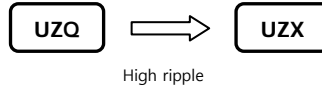




UZX series

- Super Low ESR
- High-Ripple current
- RoHS compliant

- 105°C 6,000~10,000Hrs assured.
- Low impedance, High ripple
- For SMPS, IP-Board, Adaptor, Charger
- RoHS compliant
- Halogen-free capacitors are also available.

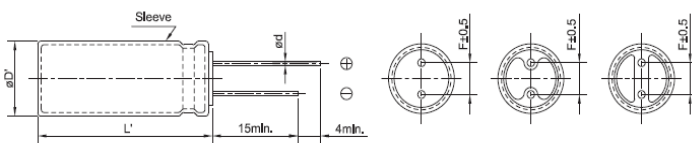


Specifications

Item	Characteristics																															
Rated Voltage Range	6.3 ~ 100Vdc																															
Operating Temperature Range	-40 ~ +105°C																															
Capacitance Tolerance	±20% (M) (at 20°C, 120Hz)																															
Leakage Current	I=0.01CV(μA) or 3μA, whichever is greater. Where, I:Max. Leakage current(μA), C:Nominal capacitance(μF), V:Rated voltage(VDC) (at 20°C, 2 minutes)																															
Dissipation Factor(Tanδ)	<table border="1"> <tr> <td>Rated voltage (Vdc)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>80</td> <td>100</td> </tr> <tr> <td>Tanδ (max.)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.09</td> <td>0.09</td> <td>0.08</td> </tr> </table> <p>If the capacitance exceeds 1,000uF, then Tanδ will be added 0.02 every 1000uF increase.(at 20°C, 120Hz)</p>	Rated voltage (Vdc)	6.3	10	16	25	35	50	63	80	100	Tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.09	0.08											
Rated voltage (Vdc)	6.3	10	16	25	35	50	63	80	100																							
Tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.09	0.08																							
Temperature characteristics (Max,impedance ratio)	<table border="1"> <tr> <td>Rated voltage (Vdc)</td> <td>6.3</td> <td>10 ~ 100</td> </tr> <tr> <td>Z(-25°C)/Z(20°C)</td> <td>3</td> <td>2</td> </tr> <tr> <td>Z(-40°C)/Z(20°C)</td> <td>5</td> <td>3</td> </tr> </table> <p>(at 120Hz)</p>	Rated voltage (Vdc)	6.3	10 ~ 100	Z(-25°C)/Z(20°C)	3	2	Z(-40°C)/Z(20°C)	5	3																						
Rated voltage (Vdc)	6.3	10 ~ 100																														
Z(-25°C)/Z(20°C)	3	2																														
Z(-40°C)/Z(20°C)	5	3																														
Load life	<p>The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for specified life times at 105°C.</p> <table border="1"> <tr> <td rowspan="2">VV</td> <td rowspan="2">5~6.30</td> <td colspan="2">80†</td> <td colspan="2">100</td> <td rowspan="2">12.50~</td> </tr> <tr> <td>11.5L</td> <td>15~20L</td> <td>12.5L</td> <td>16L~</td> </tr> <tr> <td>6.3Vdc</td> <td>6,000hrs</td> <td>8,000hrs</td> <td>9,000hrs</td> <td rowspan="2">9,000hrs</td> <td colspan="2">10,000hrs</td> </tr> <tr> <td>10~50Vdc</td> <td>7,000hrs</td> <td>9,000hrs</td> <td>10,000hrs</td> <td colspan="2">10,000hrs</td> </tr> <tr> <td>63~100Vdc</td> <td>6,000hrs</td> <td>8,000hrs</td> <td>9,000hrs</td> <td colspan="3">10,000hrs</td> </tr> </table> <p>Capacitance change ≤±30% of the initial value Tan δ ≤200% of the initial specified value Leakage current ≤The initial specified value</p>	VV	5~6.30	80†		100		12.50~	11.5L	15~20L	12.5L	16L~	6.3Vdc	6,000hrs	8,000hrs	9,000hrs	9,000hrs	10,000hrs		10~50Vdc	7,000hrs	9,000hrs	10,000hrs	10,000hrs		63~100Vdc	6,000hrs	8,000hrs	9,000hrs	10,000hrs		
VV	5~6.30			80†		100			12.50~																							
		11.5L	15~20L	12.5L	16L~																											
6.3Vdc	6,000hrs	8,000hrs	9,000hrs	9,000hrs	10,000hrs																											
10~50Vdc	7,000hrs	9,000hrs	10,000hrs		10,000hrs																											
63~100Vdc	6,000hrs	8,000hrs	9,000hrs	10,000hrs																												
Shelf life	<p>The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes at least 24 hours and not more than 48 hours before the measurements.</p> <p>Capacitance change ≤±30% of the initial value Tanδ ≤200% of the initial specified value Leakage current ≤200%The initial specified value</p>																															

Dimensions

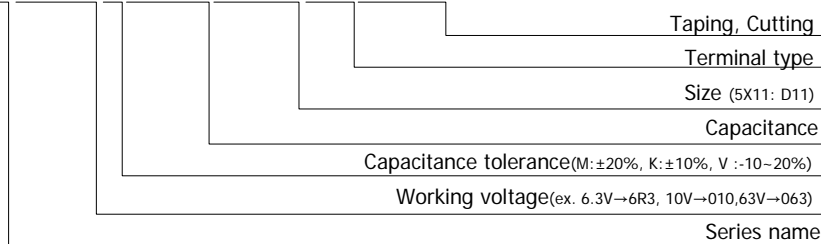
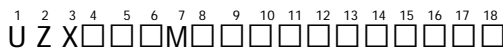
Unit(mm)



	5	6.3	8	10	12.5	16	18
ØD	5	6.3	8	10	12.5	16	18
Ød	0.5	0.5	0.5	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
ØD'	ØD+0.5 max.						
L'	L+1.5 max			L+2.0 max			

- Printed black color letter on PET purple sleeve

Code numbering system



Ø5	D
Ø6.3	E
Ø8	F
Ø10	G
Ø12.5	X
Ø16	J
Ø18	K



UZX series

Standard Ratings

Note1) Imp. = $\Omega_{max} / 20^\circ C, 100kHz$ 2) Ripple current = $mArms / 105^\circ C, 100kHz$

WV (Vdc)	Cap (uF)	Size ØxL(mm)	Imp. ¹⁾	Ripple ²⁾	Code No
6.3	150	5 x 11	0.48	360	UZX6R3□151D11CS□□□
	330	6.3 x 11	0.18	460	UZX6R3□331E11CS□□□
	470	6.3 x 11	0.17	540	UZX6R3□471E11CS□□□
	680	8 x 11.5	0.072	640	UZX6R3□681F12CS□□□
	820	8 x 11.5	0.057	945	UZX6R3□821F12CS□□□
	1,000	8 x 16	0.060	1,250	UZX6R3□102F16CS□□□
	1,200	8 x 20	0.045	1,580	UZX6R3□122F20CS□□□
		10 x 12.5	0.039	1,540	UZX6R3□122G13CS□□□
	1,800	10 x 16	0.037	1,770	UZX6R3□152G16CS□□□
	2,200	10 x 16	0.036	1,880	UZX6R3□222G16CS□□□
	2,700	10 x 20	0.028	1,970	UZX6R3□272G20CS□□□
	3,300	10 x 25	0.024	2,260	UZX6R3□332G25CS□□□
	3,900	12.5 x 20	0.025	2,490	UZX6R3□392K20CS□□□
	4,700	12.5 x 25	0.019	2,910	UZX6R3□472X25CS□□□
		12.5 x 30	0.018	3,460	UZX6R3□562X30CS□□□
	5,600	16 x 20	0.019	3,250	UZX6R3□562J20CS□□□
		12.5 x 35	0.016	3,580	UZX6R3□682X35CS□□□
	6,800	16 x 20	0.020	3,280	UZX6R3□682J20CS□□□
		16 x 25	0.017	3,640	UZX6R3□822J25CS□□□
	10,000	16 x 35.5	0.017	3,670	UZX6R3□103J36CS□□□
18 x 25		0.016	3,660	UZX6R3□103K25CS□□□	
12,000	18 x 31.5	0.016	4,270	UZX6R3□123K32CS□□□	
15,000	18 x 35.5	0.015	4,320	UZX6R3□153K36CS□□□	
18,000	18 x 40	0.013	4,480	UZX6R3□183K40CS□□□	
10	100	5 x 11	0.48	310	UZX010□101D11CS□□□
	220	6.3 x 11	0.20	540	UZX010□221E11CS□□□
	330	6.3 x 11	0.16	710	UZX010□331E11CS□□□
	470	6.3 x 15	0.084	630	UZX010□471E15CS□□□
	680	8 x 15	0.059	1,610	UZX010□681F15CS□□□
		10 x 12.5	0.062	1,380	UZX010□681G13CS□□□
	1,000	8 x 20	0.041	1,950	UZX010□102F20CS□□□
		10 x 12.5	0.046	1,740	UZX010□102G13CS□□□
	1,200	10 x 16	0.038	2,020	UZX010□122G16CS□□□
	1,500	8 x 20	0.029	2,350	UZX010□152F20CS□□□
		10 x 16	0.028	2,150	UZX010□152G16CS□□□
	2,200	10 x 25	0.024	2,920	UZX010□222G25CS□□□
		12.5 x 20	0.025	2,840	UZX010□222K20CS□□□
	3,300	12.5 x 25	0.019	3,060	UZX010□332X25CS□□□
		12.5 x 25	0.018	3,230	UZX010□392X25CS□□□
	3,900	16 x 20	0.022	3,030	UZX010□392J20CS□□□
		12.5 x 35	0.016	3,600	UZX010□562X35CS□□□
	5,600	16 x 25	0.017	3,540	UZX010□562J25CS□□□
		16 x 25	0.016	3,850	UZX010□682J25CS□□□
	6,800	18 x 20	0.018	3,580	UZX010□682K20CS□□□
16 x 31.5		0.015	3,910	UZX010□822J32CS□□□	
8,200	18 x 25	0.017	3,770	UZX010□822K25CS□□□	
	18 x 35.5	0.014	4,520	UZX010□103K36CS□□□	
12,000	18 x 40	0.014	4,680	UZX010□123K40CS□□□	
16	56	5 x 11	0.58	300	UZX016□560D11CS□□□
	120	5 x 11	0.40	450	UZX016□121D11CS□□□
	330	8 x 11.5	0.086	640	UZX016□331F12CS□□□
	470	8 x 11.5	0.075	1,210	UZX016□471F12CS□□□
		8 x 16	0.048	1,760	UZX016□681F16CS□□□
	680	10 x 12.5	0.053	1,700	UZX016□681G13CS□□□
		8 x 20	0.034	2,100	UZX016□102F20CS□□□
	1,000	10 x 16	0.038	2,010	UZX016□102G16CS□□□
		10 x 20	0.029	2,250	UZX016□122G20CS□□□

WV (Vdc)	Cap (uF)	Size ØxL(mm)	Imp. ¹⁾	Ripple ²⁾	Code No
16	1,500	10 x 20	0.028	2,500	UZX016□152G20CS□□□
		12.5 x 16	0.028	2,500	UZX016□152X16CS□□□
	2,200	10 x 33	0.023	2,660	UZX016□222G33CS□□□
		12.5 x 20	0.025	2,610	UZX016□222X20CS□□□
	2,700	12.5 x 25	0.019	3,050	UZX016□272X25CS□□□
		16 x 20	0.020	2,980	UZX016□272J20CS□□□
	3,300	12.5 x 30	0.018	3,520	UZX016□332X30CS□□□
		12.5 x 35	0.016	3,610	UZX016□392X35CS□□□
	3,900	18 x 20	0.017	3,560	UZX016□392K20CS□□□
		16 x 25	0.017	3,650	UZX016□472J25CS□□□
	4,700	18 x 25	0.017	3,740	UZX016□472K25CS□□□
		16 x 31.5	0.016	3,760	UZX016□562J32CS□□□
	5,600	18 x 25	0.016	3,770	UZX016□562K25CS□□□
		18 x 35.5	0.015	4,420	UZX016□822K36CS□□□
	10,000	18 x 40	0.014	4,480	UZX016□103K40CS□□□
25	47	5 x 11	0.38	360	UZX025□470D11CS□□□
	100	6.3 x 11	0.18	685	UZX025□101E11CS□□□
	220	6.3 x 15	0.084	840	UZX025□221E15CS□□□
	330	8 x 11.5	0.075	1,200	UZX025□331F12CS□□□
	390	8 x 16	0.059	1,610	UZX025□391F16CS□□□
		8 x 16	0.053	1,700	UZX025□471F16CS□□□
	470	10 x 12.5	0.053	1,700	UZX025□471G13CS□□□
		10 x 16	0.038	2,000	UZX025□681G16CS□□□
	680	12.5 x 16	0.038	2,160	UZX025□681X16CS□□□
		10 x 20	0.034	2,360	UZX025□821G20CS□□□
	1,000	10 x 20	0.028	2,510	UZX025□102G20CS□□□
		12.5 x 20	0.026	2,580	UZX025□102X20CS□□□
	1,500	12.5 x 20	0.025	2,610	UZX025□152X20CS□□□
		12.5 x 25	0.019	3,050	UZX025□182X25CS□□□
	1,800	16 x 20	0.022	2,930	UZX025□182J20CS□□□
12.5 x 30		0.018	3,510	UZX025□222X30CS□□□	
2,200	16 x 20	0.020	3,360	UZX025□222J20CS□□□	
	12.5 x 35	0.016	3,610	UZX025□272X35CS□□□	
2,700	16 x 25	0.017	3,650	UZX025□332J25CS□□□	
	18 x 20	0.019	3,440	UZX025□332K20CS□□□	
3,300	16 x 31.5	0.016	3,910	UZX025□392J32CS□□□	
	18 x 25	0.018	3,770	UZX025□392K25CS□□□	
4,700	16 x 35.5	0.015	4,280	UZX025□472J36CS□□□	
	18 x 31.5	0.017	4,420	UZX025□472K32CS□□□	
5,600	18 x 40	0.014	4,480	UZX025□562X40CS□□□	
35	33	5 x 11	0.38	480	UZX035□330D11CS□□□
	56	6.3 x 11	0.18	640	UZX035□560E11CS□□□
	150	6.3 x 15	0.084	1,050	UZX035□151E15CS□□□
	220	8 x 15	0.059	1,600	UZX035□221F15CS□□□
		10 x 12.5	0.053	1,700	UZX035□271G13CS□□□
	330	8 x 20	0.041	1,960	UZX035□331F20CS□□□
		8 x 20	0.038	2,150	UZX035□471F20CS□□□
	470	10 x 16	0.040	2,070	UZX035□471G16CS□□□
		10 x 20	0.028	2,510	UZX035□561G20CS□□□
	680	10 x 25	0.024	2,920	UZX035□681G25CS□□□
		12.5 x 20	0.026	2,860	UZX035□681X20CS□□□
	1,000	10 x 33	0.022	2,960	UZX035□102G33CS□□□
		12.5 x 25	0.024	2,980	UZX035□681X25CS□□□
	1,200	12.5 x 25	0.019	3,060	UZX035□122X25CS□□□
		16 x 20	0.020	2,980	UZX035□122J20CS□□□
1,500	12.5 x 31.5	0.018	3,560	UZX035□152X32CS□□□	
	16 x 20	0.020	3,370	UZX035□182J20CS□□□	
1,800	12.5 x 35	0.016	3,610	UZX035□182X35CS□□□	
	18 x 20	0.017	3,450	UZX035□182K20CS□□□	



UZ_X series

■ Standard Ratings

Note1) Imp. = Ωmax./20°C,100kHz 2) Ripple current = mA rms/105°C,100kHz

VV (Vdc)	Cap (uF)	Size ØxL(mm)	Imp. ¹⁾	Ripple ²⁾	Code No
35	2,200	16 x 25	0.015	3,750	UZ _X 035□222J25CS□□□
		18 x 20	0.015	3,440	UZ _X 035□222K20CS□□□
	2,700	16 x 31.5	0.014	3,910	UZ _X 035□272J32CS□□□
		18 x 25	0.014	4,370	UZ _X 035□272K25CS□□□
	3,300	16 x 35.5	0.013	4,280	UZ _X 035□332J36CS□□□
18 x 31.5		0.013	4,420	UZ _X 035□332K32CS□□□	
	3,900	18 x 40	0.012	4,480	UZ _X 035□392K40CS□□□
50	1.0	5 X 11	4.0	90	UZ _X 050□1R0D11CS□□□
	2.2	5 X 11	2.5	140	UZ _X 050□2R2D11CS□□□
	3.3	5 X 11	2.2	158	UZ _X 050□3R3D11CS□□□
	4.7	5 x 11	2.0	160	UZ _X 050□4R7D11CS□□□
	10	5 x 11	1.0	170	UZ _X 050□100D11CS□□□
		5 x 11	0.40	216	UZ _X 050□220D11CS□□□
	22	6.3 x 11	0.38	315	UZ _X 050□220E11CS□□□
		6.3 x 11	0.14	485	UZ _X 050□470E11CS□□□
	100	8 x 11.5	0.11	954	UZ _X 050□101F12CS□□□
	120	8 x 15	0.082	1,230	UZ _X 050□121F15CS□□□
	150	10 x 12.5	0.073	1,280	UZ _X 050□151G13CS□□□
	180	8 x 20	0.058	1,580	UZ _X 050□181F20CS□□□
	220	10 x 16	0.053	1,660	UZ _X 050□221G16CS□□□
	270	10 x 20	0.040	1,890	UZ _X 050□271G20CS□□□
		12.5 x 16	0.040	1,860	UZ _X 050□271X16CS□□□
	330	10 x 20	0.038	2,060	UZ _X 050□331G20CS□□□
		10 x 33	0.032	2,320	UZ _X 050□471G33CS□□□
	470	12.5 x 20	0.032	2,210	UZ _X 050□471X20CS□□□
		12.5 x 25	0.023	2,410	UZ _X 050□561X25CS□□□
	680	12.5 x 25	0.025	2,520	UZ _X 050□681X25CS□□□
820	12.5 x 30	0.023	3,120	UZ _X 050□821X30CS□□□	
	16 x 20	0.026	2,840	UZ _X 050□821J20CS□□□	
1,000	12.5 x 35	0.021	3,250	UZ _X 050□102X35CS□□□	
	18 x 20	0.022	3,090	UZ _X 050□102K20CS□□□	
1,200	16 x 31.5	0.020	3,410	UZ _X 050□122J32CS□□□	
	18 x 25	0.022	3,240	UZ _X 050□122K25CS□□□	
1,500	16 x 35.5	0.019	3,510	UZ _X 050□152J36CS□□□	
1,800	16 x 40	0.016	3,950	UZ _X 050□182J40CS□□□	
	18 x 31.5	0.017	3,860	UZ _X 050□182K32CS□□□	
2,200	18 x 35.5	0.014	3,980	UZ _X 050□222K36CS□□□	
2,700	18 x 40	0.013	4,160	UZ _X 050□272K40CS□□□	
63	15	5 x 11	0.88	195	UZ _X 063□150D11CS□□□
	33	6.3 x 11.5	0.35	365	UZ _X 063□330E11CS□□□
	47	6.3 x 11.5	0.28	420	UZ _X 063□470E11CS□□□
	56	6.3 x 15	0.20	580	UZ _X 063□560E15CS□□□
	82	8 x 11.5	0.18	720	UZ _X 063□820F12CS□□□
	120	8 x 20	0.12	920	UZ _X 063□121F20CS□□□
		10 x 12.5	0.12	850	UZ _X 063□121G13CS□□□
	180	10 x 16	0.076	1,200	UZ _X 063□181G16CS□□□
	220	10 x 20	0.066	1,380	UZ _X 063□221G20CS□□□
	270	10 x 20	0.056	1,680	UZ _X 063□271G20CS□□□
	390	12.5 x 20	0.041	1,990	UZ _X 063□391X20CS□□□
	470	12.5 x 25	0.031	2,460	UZ _X 063□471X25CS□□□
	560	12.5 x 30	0.028	2,770	UZ _X 063□561X30CS□□□
	680	12.5 x 35	0.024	3,040	UZ _X 063□681X35CS□□□
		18 x 20	0.026	2,660	UZ _X 063□681K20CS□□□
	820	16 x 25	0.025	2,850	UZ _X 063□821J25CS□□□
		18 x 20	0.027	2,800	UZ _X 063□821K20CS□□□
1,000	16 x 35.5	0.024	2,900	UZ _X 063□102J36CS□□□	

VV (Vdc)	Cap (uF)	Size ØxL(mm)	Imp. ¹⁾	Ripple ²⁾	Code No
63	1,200	16 x 40	0.023	3,450	UZ _X 063□122J40CS□□□
		18 x 31.5	0.022	3,350	UZ _X 063□122K32CS□□□
	1,500	18 x 35.5	0.020	3,500	UZ _X 063□152K36CS□□□
80	68	10 x 12.5	0.17	780	UZ _X 080□680G13CS□□□
	100	10 x 16	0.11	1,040	UZ _X 080□101G16CS□□□
	120	10 x 16	0.098	1,210	UZ _X 080□121G16CS□□□
	150	10 x 20	0.084	1,440	UZ _X 080□151G20CS□□□
	180	10 x 25	0.069	1,630	UZ _X 080□151G25CS□□□
	220	12.5 x 20	0.062	1,750	UZ _X 080□221X20CS□□□
	270	12.5 x 25	0.048	2,210	UZ _X 080□271X25CS□□□
	330	12.5 x 30	0.042	2,400	UZ _X 080□331X30CS□□□
		12.5 x 35	0.036	2,610	UZ _X 080□391X35CS□□□
	390	16 x 20	0.038	2,360	UZ _X 080□391J20CS□□□
		12.5 x 40	0.036	2,860	UZ _X 080□471X40CS□□□
	470	16 x 25	0.038	2,430	UZ _X 080□471J25CS□□□
		18 x 20	0.038	2,270	UZ _X 080□471K20CS□□□
	680	16 x 35.5	0.029	2,860	UZ _X 080□681J36CS□□□
		18 x 25	0.036	2,510	UZ _X 080□681K25CS□□□
	820	16 x 40	0.027	3,520	UZ _X 080□821J40CS□□□
		18 x 31.5	0.030	2,860	UZ _X 080□821K32CS□□□
1,000	16 x 45	0.025	3,880	UZ _X 080□102J45CS□□□	
	18 x 35.5	0.027	3,510	UZ _X 080□102K36CS□□□	
1,200	18 x 40	0.024	3,940	UZ _X 080□122K40CS□□□	
100	4.7	5 x 11	1.5	185	UZ _X 100□4R7D11CS□□□
	6.8	5 x 11	1.4	265	UZ _X 100□6R8D11CS□□□
	15	6.3 x 11	0.57	325	UZ _X 100□150E11CS□□□
	22	8 x 11.5	0.50	420	UZ _X 100□220F12CS□□□
	27	8 x 11.5	0.36	465	UZ _X 100□270F12CS□□□
	39	8 x 15	0.25	590	UZ _X 100□390F15CS□□□
	47	8 x 15	0.17	780	UZ _X 100□470F15CS□□□
		10 x 12.5	0.17	780	UZ _X 100□470G13CS□□□
	68	8 x 20	0.11	1,050	UZ _X 100□680F20CS□□□
		10 x 16	0.11	1,050	UZ _X 100□680G16CS□□□
	82	10 x 20	0.090	1,250	UZ _X 100□820G20CS□□□
	100	10 x 20	0.084	1,450	UZ _X 100□101G20CS□□□
		12.5 x 16	0.11	1,430	UZ _X 100□101X16CS□□□
	120	10 x 25	0.069	1,620	UZ _X 100□121G25CS□□□
		12.5 x 20	0.062	1,750	UZ _X 100□151X20CS□□□
	220	12.5 x 25	0.047	2,210	UZ _X 100□221X25CS□□□
		16 x 20	0.048	1,850	UZ _X 100□221J20CS□□□
270	12.5 x 30	0.042	2,410	UZ _X 100□271X30CS□□□	
330	12.5 x 35	0.036	2,610	UZ _X 100□331X35CS□□□	
	16 x 25	0.038	2,350	UZ _X 100□331J25CS□□□	
390	18 x 20	0.045	2,180	UZ _X 100□391X40CS□□□	
	12.5 x 40	0.032	2,850	UZ _X 100□391X40CS□□□	
470	16 x 31.5	0.032	2,640	UZ _X 100□471J32CS□□□	
	18 x 25	0.036	2,500	UZ _X 100□471K25CS□□□	
560	16 x 35.5	0.029	2,860	UZ _X 100□561J36CS□□□	
	18 x 31.5	0.030	2,760	UZ _X 100□561K32CS□□□	
680	16 x 40	0.027	3,510	UZ _X 100□681J40CS□□□	
	18 x 35.5	0.027	3,510	UZ _X 100□681K36CS□□□	
820	18 x 40	0.025	3,880	UZ _X 100□821K40CS□□□	

■ Rated ripple current multipliers

Capacitance (uF)	Frequency (Hz)				
	120	1K	10K	50K	100K
4.7 ~ 180	0.40	0.75	0.90	0.94	1.00
220 ~ 560	0.50	0.85	0.94	0.96	1.00
680 ~ 1,800	0.60	0.87	0.95	0.97	1.00
2,200 ~ 3,900	0.75	0.90	0.95	0.97	1.00
4,700 ~ 18,000	0.85	0.95	0.98	0.99	1.00