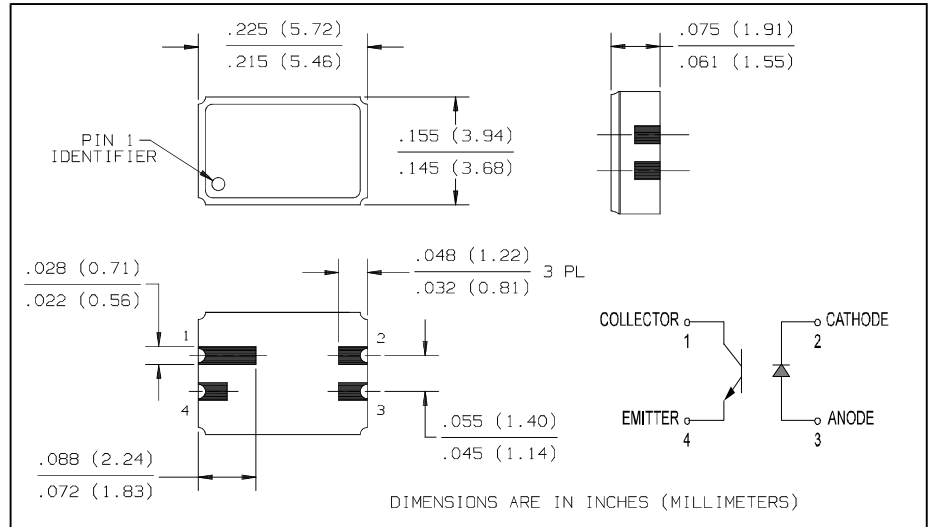


# Surface Mount Optically Coupled Isolator

## Types 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<sup>(6)</sup>

### 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  $V_{CE} = 9\text{ V}$ ,  $P_D = 275\text{ mW}$ ,  $I_F = 20\text{-}50\text{ mA}$  (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.

# Types HCC240, HCC242, TX, TXV, ESA-XN

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

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS	
<b>Input Diode</b>							
$V_F$	Forward Voltage	0.80		1.5	V	$I_F = 10.0\text{ mA}$	
		1.00		1.7	V	$I_F = 10.0\text{ mA}$ , $T_A = -55^\circ\text{C}$	
		0.70		1.3	V	$I_F = 10.0\text{ mA}$ , $T_A = 100^\circ\text{C}$	
$I_R$	Reverse Current			100	$\mu\text{A}$	$V_R = 2.0\text{ V}$	
<b>Output Phototransistor</b>							
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage <sup>(3)</sup>	30			V	$I_C = 1.0\text{ mA}$ , $I_F = 0$	
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage <sup>(4)</sup>	5.0			V	$I_E = 100\ \mu\text{A}$ , $I_F = 0$	
$I_{C(OFF)}$	Collector-Emitter Dark Current			100	nA	$V_{CE} = 20\text{ V}$ , $I_F = 0$	
				100	$\mu\text{A}$	$V_{CE} = 20\text{ V}$ , $I_F = 0$ , $T_A = 100^\circ\text{C}$	
<b>Coupled</b>							
$I_{C(ON)}$	On-State Collector Current	HCC240	0.15			mA	$V_{CE} = 5.0\text{ V}$ , $I_F = 2.0\text{ mA}$
			2.5	6.0		mA	$V_{CE} = 5.0\text{ V}$ , $I_F = 10.0\text{ mA}$
			1.0			mA	$V_{CE} = 5.0\text{ V}$ , $I_F = 10.0\text{ mA}$ , $T_A = -55^\circ\text{C}$
	HCC242		1.0			mA	$V_{CE} = 5.0\text{ V}$ , $I_F = 10.0\text{ mA}$ , $T_A = 100^\circ\text{C}$
			0.40			mA	$V_{CE} = 5.0\text{ V}$ , $I_F = 2.0\text{ mA}$
			10.0	15.0		mA	$V_{CE} = 5.0\text{ V}$ , $I_F = 10.0\text{ mA}$
			4.0			mA	$V_{CE} = 5.0\text{ V}$ , $I_F = 10.0\text{ mA}$ , $T_A = -55^\circ\text{C}$
4.0			mA	$V_{CE} = 5.0\text{ V}$ , $I_F = 10.0\text{ mA}$ , $T_A = 100^\circ\text{C}$			
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	HCC240		0.30	V	$I_C = 2.5\text{ mA}$ , $I_F = 20.0\text{ mA}$	
		HCC242		0.30	V	$I_C = 10.0\text{ mA}$ , $I_F = 20.0\text{ mA}$	
$R_{I-O}$	Resistance (Input to Output)	$10^{11}$			$\Omega$	$V_{I-O} = \pm 1000\text{ VDC}^{(1)}$	
$C_{I-O}$	Capacitance (Input to Output)			5.0	pF	$V_{I-O} = 0.0\text{ V}$ , $f = 1.0\text{ MHz}^{(1)}$	
$t_r$	Output Rise Time	HCC240		15.0	$\mu\text{s}$	$V_{CC} = 10.0\text{ V}$ , $I_F = 10.0\text{ mA}$ , $R_L = 100\ \Omega$	
		HCC242		20.0	$\mu\text{s}$		
$t_f$	Output Fall Time	HCC240		15.0	$\mu\text{s}$	$V_{CC} = 10.0\text{ V}$ , $I_F = 10.0\text{ mA}$ , $R_L = 100\ \Omega$	
		HCC242		20.0	$\mu\text{s}$		

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

Optek Technology, Inc. 1215 W. Crosby Road Carrollton, Texas 75006 (972) 323-2200 Fax (972) 323-2396