



**CeraDiode®**

**CDS2C15GTH**

**SMD type, case size 0402**

**B72590D0150H060**

**CeraDiode®**

## Reliable ESD protection of high speed signal lines

### Description

Due to the ongoing miniaturization, today's electronic devices are more and more sensitive to electrostatic discharges (ESD) and overvoltages. Therefore reliable protection components become absolutely necessary to harden your valuable electronics against the impact of ESD.

CeraDiodes are ceramic semiconductors optimized specifically for high performance in Electro Static Discharge (ESD) applications. The device has a non-linear voltage/current characteristic that is highly optimized for effectively suppressing extremely fast voltage transients. The device offers superior parametric stability over the complete operating range of  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .

CeraDiodes are bi-directional devices. A single CeraDiode® connected from signal/dataline to ground routes both positive and negative ESD transitions safely to the ground plane. This technique eliminates the need to route ESD charge into the power plane, possibility damaging nearby integrated circuits. The CDS2C15GTH exhibits a very low capacitance, making it the ideal solution for direct connection to high speed signal lines. The result is maximum protection with minimal signal distortion.

### Features

- ESD protection according to IEC 61000-4-2 (Level 4)
- Suitable for uni- and bidirectional lines
- Bidirectional ESD protection in a two pin device
- Routes all ESD events, both positive and negative, safely to ground
- Suitable for DC working voltages up to 15 V
- Very low capacitance: 10 pF typical
- No derating of maximum ratings up to  $85^{\circ}\text{C}$
- Surface mount package in 0402 case size
- Extremely fast response time  $< 0.5\text{ ns}$
- Lead free nickel barrier terminations



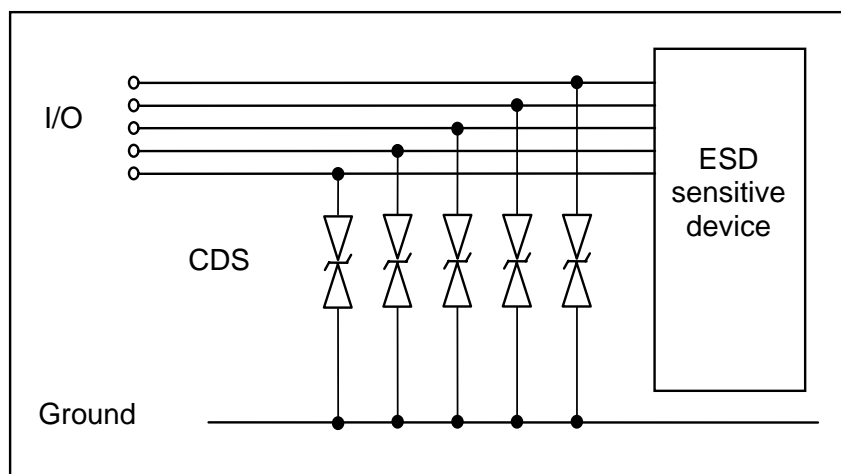
### Applications

- Desktop and notebook computers
- Peripherals
- Portable handheld products (e.g. PDA)
- Mobile communication
- Consumer products (set top box, MP3 player, digital cameras,...)
- Liquid crystal displays (LCD) / monitors



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## Application example



Protection of I/O lines with discrete CeraDiodes

## Maximum ratings ( $T_A = 85\text{ °C}$ )

Rating	Symb.	Value	Unit
Maximum DC working voltage	$V_{DC}$	15	V
Maximum RMS working voltage	$V_{RMS}$	14	V
Peak pulse current @ 8/ 20 $\mu$ s	$I_{PP}$	2	A
Air discharge ESD capability (according to IEC 61000-4-2 method)	$V_{ESD}$	15	kV
Contact discharge ESD capability (according to IEC 61000-4-2 method)	$V_{ESD}$	8	kV
Operating temperature (without derating)	$T_{op}$	-40 to +85	°C
Storage temperature	$T_{stg}$	-40 to +125	°C



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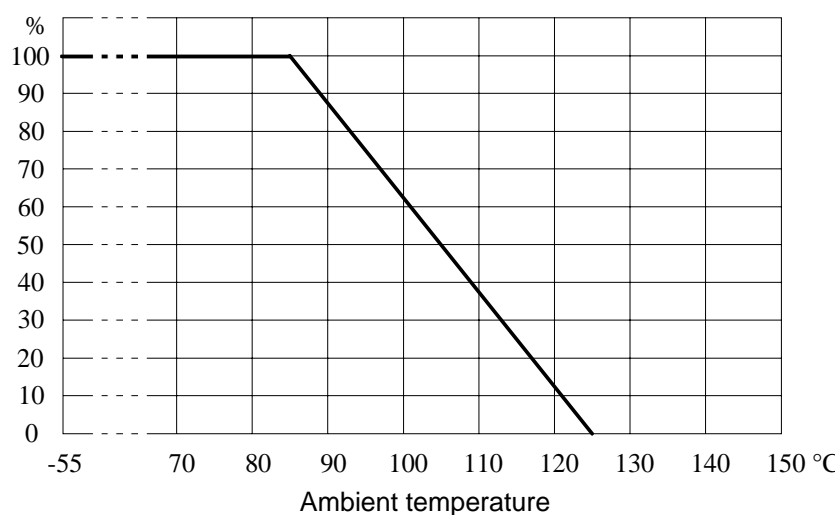
## Characteristics ( $T_A = 25\text{ °C}$ )

Parameter	Symb.	Conditions	Minimum	Typical	Maximum	Unit
Breakdown voltage	$V_{BR}$	$I_{BR} = 1\text{ mA}$	23	-	-	V
Leakage current <sup>*)</sup>	$I_{leak}$	$V_{leak} = 9\text{ V}$	-	-	10	$\mu\text{A}$
Clamping voltage	$V_{clamp}$	$I_{PP} = 1\text{ A}$ , 8/20 $\mu\text{s}$	-	-	66	V
Capacitance	C	$V = 1\text{ V}$ , $f = 1\text{ MHz}$	-	10	-	pF

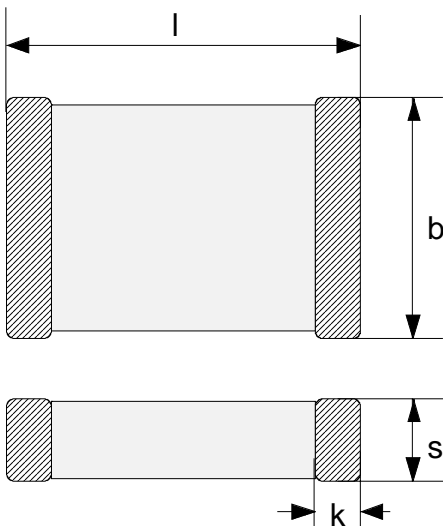
<sup>\*)</sup> Any lower operating voltage than 9V results in a lower leakage current

## Typical characteristics

Max. current, energy and average power dissipation  
depending on ambient temperature

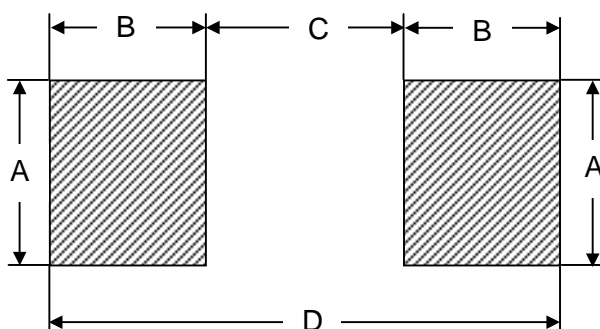


## Dimensional drawing



Symb.	Min.	Max.	Unit
l	0.85	1.15	mm
b	0.4	0.6	mm
s	0.4	0.6	mm
k	0.1	0.3	mm

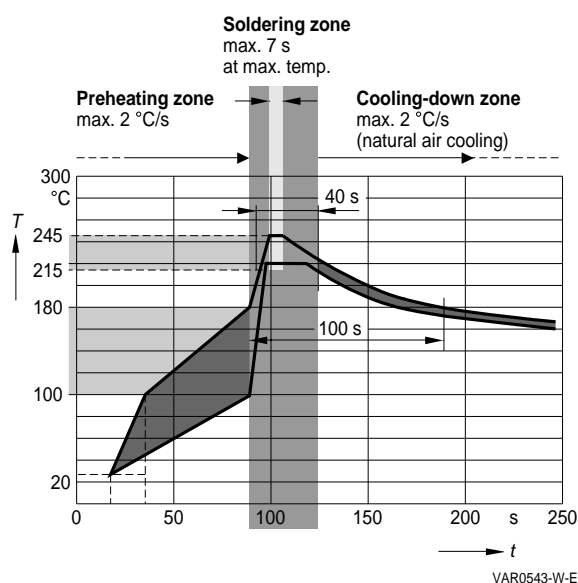
## Recommended solder pad



Symb.	Dim.	Unit
A	0.6	mm
B	0.6	mm
C	0.5	mm
D	1.7	mm

## Recommended soldering profile

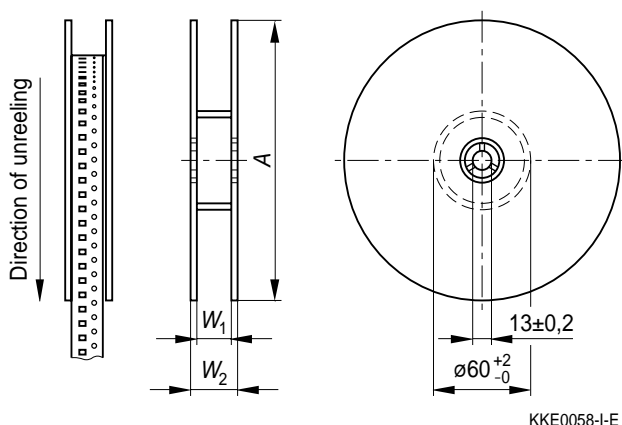
### Reflow soldering



As far as possible, the components shall be employed within 12 months. They should be left in their original packings to avoid soldering problems due to oxidized contacts. Storage temperature: –25 to 45 °C. Relative humidity: <75 % annual average, <95 % on max. 30 days in a year.

The usage of mild, non activated fluxes for soldering is recommended, as well as proper cleaning of the PCB.

## Reel dimensions

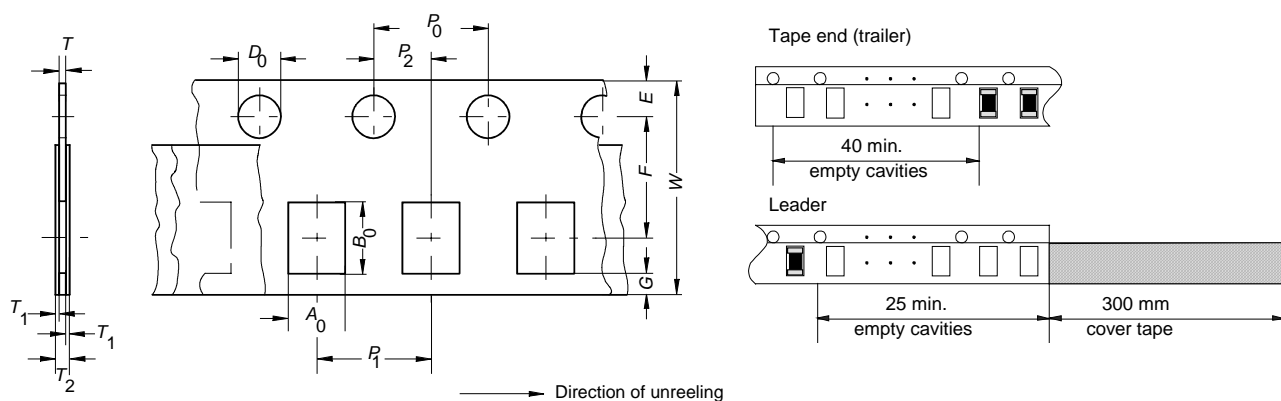


Definition	Symb.	Dim.	Tol.	Unit
Reel diameter	A	180	+0 /–3	mm
Reel width (inside)	W <sub>1</sub>	8.4	+1.5/–0	mm
Reel width (outside)	W <sub>2</sub>	14.4	max.	mm

Package: 8 mm tape  
Reel material: plastic

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## Taping according to IEC 60286-3



Tape material: cardboard









### Dimensions and tolerances

Definition	Symbol	Dim.	Tolerance
Compartment width	$A_0$	0.6	$\pm 0.2$
Compartment length	$B_0$	1.15	$\pm 0.2$
Sprocket hole diameter	$D_0$	1.5	$+0.1/-0$
Sprocket hole pitch	$P_0$	4.0	$\pm 0.1$ <sup>1)</sup>
Distance center hole to center compartment	$P_2$	2.0	$\pm 0.05$
Pitch of the component compartments	$P_1$	2.0	$\pm 0.1$
Tape width	$W$	8.0	$\pm 0.3$
Distance edge to center of hole	$E$	1.75	$\pm 0.1$
Distance center hole to center compartment	$F$	3.5	$\pm 0.05$
Distance compartment to edge	$G$	0.75	min.
Thickness of cardboard tape	$T$	0.6	max.
Overall thickness	$T_2$	0.7	max.

<sup>1)</sup>  $\leq \pm 0.2$  mm over any 10 pitches

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## Type designation

CD	S	2	C	15	G	T	H
							
Cera Diode	Single type	Chip size 2 = 0402	Chip	DC working voltage	Reel size G = 180 mm	Termination T = Nickel barrier	High speed

## Selection guide

Part number	Ordering code	Maximum DC working voltage	Qty per reel	Reel size
<b>CDS2C15GTH</b>	<b>B72590D0150H060</b>	15 V	10000	180 mm

CeraDiodes are not suitable for switching applications or for voltage stabilization, where static power dissipation is required. CeraDiodes are designed for ESD protection and transient suppression!

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