



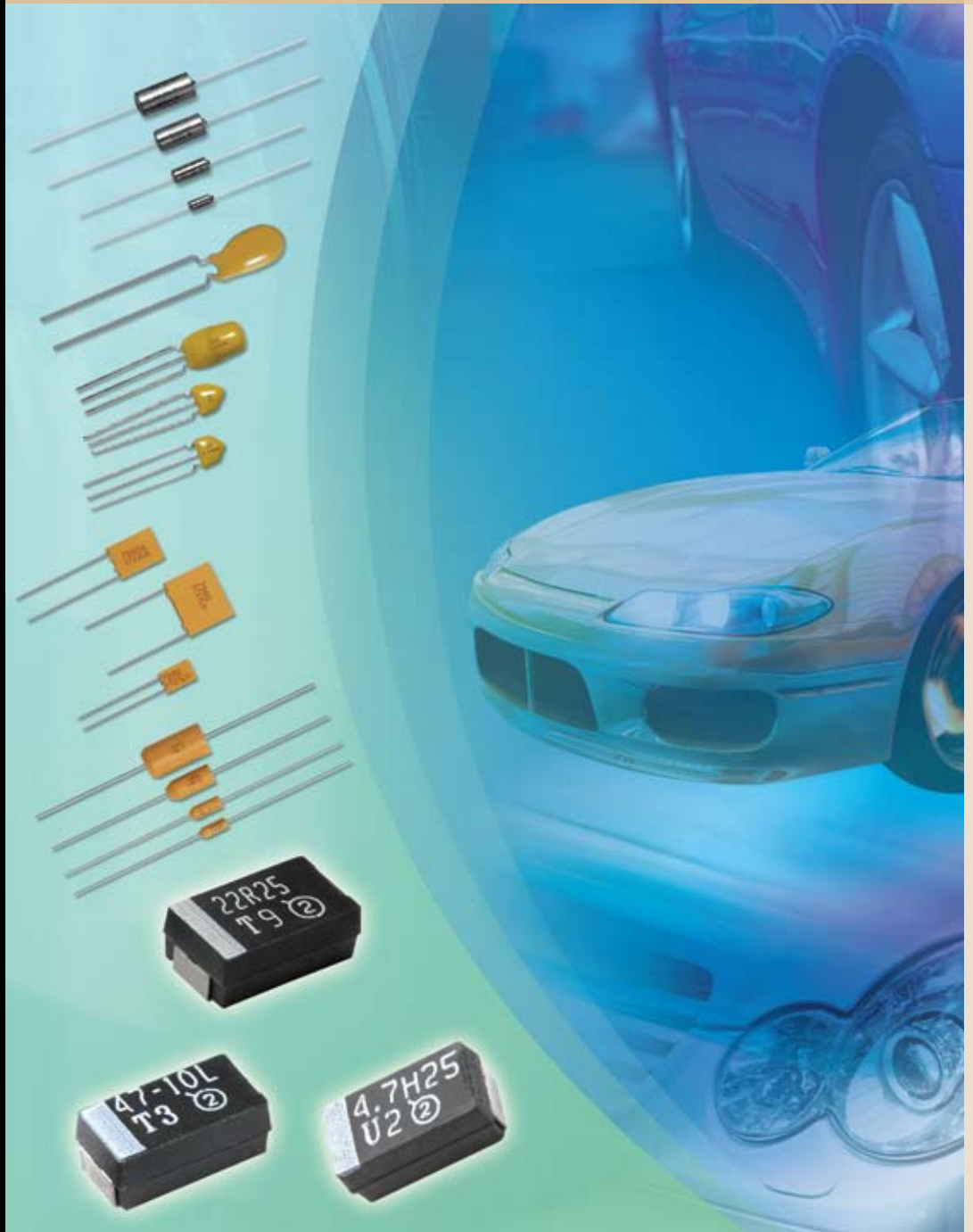
VISHAY INTERTECHNOLOGY, INC.

CAPACITORS

TANTALUM CAPACITORS SOLUTIONS

For Automotive Applications

MARKET SOLUTIONS





Automotive Applications Solutions

Using Tantalum Capacitors from Vishay

About Vishay Intertechnology

Vishay was founded in 1962 to manufacture and market foil resistors, an invention of physicist Dr. Felix Zandman, Chairman of the Board and founder. The Company began operations with foil resistors and strain gages as its initial product offerings. In 1985, having grown from a start-up into the world's leading manufacturer of these original products, Vishay began an ongoing series of strategic acquisitions to broaden its product portfolio.

Broad-Line Manufacturer, Global Presence

Today, Vishay is a broad-line manufacturer with a global presence. It is one of the world's largest manufacturers of discrete semiconductors and passive electronic components. Vishay's acquisitions include the infrared component business of Infineon and such top names as Siliconix, Dale, Draloric, Sprague, Vitramon, and BCcomponents (the former passive components business of Philips Electronics and Beyschlag).

Innovations in Technology

Over the years, Vishay's R & D efforts have led to a steady stream of technological breakthroughs and innovative products. These include packageless power MOSFETs, the industry's first silicon-based RF capacitors, dc-to-dc converter modules with all the active and passive components required for a complete power conversion solution, high-current IHLP inductors, Power Metal Strip[®] resistors, and many more.

Leading Industry Rankings

Vishay's global footprint includes manufacturing facilities in China and other Asian countries, Israel, Europe, and the Americas, as well as sales offices around the world. Vishay has market shares ranging from substantial to number-one for each of its products.

Discrete semiconductors

- Number 1 worldwide in low-voltage power MOSFETs
- Number 1 worldwide in rectifiers
- Number 1 worldwide in glass diodes
- Number 1 worldwide in infrared data communication devices (IRDCs)
- Number 1 worldwide in IR receivers

Passive components

- Number 1 worldwide in wirewound power resistors
- Number 1 worldwide in foil resistors
- Number 1 worldwide in thin film resistors
- Number 1 worldwide in MELF resistors
- Number 1 worldwide in leaded power film resistors
- Number 1 worldwide in leaded fusible resistors
- Number 1 worldwide in wet tantalum and conformal-coated capacitors
- Number 1 worldwide in strain gage sensors and load cells

“One-Stop Shop” Service

With Vishay's “one-stop shop” service, customers can send their bills of materials (BOMs) to Vishay and ask the Company to cross-reference Vishay products in all categories. This enables customers to order multiple components from one source—Vishay. In addition, Vishay's product sample service for design engineers provides free product samples worldwide. Quick turnaround time and a complete range of Vishay samples enable customers to rely on Vishay for discrete electronic component solutions. For more information about Vishay samples, please visit us on the Web at www.vishay.com or contact a local Vishay sales representative or office.



Vishay Tantalum Capacitor Solutions For Automotive Applications

Tantalum Capacitors for Automotive Applications

Vishay is one of a respected echelon of component manufacturers whose reputation for reliability and quality is complemented by a decades-long record of service to the automotive industry. The company's products are used in every electronic control unit of the typical vehicle to provide functions including power management; electric motor control; data / audio / video signal switching; infrared (IR) signal transmission; protection against overtemperature conditions; airbag ignition; and lighting.

Typical Applications

Body Electric and Comfort Electric

- Sensors
- Immobilizer and Security Systems
- Door / Window / Sunroof Control
- Seat Adjust and Memory
- HVAC (Heating, Ventilating, Air Conditioning)
- Climate Control
- Dashboard and Interior Illumination
- Passive Safety (Airbag, Restraint Systems)
- Reversible Wiper Drives
- Keyless Entry, Passive Entry, Passive Start, Bluetooth Communication
- Car TV and DVD Systems (Multimedia)

Chassis Electric

- Active Safety (ESP, ABS, ASR, USC)
- EPB (Electric Park Brake)
- Electrical Transmission (CVT, ASG, Double Clutch Shifting)
- EAGR, Electrical Catalytic Converter, Diesel Particle Filter
- Active Suspension, Dynamic Control
- Sensors
- Tire Pressure Monitoring
- Electrical Hydraulic Power Steering (EHPS)
- Electrical Power Steering (EPS)

Powertrain (Underhood)

- Common Rail Diesel Electrical Control
- Piezoelectric-Injection Driver
- Engine Control Unit (ECU)
- Turbo Charger Control Unit
- Ignition Electrical Drive
- Engine Sensors
- Electrical Water Pump
- ISG (Integrated Starter Generator 14 V / 42 V)
- Board Load-Control Unit
- Boardnet Management
- Engine Cooling (Electrical Fan Control)



Driver Information

Driver Information System
Bluetooth Communication
GPS Car Navigation and Audio System
SDARS / Antenna / Amplifier System

Lighting Systems

Sensors (ACC, LIDAR)
Headlight Leveling Control and Advanced Front Lighting Headlight Cleaning System
LED Lighting (Front and Rear)
HID Electrical (Xenon Driver)
Sensors (Night Vision Systems, Fog Detection)
Ambient Lighting

Select Application Examples

Power Management and Conversion

Tantalum capacitor options include devices in a broad variety of case sizes and with the high temperature ratings required by the automotive environment. Tantalum capacitors are available in radial, axial, and SMD formats to provide effective filtering in switchmode power supplies at temperatures up to 150 °C and vibration levels up to 20 G. Molded tantalum capacitors deliver exceptionally stable, high-capacitance performance over a long life and in high-temperature (under-the-hood) environments.

Solid tantalum capacitors available in EIA-size SMD packages, makes an ideal solution for high-volume PCB and hybrid automotive applications. Tantalum molded SMD capacitors are offered in tape-and-reel packaging and widely used for filtering low frequency noise. Vishay also offers a complete line of tantalum capacitors that can be used in through-hole board applications.

Whatever the automotive application, Vishay's extensive tantalum capacitor product offering includes the right part for the job. Throughout the automotive electronic systems, Vishay supplies designers and manufacturers with reliable, high-performing, and space-saving capacitors that improve the quality of today's automobiles.

Energy Storage

Today's automotive circuitry requires stability under various loads and peak power requirements. Vishay tantalum capacitors provide a low cost bulk energy storage solution for power buss hold-up applications.

Coupling

Automotive analog circuitry, including audio, sensor and telematics applications, require a coupling capacitor to connect two circuits so that only the AC signal passes from the first circuit to the next. The capacitor, often called a blocking capacitor, blocks the DC signal, isolating the DC bias of the two coupled circuits. Vishay tantalum capacitors offer the requisite capacitance, DC leakage current and stability with temperature and time for automotive analog coupling.



New Product Application Sheet

(To help us support your product requirements, please provide the information below)

Application description: _____

Capacitance: _____ Tolerance: _____
DF / ESR requirement: _____
Application voltage : _____ Maximum applied voltage : _____
Maximum ripple current : _____ Frequency : _____
Other electrical needs: _____
Operating temperature range: _____
Storage temperature range: _____
Special environmental or reliability needs: _____

Termination Style: (check one) SMD _____ Through-hole _____
Termination plating: (check one) Tin/lead _____ RoHS-Compliant _____

Size needed, or maximum size constraints: _____

Projected Usage (pcs) _____
Project Start Date: _____

Contact Information:

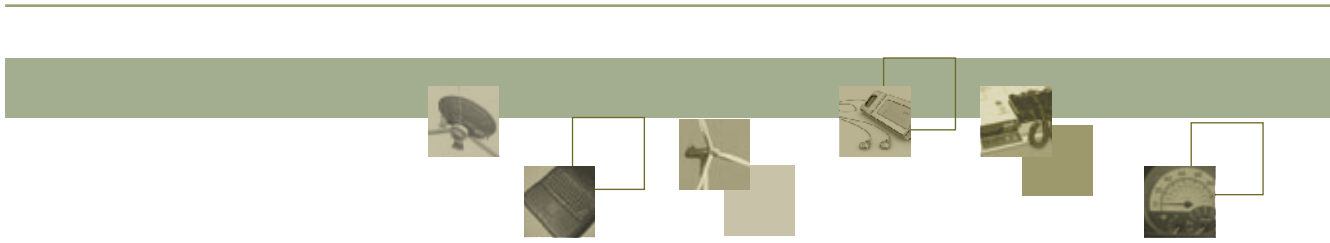
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Company: _____
Address: _____


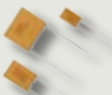





Telephone: _____
Fax: _____
E-mail: _____

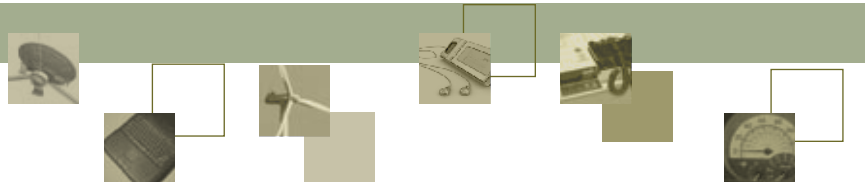
Other Miscellaneous Information: _____

For further questions refer to Regional Marketing at the VISHAY Tantalum Capacitor Division




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Tantalum Capacitors Selector Guide				
Through-Hole Product	Case Codes	Max. Height Range (mm)	Voltage Range	Features
173D 	U, V, W, X, Y	2.41 to 7.1	2 V to 50 V	<ul style="list-style-type: none"> - 55 °C to + 125 °C 0.1 uF to 330 uF Miniature axial-leaded Flame retardant molded case construction Lead (Pb)-free, RoHS-compliant
790D 	A, B, C, D	7.3 to 10.5	6.3 V to 50 V	<ul style="list-style-type: none"> - 55 °C to + 125 °C 0.1 uF to 330 uF Standoffs on all radial leaded cases Flame retardant molded case construction Lead (Pb)-free, RoHS-compliant
199D 	A, B, C, D, E, F	7.11 to 16.50	3 V to 50 V	<ul style="list-style-type: none"> - 55 °C to + 125 °C 0.1 uF to 680 uF Low leakage, low dissipation factor Epoxy coated radial-leaded Lead (Pb)-free, RoHS-compliant
299D (TriPole) 	A, B, C, D, E, F	9.14 to 15.74	3 V to 50 V	<ul style="list-style-type: none"> - 55 °C to + 125 °C 0.1 uF to 680 uF Triple-Lead design allows reverse installations Epoxy coated radial-leaded Lead (Pb)-free, RoHS-compliant
489D/499D 	A, B, C, D, E, F, H, M, N, R	7.0 to 22.0	3 V to 50 V	<ul style="list-style-type: none"> 489D (- 55 °C to + 85 °C) 499D (- 55 °C to + 125 °C) 0.1 uF to 680 uF Low Z and ESR at high frequencies Epoxy coated radial-leaded Lead (Pb)-free, RoHS-compliant
ETQW (EU style) 	1, 2, 3, 4, 5, 6	7.5 to 20.0	3 V to 50 V	<ul style="list-style-type: none"> - 55 °C to + 125 °C 0.1 uF to 470 uF Flame retardant epoxy resin construction Lead (Pb)-free, RoHS-compliant
150D 	A, B, R, S	3.85 to 9.32	6.3 V to 125 V	<ul style="list-style-type: none"> - 55 °C to + 125 °C 0.47 uF to 330 uF Low leakage, low dissipation factor Exceptional operating stability Hermetically sealed metal case construction Lead (Pb)-free, RoHS-compliant



Tantalum Capacitors Selector Guide

Surface Mount Series	Case Codes	EIA Sizes	Max. Dimensions L x W x H (mm)	Voltage Range	Features
293D⁽¹⁾ 	A B C D E	3216-18 3528-21 6032-28 7343-31 7343-43	3.4 x 1.8 x 1.8 3.7 x 3.0 x 2.1 6.3 x 6.5 x 2.8 7.6 x 4.6 x 3.1 7.6 x 4.6 x 4.3	4 V to 50 V	<ul style="list-style-type: none"> - 55 °C to + 125 °C 0.1 uF to 680 uF 100 % Surge current test (B,C, D and E sizes) Lead (Pb)-free, RoHS-compliant
TR3⁽¹⁾ 	A B C D E	3216-18 3528-21 6032-28 7343-31 7343-43	3.4 x 1.8 x 1.8 3.7 x 3.0 x 2.1 6.3 x 6.5 x 2.8 7.6 x 4.6 x 3.1 7.6 x 4.6 x 4.3	4 V to 50 V	<ul style="list-style-type: none"> - 55 °C to + 125 °C 0.1 uF to 680 uF Low ESR 100 % Surge current test (B,C, D and E sizes) Lead (Pb)-free, RoHS-compliant
TH3 	A B C D E	3216-18 3528-21 6032-28 7343-31 7343-43	3.4 x 1.8 x 1.8 3.7 x 3.0 x 2.1 6.3 x 6.5 x 2.8 7.6 x 4.6 x 3.1 7.6 x 4.6 x 4.3	4 V to 50 V	<ul style="list-style-type: none"> - 55 °C to + 150 °C 0.33 uF to 100 uF High temperature 100 % Surge current test (B,C, D and E sizes) Lead (Pb)-free, RoHS-compliant

(1) For the 293D and TR3 series, a suffix is added to the standard part number to indicate automotive grade. The automotive grade suffix is '610' for the 293D series and 'AG' for the TR3 series.

For example, standard lead (Pb)-free part numbers 293D106X9035D2TE3 and TR3D107K010C0100 become 293D106X9035D2S610 and TR3D107K010C0100AG for automotive grade.



SEMICONDUCTORS:

Rectifiers • High-Power Diodes and Thyristors • Small-Signal Diodes • Zener and Suppressor Diodes
• FETs • RF Transistors • Optoelectronics • ICs • Modules and Assemblies

PASSIVE COMPONENTS:

Resistive Products • Magnetics • Capacitors • Strain Gage Transducers and Stress Analysis Systems

**One of the World's Largest
Manufacturers**
of Discrete Semiconductors and Passive Components

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