

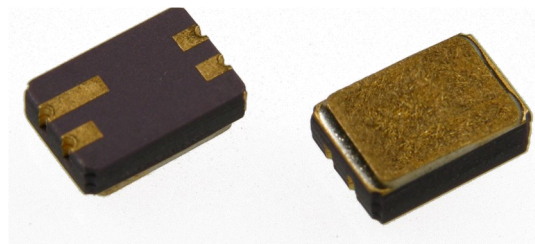
# Surface Mount Optically Coupled Isolator



## HCC240, HCC242 (TX, TXV, ESA-XN)

### Features:

- Surface mountable on ceramic or printed circuit board
- Miniature package saves circuit board area
- Electrical performance similar to 4N22A and 4N24A
- Hermetically sealed
- Screened per MIL-PRF-19500 TX and TXV equivalent levels or per ESA 5000



### Description:

The HCC240 and HCC242 are optically coupled isolators, consisting of a gallium aluminum arsenide LED and a silicon phototransistor mounted and coupled in a miniature surface mount hermetic leadless chip carrier. The HCC240 and HCC242 are identical except for the DC current transfer ratio. Electrical parameters are similar to the JEDEC registered 4N22A and 4N24A. These solid state couplers are ideal for designs where board space and device weight are important design considerations. Typical screening and lot acceptance tests are provided on page 13-4. The burn-in condition is VCE = 9 V, PD = 275 mW, IF = 20-50 mA (adjusted to achieve PD). No HTRB is performed on this device.

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

|                                                        |                                             |
|--------------------------------------------------------|---------------------------------------------|
| Input-to-Output Isolation Voltage                      | $\pm 1.0\text{ kVDC}^{(1)}$                 |
| Operating Temperature                                  | $-55^\circ\text{C}$ to $+125^\circ\text{C}$ |
| Storage Temperature                                    | $-65^\circ\text{C}$ to $+150^\circ\text{C}$ |
| Soldering Temperature (vapor phase reflow for 30 sec.) | $215^\circ\text{C}$                         |
| Soldering Temperature (heated collet for 5 sec.)       | $260^\circ\text{C}$                         |

#### Input Diode

|                                                |                      |
|------------------------------------------------|----------------------|
| Forward DC Current ( $65^\circ\text{C}$ below) | 40 mA                |
| Reverse Voltage                                | 2.0 V                |
| Power Dissipation                              | 60 mW <sup>(2)</sup> |

#### Output Phototransistor

|                              |                       |
|------------------------------|-----------------------|
| Continuous Collector Current | 50 mA                 |
| Collector-Emitter Voltage    | 30 V <sup>(3)</sup>   |
| Emitter-Collector Voltage    | 5.0 V <sup>(4)</sup>  |
| Power Dissipation            | 300 mW <sup>(5)</sup> |

#### Notes:

- (1) Measured with inputs shorted together and outputs shorted together.
- (2) Derate linearly  $1.0\text{ mW}/^\circ\text{C}$  above  $65^\circ\text{C}$ .
- (3) HCC240HV and HCC242HV are available rated at 55 V minimum.
- (4) HCC240HV and HCC242HV are available rated at 7.0 V minimum.
- (5) Derate linearly  $3.0\text{ mW}/^\circ\text{C}$  above  $25^\circ\text{C}$ .
- (6) Some deviations from ESA 5000 apply. See page 13-4 for details.

#### General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

TT Electronics | Optek Technology, Inc.  
1645 Wallace Drive, Ste. 130, Carrollton, TX USA 75006 | Ph: +1 214-323-2200  
www.ttelectronics.com | sensors@ttelectronics.com

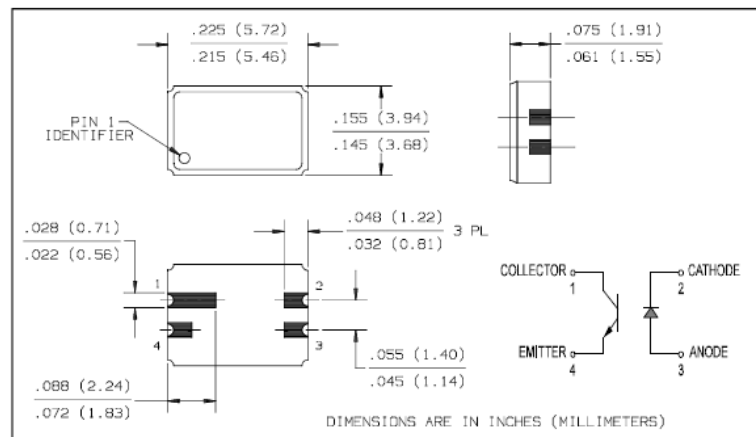
# Surface Mount Optically Coupled Isolator



## Performance

Electrical Characteristics ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| SYMBOL                 | PARAMETER                                          | MIN              | TYP  | MAX          | UNITS    | TEST CONDITIONS                                                            |
|------------------------|----------------------------------------------------|------------------|------|--------------|----------|----------------------------------------------------------------------------|
| Input Diode            |                                                    |                  |      |              |          |                                                                            |
| V <sub>F</sub>         | Forward Voltage                                    | 0.80             |      | 1.5          | V        | I <sub>F</sub> = 10.0 mA                                                   |
|                        |                                                    | 1.00             |      | 1.7          | V        | I <sub>F</sub> = 10.0 mA, T <sub>A</sub> = -55° C                          |
|                        |                                                    | 0.70             |      | 1.3          | V        | I <sub>F</sub> = 10.0 mA, T <sub>A</sub> = 100° C                          |
| I <sub>R</sub>         | Reverse Current                                    |                  |      | 100          | μA       | V <sub>R</sub> = 2.0 V                                                     |
| Output Phototransistor |                                                    |                  |      |              |          |                                                                            |
| V <sub>(BR)CEO</sub>   | Collector-Emitter Breakdown Voltage <sup>(3)</sup> | 30               |      |              | V        | I <sub>C</sub> = 1.0 mA, I <sub>F</sub> = 0                                |
| V <sub>(BR)ECO</sub>   | Emitter-Collector Breakdown Voltage <sup>(4)</sup> | 5.0              |      |              | V        | I <sub>E</sub> = 100 μA, I <sub>F</sub> = 0                                |
| I <sub>C(OFF)</sub>    | Collector-Emitter Dark Current                     |                  |      | 100          | nA       | V <sub>CE</sub> = 20 V, I <sub>F</sub> = 0                                 |
|                        |                                                    |                  |      | 100          | μA       | V <sub>CE</sub> = 20 V, I <sub>F</sub> = 0, T <sub>A</sub> = 100° C        |
| Coupled                |                                                    |                  |      |              |          |                                                                            |
| I <sub>C(ON)</sub>     | On-State Collector Current<br>HCC240               | 0.15             |      |              | mA       | V <sub>CE</sub> = 5.0 V, I <sub>F</sub> = 2.0 mA                           |
|                        |                                                    | 2.5              | 6.0  |              | mA       | V <sub>CE</sub> = 5.0 V, I <sub>F</sub> = 10.0 mA                          |
|                        |                                                    | 1.0              |      |              | mA       | V <sub>CE</sub> = 5.0 V, I <sub>F</sub> = 10.0 mA, T <sub>A</sub> = -55° C |
|                        |                                                    | 1.0              |      |              | mA       | V <sub>CE</sub> = 5.0 V, I <sub>F</sub> = 10.0 mA, T <sub>A</sub> = 100° C |
|                        | HCC242                                             | 0.40             |      |              | mA       | V <sub>CE</sub> = 5.0 V, I <sub>F</sub> = 2.0 mA                           |
|                        |                                                    | 10.0             | 15.0 |              | mA       | V <sub>CE</sub> = 5.0 V, I <sub>F</sub> = 10.0 mA                          |
|                        |                                                    | 4.0              |      |              | mA       | V <sub>CE</sub> = 5.0 V, I <sub>F</sub> = 10.0 mA, T <sub>A</sub> = -55° C |
|                        |                                                    | 4.0              |      |              | mA       | V <sub>CE</sub> = 5.0 V, I <sub>F</sub> = 10.0 mA, T <sub>A</sub> = 100° C |
| V <sub>CE(SAT)</sub>   | Collector-Emitter Saturation Voltage<br>HCC240     |                  |      | 0.30         | V        | I <sub>C</sub> = 2.5 mA, I <sub>F</sub> = 20.0 mA                          |
|                        | HCC242                                             |                  |      | 0.30         | V        | I <sub>C</sub> = 10.0 mA, I <sub>F</sub> = 20.0 mA                         |
| R <sub>I-O</sub>       | Resistance (Input to Output)                       | 10 <sup>11</sup> |      |              | Ω        | V <sub>I-O</sub> = ±1000 VDC <sup>(1)</sup>                                |
| C <sub>I-O</sub>       | Capacitance (Input to Output)                      |                  |      | 5.0          | pF       | V <sub>I-O</sub> = 0.0 V, f = 1.0 MHz <sup>(1)</sup>                       |
| t <sub>r</sub>         | Output Rise Time<br>HCC240<br><br>HCC242           |                  |      | 15.0<br>20.0 | μs<br>μs | V <sub>CC</sub> = 10.0 V, I <sub>F</sub> = 10.0 mA, R <sub>L</sub> = 100 Ω |
| t <sub>f</sub>         | Output Fall Time<br>HCC240<br><br>HCC242           |                  |      | 15.0<br>20.0 | μs<br>μs | V <sub>CC</sub> = 10.0 V, I <sub>F</sub> = 10.0 mA, R <sub>L</sub> = 100 Ω |



### General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

TT Electronics | Optek Technology, Inc.  
1645 Wallace Drive, Ste. 130, Carrollton, TX USA 75006 | Ph: +1 214-323-2200  
www.ttelectronics.com | sensors@ttelectronics.com