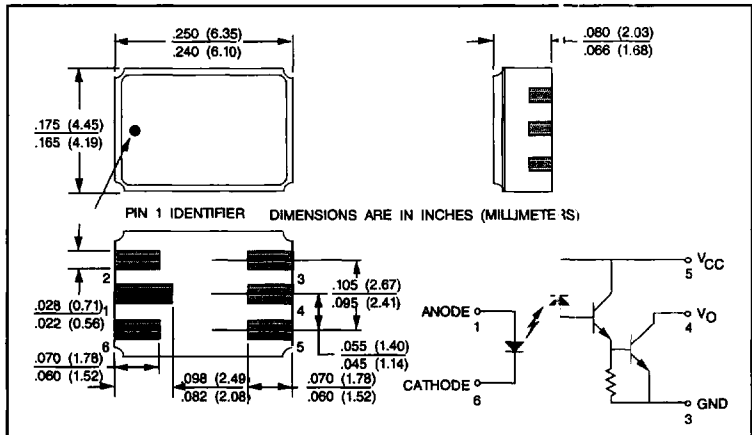
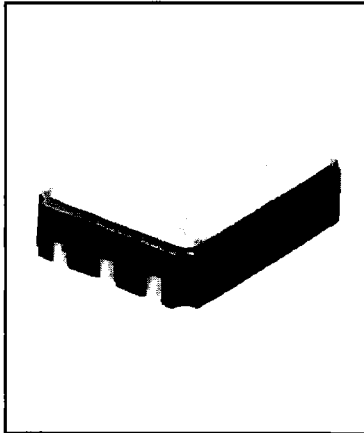


# Surface Mount Optically Coupled Isolator Type HCC640



## 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 HCC640 is a hermetically sealed, ceramic surface-mount optocoupler, consisting of a GaAlAs IRED coupled to an integrated high gain photodiode. The HCC640 is electrically equivalent to a single channel of the Optek's HDA140A (6N140A) 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<sub>A</sub> = 25°C unless otherwise noted)

Operating Temperature	-55°C to +125°C
Storage Temperature	-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 <sub>F</sub> (each channel)	10.0 mA <sup>(1)</sup>
Reverse Input Voltage, V <sub>R</sub>	5.0 V

## Output Photodetector

Output Current, I <sub>O</sub>	40 mA
Output Voltage, V <sub>O</sub>	-0.5 to 20 V <sup>(2)</sup>
Supply Voltage, V <sub>CC</sub>	-0.5 to 20 V <sup>(2)</sup>
Output Power Dissipation	75 mW <sup>(3)</sup>

## Notes:

- (1) Derate I<sub>F</sub> at 0.66 mA/°C above 110°C.
- (2) Pin 3 (Ground) should be the most negative voltage at the detector side. Keeping V<sub>CC</sub> as low as possible, but greater than 2.0 volts, will provide lowest total I<sub>OH</sub> over temperature.
- (3) Output power is collector output power plus one half of the total supply power. Derate at 5.0 mW/°C above 110°C.

For Hi-Rel order HCC640TXV.

# Type HCC640

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

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
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## 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	$I_R = 10.0 \mu\text{A}$ , $T_A = 25^{\circ}\text{C}$
$\frac{\Delta V_F}{\Delta T_A}$	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	$I_F = 5.0 \text{ mA}$ , $I_{OL} = 10.0 \text{ mA}$ , $V_{CC} = 4.5 \text{ V}$
$I_{OH}$	Logic High Output Current		0.001	250	$\mu\text{A}$	$V_O = V_{CC} = 18 \text{ V}$
$I_{CCL}$	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	$\mu\text{A}$	$I_F = 0$ , $V_{CC} = 18 \text{ V}$
$I_{I-O}$	Input-Output Insulation Leakage Current			1.0	$\mu\text{A}$	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)		$10^{12}$		$\Omega$	$V_{I-O} = 500 \text{ Vdc}$
$C_{I-O}$	Capacitance (Input-Output)		1.5		pF	$f = 1.0 \text{ MHz}$ , $T_A = 25^{\circ}\text{C}$
$C_{I-I}$	Capacitance (Input-Input)		1.0		pF	$f = 1.0 \text{ MHz}$ , $T_A = 25^{\circ}\text{C}$
$C_{IN}$	Input Capacitance		60		pF	$f = 1.0 \text{ MHz}$ , $V_F = 0$ , $T_A = 25^{\circ}\text{C}$
$I_{I-I}$	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)		$10^{12}$		$\Omega$	$V_{I-I} = 500 \text{ V}$ , $T_A = 25^{\circ}\text{C}$

## Switching Specification ( $T_A = 25^{\circ}\text{C}$ )

$t_{PLH}$	Propagation Delay Time To Logic High At Output		6.0	60	$\mu\text{s}$	$I_F = 0.5 \text{ mA}$ , $R_L = 4.7 \text{ k}\Omega$ , $V_{CC} = 5.0 \text{ V}$
			4.0	20	$\mu\text{s}$	$I_F = 5.0 \text{ mA}$ , $R_L = 680 \Omega$ , $V_{CC} = 5.0 \text{ V}$
$t_{PHL}$	Propagation Delay Time To Logic Low At Output		30	100	$\mu\text{s}$	$I_F = 0.5 \text{ mA}$ , $R_L = 4.7 \text{ k}\Omega$ , $V_{CC} = 5.0 \text{ V}$
			2.0	5.0	$\mu\text{s}$	$I_F = 5.0 \text{ mA}$ , $R_L = 680 \Omega$ , $V_{CC} = 5.0 \text{ V}$
$CM_H$	Common Mode Transient Immunity At Logic High Level Level Output	500	1000		V/ $\mu\text{s}$	$I_F = 0$ , $R_L = 1.5 \text{ k}\Omega$ $ V_{CM}  = 50 \text{ V}_{p-p}$ $V_{CC} = 5.0 \text{ V}$
$CM_L$	Common Mode Transient Immunity At Logic Low Level Level Output	-500	-1000		V/ $\mu\text{s}$	$I_F = 1.60 \text{ mA}$ , $R_L = 1.5 \text{ k}\Omega$ $ V_{CM}  = 50 \text{ V}_{p-p}$ $V_{CC} = 5.0 \text{ V}$

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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