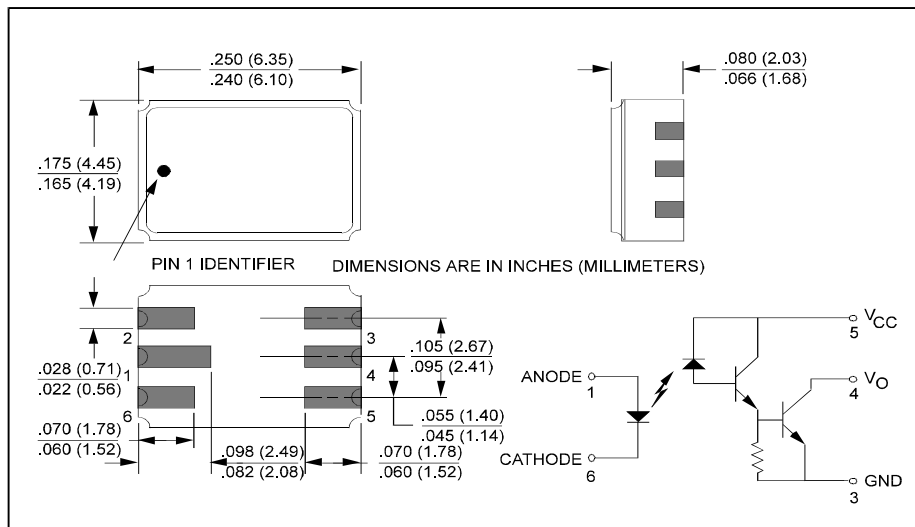


Surface Mount Optically Coupled Isolator Types HCC640, HCC640B



Features

- Surface mountable on ceramic or PC board
- 6N140A operating compatibility
- Key parameters guaranteed over -55° C to +125° C ambient temperature range
- Hermetically sealed
- Low power consumption
- High current transfer ratio
- Low input current requirement
- 1500 VDC isolation voltage

Description

The HCC 640 is a hermetically sealed, ceramic surface-mount optocoupler, consisting of a GaAlAs IRED coupled to an integrated high gain photodiode. The HCC640 is designed to be electrically equivalent to a single channel of the JEDEC 6N140 quad-channel device. The high gain, open-collector output provides both lower output saturation voltage and faster switching speeds than possible with standard photodarlington optocouplers. The high current transfer ratio at very low input currents makes the HCC640 ideal for use in MOS, CMOS and low power logic interfacing. The HCC640 is capable of operation and storage over the full military temperature range and can be supplied with full processing per Optek's Military screening procedure (based on MIL-STD-883) upon request.

Absolute Maximum Ratings (T_A = 25° C unless otherwise noted)

| | |
|--|-------------------|
| Operating Temperature Range | -55° C to +125° C |
| Storage Temperature Range | -65° C to +150° C |
| Soldering Temperature (vapor phase reflow for 30 sec.) | 215° C |
| Soldering Temperature (heated collet for 5 sec.) | 260° C |

Input Diode

| | |
|--|----------------------|
| Peak Input Current (≤1 ms duration, 500 pps) | 20 mA |
| Average Input Current, I _F (each channel) | 10 mA ⁽¹⁾ |
| Reverse Input Voltage, V _R | 5 V |

Output Photodetector

| | |
|---------------------------------|----------------------|
| Output Current, I _O | 40 mA |
| Output Voltage, V _O | -0.5 V to 20 V |
| Supply Voltage, V _{CC} | -0.5 V to 20 V |
| Output Power Dissipation | 75 mW ⁽³⁾ |

Notes:

- (1) Derate I_F at 0.66 mA/° C above 110° C.
- (2) Output power is collector output power plus one half of the total supply power. Derate at 5 mW/° C above 110° C.

Typical screening and lot acceptance tests are provided on page 13-4. For Hi-Rel order HCC640B. Minimum orders may apply.

Types HCC640, HCC640B

Electrical Characteristics ($T_A = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$ unless otherwise noted)

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|--|---|------|-----------|------|------------------------|--|
| Input Diode | | | | | | |
| V_F | Forward Voltage | | | 1.70 | V | $I_F = 1.60\text{ mA}$, $T_A = 25^{\circ}\text{C}$ |
| BV_R | Reverse Breakdown Voltage | 5.0 | | | V | $I_R = 10\ \mu\text{A}$, $T_A = 25^{\circ}\text{C}$ |
| $\frac{\Delta V_F}{\Delta T_A}$ | Temperature Coefficient of Forward Voltage | | -1.80 | | mV/ $^{\circ}\text{C}$ | $I_F = 1.60\text{ mA}$ |
| Coupled | | | | | | |
| CTR | Current Transfer Ratio | 300 | 1500 | | % | $I_F = 0.5\text{ mA}$, $V_O = 0.4\text{ V}$, $V_{CC} = 4.5\text{ V}$ |
| | | 300 | 1000 | | % | $I_F = 1.60\text{ mA}$, $V_O = 0.4\text{ V}$, $V_{CC} = 4.5\text{ V}$ |
| | | 200 | 500 | | % | $I_F = 5.0\text{ mA}$, $V_O = 0.4\text{ V}$, $V_{CC} = 4.5\text{ V}$ |
| V_{OL} | Logic Low Output Voltage | | 0.1 | 0.4 | V | $I_F = 0.5\text{ mA}$, $I_{OL} = 1.50\text{ mA}$, $V_{CC} = 4.5\text{ V}$ |
| V_{OL} | Logic Low Output Voltage | | 0.2 | 0.4 | V | $I_F = 5.0\text{ mA}$, $I_{OL} = 10\text{ mA}$, $V_{CC} = 4.5\text{ V}$ |
| I_{OH} | Logic High Output Current | | 0.001 | 250 | μA | $V_O = V_{CC} = 18\text{ V}$ |
| I_{CCL} | Logic Low Supply Current | | 0.40 | 1.0 | mA | $I_F = 1.60\text{ mA}$, $V_{CC} = 18\text{ V}$ |
| I_{CCH} | Logic High Supply Current | | 0.001 | 10 | μA | $I_F = 0$, $V_{CC} = 18\text{ V}$ |
| I_{I-O} | Input-Output Insulation Leakage Current | | | 1.0 | μA | 45% Relative Humidity, $T_A = 25^{\circ}\text{C}$ $t = 5\text{ sec}$, $V_{I-O} = 1500\text{ Vdc}$ |
| R_{I-O} | Resistance (Input-Output) | | 10^{12} | | Ω | $V_{I-O} = 500\text{ Vdc}$ |
| C_{I-O} | Capacitance (Input-Output) | | 1.5 | | pF | $f = 1\text{ MHz}$, $T_A = 25^{\circ}\text{C}$ |
| C_{I-I} | Capacitance (Input-Input) | | 1.0 | | pF | $f = 1\text{ MHz}$, $T_A = 25^{\circ}\text{C}$ |
| C_{IN} | Input Capacitance | | 60 | | pF | $f = 1\text{ MHz}$, $V_F = 0$, $T_A = 25^{\circ}\text{C}$ |
| I_{I-I} | Input-Input Insulation Leakage Current | | 0.5 | | nA | 45% Relative Humidity, $V_{I-I} = 500\text{ V}$ $T_A = 25^{\circ}\text{C}$, $t = 5\text{ sec}$ |
| R_{I-I} | Resistance (Input-Input) | | 10^{12} | | Ω | $V_{I-I} = 500\text{ V}$, $T_A = 25^{\circ}\text{C}$ |
| Switching Specification ($T_A = 25^{\circ}\text{C}$) | | | | | | |
| t_{PLH} | Propagation Delay Time to Logic High at Output | | 6.0 | 60 | μs | $I_F = 0.5\text{ mA}$, $R_L = 4.7\text{ k}\Omega$, $V_{CC} = 5\text{ V}$ |
| | | | 4.0 | 20 | μs | $I_F = 5\text{ mA}$, $R_L = 680\ \Omega$, $V_{CC} = 5\text{ V}$ |
| t_{PHL} | Propagation Delay Time to Logic Low at Output | | 30 | 100 | μs | $I_F = 0.5\text{ mA}$, $R_L = 4.7\text{ k}\Omega$, $V_{CC} = 5\text{ V}$ |
| | | | 2.0 | 5.0 | μs | $I_F = 5\text{ mA}$, $R_L = 680\ \Omega$, $V_{CC} = 5\text{ V}$ |
| CM_H | Common Mode Transient Immunity at Logic High Level Output | 500 | 1000 | | V/ μs | $I_F = 0$, $R_L = 1.5\text{ k}\Omega$ $ V_{CM} = 50\text{ V}_{P-P}$ $V_{CC} = 5\text{ V}$ |
| CM_L | Common Mode Transient Immunity at Logic Low Level Output | -500 | -1000 | | V/ μs | $I_F = 1.60\text{ mA}$, $R_L = 1.5\text{ k}\Omega$ $ V_{CM} = 50\text{ V}_{P-P}$ $V_{CC} = 5\text{ V}$ |

HI-REL
SURFACE
MOUNT

Optek reserves the right to make changes at any time in order to improve design and to supply the best product possible.

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