

# S.O.S. Short on MLCCs? Choose Panasonic Polymer Series!



## DROP-IN REPLACEMENT FOR MLCC IF:

- > Voltage 2 – 35V
- > Capacitance required  $\geq 47\mu\text{F}$
- > B and D case sizes
- > Non AECQ-200 compliant

## 2 EASY STEPS TO IDENTIFY YOUR RIGHT FIT ...

### 1. VOLTAGE NO DERATING REQUIRED

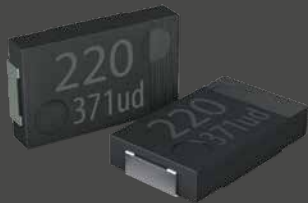
MLCC with derating	Conductive Polymer Capacitor Voltage
6.3V or 10V	~3V to 5V
10V or 16V	~6,3V to 10V
16V or 25V	~12V to 20V
25V or 50V	~20V to 35V

### 2. SMOOTHING CIRCUITS DEPENDENT UP ON:

Choose	Size	Capacitance	Low ESR	Ripple Current	Temperature	Automotive
SP-Cap	✓	✓✓	✓✓✓	✓✓✓	✓	–
POSCAP	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	✓*
OS-CON	✓✓	✓✓✓	✓✓	✓✓✓	✓✓	✓*
HYBRIDS	✓✓	✓✓	✓✓	✓✓	✓✓✓	✓✓✓
MLCC	✓✓	✓	✓✓✓	✓✓✓	–	✓✓

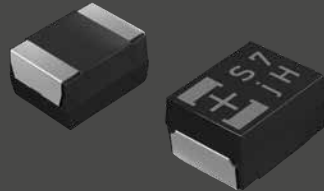
\* Only infotainment or non-safety critical circuits

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## SP-Cap

- > Voltage: 2 to 35 VDC
- > Cap: 2.2  $\mu$ F to 560  $\mu$ F
- > Ripple up to 10.2Arms
- > Lowest ESL/ESR: 1nH/3m $\Omega$



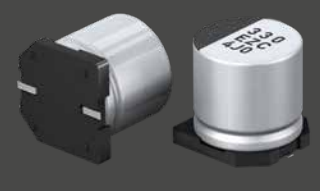
## POSCAP

- > Voltage: 2 to 35 VDC
- > Cap: 3.9  $\mu$ F to 1500  $\mu$ F
- > Size: 2.0x1.25 to 7.3x4.3mm
- > ESR: as low as 5m $\Omega$



## OS-CON

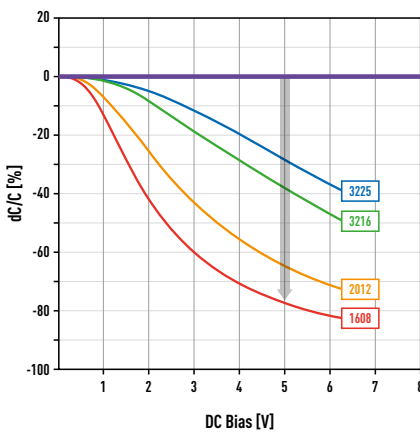
- > Voltage: 2 to 100 VDC
- > Cap: 3.3  $\mu$ F to 2700  $\mu$ F
- > Ripple up to 7.2Arms
- > ESR: as low as 5m $\Omega$



## Hybrid

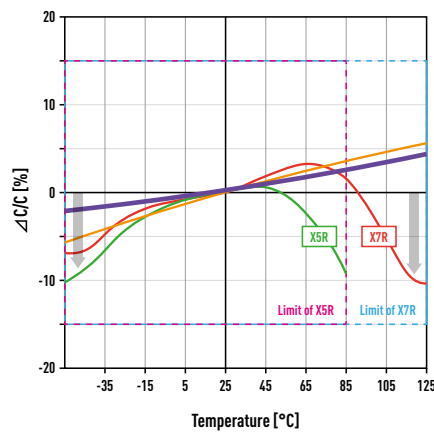
- > Voltage: 25 to 80 VDC
- > Temp: Up to 145 $^{\circ}$ C
- > Ripple up to 4.0Arms
- > AECQ-200 Compliant

### DC BIAS BEHAVIOUR OF POLYMER VS. MLCC



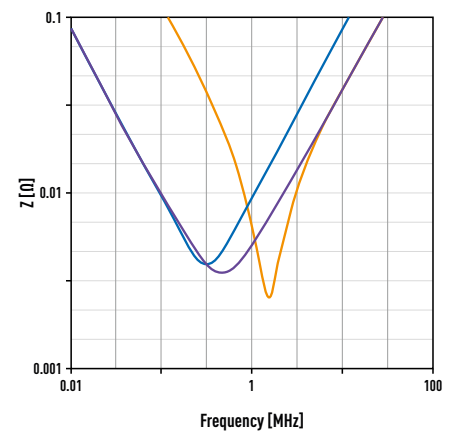
■ SP-Cap / POSCAP / OS-CON / Hybrid  
■ MLCC (6.3V 22 $\mu$ F, X5R)

### TEMPERATURE BEHAVIOUR OF POLYMER VS. MLCC



■ SP-Cap / POSCAP / OS-CON ■ Hybrid  
■ MLCC (16V 4.7 $\mu$ F, 3216, X5R / X7R)

### IMPEDANCE BEHAVIOUR OF POLYMER VS. MLCC



■ SP-Cap LS series 2.5V 180uF  
■ SP-Cap SX series 2.5V 180uF  
■ MLCC 0603 X5R 6.3V 22uF

### PANASONIC OFFERS :

- > Four variations in Polymer dielectric capacitors
- > Including chip and can-type (SMD & THT).
- > No derating and DC bias unlike MLCCs
- > Physically more robust, longer lifetimes and safe-failure modes (no-burning)

**With higher ripple current, stable ESR and capacitance across broad temperature and frequency spectrum, Polymer capacitors also offer value against Electrolytics for efficient designs.**