

## Multilayer ceramic chip capacitors

### Soft-termination MLCCs with X8R thermal characteristics for automotive applications

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- Suitable for harsh environmental conditions from -55 °C up to +150 °C
- Effective protection against solder cracks, flex cracks, and damage from vibrations and shocks
- Broadest lineup of crack-resistant MLCCs for automotive applications
- Qualified to AEC-Q200

May 26, 2015

TDK Corporation announces the introduction of high temperature resistant MLCCs with soft terminations, expanding the CGA series of MLCCs for automotive applications. These components employ electrodes made of conductive resins that provide effective protection against solder cracks caused by thermal cycling, flex cracks caused by stress to the PCB, and damage due to vibrations and shocks. In addition, the new CGA series of MLCCs employ an X8R dielectric material and are thus able offer stable capacitance values ( $\pm 15$  percent) at temperatures from -55 °C to +150 °C.

The new components are available in package sizes of IEC 1005 (EIA 0402) to IEC 3225 (EIA 1210) and offer rated capacitances ranging from 150 pF to 10  $\mu$ F and rated voltages from 16 V to 100 V. The new series include the world's only X8R soft-termination MLCC in an IEC 1005 package\*. Thus, TDK offers the broadest lineup of crack-resistant MLCCs designed for demanding automotive applications. These components are especially suitable for ECUs used in high temperature environments such as engine compartments and where space is at a premium as well as for use in smoothing and decoupling circuits. Mass production of the new MLCCs, which are qualified to AEC-Q200, will start in June 2015.

Modern cars increasingly rely on electronic systems and implement electric operation, which has led to a drastic increase in the number of electronic components found in such vehicles. At the same time, there is a strong trend towards locating electronic control units in the engine compartment or near other structural parts in order to gain more space for passengers. Electronic components used for such applications must be able to withstand high temperatures and severe vibrations. The new MLCCs retain all the advantages of existing soft-termination products and are fully compliant with the industry's most stringent X8R specifications.

\* As of April 2015, according to TDK investigations

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#### Glossary

- X8R temperature characteristics: Dielectric material with  $\pm 15$  percent change in capacitance in the temperature range from -55°C to +150°C

- Flex cracks: After MLCCs have been soldered to a PCB, handling processes such as board splitting, insertion of sockets and leaded components, and screw-down can cause the PCB to bend, and the accompanying tensile stresses can lead to cracks in the MLCC itself.
- Solder cracks: In an environment subject to repeated and drastic changes between high and low temperatures, thermal stress occurs in the solder section of components due to the different thermal expansion coefficients of the component and the PCB, leading to solder cracks.

## Main applications

- Automotive ECUs in high temperature environments such as engine compartments
- Smoothing circuits and decoupling circuits

## Main features and benefits

- Suitable for harsh environmental conditions from -55 °C up to +150 °C
- High resistance against solder cracks caused by thermal cycling, flex cracks caused by stress to the PCB, and damage due to vibrations and shocks
- Wide capacitance range from 150 pF to 10 µF
- Qualified to AEC-Q200

## Key data

Series	Package size [IEC]	Footprint [mm]	Rated voltage [V]	Capacitance
CGA2	1005 (EIA 0402)	1.0 x 0.5	16 to 100	150 pF to 47 nF
CGA3	1608 (EIA 0603)	1.6 x 0.8		1 nF to 470 nF
CGA4	2012 (EIA 0805)	2.0 x 1.25		22 nF to 1 µF
CGA5	3216 (EIA 1206)	3.2 x 1.6		100 nF to 4.7 µF
CGA6	3225 (EIA 1210)	3.2 x 2.5		470 nF to 10 µF

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## 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 portfolio includes electronic components, modules and systems\* marketed under the product brands TDK and EPCOS, power supplies, magnetic application products as well as energy devices, flash memory application devices, and others. TDK focuses on demanding markets in the areas of information and communication technology and consumer, automotive and industrial 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 2015, TDK posted total sales of USD 9.0 billion and employed about 88,000 people worldwide.

\* The product portfolio includes ceramic, aluminum electrolytic and film capacitors, ferrites, inductors, high-frequency components such as surface acoustic wave (SAW) filter products and modules, piezo and protection components, and sensors.

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