

# HCPL-817

## Phototransistor Optocoupler High Density Mounting Type



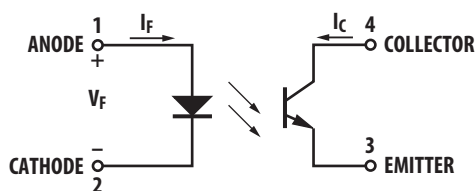
### Data Sheet



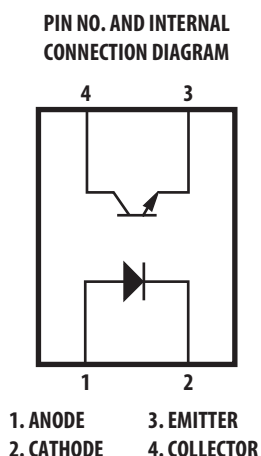
#### Description

The HCPL-817 contains a light emitting diode optically coupled to a phototransistor. It is packaged in a 4-pin DIP package and available in wide-lead spacing option and lead bend SMD option. Input-output isolation voltage is 5000 Vrms. Response time,  $t_r$ , is typically 4  $\mu$ s and minimum CTR is 50% at input current of 5 mA.

#### Schematic



#### Functional Diagram



#### Features

- Current Transfer Ratio (CTR: min. 50% at  $I_F = 5$  mA,  $V_{CE} = 5$  V)
- High input-output isolation voltage ( $V_{ISO} = 5000$  V<sub>rms</sub>)
- Response time ( $t_r$ : typ., 4  $\mu$ s at  $V_{CE} = 2$  V,  $I_C = 2$  mA,  $R_L = 100$   $\Omega$ )
- Compact dual-in-line package
- UL approved
- CSA approved
- IEC/EN/DIN EN 60747-5-2 approved
- Options available:
  - Leads with 0.4" (10.16 mm) spacing (W00)
  - Leads bends for surface mounting (300)
  - Tape and reel for SMD (500)
  - IEC/EN/DIN EN 60747-5-2 approvals (060)

#### Applications

- Signal transmission between circuits of different potentials and impedances
- I/O interfaces for computers
- Feedback circuit in power supply

**CAUTION:** It is advised that normal static precautions be taken in handling and assembly of this component to prevent damage and/or degradation which may be induced by ESD.

## Ordering Information

HCPL-817-xxxx is UL Recognized with 5000 Vrms for 1 minute per UL1577 and is approved under CSA Component Acceptance Notice #5, File CA 88324.

| Part number | RoHS Compliant Option |                      |                       |                       |                       |                      | Package         | Surface Mount | Gull Wing | Tape & Reel | IEC/EN/<br>DIN EN<br>60747-<br>5-2 | Quantity             |
|-------------|-----------------------|----------------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------|---------------|-----------|-------------|------------------------------------|----------------------|
|             | Rank<br>'O'           | Rank<br>'A'          | Rank<br>'B'           | Rank<br>'C'           | Rank<br>'D'           | Rank<br>'L'          |                 |               |           |             |                                    |                      |
|             | 50%<br><CTR<<br>600%  | 80%<br><CTR<<br>160% | 130%<br><CTR<<br>260% | 200%<br><CTR<<br>400% | 300%<br><CTR<<br>600% | 50%<br><CTR<<br>100% |                 |               |           |             |                                    |                      |
| HCPL-817    | -000E                 | -00AE                | -00BE                 | -00CE                 | -00DE                 | -00LE                | 300mil<br>DIP-4 |               |           |             |                                    | 100 pcs<br>per tube  |
|             | -300E                 | -30AE                | -30BE                 | -30CE                 | -30DE                 | -30LE                |                 | X             | X         |             |                                    | 100 pcs<br>per tube  |
|             | -500E                 | -50AE                | -50BE                 | -50CE                 | -50DE                 | -50LE                |                 | X             | X         | X           |                                    | 1000 pcs<br>per reel |
|             | -060E                 | -06AE                | -06BE                 | -06CE                 | -06DE                 | -06LE                |                 |               |           |             | X                                  | 100 pcs<br>per tube  |
|             | -360E                 | -36AE                | -36BE                 | -36CE                 | -36DE                 | -36LE                |                 | X             | X         |             | X                                  | 100 pcs<br>per tube  |
|             | -560E                 | -56AE                | -56BE                 | -56CE                 | -56DE                 | -56LE                |                 | X             | X         | X           | X                                  | 1000 pcs<br>per reel |
|             | -W00E                 | -W0AE                | -W0BE                 | -W0CE                 | -W0DE                 | -W0LE                | 400mil<br>DIP-4 |               |           |             |                                    | 100 pcs<br>per tube  |
|             | -W60E                 | -W6AE                | -W6BE                 | -W6CE                 | -W6DE                 | -W6LE                |                 |               |           |             | X                                  | 100 pcs<br>per tube  |

To order, choose a part number from the part number column and combine with the desired option from the option column to form an order entry.

### Example 1:

HCPL-817-360E to order product of 300mil DIP-4 DC Gull Wing Surface Mount package in Tube packaging with 50%<CTR<600%, IEC/EN/DIN EN 60767-5-2 Safety Approval and RoHS compliant.

### Example 2:

HCPL-817-50BE to order product of 300mil DIP-4 DC Gull Wing Surface Mount package in Tape and Reel packaging with 130%<CTR<260% and RoHS compliant.

Option datasheets are available. Contact your Avago sales representative or authorized distributor for information.

## Package Outline Drawings

### HCPL-817-000E



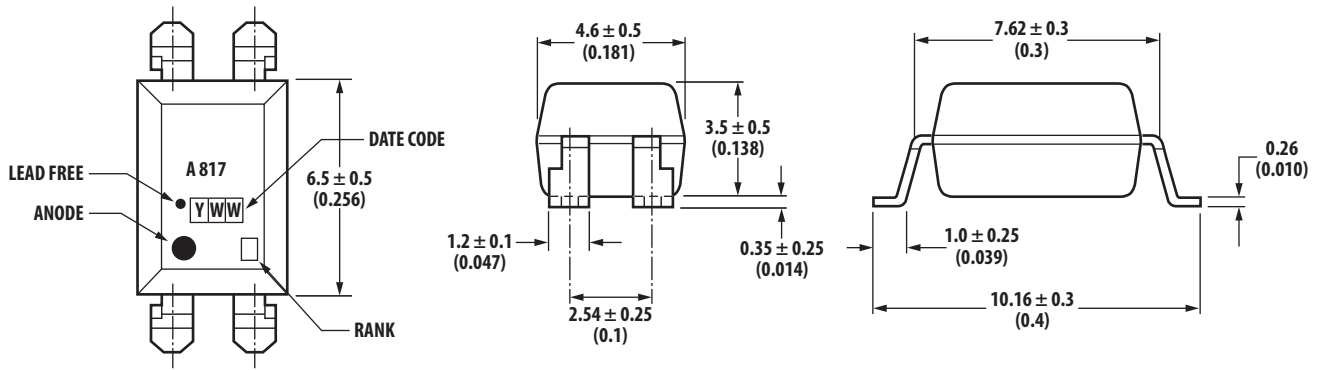
### HCPL-817-060E



### HCPL-817-W00E

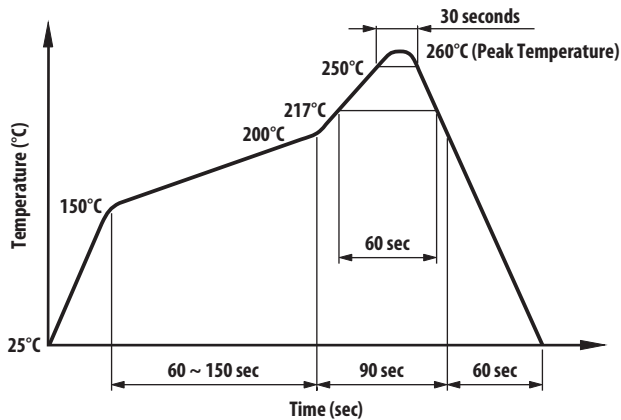


## HCPL-817-300E



Dimensions in Millimeters and (Inches)

## Solder Reflow Temperature Profile



1. One-time soldering reflow is recommended within the condition of temperature and time profile shown.
2. When using another soldering method such as infrared ray lamp, the temperature may rise partially in the mold of the device. Keep the temperature on the package of the device within the condition of (1) above.

Note: Non-halide flux should be used.

## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ )

|                                                                 |                                             |
|-----------------------------------------------------------------|---------------------------------------------|
| Storage Temperature, $T_S$                                      | $-55^\circ\text{C}$ to $+125^\circ\text{C}$ |
| Operating Temperature, $T_A$                                    | $-30^\circ\text{C}$ to $+100^\circ\text{C}$ |
| Lead Solder Temperature, max.<br>(1.6 mm below seating plane)   | $260^\circ\text{C}$ for 10 s                |
| Average Forward Current, $I_F$                                  | 50 mA                                       |
| Reverse Input Voltage, $V_R$                                    | 6 V                                         |
| Input Power Dissipation, $P_I$                                  | 70 mW                                       |
| Collector Current, $I_C$                                        | 50 mA                                       |
| Collector-Emitter Voltage, $V_{CEO}$                            | 70 V                                        |
| Emitter-Collector Voltage, $V_{ECO}$                            | 6 V                                         |
| Collector Power Dissipation                                     | 150 mW                                      |
| Total Power Dissipation                                         | 200 mW                                      |
| Isolation Voltage, $V_{ISO}$ (AC for 1 minute, R.H. = 40 ~ 60%) | 5000 Vrms                                   |

## Electrical Specifications (T<sub>A</sub> = 25°C)

| Parameter                            | Symbol               | Min.                 | Typ.                 | Max. | Units | Test Conditions                                                               |
|--------------------------------------|----------------------|----------------------|----------------------|------|-------|-------------------------------------------------------------------------------|
| Forward Voltage                      | V <sub>F</sub>       | –                    | 1.2                  | 1.4  | V     | I <sub>F</sub> = 20 mA                                                        |
| Reverse Current                      | I <sub>R</sub>       | –                    | –                    | 10   | μA    | V <sub>R</sub> = 4 V                                                          |
| Terminal Capacitance                 | C <sub>t</sub>       | –                    | 30                   | 250  | pF    | V = 0, f = 1 KHz                                                              |
| Collector Dark Current               | I <sub>CEO</sub>     | –                    | –                    | 100  | nA    | V <sub>CE</sub> = 20 V                                                        |
| Collector-Emitter Breakdown Voltage  | BV <sub>CEO</sub>    | 70                   | –                    | –    | V     | I <sub>C</sub> = 0.1 mA                                                       |
| Emitter-Collector Breakdown Voltage  | BV <sub>ECO</sub>    | 6                    | –                    | –    | V     | I <sub>E</sub> = 10 μA                                                        |
| Collector Current                    | I <sub>C</sub>       | 2.5                  | –                    | 30   | mA    | I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V,<br>R <sub>BE</sub> = ∞          |
| *Current Transfer Ratio              | CTR                  | 50                   | –                    | 600  | %     |                                                                               |
| Collector-Emitter Saturation Voltage | V <sub>CE(sat)</sub> | –                    | 0.1                  | 0.2  | V     | I <sub>F</sub> = 20 mA, I <sub>C</sub> = 1 mA                                 |
| Response Time (Rise)                 | t <sub>r</sub>       | –                    | 4                    | 18   | μs    | V <sub>CE</sub> = 2 V, I <sub>C</sub> = 2 mA<br>R <sub>L</sub> = 100 Ω        |
| Response Time (Fall)                 | t <sub>f</sub>       | –                    | 3                    | 18   | μs    |                                                                               |
| Cut-off Frequency                    | f <sub>c</sub>       | –                    | 80                   | –    | KHz   | V <sub>CC</sub> = 5 V, I <sub>C</sub> = 2 mA<br>R <sub>L</sub> = 100 Ω, –3 dB |
| Isolation Resistance                 | R <sub>iso</sub>     | 5 x 10 <sup>10</sup> | 1 x 10 <sup>11</sup> | –    | Ω     | DC 500 V<br>40 ~ 60% R.H.                                                     |
| Floating Capacitance                 | C <sub>f</sub>       | –                    | 0.6                  | 1.0  | pF    | V = 0, f = 1 MHz                                                              |

$$* \text{CTR} = \frac{I_C}{I_F} \times 100\%$$

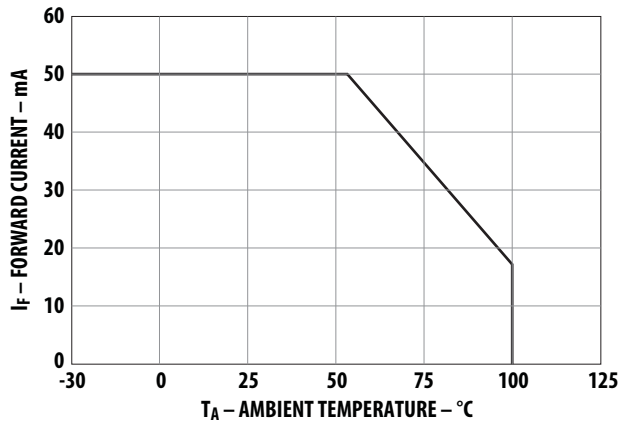


Figure 1. Forward current vs. temperature.

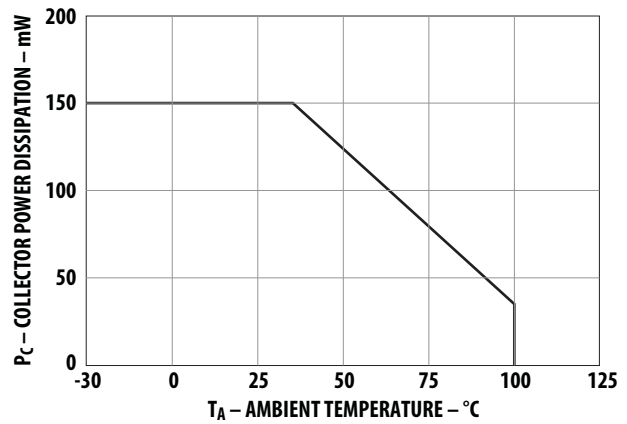


Figure 2. Collector power dissipation vs. temperature.

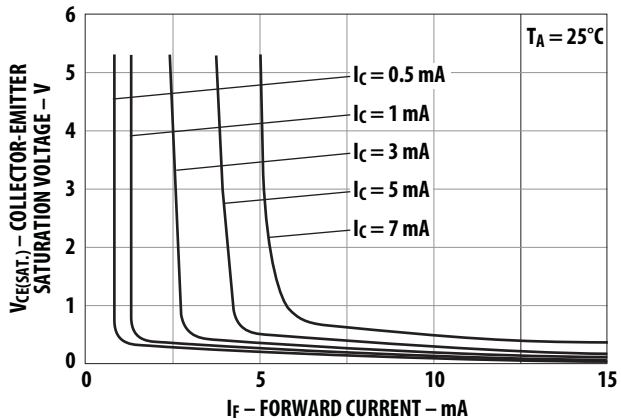


Figure 3. Collector-emitter saturation voltage vs. forward current.



Figure 4. Forward current vs. forward voltage.

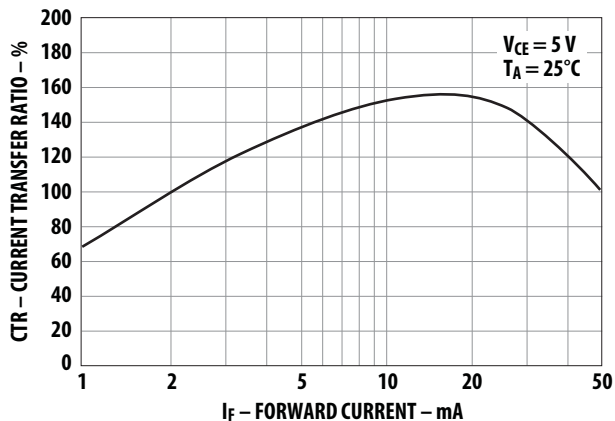


Figure 5. Current transfer ratio vs. forward current.

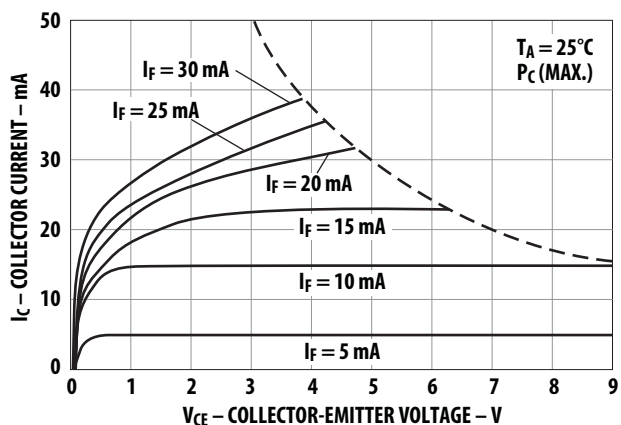


Figure 6. Collector current vs. collector-emitter voltage.

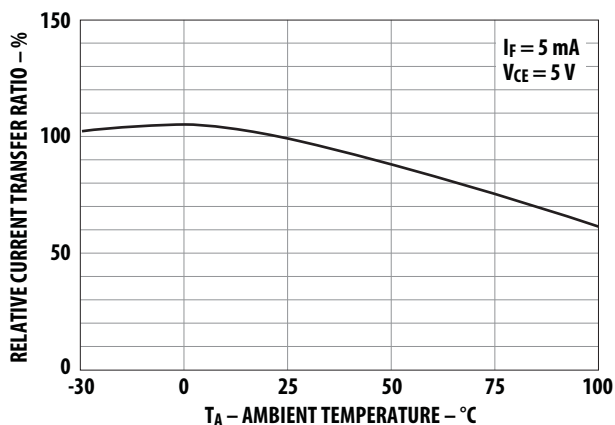


Figure 7. Relative current transfer ratio vs. temperature.

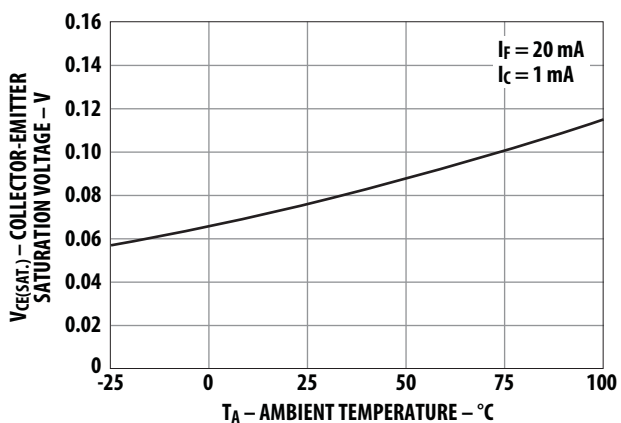


Figure 8. Collector-emitter saturation voltage vs. temperature.

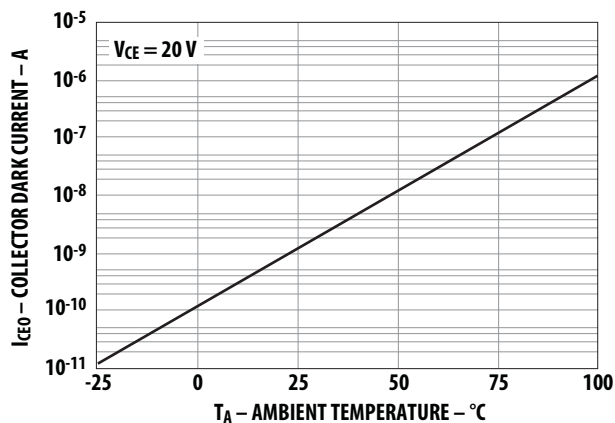


Figure 9. Collector dark current vs. temperature.



Figure 10. Response time vs. load resistance.

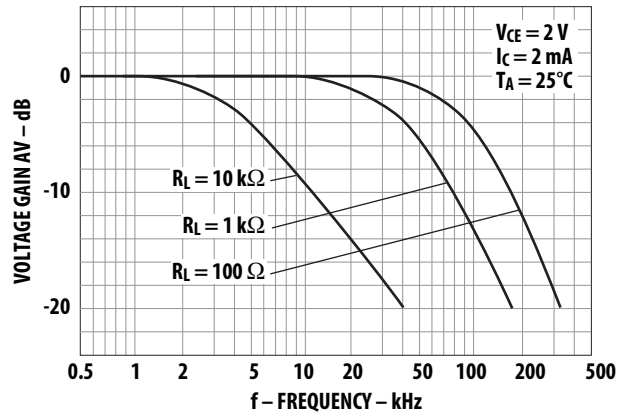
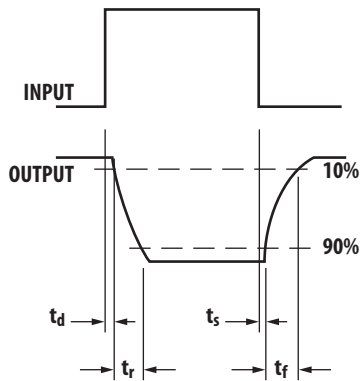
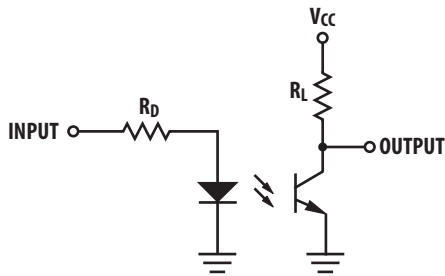
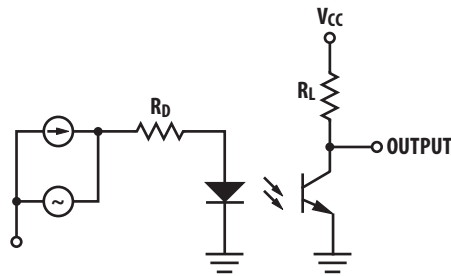


Figure 11. Frequency response.

### Test Circuit for Response Time



### Test Circuit for Frequency Response



For product information and a complete list of distributors, please go to our web site: [www.avagotech.com](http://www.avagotech.com)

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TECHNOLOGIES



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**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331