

DATA SHEET

CLA Series: Silicon Limiter Diode Chips

Features

- Established Skyworks limiter diode process
- High-power, mid-range and cleanup designs
- Low insertion loss (0.1 dB at 10 GHz)
- Power handling to 66 dBm
- Tight control of basewidth
- Mesa and planar chip designs
- Available lead (Pb)-free, RoHS-compliant, and Green

Description

Skyworks CLA series of silicon limiter diode chips provides passive receiver protection over a wide range of frequencies from 100 MHz to beyond 30 GHz. These devices utilize Skyworks well-established silicon technology for high resistivity and tightly controlled thin base width PIN limiter diodes. Limiter circuits employing these devices will perform with strong limiting action and low loss.

The CLA series consists of eight individual chip designs of different intrinsic region basewidths and capacitances designed to accommodate multistage limiter applications. The mesa constructed, thin basewidth, low capacitance CLA4601-000, CLA4602-000, CLA4604-000 and CLA4605-000 are designed for low-level and cleanup applications. The CLA4603-000, and CLA4606-000 through CLA4608-000 are planar designs designed for high-power and mid-range applications.

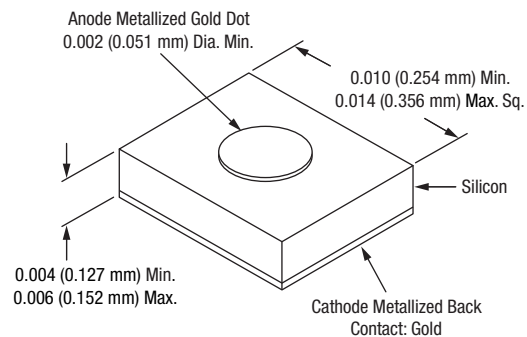
NEW



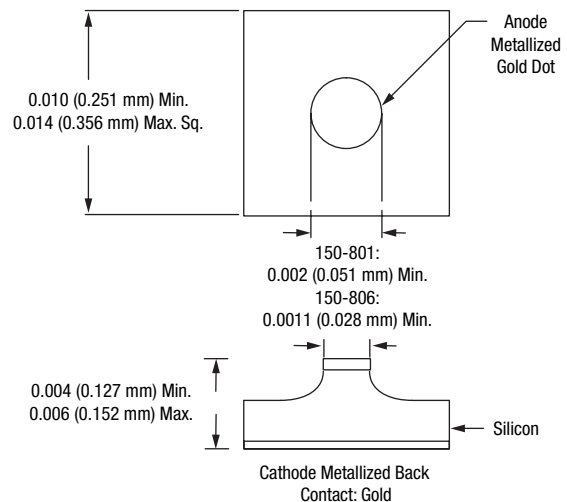
Skyworks Green products are lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant, conform to the EIA/EICTA/JEITA Joint Industry Guide (JIG) Level A guidelines, and are free from antimony trioxide and brominated flame retardants.

Outline Drawings

149-801



150 Series



Absolute Maximum Ratings

Characteristic	Value
Power dissipation	$P_{diss} = \frac{175 - T_{amb}}{\theta} W$
For CW signals	$\theta = \theta_{ave}$
For pulsed signals	$\theta = DF \times \theta_{ave} + \theta_{pulse}$ ($\theta_p @ 1 \mu S \times$ normalized θ_p from figure 2)
Operating temperature	-65 °C to +175 °C
Storage temperature	-65 °C to +200 °C

Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void the warranty.

CAUTION: Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions must be employed at all times.

Electrical Specifications at 25 °C

Part Number	Breakdown Voltage (V)	Basewidth (μm)	C _J @ 0 V (pF)	C _J @ 6 V (pF)	R _S @ 10 mA (Ω)	T _L @ 10 mA (ns)	Thermal Impedance (θ)		Top Contact Diam. (mils/mm)	Outline Drawing
							Average (°C/W)	1 μs Pulse (°C/W)		
							Min. – Max.	Nominal		
CLA4601-000	15–30	1	0.12	0.1	2.5	5	120	15	1.2/0.03	150-806
CLA4602-000	15–30	1	0.2	0.15	2	5	80	10	1.5/0.038	150-806
CLA4603-000	20–45	1.5	0.2	0.15	2	5	100	10	1.5/0.038	149-801
CLA4604-000	30–60	2	0.12	0.1	2.5	7	100	10	1.5/0.038	150-806
CLA4605-000	30–60	2	0.2	0.15	2	7	70	7	2.5/0.064	150-801
CLA4606-000	45–75	2.5	0.2	0.15	2	10	80	7	2.5/0.064	150-801
CLA4607-000	120–180	7	0.2	0.15 @ 50 V	2	50	40	1.2	3/0.076	149-801
CLA4608-000	120–180	7	0.8	0.5 @ 50 V	1.2	100	15	0.3	5/0.127	149-801

Capacitance, C_J, measured at 1 MHz.
Resistance, R_S, measured at 500 MHz.
CW thermal resistance for infinite heat sink.
Pulse thermal resistance for single 1 μs pulse.

Typical Performance at 25 °C

Part Number	Insertion Loss @ -10 dBm (dB)	Input Power for 1 dB Loss (dBm)	Maximum Pulsed Input Power (dBm)	Output at Max. Pulsed Input (dBm)	Maximum CW Input Power (W)	Recovery Time (ns)
CLA4601-000	0.1	7	47	21	2	5
CLA4602-000	0.1	7	50	24	3	5
CLA4603-000	0.1	10	50	22	2	10
CLA4604-000	0.1	12	47	24	3	10
CLA4605-000	0.1	12	50	27	4	10
CLA4606-000	0.1	15	53	27	3	20
CLA4607-000	0.1	20	60	39	6	50
CLA4608-000	0.2	20	66	44	15	100

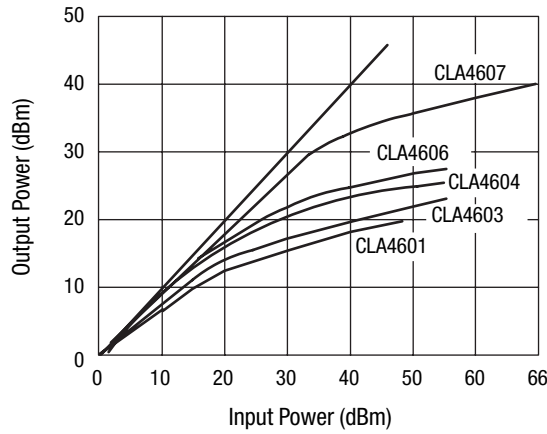
Insertion loss for CLA4601-000 through CLA4607-000 at 10 GHz; insertion loss for CLA4608-000 at 5 GHz.

Limiter power results at 1 GHz for shunt connected, single limiter diode and DC return in 50 Ω line.

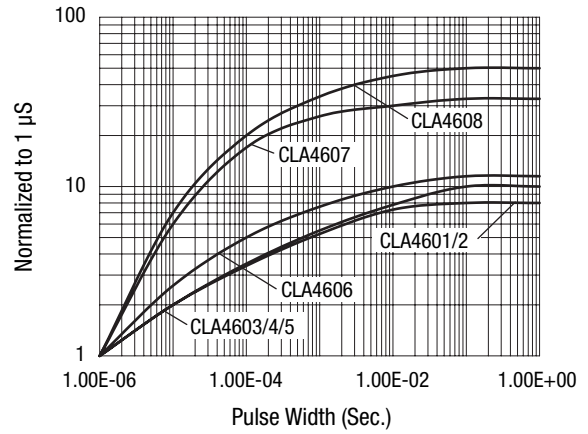
Maximum pulsed power for 1 μs pulse and 0.1% duty factor with chip at 25 °C heat sink. Derate linearly to 0 W at 175 °C.

Maximum CW input power at 25 °C heat sink. Derate linearly to 0 W at 175 °C.

Recovery time to insertion loss from limiting state.



Typical Peak Leakage Power at 1 GHz



Normalized Pulsed Thermal Impedance

Copyright © 2002, 2003, 2004, 2005, 2006, Skyworks Solutions, Inc. All Rights Reserved.

Information in this document is provided in connection with Skyworks Solutions, Inc. ("Skyworks") products or services. These materials, including the information contained herein, are provided by Skyworks as a service to its customers and may be used for informational purposes only by the customer. Skyworks assumes no responsibility for errors or omissions in these materials or the information contained herein. Skyworks may change its documentation, products, services, specifications or product descriptions at any time, without notice. Skyworks makes no commitment to update the materials or information and shall have no responsibility whatsoever for conflicts, incompatibilities, or other difficulties arising from any future changes.

No license, whether express, implied, by estoppel or otherwise, is granted to any intellectual property rights by this document. Skyworks assumes no liability for any materials, products or information provided hereunder, including the sale, distribution, reproduction or use of Skyworks products, information or materials, except as may be provided in Skyworks Terms and Conditions of Sale.

THE MATERIALS, PRODUCTS AND INFORMATION ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE, INCLUDING FITNESS FOR A PARTICULAR PURPOSE OR USE, MERCHANTABILITY, PERFORMANCE, QUALITY OR NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHT; ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED. SKYWORKS DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. SKYWORKS SHALL NOT BE LIABLE FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO ANY SPECIAL, INDIRECT, INCIDENTAL, STATUTORY, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS THAT MAY RESULT FROM THE USE OF THE MATERIALS OR INFORMATION, WHETHER OR NOT THE RECIPIENT OF MATERIALS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Skyworks products are not intended for use in medical, lifesaving or life-sustaining applications, or other equipment in which the failure of the Skyworks products could lead to personal injury, death, physical or environmental damage. Skyworks customers using or selling Skyworks products for use in such applications do so at their own risk and agree to fully indemnify Skyworks for any damages resulting from such improper use or sale.

Customers are responsible for their products and applications using Skyworks products, which may deviate from published specifications as a result of design defects, errors, or operation of products outside of published parameters or design specifications. Customers should include design and operating safeguards to minimize these and other risks. Skyworks assumes no liability for applications assistance, customer product design, or damage to any equipment resulting from the use of Skyworks products outside of stated published specifications or parameters.

Skyworks, the Skyworks symbol, and "Breakthrough Simplicity" are trademarks or registered trademarks of Skyworks Solutions, Inc., in the United States and other countries. Third-party brands and names are for identification purposes only, and are the property of their respective owners. Additional information, including relevant terms and conditions, posted at www.skyworksinc.com, are incorporated by reference.