

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.

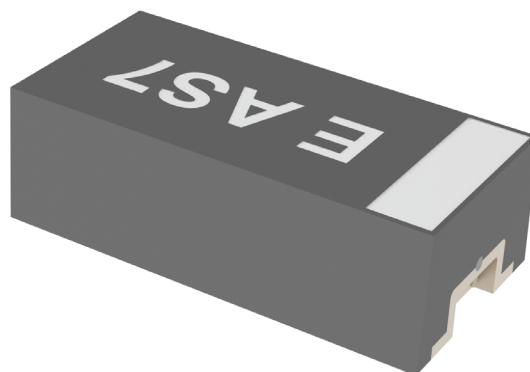
Standard: This quality grade is intended for applications in which failure or malfunction of the device is highly unlikely to cause harm to persons or damage to property, or be the source of any negative effects or problems in the wider community.

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	FPS	A3	0J	107	M	(100)	8R
Tape & Reel	Series	Case Code	DC Rated Voltage in Volts	Capacitance (pF)	Capacitance tolerance	ESR Spec	Packing Orientation
TE = φ 180 mm reel	Face down structure	A2(3216-12) A3 (3216-10) A08(3216-08) B2(3528-20) B10 (3528-10) B3 (3528-12)	0E = 2.5 V 0G = 4 V 0J = 6.3 V 1A = 10 V 1C = 16 V 1D = 20 V 1E = 25 V 1V = 35 V	First two digits represents the cap code. Third digit specifies number of zeros to follow	M = ±20%	(100) shows 100 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 – 35								
Surge Voltage (V)	Rated Voltage	2.5V	4 V	6.3 V	10 V	16V	20V	25 V	35 V
	Surge Voltage	3.3V	5.2V	8.0V	13V	20.7V	23V	29V	41V
Nominal Capacitance (120 Hz)	6.8 μF ~ 330μF *								
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

Qualification

A2/A3/A08/B2/B3 case

Test	Condition	Characteristics			
Surge Voltage	Temperature: 85°C /105°C ^{*1} , Surge Voltage apply, 1,000 Ω series resistance, 1,000 cycles	Δ C/C	Within -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	+105°C
		Δ C/C	-	0% ~ -20% compare with +25°C	+50% ~ 0% compare with +25°C
		tan δ	Within IL	Within IL	Within 1.5 × IL
		LC	Within IL	-	Within 10 × IL
Endurance	Temperature: 105°C, Rated voltage apply, Time: 1,000 hours 2,000 hours ^{*1}	Δ C/C	Within -20%/+20% of the initial value		
		tan δ	Within 1.5 × IL		
		LC	Within IL ^{*3}		
Humidity	Temperature: 60°C, Humidity: 90 ~ 95% R.H., 500 hours	Δ C/C ^{*3}	+30% ~ -20% of the initial value		
		tan δ	Within 1.5 × IL		
		LC ^{*4}	Within IL ^{*2 *4}		

IL = Initial limit

^{*1} For TEFPSB31E156M8R, TEFPSB31E226M8R, TEFPSB21E336M8R

^{*2} For TEFPSB31E226M8R, TEFPSB21E336M8R LC post testing is within 3 X IL

^{*3} For TEFPSB30E337M(20)8R,TEFPSB30E337M(25)8R,TEFPSB30E337M(30)8R LC post testing is within 1.25 xIL

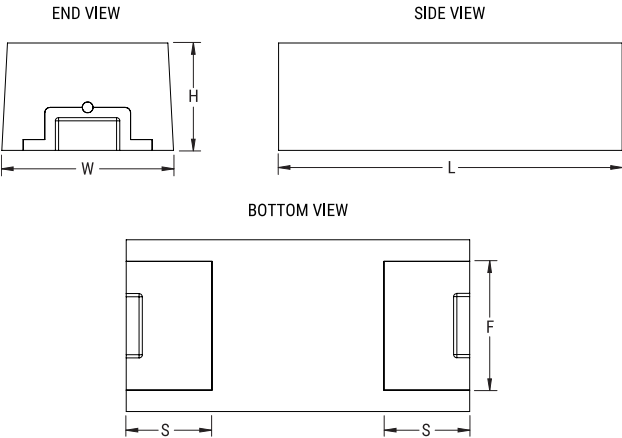
^{*4} For TEFPSB30E337M(20)8R,TEFPSB30E337M(25)8R,TEFPSB30E337M(30)8R LC port testing is within 5.0 x IL

B10 case

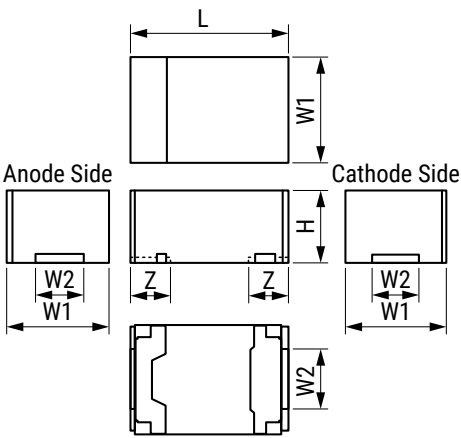
Test	Condition	Characteristics			
Surge Voltage	Temperature: 105°C, Surge Voltage apply, 1,000 Ω series resistance, 1,000 cycles	Δ C/C	Within -20%/+20% of the initial value		
		tan δ	Within IL		
		LC	Within IL		
Temperature Stability	Temperature exposure at +25°C, -55°C, +105°C		+25°C	-55°C	+105°C
		Δ C/C	-	0% ~ -20% compare with +25°C	+50% ~ 0% compare with +25°C
		tan δ	Within IL	Within IL	Within 1.5 × IL
		LC	Within IL	-	Within 10 × IL
Endurance	Temperature: 105°C, Rated voltage apply, Time: 1,000 hours 2,000 hours ^{*1}	Δ C/C	Within -20%/+20% of the initial value		
		tan δ	Within 1.5 × IL		
		LC ^{*2}	Within 1.25 × IL		
Humidity	Temperature: 60°C, Humidity: 90 ~ 95% R.H., 500 hours	Δ C/C ^{*3}	+30% ~ -20% of the initial value		
		tan δ	Within 1.5 × IL		
		LC ^{*4}	Within 5 × IL		

Dimensions – Millimeters (Inches)
Metric will govern

A2, A3 & A08 Case



B2,B3 & B10 Case



Case Size		Component Dimensions				
KEMET	EIA	L ±0.2	W1 ±0.2	W2 ±0.1	H ±0.1	Z ±0.2
A2	3216-12	3.2	1.6	1.2	1.1	0.8
A3	3216-10	3.2	1.6	1.2	0.9	0.8
A08	3216-08	3.2	1.6	1.2	0.8 max	0.8
B2	3528-20	3.5	2.8	1.2	1.9	0.7
B10	3528-10	3.5	2.8	2.2	1.0 max	0.7
B3	3528-12	3.5	2.8	2.2	1.1	0.7

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	MSL
V	μF	KEMET/EIA		μA at +25°C Maximum	% at 25°C 120 Hz Maximum	mΩ at 25°C 100 kHz Maximum	mA at +25°C 100 kHz Maximum	°C	
2.5	330	B3/3528-12	TEFPSB30E337M(20)8R	82.5	10	20	3162	105	3
2.5	330	B3/3528-12	TEFPSB30E337M(25)8R	82.5	10	25	2828	105	3
2.5	330	B3/3528-12	TEFPSB30E337M(30)8R	82.5	10	30	2582	105	3
4	100	A3/3216-10	TEFPSA30G107M8R	40	8	200	707	105	3
4	220	B10/3528-10	TEFPSB100G227M(25)	88	10	25	2049	105	3
4	220	B10/3528-10	TEFPSB100G227M(30)	88	10	30	1871	105	3
6.3	47	A08/3216-08	TEFPSA080J476M8R	29.6	10	150	632	105	4
6.3	47	A3/3216-10	TEFPSA30J476M8R	29.6	6	200	707	105	3
6.3	47	A3/3216-10	TEFPSA30J476M(70)8R	29.6	6	70	1195	105	3
6.3	100	A3/3216-10	TEFPSA30J107M8R	63	8	200	707	105	3
6.3	100	A3/3216-10	TEFPSA30J107M(100)8R	63	8	100	1000	105	3
6.3	100	A3/3216-10	TEFPSA30J107M(70)8R	63	8	70	1195	105	3
6.3	100	A3/3216-10	TEFPSA30J107M(55)8R	63	8	55	1348	105	3
10	22	A3/3216-10	TEFPSA31A226M8R	22	8	200	707	105	3
10	33	A3/3216-10	TEFPSA31A336M8R	33	6	200	707	105	3
10	33	A3/3216-10	TEFPSA31A336M(150)8R	33	6	150	816	105	3
10	47	A3/3216-10	TEFPSA31A476M8R	47	6	200	707	105	3
10	47	A3/3216-10	TEFPSA31A476M(150)8R	47	6	150	816	105	3
16	22	A08/3216-08	TEFPSA081C226M(200)8R	70.4	10	200	548	105	4
16	33	A2/3216-12	TEFPSA21C336M8R	54	10	200	707	105	3
20	15	B10/3528-10	TEFPSB101D156M8R	30	10	150	837	105	3
25	10	A2/3216-12	TEFPSA21E106M(150)8R	25	10	150	816	105	3
25	15	B10/3528-10	TEFPSB101E156M8R	75	10	150	837	105	3
25	15	B3/3528-12	TEFPSB31E156M8R	112.5	10	100	1025	105	3
25	22	B3/3528-12	TEFPSB31E226M8R	165	10	100	1025	105	3
25	33	B2/3528-20	TEFPSB21E336M8R	83	10	100	922	105	3
35	6.8	B3/3528-12	TEFPSB31V685M8R	47.6	10	100	1025	105	3
V	μF	KEMET/EIA		μA at +25°C Maximum	% at 25°C 120 Hz Maximum	mΩ at 25°C 100 kHz Maximum	mA at +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	MSL

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**

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

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**

$$I_r = \sqrt{P/ESR} \times K \times F \text{> Formula 2}$$

K : Temperature correction coefficient..... **See table 2**
 F : Frequency correction coefficient.....**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

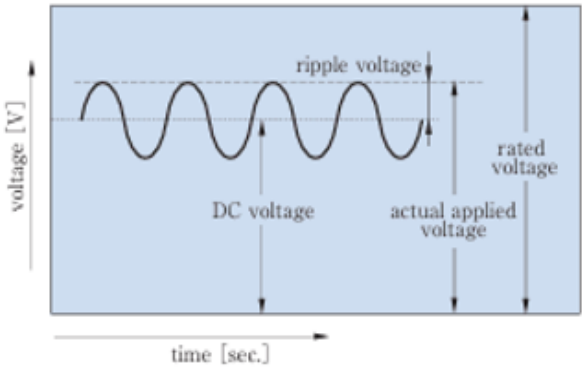
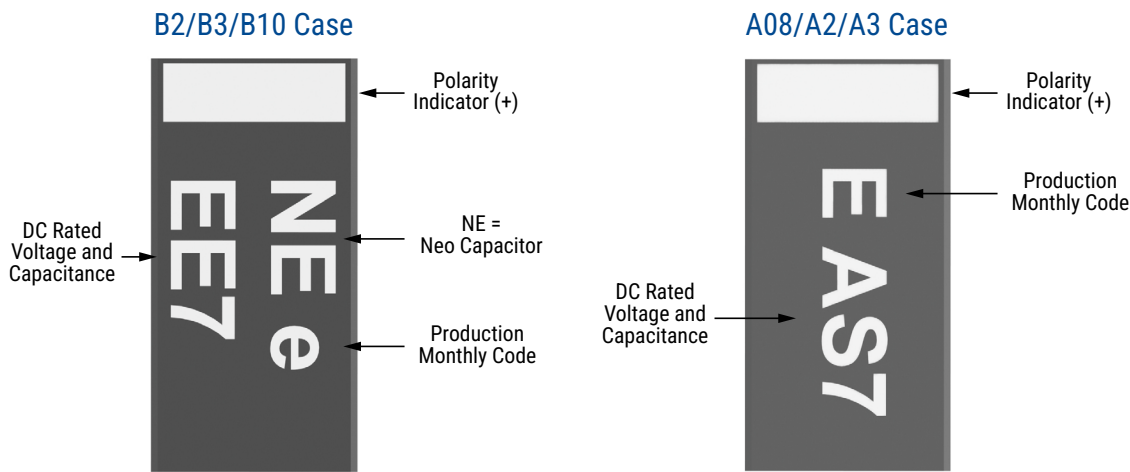


Figure 1.- explanation of rated voltage, actual applied voltage, DC voltage and ripple voltage

Capacitor Marking



DC Rated Voltage and Capacitance Code

Capacitance (μF)		Voltage						
		4 g	6 j	10 A	16 C	20 D	25 E	35 V
6.8	W6							VW6
15	E7					DE7	EE7	
22	J7			AJ7	CJ7		EJ7	
33	N7			AN7	CN7			
47	S7		jS7	AS7				
100	A8	gA8	jA8					
220	J8	gJ8						

Production Monthly Code

Year	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2025	A	B	C	D	E	F	G	H	J	K	L	M
2026	N	P	Q	R	S	T	U	V	W	X	Y	Z
2027	a	b	c	d	e	f	g	h	j	k	l	m
2028	n	p	q	r	s	t	u	v	w	x	y	z

Production monthly code will resume beginning in 2029.

KEMET Electronics Corporation Sales Offices

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Although all product-related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicated or that other measures may not be required.

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