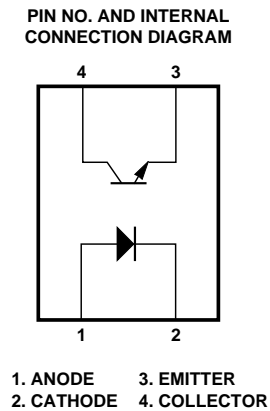


Agilent HCPL-817 Phototransistor Optocoupler High Density Mounting Type Data Sheet

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 μ s and minimum CTR is 50% at input current of 5 mA.

Functional Diagram



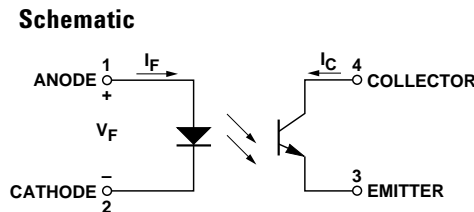
Ordering Information

Specify part number followed by Option Number (if desired).

HCPL-817-XXXXE

- Lead Free
- Option Number

000 = No Options
 060 = IEC/EN/DIN EN 60747-5-2 Option
 W00 = 0.4" Lead Spacing Option
 300 = Lead Bend SMD Option
 500 = Tape and Reel Packaging Option
 00A = Rank Mark A
 00B = Rank Mark B
 00C = Rank Mark C
 00D = Rank Mark D
 00L = Rank Mark L



Features

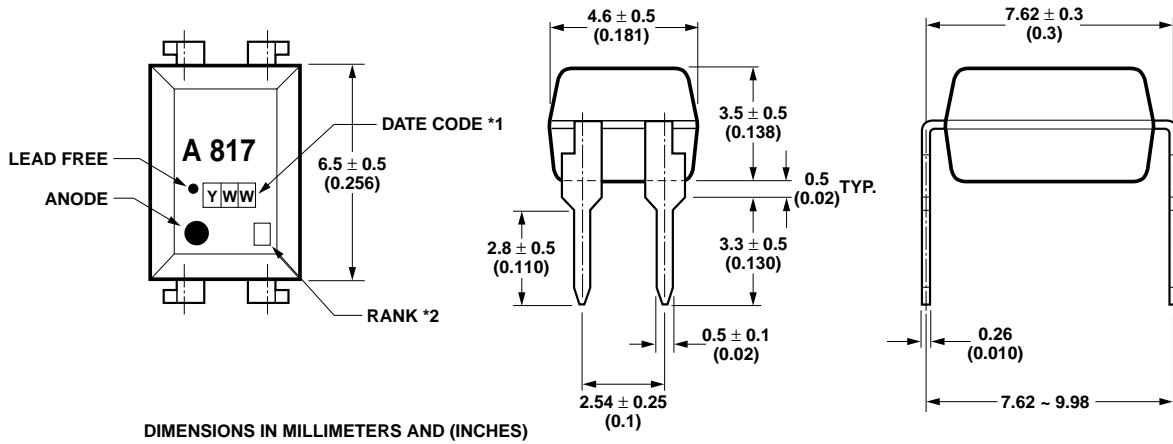
- **Current Transfer Ratio**
(CTR: min. 50% at $I_F = 5$ mA, $V_{CE} = 5$ V)
- **High input-output isolation voltage**
($V_{iso} = 5000$ Vrms)
- **Response time** (t_r : typ., 4 μ s at $V_{CE} = 2$ V, $I_C = 2$ mA, $R_L = 100$ Ω)
- **Compact dual-in-line package**
- **UL approved**
- **CSA approved**
- **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

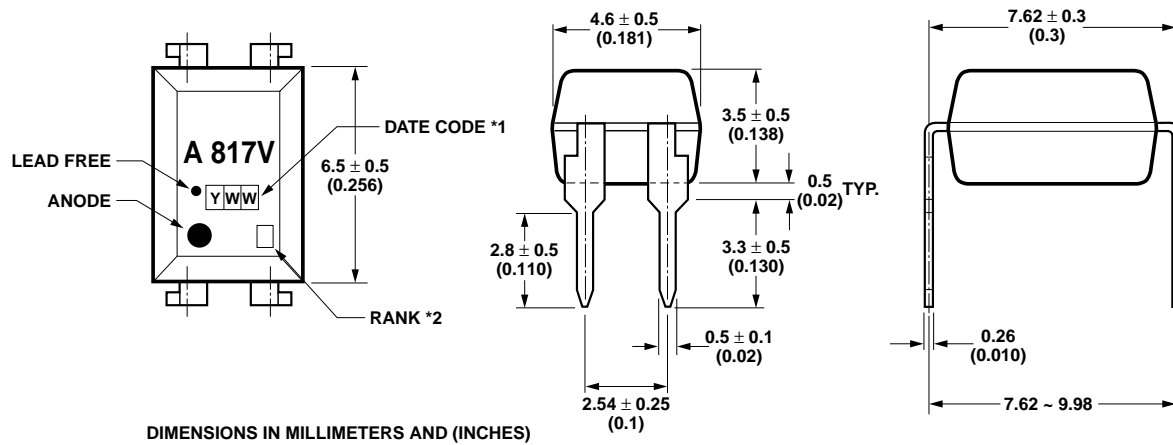
- **Signal transmission between circuits of different potentials and impedances**
- **I/O interfaces for computers**
- **Feedback circuit in power supply**

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.

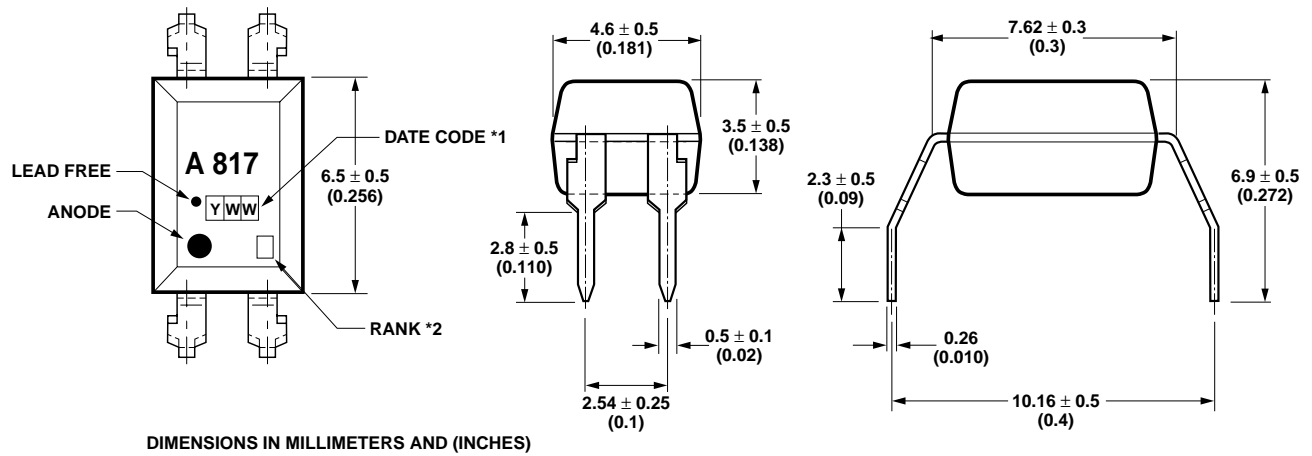
Package Outline Drawings
HCPL-817-000E



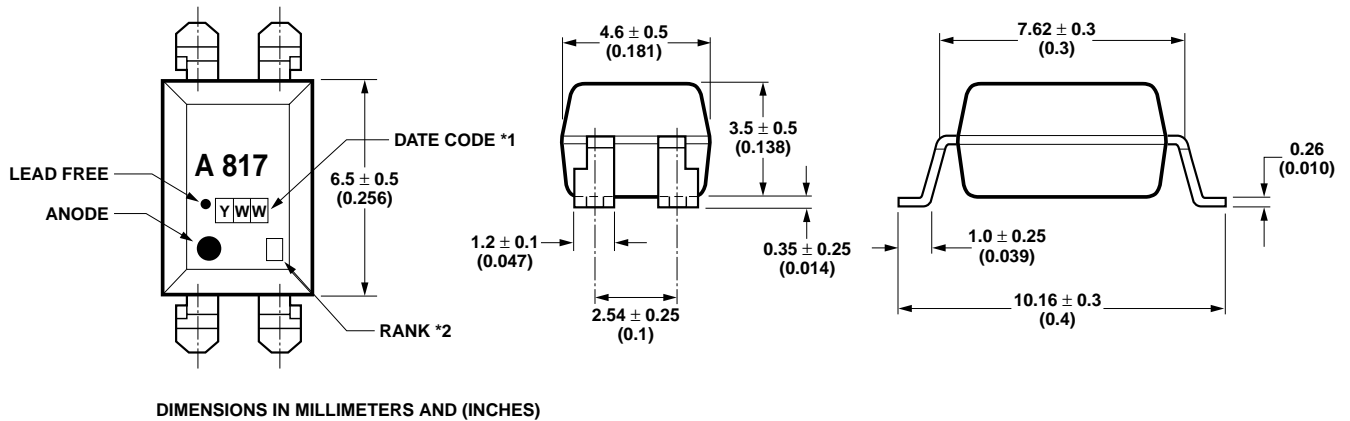
HCPL-817-060E



HCPL-817-W00E

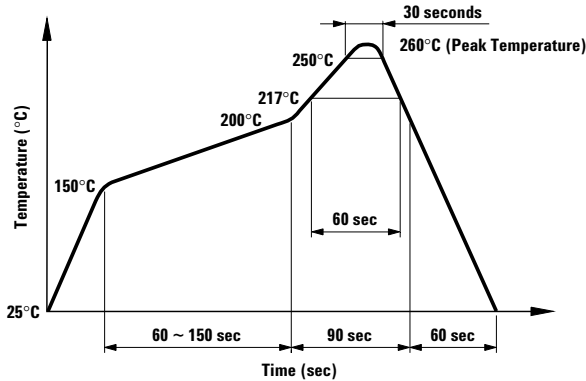


HCPL-817-300E



Solder Reflow Temperature Profile

- 1) One-time soldering reflow is recommended within the condition of temperature and time profile shown at right.
- 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.



Absolute Maximum Ratings (T_A = 25°C)

| | |
|--|-----------------|
| Storage Temperature, T _S | -55°C to +125°C |
| Operating Temperature, T _A | -30°C to +100°C |
| Lead Solder Temperature, max. (1.6 mm below seating plane) | 260°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 _{CE0} | 35 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_A = 25 °C)

| Parameter | Symbol | Min. | Typ. | Max. | Units | Test Conditions |
|--------------------------------------|----------------------|----------------------|----------------------|------|-------|---|
| Forward Voltage | V _F | – | 1.2 | 1.4 | V | I _F = 20 mA |
| Reverse Current | I _R | – | – | 10 | μA | V _R = 4 V |
| Terminal Capacitance | C _t | – | 30 | 250 | pF | V = 0, f = 1 KHz |
| Collector Dark Current | I _{CEO} | – | – | 100 | nA | V _{CE} = 20 V |
| Collector-Emitter Breakdown Voltage | BV _{CEO} | 35 | – | – | V | I _C = 0.1 mA |
| Emitter-Collector Breakdown Voltage | BV _{ECO} | 6 | – | – | V | I _E = 10 μA |
| Collector Current | I _C | 2.5 | – | 30 | mA | I _F = 5 mA, V _{CE} = 5 V, |
| *Current Transfer Ratio | CTR | 50 | – | 600 | % | R _{BE} = ∞ |
| Collector-Emitter Saturation Voltage | V _{CE(sat)} | – | 0.1 | 0.2 | V | I _F = 20 mA, I _C = 1 mA |
| Response Time (Rise) | t _r | – | 4 | 18 | μs | V _{CC} = 2 V, I _C = 2 mA |
| Response Time (Fall) | t _f | – | 3 | 18 | μs | R _L = 100 Ω |
| Cut-off Frequency | f _c | – | 80 | – | KHz | V _{CC} = 5 V, I _C = 2 mA R _L = 100 Ω, –3 dB |
| Isolation Resistance | R _{iso} | 5 × 10 ¹⁰ | 1 × 10 ¹¹ | – | Ω | DC 500 V 40 ~ 60% R.H. |
| Floating Capacitance | C _f | – | 0.6 | 1.0 | pF | V = 0, f = 1 MHz |

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

| Rank Mark | CTR (%) | Conditions |
|-----------|-----------|--|
| L | 50 ~ 100 | I _F = 5 mA, V _{CE} = 5 V, T _A = 25 °C |
| A | 80 ~ 160 | |
| B | 130 ~ 260 | |
| C | 200 ~ 400 | |
| D | 300 ~ 600 | |

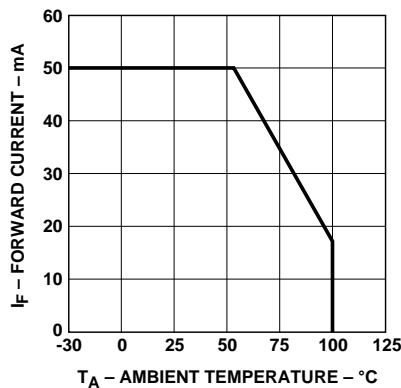


Figure 1. Forward current vs. temperature.

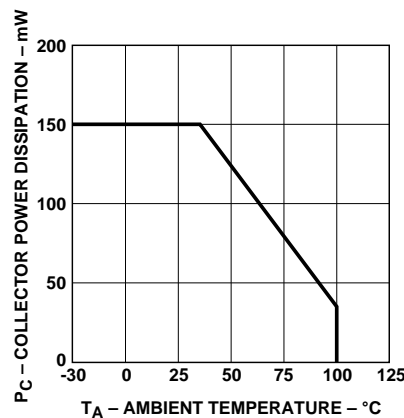


Figure 2. Collector power dissipation vs. temperature.

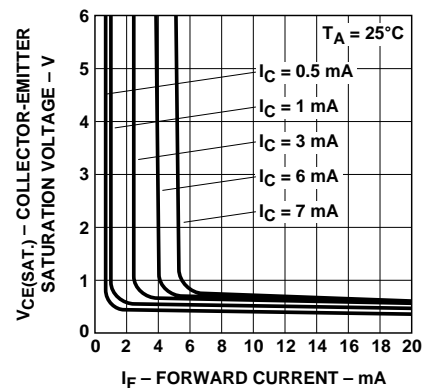


Figure 3. Collector-emitter saturation voltage vs. forward current.

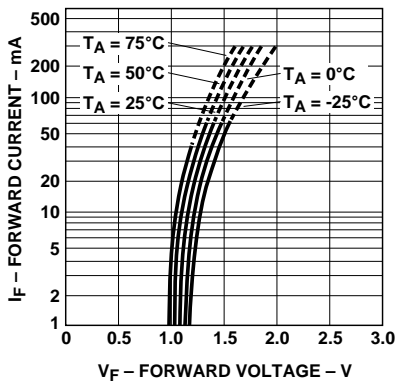


Figure 4. Forward current vs. forward voltage.

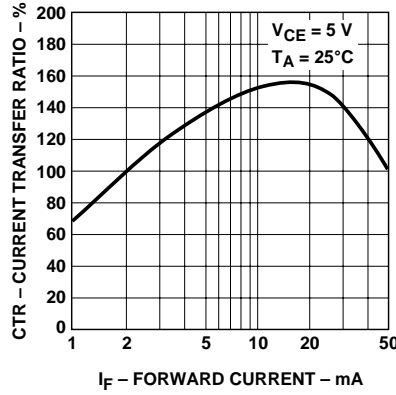


Figure 5. Current transfer ratio vs. forward current.

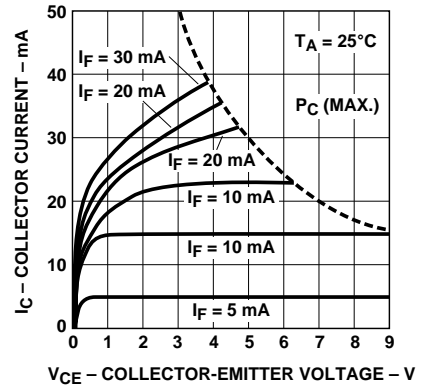


Figure 6. Collector current vs. collector-emitter voltage.

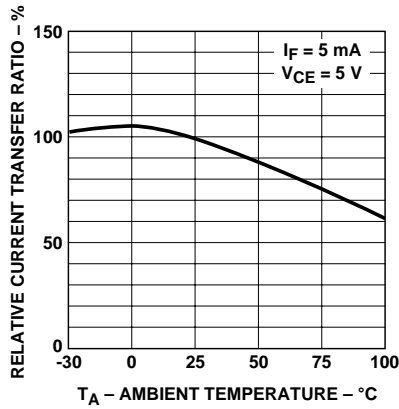


Figure 7. Relative current transfer ratio vs. temperature.

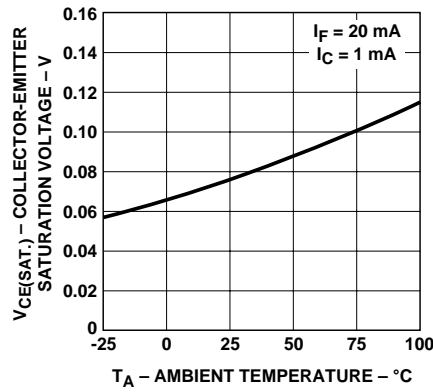


Figure 8. Collector-emitter saturation voltage vs. temperature.

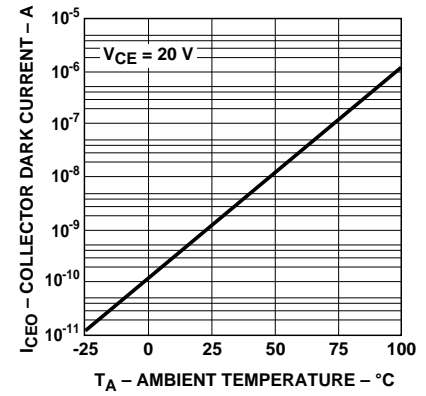


Figure 9. Collector dark current vs. temperature.

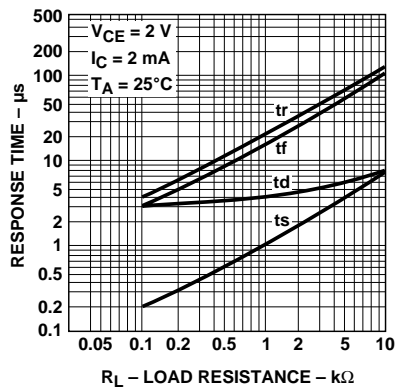


Figure 10. Response time vs. load resistance.

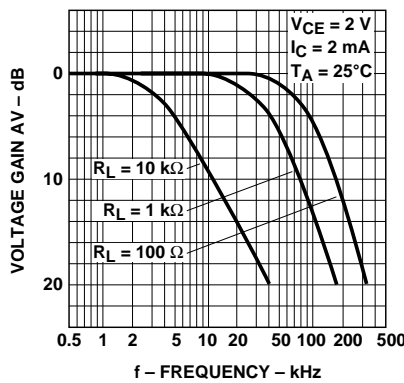
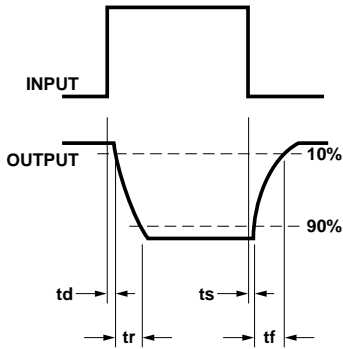
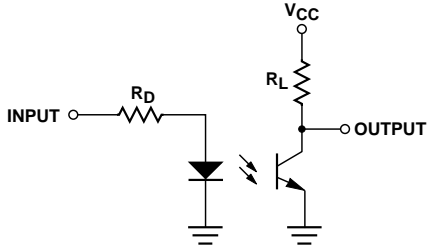
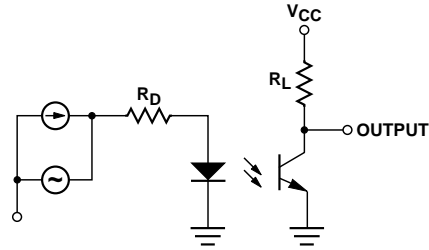


Figure 11. Frequency response.

Test Circuit for Response Time



Test Circuit for Frequency Response



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