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BS CECC 45 003 - 004

Specification available from:- As shown in PD 9002,
CECC 00200, and
ITT Components Group Europe,
Standard Telephones & Cables Ltd.,
Electron Devices,
Brixham Road, Paignton, Devon. TQ4 7BE.
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Issue 1, January 1978



Page 1 of 35 pages.

Electronic Components of assessed quality
Detail Specification in accordance with
BS CECC 45000 : 1971

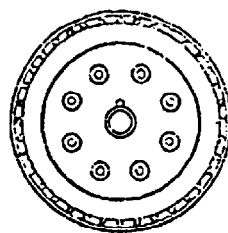
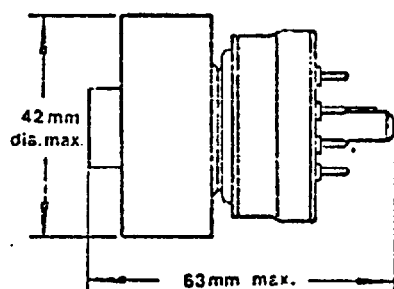
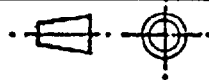
Manufacturer's Type Number

4CX250 FG

See PD 9002 and CECC 00200
For ordering information
see Clause 2

Outline and dimensions

First angle
projection



Forced air cooled
UHF Power Tetrode
250 W, 500 MHz.
Integral finned
external anode,
indirectly heated
oxide coated cathode,
ceramic envelope
B8F base.

Marking information see Clause 1

Full assessment

5.3 ELECTRICAL DATA - Limiting values. Absolute maximum in accordance with IEC 134. All voltages with respect to cathode unless otherwise stated.

	Min.	Max.	Units
Heater voltage up to 300 MHz	25.2	37.8	V
301 to 400 MHz	24.2	26.8	V
401 to 500 MHz	23.1	25.5	V
Operating frequency at full input		500	MHz
Frequency capability at 70% (Class C) conversion efficiency		300	MHz
Anode dissipation		250	W
Anode current		250	mA
Anode voltage		2	kV
Screen grid voltage		400	V
Screen grid dissipation		12	W
Grid negative voltage		-250	V
Grid dissipation		2	W
Base connections			

Pin No.	1	2	3	4	5	6	7	8	Centre post	Base Ring	Top cap
Element	g ₂	k	h	k	int conn	k	h	l	g ₁	g ₂	a

For detail dimensions see page 34

Refer to Qualified Products List PD 9002 and/or CECC 00200 for details of manufacturers approved to this Specification.

1. MARKING

The following codes shall be clearly and durably marked on the tube and the primary pack as required by 2.4 of CECC 45 000.

- (1) Type Code - 4CX250 FG
- (2) Factory identification code - STE
- (3) Date Code
- (4) BS CECC 45 003 - 004.

2. ORDERING INFORMATION

Orders for components to this specification shall include the following minimum information:

- (1) Quantity
- (2) 4CX250 FG
- (3) BS CECC 45 003 - 004 Issue B, January 1978

3. RELATED DOCUMENTS

BS 6001	Sampling procedures and tables for inspection by attributes.
BS CECC 45 000	Generic specification : space charge control tubes.
BS E 9000	General requirements for electronic components of assessed quality.

DL BS 9011 This Drawing List lists the following drawings:
F001 and F002

BS Specification Drawing Ref.	Manufacturer's Drawing Ref.
CC 5000 Air System Socket	Eimac SK 610 - 60
CC 5001 Test Cavity 4CX250B and BM	STC E 558 3.1
CC 5002 Details 1 - 7 - Test Cavity	STC E 558 9.1
CC 5003 Details 8 - 15 - Test Cavity	STC E 558 9.2
CC 5004 Details 16 - 24 - Test Cavity	STC E 558 9.3
CC 5005 Details 25 - 31 - Test Cavity	STC E 558 9.4
CC 5006 Details 32 - 35 - Test Cavity	STC E 558 9.5
CC 5007 Detail 42 - Test Cavity	STC E 558 9.6

Individual drawings are available from the originators of this Specification.

IEC 134	Rating systems for electronic tubes and analagous semi-conductor devices
PD 9002	BS 9000 Components selection guide
CECC 00200	Qualified Products List.

4. CERTIFIED TEST RECORDS.

Not applicable.

5. DATA (not for inspection purposes).

5.1 GENERAL AND MECHANICAL DATE

	Symbol	Min.	Nom.	Max.	Units
Mass (weight)			140		g
Mounting position:	Any				
Air coolant flow at sea level (see Note 1)		0.11			m ³ /min
Air coolant flow at 3000 m altitude		0.17			m ³ /min
Coolant pressure drop at 0.11 m ³ /min			90		N/m ²
Air pressure (reduced)		68.9			kN/m ²
Seal and anode core temperature				250	°C
Cathode heating time		30			s
Shock (see Note 2) tube operating					
Peak acceleration				245	m/s ²
Duration				5	ms
tube not operating					
Peak acceleration				735	m/s ²
Duration				5	ms
Vibration (continuous) Acceleration				19.6	m/s ²
Frequency range		55		500	Hz

Note 1. At an anode dissipation of 250 W and an incoming air temperature of 25°C maximum, a minimum air flow of 0.11 m³/min at sea level must pass through the anode cooler. At this flow of 0.11 m³/min, the static pressure drop across the tube and socket shown on Drawing BS CC 5000 (246-JAN) is approximately 75 N/m². The pressure drop varies with the amount of escaping air and with the shape and construction of the air director. This rating applies at bias voltages less than 100 V and frequencies less than 500 MHz. Air cooling on the tube base shall be increased with increasing negative-grid bias or with increasing frequency, or increasing ambient temperature, or a combination of all three. In all cases of operation, a socket which provides forced air cooling of the base must be used and maximum seal temperature ratings must not be exceeded. The airflow shall be applied before or simultaneously with electrode voltages, and may be removed simultaneously with them.

Note 2. The wave form for the shock rating shall be half sine wave applied in any direction.

5.2 ELECTRICAL DATA - Nominal values.

Capacitance Input	c_{in}	15.7	pF
Output	c_{out}	4.5	pF
Anode - Grid 1	$c_{a g_1}$	0.035	pF
Inner μ at $V_a = 1000$ V $V_{g_2} = 300$ V	$\mu_{g_1 g_2}$	5	
$I_a = 150$ mA			
Mutual conductance at $V_a = 500$ V	gm	12	mA/V
$V_{g_2} = 250$ V, $I_a = 200$ mA			

Characteristic curves

- (1) See Figs. 1, 2 and 3 for curves of anode current as a function of anode voltage for stated values of control grid and screen grid voltages.
- (2) See Figs. 4, 5 and 6 for curves of screen grid current as a function of anode voltage for stated values of control grid and screen grid voltages.
- (3) See Figs. 7, 8 and 9 for curves of control grid current as a function of anode voltage for stated values of control grid and screen grid voltages.
- (4) See Figs. 10, 11 and 12 for constant current diagrams of control grid voltage as a function of anode voltage for stated values of screen grid voltage and anode current, screen grid current and control grid current.
- (5) See Figs. 13 and 14 for power dissipation as a function of rate of air flow.

Operating Conditions

- (1) At class AB1 up to 30 MHz
 $V_a = 1600$ V, $V_{g_2} = 400$ V, $I_a = 100$ mA, HF drive $I_{g_1} = 10$ μ A max.
- (2) At class C up to 500 MHz
 $V_a = 2$ kV, $V_{g_2} = 250 - 300$ V, $-V_{g_1} = 90$ V
 $I_a = 250$ mA max, $I_{g_1} = 25$ mA max, $I_{g_2} = 30$ mA max $P_i = 40$ W max.
- (3) Nominal Heater Voltage

Up to 300 MHz	26.5 V
301 - 400 MHz	25.5 V
401 - 500 MHz	24.3 V

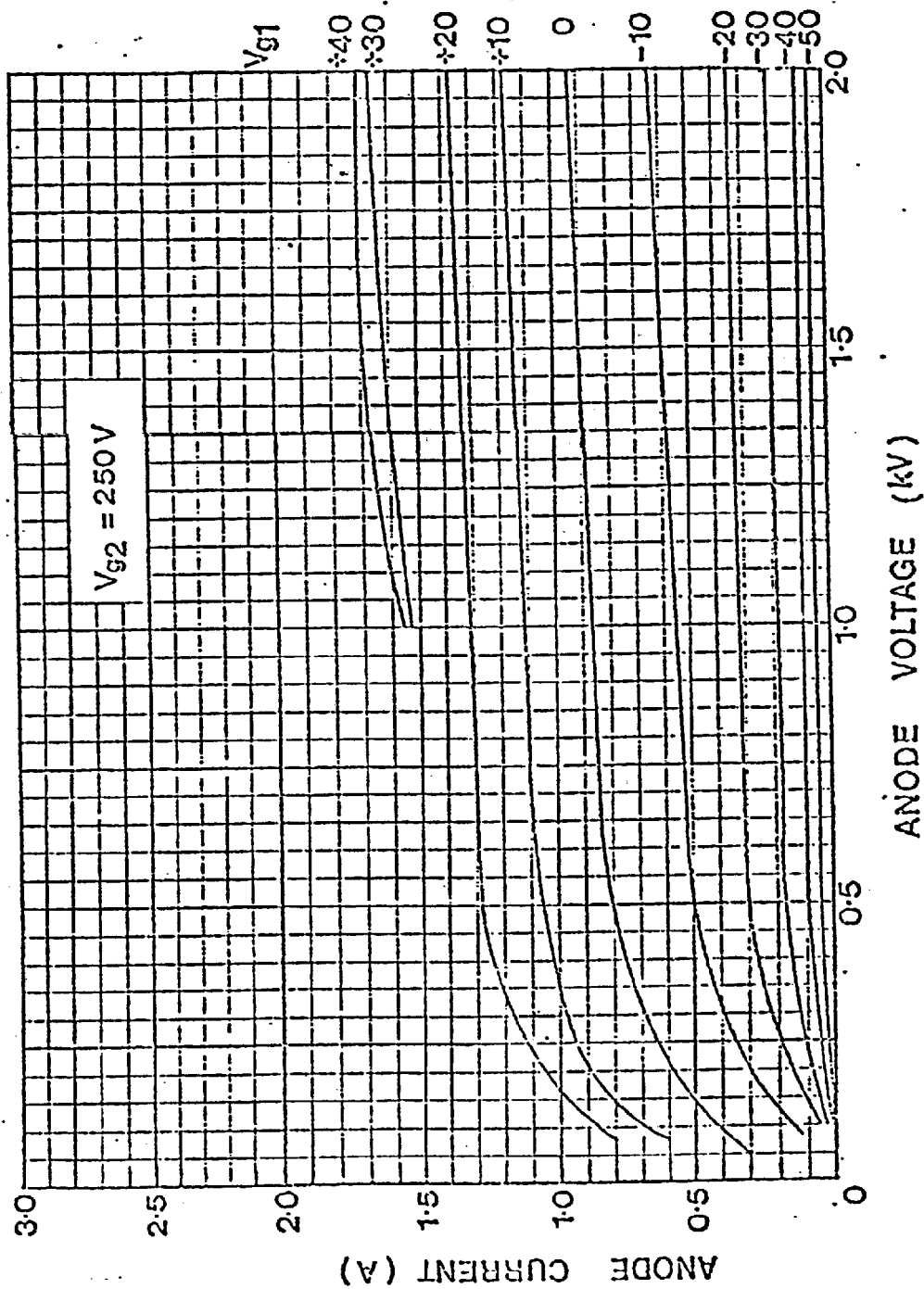


Fig.1

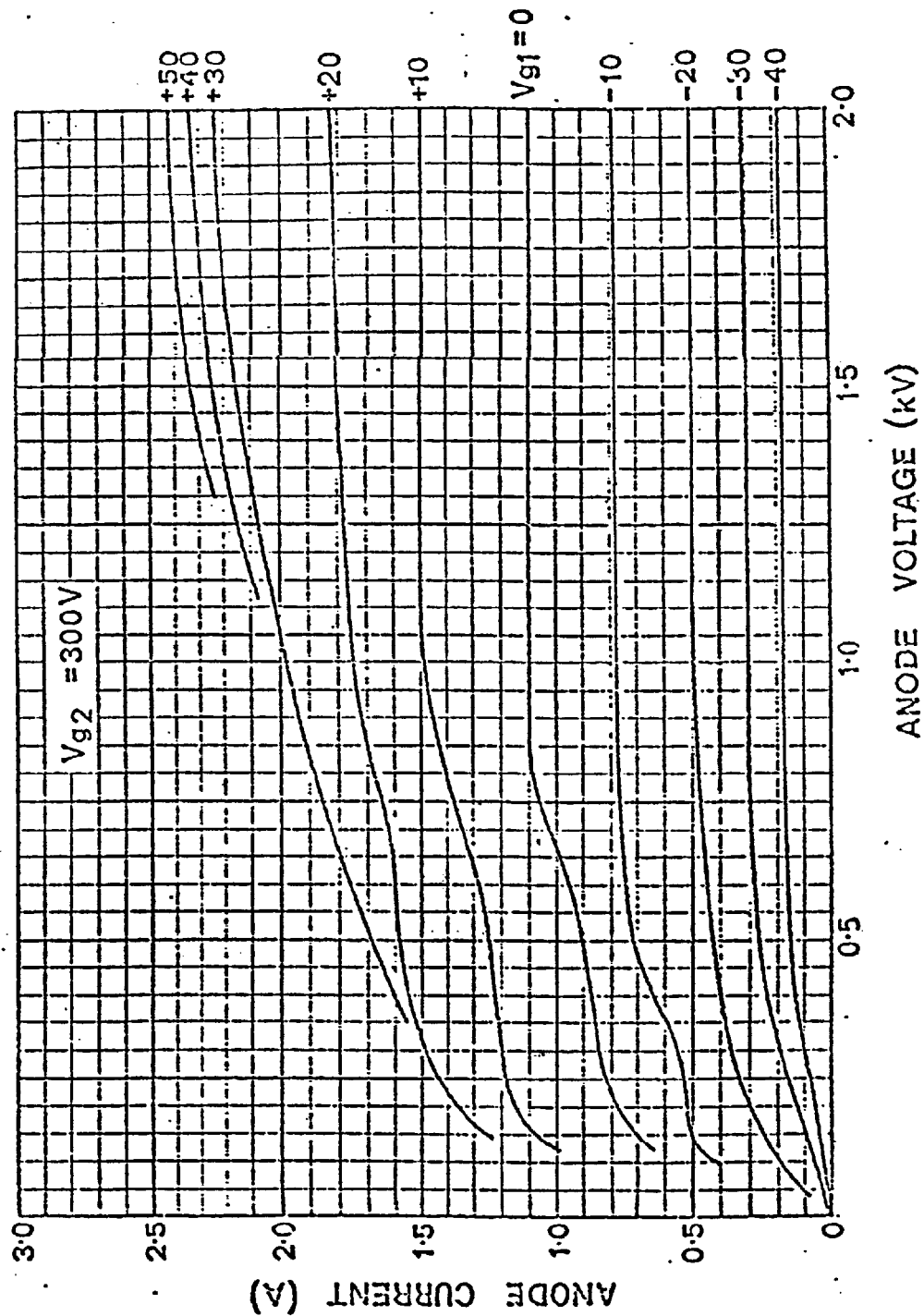


Fig.2

Issue: 1
Date: January 1978

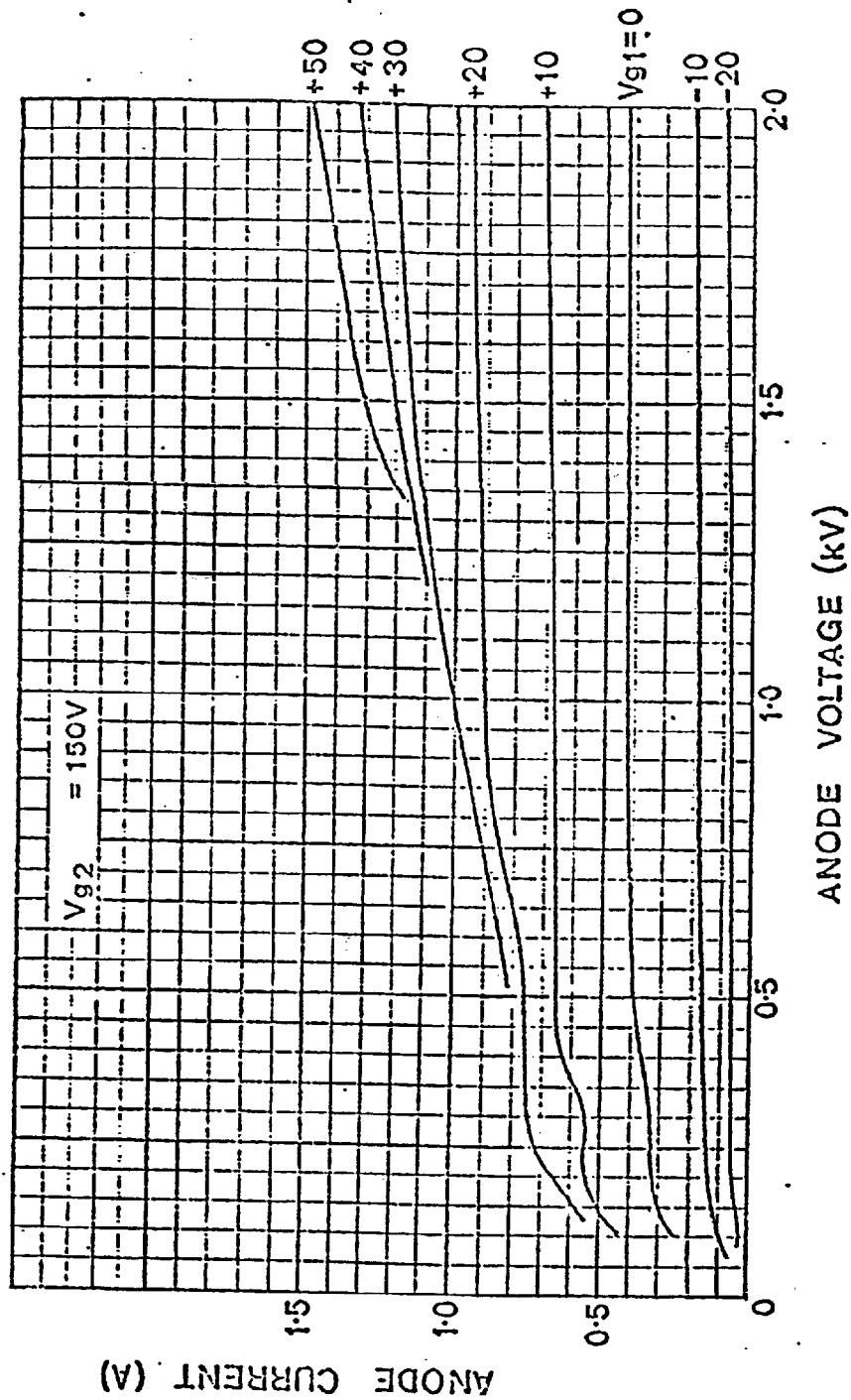


Fig.3

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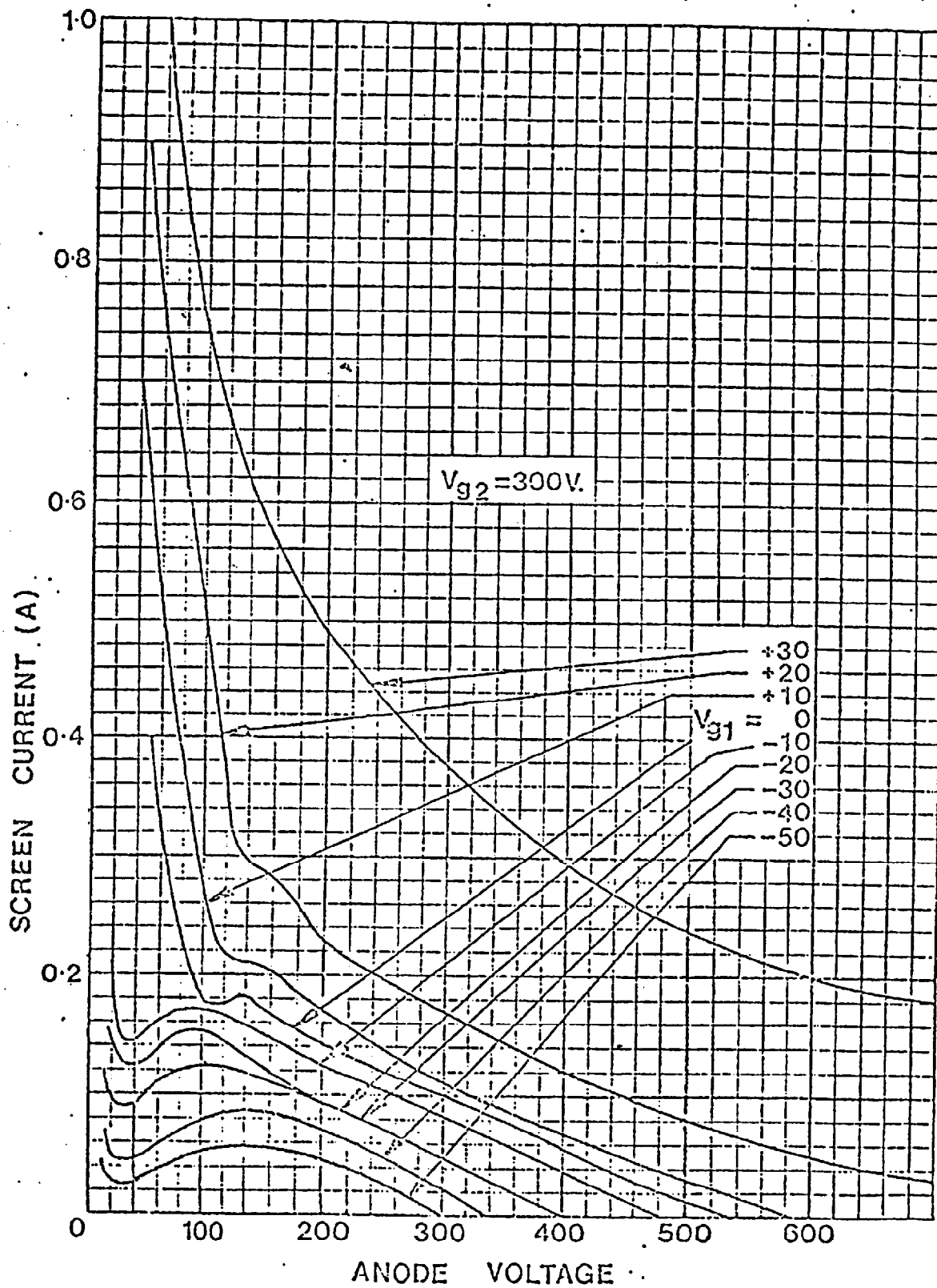


Fig. 4

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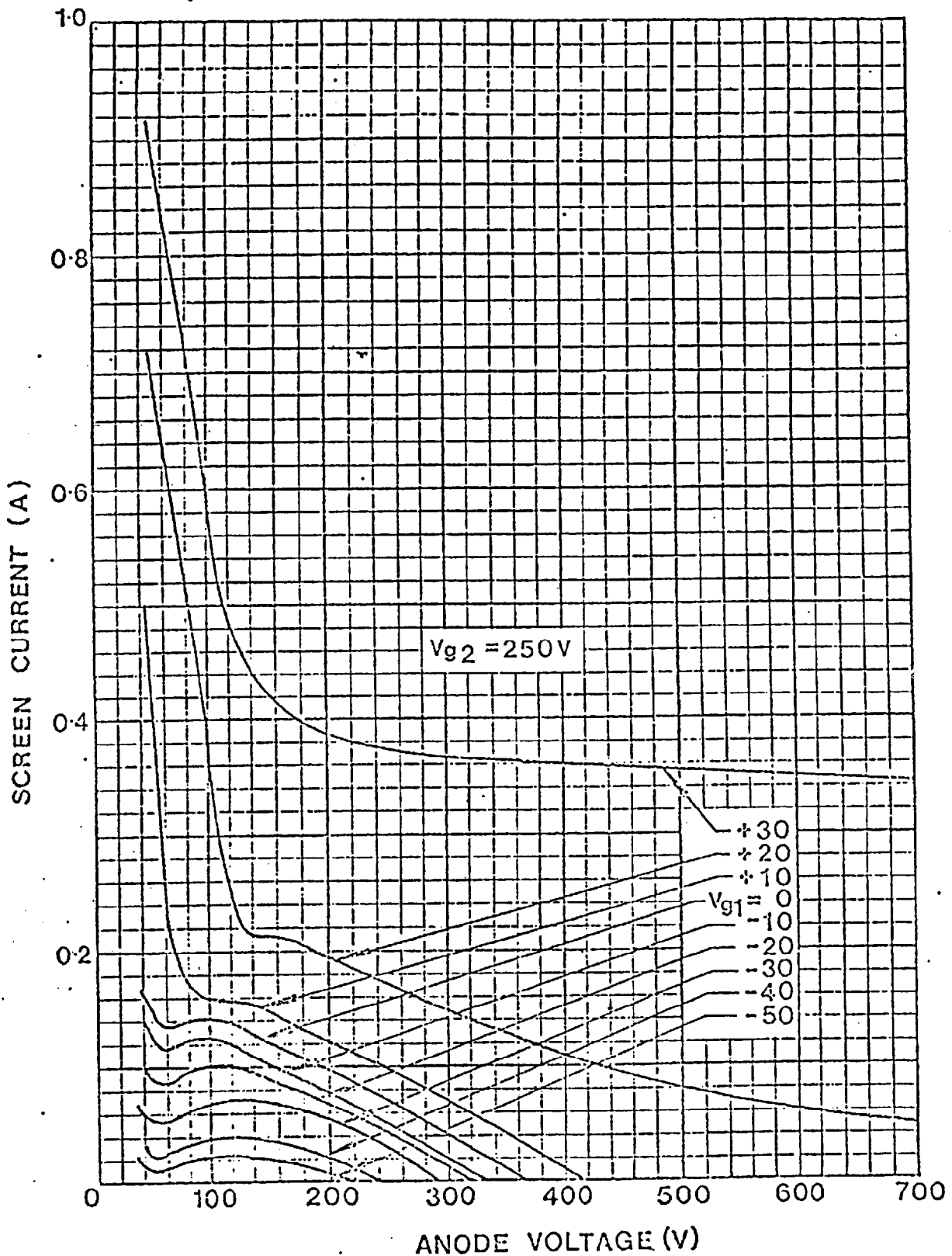


Fig. 5

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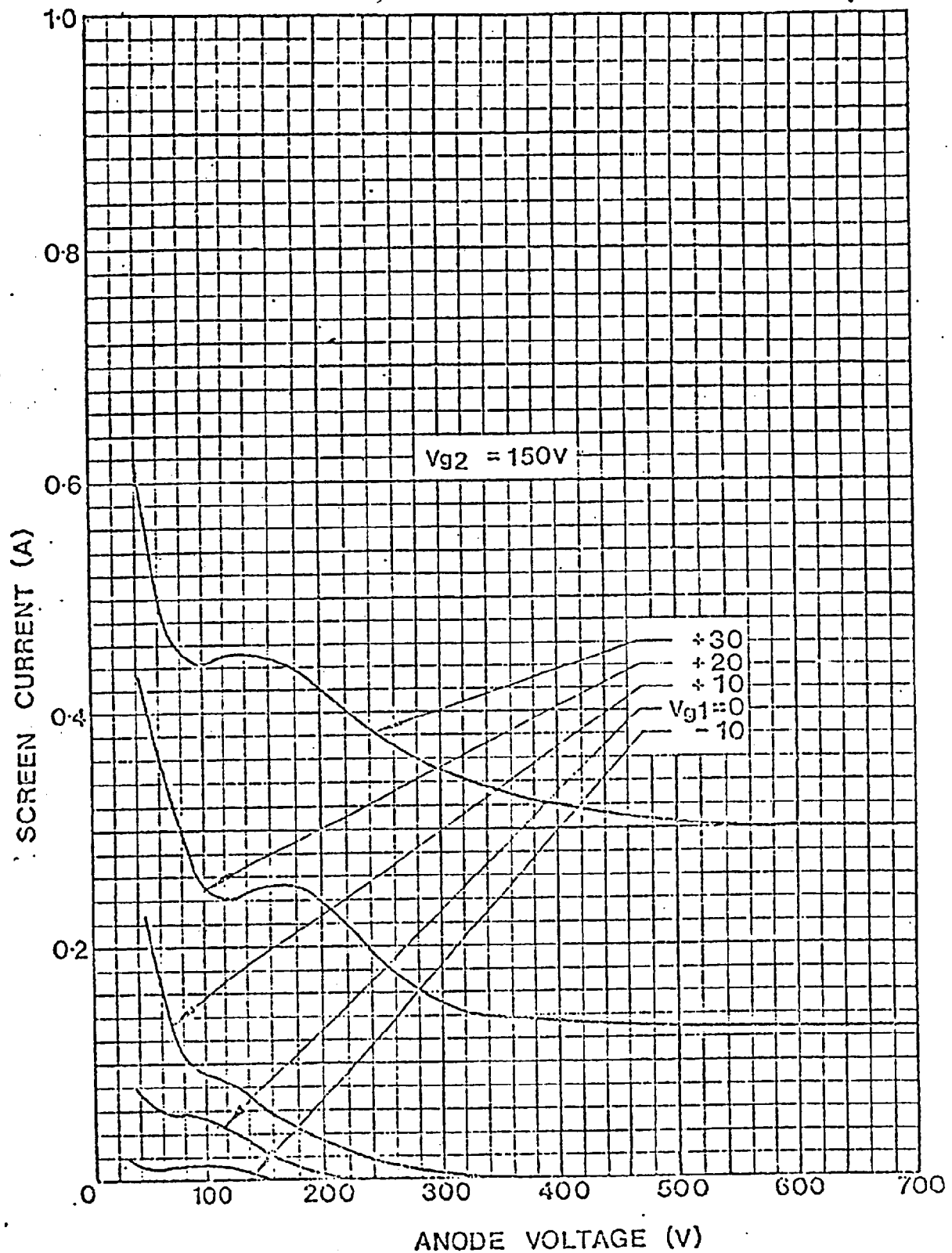


Fig.6

BS CECC 45 003 - 004

Issue : 1

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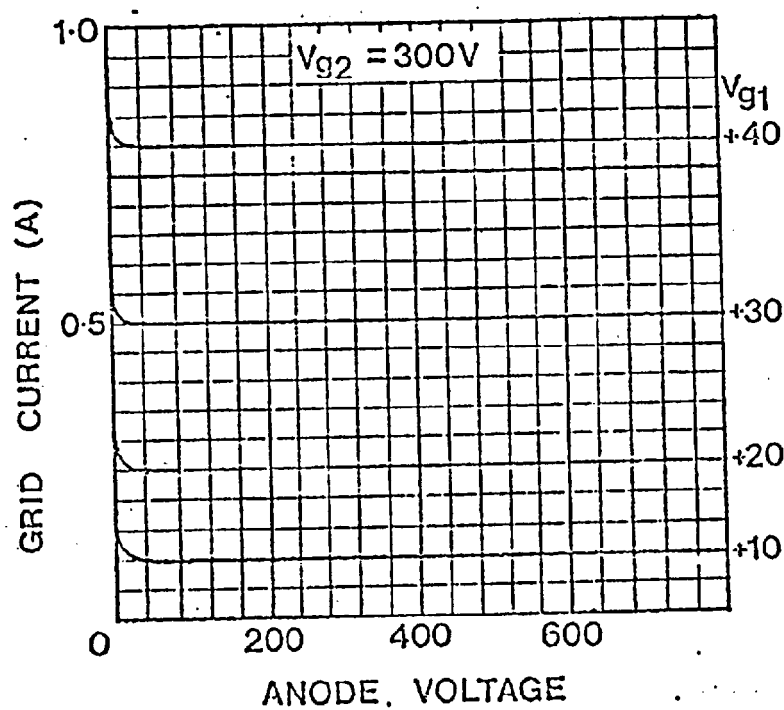


Fig. 7