

# HR Series

## High Temperature Type 105°C

### Features

- Rated Working Voltage Range 6.3 to 100V DC/160 to 450V DC at Operation Temperature Rang  
-40 to +105°C/-25 to +105°C
- This series is for communication equipments, switching power supply, industrial measuring instruments, automotive electric products, etc.

### Specifications

Items	Performance Characteristics																										
Operating Temperature Range	-40 to +105°C	-25 to +105°C																									
Rated Working Voltage Range	6.3 to 100V DC	160 to 450V DC																									
Nominal Capacitance Range	0.1 to 15000 $\mu$ F	0.47 to 330 $\mu$ F																									
Capacitance Tolerance	$\pm 20^\circ\text{C}$ (120Hz, +20°C)																										
Leakage Current	$1 \leq 0.01\text{CV}$ or $3(\mu\text{A})$ whichever is greater	$1 \leq 0.03\text{CV}$ $40\mu\text{A}$																									
	after 3 minutes application of rated working voltage at +20°C																										
Dissipation Factor ( $\tan \delta$ )  (120Hz, +20°C)	<table border="1"> <thead> <tr> <th>Working voltage (v)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> </tr> </thead> <tbody> <tr> <td><math>\tan \delta</math> (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>0.10</td> <td>0.07</td> </tr> </tbody> </table>									Working voltage (v)	6.3	10	16	25	35	50	63	100	$\tan \delta$ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.10	0.07
	Working voltage (v)	6.3	10	16	25	35	50	63	100																		
	$\tan \delta$ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.10	0.07																		
	<table border="1"> <thead> <tr> <th>Working voltage (v)</th> <th>160</th> <th>200</th> <th>250</th> <th>350</th> <th>400</th> <th>450</th> </tr> </thead> <tbody> <tr> <td><math>\tan \delta</math> (max)</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.20</td> <td>0.24</td> <td>0.24</td> </tr> </tbody> </table>									Working voltage (v)	160	200	250	350	400	450	$\tan \delta$ (max)	0.15	0.15	0.15	0.20	0.24	0.24				
Working voltage (v)	160	200	250	350	400	450																					
$\tan \delta$ (max)	0.15	0.15	0.15	0.20	0.24	0.24																					
For capacitance value > 100 $\mu$ F, Add 0.02 per another 1000 $\mu$ F																											
	Refer to standard products table (120Hz, +85°C) Correction factor for frequency																										
Maximum Permissible Ripple Current	W.V. (V.DC) CAP ( $\mu$ F)		Freq (Hz)		60	120	1K	10K	100K																		
	6.3~50	0.1~330		0.85	1.30	1.30	1.40	1.55																			
		470~3300		0.95	1.15	1.15	1.20	1.25																			
		$\geq 4700$		0.95	1.10	1.10	1.20	1.20																			
	6.3~100	0.47~33		0.75	1.55	1.55	1.65	1.80																			
		47~220		0.75	1.40	1.40	1.60	1.65																			
$\geq 330$		0.80	1.30	1.30	1.35	1.40																					
$\geq 160$	0.1~220		0.70	1.30	1.30	1.70	1.70																				
Low Temperature Characteristics	Impedance ratio max. at 120Hz																										
	Working voltage (v)	6.3	10	16	25	35	50	63	100																		
	-25°C/+20°C	4	3	2	2	2	2	2	2																		
	-40°C/+20°C	8	6	4	3	3	3	3	3																		
	<table border="1"> <thead> <tr> <th>Working voltage (v)</th> <th>160</th> <th>200</th> <th>250</th> <th>350</th> <th>400</th> <th>450</th> </tr> </thead> <tbody> <tr> <td>-25°C/+20°C</td> <td>3</td> <td>3</td> <td>3</td> <td>6</td> <td>6</td> <td>15</td> </tr> </tbody> </table>									Working voltage (v)	160	200	250	350	400	450	-25°C/+20°C	3	3	3	6	6	15				
Working voltage (v)	160	200	250	350	400	450																					
-25°C/+20°C	3	3	3	6	6	15																					
For capacitance value > 1000 $\mu$ F, Add 0.5 per another 1000 $\mu$ F for -25°C/+20°C Add 1.0 per another 1000 $\mu$ F for -40°C/+20°C																											

# HR Series

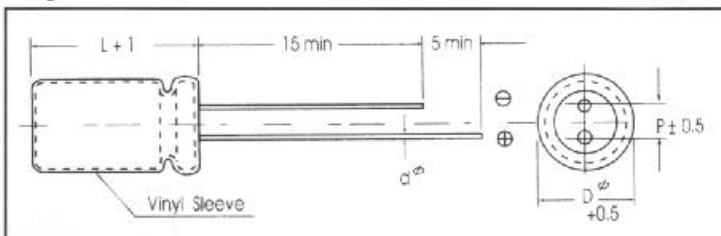
## High Temperature Type 105°C

### Specifications

Items	Performance Characteristics	
High Temperature Loading	Test conditions	
	Duration	: 1000 hours
	Ambient temperature	: +105°C
	Applied Voltage	: DC voltage with maximum permissible ripple current specified at +105°C (Sum of the DC voltage and super-imposed peak AC voltage for maximum permissible ripple current should be equal to rated DC working voltage).
	Post test requirements at +20°C	
	Leakage current	: ≤ initial specified value
	Capacitance change	: ≤ +20% of initial measured value
	tan δ	: ≤ +150% of initial specified value
Shelf Life	Test conditions	
	Duration	: 500 hour
	Ambient temperature	: +85°C
	Applied voltage	: (None)
	Post test requirements at +20°C	
	Same limits for high temperature loading.	
Others	Satisfies characteristic W of JIS C 5141	

### Diagram of Dimensions

Unit: mm



D φ	5	6.3	8	10	13	16	18	22
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0
d φ	0.5		0.6			0.8		

### Case Size Table

φ D × L (mm)

W.V. (SV) μ F	6.3 (8)	10 (13)	16 (20)	25 (32)	35 (44)	50 (63)	63 (79)	100 (125)
0.1					→	5×11		5×11
0.22					→	5×11		5×11
0.33					→	5×11		5×11
0.47					→	5×11		5×11
1.0					→	5×11		5×11
2.2					→	5×11		5×11
3.3					→	5×11		5×11
4.7					→	5×11		5×11
10			→	5×11	5×11	5×11	5×11	6.3×11
22			→	5×11	5×11	5×11	6.3×11	8×11
33		→	5×11	5×11	5×11	6.3×11	6.3×11	10×13
47	→	5×11	5×11	5×11	6.3×11	6.3×11	8×11	10×16
100	→	5×11	6.3×11	6.3×11	8×11	8×11	10×13	13×21
220	→	6.3×11	8×11	8×11	10×13	10×16	10×21	16×26
330	6.3×11	8×11	8×11	10×13	10×16	10×21	13×21	16×26
470	8×11	8×11	10×13	10×16	10×21	13×21	16×26	16×32
1,000	10×13	10×16	10×21	13×21	13×21	16×26	16×32	
2,200	10×21	13×21	13×21	13×26	16×32	18×36		
3,300	13×21	13×21	13×26	16×32	18×36	18×42		
4,700	13×26	16×26	16×32	18×36	18×42			
6,800	16×26	16×32	18×36	18×42				
10,000	16×32	18×36	18×42					
15,000	18×36	18×42						

※ All blank dimensions is the same dimensions as "→" point to.

