CERAMIC DISC CAPACITOR

Part Number Description (for order booking)

Material Type (1)	Rated Capacitance (2)	Cap. Tol. (3)	Rated Voltage (4)	T.C. (5)	Disc Size (6)	Lead Spacing (7)	Lead Style & Package (8)

Example: HK 103 Z 50V Z5U D6 F5 TBS

- TBS — Straight Lead Ammo Packaging
- F5 — Lead Spacing = 5mm
- D6 — Disc Dia. = 6mm
- Z5U — Temperature Characteristics
- 50V — 50V DC
- Z — +80% -20%
- 103 — 10,000 pF (0.01 μF)
- HK — Hi-K Type

(1) Material Type:

TC = T.C. Type (Class I), **HK** = Hi-K Type (Class II), **SC** = S.C. Type (Class III)

(2) Rated Capacitance in (pF): The first two digits are the significant figures of capacitance and the third digit denotes the number of following zeros.

Code	R47	010	4R7	100	101	102	103	104
pF	0.47	1	4.7	10	100	1,000	10,000	100,000

(3) Capacitance Tolerance:

Code	C	D	J	K	M	R	Z
Tolerance	±0.25 pF	±0.5 pF	±5%	±10%	±20%	+50% - 10%	+80%-20%

(4) Rated Voltage: in Volts (V), DC

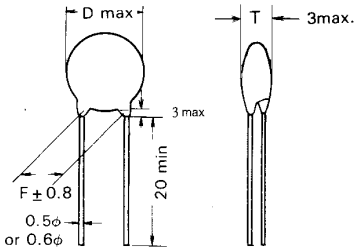
(5) T.C. (Temperature Characteristics): Please refer to page CC-2 for the details

(6) Disc Size (D): Diameter in mm.

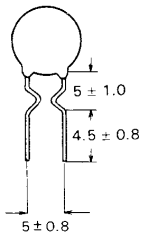
(7) Lead Spacing (F): in mm.

(8) Lead Style: The Code is omitted when the lead is in straight long leads (style 1) and the package is in bulk.

1. Straight Long Leads (Complete Durez coverage Leads)



2. Inside Kink & Cut Leads



Package:

TBS = Straight Lead Ammo packaging **TBF =** Formed Lead Ammo packaging

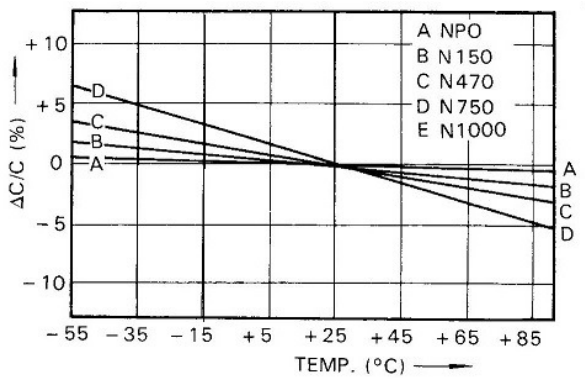
TEMPERATURE COEFFICIENT CHARACTERISTICS:

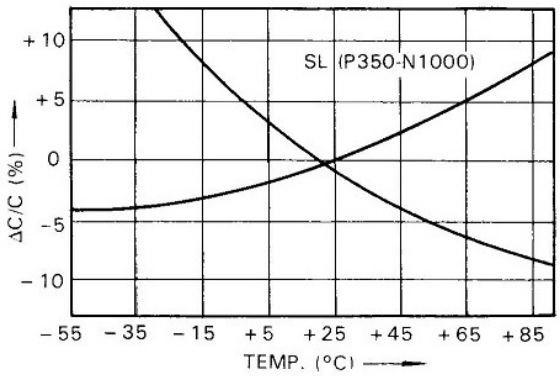
CLASS I • TEMPERATURE COMPENSATING

unit: (ppm/℃)

CAP. \ T.C.	NPO	N150	N470	N750	SL
1 pF ~ 2.7 pF	0±250	- 150±250	- 470±250	- 750±250	+ 350 ~ - 1000
3 pF ~ 3.9 pF	0±120	- 150±120	- 470±120	- 750±120	+ 350 ~ - 1000
4 pF and over	0± 60	- 150± 60	- 470± 60	- 750±120	+ 350 ~ - 1000

T.C. CHART:

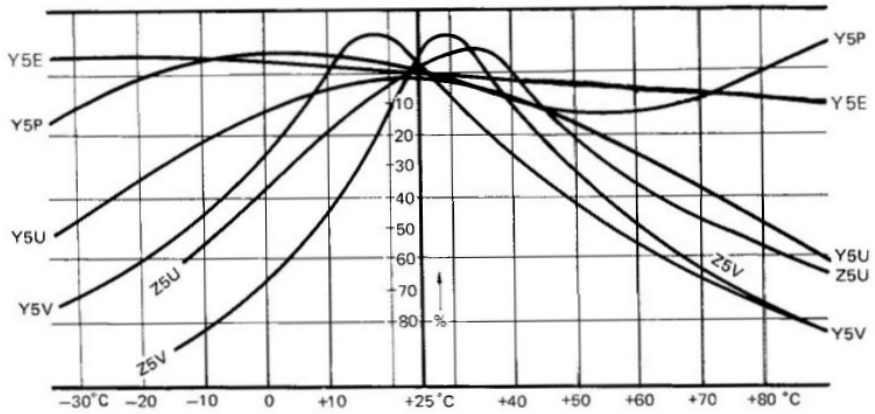




CLASS II, CLASS III • HIGH DIELECTRIC CONSTANT

Item / Dielectric Const.	Max. Capacitance Change from 25℃	Applicable Temperature Range	EIA Code
K1000	±4.7%	- 30℃ ~ + 85℃	Y5E
K3000	±10%	- 30℃ ~ + 85℃	Y5P
K10000	+ 22% ~ - 56%	+ 10℃ ~ + 85℃	Z5U
K16000	+ 22% ~ - 82%	+ 10℃ ~ + 85℃	Z5V

T.C. CHART:



CERAMIC DISC CAPACITOR

T.C. TYPE (CLASS I)



The capacitors have characteristics of predictable linear capacitance change versus temperature which are suitable for temperature compensation of resonant circuit, filters, coupling and decoupling in RF circuit where low losses and close capacitance tolerance are required.

SPECIFICATION:

Operation Temperature Range	-25℃ ~ +85℃
Rated Working Voltage (DC)	50V, 63V, 100V
Capacitance	Measured at 25℃, 1MHz, 1V rms. max.
Capacitance Tolerance	1 pF ~ 9 pF: ±0.25 pF (C) or ±0.5 pF (D) 10 pF and above: ±5% (J) or ±10% (K)
Insulation Resistance	10,000MΩ mim. at working voltage, 60 sec.
Q (Quality Factor)	Measured at 25℃, 1MHz, 1V rms. max. Q=1000 min, if C≧30 pF Q≧ 400+20C, if C＜30 pF (where C = capacitance)
Voltage Proof (Flash Test)	Withstand 250% of rated working voltage with 50mA current, 1.5 sec.
Life Test	200% of rated voltage at 85℃ for 500 hours.
Applicable Standards	EIA RS-198 (CLASS I), JIS C-6422 (TYPE I)

CAPACITANCE RANGE / DIMENSION CHART : W.V.: 50V ~ 100V (DC)

DINMENSION (mm)		TEMPERATURE CHARACTERISTIC (Capacitance in pF)					
D	**F**	**NPO**	**N80**	**N150**	**N220**	**N750**	**SL (GP)**
5	**2.5 or 5.0**	1 - 50	1 - 24	1 - 39	1 - 24	22 - 50	1 - 150
6	**5.0**	50 - 82	25 - 39	47 - 56	25 - 39	56 - 82	100 - 220
7	**5.0**	100 - 120	47 - 56	82 - 100	47 - 56	100 - 120	270 - 330
8	**5.0**	150 - 180	68	120 - 150	68	150 - 180	390 - 470
9	**5.0**	220	82	180 - 220	82	220	560 - 680
10	**5.0**	270	100	--	100	270	820 - 1000

CERAMIC DISC CAPACITOR

Hi-K TYPE (CLASS II)



The capacitors have variety of high K (dielectric constant) ceramic formulations. They are suitable to be used in circuit application of 'bypass' and 'coupling' where a large amount of capacitance is required and the capacitance change versus temperature is less sensitive.

SPECIFICATION:

Operation Temperature Range	Y5E, Y5P: - 30℃ ~ + 85℃ Z5U, Z5V: + 10℃ ~ + 85℃
Rated Working Voltage (DC)	50V, 63V, 100V
Capacitance	Measured at 25℃, 1KHz, 1V rms. max.
Capacitance Tolerance	±10% (K), ±20% (M), + 50% - 10% (R), + 80% - 20% (Z)
Insulation Resistance	10,000MΩ min. at working voltage, 60 sec.
Dissipation Factor (D.F.)	Measured at 25℃, 1KHz, 1V rms. max. Y5E, Y5P, Z5U: 2.5% max. Z5V: 5.0% max.
Voltage Proof (Flash Test)	Withstand 250% of rated working voltage with 50mA current, 1.5 sec.
Life Test	200% of rated voltage at 85℃ for 500 hours.
Applicable Standards	EIA RS-198 (CLASS II), JIS C-6422 (TYPE II)

CAPACITANCE RANGE / DIMENSION CHART: W.V.: 50V ~ 100V (DC)

DIMENSION (mm)		TEMPERATURE CHARACTERISTIC (Capacitance in pF)			
D	**F**	**Y5E**	**Y5P**	**Z5U**	**Z5V**
5	**2.5 or 5.0**	100 - 680	100 - 2200	1000 - 4700	1000 - 10000
6	**5.0**	820 - 1000	3300	5600	15000 - 22000
7	**5.0**	1500	4700	6800 - 10000	--
8	**5.0**	2200	5600	--	--
9	**5.0**	3300	8200	15000	33000
10	**5.0**	--	10000	22000	47000

CERAMIC DISC CAPACITOR

S.C. TYPE (CLASS III)



The capacitors use ceramic semiconductors of boundary insulation structure which provides economical volumetric efficiency. They are suitable for use in low voltage electronic circuits for by-pass, coupling or frequency determination in which low insulation resistance can be tolerated.

SPECIFICATION:

Operation Temperature Range	- 30℃ ~ + 85℃
Rated Working Voltage (DC)	16V, 25V, 50V
Capacitance	Measured at 25℃, 1KHz, 0.1V rms. max.
Capacitance Tolerance	±20% (M), +80 -20% (Z)
Insulation Resistance	Measured at rated working voltage, 60 sec. 16 W.V.: 500MΩ min. 25~50 W.V.: 500MΩx μF min.
Dissipation Factor (D.F.)	Measured at 25℃, 1KHz, 0.1V rms. max. 16 W.V.: 7.0% max. 25~50 W.V.: 5.0% max.
Voltage Proof (Flash Test)	Withstand 250% of rated working voltage with 50mA current, 1.5 sec.
Life Test	Apply rated voltage at 85℃ for 500 hours.

CAPACITANCE RANGE / DIMENSION CHART:

T. C.	Y5P			Y5U			Y5V		
W.V. (DC)	16V	25V	50V	16V	25V	50V	16V	25V	50V
CAP. (μF)	DIMENSIONS (Dφ in mm)								
0.01	5	5	5	5	5	5	5	5	5
0.022	6	6	8	5	5	5	5	5	5
0.033	7	8	8	5	6	7	5	5	6
0.047	8	9	9	5	6	7	5	5	6
0.1	10	12	13	6	7	8	7	7	8
0.22	--	--	--	10	11	--	10	11	12

HIGH VOLTAGE CERAMIC CAPACITOR



SPECIFICATION:

TC TYPE (CLASS I)

Operation Temperature Range	- 25℃ ~ + 85℃
Rated Working Voltage (DC)	500V to 4000V
Capacitance	Measured at 25℃, 1MHz, 1V rms. max.
Capacitance Tolerance	1 pF ~ 9 pF: ±0.25 pF (C) or ±0.5 pF (D) 10 pF and above: ±5% (J) or ±10% (K)
Insulation Resistance	10,000MΩ mim. at 500V DC test voltage, 60 sec.
Q (Quality Factor)	Measured at 25℃, 1MHz, 1V rms. max. Q=1000 min, if C≧30 pF Q≧ 400+20C, if C＜30 pF (where C =capacitance)
Voltage Proof (Flash Test) (with 50mA current, 1.5 sec.)	For 500V rating parts: Withstand 1,250V DC For 1KV & above rating parts: Withstand 200% of rated working voltage
Coating Material	For 500V to 2KV rating parts: Phenolic or epoxy resin coating For 3KV & above rating parts: Epoxy resin (meet UL 94V-0)

Hi-K TYPE (CLASS II)

Operation Temperature Range	Y5P: - 30℃ ~ + 85℃ Z5U, Z5V: + 10℃ ~ + 85℃
Rated Working Voltage (DC)	500V to 4000V
Capacitance	Measured at 25℃, 1KHz, 1V rms. Max.
Capacitance Tolerance	±10% (K), ±20% (M), + 50% - 10% (R), + 80% - 20% (Z)
Insulation Resistance	10,000MΩ mim. At 500V DC test voltage, 60 sec.
Dissipation Factor (D.F.)	Measured at 25℃, 1KHz, 1V rms. Max. Y5P, Z5U: 2.5% max. Z5V: 5.0% max.
Voltage Proof (Flash Test) (with 50mA current, 1.5 sec.)	For 500V rating parts: Withstand 1,250V DC For 1KV & above rating parts: Withstand 200% of rated working voltage
Coating Material	For 500V to 2KV rating parts: Phenolic or epoxy resin coating For 3KV & above rating parts: Epoxy resin (meet UL 94V-0)

CAPACITANCE RANGE / DIMENSION CHART:

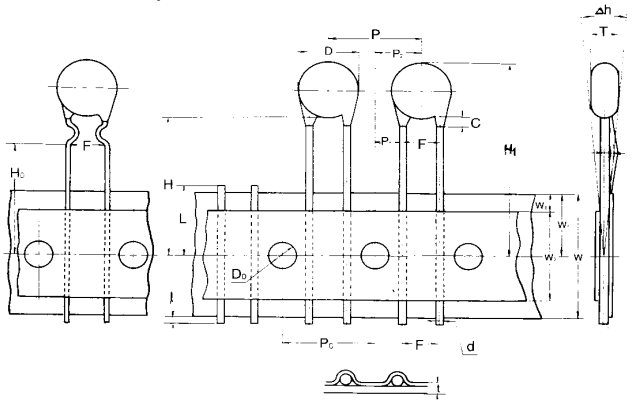
TC TYPE (CLASS I)

W.V.	DIMENSION (mm)			TEMPERATURE CHARACTERISTIC (Capacitance in pF)		
(DC)	D	T	d ϕ	NPO	N750	SL
500V	6	4	0.5	1 - 36	15 - 36	1 - 150
	7	4	0.5	39 - 56	39 - 56	180 - 220
	8	4	0.5	--	--	270 - 330
	9	4	0.5	68 - 100	68 - 100	390 - 470
	10	4	0.5	--	--	680
	11	4	0.5	120 - 150	120 - 150	--
	12	4	0.5	--	--	820
	14	4	0.5	--	--	1000
1KV	6	5	0.6	--	--	1 - 33
	7	5	0.6	10 - 22	--	47
	8	5	0.6	--	--	56
	9	5	0.6	27 - 62		82
	10	5	0.6	--	--	100
	12	5	0.6	68	--	150
	14	5	0.6	--	--	220
	16	5	0.6	--	--	330
	18	5	0.6	--	--	470
2KV	7	6	0.6	4 - 20	--	1 - 33
	8	6	0.6	--	--	39 - 47
	9	6	0.6	27 - 47	--	56
	10	6	0.6	--	--	68 - 82
	12	6	0.6	--	--	100
	14	6	0.6	--	--	150
	16	6	0.6	--	--	220
	18	6	0.6	--	--	330
	20	6	0.6	--	--	470

Radial Leads Taping Specifications

These radial taped ceramic disc capacitors are designed especially for automatic insertion. The available types for radial taped disc are diameters 11.0mm and under.

Unit: mm

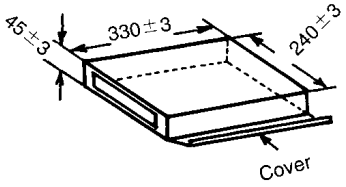


Item	Symbol	Specification		Remarks
		Value	Tolerance	
Body Width	D	110	Max.	
Body Thickness	T	3.5	Max.	
Lead-wire diameter	d	0.6	+0.06 -0.05	
Pitch of component	P	12.7	±1.0	
Feed hole pitch	P_0	12.7	±0.3	Cumulative pitch error: 1.0mm/20pitch
Feed hole center to lead	P_1	3.85	±0.7	To be measured at bottom of clinch
Lead-to-lead distance	F	5.0	±0.8	
Component alignment, F-R	h	0	±0.2	
Tape width	W	18.0	+1.0 -0.5	
Hold-down tape width	W_0	11.0	Min.	
Hole position	W_1	9.0	+0.75 -0.5	
Hole-down tape position	W_2	3.0	Max.	
Height of component from	H	20.0	+1.0 -0.5	For Straight Lead Type
Tape center	H_0	16.0	±0.5	For Kinked Lead Type
Component height	H_1	32.25	Max.	
Lead-wire protrusion	/	2.0	Max.	
Feed hole diameter	D_0	4.0	±0.3	
Total tape thickness	T	0.7	±0.2	Ground paper: 0.5±01mm
Length of snipped lead	L	11.0	Max.	
Coating rundown on leads	C	1.5	Max.	

Anchor with a stapler when the tape is cut or completed. It is accepted that up to three parts may become detached for the tape.

BOX PACKAGE

(2,000 Capacitors per Box)



SAFETY STANDARD RECOGNIZED AC RATED CERAMIC CAPACITORS (CLASS Y1)



These safety recognized disc ceramic capacitors are specifically designed for AC applications and meet the safety requirements of various safety standard agencies. They are ideal for across the line and line by-pass applications.

SPECIFICATION:

Operation Temperature Range	-25℃ ~ +125℃
Rated Working Voltage	400V (AC)
Capacitance	Measured at 25℃, 1KHz, 5V rms. max.
Capacitance Tolerance	K: ±10%, M: ±20%
Insulation Resistance	10,000MΩ mim. at 500V ±50V DC for 60 sec.
Dissipation Factor (D.F.)	2.5% max. for TC: B 5.0% max. for TC: E
Dielectric Strength	4000V AC for 60 sec. (50Hz or 60Hz)
Temperature Characteristic	B: ±10%, E: +20%-55%.

Part Number Description (for order booking)

Material Type	T.C.	Rated Capacitance	Cap. Tol.	Rated Voltage
(1)	(2)	(3)	(4)	(5)

Example: WD B 101 K AC400V

- AC400V — Rated Voltage: 400V AC
- K — Cap. Tol.: ±10%
- 101 — Capacitance: 100 pF
- B — Temperature Characteristic: B
- WD — Type WD

SAFETY STANDARD RECOGNIZED AC RATED CERAMIC CAPACITORS (CLASS Y1)

(1) Material Type: WD (for Y1 capacitor)

(2) Disc Size (D): Diameter in mm.

(3) T.C. (Temperature Characteristics): Y5P: B, Y5U: E

(4) Rated Capacitance in (pF): The first two digits are the significant figures of capacitance and the third digit denotes the number of following zeros.

Code	101	102	472
pF	100	1,000	4,700

(5) Capacitance Tolerance: K: ±10%, M: ±20%

(6) Rated Working Voltage: in Volts (V), AC

STANDARD ITEMS / DIMENSIONS LIST

Part Number	T.C.	Nominal Cap. (pF)	Cap. Tol	D (max)	F	T (max)
WDB101K AC400V	B	100	±10%	10	10	8
WDB101M AC400V	B	100	±20%	10	10	8
WDB151K AC400V	B	150	±10%	10	10	8
WDB151M AC400V	B	150	±20%	10	10	8
WDB221K AC400V	B	220	±10%	10	10	8
WDB221M AC400V	B	220	±20%	10	10	8
WDB331K AC400V	B	330	±10%	10	10	8
WDB331M AC400V	B	330	±20%	10	10	8
WDB471K AC400V	B	470	±10%	10	10	8
WDB471M AC400V	B	470	±20%	10	10	8
WDB681K AC400V	E	680	±10%	10	10	8
WDE102M AC400V	E	1000	±20%	11	10	8
WDE152M AC400V	E	1500	±20%	14	10	8
WDE222M AC400V	E	2200	±20%	14	10	8
WDE332M AC400V	E	3300	±20%	16	10	8
WDE472M AC400V	E	4700	±20%	19	10	8

SAFETY STANDARD RECOGNIZED AC RATED CERAMIC CAPACITORS (CLASS Y1)

Approval Standard and Recognized Numbers

Standard NO.	Recognized NO.	Rated Votage	Approved Monogram
UL 1414	E 104572	AC 250 V	(U.S.A.)
CSA C22.2 NO.0, NO.1	LR 66829	AC 250 V	(Canada)
VDE 0560-2	57287 58762	AC 400 V	(Germany)
SEV 1016	350781	AC 400 V	(Switzerland)
FIMKO IEC384-14⊕EN 132 400	182288-01 186040-01	AC 250 V	(Finland)
SEMKO IEC384-14	9532167 9549032-01	AC 250 V	(Sweden)
DEMKO IEC384-14	304402 3044957	AC 250 V	(Denmark)
NEMKO IEC384-14	P 95103082 P 95104346	AC 250 V	(Norway)

CROSS REFERENCE LIST

Cosonic Part Number	Murata Part Number
WDB101K AC400V	DE0910 B101K-KX
WDB151K AC400V	DE0910 B151K-KX
WDB221K AC400V	DE0910 B221K-KX
WDB331K AC400V	DE0910 B331K-KX
WDB471K AC400V	DE0910 B471K-KX
WDB681K AC400V	DE1010 B681K-KX
WDE102M AC400V	DE0910 E102M-KX
WDE152M AC400V	DE1110 E152M-KX
WDE222M AC400V	DE1210 E222M-KX
WDE332M AC400V	DE1410 E332M-KX
WDE472M AC400V	DE1610 E472M-KX

SAFETY STANDARD RECOGNIZED AC RATED CERAMIC CAPACITORS (CLASS Y2)

These safety recognized disc ceramic capacitors are specifically designed for AC applications and meet the safety requirements of various safety standard agencies. They are ideal for across the line and line by-pass applications.



SPECIFICATION:

Operation Temperature Range	-25℃ ~ +125℃
Rated Working Voltage	250V, 400V (AC)
Capacitance	Measured at 25℃, 1KHz, 5V rms. max.
Capacitance Tolerance	K: ±10%, M: ±20%, Z: +80%-20%
Insulation Resistance	10,000MΩ mim. at 500V ±50V DC for 60 sec.
Dissipation Factor (D.F.)	2.5% max. for TC: B 5.0% max. for TC: F, FZ
Dielectric Strength	2500V AC for 60 sec. (50Hz or 60Hz)
Temperature Characteristic	B: ±10%, F, FZ: +30%-85%.

Part Number Description (for order booking)

Material Type	T.C.	Rated Capacitance	Cap. Tol.	Rated Voltage
(1)	(2)	(3)	(4)	(5)

Example: KL B 101 K AC250V

- AC250V → W.V.: 250V AC
- K → Cap. Tol.: ±10%
- 101 → Capacitance: 100 pF
- B → Temperature Characteristic: B
- KL → Type KL

SAFETY STANDARD RECOGNIZED AC RATED CERAMIC CAPACITORS (CLASS Y2)

(1) Material Type: KL (for Y2 capacitor)

(2) Disc Size (D): Diameter in mm.

(3) T.C. (Temperature Characteristics): Y5P: B, Y5V: F

(4) Rated Capacitance in (pF): The first two digits are the significant figures of capacitance and the third digit denotes the number of following zeros.

Code	101	102	103
PF	100	1,000	10,000

(5) Capacitance Tolerance: K: ±10%, M: ±20%

(6) Rated Working Voltage: in Volts (V), AC

STANDARD ITEMS / DIMENSIONS LIST

Part Number	T.C.	Nominal Cap. (pF)	Cap. Tol	D (max)	F	T (max)
KLB101K AC250	B	100	±10%	10	7.5	8
KLB101M AC250	B	100	±20%	10	7.5	8
KLB151K AC250	B	150	±10%	10	7.5	8
KLB221K AC250	B	220	±10%	10	7.5	8
KLB331K AC250	B	330	±10%	10	7.5	8
KLB331M AC250	B	330	±20%	10	7.5	8
KLB471K AC250	B	470	±10%	10	7.5	8
KLB471M AC250	B	470	±20%	10	7.5	8
KLB681K AC250	B	680	±10%	10	7.5	8
KLB681M AC250	B	680	±20%	10	7.5	8
KLB102K AC250	B	1000	±10%	11	7.5	8
KLB102M AC250	B	1000	±20%	11	7.5	8
KLF102M AC250	F	1000	±20%	11	7.5	8
KLF103M AC250	F	10000	±20%	19	10	8
KLF152M AC250	F	1500	±20%	12	7.5	8
KLF222M AC250	F	2200	±20%	12	7.5	8
KLF332M AC250	F	3300	±20%	14	10	8
KLF472M AC250	F	4700	±20%	17	10	8

SAFETY STANDARD RECOGNIZED AC RATED CERAMIC CAPACITORS (CLASS Y2)

Approval Standard and Recognized Numbers

Standard NO.	Recognized NO.	Rated Votage	Approved Monogram
UL 1414	E 104572	AC 250 V	(U.S.A.)
CSA C22.2 NO.0, NO.1	LR 66829	AC 250 V	(Canada)
VDE 0560-2	57286 62063	AC 400 V	(Germany)
VDE 0565-1	58718 58769 76807	AC 250 V	(Germany)
SEV 1016 / 1055	350782	AC 400 V	(Switzerland)
FIMKO IEC384-14	182287-01	AC 250 V	(Finland)
SEMKO IEC384-14	9532168	AC 250 V	(Sweden)
DEMKO IEC384-14	304401	AC 250 V	(Denmark)
NEMKO IEC384-14	P 95103082	AC 250 V	(Norway)