Forced-Air-Cooled
Industrial Triode

Code: 3J/222E

The 3J/222E triode has been designed specifically for industrial heating applications and is capable of operation at frequencies up to 100 Mc/s. Design features give a high mutual conductance, resulting in high efficiency with the low grid dissipation and large safety factor which are desirable when the valve is operated under variable-load conditions.

CATHODE
Thoriated-tungsten filament
Filament voltage 8 ± 2% V
Filament current (nominal) 125 A
Maximum usable emission 36 24 A
Filament cold resistance (nominal) 0.0085 Ω

It is recommended that some resistance or reactance should be introduced into the filament supply to limit the switch or surge current to about two and a half times the normal working value. This impedance may be short circuited if desired as soon as the surge has decayed.

PIRANI TEST*
I_r 12 A
V_r range 0.12 to 0.15 V
Approx. measuring time 60 min

* See card supplied with individual valve for actual test figures.

CHARACTERISTICS
Amplification factor \( \frac{V_a}{I_a} \) 2kV, I_a 0.5A 16 mA/V
Mutual conductance \( \frac{V_a}{I_a} \) 2kV, V_g -87V 60

DIRECT INTERELECTRODE CAPACITANCES
Grid to anode 50 pF
Grid to filament 80 pF
Anode to filament 3 pF

June 1971

ITT Components Group Europe
Standard Telephones and Cables Limited

Valve Product Division, Brixham Road, Paignton, Devon
Telephone: Paignton 50762 (STD Code 0803). Telex: 42830
COOLING REQUIREMENTS
For air-cooling requirements see Figure 3.

Maximum radiator core temperature 220 °C
Maximum seal temperature 180 °C

Forced-air-cooling of grid and filament seals is required to limit their temperature to below the maximum permissible value of 180 °C

If the rate of air flow through the radiator is less than 350 ft³/min care should be taken to ensure that the maximum grid seal temperature is not exceeded especially at high operating frequencies.

MECHANICAL DATA
Dimensions As shown in Figure 4
Net weight, approximately 18 lb 8.2 kg
Mounting position. Vertical, anode downwards

Accessories
The following approved items are supplied separately under the codes indicated:
214-LVA-001A Filament connector, smaller
214-LVA-001B Filament connector, larger
214-LVA-001C Grid connector
GC11 Glass support tube

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS
Class C, Industrial Heating R.F. Oscillator

Maximum Ratings
Maximum anode voltage (peak value of direct voltage plus ripple) 7 kV
Maximum direct anode current 6 A
Maximum direct anode dissipation (continuous) 10 kW
Maximum direct grid dissipation (continuous) 500 W
Maximum direct grid current (Note 2) 1-4 A
Maximum negative grid bias —1 500 V
Maximum frequency for above ratings 30 MHz

Note 2.—This figure is given for guidance. Grid dissipation is absolute rating.

Typical Operating Conditions
Direct anode voltage 6 kV
Direct grid voltage —660 V
Direct anode current 5-6 A
Peak r.f. grid voltage 930 V
Direct grid current (Note 3) 750 (1 200) mA
Grid dissipation (Note 3) 260 W
Grid resistor 900 Ω
Power input 33-6 kW
Output power (oscillator) 26 kW
Power into load at 85% transfer efficiency 21 kW

Note 3.—Subject to wide variation dependent upon the impedance of the load circuit.
The value of current shown in brackets is typical of off-load conditions and is given for guidance only: a practical figure is dependent upon compensatory devices in the grid circuit.
Fig. 1.—Anode Current and Grid Current versus Anode Voltage
Fig. 2.—Grid Voltage versus Anode Voltage
Fig. 3.—Cooling Requirements and Radiator Characteristics

Temperature of Air at Intake (°C)

Anode plus grid dissipation (kW)

Rate of Flow (cu. ft/min)

Pressure drop (water gauge)

Rate of Flow (m³/min)
**DIM.**  | **MILLIMETRES** | **INCHES** | **DIM.**  | **MILLIMETRES** | **INCHES**
---|---|---|---|---|---
A | 311.2 MAX. | 12½ MAX. | J |  |  
B | 25.4 MAX. | 1 MAX. | K | 169.9 ± 1.6 | 6½ ± ⅛ 
C | 31.8 ± 0.4 | 1½ ± ⅛ | L | 182.6 ± 0.8 | 7¼ ± ⅜ 
D | 50.8 ± 0.4 | 2 ± ⅛ | M* | 4,76 MIN. 6.35 MAX. | 1½ MIN. ½ MAX. 
E | 88.9 ± 0.4 | 3½ ± ⅛ | N | 38.1 ± 1.6 | 1½ ± ⅛ 
F | 19.0 ± 1.6 | ⅜ ± ⅛ | P | 60.3 ± 4.8 | 2³/₈ ± ⅜ 
G | 95.3 ± 1.6 | 3²/₈ ± ⅛ | Q | 95.3 ± 4.8 | 3⅞ ± ⅛ 
H |  |  |  |  |  

**NOTE:** BASIC FIGURES ARE IN INCHES
* DENOTES: CONTACT LENGTH
GLASS SUPPORT TUBE
Code: GC11

GC11 Outline

<table>
<thead>
<tr>
<th>DIM</th>
<th>INCHES</th>
<th>MILLIMETRES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>8 MIN 8.3/8 MAX</td>
<td>203.2 MIN 212.7 MAX</td>
</tr>
<tr>
<td>B</td>
<td>6.13/16 ± 1/32</td>
<td>173.0 ± 0.8</td>
</tr>
<tr>
<td>C</td>
<td>5.25/32 ± 5/32</td>
<td>146.8 ± 4.0</td>
</tr>
<tr>
<td>D</td>
<td>1/4 MIN 3/8 MAX</td>
<td>6.3 MIN 9.5 MAX</td>
</tr>
<tr>
<td>E</td>
<td>7.3/4 MAX</td>
<td>195.9 MAX</td>
</tr>
</tbody>
</table>

BASIC DIMENSIONS ARE INCHES