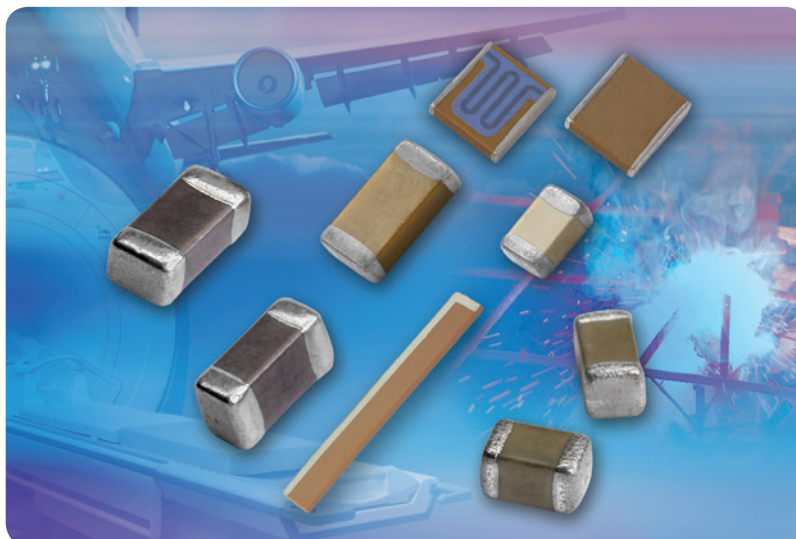




MULTILAYER CERAMIC CHIP CAPACITORS

Road Map

Multilayer Ceramic Chip Capacitors Road Map



FEATURED PRODUCTS

- Chip Capacitors in PME/NME Technology
- Chip Capacitors in BME Technology
- Automotive Grade Capacitors, AEC-Q200 Qualified
- Medical Grade Capacitors
- High Reliability, Military, DSCC, and Aerospace
- RF and High Q/Low ESR Series
- Non-Magnetic Series
- Ultra-Small Size 0201 and Chip Array
- Silver Palladium (AgPd) Termination for Hybrid Applications
- Board Flex Sensitive, Including Polymer Termination
- Surface Arc-Over Prevention for High Voltage
- Speciality Capacitors (e.g. Controlled Discharge Capacitor)
- Surface-Mount Ceramic Chip Antennae

RESOURCES

- For more information, visit:
<http://www.vishay.com/capacitors/ceramic/ceramic-multilayer-smd/>





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Surface-Mount Products

- **Vishay Vitramon Chip Capacitor** – VJ series surface-mount product, a reliable replacement for leaded capacitors
- **RF Multilayer Ceramic Chip Capacitors** – Offering high self-resonance, a high Q factor of ≥ 2000 , and a low dissipation factor of $\leq 0.05\%$ for operation in high-frequency commercial applications. 0402, 0603, and 0805 case sizes with broad working voltages from $25 V_{DC}$ to $250 V_{DC}$
- **Quad RF Capacitors** - High Q (> 2000) MLCCs for high-frequency applications in 0505, 1111, 2525, and 3838 body sizes, and application voltages up to 7200 VDC
- **High-Q Series** – C0G (NP0) ultra-stable, high-frequency capacitors
- **Medical Grade Capacitors** – For implantable cardiovascular control applications
- **Automotive Grade Capacitors** – Qualified to AEC-Q200 guidelines for reliable automotive electronics
- **MIL-PRF-55681** – Complies with Department of Defense specification requirements for CDR military grade series
- **X8R Dielectric** – Stable capacitance with reliable performance up to $+150\text{ }^{\circ}\text{C}$
- **Cassette Packaging** – Bulk case package increases pick and place productivity, reduces storage area and packaging materials
- **Open Mode Design Capacitors (OMD-Cap)** – Reduce risk of shorts and low insulation resistance from capacitor cracks due to board flex, with high voltage breakdown compared to standard designs
- **High-Reliability Series** – A broad product range manufactured with a combination of design, materials, and tight process controls to achieve high field reliability
- **DSCC Part Numbers** – 03029 (0402 case size), 03028 (0603 case size), 05006 (0805 case size), 05007 (1206 case size)
- **High-Frequency DSCC** – 05001 (0805 case size), 05002 (0603 case size), 05003 (0402 case size)
- **HVArc Guard® Capacitor Series** – Higher capacitance, surface-mountable, high-voltage, multilayer ceramic capacitors designed to prevent surface arc-over
- **X8R Dielectric Extension** – Size 0402 ($25\text{ V}/50\text{ V}/100\text{ V}$) and 0603/0805 with 100 V range for stable capacitance with reliable performance up to $+150\text{ }^{\circ}\text{C}$
- **Safety Certified Capacitors** – Size 2008, 2012, and 2225 in C0G(NP0) and X7R. Approved IEC 60384-14-2005 3rd edition with X1/Y2 and X2 classification for 250 VAC applications
- **VJ...W1BC** – Basic commodity series with base metal electrode (BME) for X7R/X5R/Y5V and noble metal electrodes (NME) for NP0 dielectric
- **Chip Arrays** – Chip arrays for space-constrained applications and filtering in data communication lines. Four capacitors in one package, built on NP0, X7R, or Y5V dielectric
- **Ultra-Small 0201** – Ultra-small series - Built with NP0, X5R, X7R, and Y5V dielectric for miniaturization in portable applications
- **0402 High-Q** – Excellent Q-factor and low ESR enable miniaturization in wireless data communication applications
- **Tunable Surface-Mount Ceramic Chip Antennas** – With ultra-small outline, omni-directional, linear polarization and complete UHF band coverage (470 MHz to 860 MHz) up to 1.1 GHz for mobile devices
- **Fixed-Frequency Surface-Mount Ceramic Chip Antennas** – Small form-factor, high-performance, chip antennas designed for operation at 868 MHz, 915 MHz, 1.5 GHz, 2.4 GHz, and 5 GHz

Termination

- **Silver/Palladium (Ag/Pd) Terminations** – Used for conductive epoxy assembly
- **Flexible Polymer Terminations** – Enhance the robustness of the terminations to resist board flexure failures
- **CDR Solder Coat Termination** – Base metallization-barrier metal-solder-coated tin/lead alloy (Sn/Pb), with a minimum of 4 % lead. Solder has a melting point $+200\text{ }^{\circ}\text{C}$ or less. Solder coat thickness is a minimum of $60\text{ }\mu\text{m}$
- **Tin/Lead (Sn/Pb) Termination Finish for CDR, DSCC, High-Reliability Series** – Base metallization 100 % tin plate barrier with tin/lead plate matte finish with a minimum 4 % lead
- **Non-Magnetic Copper Terminations (C)** – Copper barrier 100 % tin plate matte finish for reflow soldering
- **Non-Magnetic Termination (N)** – For Epoxy gluing assembly



MULTILAYER CERAMIC CHIP CAPACITORS

Road Map

Surface-Mount Products

1948	Vishay Porcelain Caps
1967	Vishay Vitramon Chip Capacitor / Ag/Pd Termination
1985	Medical Grade Capacitors / High-Q Series
1989	Automotive Grade Capacitors / MIL-PRF-55681 CDR Series
1993	X8R Dielectric Capacitors Series / Tip 'N Ring® Series until 2009
1994	High-Voltage Series / VTOP Series until 2009
1996	Low-Inductance Series (0612/0508) until 2009
2000	Cer-F (Y5E Dielectric) Series until 2009
2003	Basic Commodity Series (VJ...W1BC)
	RuGGed Chip Series until 2009
2004	Open Mode Design (OMD) Series / High-Reliability Series
2005	Chip Array, Ultra-Small 0201 and 0402 High Q for Basic Commodity Series VJ...W1BC
	DSCC Series (03028,03029,05006,05007) / Tin/Lead Finish for CDR, DSCC, and HiRel Series
2006	HVArc Guard® Series / Hot Solder Finish for CDR / Flexible Polymer Termination
2008	Controlled Discharge Cap (CDC)
	N term = Non-Magnetic for Conductive Epoxy Assembly
2009	Surface-Mount Ceramic Chip Antenna
2010	Ultra High Q, Low ESR for Basic Commodity Series VJ...W1BC
	Flexible Polymer Terminations for Automotive
2012	DSCC High Frequency (05001, 05002, 05003)
	Fixed Frequency Surface-Mount Ceramic Chip Antennas
	RF Multilayer Ceramic Chip Capacitors (Commercial)
2013	QUAD HIFREQ Series 0505 and 1111 Body Size Ceramic Chip Capacitors
	X8R Capacitors Extension (0402 and 0603 / 0805 with 100 V)
	Surface-Mount Safety Capacitors (X1/Y2 and X2)
	Surface-Mount Ceramic Chip Antennas (1.575 GHz / 2.4 GHz / 5 GHz)
	Source Energy Capacitor
2014	QUAD HIFREQ Series 2525 and 3838 Body Size Ceramic Chip Capacitors
	C term = Improved Non-Magnetic for Reflow Assembly
	RF Multilayer Ceramic Chip Capacitors < 1 pF
	VJ 31X RoHS Automotive MLCC Series
2015	High-Voltage Surface-Mount Capacitors 3 kV - 5 kV
	High-Temperature Capacitors
	MIL-PRF-123 CKS Series Chip Capacitors
	RF Microstrip Capacitors