

# INDUSTRIAL

## RF HEATING

High amplification  
factor triodes



THALES

# RF HEATING QUALITY

Thales Electron Devices' expertise in power grid tube technology makes us today's leader in the RF industrial heating market. We have established a solid reputation with both equipment makers and users, stemming from our strict emphasis on quality in tube design and manufacture and continuous product performance improvement.

With Thales Electron Devices power grid tubes, customers enjoy a wide choice of power levels (up to more than 100 kW) and frequencies (up to 100 MHz and beyond), as well as a standard of quality, ruggedness and durability which is recognized by users everywhere.



Furthermore, these tubes are fully compatible with commercial standards and can be easily installed in existing generators.

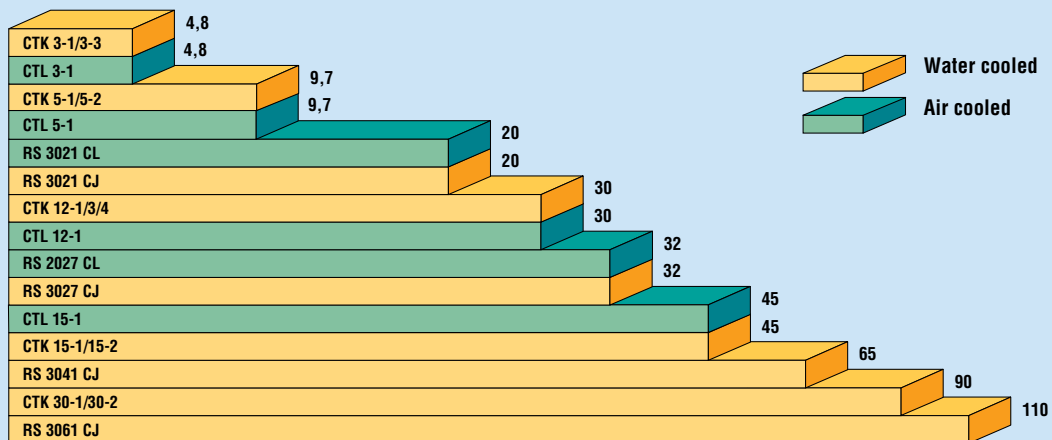
With a large network of local representatives throughout the world, Thales Electron Devices ensures comprehensive product support for all customers.

This document gives the main characteristics of the families of

industrial heating high amplification factor triodes. For more details contact your local representative.

All these products are designed, developed and manufactured at an ISO 9001 registered production site.

**Power table for the use of high amplification factor triodes in the industry in kW**



# HIGH AMPLIFICATION FACTOR TRIODES

## High amplification factor triodes air cooled

| Output Power | Reference  | Typical operating conditions<br>C class |                |                  |                |                 |                 | Filament       |                | Maximum ratings |                |                |                 |                  | Dimensions<br>(max.) |     |     |
|--------------|------------|---|----------------|------------------|----------------|-----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|------------------|----------------------|-----|-----|
|              |            | f                                       | V <sub>a</sub> | -V <sub>g1</sub> | I <sub>a</sub> | I <sub>g1</sub> | P <sub>g1</sub> | V <sub>f</sub> | I <sub>f</sub> | μ               | V <sub>a</sub> | P <sub>a</sub> | P <sub>g1</sub> | f <sub>max</sub> | l                    | d   | m   |
| kW           |            | MHz                                     | kV             | V                | A              | A               | W               | V              | A              |                 | kV             | kW             | W               | MHz              | mm                   | mm  | kg  |
| 4.8          | CTL 3-1    | 60                                      | 6              | 210              | 1.1            | 0.5             | 130             | 6.3            | 35             | 150             | 7.2            | 3              | 180             | 160              | 196                  | 123 | 2.7 |
| 9.7          | CTL 5-1    | 60                                      | 6.5            | 215              | 2              | 0.85            | 240             | 6.3            | 65             | 150             | 7.2            | 6              | 300             | 150              | 210                  | 123 | 2.9 |
| 20           | RS 3021 CL | 120                                     | 10             | 290              | 2.5            | 0.9             | 160             | 5.7            | 135            | 120             | 14             | 10             | 500             | 120              | 220                  | 159 | 5.6 |
| 30           | CTL 12-1   | 30                                      | 10             | 205              | 4              | 1.35            | 340             | 5.8            | 145            | 220             | 12             | 12             | 450             | 120              | 221                  | 160 | 6.5 |
| 32           | RS 3027 CL | 120                                     | 10             | 280              | 4.15           | 1.5             | 400             | 7              | 115            | 100             | 14             | 15             | 1 000           | 120              | 242                  | 196 | 11  |
| 45           | CTL 15-1   | 30                                      | 11             | 220              | 5.4            | 1.9             | 500             | 7.2            | 180            | 200             | 13             | 17             | 800             | 120              | 260                  | 175 | 9   |

## High amplification factor triodes water cooled

| Output Power | Reference     | Typical operating conditions<br>C class |                |                  |                |                 |                 | Filament       |                | Maximum ratings |                |                |                 |                  | Dimensions<br>(max.) |     |      |
|--------------|---------------|---|----------------|------------------|----------------|-----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|------------------|----------------------|-----|------|
|              |               | f                                       | V <sub>a</sub> | -V <sub>g1</sub> | I <sub>a</sub> | I <sub>g1</sub> | P <sub>g1</sub> | V <sub>f</sub> | I <sub>f</sub> | μ               | V <sub>a</sub> | P <sub>a</sub> | P <sub>g1</sub> | f <sub>max</sub> | l                    | d   | m    |
| kW           |               | MHz                                     | kV             | V                | A              | A               | W               | V              | A              |                 | kV             | kW             | W               | MHz              | mm                   | mm  | kg   |
| 4.8          | CTK 3-1/3-3   | 60                                      | 6              | 210              | 1.1            | 0.5             | 130             | 6.3            | 35             | 150             | 7.2            | 3              | 180             | 160              | 217                  | 100 | 1.6  |
| 9.7          | CTK 5-1/5-2   | 60                                      | 6.5            | 215              | 2              | 0.85            | 240             | 6.3            | 65             | 150             | 7.2            | 6              | 300             | 150              | 239                  | 100 | 1.8  |
| 20           | RS 3021 CJ    | 120                                     | 10             | 290              | 2.5            | 0.9             | 160             | 5.7            | 135            | 120             | 14             | 20             | 500             | 120              | 247                  | 130 | 4.1  |
| 30           | CTK 12-1/3/4  | 30                                      | 10             | 205              | 4              | 1.35            | 340             | 5.8            | 145            | 220             | 12             | 15             | 450             | 120              | 249                  | 155 | 3.1  |
| 32           | RS 3027 CJ    | 120                                     | 10             | 280              | 4.15           | 1.5             | 400             | 7              | 115            | 100             | 14             | 25             | 1 000           | 120              | 303                  | 150 | 7    |
| 45           | CTK 15-1/15-2 | 30                                      | 11             | 220              | 5.4            | 1.9             | 500             | 7.2            | 180            | 200             | 13             | 20             | 800             | 120              | 290                  | 155 | 3.8  |
| 65           | RS 3041 CJ    | 70                                      | 11             | 300              | 7.6            | 2.8             | 790             | 8              | 185            | 100             | 15             | 35             | 1 200           | 100              | 368                  | 150 | 8.5  |
| 90           | CTK 30-1/30-2 | 30                                      | 12             | 260              | 9.9            | 3.8             | 1 250           | 11             | 240            | 200             | 14             | 50             | 2 000           | 100              | 369                  | 200 | 10.3 |
| 110          | RS 3061 CJ    | 30                                      | 12             | 350              | 12             | 3.7             | 1 600           | 10             | 190            | 100             | 15             | 50             | 2 200           | 100              | 375                  | 185 | 7.5  |



The CTL family air cooled triodes



The CTK and RS families water cooled triodes

For further information, please contact:

**THALES ELECTRON DEVICES**

2 bis, rue Latécoère - 78941 Vélizy Cedex - France  
Tel: + 33 1 30 70 35 00 - Fax: + 33 1 30 70 35 35 - [www.thalesgroup.com/electronddevices](http://www.thalesgroup.com/electronddevices)

*This document cannot be considered to be a contractual specification. The information given herein may be modified without notice due to product improvement or further development. Consult Thales Electron Devices before making use of this information for equipment design.*



# SYMBOLS

|                        |   |
|------------------------|---|
| <b>d</b>               | <b>Diameter.</b>  |
| <b>f</b>               | <b>Maximum operating frequency (full power output).</b>       |
| <b>f<sub>max</sub></b> | <b>Maximum admissible frequency with reduced power input.</b> |
| <b>I<sub>a</sub></b>   | <b>D.C. average anode current.</b>                            |
| <b>I<sub>f</sub></b>   | <b>Filament current.</b>                                      |
| <b>I<sub>g1</sub></b>  | <b>D.C. average control grid current.</b>                     |
| <b>l</b>               | <b>Length.</b>  |
| <b>m</b>               | <b>Mass.</b>  |
| <b>μ</b>               | <b>Amplification factor.</b>                                  |
| <b>P<sub>a</sub></b>   | <b>Anode dissipation.</b>                                     |
| <b>P<sub>g1</sub></b>  | <b>Control grid dissipation.</b>                              |
| <b>V<sub>a</sub></b>   | <b>D.C. anode voltage.</b>                                    |
| <b>V<sub>f</sub></b>   | <b>Filament voltage.</b>                                      |
| <b>V<sub>g1</sub></b>  | <b>D.C. control grid voltage.</b>                             |