



### DESCRIPTION

The N10110 is a broadband, CW, high power helix travelling wave tube. It is capable of providing 180 W minimum over its operating frequency range of 6 - 18 GHz. Saturation gain is typically >38 dB.

The TWT features two helix sections, a convergent electron gun, depressed collector and PPM focusing within a small package. It has been designed to meet MIL-STD specifications for use in rugged environments.

This TWT is one of a range of mini- and midi-types designed by e2v technologies using the latest CAD methods to achieve optimised reliability and performance whilst operating in the most demanding environments.

Other TWTs in the range include broader bandwidth, focus electrode switching and dual-stage collector options.

### GENERAL DATA

#### Electrical

|  |     |   |
|--|-----|---|
| Heater voltage . . . . .                                     | 6.3 | V |
| Heater current . . . . .                                     | 0.6 | A |
| Cathode pre-heating time (minimum) . . . . .                 | 100 | s |
| Over-temperature protected by normally closed thermal switch |     |   |

#### Mechanical

|   |     |                   |
|---|-----|-------------------|
| Overall length (excluding flexible leads) . . . . . | 330 | mm max            |
| Overall width . . . . .                             | 50  | mm nom            |
| Overall height (including output flange) . . . . .  | 62  | mm nom            |
| RF connectors:                                      |     |                   |
| input . . . . .                                     |     | SMA               |
| output . . . . .                                    |     | WRD-650 waveguide |
| Net weight . . . . .                                | 1.4 | kg                |
| Mounting position . . . . .                         |     | any               |
| Cooling . . . . .                                   |     | conduction        |
| Heatsink temperature . . . . .                      | 100 | °C max            |

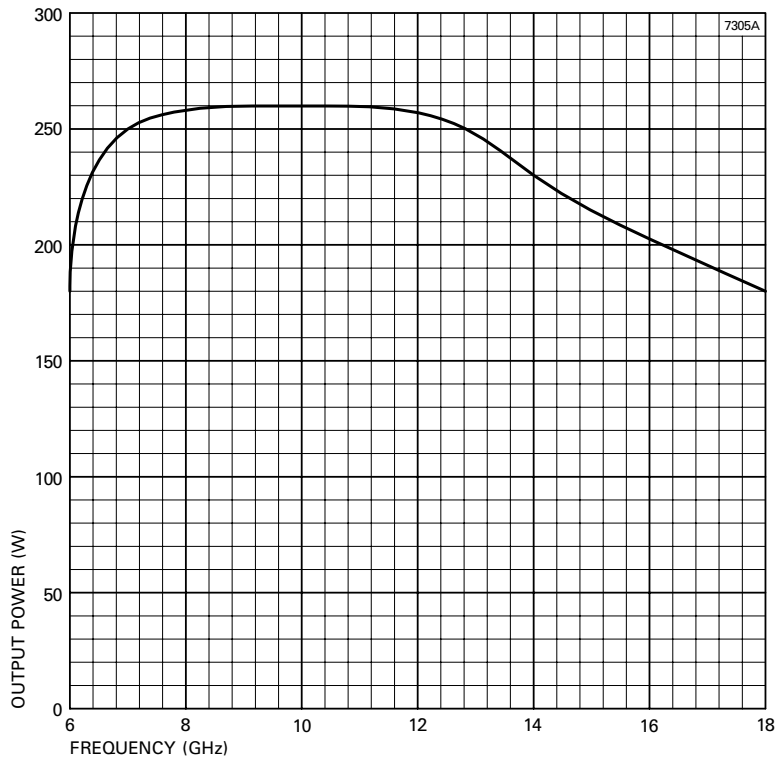
### TYPICAL RF CHARACTERISTICS

|   |           |         |
|---|-----------|---------|
| Frequency range . . . . .                 | 6 to 18   | GHz     |
| Output power (band edges) . . . . .       | 260 (180) | W       |
| Gain at rated power (band edge) . . . . . | 65 (38)   | dB      |
| Overall efficiency (band edge) . . . . .  | 25 (18)   | %       |
| Output VSWR . . . . .                     | 2.5:1     |         |
| Spectral noise density . . . . .          | -18       | dBm/MHz |
| Second harmonic level,                    |           |         |
| saturation at 6 GHz . . . . .             | -2        | dBc     |
| AM/PM conversion . . . . .                | 7         | °/dB    |
| Phase pushing:                            |           |         |
| cathode voltage (18 GHz) . . . . .        | 2.0       | °/V     |
| anode voltage . . . . .                   | 0.3       | °/V     |

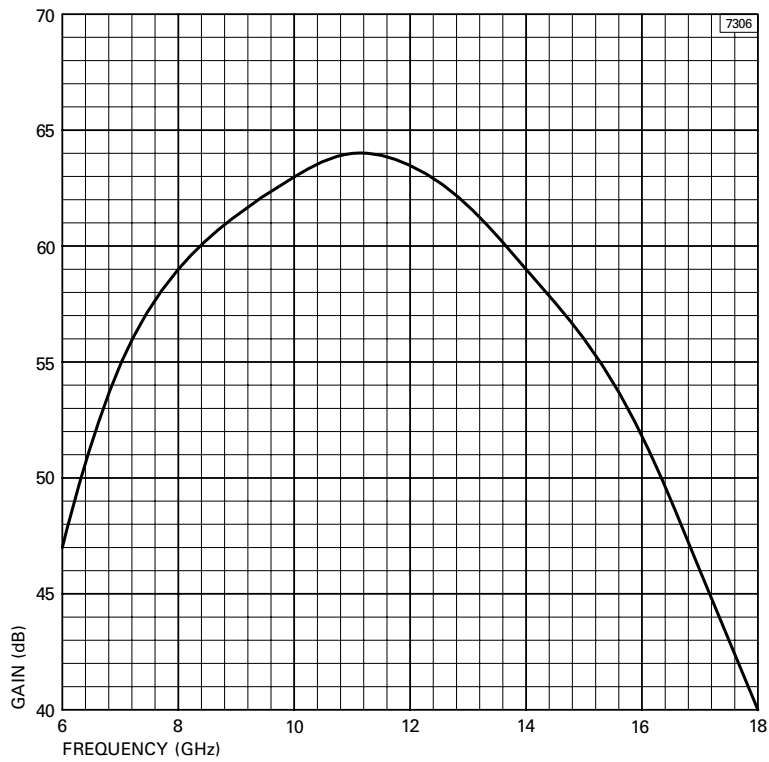
### TYPICAL ELECTRICAL CHARACTERISTICS Voltages with respect to ground (helix) except heater voltage

|  |      |    |
|--|------|----|
| Cathode voltage . . . . .                          | -6.2 | kV |
| Helix current . . . . .                            | 5    | mA |
| Anode voltage . . . . .                            | -500 | V  |
| Collector voltage . . . . .                        | -2.6 | kV |
| Collector current . . . . .                        | 285  | mA |
| Heater voltage (with respect to cathode) . . . . . | -6.3 | V  |
| Heater current . . . . .                           | 0.6  | A  |
| Cathode warm-up time . . . . .                     | 120  | s  |
| Prime power consumption . . . . .                  | 1050 | W  |

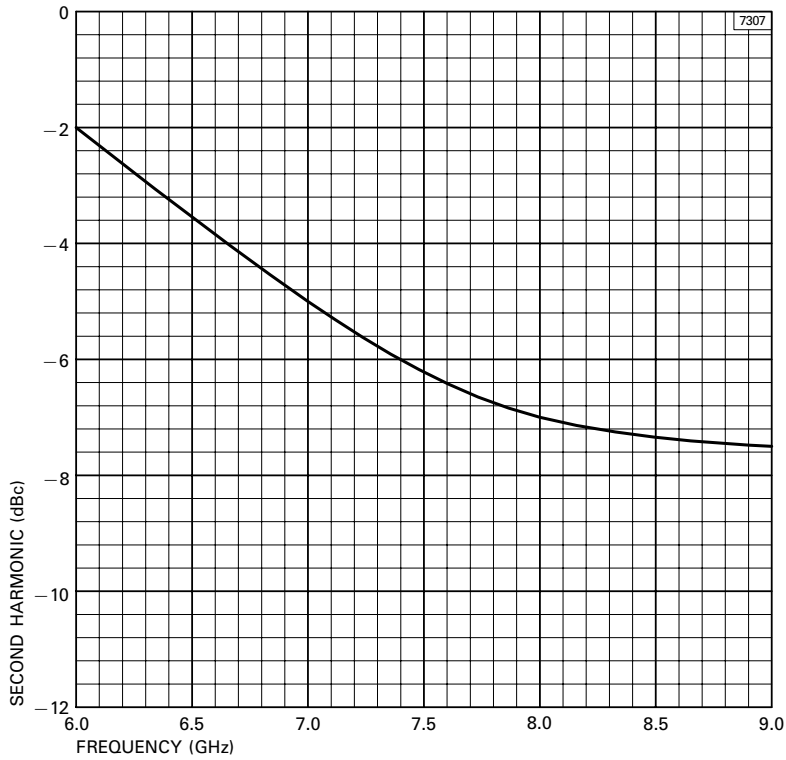
## TYPICAL SATURATION POWER



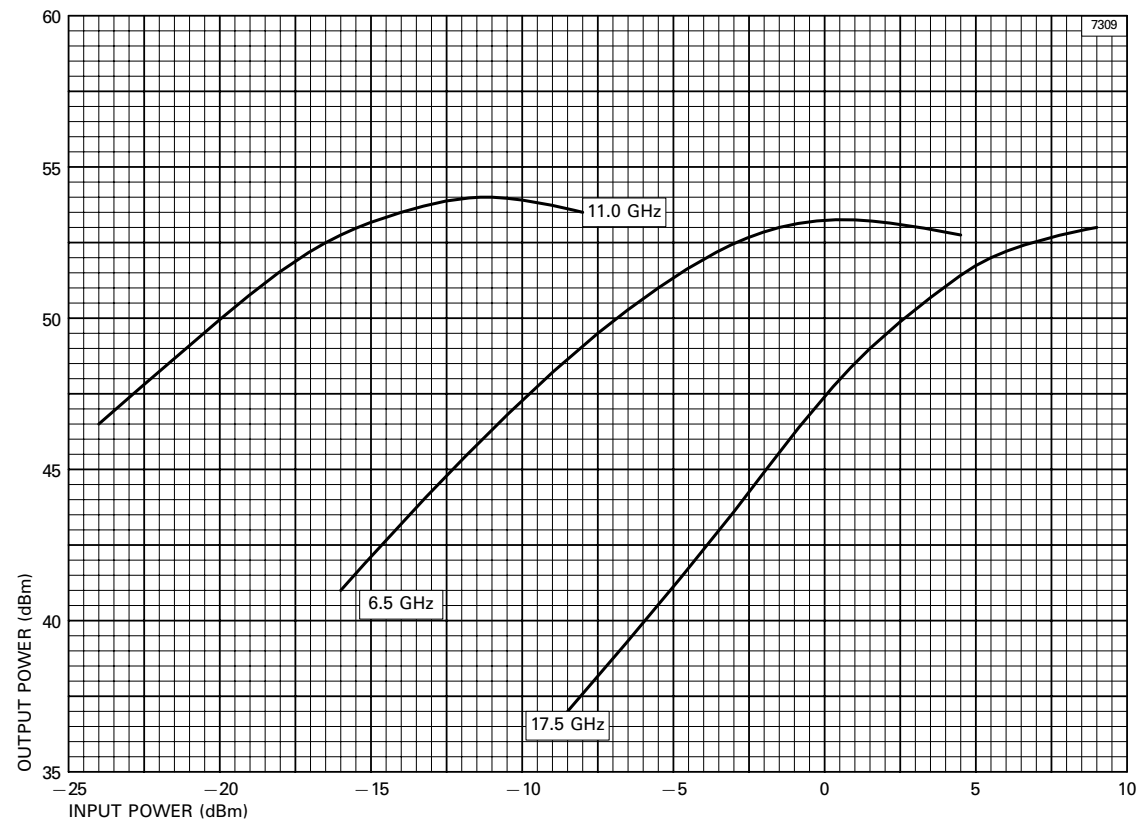
## TYPICAL SATURATION GAIN



## TYPICAL LEVEL OF SECOND HARMONIC

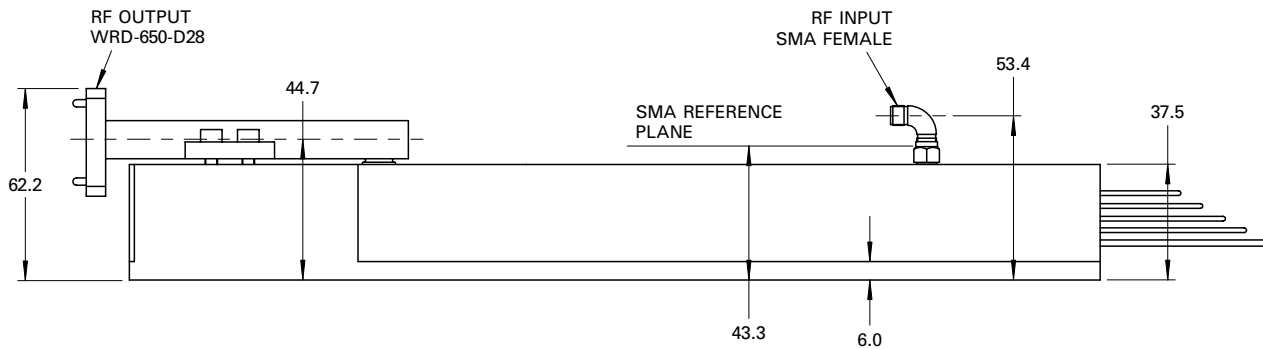
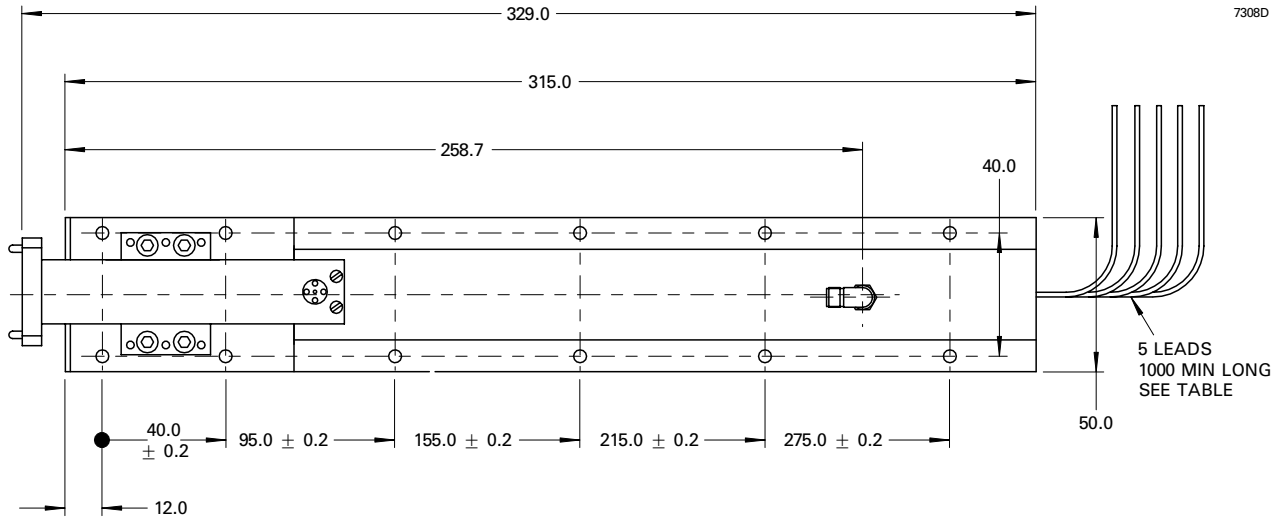


## TYPICAL TRANSFER CURVES



# OUTLINE (All dimensions in millimetres; dimensions without limits are nominal)

7308D



| Lead Colour | Connection     |
|-------------|----------------|
| Purple      | Thermal switch |
| Brown       | Heater         |
| Yellow      | Cathode        |
| Blue        | Anode          |
| Red         | Collector      |

## HEALTH AND SAFETY HAZARDS

e2v technologies electronic devices are safe to handle and operate provided that the relevant precautions stated herein are observed. e2v technologies does not accept responsibility for damage or injury resulting from the use of electronic devices it produces. Equipment manufacturers and users must ensure that adequate precautions are taken. Appropriate warning labels and notices must be provided on equipments incorporating e2v technologies devices and in operating manuals.

### High Voltage

Equipment must be designed so that personnel cannot come into contact with high voltage circuits. All high voltage circuits and terminals must be enclosed and fail-safe interlock switches must be fitted to disconnect the primary power supply and discharge all high voltage capacitors and other stored charges before allowing access. Interlock switches must not be bypassed to allow operation with access doors open.

### RF Radiation

All RF connectors must be correctly fitted before operation so that no leakage of RF energy can occur, and the RF output must be correctly terminated.

### Beryllium Oxide Ceramics

This assembly contains beryllium oxide ceramic parts, which are not accessible unless the metal casing of a tube is damaged or removed. **Beryllium oxide dust or fumes are highly toxic if inhaled, or if particles enter a cut or abrasion.** Consult e2v technologies regarding the disposal of damaged or life-expired tubes.

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