

# High Temperature Radial Electrolytic Capacitors **HTRL Series**

## FEATURES

- Excellent temperature performance
- 105°C high operating temperature
- Satisfies characteristic W of JIS-C-5141 standard



## CHARACTERISTICS

Item		Characteristics												
Operating Temperature Range		-40°C ~ +105°C												
Capacitance Tolerance		±20% at 20°C, 120Hz												
Leakage Current	6.3WV ~ 100WV	I = 0.01CWV or 3μA whichever is greater after 2 minutes of applied rated DC working voltage at 20°C Where: C = rated capacitance in μF; WV = rated DC working voltage												
	160WV ~ 250WV	For CWV ≤ 1,000: I = 0.03CWV + 15μA, for CWV > 1,000: I = 0.02CWV + 25μA after 5 min. of applied rated DC working voltage at 20°C. Where: C = rated capacitance in μF; WV = rated DC working voltage												
Dissipation Factor (Tan δ, at 20°C 120Hz)		Working voltage (WV)		6.3	10	16	25	35	50	63	100	160	250	
		Tan δ		0.23	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.20	0.20	
		For capacitors whose capacitance exceeds 1,000μF, the specification of tan δ is increased by 0.02 for every addition of 1,000μF												
Surge Voltage		Working voltage (WV)		6.3	10	16	25	35	50	63	100	160	250	
		Surge voltage (SV)		8	13	20	32	44	63	79	125	200	300	
Low Temperature Characteristics		Working voltage (WV)		6.3	10	16	25	35	50	63	100	160	250	
		Impedance ratio @ 120Hz	Z-25°C/Z+20°C	∅D < 16	4	3	3	2	2	2	2	2	3	3
				∅D ≥ 16	6	4	4	3	3	3	3	3	3	3
			Z-40°C/Z+20°C	∅D < 16	8	6	6	4	4	3	3	3	3	4
∅D ≥ 16	12			10	8	8	8	8	8	6	6	4	4	
Life Test		When returned to +20°C after 1,000 hours application of working voltage at +105°C, the capacitor will meet the following limits: Capacitance change is ≤ ±20% of initial value; tan δ is < 200% of initial specified value; leakage current is ≤ initial specified value												
Shelf Life Test		When returned to +20°C after 1,000 hours at +105°C with no voltage applied, the capacitor will meet the following limits: Capacitance change is ≤ ±20% of initial value; tan δ is < 200% of initial specified value; leakage current is ≤ initial specified value												

## PART NUMBERING SYSTEM

H	T	R	L		1	6	V		1	0	0
Series					Voltage Actual Value				Capacitance (μF) Actual Value		

## RIPPLE CURRENT AND FREQUENCY MULTIPLIERS

6.3WV ~ 100WV Capacitance (μF)	Frequency (Hz)				
	60	120	500	1K	≥10K
<100	0.70	1.0	1.30	1.40	1.50
100 ~ 1000	0.75	1.0	1.20	1.30	1.35
>1000	0.80	1.0	1.10	1.12	1.15

Working Voltage (All Capacitances)	Frequency (Hz)					
	60 (50)	120	500	1K	10K	≥20K
160WV ~ 250WV	0.80	1.0	1.10	1.10	1.30	1.35

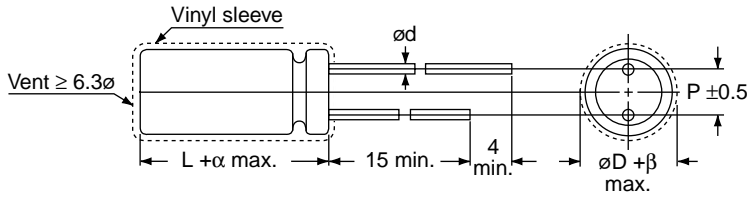
## RIPPLE CURRENT AND TEMPERATURE MULTIPLIERS

Temperature (°C)	45	70	85	105
Multiplier (6.3WV ~ 100WV)	1.95	1.78	1.40	1.00
Multiplier (160WV ~ 250WV)	2.05	1.45	1.00	1.00



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## ■ DIMENSIONS AND PERMISSIBLE RIPPLE CURRENT



Lead Spacing and Diameter (mm)

$\phi D$	5	6.3	8	10	13	16	18	22
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	7.5
$\phi d$	0.5	0.5	0.5	0.6	0.6	0.8	0.8	1.0
$\beta$	0.5	0.5	0.5	0.5	0.5	1.0	1.0	1.0
$\alpha$	1.0 if $L \leq 16$ ; 2.0 if $L \geq 20$							

Value ( $\mu F$ )	Working Voltage; Dimensions: $\phi D \times L$ (mm); Ripple Current: mA/RMS @ 120Hz, 105°C									
	6.3		10		16		25		35	
	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
10							5 x 11	45	5 x 11	45
22					5 x 11	58	5 x 11	62	5 x 11	71
33					5 x 11	71	5 x 11	76	6.3 x 11	88
47			5 x 11	76	5 x 11	85	5 x 11	97	6.3 x 11	105
100	5 x 11	103	5 x 11	111	6.3 x 11	133	6.3 x 11	142	8 x 11.5	166
220	6.3 x 11	158	6.3 x 11	170	8 x 11.5	214	8 x 11.5	236	10 x 12.5	290
330	8 x 11.5	219	8 x 11.5	234	8 x 11.5	271	10 x 12.5	328	10 x 20	387
470	8 x 11.5	261	8 x 11.5	289	10 x 12.5	367	10 x 20	427	13 x 21	485
680	10 x 12.5	325	10 x 16	385	10 x 20	465	--	--	--	--
1000	10 x 12.5	431	10 x 16	480	10 x 20	562	13 x 21	656	13 x 26	715
2200	10 x 20	733	13 x 21	786	13 x 26	919	16 x 26	1016	16 x 32	1138
3300	13 x 21	897	13 x 21	1006	16 x 26	1164	16 x 32	1290	18 x 36	1440
4700	16 x 26	1159	16 x 26	1243	16 x 36	1432	18 x 41	1629	22 x 41	1859

Value ( $\mu F$ )	Working Voltage; Dimensions: $\phi D \times L$ (mm); Ripple Current: mA/RMS @ 120Hz, 105°C									
	50		63		100		160		250	
	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
0.1	5 x 11	2.0	5 x 11	3.0	5 x 11	3.0				
0.22	5 x 11	3.5	5 x 11	4.5	5 x 11	4.5				
0.33	5 x 11	5.0	5 x 11	7.5	5 x 11	7.5				
0.47	5 x 11	6.0	5 x 11	9.0	5 x 11	9.0				
1	5 x 11	10	5 x 11	15	5 x 11	15	5 x 11	10	6.3 x 11	13
2.2	5 x 11	20	5 x 11	30	5 x 11	30	6.3 x 11	15	6.3 x 11	22
3.3	5 x 11	30	5 x 11	31	5 x 11	31	6.3 x 11	27	8 x 11.5	31
4.7	5 x 11	33	5 x 11	36	6.3 x 11	40	6.3 x 11	32	8 x 11.5	37
10	5 x 11	50	5 x 11	52	8 x 11.5	66	10 x 12.5	65	10 x 16	73
22	6.3 x 11	78	8 x 11.5	93	8 x 11.5	99	10 x 20	118	13 x 21	140
33	6.3 x 11	96	8 x 11.5	114	10 x 16	148	10 x 20	145	13 x 26	188
47	8 x 11.5	130	8 x 11.5	141	10 x 16	170	13 x 21	205	16 x 21	231
100	8 x 11.5	188	10 x 16	234	13 x 21	284	16 x 21	337	16 x 36	426
220	10 x 20	345	13 x 21	397	16 x 26	455	16 x 36	632		
330	13 x 21	445	13 x 26	491	16 x 32	578	18 x 36	826		
470	13 x 26	556	16 x 26	627	18 x 37	711				
1000	16 x 32	869	16 x 36	942	22 x 41	1085				
2200	18 x 41	1319	22 x 41	1469						
3300	22 x 41	1707								

