SUBMINIATURE COLD CATHODE TRIGGER TUBE

Z700W

Trigger tube with two independent trigger electrodes primarily intended for use in reversible counting and switching circuits. When conducting, this tube gives a visible glow.

QUICK REFERENCE DATA (nominal values)

The Z700W has two trigger electrodes and is otherwise electrically and mechanically similar to the Z700U, and can be used in conjunction with this tube.

Anode supply voltage	250	V
Anode maintaining voltage	116	V
Maximum average cathode current	4	mA
Trigger ignition voltage (either trigger)	145	V
Trigger transfer current (either trigger)	50	μA

CHARACTERISTICS AND RANGE VALUES FOR EQUIPMENT DESIGN

The values given state the range over which the tube will operate. No allowance has been made for supply voltages and component variations.

To ensure that the characteristics of the tube are maintained in both light and darkness, a priming discharge of some 3μA flowing continuously between the anode and the priming cathode is necessary. The tube is designed for operation with positive voltages on the anode and triggers.

Anode supply voltage		
Maximum (*Note 1*)	310	V
Minimum	200	V
Anode-to-cathode maintaining voltage		
(at I_a = 3mA)	See page C1	
Maximum	121	V
Minimum	111	V
Cathode current range	2 to 4	mA
Trigger-to-cathode ignition voltage (either trigger)		
V_a = 250V	See page C2	
Maximum (*Note 2*)	153	V
Minimum	137	V
Trigger maintaining voltage (either trigger)	115	V
Temperature coefficient of trigger-to-cathode ignition voltage (either trigger)		
Maximum	−25	mV per °C
Maximum trigger series resistance (either trigger) (*Note 3*)	20	MΩ

Priming cathode-to-anode supply voltage		
Minimum	200	V
Primer maintaining voltage ($I_{k\ priming}$ = 3μA)	155	V
Primer current		
Maximum	10	μA
Minimum	1	μA
Recommended priming cathode series resistor (*Note 3*)	18	MΩ
Maximum frequency of operation in a counter chain (*See Note 4 and fig. 1*)	2 to 5	kc/s

Transfer requirements

Minimum trigger current for transfer (either trigger)		
V_a = 250V (See page C3)	50	μA
Recommended value of $V_{Tr(pulse\ +\ bias)}$		
(t_{pulse} = 20μs)	200	V
(See pages C5 and C6)		

Typical component values for self-extinguishing circuits

R	1.8	1.2	0.7	MΩ
C	300	600	2000	pF

LIMITING VALUES (absolute ratings)

Maximum anode supply voltage		
Positive	310	V
Negative	0	V
Cathode current		
Minimum instantaneous	2	mA
Maximum average (av. time = 1s)	4	mA
Maximum peak (*Note 5*)	16	mA
Maximum negative trigger voltage (either trigger), tube not conducting		
At supply voltage = 300V	30	V
At supply voltage = 200V	50	V
Maximum negative trigger current (either trigger) (*Note 6*)		
Tube conducting	150	μA
Tube non-conducting	0	μA
Maximum ambient temperature	70	°C

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OPERATING NOTES

1. At anode supply voltages greater than 270V spurious ignition may occur in this tube if a large amplitude pulse (>100V) which is not intended to ignite the tube is applied to either trigger. With pulses of more than 100V amplitude, a trailing edge as defined by a time constant of at least 50μs must be used.
2. The drift in trigger ignition voltage per tube is generally less than 3V. However, when the tube is ignited for very long periods, drawing negative trigger current, it is advisable to design the circuit for an ignition voltage of 160V.
3. The priming cathode and trigger series resistors should be mounted close to the tube.
4. The maximum frequency depends on the component tolerances and the stability of the supply voltage.
5. Higher peak cathode currents are permissible in self-extinguishing circuits.
6. Negative trigger current is defined as conventional current flowing from the tube to the trigger circuit (viz. trigger acting as cathode). This current will flow whenever the trigger is returned to a potential less than the trigger maintaining voltage during anode-to-cathode conduction.
7. Direct soldered connections to the leads of this tube must be at least 5mm from the seal, and any bending of the tube leads must be at least 2mm from the seal.
8. The tube should not be mounted within 2mm of any conductive elements or spurious ignition may occur.

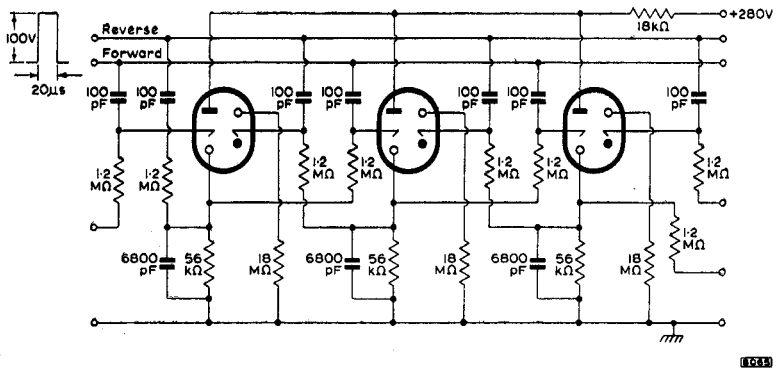

FIG. 1

Z700W

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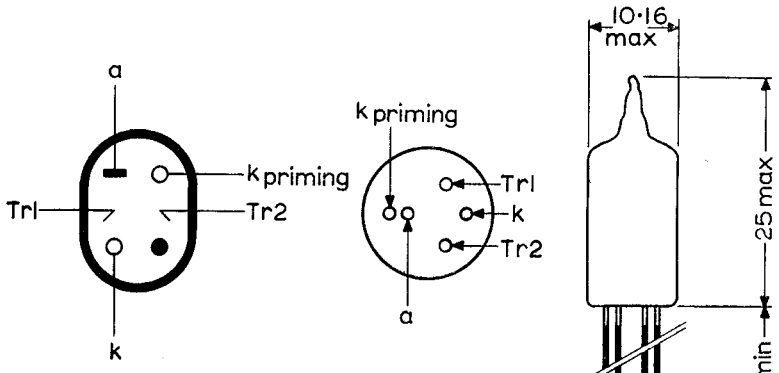

All dimensions in mm

8089

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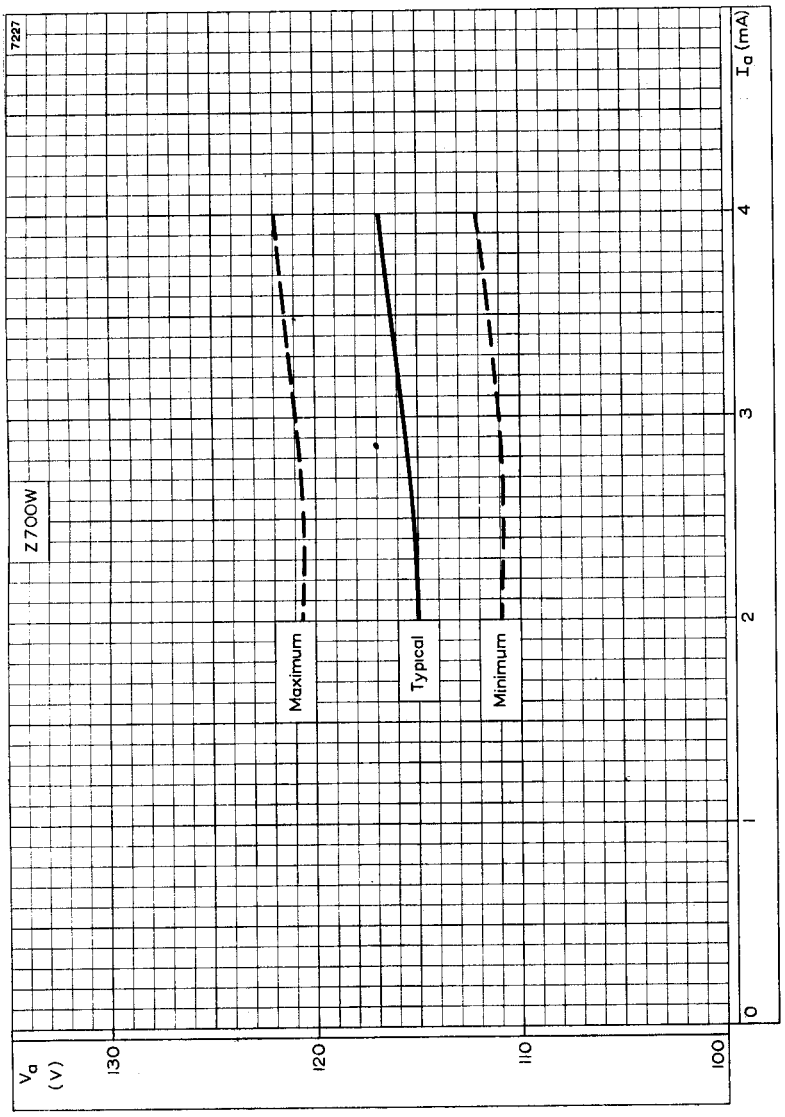

SPREAD OF ANODE MAINTAINING VOLTAGE CHARACTERISTIC

Z700W

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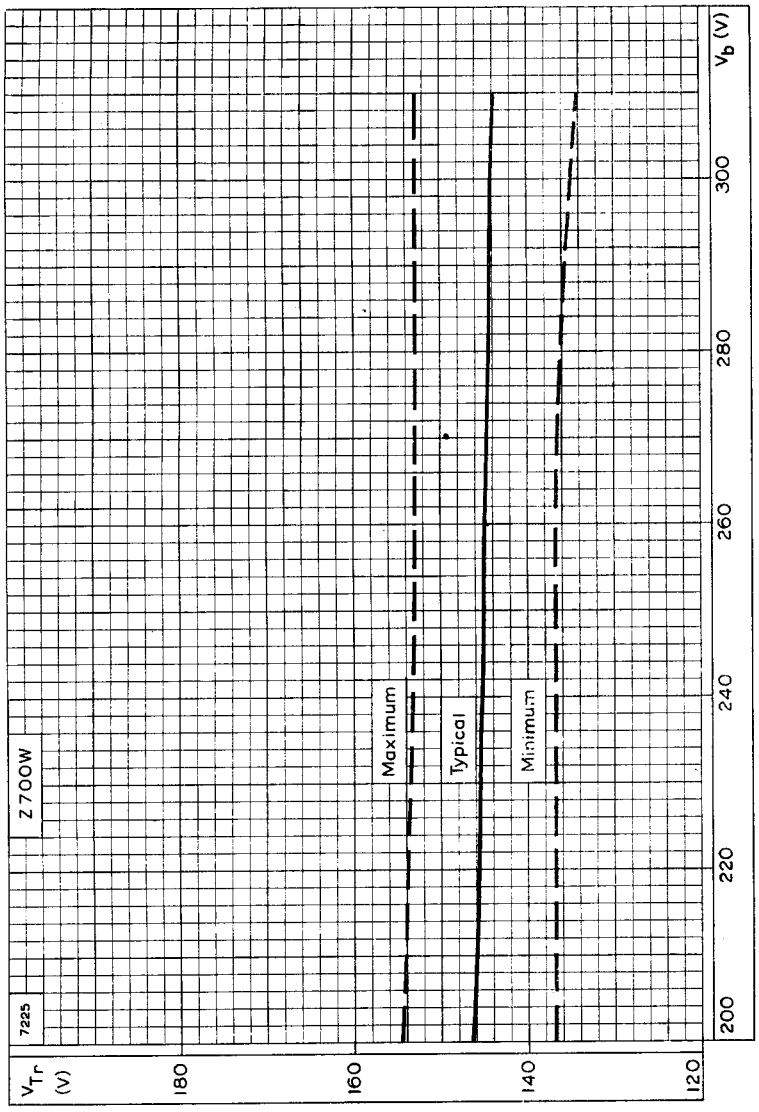
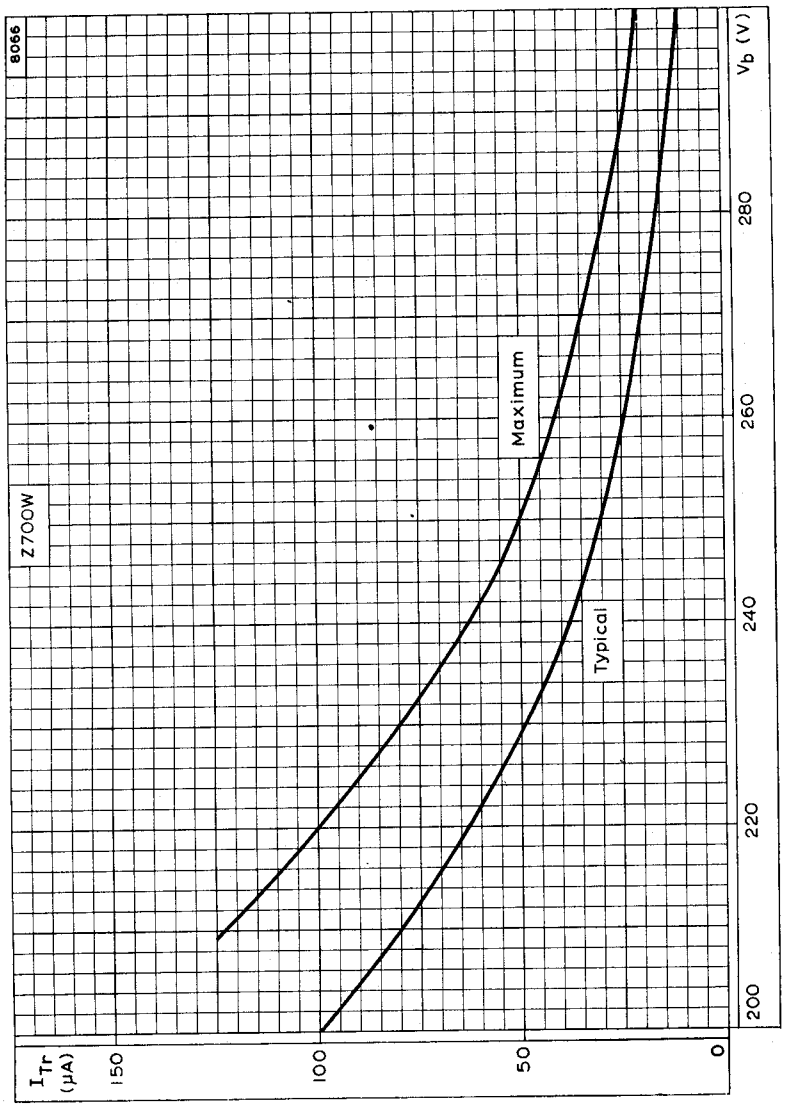


SPREAD OF TRIGGER IGNITION CHARACTERISTIC



SPREAD OF TRANSFER CHARACTERISTIC

Z700W

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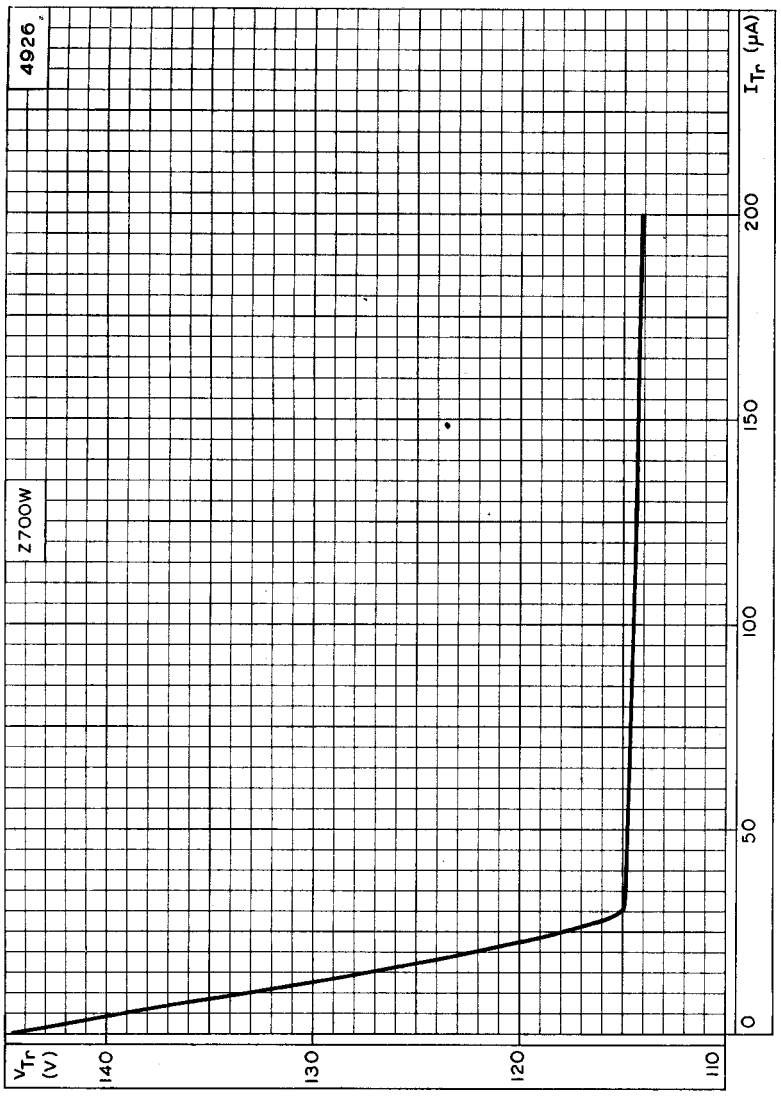

TYPICAL TRIGGER MAINTAINING VOLTAGE CHARACTERISTIC

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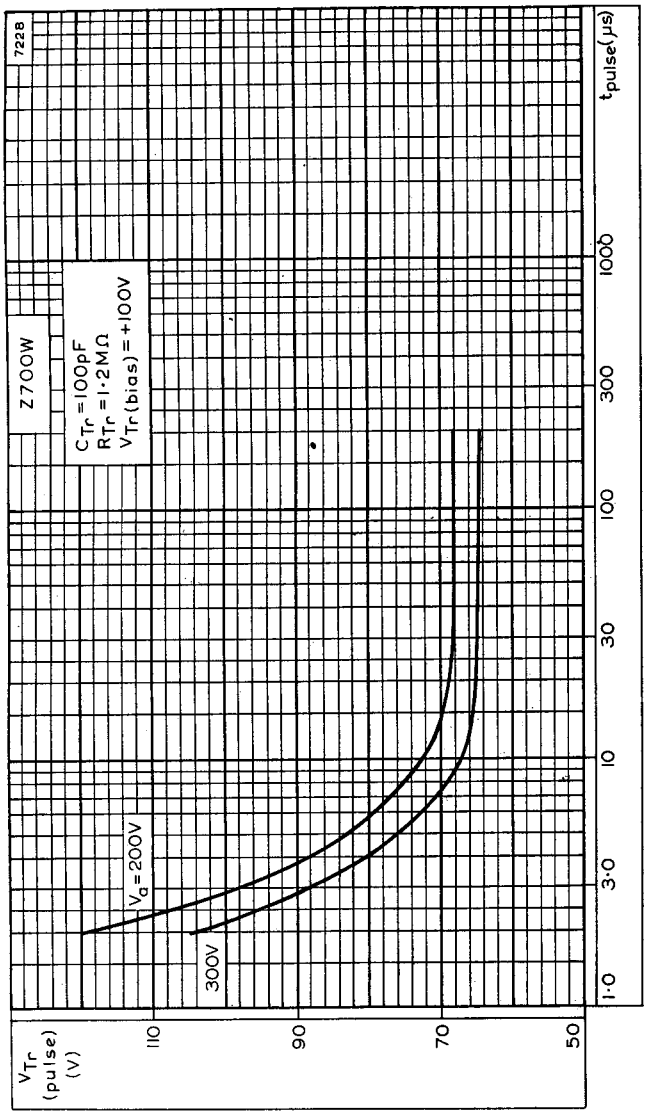
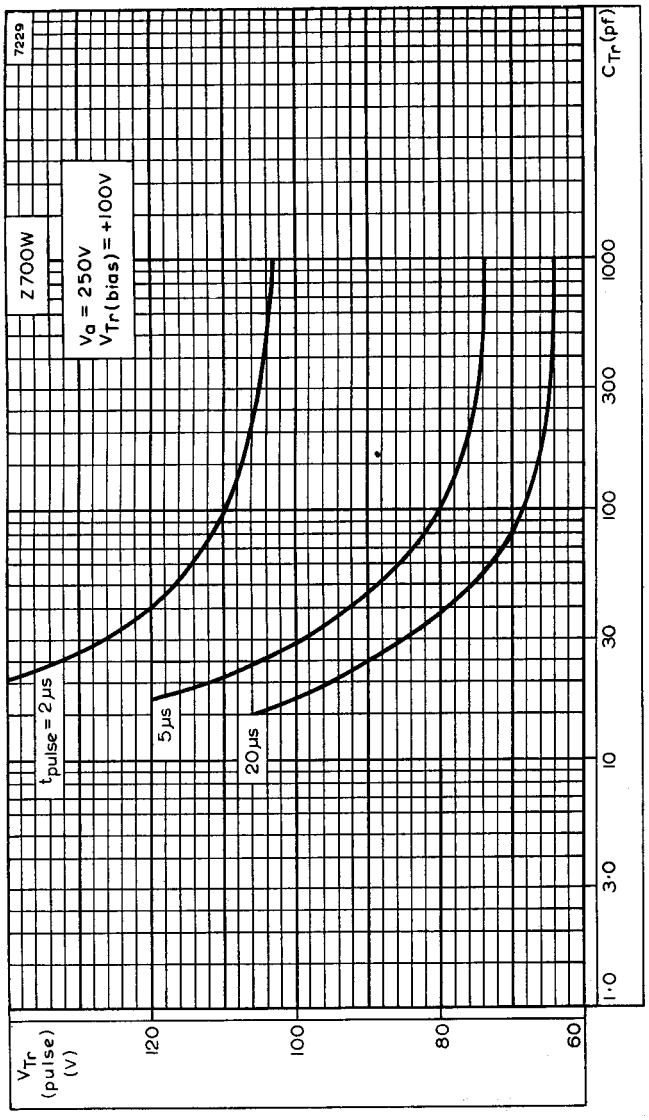


TYPICAL DYNAMIC TRIGGER IGNITION VOLTAGE CHARACTERISTICS



DYNAMIC TRIGGER IGNITION VOLTAGE AS A FUNCTION OF CAPACITANCE FOR RECTANGULAR PULSES