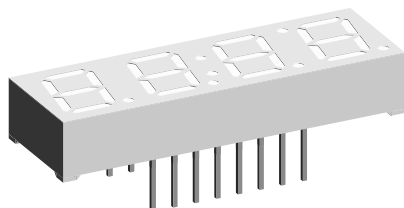


## Clock Display



16770

### DESCRIPTION

Four digit display, with 10 mm digit character size. Designed as clock display with active colon between digit two and three.

### FEATURES

- High efficient AlInGAP technology
- Dark surface, white segments
- Common anode (TDC.1050m)
- Common cathode (TDC.1060m)
- Multiplex mode
- Recommended viewing distance up to 7 m
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


RoHS  
COMPLIANT

### APPLICATIONS

- Clock modules for video/audio equipment, instrumentation, set top boxes

### PRODUCT GROUP AND PACKAGE DATA

- Product group: Display
- Package: 10 mm clock
- Product series: Standard
- Angle of half intensity:  $\pm 50^\circ$

### PARTS TABLE

| PART      | COLOR        | LUMINOUS INTENSITY ( $\mu\text{cd}$ ) |      |      | at $I_F$ (mA) | WAVELENGTH (nm) |      |      | at $I_F$ (mA) | FORWARD VOLTAGE (V) |      |      | at $I_F$ (mA) | CIRCUITRY      |
|-----------|--------------|---------------------------------------|------|------|---------------|-----------------|------|------|---------------|---------------------|------|------|---------------|----------------|
|           |              | MIN.                                  | TYP. | MAX. |               | MIN.            | TYP. | MAX. |               | MIN.                | TYP. | MAX. |               |                |
| TDCG1050m | Green        | 2800                                  | 4000 | -    | 10            | 562             | 573  | 575  | 20            | -                   | 2    | 2.4  | 20            | Common anode   |
| TDCG1060m | Green        | 2800                                  | 4000 | -    | 10            | 562             | 573  | 575  | 20            | -                   | 2    | 2.4  | 20            | Common cathode |
| TDCR1050m | Red          | 4000                                  | 6000 | -    | 10            | -               | 631  | -    | 20            | -                   | 2    | 2.4  | 20            | Common anode   |
| TDCR1060m | Red          | 4000                                  | 6000 | -    | 10            | -               | 631  | -    | 20            | -                   | 2    | 2.4  | 20            | Common cathode |
| TDCY1050m | Super yellow | 4000                                  | 8000 | -    | 10            | -               | 589  | -    | 20            | -                   | 2    | 2.4  | 20            | Common anode   |
| TDCY1060m | Super yellow | 4000                                  | 8000 | -    | 10            | -               | 589  | -    | 20            | -                   | 2    | 2.4  | 20            | Common cathode |

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified)

#### TDCG1050m, TDCG1060m, TDCR1050m, TDCR1060m, TDCY1050m, TDCY1060m

| PARAMETER                        | TEST CONDITION     | SYMBOL    | VALUE         | UNIT             |
|----------------------------------|--------------------|-----------|---------------|------------------|
| Reverse voltage per segment      |                    | $V_R$     | 5             | V                |
| DC forward current per segment   |                    | $I_F$     | 25            | mA               |
| Peak forward current per segment | Duty 1/10 at 1 kHz | $I_{FM}$  | 160           | mA               |
| Power dissipation                |                    | $P_V$     | 60            | mW               |
| Operating temperature range      |                    | $T_{amb}$ | - 40 to + 85  | $^\circ\text{C}$ |
| Storage temperature range        |                    | $T_{stg}$ | - 40 to + 100 | $^\circ\text{C}$ |
| Soldering temperature            |                    | $T_{sd}$  | $260 \pm 5$   | $^\circ\text{C}$ |

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**TDCG1050m, TDCG1060m, GREEN**

| PARAMETER                                     | TEST CONDITION       | PART                    | SYMBOL          | MIN. | TYP. | MAX. | UNIT           |
|---|----------------------|-------------------------|-----------------|------|------|------|----------------|
| Luminous intensity per segment <sup>(1)</sup> | $I_F = 2\text{ mA}$  | TDCG1050m               | $I_V$           | -    | 1000 | -    | $\mu\text{cd}$ |
|   |                      | TDCG1060m               |                 |      |      |      |                |
|   | $I_F = 10\text{ mA}$ | TDCG1050m               | $I_V$           | 2800 | 4000 | -    | $\mu\text{cd}$ |
|   |                      | TDCG1060m               |                 |      |      |      |                |
| Luminous intensity of colon                   | $I_F = 2\text{ mA}$  | TDCG1050m               | $I_V$           | -    | 200  | -    | $\mu\text{cd}$ |
|   |                      | TDCG1060m               |                 |      |      |      |                |
|   | $I_F = 10\text{ mA}$ | TDCG1050m               | $I_V$           | 500  | 1200 | -    | $\mu\text{cd}$ |
|   |                      | TDCG1060m               |                 |      |      |      |                |
| Dominant wavelength                           | $I_F = 20\text{ mA}$ | TDCG1050m,<br>TDCG1060m | $\lambda_d$     | 562  | 573  | 575  | nm             |
| Peak wavelength                               | $I_F = 20\text{ mA}$ |                         | $\lambda_p$     | -    | 575  | -    | nm             |
| Spectral bandwidth                            | $I_F = 20\text{ mA}$ |                         | $\Delta\lambda$ | -    | 20   | -    | nm             |
| Forward voltage per segment or DP             | $I_F = 20\text{ mA}$ |                         | $V_F$           | -    | 2    | 2.4  | V              |
| Reverse current per segment or DP             | $V_R = 5\text{ V}$   |                         | $I_R$           | -    | -    | 10   | $\mu\text{A}$  |

**Note**

<sup>(1)</sup>  $I_{Vmin.}$  and  $I_V$  groups are mean values of all segments (a to g, D1 to D4), matching factor within segments is  $\geq 0.5$ , excluding decimal points and colon.

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**TDCR1050m, TDCR1060m, RED**

| PARAMETER                                     | TEST CONDITION       | PART                    | SYMBOL          | MIN. | TYP. | MAX. | UNIT           |
|---|----------------------|-------------------------|-----------------|------|------|------|----------------|
| Luminous intensity per segment <sup>(1)</sup> | $I_F = 2\text{ mA}$  | TDCR1050m               | $I_V$           | -    | 1500 | -    | $\mu\text{cd}$ |
|   |                      | TDCR1060m               |                 |      |      |      |                |
|   | $I_F = 10\text{ mA}$ | TDCR1050m               | $I_V$           | 4000 | 6000 | -    | $\mu\text{cd}$ |
|   |                      | TDCR1060m               |                 |      |      |      |                |
| Luminous intensity of colon                   | $I_F = 2\text{ mA}$  | TDCR1050m               | $I_V$           | -    | 400  | -    | $\mu\text{cd}$ |
|   |                      | TDCR1060m               |                 |      |      |      |                |
|   | $I_F = 10\text{ mA}$ | TDCR1050m               | $I_V$           | 500  | 800  | -    | $\mu\text{cd}$ |
|   |                      | TDCR1060m               |                 |      |      |      |                |
| Dominant wavelength                           | $I_F = 20\text{ mA}$ | TDCR1050m,<br>TDCR1060m | $\lambda_d$     | -    | 631  | -    | nm             |
| Peak wavelength                               | $I_F = 20\text{ mA}$ |                         | $\lambda_p$     | -    | 639  | -    | nm             |
| Spectral bandwidth                            | $I_F = 20\text{ mA}$ |                         | $\Delta\lambda$ | -    | 20   | -    | nm             |
| Forward voltage per segment or DP             | $I_F = 20\text{ mA}$ |                         | $V_F$           | -    | 2    | 2.4  | V              |
| Reverse current per segment or DP             | $V_R = 5\text{ V}$   |                         | $I_R$           | -    | -    | 10   | $\mu\text{A}$  |

**Note**

<sup>(1)</sup>  $I_{Vmin.}$  and  $I_V$  groups are mean values of all segments (a to g, D1 to D4), matching factor within segments is  $\geq 0.5$ , excluding decimal points and colon.



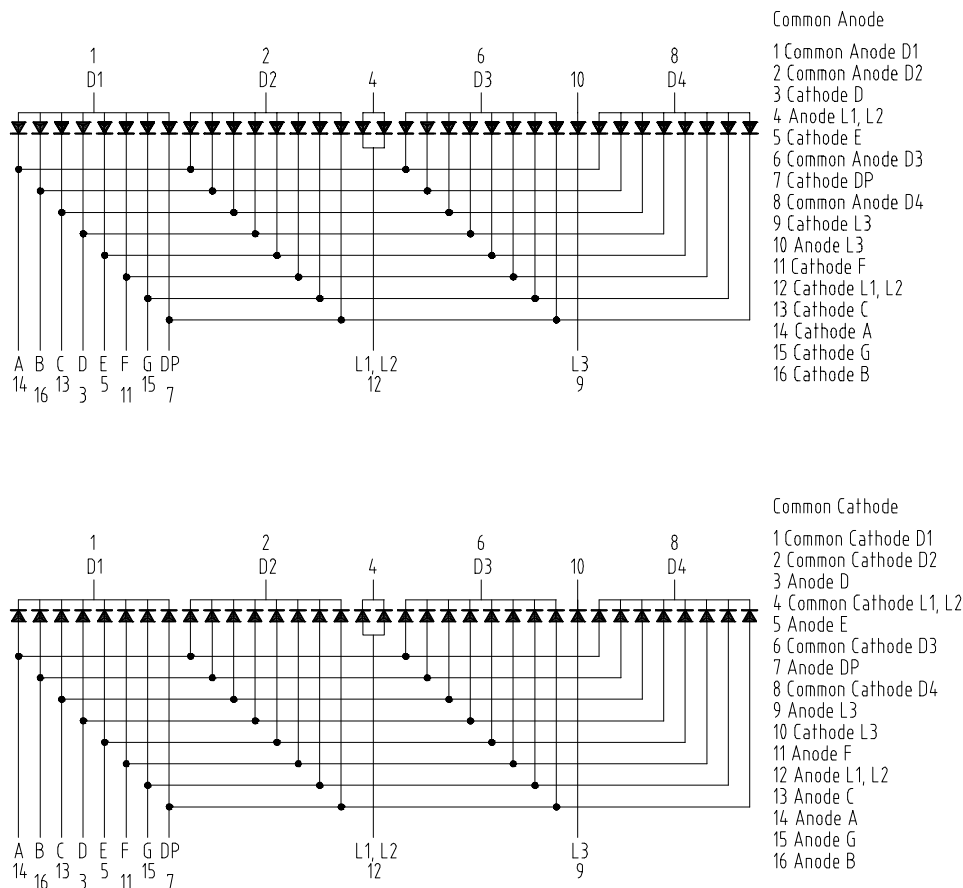
## OPTICAL AND ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) TDCY1050m, TDCY1060m, SUPER YELLOW

| PARAMETER                                     | TEST CONDITION       | PART                    | SYMBOL          | MIN. | TYP. | MAX. | UNIT           |
|---|----------------------|-------------------------|-----------------|------|------|------|----------------|
| Luminous intensity per segment <sup>(1)</sup> | $I_F = 2\text{ mA}$  | TDCY1050m               | $I_V$           | -    | 1500 | -    | $\mu\text{cd}$ |
|   |                      | TDCY1060m               |                 |      |      |      |                |
|   | $I_F = 10\text{ mA}$ | TDCY1050m               | $I_V$           | 4000 | 8000 | -    | $\mu\text{cd}$ |
|   |                      | TDCY1060m               |                 |      |      |      |                |
| Luminous intensity of colon                   | $I_F = 2\text{ mA}$  | TDCY1050m               | $I_V$           | -    | 400  | -    | $\mu\text{cd}$ |
|   |                      | TDCY1060m               |                 |      |      |      |                |
|   | $I_F = 10\text{ mA}$ | TDCY1050m               | $I_V$           | 500  | 1000 | -    | $\mu\text{cd}$ |
|   |                      | TDCY1060m               |                 |      |      |      |                |
| Dominant wavelength                           | $I_F = 20\text{ mA}$ | TDCY1050m,<br>TDCY1060m | $\lambda_d$     | -    | 589  | -    | nm             |
| Peak wavelength                               | $I_F = 20\text{ mA}$ |                         | $\lambda_p$     | -    | 591  | -    | nm             |
| Spectral bandwidth                            | $I_F = 20\text{ mA}$ |                         | $\Delta\lambda$ | -    | 15   | -    | nm             |
| Forward voltage per segment or DP             | $I_F = 20\text{ mA}$ |                         | $V_F$           | -    | 2    | 2.4  | V              |
| Reverse current per segment or DP             | $V_R = 5\text{ V}$   |                         | $I_R$           | -    | -    | 10   | $\mu\text{A}$  |

### Note

<sup>(1)</sup>  $I_{Vmin.}$  and  $I_V$  groups are mean values of all segments (a to g, D1 to D4), matching factor within segments is  $\geq 0.5$ , excluding decimal points and colon.

### PINNING



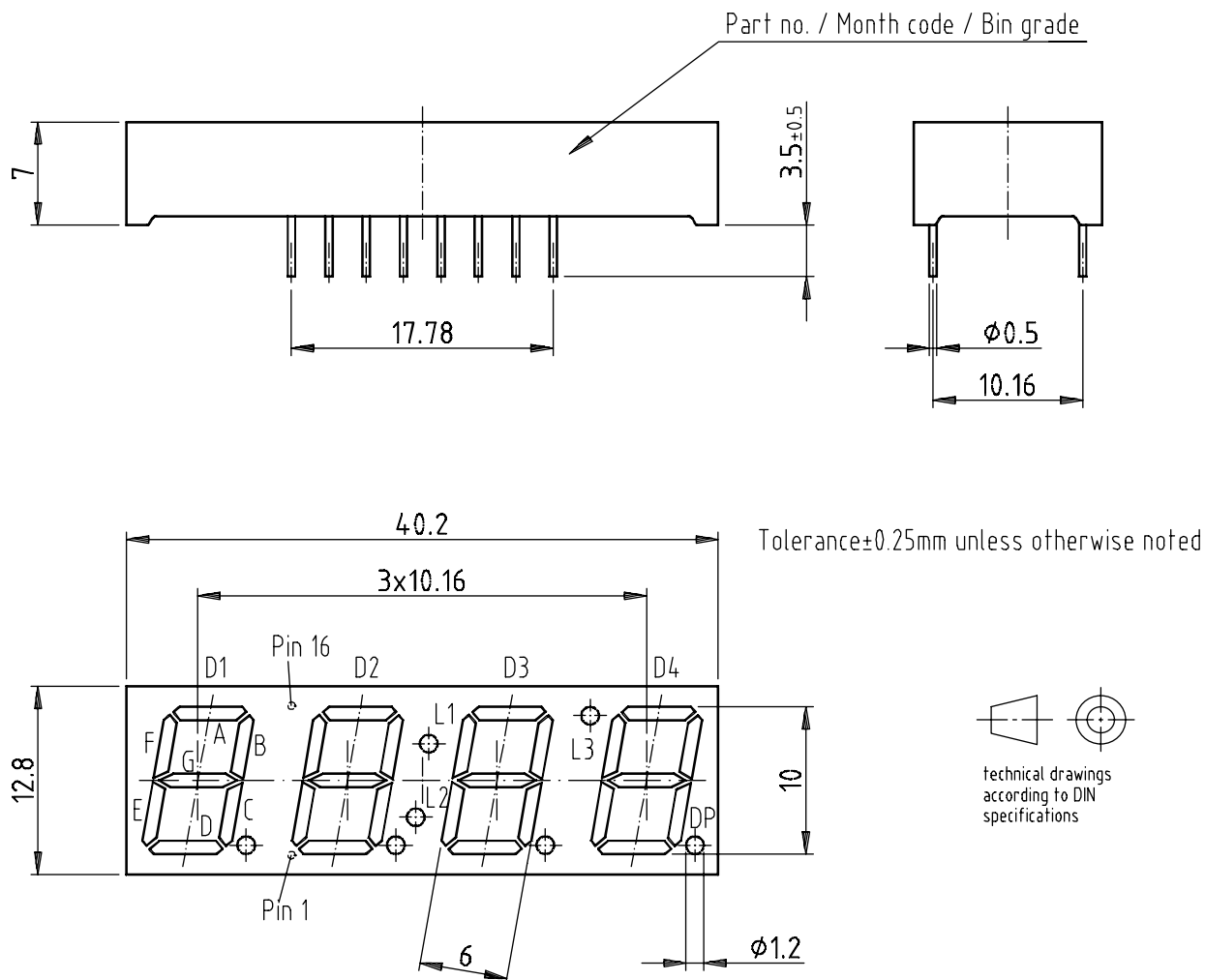
Drawing-No.: 6.544-5332.01-4 Bl. 2

Issue: 1; 20.02.02

16715



## PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.544-5332.01-4 Bl. 1

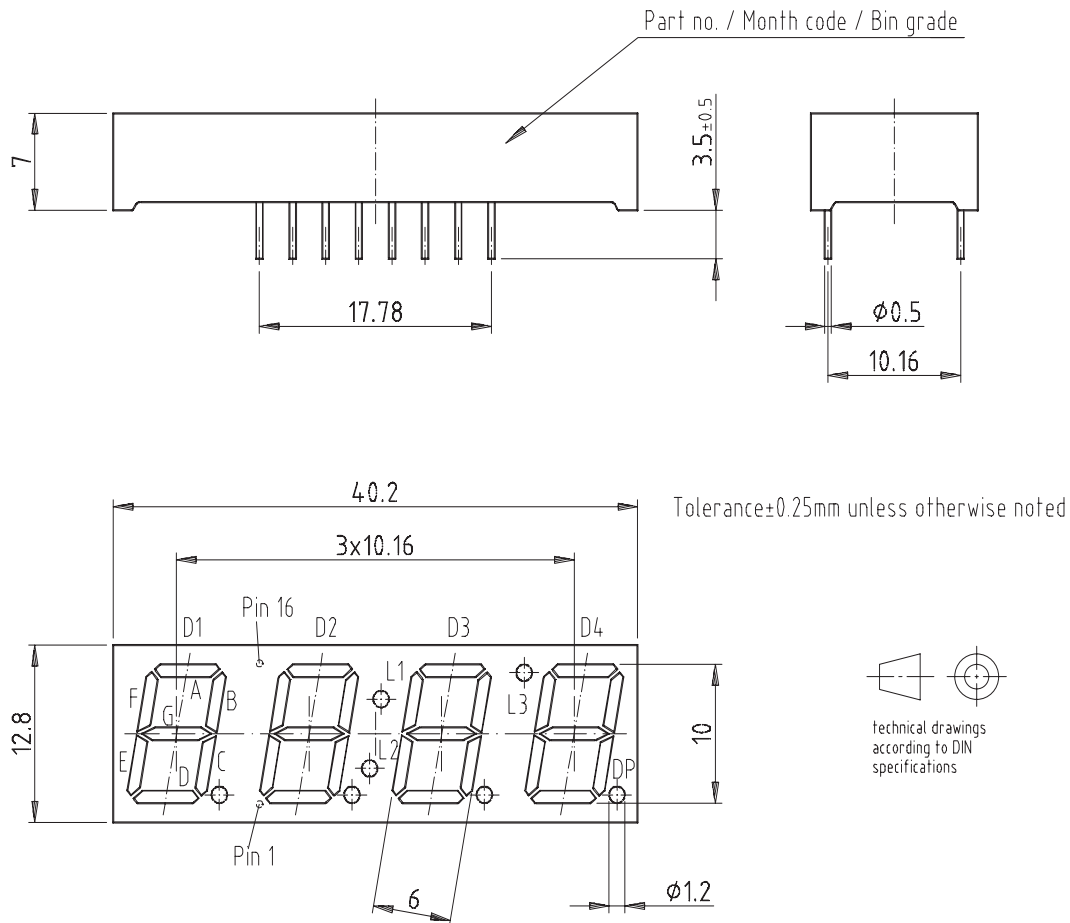
Issue: 3; 27.02.02

16764



## Display-10 mm Clock Multiplex

### Package Dimensions in mm



Drawing-No.: 6.544-5332.01-4 Bl. 1

Issue: 3; 27.02.02

16764



## Ozone Depleting Substances Policy Statement

It is the policy of **Vishay Semiconductor GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

**Vishay Semiconductor GmbH** has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

**Vishay Semiconductor GmbH** can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

**We reserve the right to make changes to improve technical design  
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