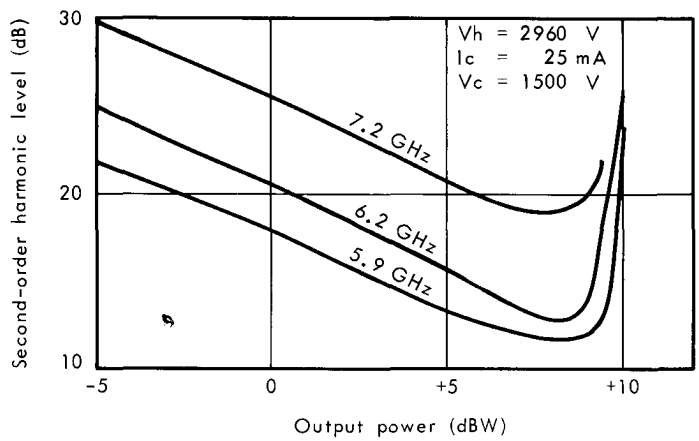
(1) $V_h$ = nominal helix voltage, as per each tube's data sheet.

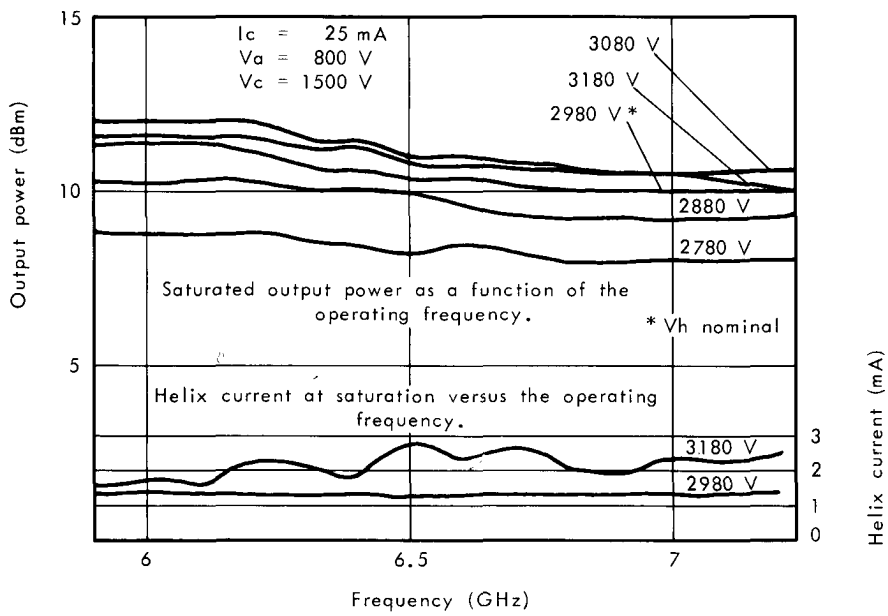
(2) $V_c$ = nominal collector voltage, as per each tube's data sheet.

## TYPICAL OPERATION

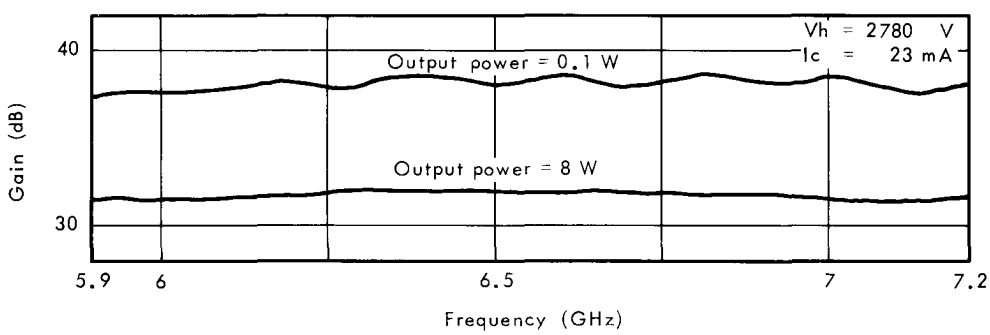
| | | |
|---|---|---|
| Frequency | 6.7 | GHz |
| Output power | 9.2 | W |
| Input power | 5.2 | mW |
| Gain | 32.5 | dB |
| Heater voltage | 6.3 | V |
| Heater current | 0.42 | A |
| Cathode current | 25 | mA |
| Anode voltage | 810 | V |
| Anode current | 0 | mA |
| Helix voltage | 2.86 | kV |
| Helix current | 0.70 | mA |
| Collector voltage | 1.5 | kV |

Second-order harmonics versus output power



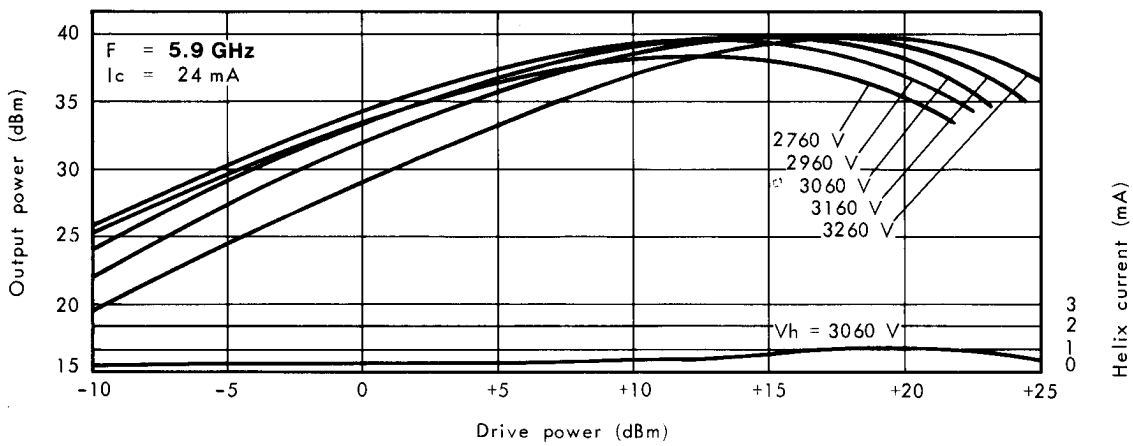



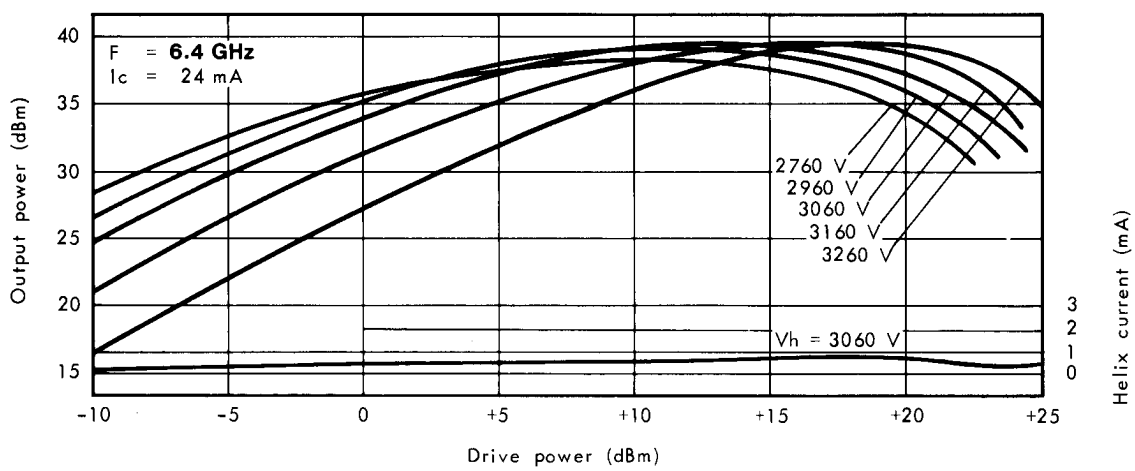

Gain flatness at two different output-power levels.

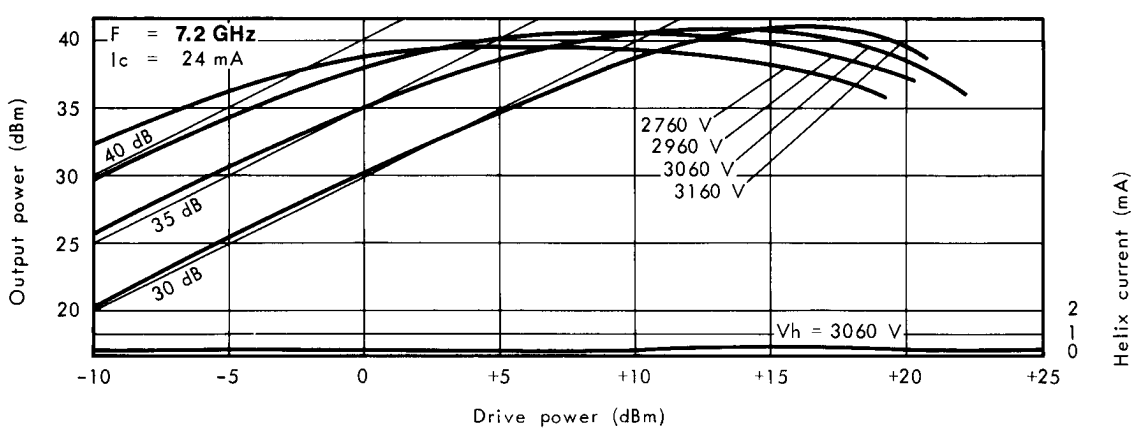


THOMSON-CSF
GROUPEMENT TUBES ELECTRONIQUES

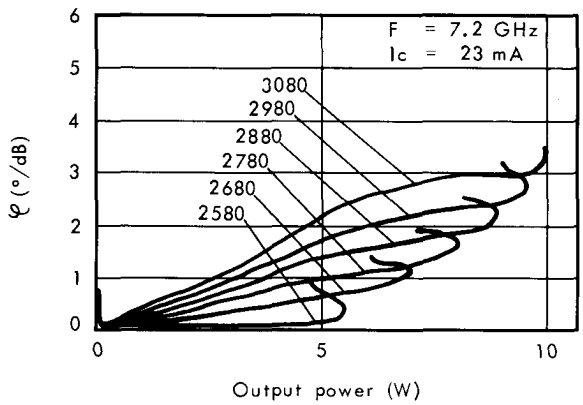
OUTPUT POWER AND HELIX CURRENT
AS A FUNCTION OF DRIVE POWER,
WITH A CONSTANT HELIX VOLTAGE

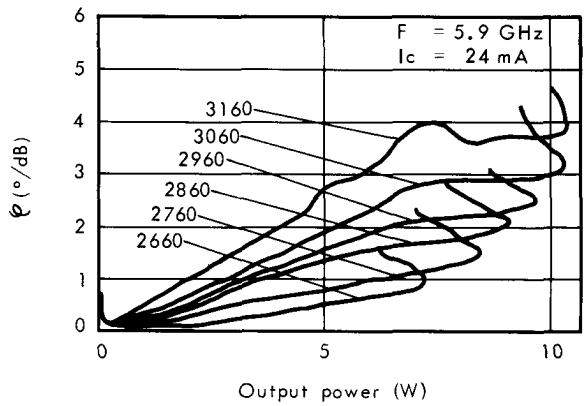


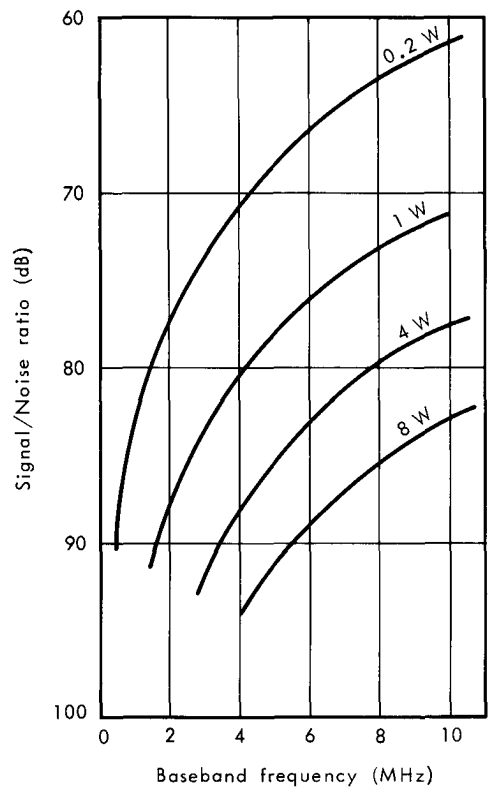



AM/PM CONVERSION (φ)

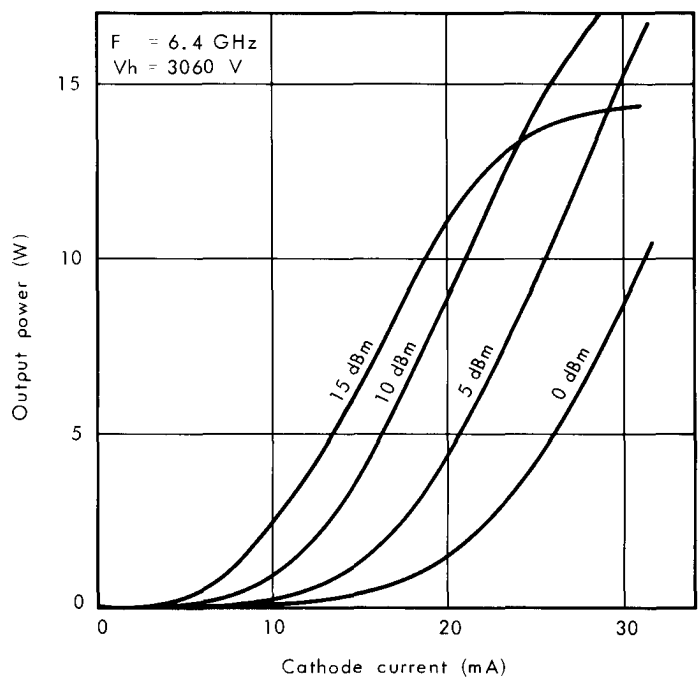



FM Signal-to-noise ratio (carrier frequency = 6 GHz) in a 4-kHz window as a function of the baseband frequency

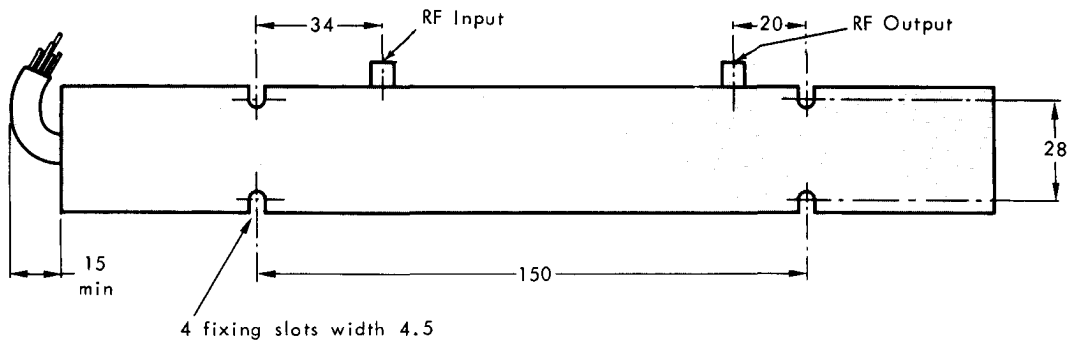


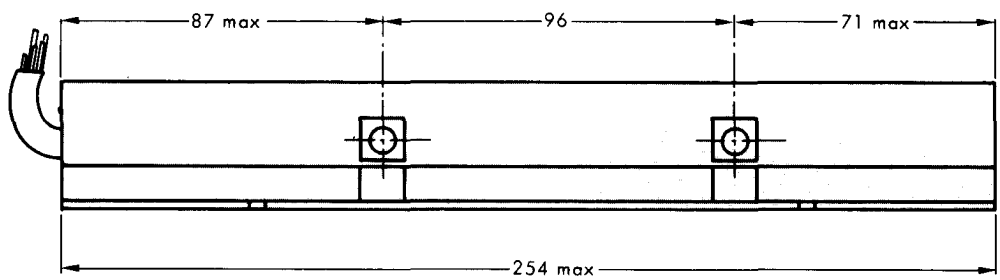

Output power as a function of the cathode current, with a constant drive-power level.



THOMSON-CSF
GROUPEMENT TUBES ELECTRONIQUES

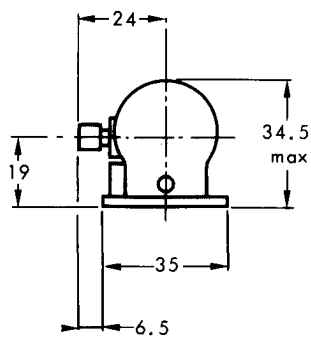
# OUTLINE DRAWING




Note - The minimum length of the flying leads is:

- for the TWT supply = 350 mm
- for the thermal protection ("Vigitherme") = 450




| LEADS IDENTIFICATION | |
|---|---|
| Brown | Heater cathode |
| Yellow | Cathode |
| Green | Wehnelt |
| Blue | Anode |
| Red | Collector |
| Orange | Helix Ground |
| Grey | "Vigitherme" |
| White | "Vigitherme" (isolated) |

All dimensions nominal (except limiting values), in mm.