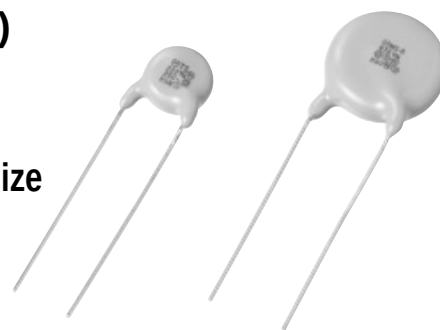


Ceramic Disc Capacitors (Safety Regulations)

Type NS-A IEC60384-14 Sub-class Y1/X1, UL, CSA

Type TS IEC60384-14 Sub-class Y2/X1, UL, CSA

Type VS IEC60384-14 Sub-class Y2/X1, UL, CSA Smaller size



■ Features

- Related by IEC60384-14 2nd Ed. and approved by European Safety Regulations (Types NS-A, TS and VS)
- Reinforced Body Insulation /0.4mm min. approved by BSI, VDE (Type NS-A, Y1, Reinforced Insulation)
- Flame-retardant insulated coating
- Easy mounting through kinked leads and radial taping

■ Recommended Applications

- Interference suppressors for IT equipment (for eg. Modem)
- Interference suppressors for AC Primary Line of electronic equipment (Switching power supplies, Inverter type lighting apparatus etc.)
- Other electronic equipment for AC primary Line.

■ Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12	
E	C	K	N	T	S	1	0	2	M	E		
Product Code		Lead Style		Type Name		Nominal Capacitance		Cap. Tolerance		Temp. Char		Suffix
Code	Class	Code	Style	Code	Type	Ex.	Cap.	Code	Cap. Tol.	Code	Char.	
ECC	Class 1	A	Kinked Lead Bulk	NA	Type NS-A	101	100 pF	J	±5 %	G	SL/GP	
ECK	Class 2	N	Kinked Lead Taped	TS	Type TS	102	1000 pF	K	±10 %	B	B/Y5P	
				VS	Type VS	222	2200 pF	M	±20 %	E	E/Y5U	
						472	4700 pF	Z	+80, -20 %	F	F/Y5V	
						103	10000 pF					

■ Specifications

Characteristics	Type NS-A	Type TS	Type VS
Related Standards	IEC 60384-14(Y1/X1) BSI, VDE, SEV, SEMKO FIMKO, NEMKO, DEMKO UL, CSA, KTL	IEC 60384-14(Y2/X1) BSI, VDE, SEV, SEMKO FIMKO, NEMKO, DEMKO UL, CSA, KTL	IEC 60384-14(Y2/X1) VDE, SEMKO, FIMKO NEMKO, DEMKO UL, KTL
Operating Temperature Range	-25 to 125 °C		
Rated Voltage	250 VAC/440 VAC		
Dielectric Withstanding Voltage	4000 VAC for 1 minute	2600 VAC for 1 minute	1500 VAC for 1 minute
Capacitance	Within the tolerance, when measured at 1 kHz ± 20 %, 1 Vrms, and 20 °C		
Q (Temp. Char. SL)	30 pF or under Q > 400+20C (C : Cap. pF) over 30 pF Q > 1000 at 1 MHz ±20 % 1 to 5 Vrms. and 20 °C		
Dissipation Factor (tanδ)	tan δ < 0.025, when measured at 1 kHz ±20 %, 1 Vrms, and 20 °C		
Insulation Resistance	10000 MΩ min at 500 VDC 1 minute electrification.		
Temperature Characteristics	Char.	max. Cap. Change	Temperature Range
	SL/GP	+350 to -1000 ppm/°C	20 to 85 °C
	B/Y5P	±10 %	-25 to 85 °C
	E/Y5U	+20, -55 %	-25 to 85 °C
	F/Y5V	+30, -80 %	-25 to 85 °C

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

Feb. 2006

■ Related Standards and Certificate Numbers

● Type NS-A

Certifying Body	Related Standard	Certificate Number	Sub-class	Rated Voltage	Dielectric Withstanding Voltage	Operating Temperature Range
BSI (UK)	EN 132 400:1994 Sub-class Y2 (IEC 60384-14 2nd Ed.)	226319	Y1, X1	Y1:250 VAC X1:440 VAC	Y1:4000 VAC X1:1892 VDC	-25 to 125 °C
VDE (Germany)		087472				
SEV (Switzerland)		05.0123				
SEMKO (Sweden)		9918234/01-02				
FIMKO (Finland)		F1 13556				
NEMKO (Norway)		P99101676				
DEMKO (Denmark)		DK99-02495				
KTL (Korea)	K60384-14 (IEC 60384-14 2nd Ed.)	SU03012-3002	—	250 VAC	1500 VAC	-25 to 85 °C
UL (USA)	UL1414	E62674				
CSA (Canada)	CSA C22.2 No.1	LR58064				

Note: Certification Number sometimes changes with the change of the approval contents and so on. CQC and KTL marks are indicated on the label.

● Type TS

Certifying Body	Related Standard	Certificate Number		Sub-class	Rated Voltage	Dielectric Withstanding Voltage	Operating Temperature Range
		Plant Code H	Plant Code M				
BSI (UK)	EN132 400:1994 Sub-class Y2 (IEC 60384-14 2nd Ed.)	228035		Y2, X1	Y2:250 VAC X1:440 VAC	Y2:1500 VAC X1:1892 VDC	-25 to 125 °C
VDE (Germany)		1220129	118911				
SEV (Switzerland)		05.0122					
SEMKO (Sweden)		9618031/01(Y2)	9909196/01-02				
FIMKO (Finland)		FI13324A1					
NEMKO (Norway)		P96102354(Y2) P99101084(X1)	P99101190				
DEMKO (Denmark)		305880(Y2) DK99-01676(X1)	DK99-01749				
KTL (Korea)	K60384-14(IEC 60384-14 2nd Ed.)	SU03012-3001	SU03013-3002	—	250 VAC	1500 VAC	-25 to 85 °C
UL (USA)	UL 1414	E62674					
CSA (Canada)	CSA C22.2 No.1	LR58064	LR31605				

Note: Certification Number sometimes changes with the change of the approval contents and so on. KTL marks are indicated on the label.

● Type VS

Certifying Body	Related Standard	Certificate Number	Sub-class	Rated Voltage	Dielectric Withstanding Voltage	Operating Temperature Range
VDE (Germany)	EN 132 400:1994 Sub-class Y2 (IEC 60384-14 2nd Ed.)	123139	Y2, X1	Y2:250 VAC X1:440 VAC	Y2:1500 VAC X1:1892 VDC	-25 to 125 °C
SEMKO (Sweden)		0042075/01-02				
FIMKO (Finland)		F116196				
NEMKO (Norway)		P00102412				
DEMKO (Denmark)		310308-01				
KTL (Korea)	K60384-14 (IEC 60384-14 2nd Ed.)	SU03013-3003	—	-250 VAC	1500 VAC	-25 to 85 °C
UL (USA)	UL1414*	E62674				
	CSA C22.2 No.1*					

Note: * is for Line-by-pass capacitors. Certification Number sometimes changes with the change of the approval contents and so on. KTL marks is indicated on the label. Certification contents are subject to differ in capacitance values.

■ Marking Examples (Ex. Type NS-A, 4700 pF)

Marking Items			Examples* (Marking of the face and the reverse)	
Manufacturer's Identification		M	M NS-A 472 H64 LL2 Y1-250V~ X1-440V~	
Type Designation		NS-A		
sub-class and Rated Voltage		Y1-250V ~ X1-440V~		
Capacitance		472		
Recognized Marking (Logo or Monogram)	BSI			
	VDE			
	SEV			
	SEMKO			
	FIMKO			
	NEMKO			
	DEMKO			
	UL			
	CSA			
Plant Code		H		
Date Code (Ex. Apr. 2006)		64		

Note: * The actual marking is sometimes different from the above example with the change of the safety approval contents and so on.

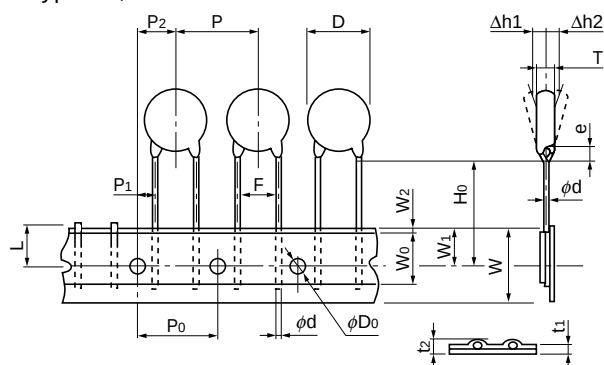
Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

■ Dimensions in mm (not to scale)

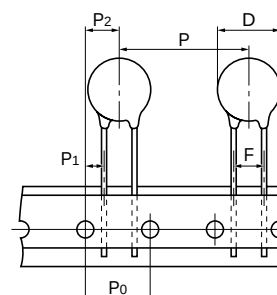
Standard lead styles are available in Kinked Lead and Kinked Lead Taping shown below.

● Kinked Lead Taping

Type N0, N1

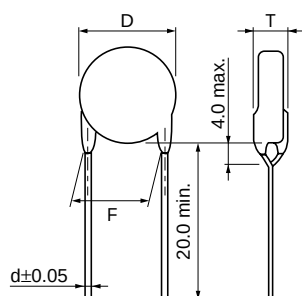


Type N2 *



* Same dimensions as Type N0, N1 except for special dimensions.

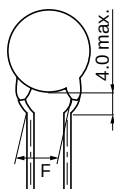
● Kinked Lead Type



Note: Tolerance of Lead Space

Dim. F (Nominal)	Tolerance of Dim. F
5.0	±1.0
7.5	±1.5
10.0	±1.5 (*1.5 -1.0 for Type NS-A)

Under kinked lead style are applied to only 3300 pF and over have a lead space (F) 7.5 mm of Type TS



Unit (mm)

Taping Type Symbol	N0	N1	N2
P	12.7±1.0	15.0±2.0	30.0±2.0
P ₀	12.7±0.3	15.0±0.3	15.0±0.3
F	5.0±0.8	7.5±1.0	7.5±1.0
P ₁	3.85±0.70	3.75±0.80	3.75±0.80
P ₂	6.35±1.30	7.5±1.5	7.5±1.5
D	To comply with each individual specification		
W	18.0 ^{+1.0} _{-0.5}		
W ₀	10.0 min.		
W ₁	9.0±0.5		
W ₂	3.0 max.		
H ₀	18.0 ^{+2.0} ₀		
e	4.0 max.		
ϕD ₀	4.0±0.2		
ϕd	0.60±0.05	0.65±0.05	0.65±0.05
t ₁	0.6±0.3		
t ₂	1.5 max.		
T	To comply with each individual specification		
Δ h ₁ , Δ h ₂	2.0 max.		
L	11.0 max.		

■ Minimum Quantity/Packing Unit

Type		Part Number		Minimum Packing Quantity	Packing Quantity in Carton	Carton L×W×H (mm)
Type NS-A	Kinked Lead Bulk	ECKANA□□□□□	100 to 2200 pF	200	3000	365×197×126
			3300, 4700 pF	200	2000	
Type TS	Kinked Lead Bulk	ECKATS□□□□□	100 to 2200 pF	200	3000	365×197×126
			3300, 4700 pF	200	2000	
			10000 pF	200	1000	
	Kinked Lead Taped Type	ECKNTS□□□□□	100 to 10000 pF	500	2500	358×232×305
Type VS	Kinked Lead Bulk	ECCA VS□□□□□	5 to 68 pF	200	4000	365×197×126
		ECKA VS□□□□□	100 to 3300 pF	200	4000	
		ECKA VS472MF	4700 pF	200	4000	
		ECKA VS472ME	4700 pF	200	3000	
		ECKA VS103MF	10000 pF	200	3000	
	Kinked Lead Taped Type	ECCN VS□□□□□	5 to 68 pF	1000	5000	358×232×305
		ECKN VS□□□□□	100 to 4700 pF	1000	5000	
		ECKN VS103MF	10000 pF	500	2500	

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

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■ Ratings and Characteristics

● Type NS-A (IEC60384-14 Sub-class Y1, X1) Ratings and Characteristics

Cap. in pF	Capacitance Tolerance (%)	Temp. Char.	Dimensions in mm		Kinked Lead Type (Bulk)		
			D max.	T max.	Part Number	Dim. in mm	
						F	d
100	±10, ±20	B/Y5P	11.0	8.0	ECKANA101□B	10.0	0.65
150	±10, ±20	B/Y5P	11.0	8.0	ECKANA151□B	10.0	0.65
220	±10, ±20	B/Y5P	11.0	8.0	ECKANA221□B	10.0	0.65
330	±10, ±20	B/Y5P	11.0	8.0	ECKANA331□B	10.0	0.65
470	±10, ±20	B/Y5P	11.0	8.0	ECKANA471□B	10.0	0.65
680	±10, ±20	B/Y5P	11.0	8.0	ECKANA681□B	10.0	0.65
1000	±10, ±20	B/Y5P	11.0	8.0	ECKANA102□B	10.0	0.65
1000	±20	E/Y5U	10.0	8.0	ECKANA102ME	10.0	0.65
1500	±20	E/Y5U	11.0	8.0	ECKANA152ME	10.0	0.65
2200	±20	E/Y5U	11.0	8.0	ECKANA222ME	10.0	0.65
3300	±20	E/Y5U	13.0	8.0	ECKANA332ME	10.0	0.65
4700	±20	E/Y5U	16.0	8.0	ECKANA472ME	10.0	0.65

Remark

Type NS-A is approved by BSI and VDE for Reinforced Body Insulation (0.4 mm min.)

CB certification No.

BSI (UK)	GB386W
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Certification No.

VDE (Germany)	087469
	087472

Redial Taped version is available.
(Lead space is available only in 10 mm)□: Capacitance Tolerance Code
K:(±10 %) or M(±20 %)

● Type TS (IEC60384-14 Sub-class Y2, X1) Ratings and Characteristics

Cap. in pF	Capacitance Tolerance (%)	Temp. Char.	Dimensions in mm		Kinked Lead Type (Bulk)			Kinked Lead Taped Type			
			D max. (Tol.)	T max.	Part Number	Dim. in mm		Part Number	Taped Type	Dim. in mm	
						F	d			F	d
100	±10, ±20	B/Y5P	8.0(7.0±1.0)	7.0	ECKATS101□B	7.5	0.65	ECKNTS101□B	N1	7.5	0.65
150	±10, ±20	B/Y5P	8.0(7.0±1.0)	7.0	ECKATS151□B	7.5	0.65	ECKNTS151□B	N1	7.5	0.65
220	±10, ±20	B/Y5P	8.0(7.0±1.0)	7.0	ECKATS221□B	7.5	0.65	ECKNTS221□B	N1	7.5	0.65
330	±10, ±20	B/Y5P	8.0(7.0±1.0)	7.0	ECKATS331□B	7.5	0.65	ECKNTS331□B	N1	7.5	0.65
470	±10, ±20	B/Y5P	8.0(7.0±1.0)	7.0	ECKATS471□B	7.5	0.65	ECKNTS471□B	N1	7.5	0.65
680	±10, ±20	B/Y5P	9.0(8.0±1.0)	7.0	ECKATS681□B	7.5	0.65	ECKNTS681□B	N1	7.5	0.65
1000	±10, ±20	B/Y5P	10.5(9.5±1.0)	7.0	ECKATS102□B	7.5	0.65	ECKNTS102□B	N1	7.5	0.65
1000	±20	E/Y5U	8.0(7.0±1.0)	7.0	ECKATS102ME	7.5	0.65	ECKNTS102ME	N1	7.5	0.65
1500	±20	E/Y5U	9.0(8.0±1.0)	7.0	ECKATS152ME	7.5	0.65	ECKNTS152ME	N1	7.5	0.65
2200	±20	E/Y5U	9.5(9.0±1.0)	7.0	ECKATS222ME	7.5	0.65	ECKNTS222ME	N1	7.5	0.65
3300	±20	E/Y5U	12.5(11.5±1.0)	7.0	ECKATS332ME	7.5	0.65	ECKNTS332ME	N1	7.5	0.65
4700	±20	E/Y5U	15.0(14.0±1.0)	7.0	ECKATS472ME	10.0	0.65	ECKNTS472ME	N2	7.5	0.65
4700	±20	F/Y5V	12.5(11.5±1.0)	7.0	ECKATS472MF	7.5	0.65	ECKNTS472MF	N1	7.5	0.65
10000	±20	F/Y5V	17.0(16.0±1.5)	7.0	ECKATS103MF	10.0	0.65	ECKNTS103MF	N2	7.5	0.65

Note : □-- Capacitance Tolerance Code K (±10 %) or M (±20 %)

● Type VS (IEC60384-14 Sub-class Y2, X1 Smaller type) Ratings and Characteristics

Cap. in pF	Capacitance Tolerance (%)	Temp. Char.	Dimensions in mm		Kinked Lead Type (Bulk)			Kinked Lead Taped Type			
			D max.	T max.	Part Number	Dim. in mm		Part Number	Taped Type	Dim. in mm	
						F	d			F	d
10	±0.5pF, ±1pF	SL/GP	8.0	6.0	ECCA VS100□G*	5.0	0.60	ECCNVS100□G*	N0	5.0	0.60
15	±5, ±10	SL/GP	8.0	6.0	ECCA VS150□G*	5.0	0.60	ECCNVS150□G*	N0	5.0	0.60
22	±5, ±10	SL/GP	8.0	6.0	ECCA VS220□G*	5.0	0.60	ECCNVS220□G*	N0	5.0	0.60
33	±5, ±10	SL/GP	8.0	6.0	ECCA VS330□G	5.0	0.60	ECCNVS330□G	N0	5.0	0.60
47	±5, ±10	SL/GP	8.0	6.0	ECCA VS470□G	5.0	0.60	ECCNVS470□G	N0	5.0	0.60
68	±5, ±10	SL/GP	8.0	6.0	ECCA VS680□G	5.0	0.60	ECCNVS680□G	N0	5.0	0.60
100	±10, ±20	B/Y5P	8.0	6.0	ECKA VS101□B	5.0	0.60	ECKNVS101□B	N0	5.0	0.60
150	±10, ±20	B/Y5P	8.0	6.0	ECKA VS151□B	5.0	0.60	ECKNVS151□B	N0	5.0	0.60
220	±10, ±20	B/Y5P	8.0	6.0	ECKA VS221□B	5.0	0.60	ECKNVS221□B	N0	5.0	0.60
330	±10, ±20	B/Y5P	8.0	6.0	ECKA VS331□B	5.0	0.60	ECKNVS331□B	N0	5.0	0.60
470	±10, ±20	B/Y5P	8.0	6.0	ECKA VS471□B	5.0	0.60	ECKNVS471□B	N0	5.0	0.60
680	±10, ±20	B/Y5P	8.0	6.0	ECKA VS681□B	5.0	0.60	ECKNVS681□B	N0	5.0	0.60
1000	±20	E/Y5U	8.0	6.0	ECKA VS102ME	5.0	0.60	ECKNVS102ME	N0	5.0	0.60
1500	±20	E/Y5U	8.0	6.0	ECKA VS152ME	5.0	0.60	ECKNVS152ME	N0	5.0	0.60
2200	±20	E/Y5U	9.0	6.0	ECKA VS222ME	5.0	0.60	ECKNVS222ME	N0	5.0	0.60
3300	±20	E/Y5U	10.0	6.0	ECKA VS332ME	5.0	0.60	ECKNVS332ME	N0	5.0	0.60
4700	±20	E/Y5U	11.0	6.0	ECKA VS472ME	5.0	0.60	ECKNVS472ME	N0	5.0	0.60
4700	±20	F/Y5V	10.0	6.0	ECKA VS472MF	5.0	0.60	ECKNVS472MF	N0	5.0	0.60
10000	±20	F/Y5V	14.0	6.0	ECKA VS103MF	7.5	0.65	ECKNVS103MF	N1	7.5	0.65

Note 1 : □-- Capacitance Tolerance Code D (±0.5 pF) or F (±1 pF) or J (±5 %) or K(±10 %) or M(±20 %)

2 : * --except for VDE and KTL.

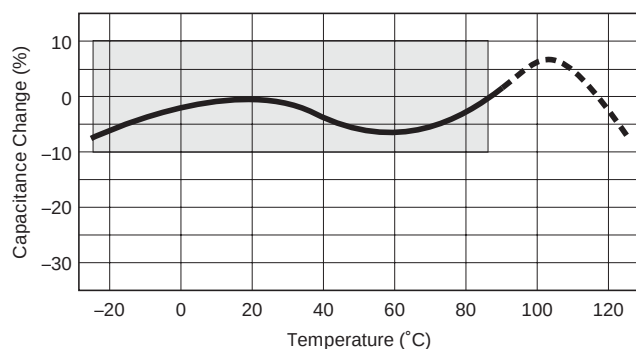
Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
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Feb. 2006

■ Typical Temperature Characteristics (Type TS, and Type NS-A)

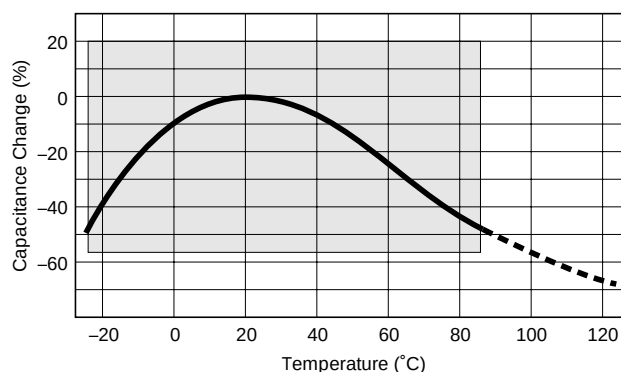
Char. B/Y5P

(Temp. Range : -25 to 85 °
max.Cap.Change : +10 %)



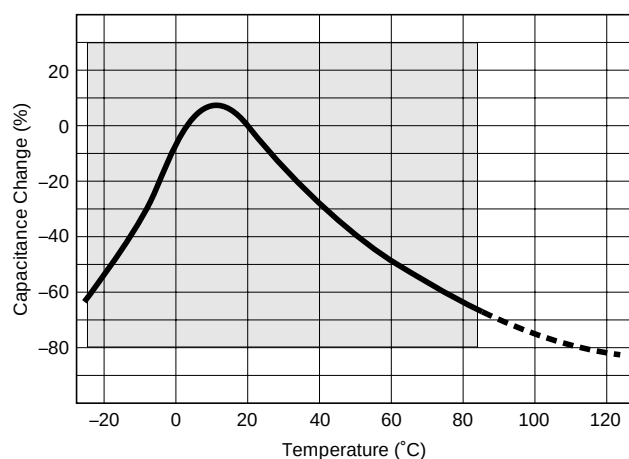
Char. E/Y5U

(Temp. Range : -25 to 85 °
max.Cap.Change : +20, -55 %)



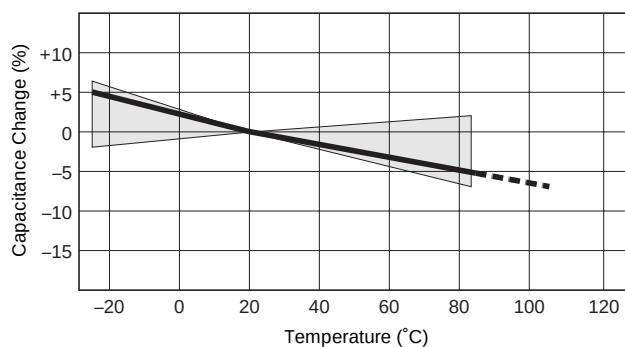
Char. F/Y5V

(Temp. Range : -25 to 85 °
max.Cap.Change : +30, -80 %)



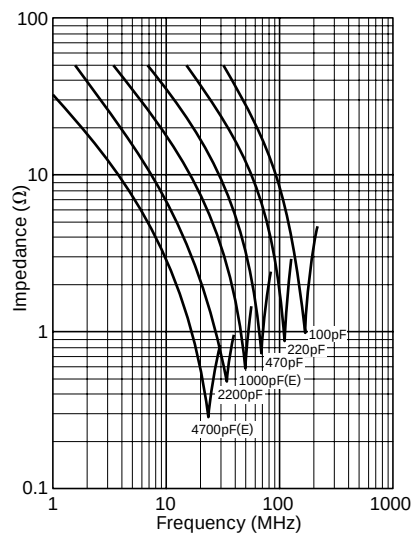
Char. SL/GP

(Temp. Coeff. : +350 to -1000 ppm/°C)

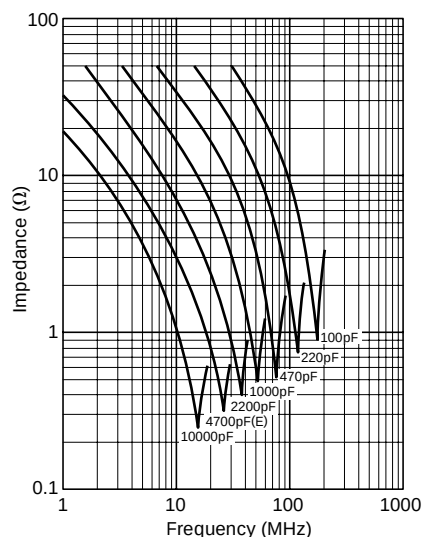


■ Impedance vs. Frequency Characteristics

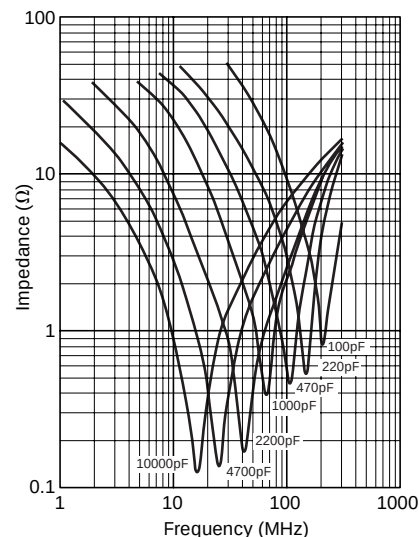
Type NS-A



Type TS



Type VS



■ Current vs. Voltage (Leakage Current Characteristics)

Conditions Temperature: 20 °C, Applied Voltage: Sine Wave 60 Hz

