SKYWORKS®

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.

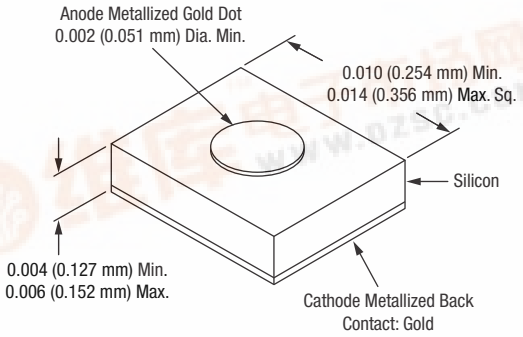
The CLA series consists of eight individual chip designs of different intrinsic region basewidths and capacitances designed to accommodate multistage limiter applications. The mesa constructed, thin basewidth, low capacitance CLA4601-000, CLA4602-000, CLA4604-000 and CLA4605-000 are designed for low-level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

NEW

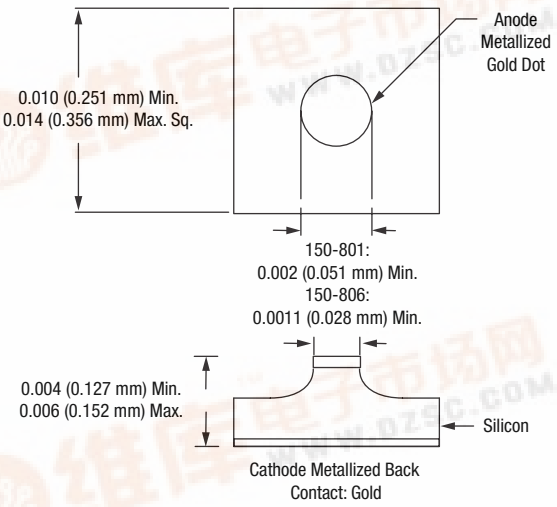
Skyworks Green products are lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant, conform to the EIA/EICTA/JEITA Joint Industry Guide (JIG) Level A guidelines, and are free from antimony trioxide and brominated flame retardants.

Outline Drawings

149-801



150 Series



Absolute Maximum Ratings

Characteristic	Value
Power dissipation	$Pdiss = \frac{175\text{-}Tamb}{\theta}$ W
For CW signals	θ = θave
For pulsed signals	θ = DF x θave + θ pulse (θp @1 µS x normalized θp 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

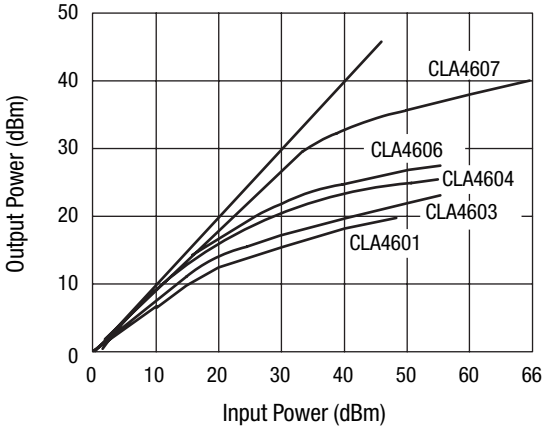
Part Number	Breakdown Voltage (V)	Basewidth (µm)	C_J @ 0 V (pF)	C_J @ 6 V (pF)	R_S @ 10 mA (Ω)	T_L @ 10 mA (ns)	Thermal Impedance (θ)		Top Contact Diam. (mils/mm)	Outline Drawing
							Average (°C/W)	1 µs Pulse (°C/W)		
	Min. – Max.	Nominal	Typ.	Max.	Max.	Typ.	Max.	Typ.	Typ.	
CLA4601-000	15–30	1	0.12	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.

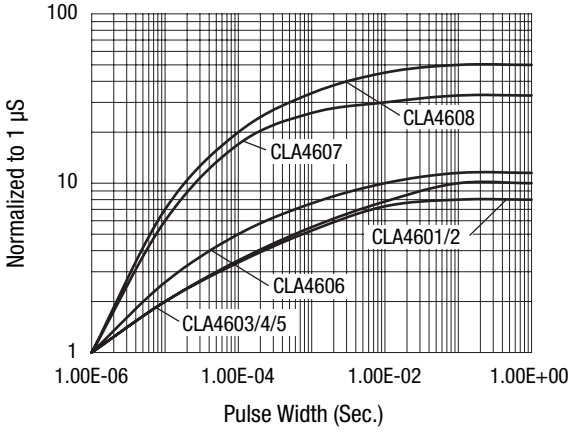
Typical Performance at 25 °C

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