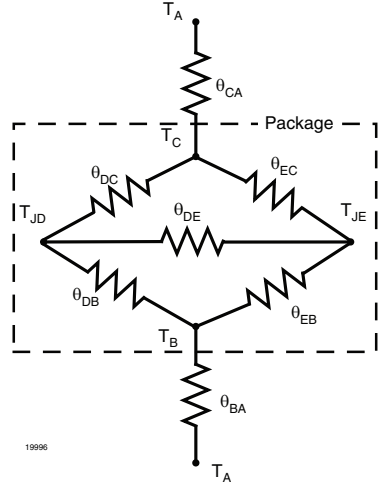




| <b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                      |            |             |                    |
|--|--------------------------------------|------------|-------------|--------------------|
| PARAMETER  | TEST CONDITION                       | SYMBOL     | VALUE       | UNIT               |
| <b>INPUT</b>   |                                      |            |             |                    |
| Reverse voltage  |                                      | $V_R$      | 6           | V                  |
| Forward current  |                                      | $I_F$      | 60          | mA                 |
| Forward surge current  | $t_p \leq 10\text{ }\mu\text{s}$     | $I_{FSM}$  | 1.5         | A                  |
| <b>OUTPUT</b>  |                                      |            |             |                    |
| Collector emitter voltage  |                                      | $V_{CEO}$  | 70          | V                  |
| Emitter collector voltage  |                                      | $V_{ECO}$  | 7           | V                  |
| Collector current  |                                      | $I_C$      | 50          | mA                 |
| Collector peak current   | $t_p/T = 0.5, t_p \leq 10\text{ ms}$ | $I_{CM}$   | 100         | mA                 |
| <b>COUPLER</b>   |                                      |            |             |                    |
| Isolation test voltage (RMS)   | $t = 1\text{ min}$                   | $V_{ISO}$  | 5000        | $V_{RMS}$          |
| Operating ambient temperature range  |                                      | $T_{amb}$  | -40 to +100 | $^{\circ}\text{C}$ |
| Storage temperature range  |                                      | $T_{stg}$  | -55 to +125 | $^{\circ}\text{C}$ |
| Soldering temperature <sup>(1)</sup>   | 2 mm from case, $\leq 10\text{ s}$   | $T_{slid}$ | 260         | $^{\circ}\text{C}$ |

**Notes**

- Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability
- <sup>(1)</sup> Refer to wave profile for soldering conditions for through hole devices

| <b>THERMAL CHARACTERISTICS</b>                            |               |       |                             |   |
|---|---------------|-------|-----------------------------|---|
| PARAMETER   | SYMBOL        | VALUE | UNIT                        |   |
| LED power dissipation                                     | $P_{diss}$    | 100   | mW                          |  |
| Output power dissipation                                  | $P_{diss}$    | 150   | mW                          |   |
| Maximum LED junction temperature                          | $T_{jmax.}$   | 125   | $^{\circ}\text{C}$          |   |
| Maximum output die junction temperature                   | $T_{jmax.}$   | 125   | $^{\circ}\text{C}$          |   |
| Thermal resistance, junction emitter to board             | $\theta_{EB}$ | 173   | $^{\circ}\text{C}/\text{W}$ |   |
| Thermal resistance, junction emitter to case              | $\theta_{EC}$ | 149   | $^{\circ}\text{C}/\text{W}$ |   |
| Thermal resistance, junction detector to board            | $\theta_{DB}$ | 111   | $^{\circ}\text{C}/\text{W}$ |   |
| Thermal resistance, junction detector to case             | $\theta_{DC}$ | 127   | $^{\circ}\text{C}/\text{W}$ |   |
| Thermal resistance, junction emitter to junction detector | $\theta_{ED}$ | 173   | $^{\circ}\text{C}/\text{W}$ |   |
| Thermal resistance, board to ambient <sup>(1)</sup>       | $\theta_{BA}$ | 197   | $^{\circ}\text{C}/\text{W}$ |   |
| Thermal resistance, case to ambient <sup>(1)</sup>        | $\theta_{CA}$ | 4041  | $^{\circ}\text{C}/\text{W}$ |   |

**Notes**

- The thermal model is represented in the thermal network below. Each resistance value given in this model can be used to calculate the temperatures at each node for a given operating condition. The thermal resistance from board to ambient will be dependent on the type of PCB, layout and thickness of copper traces. For a detailed explanation of the thermal model, please reference Vishay's "Thermal Characteristics of Optocouplers" application note
- <sup>(1)</sup> For 2 layer FR4 board (4" x 3" x 0.062")



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |  |             |      |      |      |      |
|--|--|-------------|------|------|------|------|
| PARAMETER  | TEST CONDITION   | SYMBOL      | MIN. | TYP. | MAX. | UNIT |
| <b>INPUT</b>   |  |             |      |      |      |      |
| Forward voltage  | $I_F = 50\text{ mA}$   | $V_F$       | -    | 1.25 | 1.6  | V    |
| Junction capacitance   | $V_R = 0, f = 1\text{ MHz}$  | $C_j$       | -    | 50   | -    | pF   |
| <b>OUTPUT</b>  |  |             |      |      |      |      |
| Collector emitter voltage  | $I_C = 1\text{ mA}$  | $V_{CEO}$   | 70   | -    | -    | V    |
| Emitter collector voltage  | $I_E = 100\text{ }\mu\text{A}$                                     | $V_{ECO}$   | 7    | -    | -    | V    |
| Collector emitter cut-off current  | $V_{CE} = 20\text{ V}, I_F = 0\text{ A}, E = 0$                    | $I_{CEO}$   | -    | 10   | 100  | nA   |
| <b>COUPLER</b>   |  |             |      |      |      |      |
| Collector emitter saturation voltage   | $I_F = 10\text{ mA}, I_C = 1\text{ mA}$                            | $V_{CEsat}$ | -    | -    | 0.3  | V    |
| Cut-off frequency  | $V_{CE} = 5\text{ V}, I_F = 10\text{ mA}, R_L = 100\text{ }\Omega$ | $f_c$       | -    | 110  | -    | kHz  |
| Coupling capacitance   | $f = 1\text{ MHz}$   | $C_k$       | -    | 0.3  | -    | pF   |

**Note**

- Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements

| <b>CURRENT TRANSFER RATIO</b> |   |                     |        |      |      |      |      |
|-------------------------------|---|---------------------|--------|------|------|------|------|
| PARAMETER                     | TEST CONDITION                            | PART                | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| $I_C/I_F$                     | $V_{CE} = 5\text{ V}, I_F = 1\text{ mA}$  | TCET1101G           | CTR    | 13   | 30   | -    | %    |
|                               |   | TCET1102, TCET1102G | CTR    | 22   | 45   | -    | %    |
|                               |   | TCET1103, TCET1103G | CTR    | 34   | 70   | -    | %    |
|                               |   | TCET1104G           | CTR    | 56   | 90   | -    | %    |
|                               | $V_{CE} = 5\text{ V}, I_F = 5\text{ mA}$  | TCET1100, TCET1100G | CTR    | 50   | -    | 600  | %    |
|                               |   | TCET1106, TCET1106G | CTR    | 100  | -    | 300  | %    |
|                               |   | TCET1107, TCET1107G | CTR    | 80   | -    | 160  | %    |
|                               |   | TCET1108, TCET1108G | CTR    | 130  | -    | 260  | %    |
|                               |   | TCET1109, TCET1109G | CTR    | 200  | -    | 400  | %    |
|                               | $V_{CE} = 5\text{ V}, I_F = 10\text{ mA}$ | TCET1101, TCET1101G | CTR    | 40   | -    | 80   | %    |
|                               |   | TCET1102, TCET1102G | CTR    | 63   | -    | 125  | %    |
|                               |   | TCET1103, TCET1103G | CTR    | 100  | -    | 200  | %    |
|                               |   | TCET1104, TCET1104G | CTR    | 160  | -    | 320  | %    |

| MAXIMUM SAFETY RATINGS |                |            |      |      |      |      |
|------------------------|----------------|------------|------|------|------|------|
| PARAMETER              | TEST CONDITION | SYMBOL     | MIN. | TYP. | MAX. | UNIT |
| <b>INPUT</b>           |                |            |      |      |      |      |
| Forward current        |                | $I_F$      | -    | -    | 130  | mA   |
| <b>OUTPUT</b>          |                |            |      |      |      |      |
| Power dissipation      |                | $P_{diss}$ | -    | -    | 265  | mW   |
| <b>COUPLER</b>         |                |            |      |      |      |      |
| Rated impulse voltage  |                | $V_{IOTM}$ | -    | -    | 6    | kV   |
| Safety temperature     |                | $T_{si}$   | -    | -    | 150  | °C   |

**Note**

- According to DIN EN 60747-5-5 (see figure 2). This optocoupler is suitable for safe electrical isolation only within the safety ratings. Compliance with the safety ratings shall be ensured by means of suitable protective circuits

| INSULATION RATED PARAMETERS                             |   |            |           |      |      |          |
|---|---|------------|-----------|------|------|----------|
| PARAMETER   | TEST CONDITION  | SYMBOL     | MIN.      | TYP. | MAX. | UNIT     |
| Partial discharge test voltage - routine test           | 100 %, $t_{test} = 1$ s                                       | $V_{pd}$   | 1.6       | -    | -    | kV       |
| Partial discharge test voltage - lot test (sample test) | $t_{Tr} = 60$ s, $t_{test} = 10$ s, (see figure 2)            | $V_{IOTM}$ | 6         | -    | -    | kV       |
|   |   | $V_{pd}$   | 1.3       | -    | -    | kV       |
| Insulation resistance                                   | $V_{IO} = 500$ V  | $R_{IO}$   | $10^{12}$ | -    | -    | $\Omega$ |
|   | $V_{IO} = 500$ V, $T_{amb} = 100$ °C                          | $R_{IO}$   | $10^{11}$ | -    | -    | $\Omega$ |
|   | $V_{IO} = 500$ V, $T_{amb} = 150$ °C (construction test only) | $R_{IO}$   | $10^9$    | -    | -    | $\Omega$ |

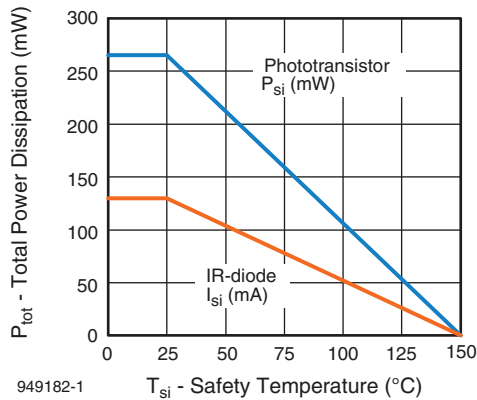


Fig. 1 - Derating Diagram

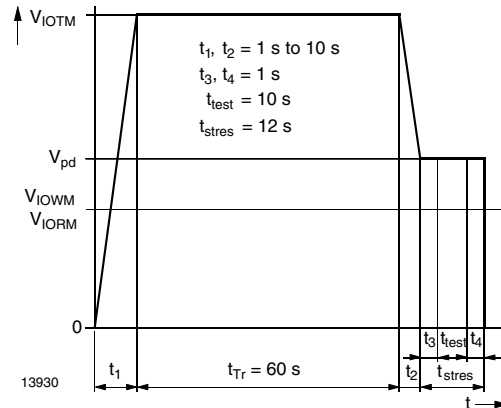


Fig. 2 - Test Pulse Diagram for Sample Test According to DIN EN 60747-5-5 / DIN EN 60747-; IEC 60747

| SWITCHING CHARACTERISTICS |  |           |      |      |      |               |
|---------------------------|--|-----------|------|------|------|---------------|
| PARAMETER                 | TEST CONDITION   | SYMBOL    | MIN. | TYP. | MAX. | UNIT          |
| Delay time                | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$ ,<br>(see Fig. 3)       | $t_d$     | -    | 3    | -    | $\mu\text{s}$ |
| Rise time                 | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$ ,<br>(see Fig. 3)       | $t_r$     | -    | 3    | -    | $\mu\text{s}$ |
| Turn-on time              | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$ ,<br>(see Fig. 3)       | $t_{on}$  | -    | 6    | -    | $\mu\text{s}$ |
| Storage time              | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$ ,<br>(see Fig. 3)       | $t_s$     | -    | 0.3  | -    | $\mu\text{s}$ |
| Fall time                 | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$ ,<br>(see Fig. 3)       | $t_f$     | -    | 4.7  | -    | $\mu\text{s}$ |
| Turn-off time             | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$ ,<br>(see Fig. 3)       | $t_{off}$ | -    | 5    | -    | $\mu\text{s}$ |
| Turn-on time              | $V_S = 5\text{ V}$ , $I_F = 10\text{ mA}$ , $R_L = 1\text{ k}\Omega$ ,<br>(see Fig. 4) | $t_{on}$  | -    | 9    | -    | $\mu\text{s}$ |
| Turn-off time             | $V_S = 5\text{ V}$ , $I_F = 10\text{ mA}$ , $R_L = 1\text{ k}\Omega$ ,<br>(see Fig. 4) | $t_{off}$ | -    | 10   | -    | $\mu\text{s}$ |

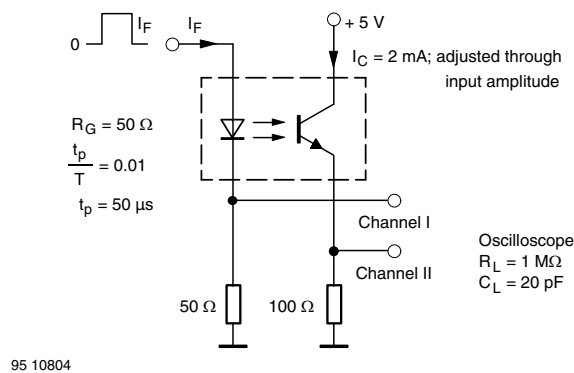


Fig. 3 - Test Circuit, Non-Saturated Operation

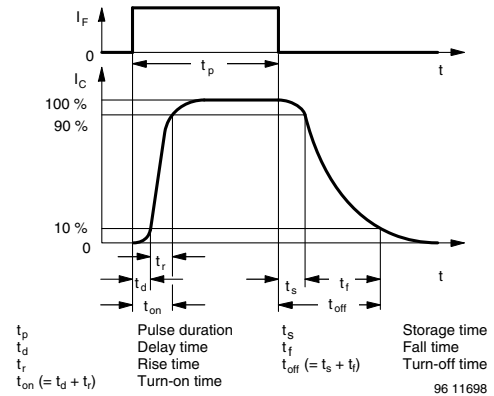


Fig. 5 - Switching Times

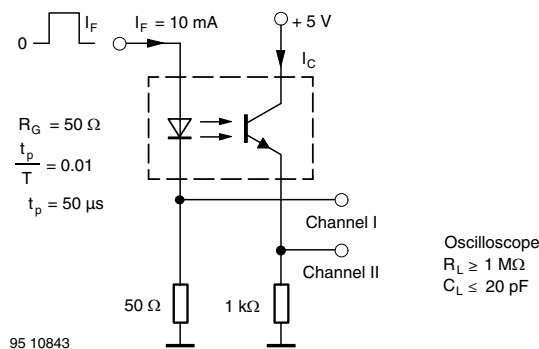


Fig. 4 - Test Circuit, Saturated Operation



TYPICAL CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

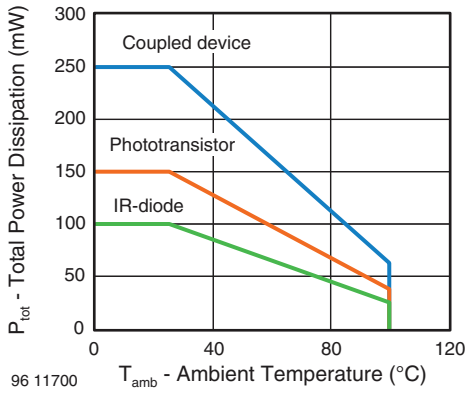


Fig. 6 - Total Power Dissipation vs. Ambient Temperature

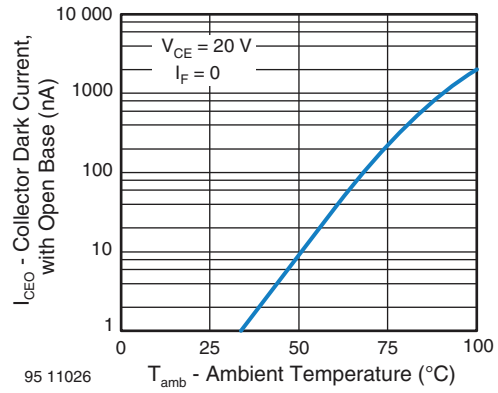


Fig. 9 - Collector Dark Current vs. Ambient Temperature

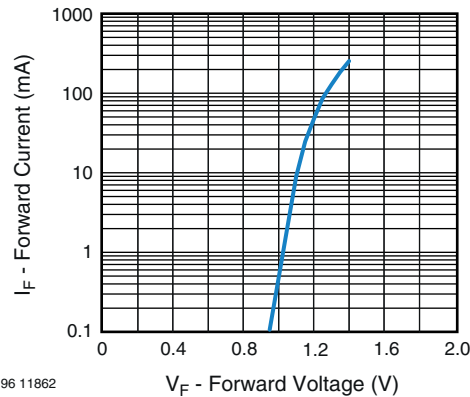


Fig. 7 - Forward Current vs. Forward Voltage

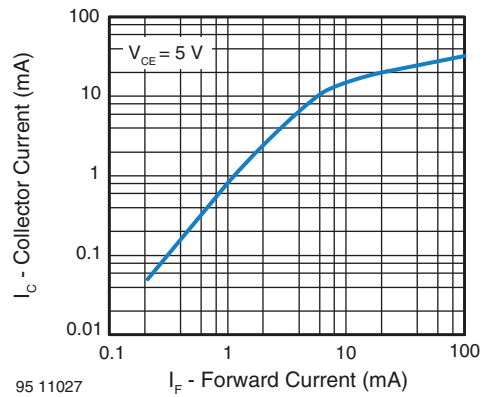


Fig. 10 - Collector Current vs. Forward Current

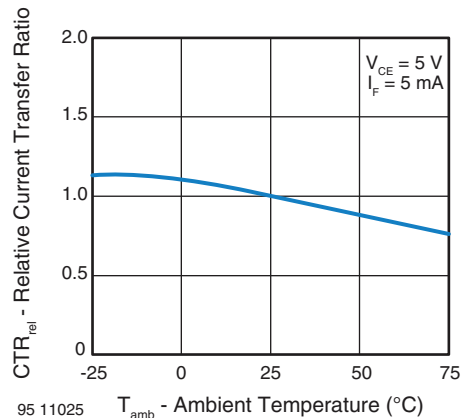


Fig. 8 - Relative Current Transfer Ratio vs. Ambient Temperature

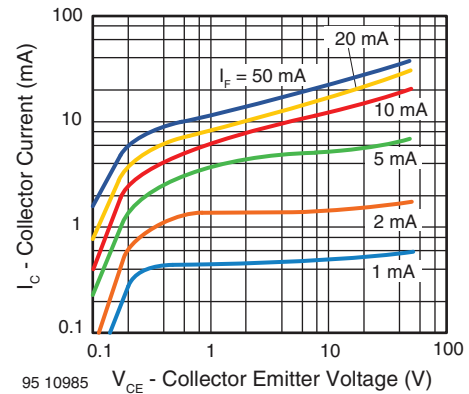


Fig. 11 - Collector Current vs. Collector Emitter Voltage

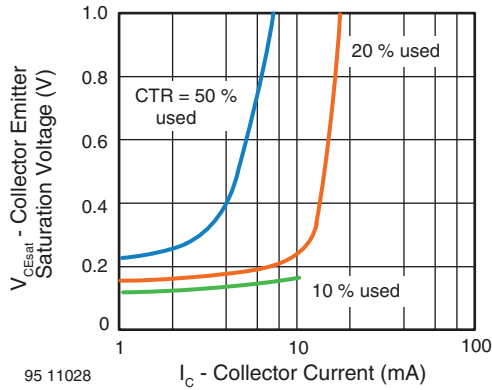


Fig. 12 - Collector Emitter Saturation Voltage vs. Collector Current

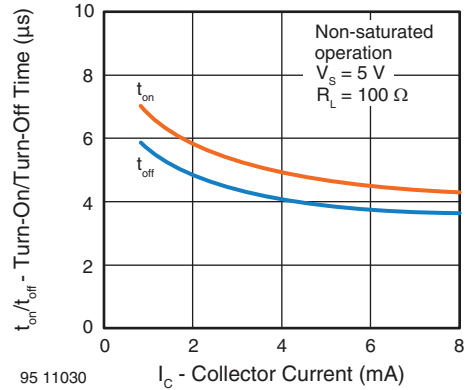


Fig. 14 - Turn-On / Off Time vs. Collector Current

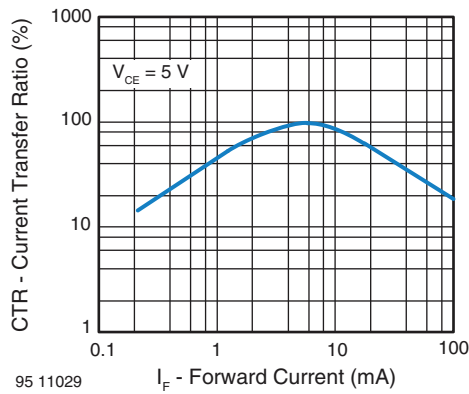


Fig. 13 - Current Transfer Ratio vs. Forward Current

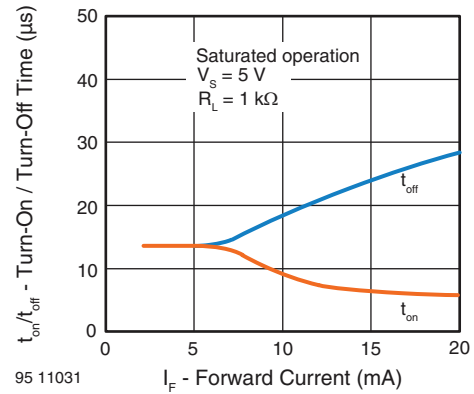
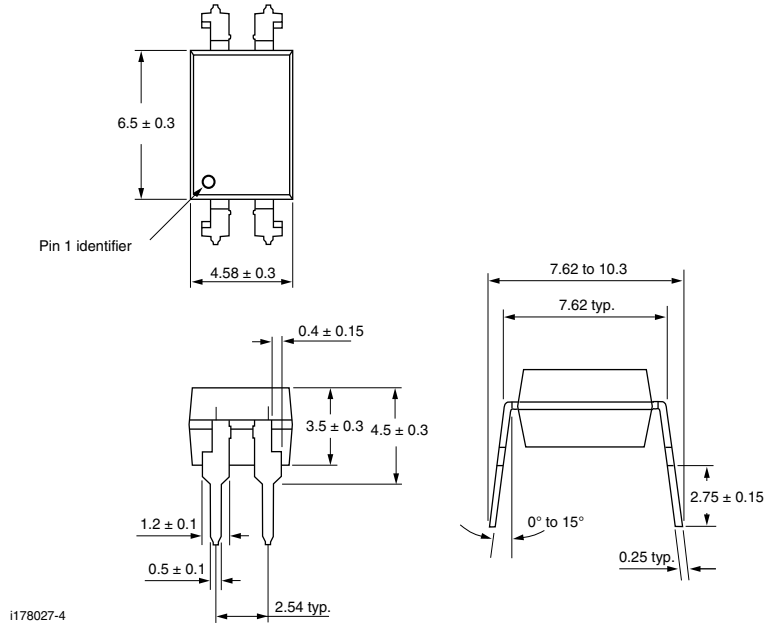


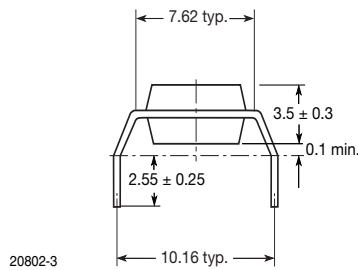
Fig. 15 - Turn-On / Off Time vs. Forward Current



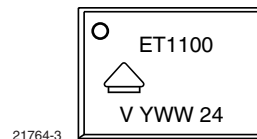
## PACKAGE DIMENSIONS in millimeters



### TCET1100G type



## PACKAGE MARKING







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