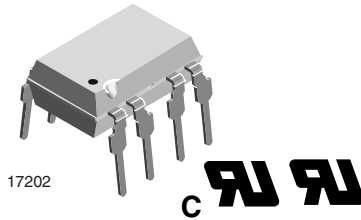
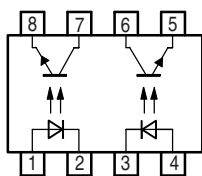




# Optocoupler, Phototransistor Output, Dual Channel



## FEATURES

- Current transfer ratio (CTR) of typical 100 %
- Isolation test voltage  $V_{ISO} = 5300 V_{RMS}$
- Low temperature coefficient of CTR
- Low coupling capacitance of typical 0.3 pF
- Wide ambient temperature range
- Lead (Pb)-free component
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

## DESCRIPTION

The MCT6H and MCT62H consist of a phototransistor optically coupled to a gallium arsenide infrared emitting diode in a 6-lead plastic dual in-line package. The elements are mounted on one leadframe, providing a fixed distance between input and output for highest safety requirements.

## APPLICATIONS

- Galvanically separated circuits
- Non-interacting switches

## AGENCY APPROVALS

- UL1577, file no. E76222 system code U, double protection

## ORDER INFORMATION

| PART   | REMARKS            |
|--------|--------------------|
| MCT6H  | CTR > 50 %, DIP-8  |
| MCT62H | CTR > 100 %, DIP-8 |

### Note

MCT6H and MCT62H are marked as MCT6 and MCT62 respectively.

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

| PARAMETER                            | TEST CONDITION                | PART | SYMBOL     | VALUE         | UNIT        |
|--------------------------------------|-------------------------------|------|------------|---------------|-------------|
| <b>INPUT</b>                         |                               |      |            |               |             |
| Reverse voltage                      |                               |      | $V_R$      | 6             | V           |
| Forward current                      |                               |      | $I_F$      | 60            | mA          |
| Forward surge current                | $t_p \leq 10 \mu s$           |      | $I_{FSM}$  | 1.5           | A           |
| Power dissipation                    |                               |      | $P_{diss}$ | 100           | mW          |
| Junction temperature                 |                               |      | $T_j$      | 125           | $^{\circ}C$ |
| <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               | $t_p/T = 0.5, t_p \leq 10 ms$ |      | $I_{CM}$   | 100           | mA          |
| Power dissipation                    |                               |      | $P_{diss}$ | 150           | mW          |
| Junction temperature                 |                               |      | $T_j$      | 125           | $^{\circ}C$ |
| <b>COUPLER</b>                       |                               |      |            |               |             |
| AC isolation test voltage (RMS)      | $t = 1.0 min$                 |      | $V_{ISO}$  | 5000          | $V_{RMS}$   |
| Total power dissipation              |                               |      | $P_{tot}$  | 250           | mW          |
| Ambient temperature range            |                               |      | $T_{amb}$  | - 55 to + 100 | $^{\circ}C$ |
| Storage temperature range            |                               |      | $T_{stg}$  | - 55 to + 125 | $^{\circ}C$ |
| Soldering temperature <sup>(2)</sup> | 2 mm from case, $t \leq 10 s$ |      | $T_{sld}$  | 260           | $^{\circ}C$ |

### Notes

- (1) 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.
- (2) Refer to wave profile for soldering conditions for through hole devices.



| <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         |
| <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 dark current                                                                                   | $V_{CE} = 20\text{ V}$ , $I_F = 0$ , $E = 0$                                | $I_{CEO}$   |      |           | 100  | nA        |
| <b>COUPLER</b>                                                                                           |                                                                             |             |      |           |      |           |
| DC isolation test voltage                                                                                | $t = 2\text{ s}$                                                            | $V_{ISO}$   | 5000 |           |      | $V_{RMS}$ |
| Isolation resistance                                                                                     | $V_{IO} = 1000\text{ V}$ ,<br>40 % relative humidity                        | $R_{IO}$    |      | $10^{12}$ |      | $\Omega$  |
| Collector emitter saturation voltage                                                                     | $I_F = 10\text{ mA}$ , $I_C = 1\text{ mA}$                                  | $V_{CEsat}$ |      |           | 0.3  | V         |
| Cut off frequency                                                                                        | $I_F = 10\text{ mA}$ , $V_{CE} = 5\text{ V}$ ,<br>$R_L = 100\text{ }\Omega$ | $f_C$       |      | 100       |      | kHz       |
| Coupling capacitance                                                                                     | $f = 1\text{ MHz}$                                                          | $C_k$       |      | 0.3       |      | pF        |

**Note**

- (1) 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 |
| $I_C/I_F$                     | $V_{CE} = 5\text{ V}$ , $I_F = 5\text{ mA}$  | MCT6H  | CTR    | 50   | 100  |      | %    |
|                               | $V_{CE} = 5\text{ V}$ , $I_F = 10\text{ mA}$ | MCT6H  | CTR    | 60   | 120  |      | %    |
|                               | $V_{CE} = 5\text{ V}$ , $I_F = 5\text{ mA}$  | MCT62H | CTR    | 100  | 200  |      | %    |

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

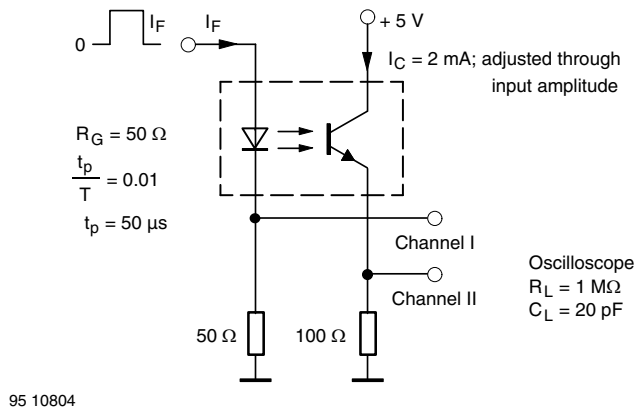


Fig. 1 - Test Circuit, non Saturated Operation

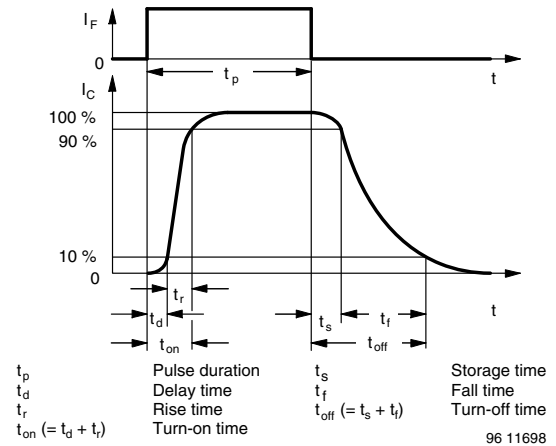


Fig. 1 - Switching Times

## TYPICAL CHARACTERISTICS

$T_{amb} = 25^\circ\text{C}$ , unless otherwise specified

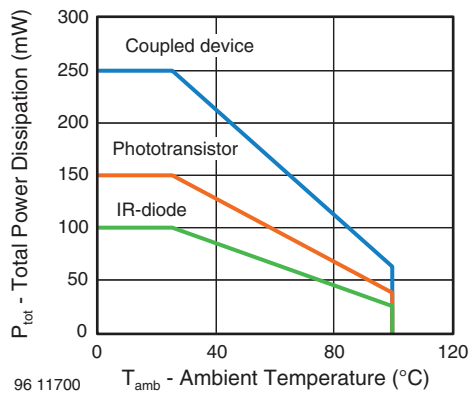


Fig. 2 - Total Power Dissipation vs. Ambient Temperature

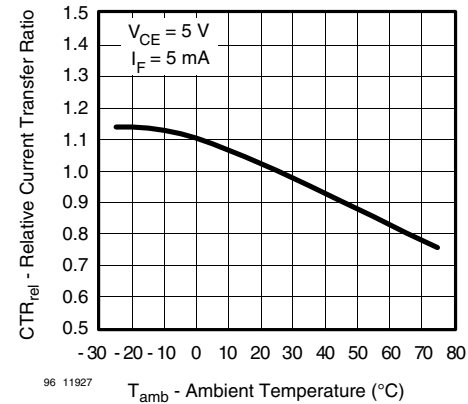


Fig. 3 - Relative Current Transfer Ratio vs. Ambient Temperature

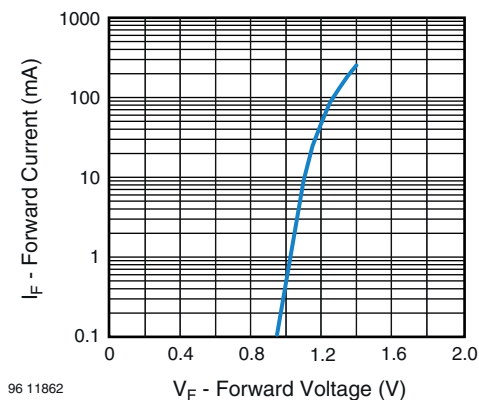


Fig. 2 - Forward Current vs. Forward Voltage

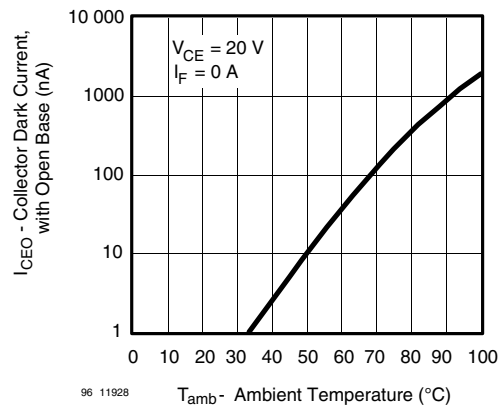


Fig. 4 - Collector Dark Current vs. Ambient Temperature

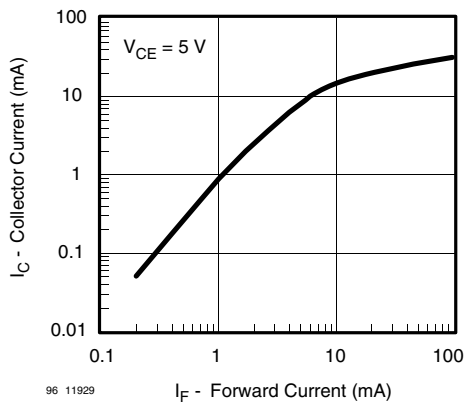


Fig. 5 - Collector Current vs. Forward Current

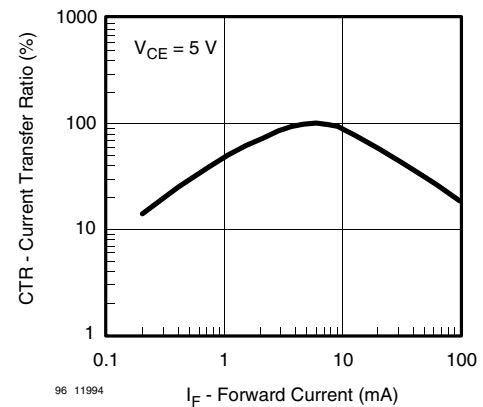


Fig. 8 - Current Transfer Ratio vs. Forward Current

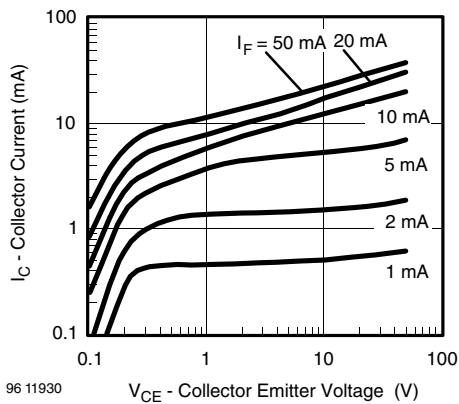


Fig. 6 - Collector Current vs. Collector Emitter Voltage

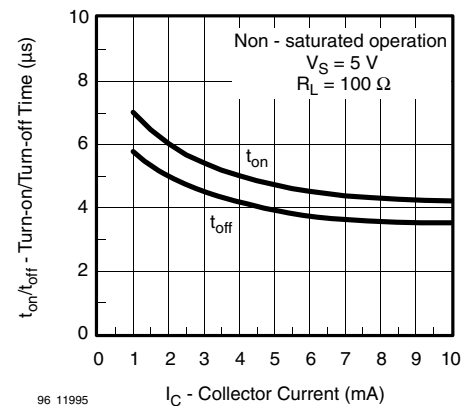


Fig. 9 - Turn-on/Turn-off Time vs. Collector Current

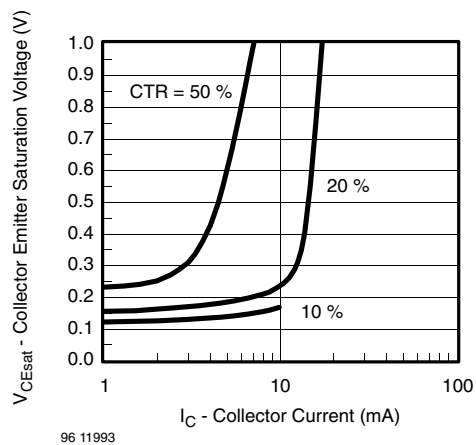
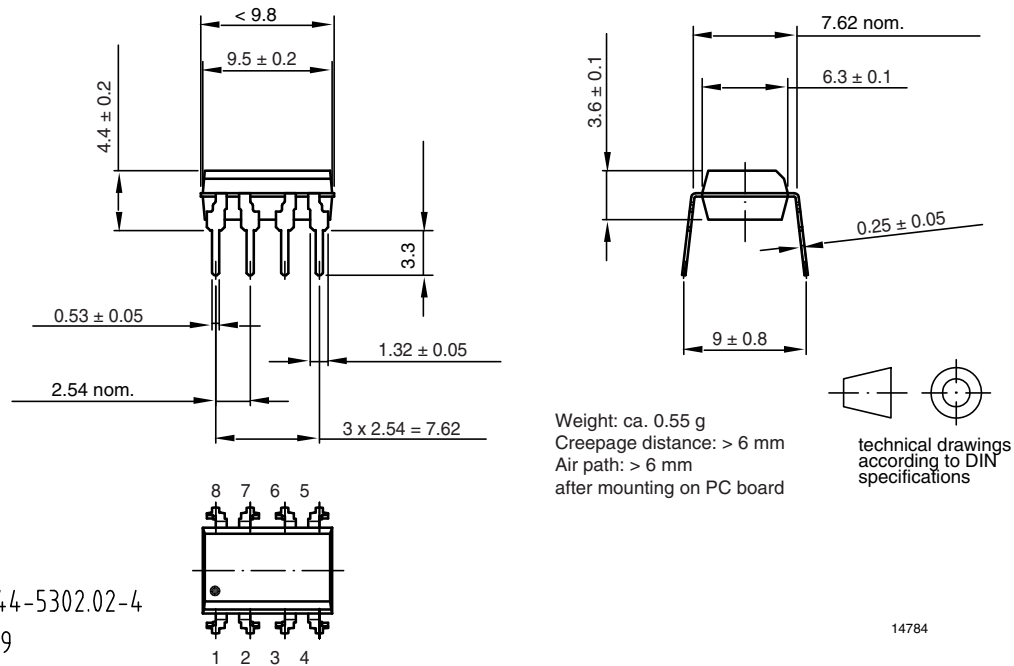


Fig. 7 - Collector Emitter Saturation Voltage vs. Collector Current

**PACKAGE DIMENSIONS** in inches (millimeters)

Drawing-No.: 6.544-5302.02-4

Issue: 4; 02.06.99



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