DUAL 7-SEGMENT INDICATOR TUBE

suitable for direct drive with 30 V ICs

Long-life segmented dual cold-cathode gas-filled indicator tube in a flat envelope for in-line numeric display applications, such as in digital measuring equipment, clocks, cash registers, weighing machines etc. The tube is suitable for soldering into the circuit. Two or more tubes may be stacked horizontally.

QUICK REFERENCE DATA

Character height	15 mm
Characters	formed by 7 segments
Number of decades	2
Decimal point	to the lower right of the characters
Decade pitch (also for stacked tubes)	17,78 mm (0,7 in)

MECHANICAL DATA

Mounting position: any

The tube is provided with dual in-line tinned dip-solder pins for insertion in a printed-wiring board (e = 2,54 mm). It may also be plugged into a socket.

Mechanical strength

The robustness of the pins is tested according to IEC 68–2–21, test 3.4.2.1, method 1.

Soldering

The dip-solder pins may be soldered for 5 s in solder of max. 260 °C.

CHARACTERISTICS

Ignition voltage, first ignition, 25 lx	V_{ign}		<	165	V
Ignition delay, first ignition, V_{ba} = 165 V, 25 lx	T_d	typ.	<	1	s
Ignition voltage, subsequent ignitions within 10 ms	V_{ign}		<	145	V
Primed ignition voltage	$V_{ign\ pr}$		⩽	140	V *
Maintaining voltage			see graph		
Extinction voltage	V_{ext}		⩾	120	V
Luminous intensity per segment				10	mcd/mA

* Primed ignition voltage is the minimum anode to cathode voltage to ensure that any selected numeral (including decimal point) is completed after ignition of one segment.

LIMITING VALUES (Absolute maximum rating system)

		segments		decimal points		
Cathode current, d.c.	max.	0,7	max.	0,25	mA
	min.	0,25	min.	0,1	mA
Cathode current, peak	max.	3	max.	1,1	mA
$T_{imp} \geqslant 0{,}2$ ms	min.	0,35	min.	0,1	mA
Cathode current, mean T_{av} = max. 25 ms	max.	0,5	max.	0,2	mA
Voltage between any two segments and/or decimal points	max.	120			V
Voltage between screen and any other electrode (tube ignited)	max.	120			V
Ambient temperature	max.	100			°C *
	min.	−50			°C **

RECOMMENDED OPERATING CONDITIONS

If the tube is used within its limiting values and according to the conditions below, a high-quality display is obtained and interdigit discharges are prevented, even with the worst combination of parameters.

For many applications the worst parameter combination will not occur. In those cases the conditions recommended below may be changed which may result in a cheaper drive circuit. These changes should, however, only be made after consulting the tube manufacturer.

Static operation see Fig. 1

Anode supply voltage	V_{ba}	max.	350	V
		min.	165	V

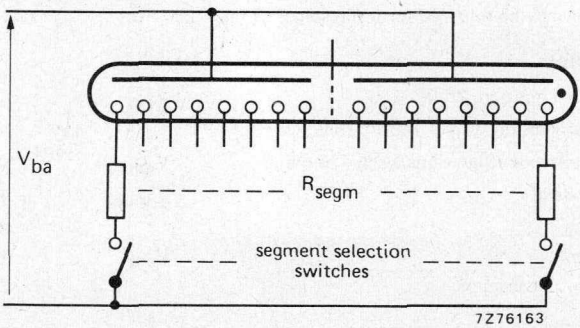


Fig. 1.

* Bulb temperatures above 70 °C result in changes in colour.

** Bulb temperatures below 10 °C result in a reduced life expectancy and changes in characteristics.

Dynamic operation see Fig. 2

Anode supply	V_{ba}	max.	185	V
		min.	165	V
Screen supply voltage ($R_{screen} < 10\ k\Omega$)	V_{bs}	max.	60	V
		min.	50	V
	$V_{ba\ off}$	max.	125	V
		min.	115	V

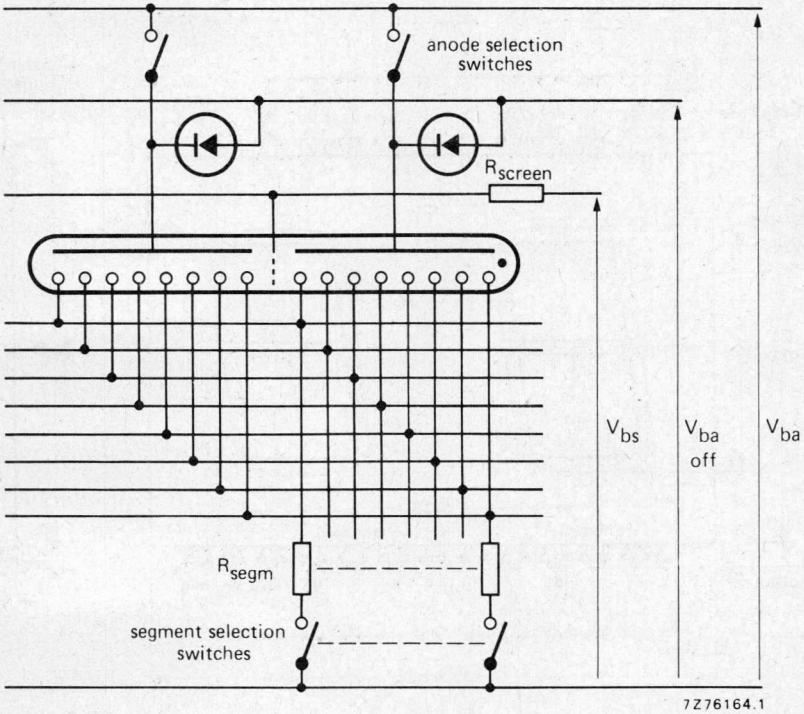


Fig. 2.

Shock and vibration

Samples are taken from the normal production line and are subjected to the following tests:

Shock: 50 g (peak), 1000 shocks in one of the three positions of the tube

Vibration: (–1) 2,5 g (peak), –50 Hz for 2 hours
(–2) 2,5 g (peak), –50 Hz for 96 hours (32 hours in each direction)

Acceptable quality level: 0,65

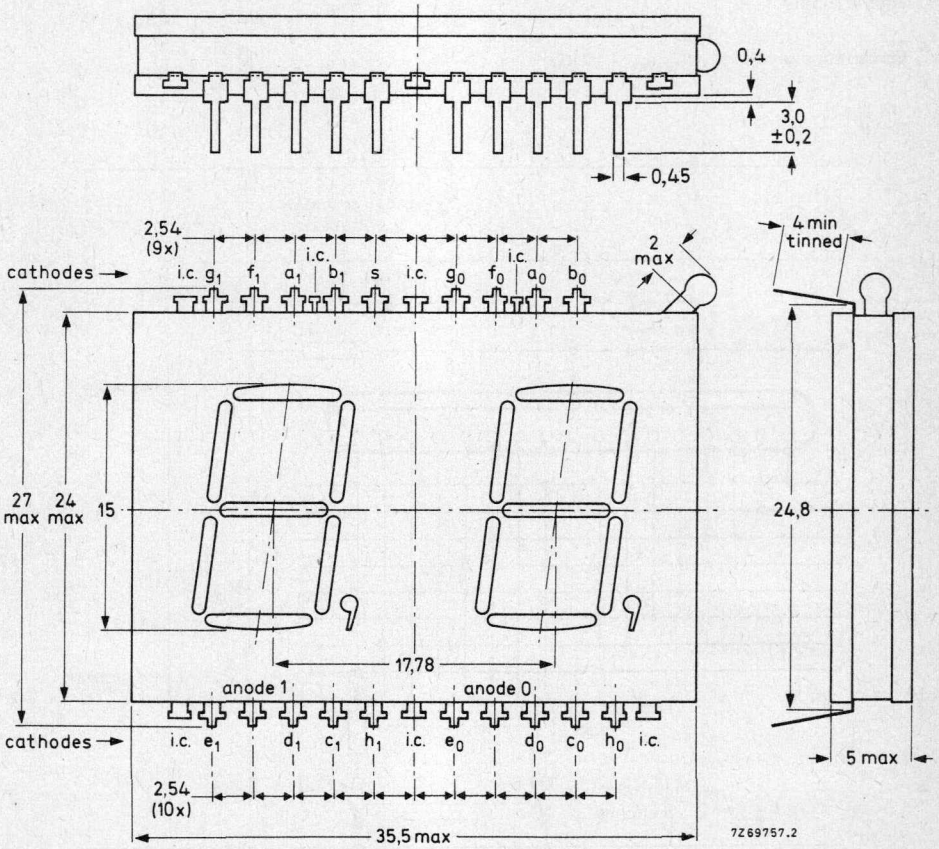
Life expectancy > 50 000 h at max. cathode current

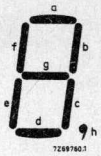
End of life is reached when: (1) the light output is 50% below the initial output, or (2) the min. cover current is 10% higher than the initial min. cover current.

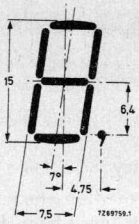
Life with respect to the min. cover current criterion may be reduced for segments not regularly activated. Please consult the manufacturer.

DIMENSIONS AND CONNECTIONS

Dimensions in mm







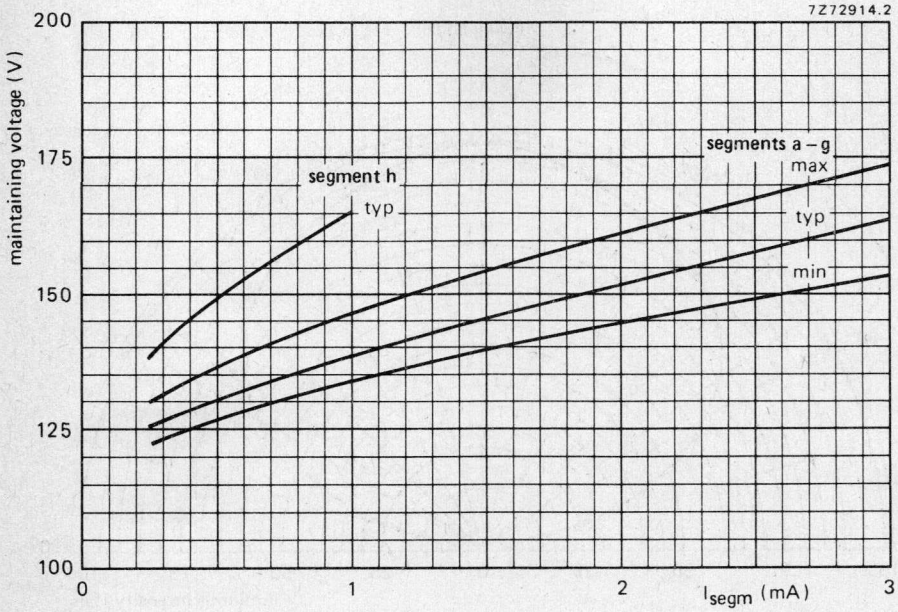


Fig. 4 Maintaining voltage as a function of segment current.

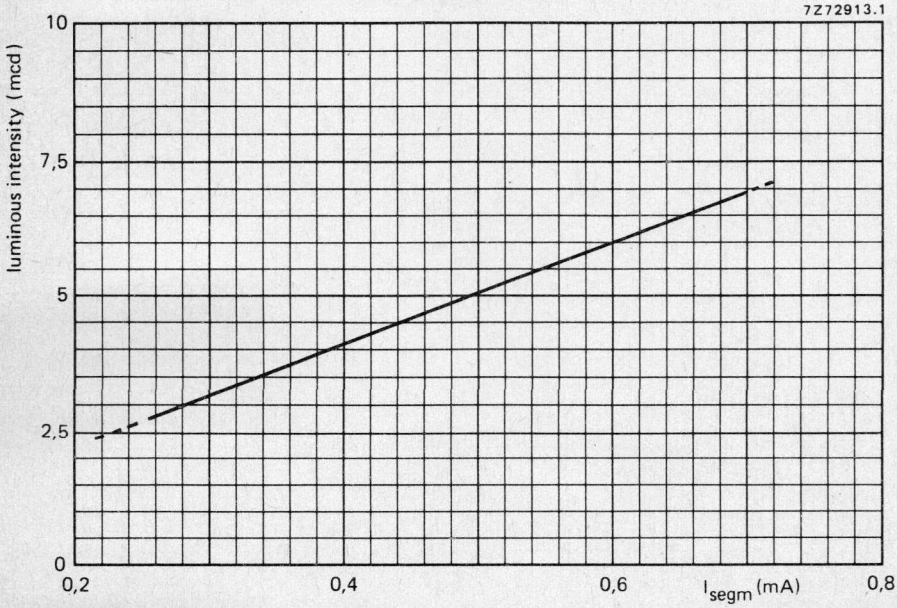


Fig. 5 Luminous intensity as a function of d.c. segment current.

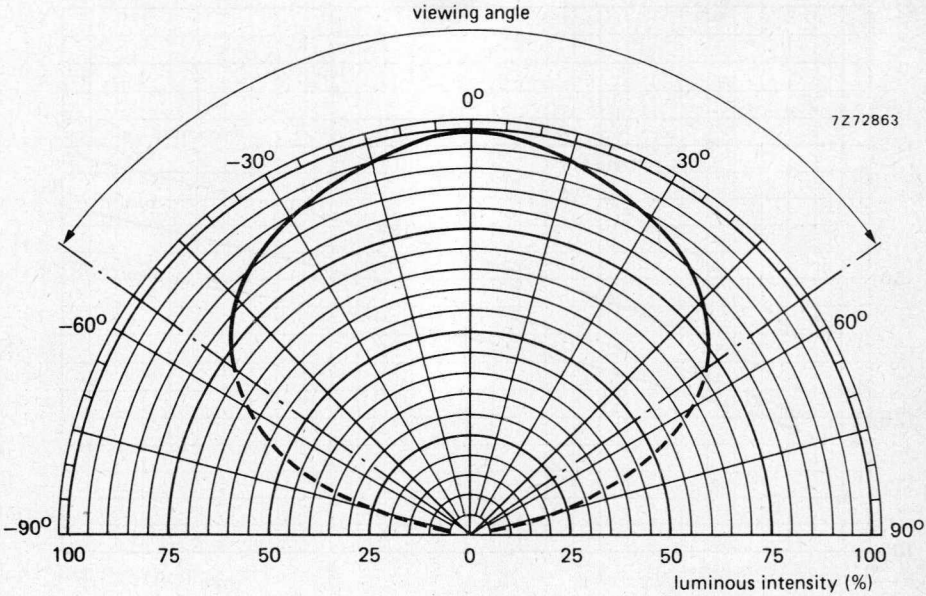


Fig. 6 Relative luminous intensity as a function of the direction of viewing.