

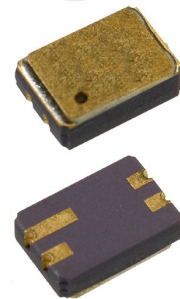
# Hi-Reliability RAD Capable Optoisolator

HCC1002



**Features:**

- TID Capable to 100Krad (SI)/cm2 ELDRS (0.1rad/s)
- Neutron capable to 1E12 neutrons (14MeV)
- TX & TXV Processing available to MIL-STD-19500
- 1 KV electrical isolation

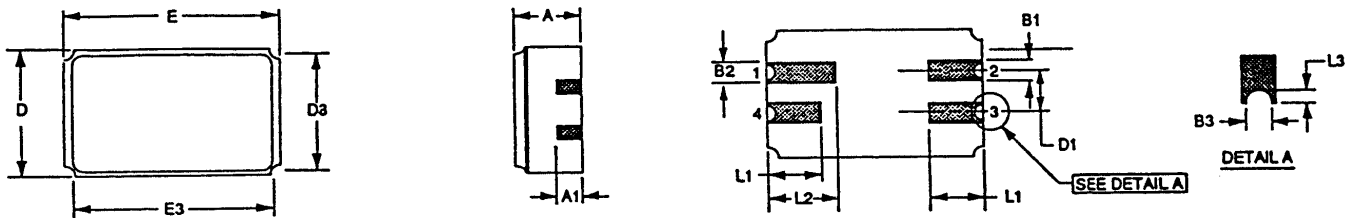


**Description:**

This device is similar to Optek’s 4N series of optoisolators with exception of the die. TX & TXV processing is per MIL-PRF-19500 and can be modified per customer SCDs. Each device consists of a IRLED & NPN transistor mounted in a hermetic 4 pin LCC SMD.

**Applications:**

Circuit electrical isolation in space applications such as satellites, launchers, space vehicles and planetary rovers



Dimensions				
Inches			Millimeters	
Ltr	Min	Max	Min	Max
A	.061	.075	1.55	1.90
A1	.026	.034	0.66	0.88
B1	.022	.028	0.56	0.71
B2	.072 Ref		1.83 Ref	
B3	.006	.022	0.15	0.56
D	.145	.155	3.68	3.93
D1	.045	.055	1.14	1.39
D3	-	.155	-	3.93
E	.215	.225	5.46	5.71
E3	-	.225	-	5.71
L1	.032	.048	0.81	1.22
L2	.072	.088	1.83	2.23
L3	.003	.007	0.08	0.18
N	4			
ND	2			
NE	0			

**General Note**

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### Electrical Specifications

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

Storage Temperature Range	-55° C to +150° C
Operating Temperature Range	-55° C to +150° C
Input-to-Output Isolation Voltage	$\pm 1.00\text{ kVDC}^{(1)}$
Lead Soldering Temperature (TO-78 Metal Can) [1/16 inch (1.6 mm) from case for 5 seconds with soldering iron]	260° C <sup>(2)</sup>
Soldering Temperature (SMD) Vapor Phase Reflow for 30 seconds	215° C

#### Input Diode (LED)

Forward DC Current (65° C or below)	40 mA
Reverse Voltage	2 V
Power Dissipation	60 mW <sup>(3)</sup>

#### Output Phototransistor:

Continuous Collector Current	50 mA
Collector-Emitter Voltage	40 V
Power Dissipation	300 mW <sup>(4)</sup>

#### Notes:

1. Measured with input leads shorted together and output leads shorted together.
2. RMA flux is recommended.
3. Derate linearly 1.0 mW/° C above 65° C.
4. Derate linearly 3.0 mW/° C above 25° C.

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### Performance

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

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
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#### Input Diode

$V_F$	Forward Voltage	0.80 1.00 0.70	- - -	1.70 1.9 1.50	V	$I_F = 10.0\text{ mA}$ $I_F = 10.0\text{ mA}, T_A = -55^\circ\text{C}$ $I_F = 10.0\text{ mA}, T_A = 125^\circ\text{C}$
$I_R$	Reverse Current	-	-	100	$\mu\text{A}$	$V_R = 2.0\text{ V}$

#### Output Phototransistor

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	40	-	-	V	$I_C = 1.0\text{ mA}, I_B = 0, I_F = 0$
$V_{(BR)EBO}$	Emitter-Collector Breakdown Voltage	7	-	-	V	$I_E = 100\ \mu\text{A}, I_C = 0, I_F = 0$
$I_{C(OFF)}^1$	Collector-Emitter Dark Current	-	-	100	nA	$V_{CE} = 20\text{ V}, I_B = 0, I_F = 0$
$I_{C(OFF)}^2$	Collector-Emitter Dark Current	-	-	100	$\mu\text{A}$	$V_{CE} = 20\text{ V}, I_B = 0, I_F = 0, T_A = 100^\circ\text{C}$

#### Coupled

$I_{C(ON)}$	On-State Collector Current	1 15 10 15	- - - -	- - - -	mA	$I_F = 1.0\text{ mA}, V_{CE} = 1.0\text{ V}, I_B = 0$ $I_F = 15.0\text{ mA}, V_{CE} = 1.0\text{ V}, I_B = 0$ $I_F = 10.0\text{ mA}, V_{CE} = 5.0\text{ V}, I_B = 0$ $I_F = 15.0\text{ mA}, V_{CE} = 5.0\text{ V}, I_B = 0$
		2.8 2.0	- -	- -		$I_F = 2.0\text{ mA}, V_{CE} = 5.0\text{ V}, I_B = 0, T_A = -55^\circ\text{C}$ $I_F = 2.0\text{ mA}, V_{CE} = 5.0\text{ V}, I_B = 0, T_A = 100^\circ\text{C}$
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	-	-	0.30	V	$I_F = 20.0\text{ mA}, I_C = 10.0\text{ mA}, I_B = 0$
$R_{IO}$	Resistance (Input-to-Output)	$10^{11}$	-	-	$\Omega$	$V_{I-O} = \pm 1000\text{ VDC}^{(1)}$
$C_{IO}$	Capacitance (Input-to-Output)	-	-	5	pF	$V_{I-O} = 0\text{ V}, f = 1.0\text{ MHz}^{(1)}$
$T_R, T_F$	Rise and Fall Time	-	-	20	$\mu\text{s}$	$V_{CC} = 10.0\text{ V}, I_F = 10.0\text{ mA}, R_L = 100\ \Omega$

#### Notes:

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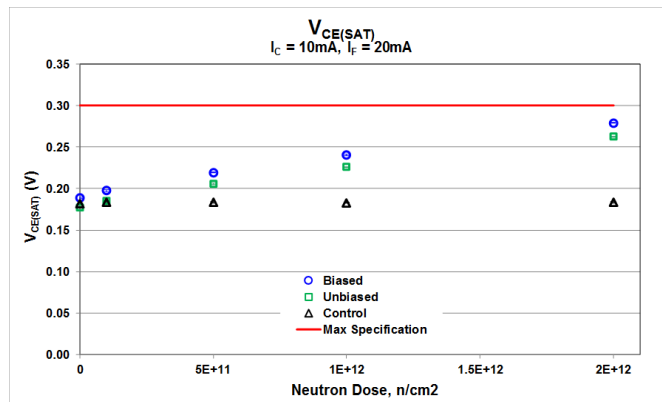
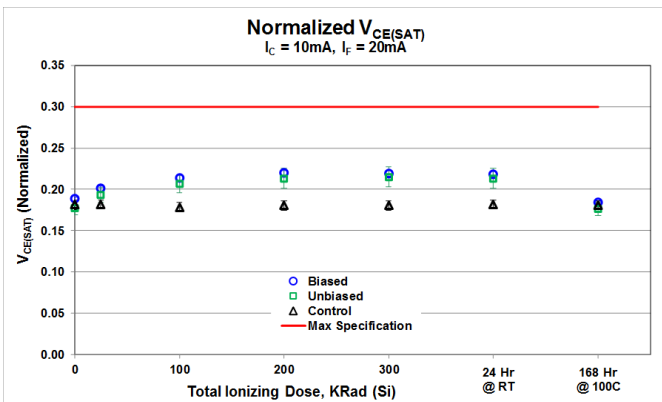
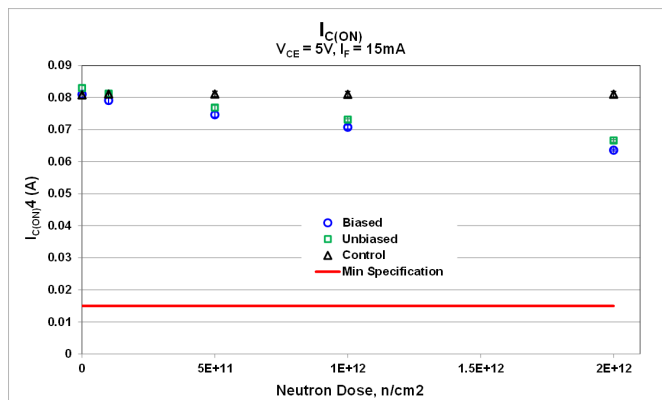
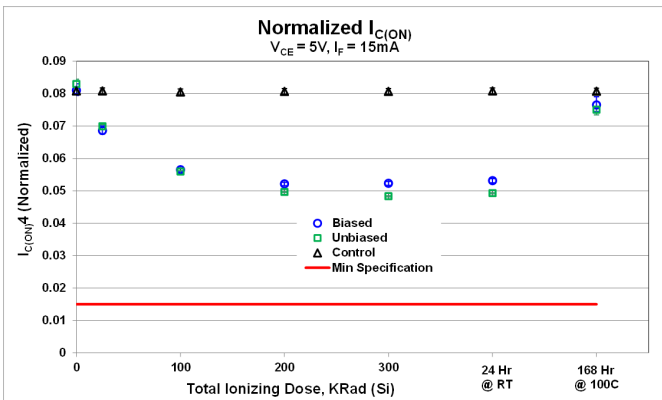
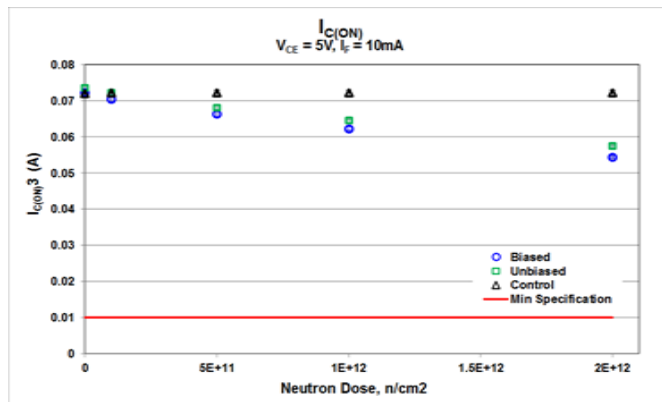
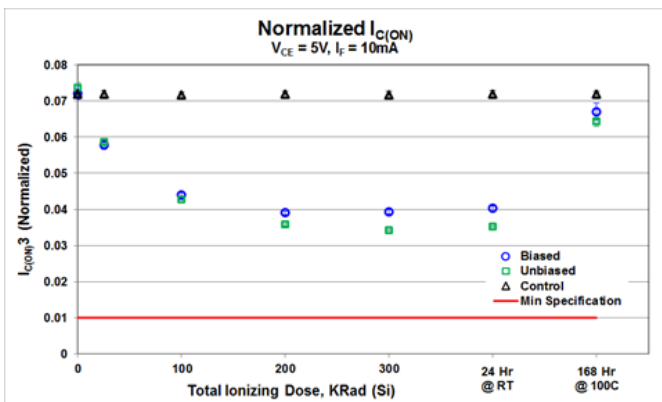
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### Radiation Test Standards

- **Total Ionizing Dose:** MIL-STD-883 Method 1019.7 and ASTM F1892-06 (0.1rad (si)/s) dose rate
- **Neutron:** MIL-STD-883 Method1017.2 and ASTM Designation: E 772—94
- **Full Radiation report available**



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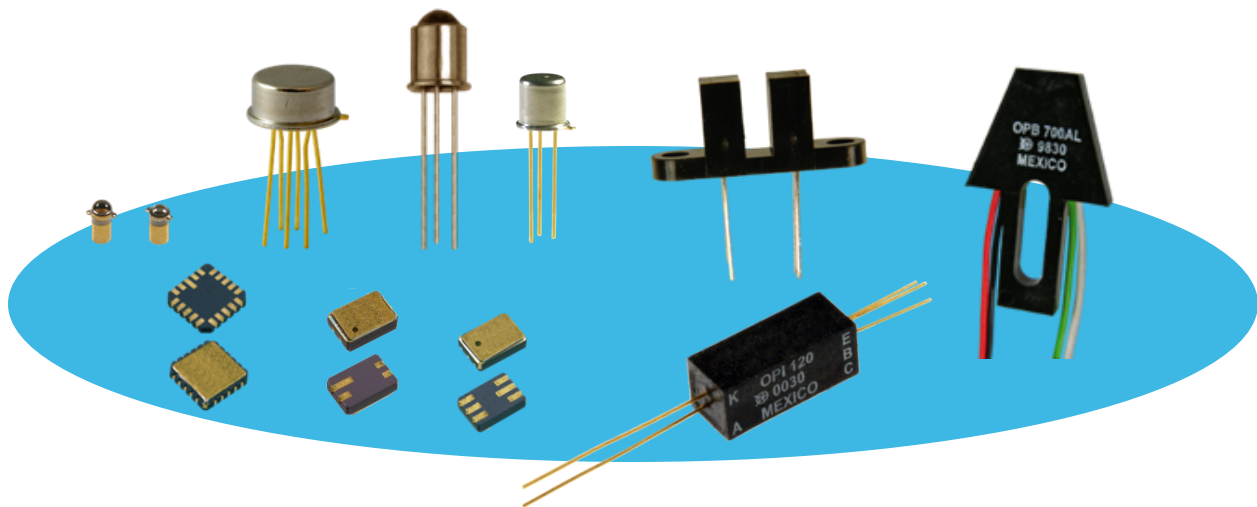
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### Packaging

#### Package styles available:

Radiation testing was in a TO-78 can; functional & radiation samples can be supplied in discrete pairs such as, “pills” or TO-46 / TO-18 metal cans, 4 & 6 pin Hermetic Ceramic LLC, high voltage assemblies like the OPI120 and OPI150 hermetic high voltage isolators and more.



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## HCC1002



Issue	Change Description	Approval	Date
A	Initial Preliminary Release	R. Bailey	3-23-16

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