Hi-Reliability RAD Capable Optoisolator

HCC1002

Features:

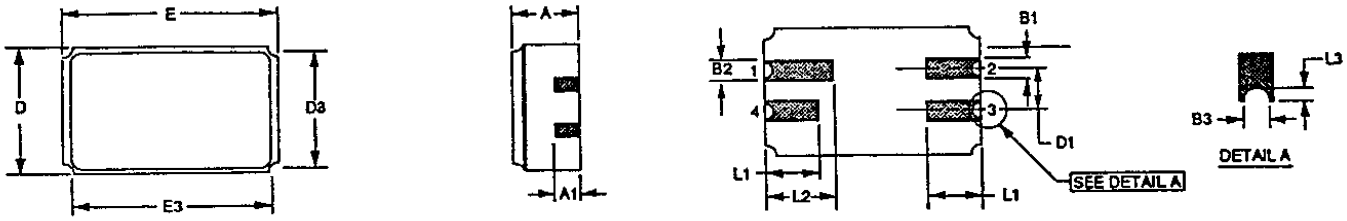
- TID Capable to 100Krad (SI)/cm2 ELDRS (0.1rad/s)
- Neutron capable to 1E12 neutrons (14MeV)
- Processed to MIL-STD-19500 TXV level
- 1 KV electrical Isolation

Description:

This device is similar to Optek's 4N series of optoisolators with exception of the die. It is processed to 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



1 — Collector
2 — Cathode
3 — Anode
4 — Emitter

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

TT Electronics | OPTEK Technology
2900 E. Plano Pkwy, Plano, TX 75074 | Ph: +1 972 323 2200
www.ttelectronics.com | sensors@ttelectronics.com

Electrical Specifications

Absolute Maximum Ratings (T_A = 25° 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	± 1.00 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
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°C unless otherwise noted)

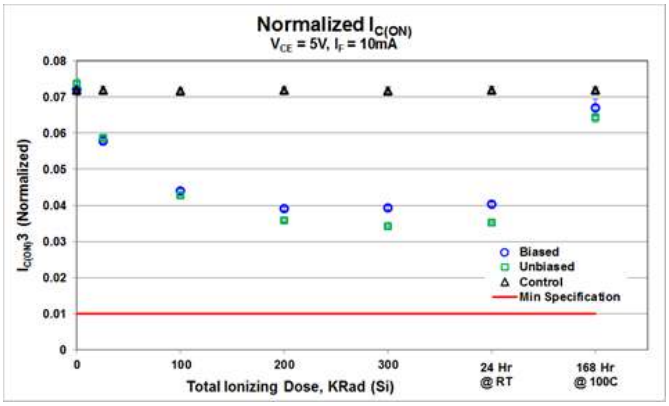
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode						
V_F	Forward Voltage	0.80 1.00 0.70	- - -	1.70 1.9 1.50	V	I_F = 10.0 mA I_F = 10.0 mA, T_A = -55° C I_F = 10.0 mA, T_A = 125° C
I_R	Reverse Current	-	-	100	µA	V_R= 2.0 V
Output Phototransistor						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	40	-	-	V	I_C = 1.0 mA, I_B= 0, I_F= 0
$V_{(BR)EBO}$	Emitter-Collector Breakdown Voltage	7	-	-	V	I_E = 100 µA, I_C= 0, I_F= 0
$I_{C(OFF)}$ [1]	Collector-Emitter Dark Current	-	-	100	nA	V_{CE} = 20 V, I_B= 0, I_F= 0
$I_{C(OFF)}$ [2]	Collector-Emitter Dark Current	-	-	100	µA	V_{CE} = 20 V, I_B= 0, I_F= 0, T_A = 100° C
Coupled						
$I_{C(ON)}$	On-State Collector Current	1 15 10 15 2.8 2.0	- - - - - -	- - - - - -	mA	I_F = 1.0 mA, V_{CE} = 1.0 V, I_B = 0 I_F = 15.0 mA, V_{CE} = 1.0 V, I_B = 0 I_F = 10.0 mA, V_{CE} = 5.0 V, I_B = 0 I_F = 15.0 mA, V_{CE} = 5.0 V, I_B = 0 I_F = 2.0 mA, V_{CE} = 5.0 V, I_B = 0, T_A = -55° C I_F = 2.0 mA, V_{CE} = 5.0 V, I_B = 0, T_A = 100° C
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	-	-	0.30	V	I_F = 20.0 mA, I_C = 10.0 mA, I_B = 0
R_{IO}	Resistance (Input-to-Output)	10^{11}	-	-	Ω	V_{I-O} = ± 1000 VDC(1)
C_{IO}	Capacitance (Input-to-Output)	-	-	5	pF	V_{I-O} = 0 V, f = 1.0 MHz(1)
T_R, T_F	Rise and Fall Time	-	-	20	µs	V_{CC} = 10.0 V , I_F = 10.0 mA, R_L = 100 Ω

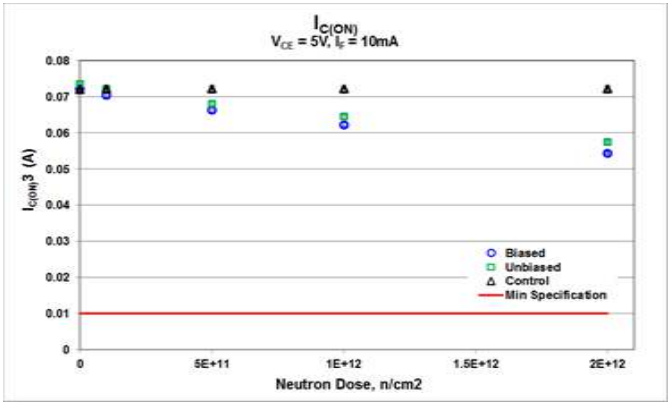
Notes:

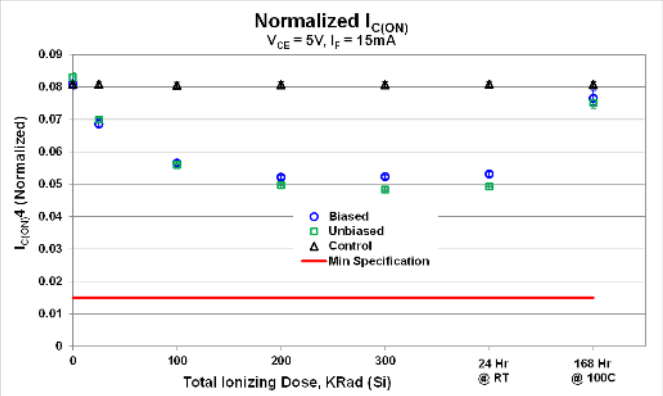
1. Measured with input leads shorted together and output leads shorted together.

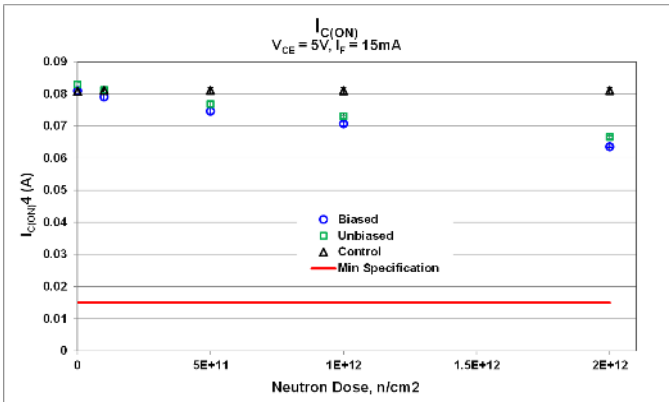
Radiation Test Standards

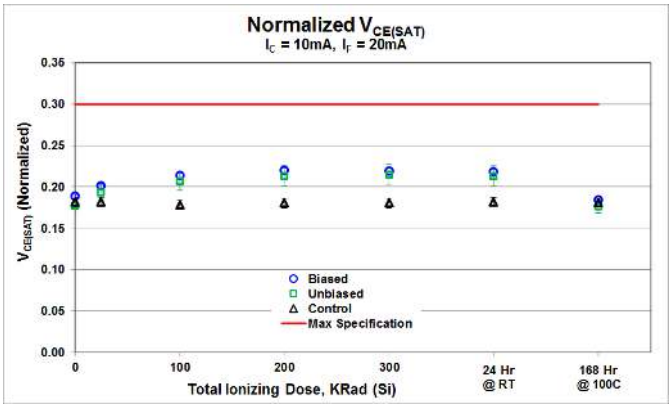
- **Total Ionizing Dose:** MIL-STD-883 Method 1019.7 and ASTM F1892-06 (0.1rad (si)/s) dose rate
- **Neutron:** MIL-STD-883 Method1017.2 and ASTM Designation: E 772—94
- **Full Radiation report available**

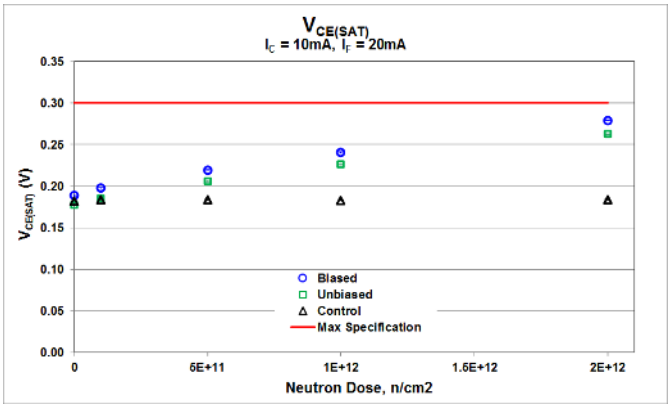












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Packaging

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.