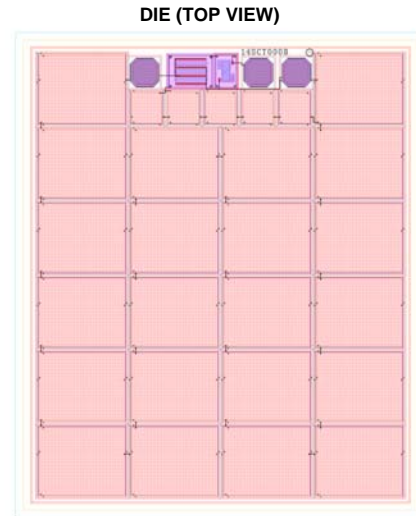


14SCT000 12V PHOTO-VOLTAIC DIODE STACK

14SCT000 - PRELIMINARY SPECIFICATION - REVISION October 5th, 2017

- 12V Nominal Room Temperature Voltage
- Built-in Active MosFet Turn-off
- -55C to +125C operation
- Small die size at 1375um X 1630um
- Low Cost

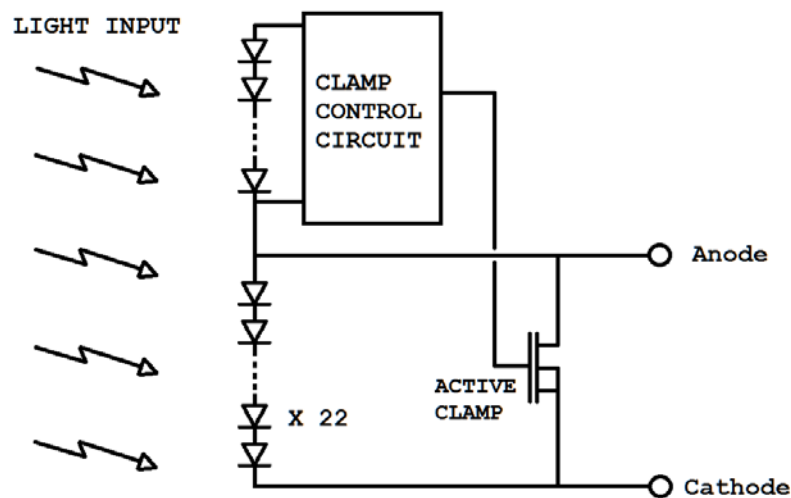


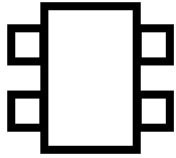
Description

The 14SCT000 is a 12V photo-diode stack with an active clamp circuit. The active clamp circuit keeps a low Anode to Cathode resistance when light intensity is below a few mW/cm². When light intensity is above this threshold the clamp is disconnected and normal photo-voltaic Anode - Cathode voltage is applied.

The active clamp is very useful in controlling unwanted FET turn-on due to dV/dT at the FET's drain. The 14SCT000 delivers steady performance across the entire extended temperature range of -55C to 125C.

Block Diagram:





14SCT000 12V PHOTO-VOLTAIC DIODE STACK

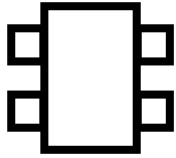
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Absolute maximum rating

Dielectric Isolation to Substrate +/- 650V
 Operating temperature -55 C to 125 C
 Storage temperature..... -65 C to 150 C

Electrical characteristics at room temperature (27C +/- 5C) (100% tested)

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
I _{A880}	880nm Responsivity	880nm LED 10mW/cm ² Normal Incidence V _A =0, V _C =0, Measure I _A	2.7	3.5	n/a	μA/ (mW/cm ²)
V _A	Open Circuit Voltage	880nm LED 10mW/cm ² Normal Incidence, V _C =0, Measure V _A	11.0	11.8	13.0	V
R _A	Clamp Resistance	880nm LED 0.0mW/cm ² Normal Inci- dence, V _A =100mV, V _C =0, Measure I _A	4.0	6.7	12	kΩ
I _{L880}	Clamp Threshold	880nm LED Normal Incidence Measure Minimum Optical Power for V _A >=6V	0.5	1.2	2.5	mW/cm ²
T _{OFF}	Turn-off Time	880nm LED Normal Incidence from 10 to 0mW/cm ² , C _{LOAD} = 1.0nF Measured T _{OFF} at V _A =100mV	0	0.6	2.0	mSec



14SCT000 12V PHOTO-VOLTAIC DIODE STACK

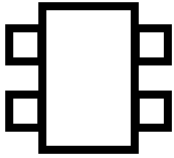
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Electrical characteristics at COLD temperature (-55C +/- 2C) (Sample tested)

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
I _{A880}	880nm Responsivity	880nm LED 10mW/cm ² Normal Incidence V _A =0, V _C =0, Measure I _A	2.7	3.5	n/a	μA/ (mW/cm ²)
V _A	Open Circuit Voltage	880nm LED 10mW/cm ² Normal Incidence, V _C =0, Measure V _A	14.0	15.4	16.5	V
R _A	Clamp Resistance	880nm LED 0.0mW/cm ² Normal Inci- dence, V _A =100mV, V _C =0, Measure I _A	3.0	4.8	7.5	kΩ
IL _{T880}	Clamp Threshold	880nm LED Normal Incidence Measure Minimum Optical Power for V _A >=6V	0.2	0.8	2.0	mW/cm ²
T _{OFF}	Turn-off Time	880nm LED Normal Incidence from 10 to 0mW/cm ² , C _{LOAD} = 1.0nF Measured T _{OFF} at V _A =100mV	0	1.0	3.0	mSec

Electrical characteristics at HOT temperature (125C +/- 2C) (Sample tested)

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
I _{A880}	880nm Responsivity	880nm LED 10mW/cm ² Normal Incidence V _A =0, V _C =0, Measure I _A	2.7	3.5	n/a	μA/ (mW/cm ²)
V _A	Open Circuit Voltage	880nm LED 10mW/cm ² Normal Incidence, V _C =0, Measure V _A	7.0	8.3	9.5	V
R _A	Clamp Resistance	880nm LED 0.0mW/cm ² Normal Inci- dence, V _A =100mV, V _C =0, Measure I _A	5.5	9.3	16.7	kΩ
IL _{T880}	Clamp Threshold	880nm LED Normal Incidence Measure Minimum Optical Power for V _A >=6V	1.0	2.6	5.0	mW/cm ²
T _{OFF}	Turn-off Time	880nm LED Normal Incidence from 10 to 0mW/cm ² , C _{LOAD} = 1.0nF Measured T _{OFF} at V _A =100mV	0	0.25	1.0	mSec

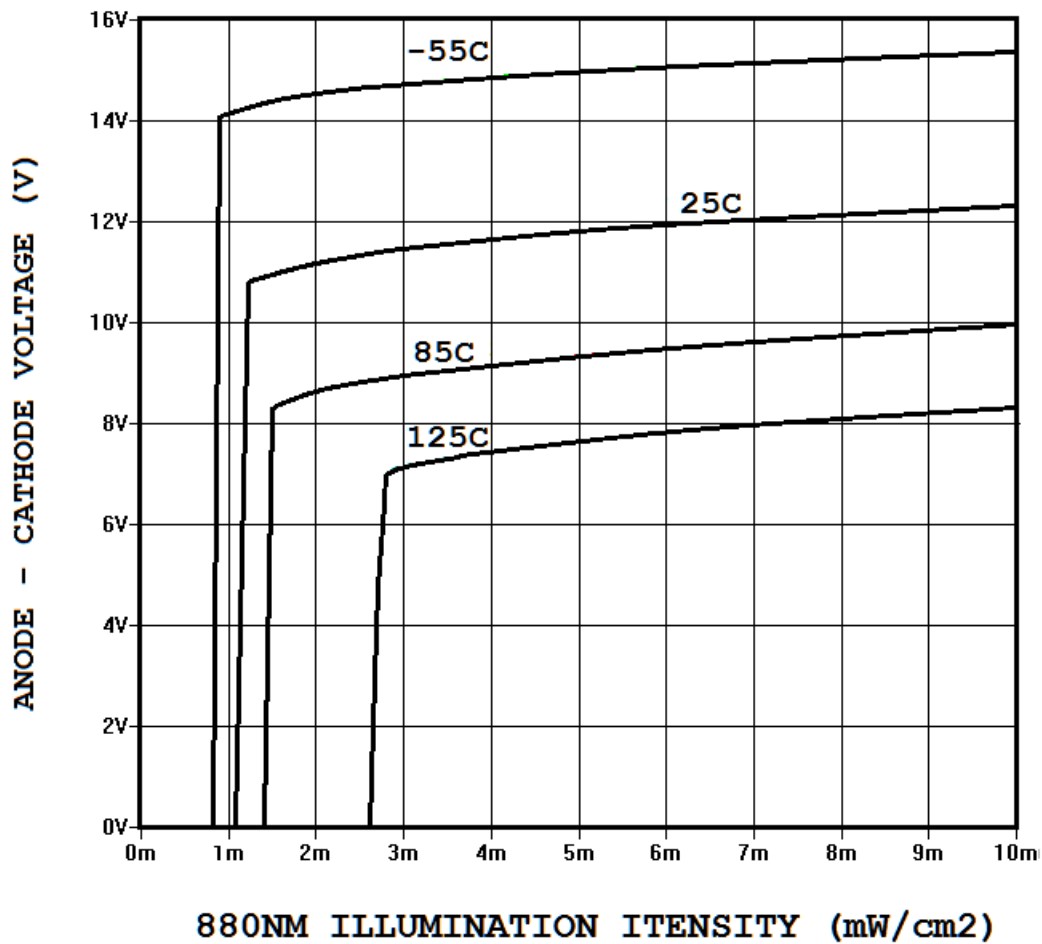


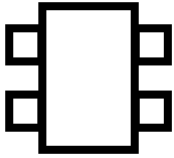
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Typical Charts

TYPICAL OPEN CIRCUIT VOLTAGE AS A FUNCTION OF LIGHT INTENSITY AND TEMPERATURE

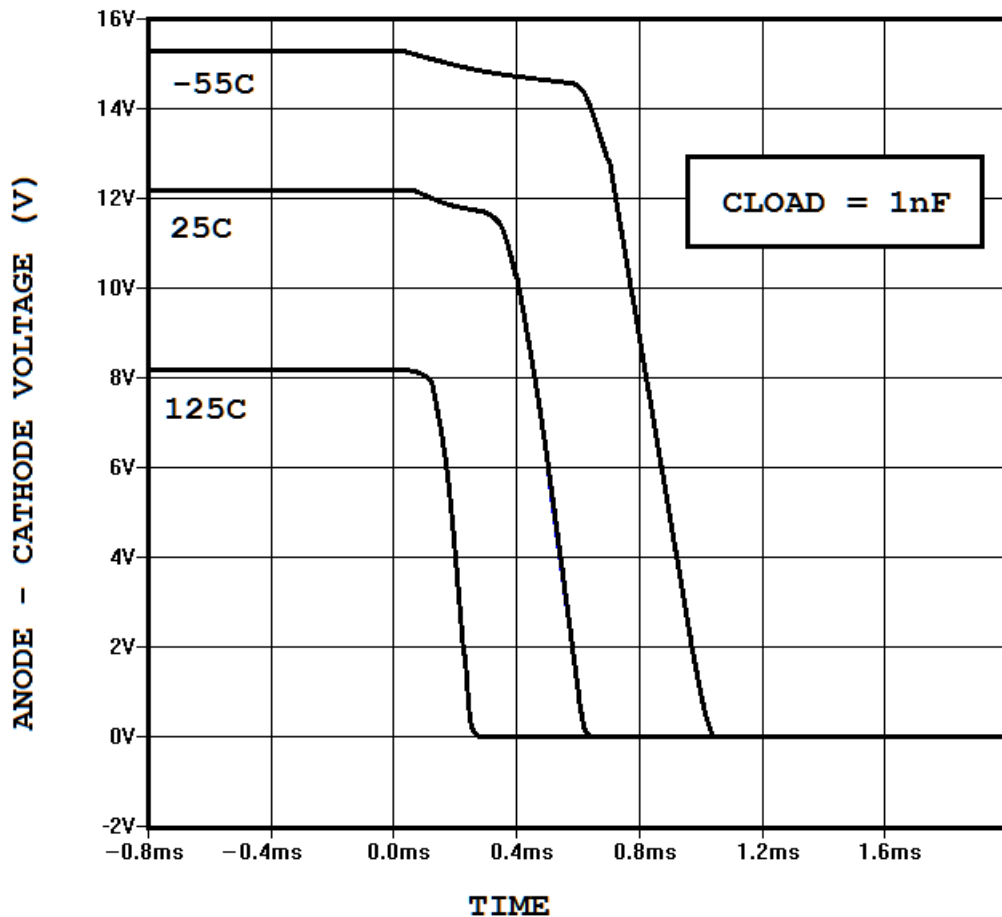


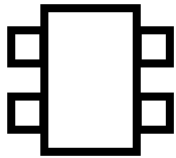


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TYPICAL TURN-OFF VOLTAGE AS A FUNCTION OF TEMPERATURE

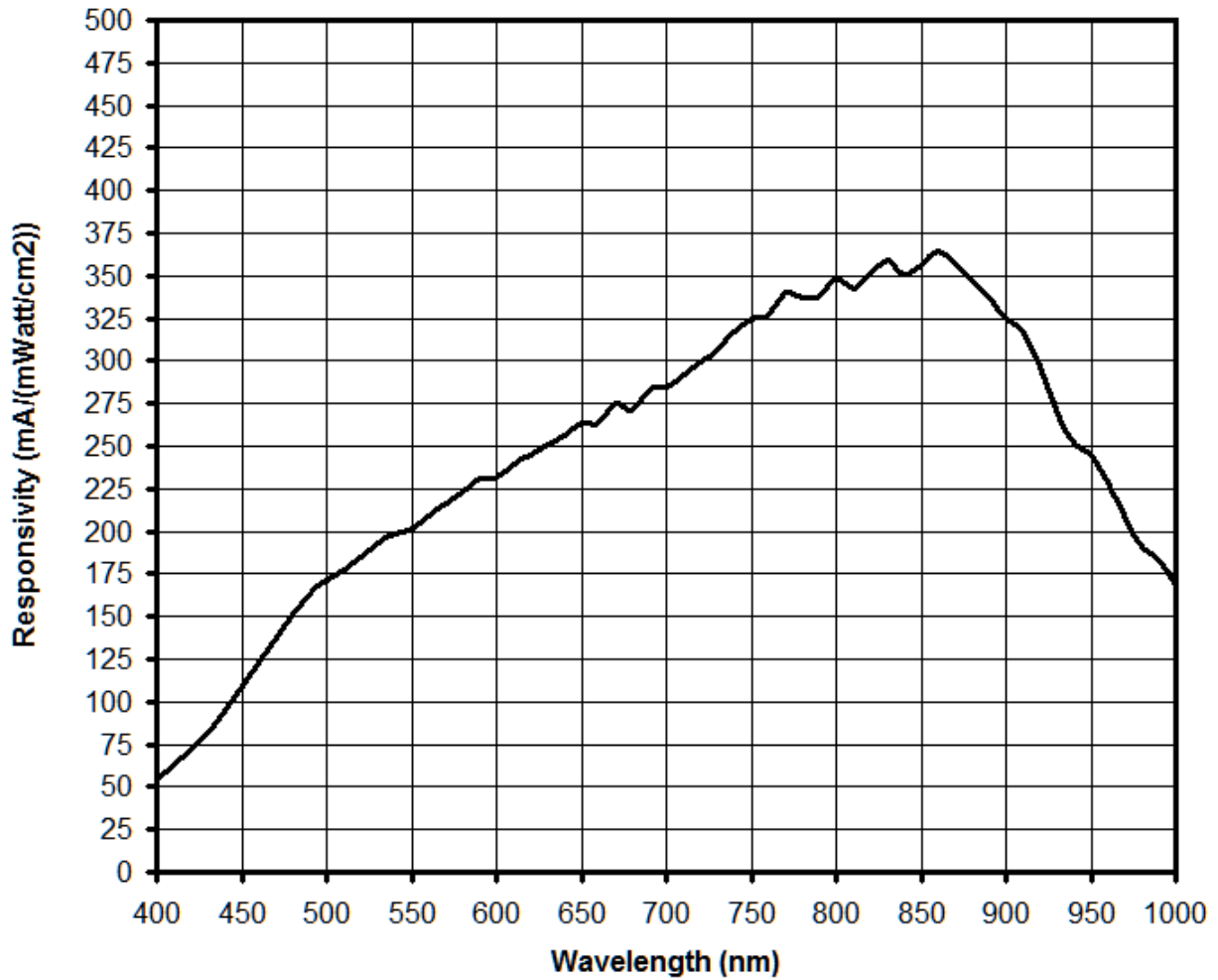


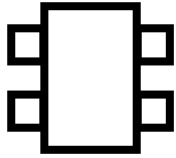


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14SCT000 Typical Responsivity





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Die dimensions

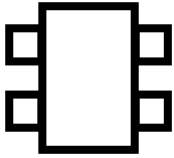
	PARAMETER	MIN	TYP	MAX	UNIT
Y _{SIZE}	Long Side Dimensions	1580	1630	1680	μm
X _{SIZE}	Short Side Dimensions	1325	1375	1425	μm
Z _{SIZE}	Die Thickness	260	285	310	μm

Product qualification tests

PARAMETER	Lot Sampled	Sample Size	Fails Allowed	UNIT
Static burn-in 1000hrs @ V _{BIAS} =32V; MIL STD 883 method 1015	3	22	0	n/a
Physical dimensions	3	11	0	n/a
Wire Bond Evaluation (Gold Ball Bond) per MIL STD 883 method 2011	3	20	1	n/a
COLD temperature electrical test	each	22	0	n/a
HOT temperature electrical test	each	22	0	n/a

Visual inspection

PARAMETER	Lot Sampled	Sample Size	Fails Allowed	UNIT
100% Visual Inspection per MIL STD 883H Method 2010 Condition S.	ALL	100%	n/a	n/a



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Lot acceptance tests

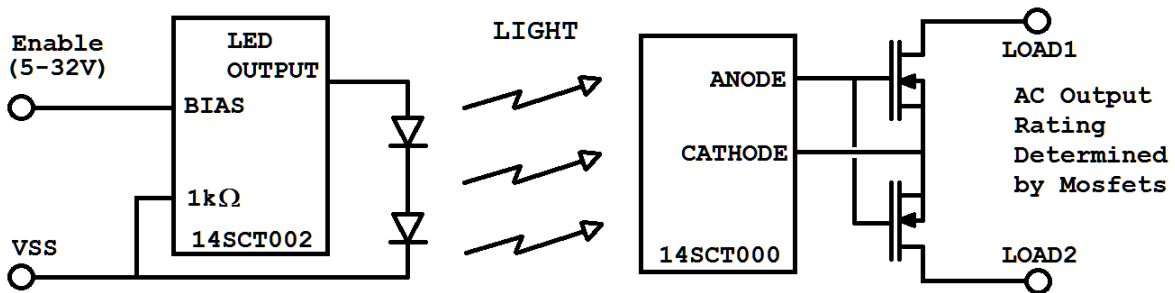
PARAMETER	Lot Sampled	Sample Size	Fails Allowed	UNIT
Static burn-in 125C; 168hrs; $V_{BIAS}=32V$; $V_r=2.25V$; $R=2000\ \Omega$ MIL STD 883 method 1015	each	22	0	n/a
Physical dimensions	each	11	0	n/a
Wire Bond Evaluation (Gold Ball Bond) per MIL STD 883 method 2011	each	20	1	n/a
COLD temperature electrical test	each	22	0	n/a
HOT temperature electrical test	each	22	0	n/a

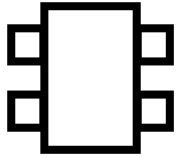
Product qualification tests are done on 3 batches only while lot acceptance test are performed on each "diffusion lot". Lot acceptance tests (LAT) are considered done if the lot in question was used for product qualification.

All samples used for qualification and LAT burn-in test are assembled in a open cavity ceramic DIL.

Typical Application

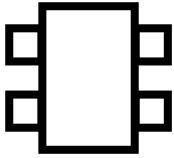
SSR SYSTEM WITH LOW
COMPONENT COUNT USING
14SCT000 AND 14SCT002





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Die dimensions

