

Attracting Tomorrow



Transient Voltage Suppressors (TVS)

High-performance TVS diodes for ICT, consumer & high-speed applications

TDK Electronics AG
Piezo & Protection Devices Business Group
Multilayer Business Division
Munich, Germany
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TVS diodes

Excellent ESD protection for portable, wearable & high-speed applications

The new micro-packaged TVS diodes by TDK are designed to protect voltage-sensitive components from ESD, for existing and future applications in the direction of general-purpose and high-speed interfaces.

These TVS diodes are specifically designed to protect USB type-C connectors.

The portfolio offers ideal solutions for high-speed data pins up to 40 Gbps using the fast USB4 40G protocol as well as the Thunderbolt protocol and supports fast charging of devices via power delivery protocol.

Applications

General purpose

- Smartphones
- Laptops
- Tablets
- Wearables & portable devices
- Network communication devices

High-speed interfaces

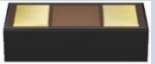
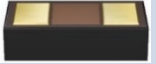
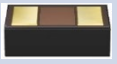
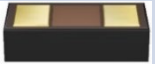
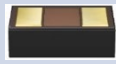
- USB, Firewire
- DVI, HDMI & Display Port
- S-ATA
- Thunderbolt
- SWP/NFC



- High ESD robustness up to 25 kV based on IEC61000-4-2 ✓
- Low clamping voltage down to 3.8 V (ITLP = 8 A) ✓
- Low leakage current as low as 1 nA (VRWM = 3.3 V) ✓
- Very low capacitance down to 0.18 pF ✓
- Available in chip scale packages WL-CSP0201 and WL-CSP01005 ✓
- Ultra-small wafer-level chip-scale package with a thickness of 100 μm and 150 μm ✓

TVS diodes

Portfolio for data line applications

Type	UCL series for data lines				
Ordering code	B74121 U0028M060	B74121 U0033M160	B74111 U033M060	B74121 U0055M060	B74111 U0055M060
Footprint					
Size	580 x 280µm	600 x 300µm	400 x 200µm	600 x 300µm	400 x 200µm
Package	WLCSP 0201	WLCSP 0201	WLCSP 01005	WLCSP 0201	WLCSP 01005
Thickness	150 µm	150 µm	100 µm	150 µm	100 µm
Working voltage VRWM	2.8 V	3.3 V	3.3 V	5.5 V	5.5 V
Breakdown voltage	5.9 V	6.3 V	6.3 V	10.3 V	10.3 V
Clamping voltage @ ITLP = 8 A	5.0 V	3.9 V	3.8 V	4.1 V	3.9 V
Dynamic resistance	0.27 Ω	0.16 Ω	0.15 Ω	0.15 Ω	0.15 Ω
Leakage current @VRWM	5 nA	1 nA	1 nA	1 nA	1 nA
Capacitance @1 MHz at VRWM	0.18 pF*	0.65 pF	0.48 pF	0.55 pF	0.43 pF
ESD level contact discharge	15 kV max.	15 kV max.	15 kV max.	15 kV max.	15 kV max.



Applications

- └ Hearing aids
- └ Cellular handsets & smartphones
- └ Machine-to-Machine (M2M)
- └ Laptops
- └ True wireless earbuds
- └ Wearables
- └ Network communication devices
- └ High-speed interfaces (**USB type-C**, USB4™ 40 Gbps, HDMI 2.0, Thunderbolt, FireWire, DVI, DisplayPort, S-ATA, Single Wire Protocol (SWP))

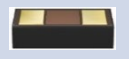
More details on the TVS landing page
https://www.tdk-electronics.tdk.com/tvs_diodes

* @ 5GHz

➔ With ultra low capacitance designed for **USB Type-C** high speed data lines applications

TVS diodes

Portfolio for power lines applications

Type	GP series for power lines				
Ordering code	B74121 G0050M060	B74121 G0160M060	B74121 G0200M060	B74111 G0050M060	B74111 G0055M060
Footprint					
Size	600 x 300µm	600 x 300µm	580 x 280µm	400 x 200µm	400 x 200µm
Package	WLCSP 0201	WLCSP 0201	WLCSP 0201	WLCSP 01005	WLCSP 01005
Thickness	150 µm	150 µm	150 µm	100 µm	100 µm
Working voltage VRWM	5 V	16 V	20 V	5 V	5.5 V
Breakdown voltage	6.8 V	21 V	22 V	6.8 V	7.5 V
Clamping voltage @ ITLP = 8 A	7.2 V	23 V	27 V	7.6 V	8.5 V
Dynamic resistance	0.1 Ω	0.33 Ω	0.6 Ω	0.125 Ω	0.125 Ω
Leakage current @VRWM	2 nA	5 nA	20 nA	20 nA	10 nA
Capacitance @1 MHz at VRWM	12 pF	5.5 pF	4 pF	5 pF	5 pF
ESD level contact discharge	24 kV max.	15 kV max.	10 kV max.	15 kV max.	15 kV max.
Surge	8 A max.	3.5 A max.	1.5 A max.	4 A max.	3 A max.



Applications

- ▮ Hearing aids
- ▮ Cellular handsets & smartphones
- ▮ Machine-to-Machine (M2M)
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- ▮ True wireless earbuds
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- ▮ High-speed interfaces (**USB Type-C**, USB4™ 40Gbps, HDMI 2.0, Thunderbolt, FireWire, DVI, DisplayPort, S-ATA, Single Wire Protocol (SWP))

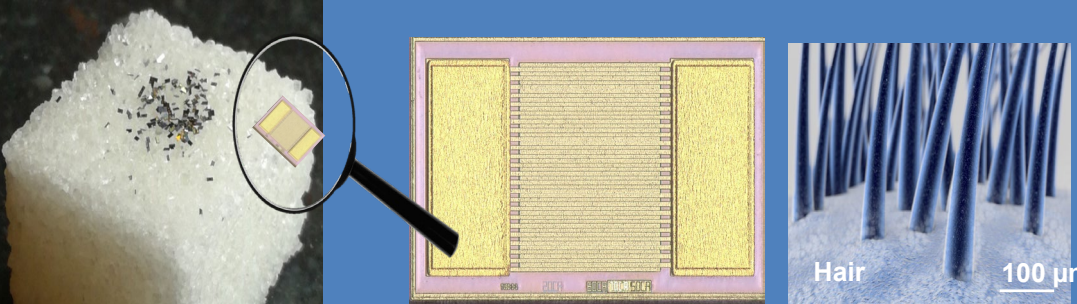
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➔ With working voltage up to 20 V designed for **USB Type-C fast charging applications**

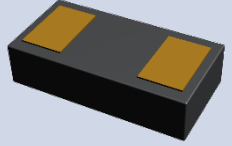
TVS diodes

Miniaturization – package range

We protect with smallest TVS packages in class!



TVS packages thinner than a human hair with strong ESD performance

	WLCSP* 0201 SLIM	WLCSP 01005 SLIM
Footprint		
Size	600 x 300 µm	400 x 200 µm
Thickness	150 µm	100 µm
Status	Series	Series

* WLCSP: Wafer Level Chip Scale Package



For further information please refer to:
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