



ELECTRONIC TUBE REFERENCE

11D12

Power - Triode electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

TRIODE-TRIODE

Dual low-mu power triode designed for booster-scanning circuits and series-regulator service in DC power supplies. Its sections withstand severe pulse conditions, including kilovolt-level inverse and control-grid pulse voltages.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	8
NOMINAL HEATER	6.3 V / 2.5 A	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Triode	
PLATE RESISTANCE	280 Ω
TRANSCONDUCTANCE	0.007 S
AMPLIFICATION FACTOR	2
MAXIMUM PLATE VOLTAGE	550 V
MAXIMUM PLATE DISSIPATION	13 W
MAXIMUM CATHODE CURRENT	125 mA
Representative section for repeated identical sections.	

SECTION2 Triode	
PLATE RESISTANCE	280 Ω
TRANSCONDUCTANCE	0.007 S
AMPLIFICATION FACTOR	2
MAXIMUM PLATE VOLTAGE	550 V
MAXIMUM PLATE DISSIPATION	13 W
MAXIMUM CATHODE CURRENT	125 mA
Identical second physical section; duplicated from representative section per physical-section-row policy.	

11D12 — Low-Mu Power Double Triode Vacuum Tube

The **11D12** is an indirectly heated, low-mu power double triode designed with separate cathodes for each section. It is specifically engineered for demanding roles such as booster scanning circuits and as a series regulator in DC power supply units. Produced under the Ediswan brand by Associated Electrical Industries (AEI) Limited, this tentative design provides high current capability and substantial power handling within a single envelope.

Physical Dimensions, Mounting, and Base Configuration

The 11D12 is housed in a glass bulb with a maximum overall length of 103 mm, a maximum seated height of 88.5 mm, and a maximum base diameter of 43.5 mm. The tube is designed for unrestricted mounting positions, allowing flexibility in physical chassis layouts.

The tube utilizes a **108** base. The pin connections, viewed from the free end of the pins, are arranged as follows:

Pin	Connection	Symbol
Pin 1	Grid (Section 1)	g'
Pin 2	Anode (Section 1)	a'
Pin 3	Cathode (Section 1)	k'
Pin 4	Grid (Section 2)	g''
Pin 5	Anode (Section 2)	a''
Pin 6	Cathode (Section 2)	k''
Pin 7	Heater	h

Pin	Connection	Symbol
Pin 8	Heater	h

Heater and Electrical Characteristics

The 11D12 features a high-power heater designed to support the heavy emission requirements of its two triode sections. The heater operates at a nominal voltage of 6.3 V and draws a nominal current of 2.5 A.

- **Calculated Heater Power:** 15.75 W (derived from the nominal inputs of 6.3 V and 2.5 A).

Section Characteristics

Each independent triode section exhibits low anode resistance and low amplification factor, optimized for high-current regulation and booster scanning applications. The typical characteristics per section, measured at the absolute limit of anode current and dissipation, are:

Parameter	Value
Anode Supply Voltage ($V_{a(b)}$)	135 V
Anode Current (I_a)	125 mA
Cathode Bias Resistance (R_k)	250 Ω
Mutual Conductance (g_m)	7.0 mA/V
Amplification Factor (μ)	2.0
Valve Anode Resistance (r_a , approx.)	280 Ω

The relationship between these parameters is consistent with standard triode behavior, where $g_m \times r_a \approx \mu$ (calculated as $0.007 \text{ A/V} \times 280 \text{ } \Omega = 1.96$, which closely approximates the nominal amplification factor of 2.0).

Absolute Maximum Ratings and Circuit Constraints

The absolute maximum ratings for the 11D12 must be strictly observed to prevent premature failure or damage. These ratings apply to each section individually unless otherwise specified:

Rating Parameter	Absolute Maximum Value
Maximum Anode Supply Voltage ($V_{a(b)\text{max}}$)	550 V
Maximum Anode Voltage ($V_{a(\text{max})}$)	250 V
Maximum Peak Inverse Voltage (Booster Service)	3.0 kV *

Rating Parameter	Absolute Maximum Value
Maximum Negative Control Grid Pulse Voltage (Booster Service)	2.3 kV *
Maximum Cathode Current ($I_{k(\max)}$)	125 mA
Maximum Anode Dissipation ($P_{a(\max)}$)	13 W
Maximum Heater-to-Cathode Voltage ($V_{h-k(\max)}$)	300 V †
Maximum Bulb Temperature ($T_{\text{bulb}(\max)}$)	230 °C

* *Booster scanning service limits apply to a maximum pulse duration of 15% of one cycle, with an absolute maximum duration of 15 μ s.* † *Operation is explicitly not recommended with a damper pulse between the heater and cathode.*

Grid-to-Cathode Resistance Limits

- **Cathode Bias:** The maximum allowable resistance between the grid and cathode is 1.0 M Ω per section.
- **Fixed Bias:** The maximum allowable resistance between the grid and cathode is 0.1 M Ω per section.

Circuit Design and Biasing Guidelines

Specific circuit precautions must be followed when operating the 11D12 under various biasing and configuration states:

- **Fixed Bias Protection:** When utilizing fixed bias, the anode circuit must contain a protective resistance designed to provide a minimum voltage drop of 15 V DC under normal operating conditions.
- **Parallel Operation:** If two or more triode sections are operated in parallel at dissipations approaching their rated maximums, separate anode and cathode resistors must be employed to assist in proper load sharing.
- **Combined Bias:** When a combination of fixed and cathode bias is used, the cathode bias portion must provide a minimum value of 7.5 V DC under normal operating conditions, with a grid-to-cathode resistance of 100 k Ω .
- **Booster Scanning Restriction:** The use of fixed bias is not recommended when the valve is employed in booster scanning circuits.

Inter-electrode Capacitances

The inter-electrode capacitances for each section of the 11D12 are measured in a fully shielded socket without an external can. These values define the capacitive coupling between elements:

Capacitance Parameter	Value
Anode to Grid (C_{a-g})	7.3 pF
Heater to Cathode (C_{h-k})	9.6 pF
Anode 2 to Anode 1 ($C_{a''-a'}$)	2.7 pF
Grid 2 to Grid 1 ($C_{g''-g'}$)	0.25 pF
Grid 1 or Grid 2 to Earth (C_{in})	6.9 pF
Anode 1 or Anode 2 to Earth (C_{out})	2.5 pF

The low grid-to-grid capacitance ($C_{g''-g'} = 0.25$ pF) indicates relatively good isolation between the control grids of the two sections, despite their proximity within the same envelope. However, the anode-to-anode capacitance ($C_{a''-a'}$) is 2.7 pF, which must be accounted for in high-frequency or pulse-based circuit designs.

Technical Summary

The **11D12** is a robust, high-current, low-mu power double triode featuring separate cathodes and a common 6.3 V, 2.5 A heater. Designed for heavy-duty applications, it is highly suited for booster scanning circuits and series regulation in DC power supplies. Each section is capable of dissipating up to 13 W and handling up to 125 mA of continuous cathode current. With an exceptionally low anode resistance of approximately 280 Ω and an amplification factor of 2.0 at its operating limit, the 11D12 provides the low-impedance drive necessary for efficient power control and voltage regulation.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1961 AEI Industrial Valves

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1961 AEI INDUSTRIAL VALVES

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum anode supply voltage	550 V	EachSection
Maximum peak inverse voltage	3 kV	BoosterScanning
Maximum negative control-grid pulse voltage	2.3 kV	BoosterScanning
Maximum heater-cathode voltage	300 V	EachSection

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode-grid capacitance	7.3 pF	EachSection
Heater-cathode capacitance	9.6 pF	EachSection
Inter-anode capacitance	2.7 pF	BetweenSections
Inter-grid capacitance	0.25 pF	BetweenSections



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1961 Associated Electrical Industries

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1961 ASSOCIATED ELECTRICAL INDUSTRIES

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum anode supply voltage	550 V	EachSection
Maximum peak inverse voltage	3 kV	BoosterScanning
Maximum negative control-grid pulse voltage	2.3 kV	BoosterScanning
Maximum heater-cathode voltage	300 V	EachSection

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode-grid capacitance	7.3 pF	EachSection
Heater-cathode capacitance	9.6 pF	EachSection
Inter-anode capacitance	2.7 pF	BetweenSections
Inter-grid capacitance	0.25 pF	BetweenSections

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