

Hi-Reliability RAD Capable Optoisolator

HCC1000 (Through Hole)

HCC1001 (SMT)



Features:

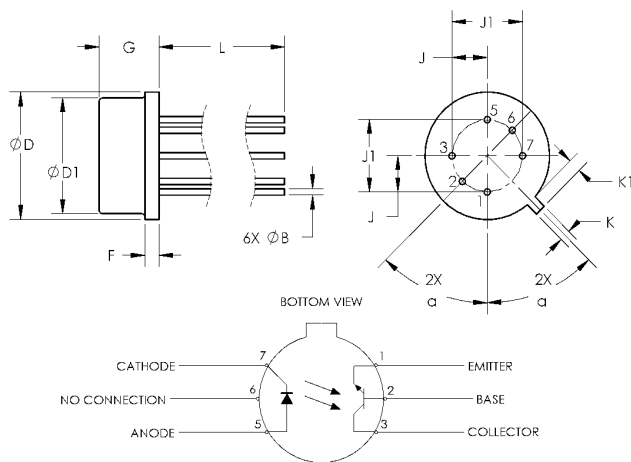
- TID Capable to 100Krad (SI)/cm² ELDRS (0.1rad/s)
- Neutron capable to 1E12 neutrons (14MeV)
- Processed to MIL-STD-19500 TXV level
- 1 KV electrical Isolation
- Base Contact provided for conventional transistor biasing

Description:

These devices are similar to Optek's 4N series of opto isolators with exception of the chips. It is processed per MIL-PRF-19500 TXV level and can be modified per customer SCDs. Each device consists of a IRLED & NPN transistor mounted in either hermetic TO-78 metal can, 6 pin SMD or custom packaging.

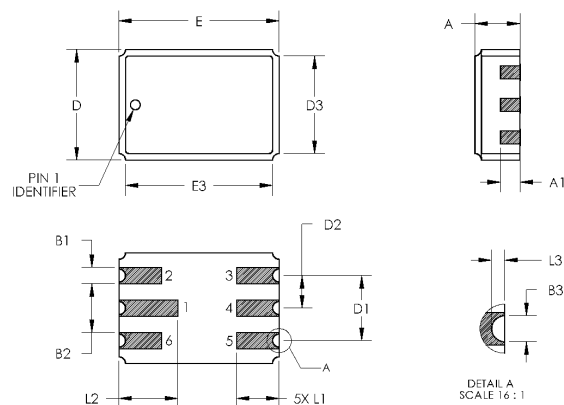
Applications:

Circuit Electrical Isolation in Space Applications such as Satellites, Launchers, Space Vehicles & Planetary Rovers.



HCC1000—6 leads metal can (TO-78) Package

LTR	DIMENSIONS			
	INCHES		MILLIMETERS	
ϕD	0.335	0.370	8.51	9.40
$\phi D1$	0.305	0.335	7.75	8.51
ϕB	0.016	0.019	0.41	0.48
α	45° T.P.		45° T.P.	
F		0.040		1.02
G	0.155	0.185	3.94	4.70
J	.100 T.P.		2.54 T.P.	
J1	.200 T.P.		5.08 T.P.	
K	0.028	0.034	0.71	0.86
K1	0.029	0.045	0.74	1.14
L	0.500	0.600	12.70	15.24



HCC1001—6 pin SMT LCC Package

LTR	DIMENSIONS			
	INCHES		MILLIMETERS	
A	0.066	0.080	1.68	2.03
A1	0.026	0.034	0.66	0.86
B1	0.022	0.028	0.56	0.71
B2	.072 REF		1.83 REF	
B3	0.006	0.022	0.15	0.56
D	0.165	0.175	4.19	4.44
D1	0.095	0.105	2.41	2.67
D2	0.045	0.055	1.14	1.39
D3		0.175		4.44
E	0.240	0.250	6.10	6.35
E3		0.250		6.35
L1	0.060	0.070	1.65	1.78
L2	0.082	0.098	2.08	2.49
L3	0.003		0.08	

- 1—Anode
- 2—N/C
- 3—Collector
- 4—Base
- 5—Emitter
- 6—Cathode

(COLLECTOR MAY OR MAY NOT BE CONNECTED INTERNALLY TO CASE)

General Note

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Electrical Specifications

Absolute Maximum Ratings ($T_A = 25\text{ }^\circ\text{C}$ 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 ⁽²⁾
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 ⁽³⁾

Output Phototransistor:

Continuous Collector Current	50 mA
Collector-Emitter Voltage	40 V
Collector-Base Voltage	45 V
Emitter-Base Voltage	7.0 V
Power Dissipation	300 mW ⁽⁴⁾

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

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
V_F	Forward Voltage	0.80 1.00 0.70	- - -	1.70 1.9 1.50	V	$I_F = 10.0\text{ mA}$ $I_F = 10.0\text{ mA}, T_A = -55\text{ }^\circ\text{C}$ $I_F = 10.0\text{ mA}, T_A = 125\text{ }^\circ\text{C}$
I_R	Reverse Current	-	-	100	μA	$V_R = 2.0\text{ V}$

Input Diode

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

Output Phototransistor

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	40	-	-	V	$I_C = 1.0\text{ mA}, I_B = 0, I_F = 0$
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	45	-	-	V	$I_C = 100\text{ }\mu\text{A}, I_B = 0, I_F = 0$
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	7	-	-	V	$I_E = 100\text{ }\mu\text{A}, I_C = 0, I_F = 0$
$I_{C(OFF)}^1$	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	μA	$V_{CE} = 20\text{ V}, I_B = 0, I_F = 0, T_A = 100\text{ }^\circ\text{C}$
$I_{CB(OFF)}$	Collector-Base Dark Current	-	-	10	nA	$V_{CB} = 20\text{ V}, I_E = 0, I_F = 0$

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	- -	- -		$I_F = 2.0\text{ mA}, V_{CE} = 5.0\text{ V}, I_B = 0, T_A = -55\text{ }^\circ\text{C}$ $I_F = 2.0\text{ mA}, V_{CE} = 5.0\text{ V}, I_B = 0, T_A = 100\text{ }^\circ\text{C}$
$I_{CB(ON)}$	On-State Collector Base	30	-	-	μA	$V_{CB} = 5\text{ V}, I_E = 0, I_F = 10\text{ mA}$
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	-	-	0.30	V	$I_F = 20.0\text{ mA}, I_C = 10.0\text{ mA}, I_B = 0$
H_{FE}	DC Current Gain	100	-	-	V	$V_{CE} = 5.0\text{ V}, I_C = 10.0\text{ mA}, I_F = 0\text{ mA}$
R_{IO}	Resistance (Input-to-Output)	10^{11}	-	-	Ω	$V_{I-O} = \pm 1000\text{ VDC}^{(1)}$
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	μs	$V_{CC} = 10.0\text{ V}, I_F = 10.0\text{ mA}, R_L = 100\text{ }\Omega$

Notes:

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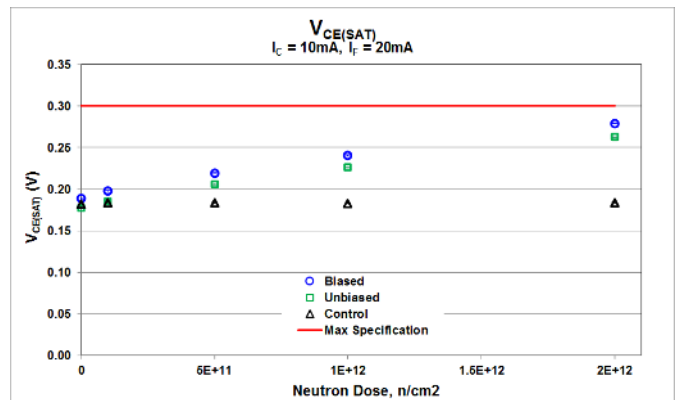
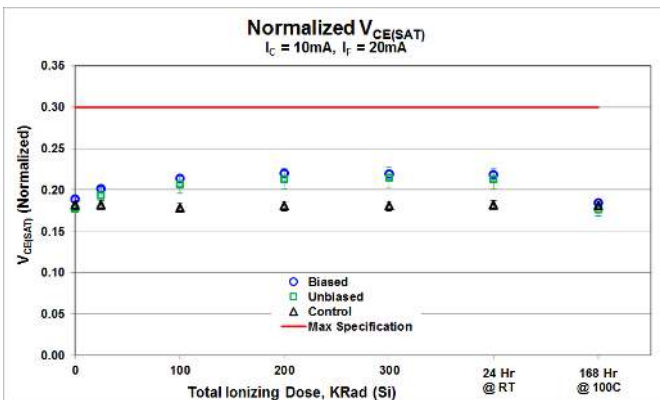
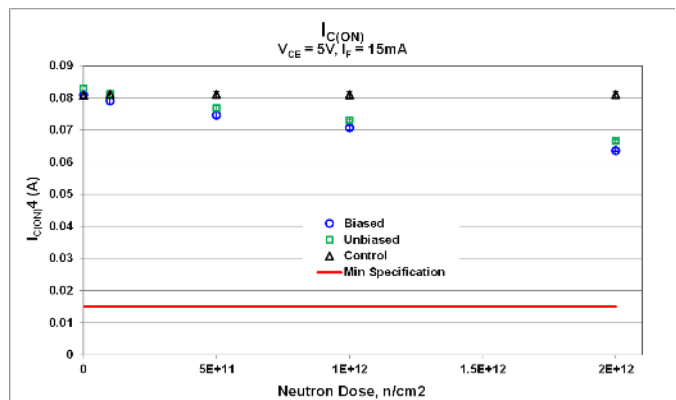
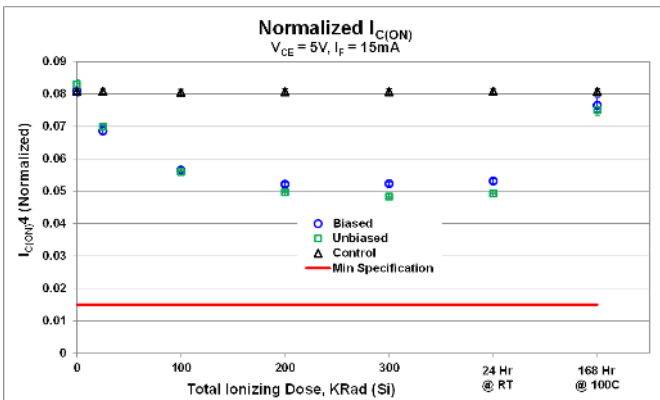
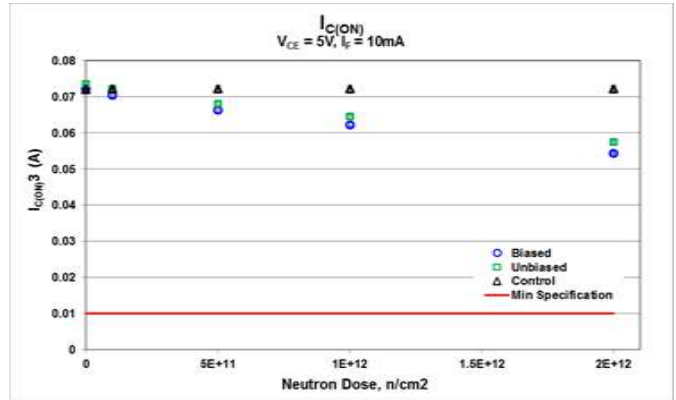
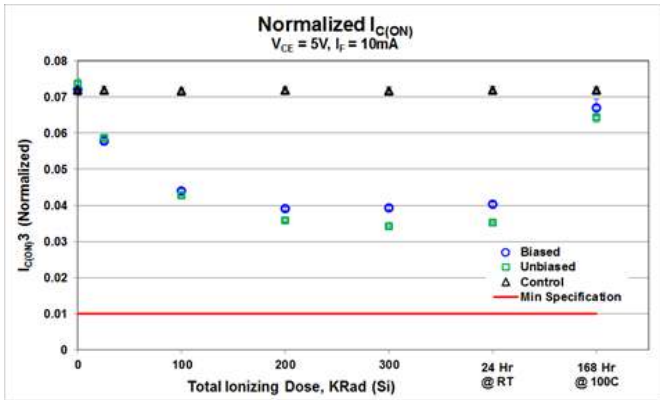
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Radiation Test Standards:

- **Total Ionizing Dose:** MIL-STD-883 Method 1019.7 and ASTM F1892-06 (0.1rad (si)/s) dose rate
- **Neutron:** MIL-STD-883 Method 1017.2 and ASTM Designation: E 772—94
- **Full Radiation report available**



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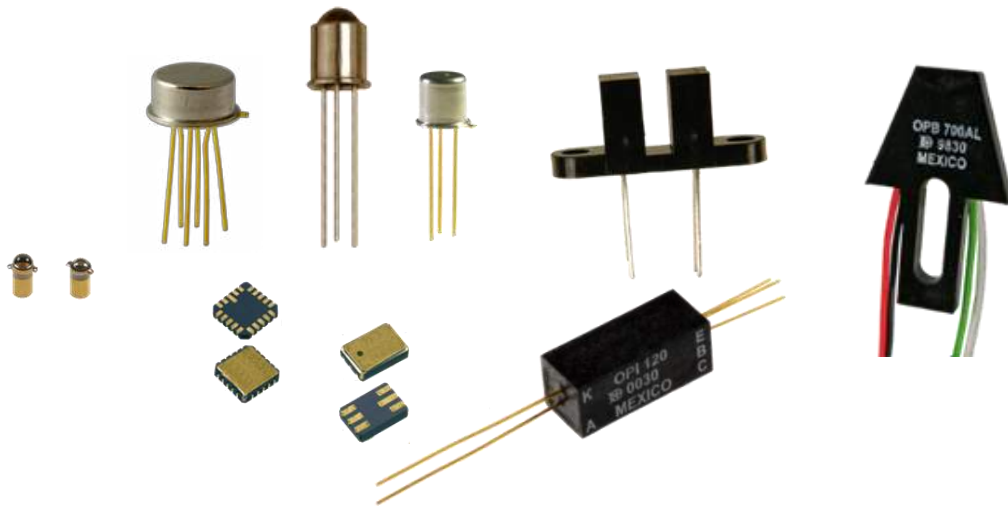
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Packaging

Package styles available:

Radiation testing was in a TO-78 can; however, 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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