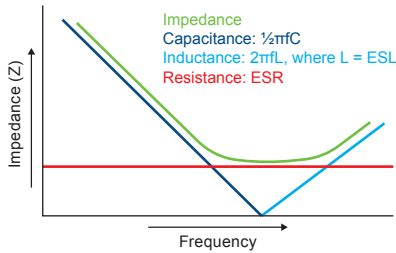
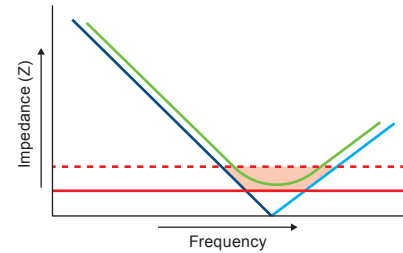


Impedance Characteristics and AC Ripple Reduction

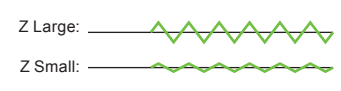
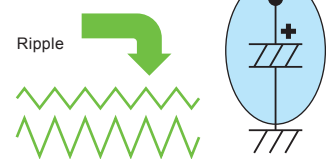
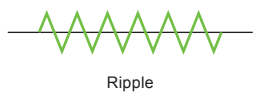
Conventional low-ESR tantalum capacitors



Polymer capacitor

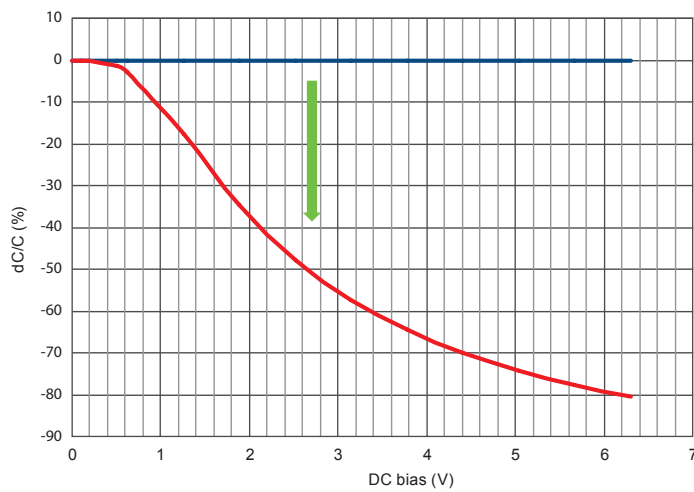


LOW ESR

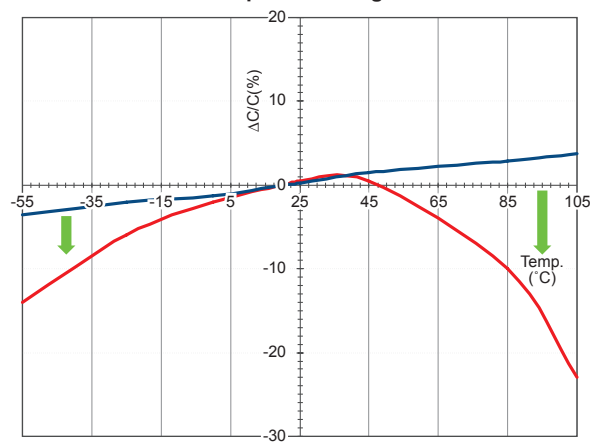


Stable Capacitance

DC bias



Temperature range



— MLCC Multilayer ceramic capacitor (6.3V47μF/3216/X5R)
— Polymer capacitor

Smart Solutions

MLCC + E-CAP → Hybrid

High Voltage MLCC



4x
Size 5750
100V 22μF

Radial E-CAP



1x
Size Ø10mm x 12.5 mm
25V 220μF

Hybrid-Cap



1x
EEHZC1E221P
Size Ø8mm x 10.2mm

CONDITION
High voltage and large current power supply circuit

BENEFIT
1. Space -58% off
2. Same capacitance
3. Low ESR/high ripple



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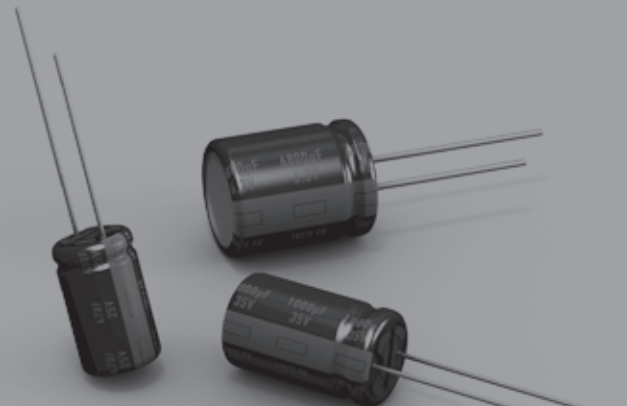
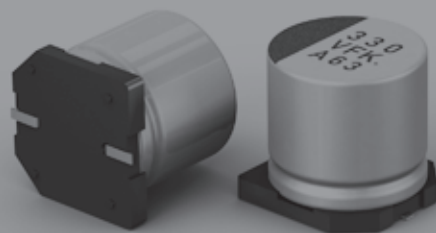
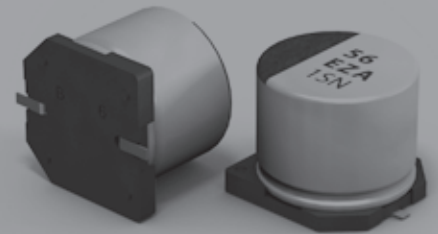
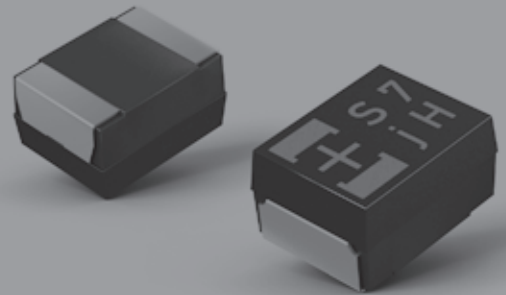
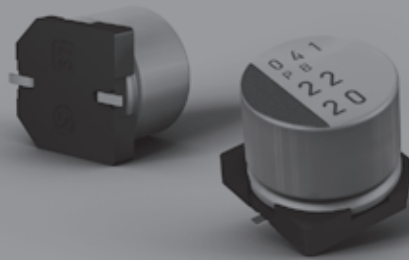


Panasonic

TTI & Panasonic
Capacitor Product Guide



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TTI, Inc. – Never Short on Solutions

Introduction

Together, TTI and Panasonic offer a wide range of capacitor design solutions. The Panasonic Corporation is one of the largest manufacturers of industrial products including a wide range of passive, electromechanical and semiconductor components. The company is a leading manufacturer of various capacitor technologies that can be used in the most demanding applications. Panasonic's aluminium electrolytic capacitors are available in SMT, THT and snap-in terminal packages. The latest developments are hybrid capacitors that combine conductive polymer and aluminium electrolytic capacitor technology. Panasonic's Polymer Capacitors; SP-Cap, POSCAP, OS-CON and Polymer Hybrid, provide high efficiency and low ESR alternatives to traditional tantalum capacitors and MLCCs.

OS-CON

OS-CON™ is an aluminium solid capacitor with high conductive polymer electrolyte material. OS-CON™ acquires low ESR, excellent noise reduction capability and frequency characteristics. In addition, OS-CON™ has a long life span and its ESR has little change even at low temperatures since the electrolyte is solid.

Features and Benefits

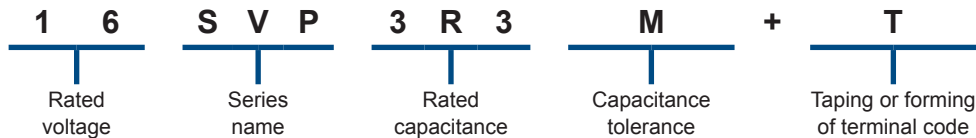
- Voltage range: 2VDC – 100VDC
- Capacitance range: 3.3 μ F – 2,700 μ F
- Temperature range: -55°C/+105°C, -55°C/+125°C
- Endurance*: up to 5,000h at 105°C, 2,000h at 125°C
- ESR: down to 5m Ω
- Ripple current: up to 7,200mA_{rms}
- Size \varnothing : 4mm – 10mm
- Height: 4.5mm – 13mm
- AEC-Q200 qualified series available

Applications

- Industrial equipment
- Automotive systems
- Power supplies
- DC/DC converters
- Telecommunication and network



How to read Part Numbers



POSCAP

POSCAP™ is a solid electrolytic chip capacitor. The anode is sintered tantalum and the cathode is a highly conductive polymer. POSCAP™ has a low ESR (Equivalent Series Resistance) level and excellent performance for high frequency while maintaining a low profile and high capacitance. In addition, it has high reliability and high heat resistance.

Features and Benefits

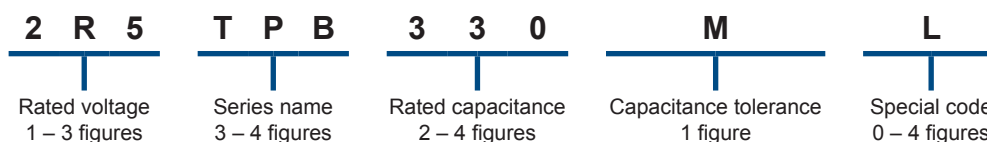
- Voltage range: 2VDC – 35VDC
- Capacitance range: 2.7 μ F – 1,500 μ F
- Temperature range: -55°C/+105°C, -55°C/+125°C
- Endurance*: 2,000h at 105°C, 1,000h at 125°C
- ESR: down to 5m Ω
- Ripple current: up to 6,100mA_{rms}
- Size (L x W): 2.0mm x 1.25mm – 7.3mm x 4.3mm
- Height: 1.0mm – 4.0mm
- AEC-Q200 qualified series available

Applications

- Industrial equipment
- Automotive systems
- Power supplies
- DC/DC converters
- Telecommunication and network



How to read Part Numbers



SP-Cap – Conductive Polymer Aluminium Capacitors



Based on common aluminium electrolytic capacitor technology SP cap uses solid polymer electrolyte instead of liquid electrolyte.

It has been continuously developed since 1990 and offers very stable capacitance characteristics over the complete operating temperature and frequency range, especially compared to ceramic and low ESR tantalum capacitors. And in terms of safety SP Cap does not easily ignite or “smoke” at over-voltage conditions or in case of short circuit. If a defect occurs, the polymer will become self-insulating and shuts off the current flow.

Features & Benefits

- Rated voltage: DC 2V – 25V
- Capacitance range: 2µF – 560µF
- Various Series available
e.g. low ESL type, low height
- Super low ESR (down to 3mΩ)
- High ripple current (up to 4A)
- Stable characteristics at high frequency and temperature
- High safety aspect
- Tantal replacement

Applications

- Embedded systems
- Input/output filter for converter, voltage regulator and power supply
- Industrial electronics
- Digital devices
- Telecommunication, e.g. base stations
- Power and battery decoupling
- New designs for high efficiency and miniaturisation

How to read Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12
E E F			● ●		▲ ▲		* * *			0A ◆	
Product Code			Series & Size Code		Rated Voltage		Capacitance			ESR Code	
e.g.			0D 2V 0E 2.5V 1C 16V		2R2 2.2µF 470 47µF 561 560µF			ER ESR 9mΩ E7 ESR 7mΩ XE ESR 6mΩ E4 ESR 4.5mΩ			

V-ZA, V-ZC Series – Conductive Polymer Hybrid Aluminium Electrolytic Capacitors



Lytic meets Polymer. It brings together low ESR characteristics of specialty polymer capacitor and the low leakage current of aluminium electrolytic capacitor. The series shows a compact design, high reliability of the specialty polymer capacitor and the safety of the aluminum electrolytic capacitor.

Features & Benefits – ZA Series

- Rated voltage: DC 25V – 80V
- Capacitance range: 10µF – 330µF
- Temperature range: -55°C – +105°C
- Endurance: 10,000h at +105°C
- Hybrid (polymer & electrolyte)
- Super low ESR (down to 20mΩ)
- High ripple current (up to 2.5A)
- Low leakage current
- AEC-Q200 qualified

Features & Benefits – ZC Series

- Rated voltage: DC 25V – 63V
- Capacitance range: 10µF – 330µF
- Temperature range: -55°C – +125°C
- Endurance: 4,000h at +125°C
- Hybrid (polymer & electrolyte)
- Super low ESR (down to 20mΩ)
- High ripple current (up to 2A)
- Low leakage current
- AEC-Q200 qualified

Applications

- Switching power supplies
- DC/DC converters
- Automotive equipment
- Industrial electronics
- Digital devices
- Telecommunication, e.g. base stations
- Smart meters
- New designs for high efficiency and miniaturisation

How to read Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12
E E H			● ●		▲ ▲		* * *			X	◆
Product Code			Series		Rated Voltage		Capacitance			Size Code D8	Suffix Taping Code
e.g.			ZA ZC		1E 25V 1V 35V 1J 63V		100 10µF 101 100µF 331 330µF				R 12mm Width (Size Code C) P 16mm Width (Size Code D-D8) 24mm Width (Size Code F-G)

V-FK, V-FT Series – Low ESR Aluminium Electrolytic Capacitors (SMD Type)



This series dispose of high capacitance and low resistance values combined with a small-sized case.

The outstanding performance of the new V-FT Series is achieved by high-capacity electrode foil and sophisticated Panasonic low resistance technology. Compared to the leading low ESR Panasonic Series (V-FK and V-FP) and to comparable competitor products, the new V-FT Series is miniaturised by one case size with same CV values and low resistance. Less material contributes to higher environmental friendliness.

Features & Benefits – FK Series

- Rated voltage: DC 6.3V – 100V
- Capacitance range: 3.3 μ F – 6,800 μ F
- Temperature range: -55°C – +105°C
- Endurance: 2,000h – 5,000h at +105°C
- Low ESR (down to 60m Ω)
- Vibration-proof product available ($\varnothing 8 \leq$)
- Suitable for series to the mains usage
- AEC-Q200 qualified

Features & Benefits – FT Series

- Rated voltage: DC 6.3V – 50V
- Capacitance range: 10 μ F – 2,200 μ F
- Temperature range: -55°C – +105°C
- Endurance: 2,000h at +105°C
- Low ESR (down to 60m Ω)
- Vibration-proof product available ($\varnothing 8 \leq$)
- Suitable for series to the mains usage
- AEC-Q200 qualified

Applications

- Switching power supplies
- DC/DC converters
- Automotive equipment
- Industrial electronics
- Digital devices
- Telecommunication, e.g. base stations
- Smart meters
- New designs for high efficiency and miniaturisation

How to read Part Numbers

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Product Code EEV			Series		Rated Voltage		Capacitance			High Temperature Reflow Type		Suffix Taping Code																														
			<table border="1"> <tr><td>FK</td></tr> <tr><td>FT</td></tr> </table>		FK	FT	<table border="1"> <tr><td>e.g.</td><td>0J</td><td>6.3V</td></tr> <tr><td></td><td>1C</td><td>16V</td></tr> <tr><td></td><td>2A</td><td>100V</td></tr> </table>		e.g.	0J	6.3V		1C	16V		2A	100V	<table border="1"> <tr><td>3R3</td><td>3.3μF</td></tr> <tr><td>821</td><td>820μF</td></tr> <tr><td>682</td><td>6,800μF</td></tr> </table>			3R3	3.3 μ F	821	820 μ F	682	6,800 μ F	<table border="1"> <tr><td>A</td><td>HTRT</td></tr> <tr><td>UA</td><td>HTRT Mini. Prod.</td></tr> <tr><td>XA</td><td>HTRT Size Code D8</td></tr> </table>		A	HTRT	UA	HTRT Mini. Prod.	XA	HTRT Size Code D8	<table border="1"> <tr><td>R</td><td>12mm Width (Size Code B-C)</td></tr> <tr><td>P</td><td>16mm Width (Size Code D-D8)</td></tr> <tr><td></td><td>24mm Width (Size Code F-G)</td></tr> </table>		R	12mm Width (Size Code B-C)	P	16mm Width (Size Code D-D8)		24mm Width (Size Code F-G)
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P	16mm Width (Size Code D-D8)																																									
	24mm Width (Size Code F-G)																																									

A-FR Series – Low ESR Aluminium Electrolytic Capacitors (Radial Lead Type)



This capacitor is a perfect solution for applications, which require ultra-low ESR – very high ripple current – very long life in a small mounting form. In comparison to our current products e.g. FM Series, we could achieve a lifetime upgrade of up to 100% (up to 10,000h at 105°C) and a capacitance increase of up to 30% by improving the material technology.

Features & Benefits

- Rated voltage: DC 6.3V – 63V (100V under development)
- Capacitance range: 18 μ F – 8,200 μ F
- Temperature range: -40°C – +105°C
- High ripple current (Up to 3,820mA)
- Low ESR (down to 12m Ω)
- Endurance: 5,000h – 10,000h at +105°C

Applications

- Switching power supplies
- DC/DC converters
- Industrial electronics
- Digital devices
- Telecommunication, e.g. base stations
- Smart meters
- New designs for high efficiency and miniaturisation

How to read Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12																									
E	E	U	F	R	▲	▲	*	*	*	●	◆																									
Product Code			Series		Rated Voltage		Capacitance			Height		Suffix																								
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