

Overview

NeoCapacitor® provides excellent performance for various applications due to high conductivity of the conductive polymer.

TOKIN's devices are classified into the following three quality grades, in accordance with their application: Standard, Special, and Specific. The quality grade of all devices in this document is "standard" and cannot be used for "special" or "specific" quality grade applications. Customers who intend to use the products in this document for applications other than "standard" quality grade must contact KEMET sales representative in advance.

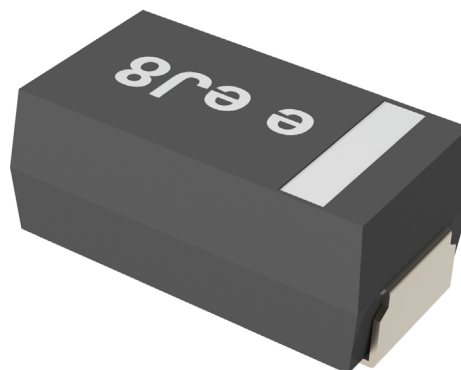
Standard: This quality grade is intended for applications in which failure or malfunction of the device is highly unlikely to cause harm to persons or damage to property, or be the source of any negative effects or problems in the wider community.

Special: This quality grade is intended for special applications that have common requirements, such specific industrial fields. Devices with a "special" quality grade are designed, manufactured, and tested using more a stringent quality assurance program than what is used for "standard" grade devices. There is a high possibility that failure or malfunction of the device when being used for applications in this category will cause harm to persons or damage to property, or bring negative effects or problems in the wider community.

Specific: Devices in this quality grade are designed, manufactured, and tested using a quality assurance program that is designated by the customer or that is created in accordance with the customer's specifications. There is an extremely high possibility that failure or malfunction of the device when being used for applications in this category will cause harm to persons or damage to property, or bring serious problems in the wider community. Customers who use KEMET's products for these "specific" applications must conclude an individual quality agreement and/or development agreement with KEMET. A quality assurance program designated by the customer must also be determined in advance.

Benefits

- Excellent noise absorption performance
- Higher ripple current
- Miniaturized, thinner, higher capacitance and lower ESR
- Lead free (JEITA PHASE3), RoHS2 directive (2011/65/EU + 2015/863/EU) and halogen-free.
- Antimony-free and Red phosphorous-free materials for mold resin.



Applications

Typical applications include voltage smoothing, noise absorption in high speed operation circuit , multi media instruments, PC (voltage smoothing and noise absorption of CPU, memory and various LSI), Smartphone, mobile phone (stabilization of battery voltage, stabilization for display), LCD TV (stabilization of LCD driver and timing controller) and others (tablet, PC, portable audio player, DSC, DVC, HDD, SSD, communication card, portable gaming devices, head-mounted displays, drones, IoT devices).

K-SIM

For a detailed analysis of specific part numbers, please visit ksim.kemet.com to access KEMET's K-SIM software. KEMET K-SIM is designed to simulate behavior of components with respect to frequency, ambient temperature, and DC bias levels.

Ordering Information

TE	PSL	B2	1A	107	M	(45)	8R
Tape & Reel	Series	Case Code	DC Rated Voltage in Volts	Capacitance (pF)	Capacitance Tolerance	ESR Spec	Packing Orientation
φ 180 mm reel	Standard product of NeoCapacitor	A (3216-18) B3 (3528-12) B15 (3528-15) B2 (3528-20)	0E = 2.5 V 0G = 4 V 0J = 6.3 V 1A = 10 V 1C = 16 V 1D = 20 V 1E = 25 V	First two digits represents the cap code. Third digit specifies number of zeros to follow	M = ±20%	For example: (45) shows 45 mΩ Blank = Refer to PN in Table 1 for specification	8 = Tape width (8 mm) R = Packaging orientation (Cathode on sprocket hole)

Performance Characteristics

Item	Performance Characteristics							
Operating Temperature	-55°C to +105°C							
Rated Voltage Range (V)	2.5 – 25							
Surge Voltage (V)	Rated Voltage	2.5 V	4 V	6.3 V	10 V	16 V	20 V	25 V
	Surge Voltage	3.3 V	5.2 V	8 V	13 V	20 V	23 V	29 V
Nominal Capacitance (120 Hz)	3.3 μF ~ 470 μF*							
Dissipation Factor (tan δ, 120 Hz)	Refer to Standard Ratings*							
Leakage Current (LC, V _R , 5 minutes)	Refer to Standard Ratings							
Equivalent Series Resistance (ESR, 100 kHz**)	Refer to Standard Ratings							
Permissible Ripple Current (100 kHz**)	Refer to Standard Ratings							

* For these measurements apply 1.5 VDC

** Partially ESR measurements should be taken at 300 k to 500 kHz

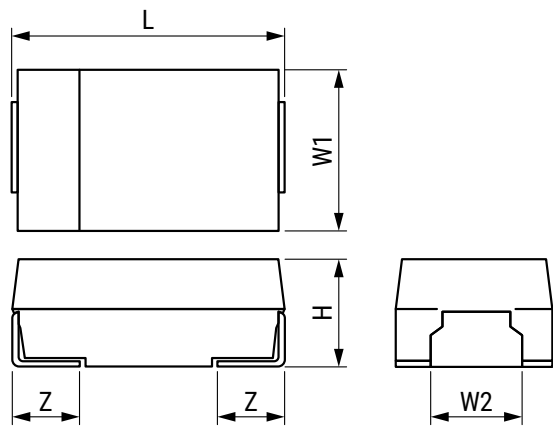
Qualification

Test	Condition	Characteristics		
Surge Voltage	Temperature: 105°C, Surge Voltage apply, 1,000 Ω series resistance, 1,000 cycles	Δ C/C	+20% ~ -20% of the initial value	
		tan δ	Within IL	
		LC	Within IL	
Temperature Stability	Temperature exposure at +25°C, -55°C, +105°C		+25°C	-55°C
		Δ C/C	-	0% ~ -20% compare with +25°C
		tan δ	Within IL	Within IL
		LC	Within IL	-
Endurance	Temperature: 105°C, Rated voltage apply, 2,000 hours*	Δ C/C	+20% ~ -20% of the initial value	
		tan δ	Within 1.5 $\times$ IL	
		LC	Within IL	
Humidity	Temperature: 60°C, Humidity: 90 ~ 95% R.H., 500 hours	Δ C/C	+30% ~ -20% of the initial value	
		tan δ	Within 1.5 $\times$ IL	
		LC	Within IL	

IL = Initial limit
* 85°C, Rated voltage apply, 1,000 hours for TEPSLB20E477M(14)8R.

Dimensions – Millimeters

Metric will govern



Case Size		Component Dimensions				
KEMET	EIA	L $\pm$ 0.2	W1 $\pm$ 0.2	W2 $\pm$ 0.1	H	Z $\pm$ 0.2
A	3216-18	3.2	1.6	1.2	1.6 $\pm$ 0.2	0.8
B3	3528-12	3.5	2.8	2.2	1.1 $\pm$ 0.1	0.8
B15	3528-15	3.5	2.8	2.2	1.4 $\pm$ 0.1	0.8
B2	3528-20	3.5	2.8	2.2	1.9 $\pm$ 0.1	0.8

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	Leakage Current	tan δ	ESR	Permissible Ripple Current	Rated and Maximum Operating Temperature
V	μF	KEMET/EIA		μA at +25°C Maximum	% at 25°C 120 Hz Maximum	mΩ at 25°C 100 kHz Maximum	(mA _{rms} , +25°C, 100 kHz) Maximum	°C
2.5	47	A/3216-18	TEPSLA0E476M8R	11.7	6	180	816	105
2.5	100	A/3216-18	TEPSLA0E107M8R	25	8	100	1095	105
2.5	100	A/3216-18	TEPSLA0E107M(45)8R	25	8	45	1633	105
2.5	100	A/3216-18	TEPSLA0E107M(35)8R	25	8	35	1852	105
2.5	100	B3/3528-12	TEPSLB30E107M8R	25	8	70	1512	105
2.5	220	A/3216-18	TEPSLA0E227M(70)8R	55	8	70	1309	105
2.5	220	A/3216-18	TEPSLA0E227M(45)8R	55	8	45 *	1633 *	105
2.5	220	A/3216-18	TEPSLA0E227M(35)8R	55	8	35 *	1852 *	105
2.5	220	A/3216-18	TEPSLA0E227M(25)8R	55	8	25 *	2191 *	105
2.5	220	B2/3528-20	TEPSLB20E227M8R	55	8	45	2108	105
2.5	220	B2/3528-20	TEPSLB20E227M(35)8R	55	8	35	2390	105
2.5	220	B2/3528-20	TEPSLB20E227M(25)8R	55	8	25	2828	105
2.5	220	B2/3528-20	TEPSLB20E227M(21)8R	55	8	21	3086	105
2.5	220	B2/3528-20	TEPSLB20E227M(15)8R	55	8	15 *	3651 *	105
2.5	220	B3/3528-12	TEPSLB30E227M8R	55	8	70	1512	105
2.5	220	B3/3528-12	TEPSLB30E227M(35)8R	55	8	35	2138	105
2.5	330	B2/3528-20	TEPSLB20E337M(45)8R	82.5	8	45	2108	105
2.5	330	B2/3528-20	TEPSLB20E337M(35)8R	82.5	8	35	2390	105
2.5	330	B2/3528-20	TEPSLB20E337M(21)8R	82.5	8	21	3086	105
2.5	330	B2/3528-20	TEPSLB20E337M(15)8R	82.5	8	15 *	3651 *	105
2.5	470	B2/3528-20	TEPSLB20E477M(14)8R	188	8	14 *	3780 *	85
4	47	A/3216-18	TEPSLA0G476M8R	18.8	6	180	816	105
4	47	A/3216-18	TEPSLA0G476M(70)8R	18.8	6	70	1309	105
4	68	A/3216-18	TEPSLA0G686M8R	27.2	6	180	816	105
4	100	A/3216-18	TEPSLA0G107M8R	40	8	100	1095	105
4	100	A/3216-18	TEPSLA0G107M(45)8R	40	8	45	1633	105
4	100	A/3216-18	TEPSLA0G107M(35)8R	40	8	35	1852	105
4	100	A/3216-18	TEPSLA0G107M(25)8R	40	8	25	2191	105
4	100	B2/3528-20	TEPSLB20G107M8R	40	8	70	1690	105
4	100	B2/3528-20	TEPSLB20G107M(45)8R	40	8	45	2108	105
4	100	B2/3528-20	TEPSLB20G107M(35)8R	40	8	35	2390	105
4	100	B3/3528-12	TEPSLB30G107M8R	40	8	70	1512	105
4	150	B2/3528-20	TEPSLB20G157M8R	60	8	45	2108	105
4	150	B2/3528-20	TEPSLB20G157M(35)8R	60	8	35	2390	105
4	150	B2/3528-20	TEPSLB20G157M(30)8R	60	8	30	2582	105
4	150	B2/3528-20	TEPSLB20G157M(25)8R	60	8	25	2828	105
4	220	B2/3528-20	TEPSLB20G227M8R	88	8	45	2108	105
4	220	B2/3528-20	TEPSLB20G227M(35)8R	88	8	35	2390	105
4	220	B2/3528-20	TEPSLB20G227M(15)8R	88	8	15	3651	105
6.3	6.8	A/3216-18	TEPSLA0J685M8R	4.2	6	300	632	105
6.3	10	A/3216-18	TEPSLA0J106M8R	6.3	6	200	775	105
6.3	15	A/3216-18	TEPSLA0J156M8R	9.4	6	200	775	105
6.3	22	A/3216-18	TEPSLA0J226M8R	13.8	6	180	816	105
6.3	22	B2/3528-20	TEPSLB20J226M8R	13.8	8	150	1155	105
6.3	22	B3/3528-12	TEPSLB30J226M8R	13.8	8	70	1512	105
6.3	33	A/3216-18	TEPSLA0J336M8R	20.7	6	180	816	105
6.3	33	B2/3528-20	TEPSLB20J336M8R	20.7	8	150	1155	105
6.3	33	B3/3528-12	TEPSLB30J336M8R	20.7	8	70	1512	105
V	μF	KEMET/EIA		μA at +25°C Maximum	% at 25°C 120 Hz Maximum	mΩ at 25°C 100 kHz Maximum	(mA _{rms} , +25°C, 100 kHz) Maximum	°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	Leakage Current	tan δ	ESR	Permissible Ripple Current	Rated and Maximum Operating Temperature

* ESR and Ripple measurement condition is 300 to 500kHz

∅ Ripple current condition is at 105°C, 100kHz

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	Leakage Current	tan δ	ESR	Permissible Ripple Current	Rated and Maximum Operating Temperature
V	μF	KEMET/EIA		μA at +25°C Maximum	% at 25°C 120 Hz Maximum	mΩ at 25°C 100 kHz Maximum	(mA _{rms} , +25°C, 100 kHz) Maximum	°C
6.3	47	A/3216-18	TEPSLA0J476M8R	29.6	6	150	894	105
6.3	47	A/3216-18	TEPSLA0J476M(70)8R	29.6	6	70	1309	105
6.3	47	B2/3528-20	TEPSLB20J476M8R	29.6	8	150	1155	105
6.3	47	B2/3528-20	TEPSLB20J476M(70)8R	29.6	8	70	1690	105
6.3	47	B3/3528-12	TEPSLB30J476M8R	29.6	8	70	1512	105
6.3	47	B3/3528-12	TEPSLB30J476M(55)8R	29.6	8	55	1706	105
6.3	68	A/3216-18	TEPSLA0J686M(70)8R	43	8	70	1309	105
6.3	68	B2/3528-20	TEPSLB20J686M8R	42.8	8	70	1690	105
6.3	68	B2/3528-20	TEPSLB20J686M(55)8R	42.8	8	55	1907	105
6.3	68	B3/3528-12	TEPSLB30J686M8R	42.8	8	70	1512	105
6.3	100	A/3216-18	TEPSLA0J107M8R	63	8	70	1309	105
6.3	100	A/3216-18	TEPSLA0J107M(45)8R	63	8	45	1633	105
6.3	100	A/3216-18	TEPSLA0J107M(35)8R	63	8	35	1852	105
6.3	100	A/3216-18	TEPSLA0J107M(25)8R	63	8	25	2191	105
6.3	100	B2/3528-20	TEPSLB20J107M8R	63	8	70	1690	105
6.3	100	B2/3528-20	TEPSLB20J107M(45)8R	63	8	45	2108	105
6.3	100	B2/3528-20	TEPSLB20J107M(35)8R	63	8	35	2390	105
6.3	100	B2/3528-20	TEPSLB20J107M(25)8R	63	8	25	2828	105
6.3	100	B3/3528-12	TEPSLB30J107M8R	63	8	70	1512	105
6.3	100	B3/3528-12	TEPSLB30J107M(45)8R	63	8	45	1886	105
6.3	150	B15/3528-15	TEPSLB150J157M(70)8R	94.5	10	70	1309	105
6.3	150	B15/3528-15	TEPSLB150J157M(35)8R	94.5	10	35	1852	105
6.3	150	B2/3528-20	TEPSLB20J157M(45)8R	94.5	8	45	2108	105
6.3	150	B2/3528-20	TEPSLB20J157M(35)8R	94.5	8	35	2390	105
6.3	150	B2/3528-20	TEPSLB20J157M(25)8R	94.5	8	25	2828	105
6.3	150	B3/3528-12	TEPSLB30J157M(35)8R	94.5	8	35	2138	105
6.3	220	B15/3528-15	TEPSLB150J227M(35)8R	138.6	10	35	1852	105
6.3	220	B2/3528-20	TEPSLB20J227M(45)8R	138.6	8	45	2108	105
6.3	220	B2/3528-20	TEPSLB20J227M(35)8R	138.6	8	35	2390	105
6.3	220	B2/3528-20	TEPSLB20J227M(25)8R	138.6	8	25	2828	105
6.3	220	B2/3528-20	TEPSLB20J227M(18)8R	138.6	8	18	3333	105
6.3	220	B2/3528-20	TEPSLB20J227M(15)8R	138.6	8	15	3651	105
6.3	330	B2/3528-20	TEPSLB20J337M(45)8R	415.8	10	45	2108	105
10	4.7	A/3216-18	TEPSLA1A475M8R	4.7	6	300	632	105
10	6.8	A/3216-18	TEPSLA1A685M8R	6.8	6	300	632	105
10	10	A/3216-18	TEPSLA1A106M8R	10	6	200	775	105
10	10	B2/3528-20	TEPSLB21A106M8R	10	8	200	1000	105
10	15	A/3216-18	TEPSLA1A156M8R	15	6	180	816	105
10	15	B2/3528-20	TEPSLB21A156M8R	15	8	150	1155	105
10	22	A/3216-18	TEPSLA1A226M8R	22	6	180	816	105
10	22	B2/3528-20	TEPSLB21A226M8R	22	8	150	1155	105
10	22	B3/3528-12	TEPSLB31A226M8R	22	8	70	1512	105
10	33	A/3216-18	TEPSLA1A336M8R	33	8	200	775	105
10	33	B2/3528-20	TEPSLB21A336M8R	33	8	150	1155	105
10	33	B3/3528-12	TEPSLB31A336M8R	33	8	70	1512	105
10	47	A/3216-18	TEPSLA1A476M(180)8R	47	8	180	816	105
10	47	A/3216-18	TEPSLA1A476M(45)8R	47	8	45	1633	105
10	47	B2/3528-20	TEPSLB21A476M8R	47	8	70	1690	105
10	47	B2/3528-20	TEPSLB21A476M(35)8R	47	8	35	2390	105
V	μF	KEMET/EIA		μA at +25°C Maximum	% at 25°C 120 Hz Maximum	mΩ at 25°C 100 kHz Maximum	(mA _{rms} , +25°C, 100 kHz) Maximum	°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	Leakage Current	tan δ	ESR	Permissible Ripple Current	Rated and Maximum Operating Temperature

* ESR and Ripple measurement condition is 300 to 500kHz

◇ Ripple current condition is at 105°C, 100kHz

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	Leakage Current	tan δ	ESR	Permissible Ripple Current	Rated and Maximum Operating Temperature
V	μ F	KEMET/EIA		μ A at +25°C Maximum	% at 25°C 120 Hz Maximum	m Ω at 25°C 100 kHz Maximum	(mA _{rms} , +25°C, 100 kHz) Maximum	°C
10	47	B3/3528-12	TEPSLB31A476M8R	47	8	70	1512	105
10	47	B3/3528-12	TEPSLB31A476M(45)8R	47	8	45	1886	105
10	100	B2/3528-20	TEPSLB21A107M(45)8R	100	10	45	2108	105
16	3.3	A/3216-18	TEPSLA1C335M8R	5.2	6	800	387 $\diamond$	105
16	4.7	B2/3528-20	TEPSLB21C475M8R	7.5	8	200	1000 $\diamond$	105
16	6.8	B2/3528-20	TEPSLB21C685M8R	10.8	8	200	1000 $\diamond$	105
16	10	A/3216-18	TEPSLA1C106M8R	16	8	200	775	105
16	10	B2/3528-20	TEPSLB21C106M8R	16	8	100	1414 $\diamond$	105
16	15	B2/3528-20	TEPSLB21C156M(90)8R	16	10	90	1491 $\diamond$	105
16	33	B2/3528-20	TEPSLB21C336M8R	52.8	8	70	1690 $\diamond$	105
16	33	B3/3528-12	TEPSLB31C336M8R	105.6	8	70	1512 $\diamond$	105
16	33	B3/3528-12	TEPSLB31C336M(55)8R	105.6	8	55	1706 $\diamond$	105
16	33	B3/3528-12	TEPSLB31C336M(45)8R	105.6	8	45	1886 $\diamond$	105
20	33	B2/3528-20	TEPSLB21D336M8R	132	10	90	1491 $\diamond$	105
25	6.8	B2/3528-20	TEPSLB21E685M8R	17	8	100	1414 $\diamond$	105
25	6.8	B3/3528-12	TEPSLB31E685M8R	34	8	100	1265 $\diamond$	105
25	10	B15/3528-15	TEPSLB151E106M8R	50	10	100	1095 $\diamond$	105
25	15	B2/3528-20	TEPSLB21E156M8R	75	10	100	1414 $\diamond$	105
25	22	B2/3528-20	TEPSLB21E226M8R	55	10	90	1491 $\diamond$	105
V	μ F	KEMET/EIA		μ A at +25°C Maximum	% at 25°C 120 Hz Maximum	m Ω at 25°C 100 kHz Maximum	(mA _{rms} , +25°C, 100 kHz) Maximum	°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	Leakage Current	tan δ	ESR	Permissible Ripple Current	Rated and Maximum Operating Temperature

* ESR and Ripple measurement condition is 300 to 500kHz

$\diamond$ Ripple current condition is at 105°C, 100kHz

Ripple Current/Ripple Voltage

When a ripple current or ripple voltage is applied to NeoCapacitor, self heat generation of capacitor element and power loss occur. Then temperature of the product rise and have a influence on reliability. Therefore ripple current exceed defined as permissible ripple current in this catalog shall not be supplied to the capacitors. At that time, ripple current shall be decreased so that temperature on marking plane of the product can be controlled lower than rated temperature

Power loss is determined by following **Formula 1**

$$P = I^2 \times ESR \dots\dots > \textbf{Formula 1}$$

P : Power loss (Watt)
 I : ripple current (A rms)
 ESR : Ω

Permissible ripple current of each case size P (at 100 kHz, at 25°C) is indicated in **Table 1**

Table 1.- Permissible power loss of each case size: P (Watt)
(At frequency = 100 kHz sine wave, temperature 25°C)

Case Code	Current	Revised
P2	0.025	0.05
A08	Not yet defined	0.085
A3	0.06	0.1
A2	0.06	0.1
A	0.075	0.12
B10	0.075	0.105
B3	0.075	0.16
B3	0.075	0.105
(FPS,FPH)		
B15	0.08	0.12
B2	0.085	0.2

Actual permissible ripple current I r (A rms) is calculated by **Formula 2**

$$I\ r = \sqrt{P/ESR} \times K \times F \dots\dots > \textbf{Formula 2}$$

$$K : \text{Temperature correction coefficient} \dots\dots \textbf{See table 2}$$
$$F : \text{Frequency correction coefficient} \dots\dots\dots \textbf{See table 3}$$

Ripple Current/Ripple Voltage cont.

Table 2.- Temperature correction coefficient

Temperature °C	Current	Revised
T < 45°C	1.0	1.0
< 45 T < 85°C	0.9	1.0
85 < T <105°C	0.4	0.7*
105 < T <125°C	N/A	0.7*

* 125C product (PSH, FPH, PSU, FPU)

Ripple voltage E is calculated from impedance Z and permissible ripple current Ir as shown in following Formula 3
 $E = Z \times I_r$**Formula 3**

As for ripple voltage E, following note shall be taken into consideration

- Peak value in summation of DC voltage and ripple voltage shall not exceed rated voltage as shown in **Figure 1**
- Sudden drop of imposed voltage, especially large drop of DC voltage shall be avoided so that reverse voltage cannot be applied to the capacitor

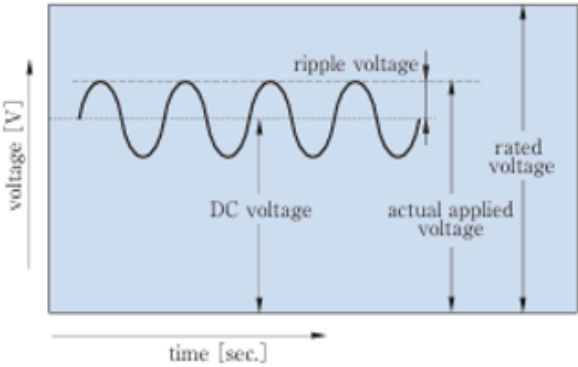
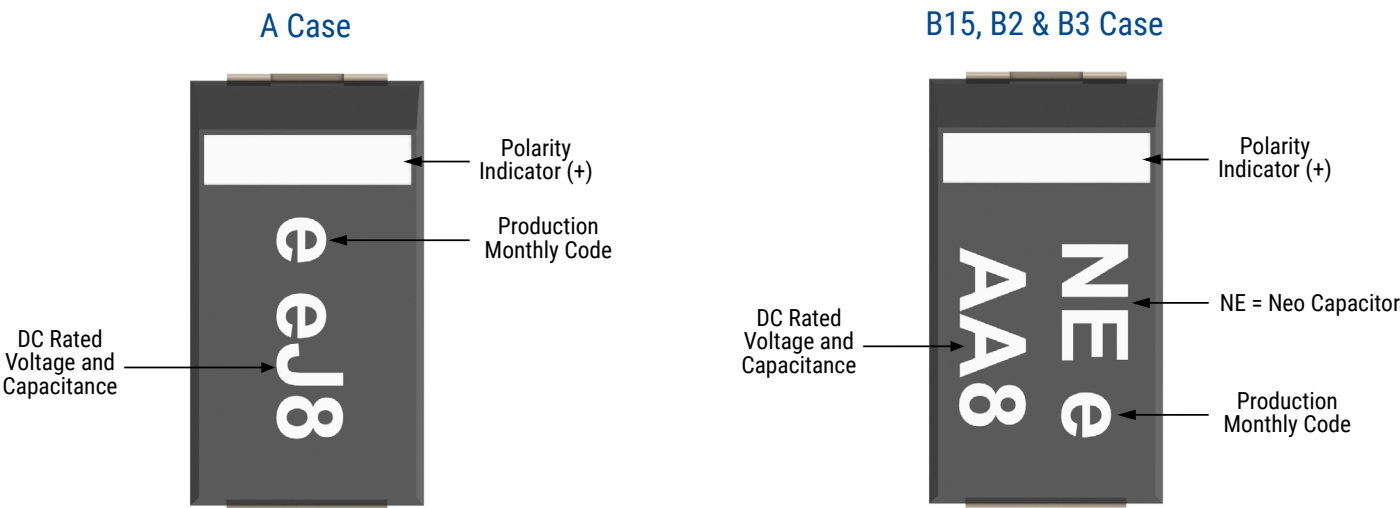


Figure 1.- explanation of rated voltage, actual applied voltage, DC voltage and ripple voltage

Capacitor Marking



DC Rated Voltage and Capacitance Code

Capacitance (μ F)		Voltage						
		2.5 e	4 g	6.3 j	10 A	16 C	20 D	25 E
3.3	N6					CN6		
4.7	S6				AS6	CS6		
6.8	W6			jW6	AW6	CW6		EW6
10	A7			jA7	AA7	CA7		EA7
15	E7			jE7	AE7	CE7		EE7
22	J7			jJ7	AJ7			EJ7
33	N7			jN7	AN7	CN7	DN7	
47	S7	eS7	gS7	jS7	AS7			
68	W7		gW7	jW7				
100	A8	eA8	gA8	jA8	AA8			
150	E8		gE8	jE8				
220	J8	eJ8	gJ8	jJ8				
330	N8	eN8		jN8				
470	S8	eS8						

Production Monthly Code

Year	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2022	N	P	Q	R	S	T	U	V	W	X	Y	Z
2023	a	b	c	d	e	f	g	h	j	k	l	m
2024	n	p	q	r	s	t	u	v	w	x	y	z
2025	A	B	C	D	E	F	G	H	J	K	L	M

Production monthly code will resume beginning in 2026.

KEMET Electronics Corporation Sales Offices

For a complete list of our global sales offices, please visit <https://www.yageogroup.com/SalesResources/SalesOffices>

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