

Voltage protection devices

Multilayer varistors with high ESD robustness for automotive Ethernet

- Reliable ESD protection up to 25 kV
- Low capacitance and narrow tolerance for signal integrity at high data rates
- Miniature dimensions of 1.0 x 0.5 x 0.5 mm
- High operating temperatures up to 150 °C

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TDK Corporation (TSE:6762) has expanded its lineup of multilayer varistors for automotive Ethernet with a new type (AVRH10C221KT1R5YA8) with a very high ESD robustness for use in especially hostile environments. The new addition to the AVR series thus provides reliable ESD protection up to 25 kV (IEC61000-4-2). Moreover, thanks to the extremely precise multilayer technology and optimized manufacturing process, the new chip varistor features a low capacitance of 1.5 ± 0.13 pF. With its IEC 1005 package (1.0 x 0.5 x 0.5 mm) the component's volume is about 75 percent smaller than that of existing components. The new varistor features a maximum operating voltage of 70 V and an operating temperature range of -55 to 150 °C, thus enabling a broad range of possible applications.

Automotive Ethernet is the communication infrastructure of choice for today's vehicles since ECUs require a high speed, low latency communication in advanced driver assistance systems (ADAS) and autonomous driving. TDK's newest multilayer varistor extends the portfolio of protection components for automotive Ethernet applications. With the AVR and CT series reliable ESD protection up to 25 kV is now available for both 100Base-T1 and 1000Base-T1 interfaces without impeding high speed data communication.

Moving forward, TDK will further increase the product lineup in terms of compactness, operating voltage, and capacitance to flexibly respond to the wide range of automotive device designs.

Glossary

- IEC61000-4-2: International Electrotechnical Commission's immunity standard on ESD

Main applications

- ESD protection of ECUs networked with automotive Ethernet

Main features and benefits

- Reliable ESD protection up to 25 kV
- Low capacitance and narrow tolerance through extremely precise multilayer technology
- Compact dimensions of just 1.0 x 0.5 x 0.5 mm
- High operating temperature of up to 150 °C

Key data

Type	Dimensions [mm]	Max. operating voltage [V]	Capacitance [pF]	Applications
AVRH10C221KT1R5YA8	1.0 x 0.5 x 0.5	70	1.5 ±0.13	Ethernet 1000Base-T1

Multilayer varistor portfolio / Application overview (TDK and EPCOS brand products)

Type	Case size [EIA]	V _{Br} [V]	V _{DC} [V]	Capacitance [pF]		AEC-Q200	LIN	CAN	CAN-FD	MOST	FlexRay	Ethernet 100Base-T1	Ethernet 1000Base-T1
				typ.	max.								
0402, single													
CT0402S14AHSG	0402	> 28	16	10	15	x	x	x	x	x	x		
CT0402S17AG	0402	> 32.5	19	15	-	x	x	x	x	x	x		
CT0402S20AHSG P	0402	> 100	24	4.7	5.7	x						x	
AVRH10C270KT350NA8	0402	27	19	35	45.5	x		x	x	x	x		
AVRH10C270KT150NA8	0402	27	19	15	19.5	x		x	x	x	x		
AVRH10C101KT4R7FA8	0402	100	70	4.7	5.7	x						x	
AVRH10C101KT1R1NE8	0402	> 100	70	1.1	1.4	x							x
AVRH10C221KT1R5YA8	0402	220	70	1.5	1.63								x
0603, single													
CT0603S20AHSG P	0603	> 100	24	4.7	5.7	x						x	
CT0603L25HSG	0603	> 61	32	10	15	x	x	x	x	x	x		
CT0603S14AHSG	0603	> 28	16	15	30	x	x	x					
AVRM1608C270KT221M	0603	27	19	220	264	x	x						
AVR-M1608C270MTAAB	0603	27	17	30	-	x		x	x	x	x		
AVR-M1608C270MTABB	0603	27	17	15	-	x		x	x	x	x		
0508, array													
CA05M2S10T100HG	0508	> 26	12	2 x 10 matched ± 3%	15	x		x	x	x	x		

About TDK Corporation

TDK Corporation is a leading electronics company based in Tokyo, Japan. It was established in 1935 to commercialize ferrite, a key material in electronic and magnetic products. TDK's comprehensive portfolio features passive components such as ceramic, aluminum electrolytic and film capacitors, as well as magnetics, high-frequency, and piezo and protection devices. The product spectrum also includes sensors and sensor systems such as temperature and pressure, magnetic, and MEMS sensors. In addition, TDK provides power supplies and energy devices, magnetic heads and more. These products are marketed under the product brands TDK, EPCOS, InvenSense, Micronas, Tronics and TDK-Lambda. TDK focuses on demanding markets in the areas of information and communication technology and automotive, industrial and consumer electronics. The company has a network of design and manufacturing locations and sales offices in Asia, Europe, and in North and South America. In fiscal 2019, TDK posted total sales of USD 12.5 billion and employed about 105,000 people worldwide.

You can download this text and associated images from www.tdk.com/corp/en/news_center/press/20190820_01.htm.

Further information on the products can be found under https://product.tdk.com/info/en/catalog/datasheets/vpd_automotive_varistors_avr_en.pdf.

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