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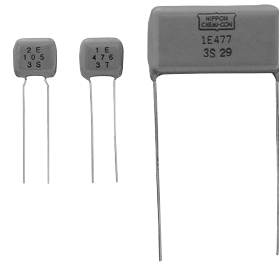
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# DIPPED RADIAL LEAD MULTILAYER CERAMIC CAPACITORS

## THD Series



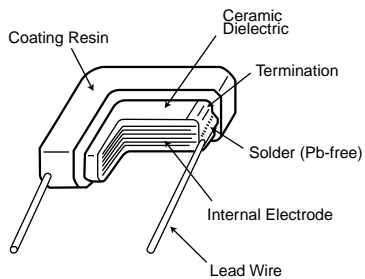
### ◆FEATURES

1. Small size and large capacitance, high ripple current.
2. Temperature characteristic is Y5U in EIA code.
3. Superior humidity characteristic and long life.
4. Excellent noise absorption.
5. Resin(UL94 V-0) used for coating.

### ◆APPLICATIONS

1. Automotive equipments.
2. Smoothing circuit of switching mode AC-DC or DC-DC converter.
3. Noise suppressor for various kinds of equipments.
4. By-pass or decoupling circuits.

### ◆CONSTRUCTION



### ◆RATINGS

1. Category Temperature Range	-55 to +125°C
2. Rated Voltage Range	16, 25, 50, 100, 250 V <sub>dc</sub>
3. Rated Capacitance Range	0.1 to 680μF
4. Rated Capacitance Tolerance	M(±20%), Z(±20%)
5. Temperature Characteristics	E(JIS) ≒ Y5U(EIA)
6. Rated Ripple Current	See No.5 on the following table

### ◆SPECIFICATIONS

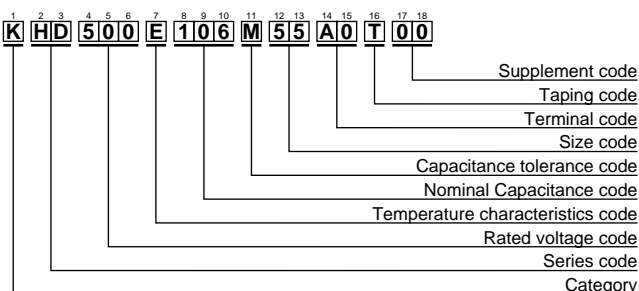
No.	Items		Specification	Test Condition
1	Withstand Voltage	Between Terminals	No abnormality.	250% of rated voltage shall be applied for 5 seconds.
		Terminals to Coating Resin		
2	Insulation Resistance		1000/C <sub>R</sub> (MΩ) or 10000(MΩ) whichever is less.	Rated voltage shall be applied for 60±5 seconds at temperature 20±2°C.
3	Rated Capacitance		Within specified tolerance.	Temperature : 20±2°C Frequency : 1±0.1kHz(≥100μF, 120Hz) Voltage : 1±0.2V <sub>rms</sub>
4	Dissipation Factor		5.0% maximum.	Temperature : 20±2°C Frequency : 1±0.1kHz(≥100μF, 120Hz) Voltage : 1±0.2V <sub>rms</sub>

## ◆SPECIFICATIONS

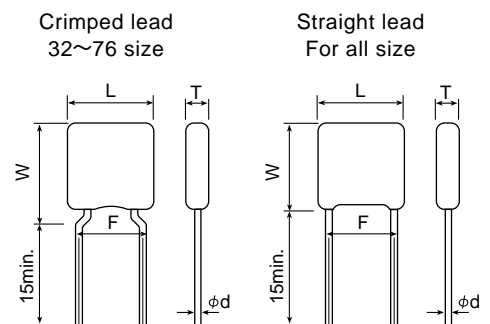
No.	Items	Specification	Test Condition																		
5	Rated Ripple Current	<table border="1"> <tr> <td>Size code</td> <td>32</td> <td>43</td> <td>55</td> <td>76</td> <td>80</td> <td>90</td> <td>99</td> </tr> <tr> <td>Arms</td> <td>0.3</td> <td>0.8</td> <td>1.0</td> <td>1.5</td> <td>2.0</td> <td>3.0</td> <td>4.0</td> </tr> </table>	Size code	32	43	55	76	80	90	99	Arms	0.3	0.8	1.0	1.5	2.0	3.0	4.0	10kHz to 1MHz (sine curve) Ripple voltage $V_p$ shall be less than the rated voltage.		
Size code	32	43	55	76	80	90	99														
Arms	0.3	0.8	1.0	1.5	2.0	3.0	4.0														
6	Robustness of Terminations	No visible damage.	The force applied shall be : <table border="1"> <tr> <td>Lead <math>\phi</math> (mm)</td> <td>Tensile(N)</td> <td>(sec.)</td> </tr> <tr> <td>0.5 max.</td> <td>5</td> <td>10±1</td> </tr> <tr> <td>0.6 to 0.8 max.</td> <td>10</td> <td>10±1</td> </tr> </table> <table border="1"> <tr> <td>Lead <math>\phi</math> (mm)</td> <td>Bending(N)</td> <td>(kg)</td> </tr> <tr> <td>0.5 max.</td> <td>2.5</td> <td>0.25</td> </tr> <tr> <td>0.6 to 0.8 max.</td> <td>5</td> <td>0.51</td> </tr> </table> Time : 2times.	Lead $\phi$ (mm)	Tensile(N)	(sec.)	0.5 max.	5	10±1	0.6 to 0.8 max.	10	10±1	Lead $\phi$ (mm)	Bending(N)	(kg)	0.5 max.	2.5	0.25	0.6 to 0.8 max.	5	0.51
Lead $\phi$ (mm)	Tensile(N)	(sec.)																			
0.5 max.	5	10±1																			
0.6 to 0.8 max.	10	10±1																			
Lead $\phi$ (mm)	Bending(N)	(kg)																			
0.5 max.	2.5	0.25																			
0.6 to 0.8 max.	5	0.51																			
7	Vibration	Appearance : No abnormality. Capacitance : To meet the initial specification. D.F. : To meet the initial specifications.	Amplitude : 1.5mm Frequency range : 10-55-10Hz (1 min) Direction and time : 2 hours each to X, Y, Z axis. Total 6 hours.																		
8	Solderability	Min. 75% of surface of the termination shall be covered with new solder.	<table border="1"> <tr> <td>Solder</td> <td>Pb Free</td> <td>Eutectic</td> </tr> <tr> <td>Solder Temperature</td> <td>245±5°C</td> <td>235±5°C</td> </tr> <tr> <td>Dipping Time</td> <td colspan="2">2±0.5sec.</td> </tr> </table>	Solder	Pb Free	Eutectic	Solder Temperature	245±5°C	235±5°C	Dipping Time	2±0.5sec.										
Solder	Pb Free	Eutectic																			
Solder Temperature	245±5°C	235±5°C																			
Dipping Time	2±0.5sec.																				
9	Resistance to Soldering Heat	Appearance : No abnormality. $\Delta C/C$ : ±15% D.F. : Satisfy the initial spec.	Solder Temperature : 350±10°C Dipping Time : 3±0.5 sec. Depth : 1.5 to 2mm																		
10	Temperature Cycle	Appearance : No abnormality. $\Delta C/C$ : ±15% D.F. : To meet the initial specification I.R. : To meet the initial specification	<table border="1"> <tr> <td>Step</td> <td>Temperature (°C)</td> <td>(min.)</td> </tr> <tr> <td>1</td> <td>Min. Category temperature ±3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>3 max.</td> </tr> <tr> <td>3</td> <td>Max. Category temperature ±3</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>3 max.</td> </tr> </table> For 5 cycles for above temperature cycle.	Step	Temperature (°C)	(min.)	1	Min. Category temperature ±3	30±3	2	Room temperature	3 max.	3	Max. Category temperature ±3	30±3	4	Room temperature	3 max.			
Step	Temperature (°C)	(min.)																			
1	Min. Category temperature ±3	30±3																			
2	Room temperature	3 max.																			
3	Max. Category temperature ±3	30±3																			
4	Room temperature	3 max.																			
11	Humidity Load Life	Appearance : No abnormality. $\Delta C/C$ : ±20% D.F. : 7% maximum I.R. : 50/ $C_R$ (M $\Omega$ ) or 1000(M $\Omega$ ) whichever is less.	Temperature : 40±2°C Humidity : 90 to 95%RH Voltage : Rated voltage Time : 500± <sup>24</sup> <sub>0</sub> hours																		
12	Endurance	Appearance : No abnormality. $\Delta C/C$ : ±20% D.F. : 7% maximum I.R. : 100/ $C_R$ (M $\Omega$ ) or 1000(M $\Omega$ ) whichever is less.	Temperature : 85±2°C Voltage : 200% of rated voltage. Time : 1000± <sup>48</sup> <sub>0</sub> hours  Temperature : 125±3°C Voltage : Rated voltage Time : 1000± <sup>48</sup> <sub>0</sub> hours																		

\* $C_R$  : Rated Capacitance( $\mu$ F)

## ◆PART NUMBERING SYSTEM



## ◆DIMENSIONS





# DIPPED RADIAL LEAD MULTILAYER CERAMIC CAPACITORS

## THD Series

### ◆THD SERIES STANDARD RATINGS

Rated voltage (Vdc)	Rated Capacitance (μF)	Dimensions (mm)					Maximum ripple current (Arms)	Part Number	Previous Part Number (Just for your reference)						
		Lmax.	Wmax.	Tmax.	F±0.8	φd±0.05									
16	6.8	5.0	6.5	3.5	5.0	0.5	0.3	KHD160E685M32A0T00	THD21E1C685MT						
	10							KHD160E106M32A0T00	THD21E1C106MT						
	15							KHD160E156M43A0T00	THD30E1C156MT						
	22	6.5	7.5	4.0	5.0	0.5	0.8	KHD160E226M43A0T00	THD30E1C226MT						
	33							KHD160E336M55A0T00	THD31E1C336MT						
	47							KHD160E476M55A0T00	THD31E1C476MT						
	68	8.0	9.0	4.5	5.0	0.5	1.0	KHD160E686M76A0T00	THD41E1C686MT						
	100							KHD160E107M76A0T00	THD41E1C107MT						
	150							10.0	11.5	4.5	5.0	0.5	1.5	KHD160E157M80A0B00	THD51E1C157M
	220	KHD160E227M80A0B00	THD51E1C227M												
	330	KHD160E337M90C0B00	THD60E1C337M												
	470	22.5	20.0	6	20.0	0.8	3.0	KHD160E477M90C0B00	THD60E1C477M						
680	KHD160E687M99C0B00							THD61E1C687M							
1000	KHD160E1077M99C0B00							THD61E1C1077M							
25	3.3	5.0	6.5	3.0	5.0	0.5	0.3	KHD250E335M32A0T00	THD21E1E335MT						
	4.7							KHD250E475M32A0T00	THD21E1E475MT						
	6.8							6.5	7.0	3.5	5.0	0.5	0.8	KHD250E685M43A0T00	THD30E1E685MT
	10	KHD250E106M43A0T00	THD30E1E106MT												
	15	KHD250E156M43A0T00	THD30E1E156MT												
	22	7.5	9.0	4.0	5.0	0.5	1.0	KHD250E226M55A0T00	THD31E1E226MT						
	33							KHD250E336M55A0T00	THD31E1E336MT						
	47							10.0	11.5	4.5	5.0	0.5	1.5	KHD250E476M76A0T00	THD41E1E476MT
	68	KHD250E686M80A0B00	THD51E1E686M												
	100	KHD250E107M80A0B00	THD51E1E107M												
	150	13.5	15.0	5.0	10.0	0.6	2.0	KHD250E157M90C0B00	THD60E1E157M						
	220							KHD250E227M90C0B00	THD60E1E227M						
	330							KHD250E337M99C0B00	THD61E1E337M						
	470	28.5	20.0	7.5	25.0	0.8	4.0	KHD250E477M99C0B00	THD61E1E477M						
	1.0							5.0	6.5	3.0	5.0	0.5	0.3	KHD500E105M32A0T00	THD21E1H105MT
	1.5													KHD500E155M32A0T00	THD21E1H155MT
2.2	KHD500E225M32A0T00	THD21E1H225MT													
3.3	6.5	7.0	3.5	5.0	0.5	0.8	KHD500E335M43A0T00	THD30E1H335MT							
4.7							KHD500E475M43A0T00	THD30E1H475MT							
6.8							7.5	9.0	4.0	5.0	0.5	1.0	KHD500E685M55A0T00	THD31E1H685MT	
10	KHD500E106M55A0T00	THD31E1H106MT													
15	KHD500E156M55A0T00	THD31E1H156MT													
22	10.0	11.5	4.5	5.0	0.5	1.5	KHD500E226M76A0T00	THD41E1H226MT							
33							13.5	15.0	5.0	10.0	0.6	2.0	KHD500E336M80A0B00	THD51E1H336M	
47													KHD500E476M90C0B00	THD60E1H476M	
68	22.5	20.0	6.0	20.0	0.8	3.0							KHD500E686M90C0B00	THD60E1H686M	
100							KHD500E107M90C0B00	THD60E1H107M							
150							28.5	20.0	7.5	25.0	0.8	4.0	KHD500E157M99C0B00	THD61E1H157M	
220	KHD500E227M99C0B00	THD61E1H227M													
330	5.0	6.5	3.0	5.0	0.5	0.3							KHD101E334M32A0T00	THD21E2A334MT	
0.47							5.0	6.5	3.5	5.0	0.5	0.8	KHD101E474M32A0T00	THD21E2A474MT	
0.68													KHD101E684M32A0T00	THD21E2A684MT	
1.0	6.5	7.0	3.5	5.0	0.5	0.8							KHD101E105M43A0T00	THD30E2A105MT	
1.5							KHD101E155M43A0T00	THD30E2A155MT							
2.2							KHD101E225M43A0T00	THD30E2A225MT							
3.3	7.5	9.0	4.0	5.0	0.5	1.0	KHD101E335M55A0T00	THD31E2A335MT							
4.7							KHD101E475M55A0T00	THD31E2A475MT							
6.8							10.0	11.5	4.5	5.0	0.5	1.5	KHD101E685M76A0T00	THD41E2A685MT	
10	13.5	15.0	5.0	10.0	0.6	2.0							KHD101E106M80A0B00	THD51E2A106M	
15													KHD101E156M80A0B00	THD51E2A156M	
22							22.5	20.0	6.0	20.0	0.8	3.0	KHD101E226M90C0B00	THD60E2A226M	
33	KHD101E336M90C0B00	THD60E2A336M													
47	28.5	20.0	7.5	25.0	0.8	4.0							KHD101E476M99C0B00	THD61E2A476M	
68							KHD101E686M99C0B00	THD61E2A686M							
100							KHD101E107M99C0B00	THD61E2A107M							
250	0.1	6.5	7.0	3.5	5.0	0.5	0.8	KHD251E104M43A0T00	THD30E2E104MT						
	0.15							KHD251E154M43A0T00	THD30E2E154MT						
	0.22							KHD251E224M43A0T00	THD30E2E224MT						
	0.33	7.5	9.0	4.0	5.0	0.5	1.0	KHD251E334M43A0T00	THD30E2E334MT						
	0.47							KHD251E474M55A0T00	THD31E2E474MT						
	0.68							KHD251E684M55A0T00	THD31E2E684MT						
	1.0	10.0	11.5	4.5	5.0	0.5	1.5	KHD251E105M76A0T00	THD41E2E105MT						
	1.5							KHD251E155M76A0T00	THD41E2E155MT						
	2.2							13.5	15.0	5.0	10.0	0.6	2.0	KHD251E225M80A0B00	THD51E2E225M
	3.3	KHD251E335M90C0B00	THD60E2E335M												
	4.7	22.5	20.0	6.0	20.0	0.8	3.0							KHD251E475M90C0B00	THD60E2E475M
	6.8							KHD251E685M99C0B00	THD61E2E685M						
	10							28.5	20.0	7.5	25.0	0.8	4.0	KHD251E106M99C0B00	THD61E2E106M
	15	KHD251E156M99C0B00	THD61E2E156M												