

**Features:**

- High-frequency circuits.
- Temperature compensating.
- High stability.
- Space saving.

Applications:

In a great variety of electronic circuits, e.g. in filters and tuning circuits where high stability and/or temperature compensation are a requirement. Because of their small size the capacitors are suitable for use in circuitry with high component density.

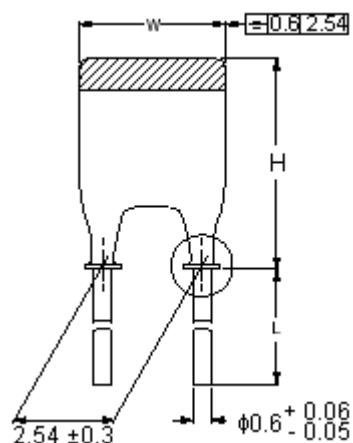
Description:

The capacitors consist of a thin rectangular ceramic plate, both sides of which are metallized, and tinned connecting leads are secured using a high melting point solder. The capacitors are encapsulated in epoxy lacquer, which is resistant to all commonly used cleaning solvents. They have small dimensions and narrow tolerances on the lead spacing. The leads are provided with a flange, which guarantees that the leads are free of lacquer, and its shape allows soldering gasses to escape freely, ensuring excellent solderability. This makes the capacitors suitable for both hand-mounting and automatic insertion. The electrical properties are characterized by low losses, a narrow tolerance on capacitance ($\pm 0.25\text{pF}$ or 2%), high stability and, owing to the absence of silver, an extremely good DC behaviour.

Quick Reference Data

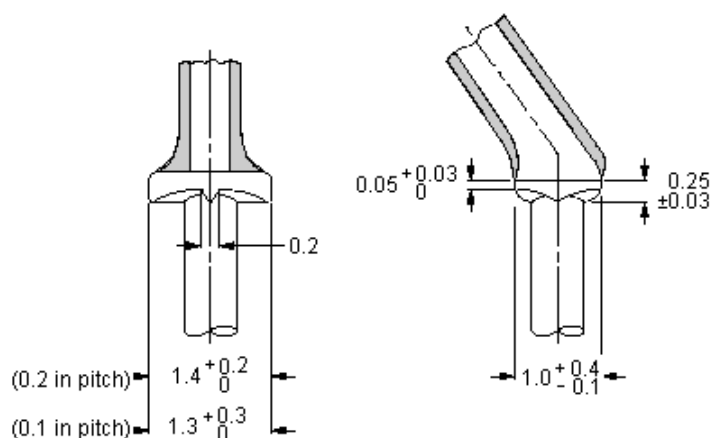
Description	Value
Capacitance range (E12 series)	0.56 to 680pF
Rated DC voltage	100V
Tolerance on capacitance	$\pm 2\%$ or $\pm 0.25\text{pF}$
Temperature coefficients	P100, NP150, N150, N750 and N1500
Sectional specification	IEC 60384-8
Climatic category (IEC 60068)	55/085/21 (N150, N750); 55/125/56 (P100, NP150, N1500)

Mechanical Data:



Dimensions : Millimetres

Detail of Flange



Dimensions : Millimetres

Physical Dimensions

Capacitor Dimensions (Table 1)

Size	W (1)	H (1)
I	3.6 (-1.1)	5.0 (-1.5)
IIA	3.9 (-1.4)	5.3 (-1.7)
IIB	4.5 (-1.8)	6.0 (-2.1)
III	5.3 (-1.8)	6.8 (-2.3)
IV	6.2 (-2.0)	7.7 (-2.4)
V		10.3 (-2.8)
VI	6.5 (-2.3)	12.3 (-3.5)

Dimensions : Millimetres

Notes: 1. Tolerances are given between parentheses.

Marking:

The temperature coefficient is indicated by a colour code in accordance with IEC recommendations. Capacitance value is indicated by a marking code in a contrasting colour on the body.

Mounting:

When bending, cutting or flattening, the leads should be relieved of the applied load by supporting them at the capacitor body.

Soldering conditions:

Maximum 265°C, maximum 10s.

The capacitors are suitable for mounting on printed-circuit boards (hand-mounting or automatic insertion).

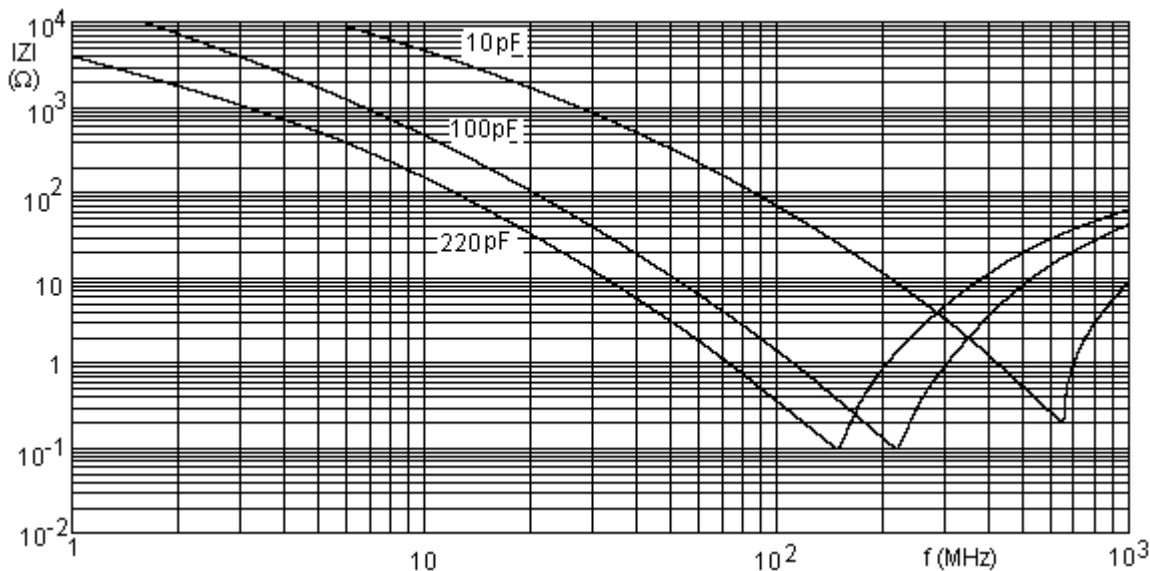
Electrical Characteristics

The capacitors meet the essential requirements of "IEC 60384-8". Unless stated otherwise all electrical values apply at an ambient temperature of $20 \pm 1^\circ\text{C}$, an atmospheric pressure of 86 to 106kPa and a relative humidity of 63 to 67%.

Description	Value
Rated DC voltage	100V
DC test voltage; duration 1 minute	300V
DC test voltage of coating; duration 1 minute	300V
Insulation resistance at 100V dc after 1 minute	$\geq 10,000\text{M}\Omega$
Tan δ (note 1) measured at 1MHz, $\leq 5\text{V}$: C $\leq 50\text{pF}$ C $> 50\text{pF}$	$\leq 15 (15/C + 0.7) \times 10^{-4}$; $< 55 \times 10^{-4}$ $\leq 15 \times 10^{-4}$
Category temperature range	-55 to +85°C (N150, N750); -55 to +125°C (P100, NP150, N1500)

Note: 1. Including 2mm per connecting lead.

Typical Impedance $|Z|$ as a Function of Frequency



Conditions for Capacitors with Temperature Coefficient NP150 (C0G), Rated Voltage 100V dc

Description	Value
Capacitance range	1.8 to 330pF (E12 series)
Temperature coefficient of the capacitance ($\Delta C/C\Delta T$)	$0 \times 10^{-6}/K$
Tolerance on the temperature coefficient	$\pm 30 \times 10^{-6}/K$
Marking colour of the temperature coefficient	CG
Climatic category (IEC 60068)	55/125/56

Preferred Capacitance Range, Temperature Coefficient NP150 (C0G)

Capacitance Value (pF)	Voltage (V)	Tolerance	Size (See Table 1)	Pitch (P)	Lead Diameter (d)	Length	Marking	Part Number
2.2	100	$\pm 0.25pF$	I (1)	2.54 (0.1)	0.6 (0.024)	4 \pm 0.5 (0.015 \pm 0.001)	2p2	2222 682 09228
3.3			3p3				2222 682 09338	
4.7			4p7				2222 682 09478	
5.6			5p6				2222 682 09568	
6.8			6p8				2222 682 09688	
8.2		$\pm 2\%$	I				8p2	2222 682 09828
10.0			10p				2222 682 10109	
12.0			12p				2222 682 10129	
15.0			15p				2222 682 10159	
18.0			18p				2222 682 10189	

Dimensions : Millimetres (Inches)

Notes :

1. Maximum thickness 2.5mm.

Conditions for Capacitors with Temperature Coefficient N150 (P2G), Rated Voltage 100V dc

Description	Value
Capacitance range	3.9 to 330pF (E12 series)
Temperature coefficient of the capacitance ($\Delta C/C\Delta T$)	$-150 \times 10^{-6}/K$
Tolerance on the temperature coefficient	$\pm 30 \times 10^{-6}/K$
Marking colour of the temperature coefficient	PG
Climatic category (IEC 60068)	55/085/21

Preferred Capacitance Range, Temperature Coefficient N150 (P2G)

Capacitance Value (pF)	Voltage (V)	Tolerance	Size (See Table 1)	Pitch (P)	Lead Diameter (d)	Length	Marking	Part Number
100	100	±2%	III	2.54 (0.1)	0.6 (0.024)	4 ±0.5 (0.015 ±0.001)	n10	2222 682 34101
120			IV				n12	2222 682 34121
150			I				n15	2222 682 34151
22							22p	2222 682 34229
27							27p	2222 682 34279
33			IIA				33p	2222 682 34339
39							39p	2222 682 34399
47			IIB				47p	2222 682 34479
56							56p	2222 682 34479
68			III				68p	2222 682 34689
82							82p	2222 682 34829

Dimensions : Millimetres (Inches)

Conditions for Capacitors with Temperature Coefficient N750 (U2J), Rated Voltage 100V dc

Description	Value
Capacitance range	3.9 to 330pF (E12 series)
Temperature coefficient of the capacitance ($\Delta C/C\Delta T$)	$-750 \times 10^{-6}/K$
Tolerance on the temperature coefficient	$\pm 120 \times 10^{-6}/K$
Marking colour of the temperature coefficient	UJ
Climatic category (IEC 60068)	55/085/21

Preferred Capacitance Range, Temperature Coefficient N750 (U2J)

Capacitance Value (pF)	Voltage (V)	Tolerance	Size (See Table 1)	Pitch (P)	Lead Diameter (d)	Length	Marking	Part Number
180	100	±2%	IV	2.54 (0.1)	0.6 (0.024)	4 ±0.5 (0.015 ±0.001)	n18	2222 682 58181
220							n22	2222 682 58221
270			V				n27	2222 682 58271
330							n33	2222 682 58331

Dimensions : Millimetres (Inches)

Conditions for Capacitors with Temperature Coefficient N1500 (P3K), Rated Voltage 100V dc

Description	Value
Capacitance range	18 to 680pF (E12 series)
Temperature coefficient of the capacitance ($\Delta C/C\Delta T$)	$-1500 \times 10^{-6}/K$
Tolerance on the temperature coefficient	$(0 \text{ to } +500) \times 10^{-6}/K$
Marking colour of the temperature coefficient	VK
Climatic category (IEC 60068)	55/125/56

Preferred Capacitance Range, Temperature Coefficient N1500 (P3K)

Capacitance Value (pF)	Voltage (V)	Tolerance	Size (See Table 1)	Pitch (P)	Lead Diameter (d)	Length	Marking	Part Number
390	100	$\pm 2\%$	IV	2.54 (0.1)	0.6 (0.024)	4 ± 0.5 (0.015 ± 0.001)	n39	2222 682 70391
470			V				n47	2222 682 70471
560			VI				n56	2222 682 70561
680			n68				2222 682 70681	

Dimensions : Millimetres (Inches)

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