

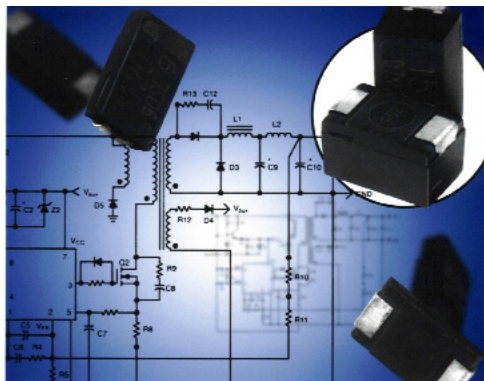


**THE DATASHEET OF  
ESRD220M12R**



# Type ESRD Solid Polymer Aluminum SMT Capacitors

Filtering power of 3 or more tantalum chips and 50 year life



Solid Polymer Aluminum capacitors combine the high capacitance capability of an electrolytic component with the high frequency performance of film capacitors. When the need for low impedance at high frequency is critical for your design, one ESRD chip is capable of replacing several liquid electrolyte aluminum or tantalum capacitors connected in parallel. This is due to the ultra-low ESR which results in significantly lower impedance than either aluminum or tantalum capacitors at frequencies of 100 kHz and above. There is no longer a need to stack capacitors to lower the impedance at high frequency. The low ESR and high capacitance make them ideal for bypassing high frequency noise, and for switching frequency filtering in DC/DC conversion. ESRD capacitors are packaged in a molded resin case with the same footprint (7.3 x 4.3 mm) as the industry standard tantalum "D" and "E" case sizes. The solid electrolyte results in a capacitor with stable impedance and equivalent series resistance over the entire operating temperature range and they have more than twice the ripple current handling capability of tantalum capacitors. In addition, the solid electrolyte delivers a typical expected operating life of more than 50 years, and it is ignition free.

RoHS Compliant

## Applications

Motherboard By-Pass

Switching Supply Input/Output Filters

Power Supply Decoupling

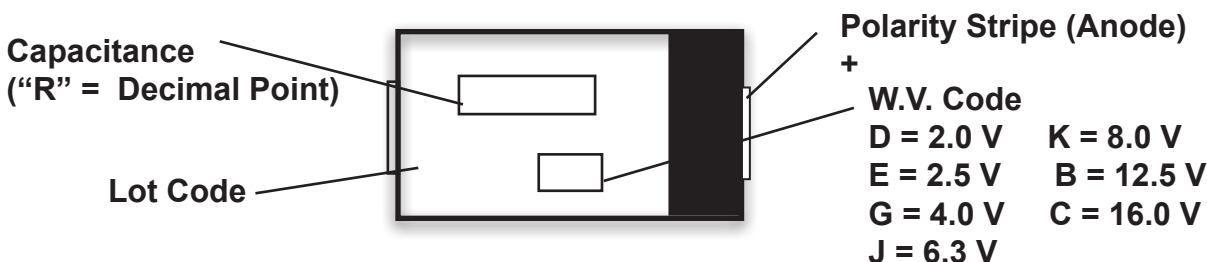
High Frequency Noise Reduction

Laptop LCD Displays

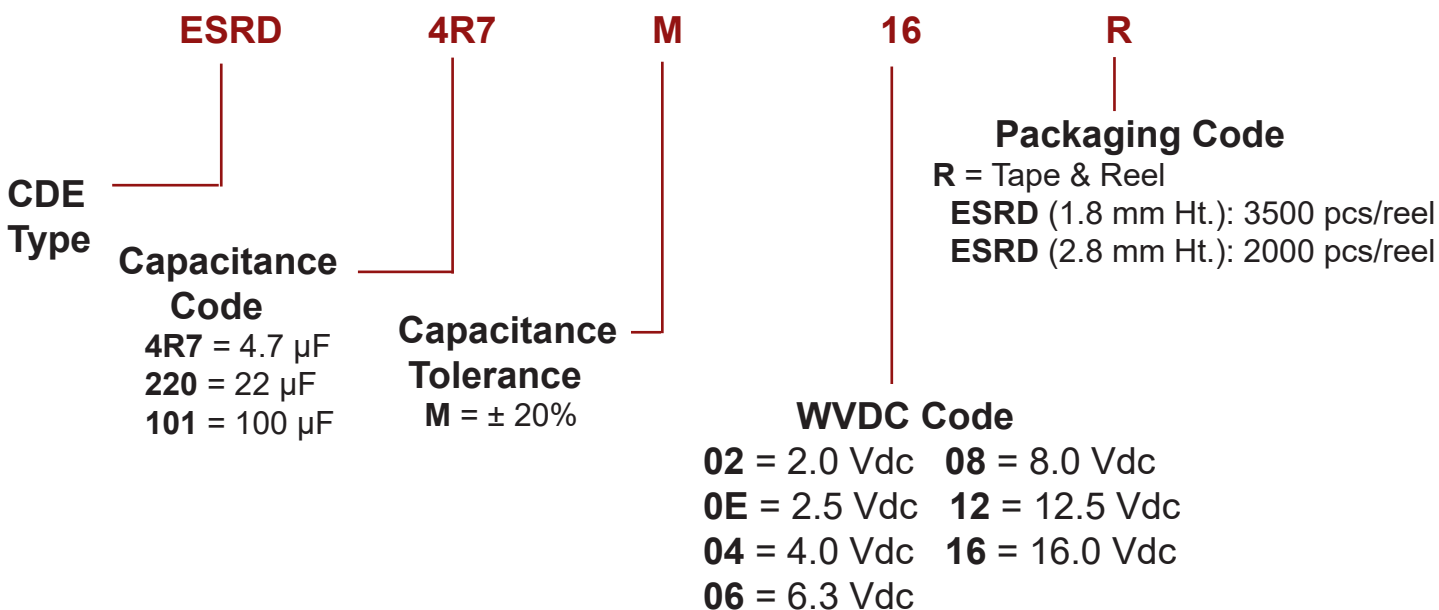
Automotive Digital Equipment

Portable Electronic Equipment

## Markings



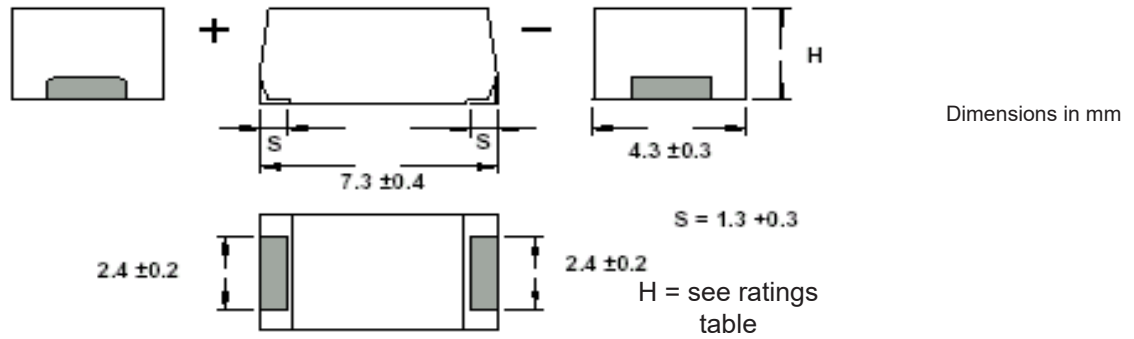
## Ordering Information



# Type ESRD Solid Polymer Aluminum SMT Capacitors

## High Voltage

## Outline Drawing



## Ratings

Capacitance ( $\mu\text{F}$ )	Catalog Part Number (Tape & Reel)	Maximum E.S.R 100 kHz/20 °C ( $\Omega$ )	Maximum <sup>1</sup> Ripple Current 100 kHz/105 °C (Amps)	Case Height H (mm)
<b>2.0 Vdc</b>				
100	ESRD101M02R	0.018	2.5	1.8 $\pm$ 0.1
120	ESRD121M02XR	0.015	2.7	1.8 $\pm$ 0.1
180	ESRD181M02R	0.015	3.0	2.8 $\pm$ 0.2
220	ESRD221M02R	0.015	3.0	2.8 $\pm$ 0.2
270	ESRD271M02XR	0.012	3.3	2.8 $\pm$ 0.2
<b>2.5 Vdc</b>				
82	ESRD820M0ER	0.018	2.5	1.8 $\pm$ 0.1
100	ESRD101M0EXR	0.015	2.7	1.8 $\pm$ 0.1
150	ESRD151M0ER	0.015	3.0	2.8 $\pm$ 0.2
180	ESRD181M0ER	0.015	3.0	2.8 $\pm$ 0.2
220	ESRD221M0EXR	0.012	3.3	2.8 $\pm$ 0.2
<b>4.0 Vdc</b>				
56	ESRD560M04R	0.018	2.5	1.8 $\pm$ 0.1
82	ESRD820M04XR	0.015	2.7	1.8 $\pm$ 0.1
120	ESRD121M04R	0.015	3.0	2.8 $\pm$ 0.2
150	ESRD151M04XR	0.012	3.3	2.8 $\pm$ 0.2
<b>6.3 Vdc</b>				
10	ESRD100M06R	0.055	1.4	1.8 $\pm$ 0.1
22	ESRD220M06R	0.040	1.6	1.8 $\pm$ 0.1
33	ESRD330M06R	0.028	2.0	1.8 $\pm$ 0.1
47	ESRD470M06R	0.018	2.5	1.8 $\pm$ 0.1
68	ESRD680M06XR	0.015	2.7	1.8 $\pm$ 0.1
100	ESRD101M06R	0.015	3.0	2.8 $\pm$ 0.2
120	ESRD121M06XR	0.012	3.3	2.8 $\pm$ 0.2
<b>8.0 Vdc</b>				
8.2	ESRD8R2M08R	0.055	1.4	1.8 $\pm$ 0.1
15	ESRD150M08R	0.040	1.6	1.8 $\pm$ 0.1
22	ESRD220M08R	0.028	2.0	1.8 $\pm$ 0.1
33	ESRD330M08R	0.018	2.5	1.8 $\pm$ 0.1
68	ESRD680M08R	0.015	3.0	2.8 $\pm$ 0.2
<b>12.5 Vdc</b>				
4.7	ESRD4R7M12R	0.080	1.0	1.8 $\pm$ 0.1
10	ESRD100M12R	0.060	1.0	1.8 $\pm$ 0.1
15	ESRD150M12R	0.050	1.3	1.8 $\pm$ 0.1
22	ESRD220M12R	0.030	1.6	1.8 $\pm$ 0.1
<b>16.0 Vdc</b>				
2.2	ESRD2R2M16R	0.110	1.0	1.8 $\pm$ 0.1
4.7	ESRD4R7M16R	0.080	1.0	1.8 $\pm$ 0.1
6.8	ESRD6R8M16R	0.070	1.0	1.8 $\pm$ 0.1
8.2	ESRD8R2M16R	0.045	1.3	1.8 $\pm$ 0.1

## Specifications

### Operating Temperature Range:

–55 °C to +105 °C, at 100% rated voltage

### Surge Voltage:

125% of the rated working Vdc

### Capacitance Range:

2.2 µF to 270 µF

### Capacitance Tolerance:

±20% at 120 Hz and +20 °C

### DC Leakage Current (DCL):

After a two minute application of the rated working voltage at +20 °C:

2V — 4V:  $I \leq 0.06CV$

6.3V — 16V:  $I \leq 0.04CV$  or 3 µA  
(whichever greater)

### Dissipation Factor (DF):

The ratio of the capacitor's equivalent series resistance to its reactance at 120Hz and +20 °C ESRD (1.8 mm ht.): DF is 0.06 Max.  
ESRD (2.8 mm ht.): DF is 0.10 Max.

### Resistance to Soldering Heat:

Heat the capacitors at 235 °C in an oven for 200 seconds. The capacitors will meet the following limits after stabilizing at 20 °C:

$\Delta C = \pm 10\%$  of the initial measured value

$DF \leq$  the initial specified value

$DCL \leq$  the initial specified value

### Vibration:

No abnormal change shall occur to capacitors that have been soldered (and attached) to a board when subjected to a vibration of 1.5 mm amplitude that is varied from 10 Hz to 2000 Hz in 20 min. cycles. The test duration is 2 hours for each right angle direction (total 6 hours). Capacitance is monitored during the last cycle of the test for stability.

### Moisture Resistance:

After 500 hours storage at +60 °C and 90% to 95% RH without load, the capacitor will meet the following limits:

$\Delta C = +70\%/-20\%$  of the initial measured value (2.0 Vdc, 2.5 Vdc),

+60%/-20% of the initial measured value (4.0 Vdc),

+50%/-20% of the initial measured value (6.3 Vdc),

+40%/-20% of the initial measured value (all other voltages)

$DF \leq$  two times the initial specified value

$DCL \leq$  the initial specified value

### Life Test:

Apply rated DC working voltage at 105 °C for 1000 hours, and then stabilize them to +20 °C. Capacitors will meet the following limits:

$\Delta C = \pm 10\%$  of the initial measured value

$DF \leq$  the initial specified value

$DCL \leq$  the initial specified value

### Shelf Life Test:

Shelf life is typically 42 months. Accelerated test: after 500 hours at 105 °C, capacitors will meet the following limits after stabilization at 20 °C:

$\Delta C = \pm 10\%$  of the initial measured value

$DF \leq$  the initial specified value

$DCL \leq$  the initial specified value

### Shear Test:

No damage shall be visible after subjecting a mounted capacitor to a side force of 5 N for 10 seconds

(For more information on this product please see the Solid Polymer Aluminum Capacitors Application Guide)

## Type ESRD Solid Polymer Aluminum SMT Capacitors

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