# ACPL-8x7
## Multi-Channel Full-Pitch Phototransistor Optocoupler

AVAGO TECHNOLOGIES

# Data Sheet

Lead (Pb) Free
RoHS 6 fully compliant

RoHS 6 fully compliant options available;
-xxxE denotes a lead-free product

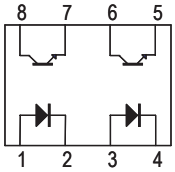
### Description

The ACPL-827 is a DC-input dual channel full-pitch phototransistor optocoupler which contains two light emitting diode optically coupled to two separate transistor. It is packaged in a 8-pin DIP package.

Likewise, the ACPL-847 is a DC-input quad channel full-pitch phototransistor optocoupler which contains four light emitting diode optically coupled to four separate transistor. It is packaged in a 16-pin DIP package

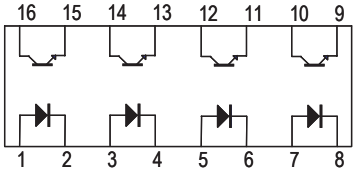
For both types, it is also available in wide-lead spacing option and lead bend SMD option with input-output isolation voltage at 5000 Vrms. Response time, tr, is typically 4 µs and minimum CTR is 50% at input current of 5 mA

### ACPL-827 pin layout




- Pin 1, 3 Anode
- Pin 2, 4 Cathode
- Pin 5, 7 Emitter
- Pin 6, 8 Collector

### ACPL-847 pin layout




- Pin 1, 3, 5, 7 Anode
- Pin 2, 4, 6, 8 Cathode
- Pin 9,11,13,15 Emitter
- Pin 10,12,14,16 Collector

### Features

- Current transfer ratio
  (CTR: min. 50% at $I_F$ = 5mA, $V_{CE}$ = 5V)
- High input-output isolation voltage
  ($V_{ISO}$ = 5,000$V_{RMS}$)
- Response time
  (tr: typ. 4µs at $V_{CE}$ = 2V, $I_C$ = 2mA, $R_L$= 100Ω)
- Compact dual-in-line package
- Safety and regulatory approvals
  - CSA
  - UL 1577
  - IEC/EN/DIN EN 60747-5-2
- Options available:
  – Leads with 0.4" (10.16 mm) spacing (W00)
  – Lead bend for surface mounting (300)
  – Tape and reel for SMD (500) – available only for ACPL-827
  – IEC/EN/DIN EN 60747-5-2 approved (060)
  – Lead-Free (000E)

### Applications

- I/O Interface for Programmable controllers, computers.
- Sequence controllers
- System appliances, measuring instruments
- Signal transmission between circuits of different potentials and impedances.

## Ordering Information

ACPL-8x7 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 | No. of Channels | Surface Mount | Gull Wing | Tape & Reel | IEC/EN/ DIN EN 60747-5-2 | Quantity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rank '0' 50% <CTR< 600% | Rank 'B' 130% <CTR< 260% | Rank 'C' 200% <CTR< 400% | Rank 'G' 130% <CTR< 400% | | | | | | | |
| ACPL-827 | -000E | -00BE | -00CE | | 300mil DIP-8 | Dual | | | | | 50 pcs per tube |
| | -300E | -30BE | -30CE | | 300mil DIP-8 | | x | X | | | 50 pcs per tube |
| | -500E | -50BE | -50CE | | 300mil DIP-8 | | X | X | X | | 1000 pcs per reel |
| | -060E | -06BE | -06CE | | 300mil DIP-8 | | | | | X | 50 pcs per tube |
| | -360E | -36BE | -36CE | | 300mil DIP-8 | | x | X | | X | 50 pcs per tube |
| | -560E | -56BE | -56CE | | 300mil DIP-8 | | x | X | X | X | 1000 pcs per reel |
| | -W00E | -W0BE | -W0CE | | 400mil DIP-8 | | | | | | 50 pcs per tube |
| | -W60E | -W6BE | -W6CE | | 400mil DIP-8 | | | | | X | 50 pcs per tube |
| ACPL-847 | -000E | | | -00GE | 300mil DIP-16 | Quad | | | | | 25 pcs per tube |
| | -300E | | | -30GE | 300mil DIP-16 | | X | X | | | 25 pcs per tube |
| | -060E | | | -06GE | 300mil DIP-16 | | | | | X | 25 pcs per tube |
| | -360E | | | -36GE | 300mil DIP-16 | | X | X | | X | 25 pcs per tube |
| | -W00E | | | -W0GE | 400mil DIP-16 | | | | | | 25 pcs per tube |
| | -W60E | | | -W6GE | 400mil DIP-16 | | | | | X | 25 pcs 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:

ACPL-827-36GE to order product of 300mil DIP-8 Dual Channel DC Gull Wing Surface Mount package in Tube packaging with 130%<CTR<400%, IEC/EN/DIN EN 60747-5-2 Safety Approval and RoHS compliant.

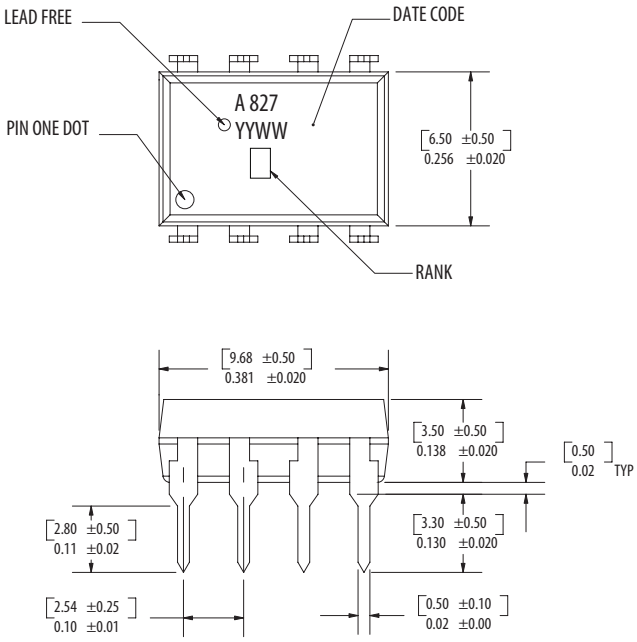
Example 2:

ACPL-847-W00E to order product of 400mil DIP-16 Quad Channel DC package in Tube packaging with 50%<CTR<600% and RoHS compliant.

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

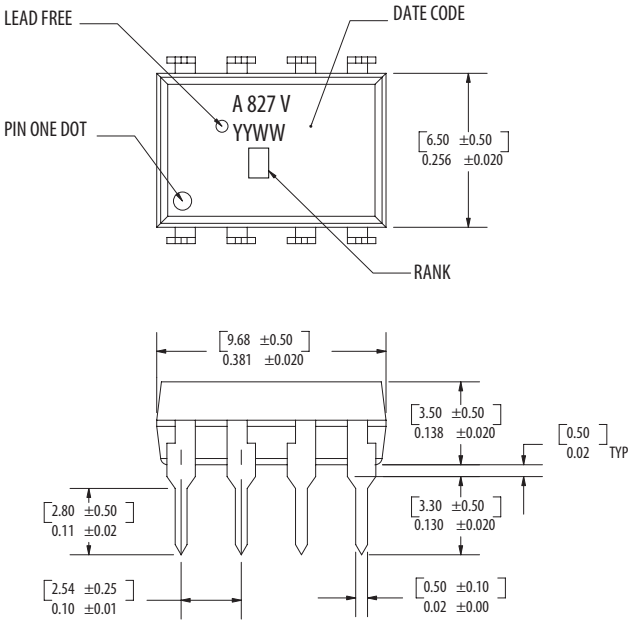
## Package Outline Drawings

### ACPL-827 Package Outline



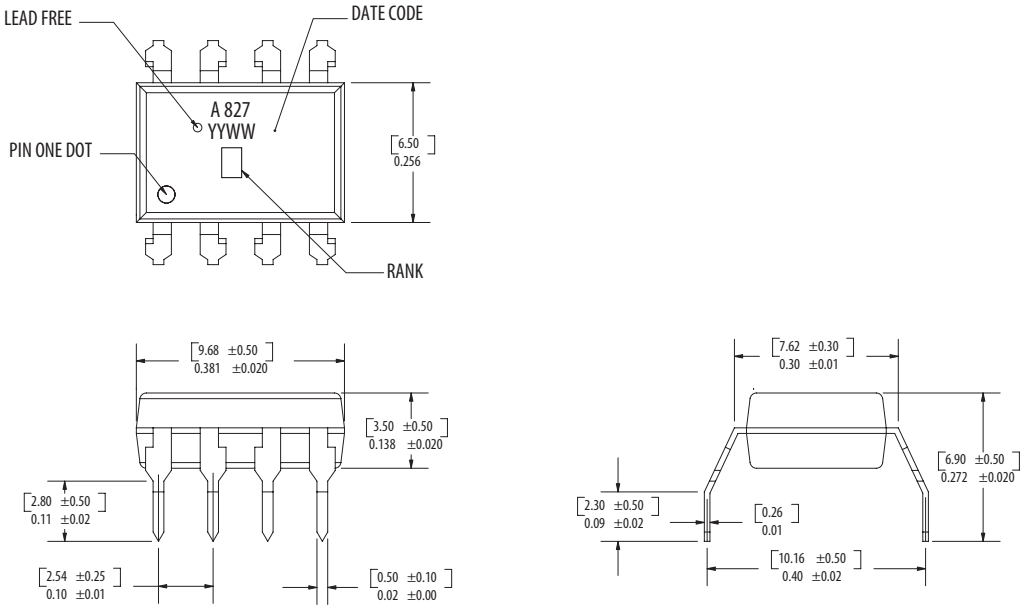

DIMENSIONS IN [MILLIMETERS] AND INCHES

### ACPL-827 Package Outline – Option 060



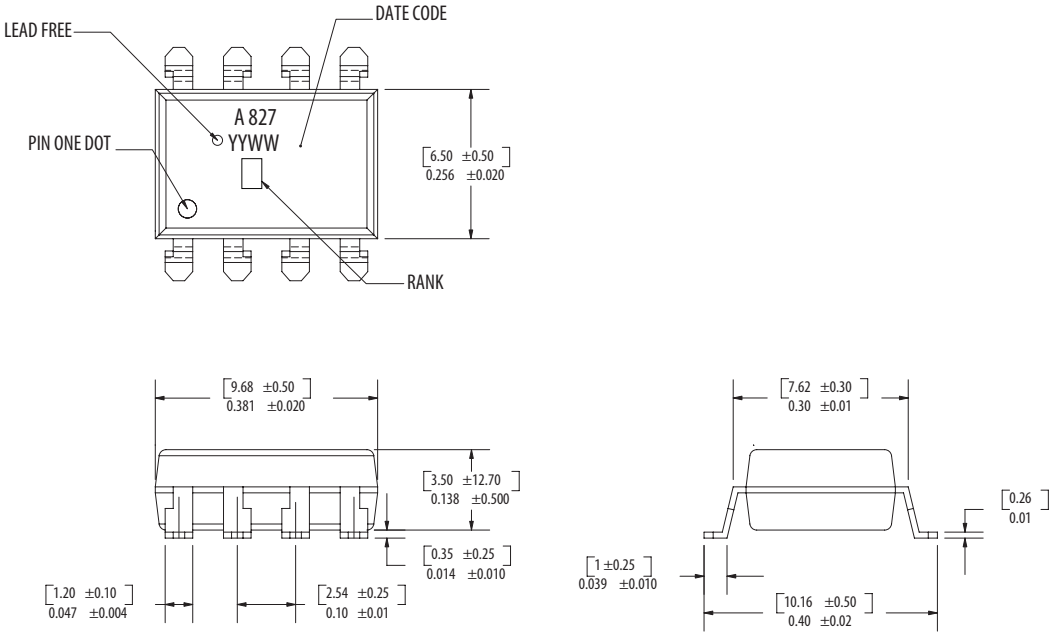

DIMENSIONS IN [MILLIMETERS] AND INCHES

### ACPL-827 Package Outline – Option W00



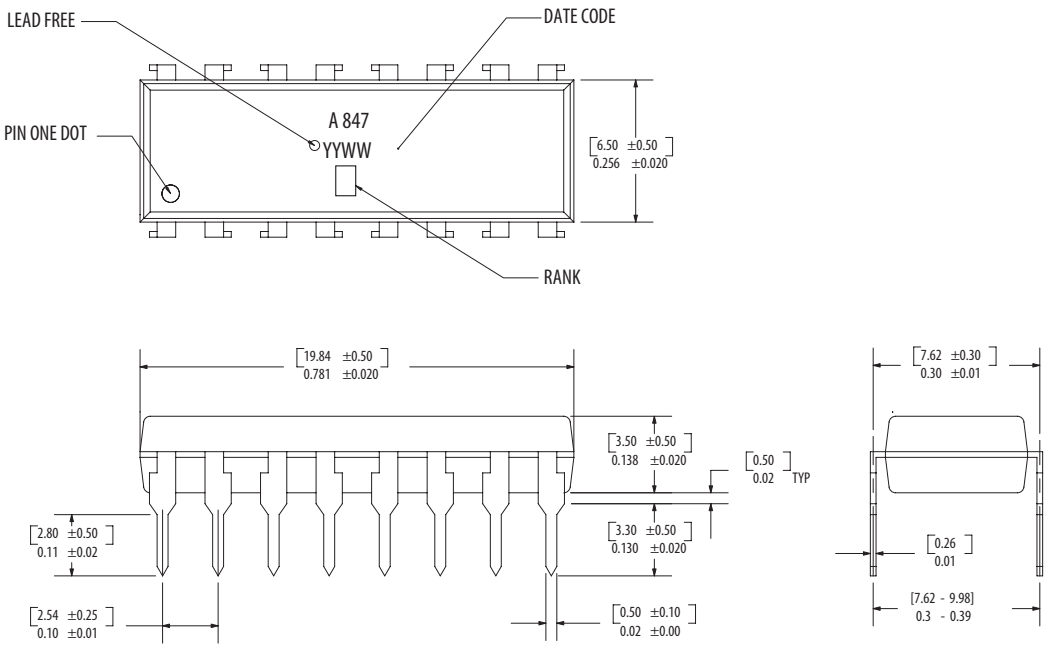

DIMENSIONS IN [MILLIMETERS] AND INCHES

### ACPL-827 Package Outline – Option 300



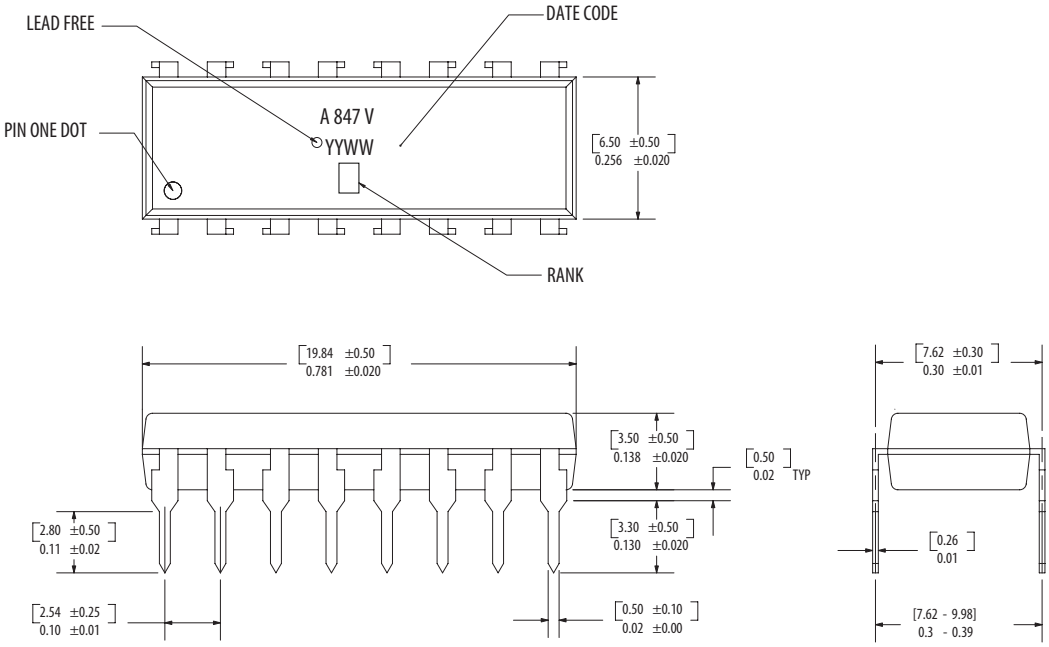

DIMENSIONS IN [MILLIMETERS] AND INCHES

### ACPL-847 Package Outline



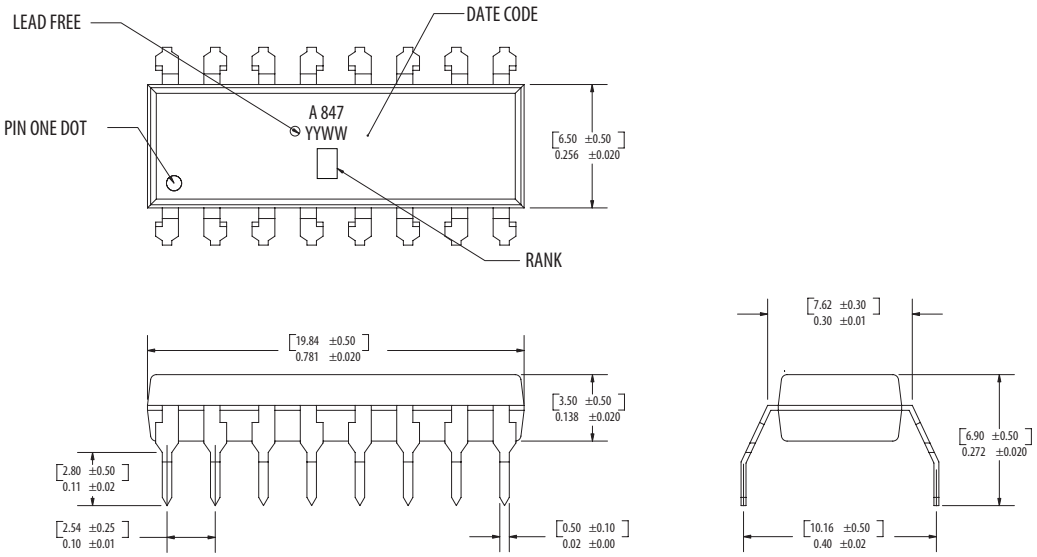

DIMENSIONS IN [MILLIMETERS] AND INCHES

### ACPL-847 Package Outline - Option 060



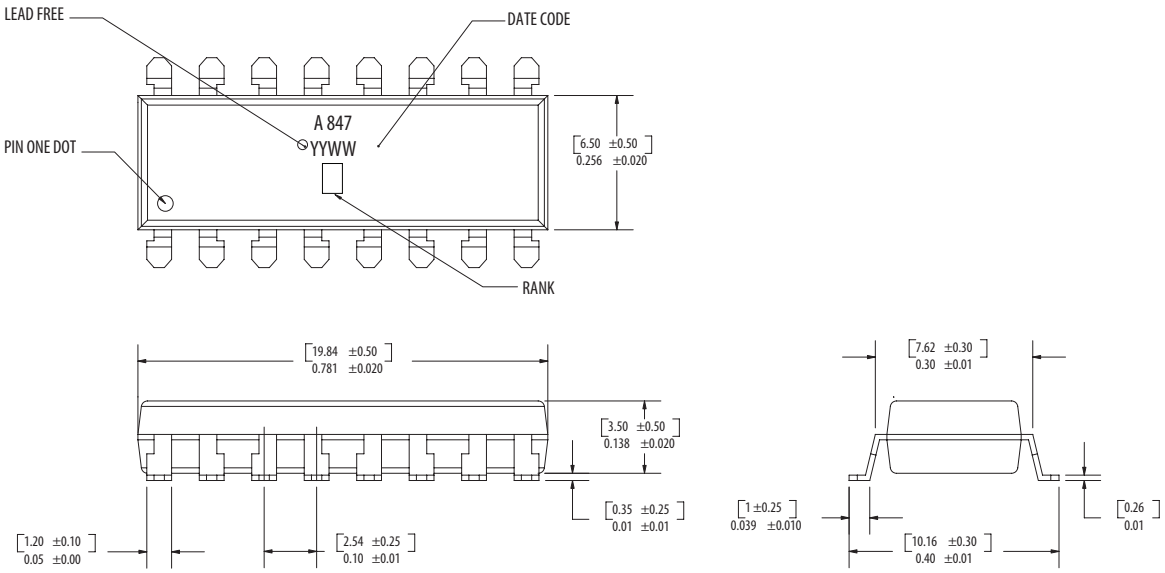

DIMENSIONS IN [MILLIMETERS] AND INCHES

### ACPL-847 Package Outline - Option W00




DIMENSIONS IN [MILLIMETERS] AND INCHES

### ACPL-847 Package Outline - Option 300

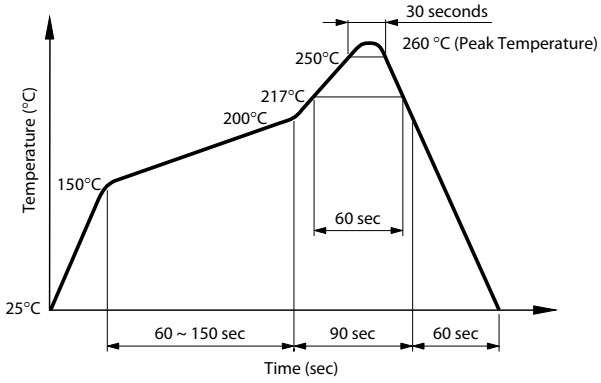



DIMENSIONS IN [MILLIMETERS] AND INCHES

## Solder Reflow Temperature Profile

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

Note: Non-halide flux should be used.



## Absolute Maximum Ratings

| Parameter | Symbol | Min. | Max. | Units | Note |
|---|---|---|---|---|---|
| Storage Temperature | $T_S$ | -55 | 125 | °C | |
| Operating Temperature | $T_A$ | -30 | 100 | °C | |
| Average Forward Current | $I_{F(AVG)}$ | - | 50 | mA | |
| Input Power Dissipation | $P_I$ | - | 70 | mW | |
| Input Reverse Voltage | $V_R$ | - | 6 | V | |
| Collector Current | $I_C$ | - | 50 | mA | |
| Collector-Emitter Voltage | $V_{CEO}$ | - | 70 | V | |
| Emitter-Collector Voltage | $V_{ECO}$ | - | 6 | V | |
| Isolation Voltage (AC for 1min, R.H. 40~60%) | $V_{ISO}$ | - | 5000 | $V_{RMS}$ | |
| Collector Power Dissipation | $P_C$ | - | 150 | mW | |
| Total Power Dissipation | $P_{TOT}$ | - | 200 | mW | |
| Lead Solder Temperature | 260°C for 10 sec., 1.6 mm below seating plane | | | | |

## Electrical Specifications (DC)

Over recommended operating conditions unless otherwise specified.

| Parameter | Symbol | Min. | Typ. | Max. | Units | Test Conditions | Note |
|---|---|---|---|---|---|---|---|
| Forward Voltage | $V_F$ | - | 1.2 | 1.4 | V | $I_F$ = 20mA | |
| Reverse Current | $I_R$ | - | - | 10 | μA | $V_R$ = 4V | |
| Terminal Capacitance | $C_t$ | | 30 | 250 | pF | V = 0, f = 1KHz | |
| Collector Dark Current | $I_{CEO}$ | | - | 100 | nA | $V_{CE}$ = 20V, $I_F$ = 0 mA | |
| Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | 70 | - | - | V | $I_C$ = 0.1 mA, $I_F$ = 0 mA | |
| Emitter-Collector Breakdown Voltage | $BV_{ECO}$ | 6 | - | - | V | $I_E$ = 10 μA, $I_F$ = 0 mA | |
| Collector Current | $I_C$ | 2.5 | - | 30 | mA | $I_F$ = 5 mA, $V_{CE}$ = 5V | CTR=($I_C$/$I_F$ )* 100% |
| Current Transfer Ratio | CTR | 50 | - | 600 | % | | |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | - | 0.1 | 0.2 | V | $I_F$ = 20 mA, $I_C$ = 1mA | |
| Isolation Resistance | $R_{ISO}$ | $5x10^{10}$ | $1x10^{11}$ | - | Ω | DC500V, R.H. 40~60% | |
| Floating Capacitance | $C_F$ | - | 0.6 | 1 | pF | V = 0, f = 1MHz | |
| Cut-off Frequency (-3dB) | $F_C$ | - | 80 | - | KHz | $V_{CE}$ = 5V, $I_C$ = 2 mA, RL = 100Ω | See fig 13 |
| Response Time (Rise) | $t_r$ | - | 4 | 18 | μs | $V_{CE}$ = 2V, $I_C$ = 2 mA, RL = 100Ω | See fig 12 |
| Response Time (Fall) | $t_f$ | - | 3 | 18 | μs | | |

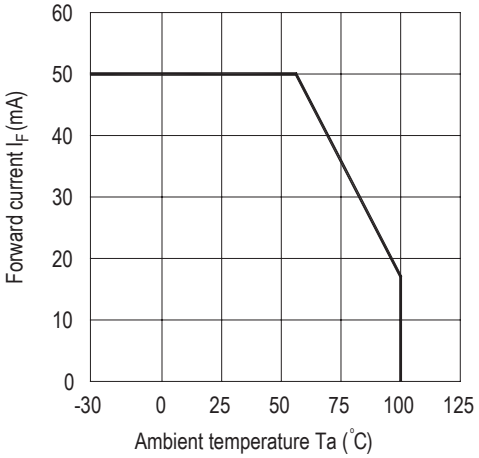



**Figure 1. Forward Current vs. Ambient Temperature.**

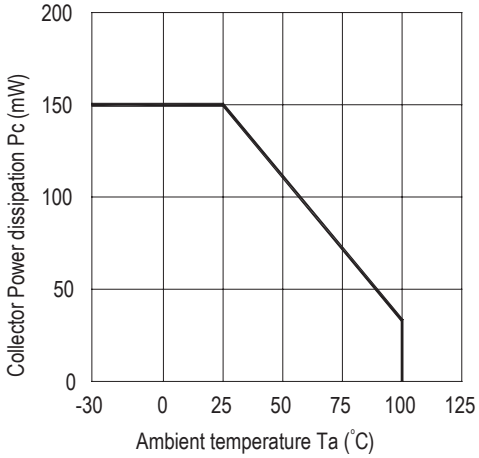



**Figure 2 Collector Power Dissipation vs. Ambient Temperature**

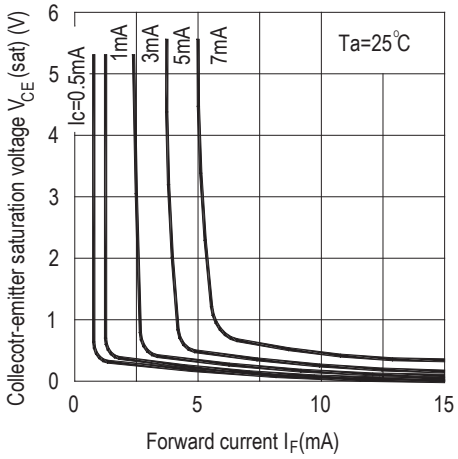



**Figure 3. Collector-emitter Saturation Voltage vs. Forward Current**

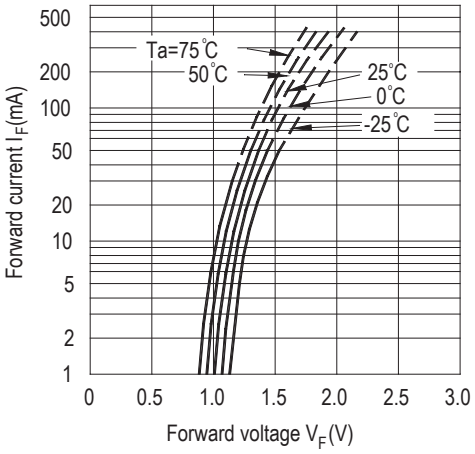



**Figure 4. Forward Current vs. Forward Voltage**

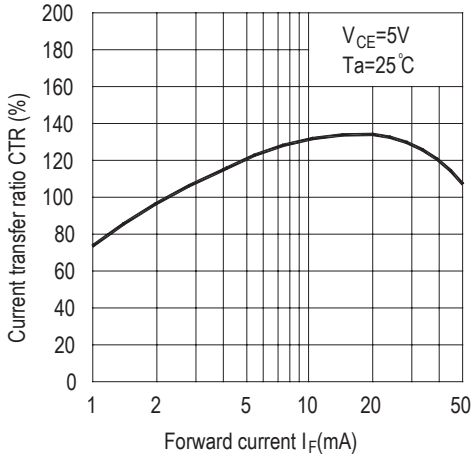



**Figure 5. Current Transfer Ratio vs. Forward Current**

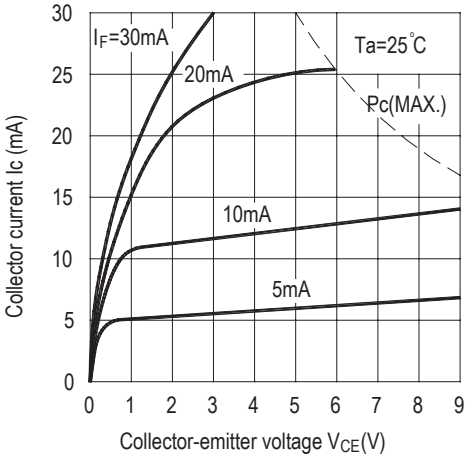



**Figure 6. Collector Current vs. Collector-emitter Voltage.**

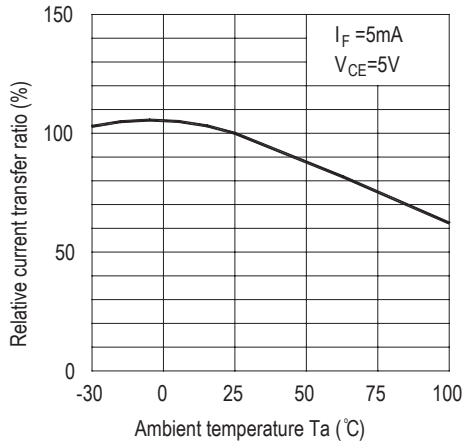



**Figure 7. Relative Current Transfer Ratio vs. Ambient Temperature**

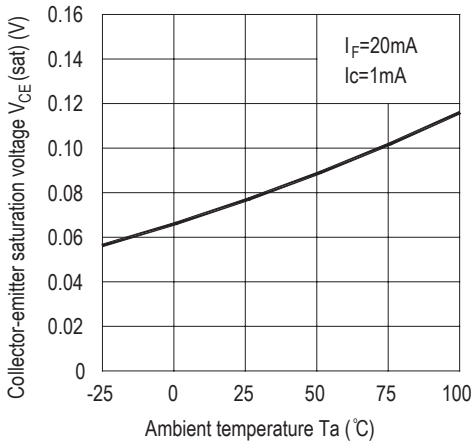



**Figure 8. Collector-emitter Saturation Voltage vs. Ambient Temperature**

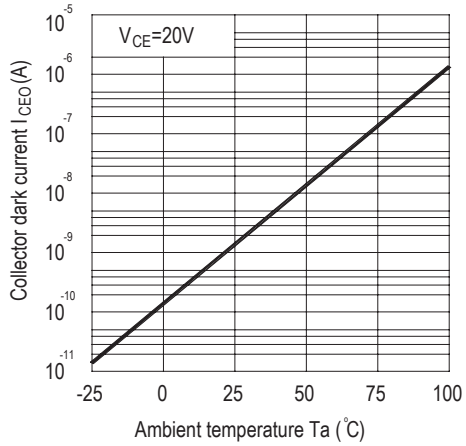



**Figure 9. Collector Dark Current vs. Ambient Temperature**

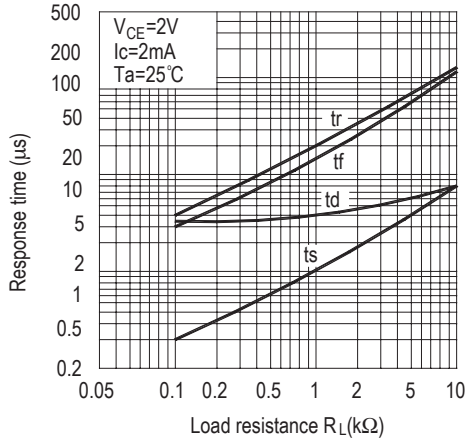



**Figure 10. Response Time vs. Load Resistance**

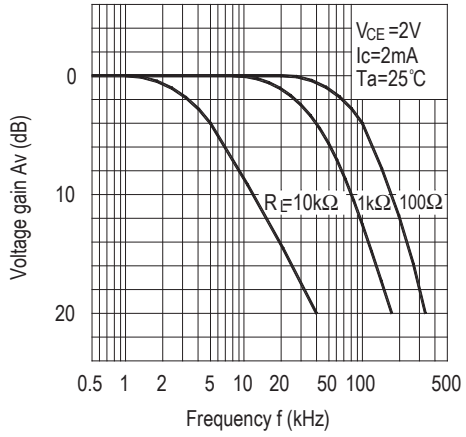



**Figure 11. Frequency Response**

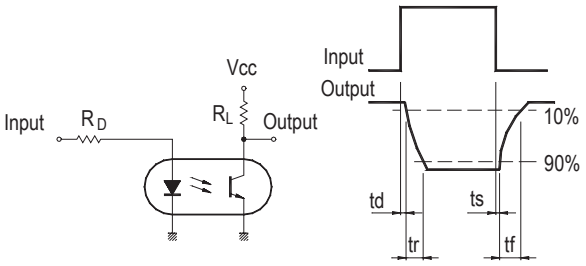



**Figure 12. Test Circuit for Response Time**

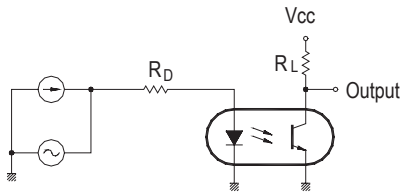



**Figure 13. Test Circuit for Frequency Response**

For product information and a complete list of distributors, please go to our web site: **www.avagotech.com**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