TRIGGER TUBE

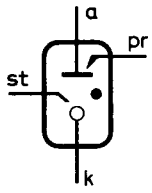
Ruggedized cold cathode trigger tube with pure molybdenum electrodes and very high light-output for use in e.g. shift registers for running-text displays.

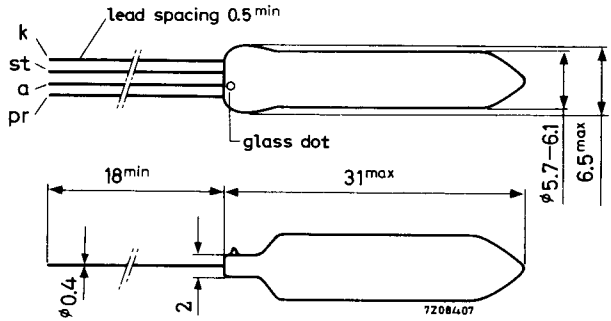
QUICK REFERENCE DATA			
Anode supply voltage	V_{b_a}	300	V
Anode maintaining voltage	V_{m_a}	136	V
Cathode current	I_k	2	mA
Starter to cathode ignition voltage	$V_{st_{ign}}$	180	V
Light output	approx.	0.3	lm

DIMENSIONS AND CONNECTIONS

Dimensions in mm

Glass dot indicates anode lead





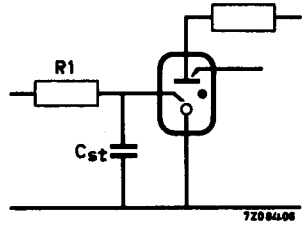
MOUNTING

1. Directly soldered connections to the leads must be at least 5 mm from glass and any bending of the leads must be at least 1.5 mm from the glass.
2. When soldering into the circuit the heat conducted to the glass should be kept to a minimum by the use of a thermal shunt on the leads.
3. The leads may be dip-soldered to minimum 5 mm from the glass at a solder temperature of 240 °C during maximum 10 s.
4. The primer and starter circuit resistors and capacitors should be mounted close to the tube.
5. The tube should not be mounted close to conductors or components which give rise to strong electrical fields.

CHARACTERISTIC RANGE VALUES FOR EQUIPMENT DESIGN

Valid over life and full temperature range unless otherwise stated.
The tube characteristics are independent of ambient light and assume the presence of a priming discharge.

PRIMING CONDITIONS			
Anode to primer supply voltage	$V_{ba\text{-}pr}$	> 265 V	1)
Typical max. ignition delay		0.3 s	
Anode to primer maintaining voltage	$V_{ma\text{-}pr}$	see page 5	
Primer current	I_{pr}	7.5 to 30 μA	
STAND-BY (main gap non-conducting)			
Anode to cathode voltage,			
positive	V_a	< 350 V	1)
negative	$-V_a$	< 100 V	
Anode to starter voltage,			
positive	$V_{a\text{-}st}$	< 350 V	1)
negative	$-V_{a\text{-}st}$	< 100 V	
Starter to cathode voltage to ensure non ignition,			
positive	V_{st}	< 165 V	
negative	$-V_{st}$	< 100 V	
Primer current	I_{pr}	< 30 μA	
IGNITION REQUIREMENTS			
a. D.C. triggering			
Anode to cathode voltage	V_a	> 265 V	1)
Starter to cathode voltage to ensure ignition	$V_{st_{ign}}$	> 200 V	
Starter to cathode capacitor to ensure transfer	C_{st}	> 1 nF	
Starter circuit charging resistance	R_1	> 0.5 MΩ	



b. Bias + pulse triggering

Anode to cathode voltage	V_a	> 265	> 220	V 1)
Starter coupling capacitor	C_{st}	> 1	> 1	nF
Starter to cathode voltage	V_{st}	> 200	> 220	V
Starter series resistance				
at C_{st} = 1 nF	R_{st}	< 3.3		kΩ
at C_{st} = 1.5 nF	R_{st}	< 10		kΩ
Pulse duration	T_p	> 40		μs

MAIN GAP CONDUCTING

Anode maintaining voltage	V_{m_a}	see page 6		
Cathode current range	I_k	1	to 3	mA

EXTINCTION REQUIREMENTS

Anode to cathode voltage at I_a = 3 mA	V_a	see page 7		
Anode to starter voltage at I_a = 3 mA	V_{a-st}	see page 7		

LIMITING VALUES (Absolute max. rating system)

Anode to cathode voltage, negative	$-V_a$	max.	100	V
Starter to cathode voltage, negative	$-V_{st}$	max.	100	V
Cathode current				
average during any conduction period	I_k	min.	1	mA
average (T_{av} = max. 20 ms)	I_k	max.	3	mA
peak	I_{k_p}	max.	10	mA 2)
Envelope temperature	t_{bulb}	max.	70	°C
	t_{bulb}	min.	-55	°C
Altitude	h	max.	20	km

LIFE EXPECTANCY

10 000 operating hours.
The tube is deemed to have reached its end of life when the anode to cathode maintaining voltage V_{m_a} has reached the maximum value indicated on page 6.

WAVELENGTH OF RADIATED LIGHT 580 to 700 nm

1) To avoid spurious ignition the rate of rise of applied anode voltage shall have a minimum time constant as given on page 7.

2) For higher values the manufacturer should be consulted.

ENVIRONMENTAL CONDITIONS

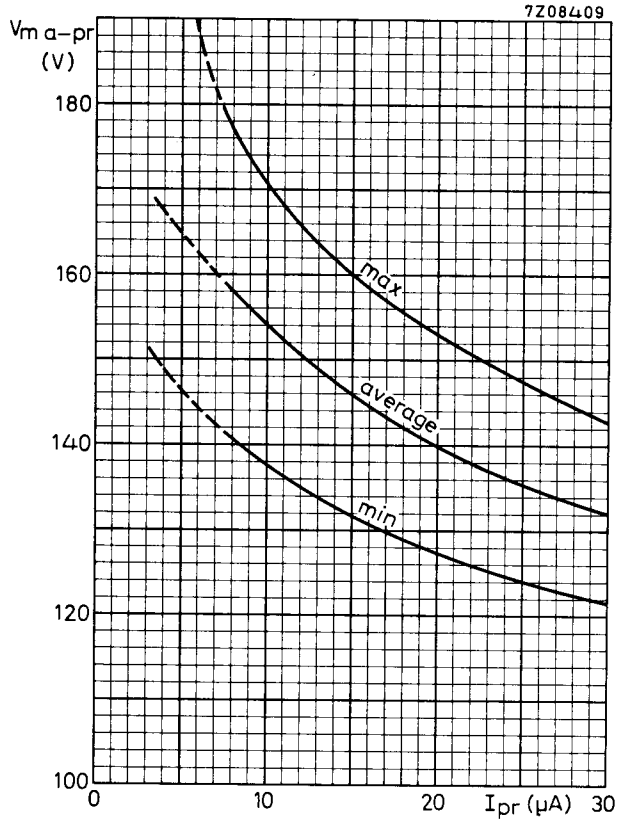
Vibration resistance

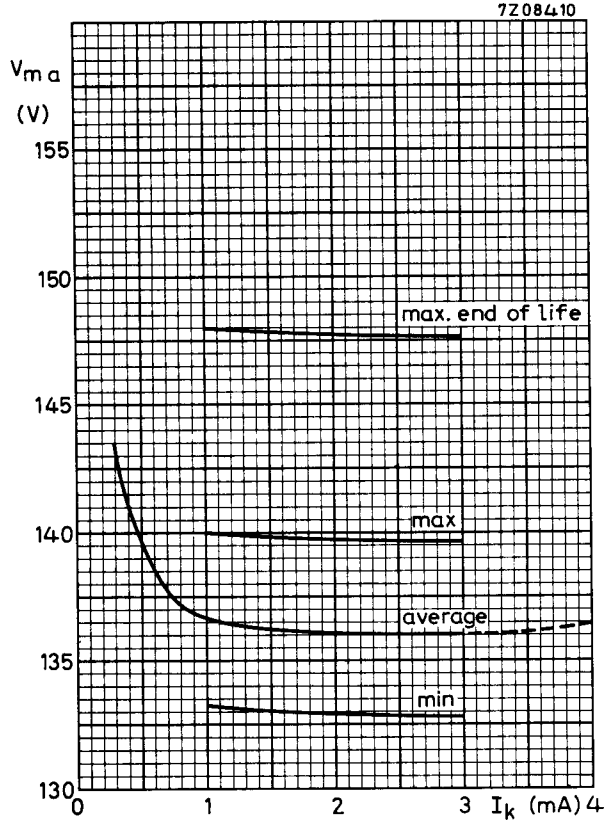
These conditions are solely used to assess the mechanical quality of the tube. The tube must not be continuously operated under these conditions.

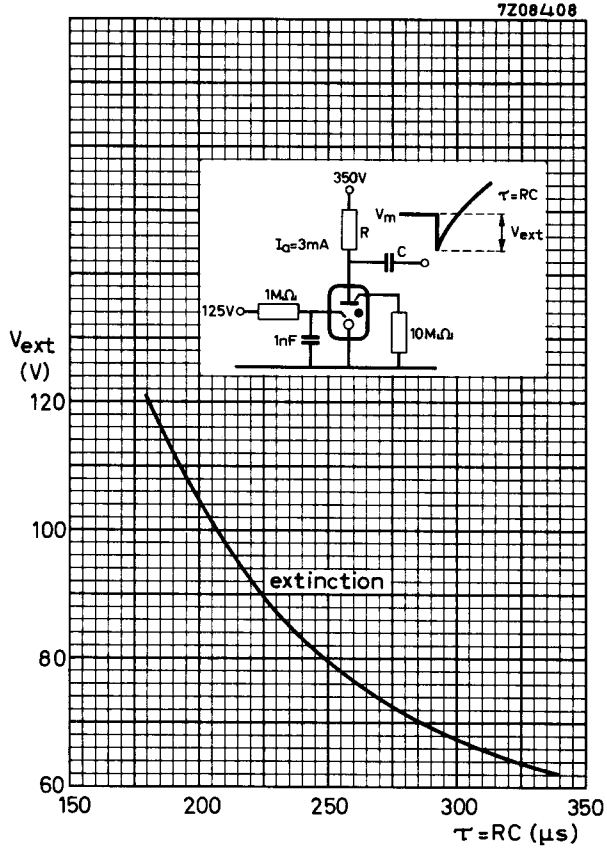
Vibration resistance 2.5 g_{peak}

Vibrational forces for a period of 32 hours at a frequency of 50 Hz in each of three directions.

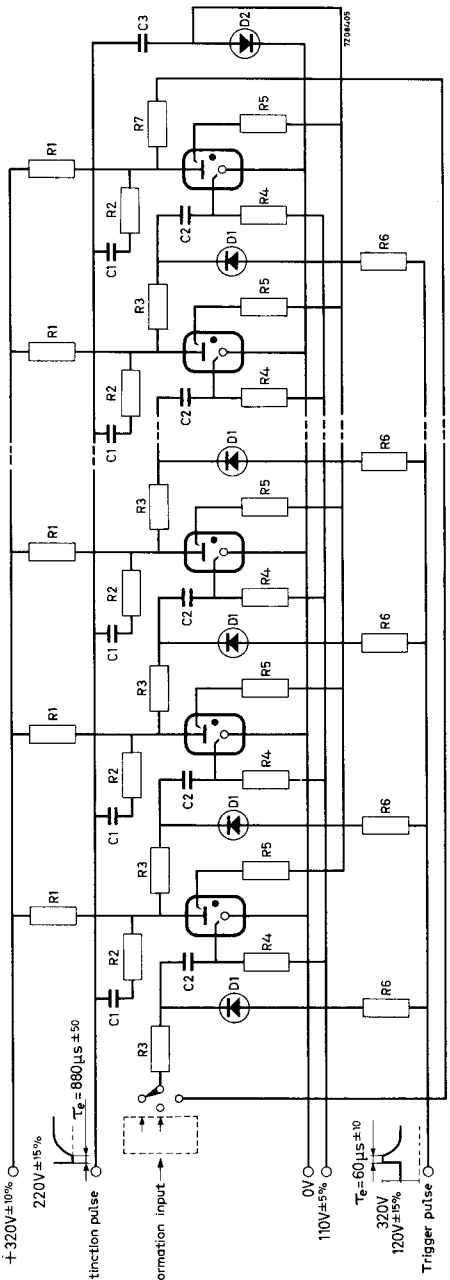
Data based on pilot-production tubes.


7Z08409
Vm a-pr
(V)
180
160
140
120
100
0
10
20
Ipr (μA)
30
max
average
min


7Z08410
$V_{m\,a}$
(V)
155
150
145
140
135
130
0
1
2
3
4
I_k (mA)
max. end of life
max
average
min


7Z08408
350V
R
V_m
τ=RC
V_{ext}
I_Q=3mA
C
1MΩ
125V
1nF
10MΩ
V_{ext} (V)
120
100
80
60
extinction
150
200
250
300
350
τ=RC (μs)

Application of the ZC1050 in a shift register



R1 = 82 kΩ 5% 0.5 W
R2 = 22 kΩ 5% 0.125 W
R3 = 1 MΩ 5% 0.25 W
R4 = 1 MΩ 5% 0.25 W
R5 = 10 MΩ 10% 0.125 W
R6 = 10 kΩ 5% 0.125 W
R7 = 10 kΩ 5% 0.25 W

C1 = 2.2 nF 10%
C2 = 2.2 nF 10%
C3 = 100 to 500 nF
D1 = BYX10
D2 = BYX10
V = Cold Cathode Trigger tube ZC1050
Max. shift frequency = 80 p.p.s.