

# Reference Specification

DEB Series Lead Type Disc Ceramic Capacitors of Class 2 for General Purpose

Product specifications in this catalog are as of Dec. 2017, and are subject to change or obsolescence without notice.

Please consult the approval sheet before ordering. Please read rating and Cautions first.

# **⚠** CAUTION

#### 1. OPERATING VOLTAGE

When DC-rated capacitors are to be used in AC or ripple current circuits, be sure to maintain the Vp-p value of the applied voltage or the Vo-p which contains DC bias within the rated voltage range. When the voltage is started to apply to the circuit or it is stopped applying, the irregular voltage may be generated for a transit period because of resonance or switching. Be sure to use a capacitor within rated voltage containing these irregular voltage.

When DC-rated capacitors are to be used in input circuits from commercial power source (AC filter), be sure to use Safety Recognized Capacitors because various regulations on withstand voltage or impulse withstand established for each equipment should be taken into considerations.

Voltage	DC Voltage	DC+AC Voltage	AC Voltage	Pulse Voltage(1)	Pulse Voltage(2)
Positional Measurement	Vo-p	Vo-p	Vp-p	Vp-p	Vp-p

#### 2. OPERATING TEMPERATURE AND SELF-GENERATED HEAT

Keep the surface temperature of a capacitor below the upper limit of its rated operating temperature range. Be sure to take into account the heat generated by the capacitor itself.

When the capacitor is used in a high-frequency current, pulse current or the like, it may have the self-generated heat due to dielectric-loss. The allowable frequency should be in less than 300kHz in sine wave. Applied voltage should be the load such as self-generated heat is within 20 °C on the condition of atmosphere temperature 25 °C. When measuring, use a thermocouple of small thermal capacity-K of  $\phi$ 0.1mm and be in the condition where capacitor is not affected by radiant heat of other components and wind of surroundings. While, in case of non-sine wave which include a harmonic frequency, please contact our sales representatives or product engineers.

#### 3. FAIL-SAFE

When capacitor would be broken, failure may result in a short circuit. Be sure to provide an appropriate fail-safe function like a fuse on your product if failure would follow an electric shock, fire or fume.

#### 4. VIBRATION AND IMPACT

Do not expose a capacitor or its leads to excessive shock or vibration during use.

#### 5. SOLDERING

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specification of the capacitor. Subjecting this product to excessive heating could melt the internal junction solder and may result in thermal shocks that can crack the ceramic element.

When soldering capacitor with a soldering iron, it should be performed in following conditions.

Temperature of iron tip: 400 °C max. Soldering iron wattage: 50W max. Soldering time: 3.5 s max.

#### 6. BONDING, RESIN MOLDING AND COATING

In case of bonding, molding or coating this product, verify that these processes do not affect the quality of capacitor by testing the performance of the bonded, molded or coated product in the intended equipment.

In case of the amount of applications, dryness / hardening conditions of adhesives and molding resins containing organic solvents (ethyl acetate, methyl ethyl ketone, toluene, etc.) are unsuitable, the outer coating resin of a capacitor is damaged by the organic solvents and it may result, worst case, in a short circuit.

The variation in thickness of adhesive, molding resin or coating may cause a outer coating resin cracking and/or ceramic element cracking of a capacitor in a temperature cycling.

#### 7. TREATMENT AFTER BONDING, RESIN MOLDING AND COATING

When the outer coating is hot (over 100 °C) after soldering, it becomes soft and fragile. So please be careful not to give it mechanical stress.

Failure to follow the above cautions may result, worst case, in a short circuit and cause fuming or partial dispersion when the product is used.

#### 8. OPERATING AND STORAGE ENVIRONMENT

The insulating coating of capacitors does not form a perfect seal; therefore, do not use or store capacitors

in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. And avoid exposure to moisture. Before cleaning, bonding, or molding this product, verify that these processes do not affect product quality by testing the performance of a cleaned, bonded or molded product in the intended equipment. Store the capacitors where the temperature and relative humidity do not exceed -10 to 40 °C and 15 to 85%. Use capacitors within 6 months after delivered.

Check the solderability after 6 months or more.

#### 9. LIMITATION OF APPLICATIONS

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property.

- 1. Aircraft equipment
- 2. Aerospace equipment
- 3. Undersea equipment
- 4. Power plant control equipment
- 5. Medical equipment
- 6. Transportation equipment (vehicles, trains, ships, etc.)
- 7. Traffic signal equipment
- 8. Disaster prevention / crime prevention equipment
- 9. Data-processing equipment exerting influence on public
- 10. Application of similar complexity and/or reliability requirements to the applications listed in the above.

EGD06F

#### **NOTICE**

#### 1. CLEANING (ULTRASONIC CLEANING)

To perform ultrasonic cleaning, observe the following conditions.

Rinse bath capacity: Output of 20 watts per liter or less.

Rinsing time: 5 min maximum.

Do not vibrate the PCB/PWB directly.

Excessive ultrasonic cleaning may lead to fatigue destruction of the lead wires.

#### 2. CAPACITANCE CHANGE OF CAPACITORS

- Class 1 capacitors

Capacitance might change a little depending on a surrounding temperature or an applied voltage. Please contact us if you use for the strict time constant circuit.

- Class 2 and 3 capacitors

Class 2 and 3 capacitors like temperature characteristic B, E and F have an aging characteristic, whereby the capacitor continually decreases its capacitance slightly if the capacitor leaves for a long time. Moreover, capacitance might change greatly depending on a surrounding temperature or an applied voltage. So, it is not likely to be able to use for the time constant circuit.

Please contact us if you need a detail information.

# **⚠** NOTE

- 1.Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.
- 2. You are requested not to use our product deviating from this specification.

EGD06F

# 1. Application

This specification is applied to Lead Type Disc Ceramic Capacitors of D1kV ratings and Class 2 of DEB series used for General Electric equipment.

Do not use these products in any automotive power train or safety equipment including battery chargers for electric vehicles and plug-in hybrids.

#### 2. Rating

2-1. Operating temperature range

-25 ~ +85°C

2-2. Part number configuration

ex.) DEB B3 3A 332 K A2 B
Series Temperature Rated Capacitance Capacitance Lead Packing Individual tolerance code style code specification

•Temperature characteristic

Code	Temperature characteristic
B3	В
E3	E
F3	F

Please confirm detailed specification on [ Specification and test methods ].

Rated voltage

Code	Rated voltage
3A	DC1kV

#### Capacitance

The first two digits denote significant figures; the last digit denotes the multiplier of 10 in pF. ex.) In case of 332.

$$33 \times 10^2 = 3300 pF$$

#### • Capacitance tolerance

Please refer to [ Part number list ].

#### • Lead code

Code	Lead style
A*	Vertical crimp long type
C*	Straight long type
B*	Vertical crimp short type
D*	Straight short type
N*	Vertical crimp taping type
P*	Straight taping type

<sup>\*</sup> Please refer to [ Part number list ].

Solder coated copper wire is applied for termination.

• Packing style code

Code	Packing type				
В	Bulk type				
Α	Ammo pack taping type				

#### • Individual specification

In case part number cannot be identified without 'individual specification', it is added at the end of part number.

#### 3. Marking

Temperature characteristic : Letter code

Identified by code for char. B or char. E.

(Omitted for maximum body diameter  $\phi$  9mm and under )

Nominal capacitance : 3 digit system

Capacitance tolerance : Code(Omitted for maximum body diameter φ 6mm and under)

Rated voltage : Letter code Company name code : Abbreviation (

(Omitted for maximum body diameter  $\phi$  9mm and under)

Manufacturing year : Letter code(The last digit of A.D. year.)

(Omitted for maximum body diameter  $\phi$  5mm and under)

Manufacturing month : Code(Omitted for maximum body diameter φ 5mm and under)

 Feb./Mar. → 2
 Aug./Sep. → 8

 Apr./May → 4
 Oct./Nov. → O

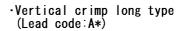
 Jun./Jul. → 6
 Dec./Jan. → D

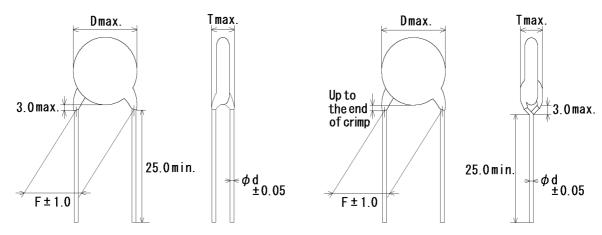
(Example)

B 332K 1KV (M 0D

#### 4. Part number list

·Straight long type
(Lead code:C\*)



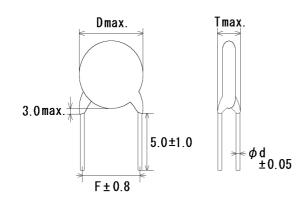


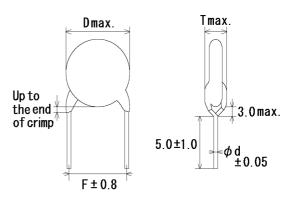
Note) The mark '\*' of lead code differ from lead spacing(F) and lead diameter(d).
Please see the following list about details.

				ı						<u> </u>	
TC	T.C. Cap.	Cap. tol.	Customer Part Number	Murata Part Number	DC Rated Volt.	Dir	nensi	Lead	Pack		
1.0.	(pF)	Сар. Ю.	Customer Part Number	iviuiata Fait Nullibei	(V)	D	Т	F	d	Code	qty. (pcs)
В	100	±10%		DEBB33A101KC1B	1000	4.5	4.0	5.0	0.5	C1	500
В	150	±10%		DEBB33A151KC1B	1000	4.5	4.0	5.0	0.5	C1	500
В	220	±10%		DEBB33A221KC1B	1000	4.5	4.0	5.0	0.5	C1	500
В	330	±10%		DEBB33A331KC1B	1000	4.5	4.0	5.0	0.5	C1	500
В	470	±10%		DEBB33A471KC1B	1000	5.0	4.0	5.0	0.5	C1	500
В	680	±10%		DEBB33A681KA2B	1000	6.0	4.0	5.0	0.6	A2	500
В	1000	±10%		DEBB33A102KA2B	1000	6.0	4.0	5.0	0.6	A2	500
В	1500	±10%		DEBB33A152KA2B	1000	8.0	4.0	5.0	0.6	A2	250
В	2200	±10%		DEBB33A222KA2B	1000	9.0	4.0	5.0	0.6	A2	250
В	3300	±10%		DEBB33A332KA2B	1000	10.0	4.0	5.0	0.6	A2	250
В	4700	±10%		DEBB33A472KA3B	1000	12.0	4.0	7.5	0.6	А3	200
В	6800	±10%		DEBB33A682KA3B	1000	15.0	4.0	7.5	0.6	А3	100
Е	1000	+80/-20%		DEBE33A102ZC1B	1000	5.0	4.0	5.0	0.5	C1	500
Е	2200	+80/-20%		DEBE33A222ZA2B	1000	7.0	4.0	5.0	0.6	A2	500
Е	4700	+80/-20%		DEBE33A472ZA2B	1000	9.0	4.0	5.0	0.6	A2	250
Е	10000	+80/-20%		DEBE33A103ZA3B	1000	13.0	4.0	7.5	0.6	А3	200
F	2200	+80/-20%		DEBF33A222ZA2B	1000	6.0	4.0	5.0	0.6	A2	500
F	4700	+80/-20%		DEBF33A472ZA2B	1000	7.0	4.0	5.0	0.6	A2	500
F	10000	+80/-20%		DEBF33A103ZA2B	1000	10.0	4.0	5.0	0.6	A2	250

·Straight short type (Lead code:D\*)

Vertical crimp short type (Lead code:B\*)

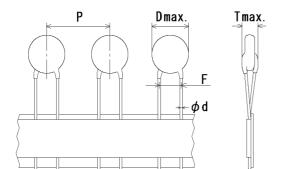




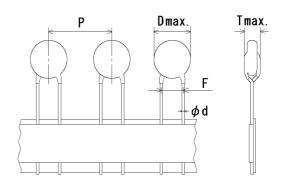
Note) The mark '\*' of lead code differ from lead spacing(F) and lead diameter(d).
Please see the following list about details.

<b>—</b>				1	1						
T.C.	Сар.	Cap. tol.	Customer Part Number	Murata Part Number	DC Rated Volt.	Dir	nensi	Lead	Pack		
1.0.	(pF)	Сар. 101.	Customer Falt Number	iviuiata Fait Nullibei	(V)	D	Т	F	d	Code	qty. (pcs)
В	100	±10%		DEBB33A101KD1B	1000	4.5	4.0	5.0	0.5	D1	500
В	150	±10%		DEBB33A151KD1B	1000	4.5	4.0	5.0	0.5	D1	500
В	220	±10%		DEBB33A221KD1B	1000	4.5	4.0	5.0	0.5	D1	500
В	330	±10%		DEBB33A331KD1B	1000	4.5	4.0	5.0	0.5	D1	500
В	470	±10%		DEBB33A471KD1B	1000	5.0	4.0	5.0	0.5	D1	500
В	680	±10%		DEBB33A681KB2B	1000	6.0	4.0	5.0	0.6	B2	500
В	1000	±10%		DEBB33A102KB2B	1000	6.0	4.0	5.0	0.6	B2	500
В	1500	±10%		DEBB33A152KB2B	1000	8.0	4.0	5.0	0.6	B2	500
В	2200	±10%		DEBB33A222KB2B	1000	9.0	4.0	5.0	0.6	B2	500
В	3300	±10%		DEBB33A332KB2B	1000	10.0	4.0	5.0	0.6	B2	500
В	4700	±10%		DEBB33A472KB3B	1000	12.0	4.0	7.5	0.6	В3	250
В	6800	±10%		DEBB33A682KB3B	1000	15.0	4.0	7.5	0.6	В3	200
Е	1000	+80/-20%		DEBE33A102ZD1B	1000	5.0	4.0	5.0	0.5	D1	500
Е	2200	+80/-20%		DEBE33A222ZB2B	1000	7.0	4.0	5.0	0.6	B2	500
Е	4700	+80/-20%		DEBE33A472ZB2B	1000	9.0	4.0	5.0	0.6	B2	500
Е	10000	+80/-20%		DEBE33A103ZB3B	1000	13.0	4.0	7.5	0.6	В3	250
F	2200	+80/-20%		DEBF33A222ZB2B	1000	6.0	4.0	5.0	0.6	B2	500
F	4700	+80/-20%		DEBF33A472ZB2B	1000	7.0	4.0	5.0	0.6	B2	500
F	10000	+80/-20%		DEBF33A103ZB2B	1000	10.0	4.0	5.0	0.6	B2	500

# ·Straight taping type (Lead code:P\*)



# Vartical crimp taping type (Lead code:N\*)



Note) The mark '\*' of lead code differ from lead spacing(F), lead diameter(d) and pitch of component(P). Please see the following list or taping specification about details.

T.C.	Сар.	Сар.	Customer Part Number	Murata Part Number	DC Rated volt.	Dimension (mm)					Lead	Pack qty.
1.0.	(pF)	tol.	Subtomort are Hambor	marata i art i anno	(V)	D T		F	d	Р	code	(pcs)
В	100	±10%		DEBB33A101KP2A	1000	4.5	4.0	5.0	0.6	12.7	P2	1500
В	150	±10%		DEBB33A151KP2A	1000	4.5	4.0	5.0	0.6	12.7	P2	1500
В	220	±10%		DEBB33A221KP2A	1000	4.5	4.0	5.0	0.6	12.7	P2	1500
В	330	±10%		DEBB33A331KP2A	1000	4.5	4.0	5.0	0.6	12.7	P2	1500
В	470	±10%		DEBB33A471KP2A	1000	5.0	4.0	5.0	0.6	12.7	P2	1500
В	680	±10%		DEBB33A681KN2A	1000	6.0	4.0	5.0	0.6	12.7	N2	1500
В	1000	±10%		DEBB33A102KN2A	1000	6.0	4.0	5.0	0.6	12.7	N2	1500
В	1500	±10%		DEBB33A152KN2A	1000	8.0	4.0	5.0	0.6	12.7	N2	1500
В	2200	±10%		DEBB33A222KN2A	1000	9.0	4.0	5.0	0.6	12.7	N2	1500
В	3300	±10%		DEBB33A332KN2A	1000	10.0	4.0	5.0	0.6	12.7	N2	1500
В	4700	±10%		DEBB33A472KN3A	1000	12.0	4.0	7.5	0.6	15.0	N3	1000
В	6800	±10%		DEBB33A682KN7A	1000	15.0	4.0	7.5	0.6	30.0	N7	500
Е	1000	+80/-20%		DEBE33A102ZP2A	1000	5.0	4.0	5.0	0.6	12.7	P2	1500
Е	2200	+80/-20%		DEBE33A222ZN2A	1000	7.0	4.0	5.0	0.6	12.7	N2	1500
Е	4700	+80/-20%		DEBE33A472ZN2A	1000	9.0	4.0	5.0	0.6	12.7	N2	1500
Е	10000	+80/-20%		DEBE33A103ZN3A	1000	13.0	4.0	7.5	0.6	15.0	N3	1000
F	2200	+80/-20%		DEBF33A222ZN2A	1000	6.0	4.0	5.0	0.6	12.7	N2	1500
F	4700	+80/-20%		DEBF33A472ZN2A	1000	7.0	4.0	5.0	0.6	12.7	N2	1500
F	10000	+80/-20%	-	DEBF33A103ZN2A	1000	10.0	4.0	5.0	0.6	12.7	N2	1500

5. Sp	ecification and test	methods							
No.	Ite			cification			Test m		
1	Appearance and o	limensions	No marked def form and dimer	ect on appearance	The capacitor should be inspected by naked eyes for visible evidence of defect.  Dimensions should be measured with slide calipers.				
2	Marking		To be easily leg	gible.	The capacitor should be inspected by naked eyes.				
3	Dielectric strength	Between lead wires	No failure.		The capacitor should not be damaged when DC voltage of 200% of the rated voltage are applied between the lead wires for 1 to 5 s. (Charge/Discharge current≤50mA.)				
		Body insulation	No failure.		The capacitor is placed in the container with metal balls of diameter 1mm so that each lead wire, shortcircuited, is kept about 2mm off the balls as shown in the figure, and DC voltage of 1.3kV is applied for 1 to 5 s between capacitor lead wires and small metals.  (Charge/Discharge current≤50mA.)				
4	Insulation Resistance (I.R.)	Between lead wires	10 000MΩ min.		DC500	±50V with	in 60±5 s	of chargin	
5	Capacitance		Within specified		The capacitance should be measure 1±0.2kHz and AC5V(r.m.s.) max		max		
6	Dissipation Factor	(D.F.)	Char. B,E: 2.5 Char. F: 5.0	% max. % max.	The dissipation factor should be measure with 1±0.2kHz and AC5V(r.m.s.) max				
7	Temperature chara	acteristic	Char. B : Within Char. E : Within Char. F : Within Pre-treatment :	n +20/-55%	each st e stored	tep specifi at 85±2°C	ed in Table for 1 h, th	e. en placed	at *room  5 20±2
8	Strength of lead			As sho body of weight radial of 10N (5) and ke	wn in the fifthe capal gradually direction of 5N for lead ep it for 10	figure at riction and a to each lead the capace I diameter 0±1 s.	ght, fix the apply a tental ad wire in citor up to 0.5mm),	e usile ////// the	
	Vilencia		No. and a late		point of original direction	f egress, in I position, on at the ra	n one direct and bent state of one	ction, then 90° in the bend in 2	to 3 s.
9	Vibration resistance	Appearance Capacitance D.F.	No marked defect.  Within specified tolerance.  Char. B,E: 2.5% max.  Char. F: 5.0% max.		The capacitor should be firmly soldered to the supporting lead wire and vibrated at a frequency range of 10 to 55Hz, 1.5mm in total amplitude, with about a 1min rate of vibration change from 10Hz to 55Hz and back to 10Hz. Apply for a total of 6 h; 2 h each in 3 mutually perpendicular directions.				
10	10 Solderability of leads  * "room condition" Temperature: 15 to 3		with uniformly of direction over 3 circumferential	direction.	The lead wire of a capacitor should be dipped into a ethanol solution of 25wt% rosin and then into molten solder for 2±0.5 s. In both cases the depth of dipping is up to about 1.5 to 2mm from the root of lead wires.  Temp. of solder:  245±5°C Lead Free Solder (Sn-3Ag-0.5Cu) 235±5°C H63 Eutectic Solder				

<sup>\* &</sup>quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

	Ī		Reference only	
No.	Item	_	Specification	Test method
11	Soldering effect	Appearance	No marked defect.	The lead wire should be immersed into the melted
	(Non-preheat)	Capacitance	Char. B: Within ± 5%	solder of 350±10°C ( Body of φ5 and under:
l l		change	Char. E: Within ± 15%	270±5°C) up to about 1.5 to 2.0mm from the
			Char. F: Within ± 20%	main body for 3.5±0.5 s. ( Body of φ5 and under:
		Dielectric	Per item 3.	5±0.5 s. )
l l		strength		Pre-treatment : Capacitor should be stored at
		(Between		85±2°C for 1 h, then placed at
l l		lead wires)		* room condition for 24±2 h
				before initial measurements.
l l				Post-treatment: Capacitor should be stored for
				4 to 24 h at * room condition.
12	Soldering effect	Appearance	No marked defect.	First the capacitor should be stored at
	(On-preheat)	Capacitance	Char. B: Within ± 5%	120+0/-5°C for 60+0/-5 s.
		change	Char. E: Within ± 15%	Then, as in figure, the lead wires should be
			Char. F: Within ± 20%	immersed solder of 260+0/-5°C up to 1.5 to
		Dielectric	Per item 3.	2.0mm from the root of terminal for 7.5+0/-1 s.
		strength		
		(Between		Thermal Capacitor
		lead wires)		1.5
l				to 2.0mm
1				
				solder
				Pre-treatment: Capacitor should be stored at
ļ.				85±2°C for 1 h, then placed at
				* room condition for 24±2 h
				before initial measurements.
				Post-treatment : Capacitor should be stored for
				4 to 24 h at * room condition.
13	Humidity	Appearance	No marked defect.	Set the capacitor for 500 +24/-0 h at 40±2°C in
	(Under steady	Capacitance	Char. B: Within ±10%	90 to 95% relative humidity.
ļ.	state)	change	Char. E: Within ±20%	Pre-treatment : Capacitor should be stored at
ļ.	,		Char. F: Within ±30%	85±2°C for 1 h, then placed at
		D.F.	Char. B,E : 5.0% max.	* room condition for 24±2 h
		J	Char. F : 7.5% max.	before initial measurements.
		I.R.	1000MΩ min.	Post-treatment : Capacitor should be stored for 1
				to 2 h at * room condition.
14	Humidity loading	Appearance	No marked defect.	Apply the rated voltage for 500 +24/-0 h at
		Capacitance	Char. B: Within ±10%	40±2°C in 90 to 95% relative humidity.
		change	Char. E: Within ±20%	(Charge/Discharge current≤50mA.)
			Char. F: Within ±30%	Pre-treatment : Capacitor should be stored at
,		D.F.	Char. B,E: 5.0% max.	85±2°C for 1 h, then placed at
ļ			Char. F : 7.5% max.	* room condition for 24±2 h
		I.R.	500M $Ω$ min.	before initial measurements.
,				Post-treatment: Capacitor should be stored at
,				85±2°C for 1 h, then placed at
	<u></u>	<u> </u>		* room condition for 24±2 h.
15	Life	Appearance	No marked defect.	Apply a DC voltage of 150% of the rated voltage
,		Capacitance	Char. B: Within ±10%	for 1 000 +48/-0 h at 85±2°C, and relative
		change	Char. E: Within ±20%	humidity of 50% max
,			Char. F: Within ±30%	(Charge/Discharge current≤50mA.)
,		D.F.	Char. B,E: 4.0% max.	Pre-treatment : Capacitor should be stored at
			Char. F : 7.5% max.	85±2°C for 1 h, then placed at
,		I.R.	2000MΩ min.	* room condition for 24±2 h
ļ		1.13.	Z GOOIVISZ IIIIII.	before initial measurements.
				Post-treatment : Capacitor should be stored at
				85±2°C for 1 h, then placed at
				* room condition for 24±2 h.
* "	room condition" Tem	perature: 15 to 3	5°C, Relative humidity: 45 to 75%, Atn	
			= 1, 1.0.a 1	

			itererence ening					
No.	Item		Specification			Test m	ethod	
16	Temperature and	Appearance	No marked defect.	T	he cap	acitor should be s	ubjected t	to
	Immersion cycle	Capacitance	Char. B: Within ±10%		5 temperature cycles, then consecutively to			itively to
		change	Char. E: Within ±20%			sion cycles.		
			Char. F: Within ±30%	<	Tempe	rature cycle>		
		D.F.	Char. B,E: 4.0% max.		Step	Temperature(°C	C) Tim	ne
			Char. F : 7.5% max.		1	-25±3	30 n	nin
		I.R.	2000M $Ω$ min.		2	Room Temp.	3 m	
		Dielectric	Per item 3.		3	+85±3	30 n	
		strength			4	Room Temp.	3 m	nin
		(Between					Cycl	e time : 5 cycle
		lead wires)		<	Immers	sion cycle>		
				5	Step .	Temperature(°C)	Time	Immersion water
					1	+65+5/-0	15 min	Clean water
					2	0±3	15 min	Salt water
						85±2°C * room o before atment : Capacito	or should for 1 h, the condition for initial me or should for shou	asurements.
* '	room condition" Temp	perature: 15 to 3	5°C, Relative humidity: 45 to 75%, At	tmosp	heric p	ressure: 86 to 10	6kPa	

# 6. Packing specification

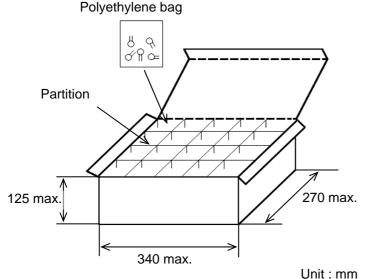
•Bulk type (Packing style code : B)

The number of packing =  ${}^{*1}$  Packing quantity  ${}^{*2}$  n

The size of packing case and packing way

\*1 : Please refer to [Part number list].

\*2 : Standard n = 20 (bag)

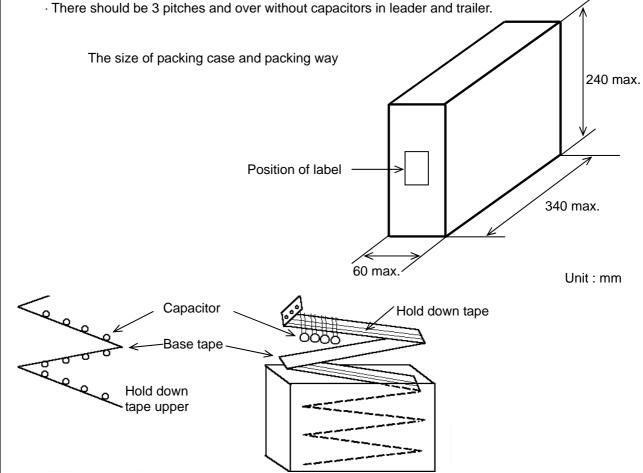


Note)

The outer package and the number of outer packing be changed by the order getting amount.

•Ammo pack taping type (Packing style code : A)

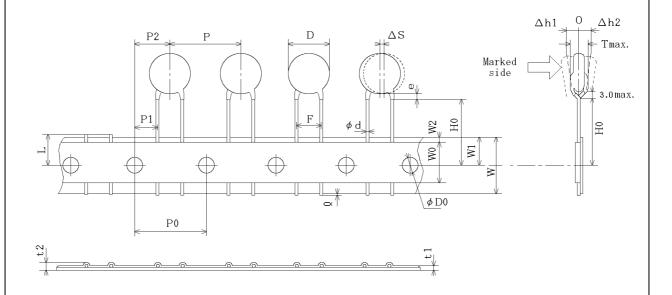
- · The tape with capacitors is packed zigzag into a case.
- · When body of the capacitor is piled on other body under it.



# 7. Taping specification

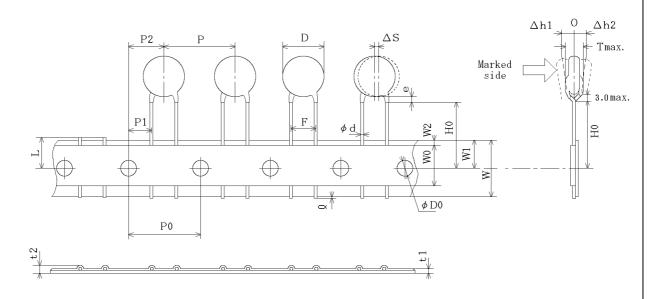
# 7-1. Dimension of capacitors on tape

Vertical crimp taping type < Lead code : N2 > Pitch of component 12.7mm / Lead spacing 5.0mm



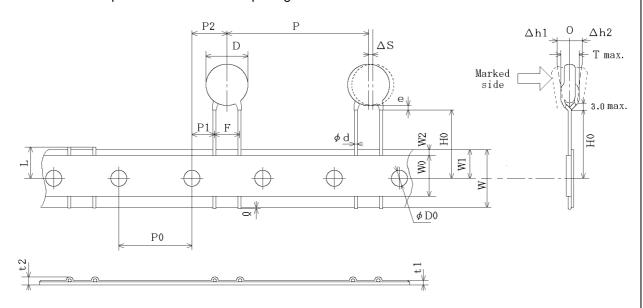
Item	Code	Dimensions	Remarks		
Pitch of component	Р	12.7±1.0			
Pitch of sprocket hole	P0	12.7±0.3			
Lead spacing	F	$5.0\pm^{0.8}_{0.2}$			
Length from hole center to component center	P2	6.35±1.3			
Length from hole center to lead	P1	3.85±0.7	Deviation of progress direction		
Body diameter	D	Please refer to [P	art number list ].		
Deviation along tape, left or right	ΔS	0±1.0	They include deviation by lead bend .		
Carrier tape width	W	18.0±0.5			
Position of sprocket hole	W1	9.0±0.5	Deviation of tape width direction		
Lead distance between reference and bottom planes	Н0	18.0±2.0			
Protrusion length	Q	+0.5~-1.0			
Diameter of sprocket hole	φ <b>D</b> 0	4.0±0.1			
Lead diameter	φd	0.60±0.05			
Total tape thickness	t1	0.6±0.3			
Total thickness, tape and lead wire	t2	1.5 max.	They include hold down tape thickness.		
Deviation across tape, front	∆h1	4.0			
Deviation across tape, rear	∆h2	1.0 max.			
Portion to cut in case of defect	L	11.0± <sup>0</sup> <sub>1.0</sub>			
Hold down tape width	W0	11.5 min.			
Hold down tape position	W2	1.5±1.5			
Coating extension on lead	е	Up to the end of crimp			
Body thickness	Т	Please refer to [Part number list ].			

Vertical crimp taping type < Lead code : N3 > Pitch of component 15.0mm / Lead spacing 7.5mm



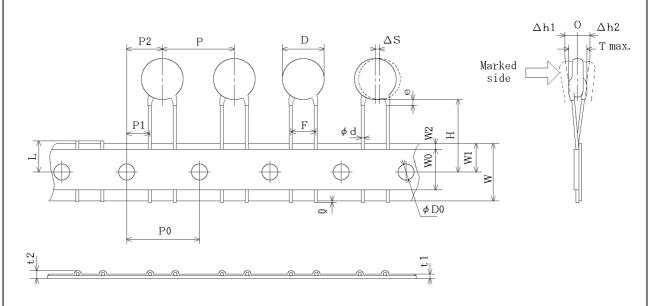
Item	Code	Dimensions	Remarks	
Pitch of component	Р	15.0±2.0		
Pitch of sprocket hole	P0	15.0±0.3		
Lead spacing	F	7.5±1.0		
Length from hole center to component center	P2	7.5±1.5		
Length from hole center to lead	P1	3.75±1.0	Deviation of progress direction	
Body diameter	D	Please refer to [ Part number list ].		
Deviation along tape, left or right	ΔS	0±2.0	They include deviation by lead bend .	
Carrier tape width	W	18.0±0.5		
Position of sprocket hole	W1	9.0±0.5	Deviation of tape width direction	
Lead distance between reference and bottom planes	НО	18.0± <sup>2.0</sup>		
Protrusion length	Q	+0.5~-1.0		
Diameter of sprocket hole	φ <b>D</b> 0	4.0±0.1		
Lead diameter	φd	0.60±0.05		
Total tape thickness	t1	0.6±0.3		
Total thickness, tape and lead wire	t2	1.5 max.	They include hold down tape thickness.	
Deviation across tape, front	∆h1	2.0		
Deviation across tape, rear	∆h2	2.0 max.		
Portion to cut in case of defect	L	11.0± <sup>0</sup> <sub>1.0</sub>		
Hold down tape width	W0	11.5 min.		
Hold down tape position	W2	1.5±1.5		
Coating extension on lead	е	Up to the end of crimp		
Body thickness	Т	Please refer to [ Part number list ].		

Vertical crimp taping type < Lead code : N7 > Pitch of component 30.0mm /Lead spacing 7.5mm



Item	Code	Dimensions	Remarks	
Pitch of component	Р	30.0±2.0		
Pitch of sprocket hole	P0	15.0±0.3		
Lead spacing	F	7.5±1.0		
Length from hole center to component center	P2	7.5±1.5	Deviation of progress direction	
Length from hole center to lead	P1	3.75±1.0		
Body diameter	D	Please refer to [	ease refer to [ Part number list ].	
Deviation along tape, left or right	ΔS	0±2.0	They include deviation by lead bend.	
Carrier tape width	W	18.0±0.5		
Position of sprocket hole	W1	9.0±0.5	Deviation of tape width direction	
Lead distance between reference and bottom planes	НО	18.0± <sup>2.0</sup>		
Protrusion length	Q	+0.5~-1.0		
Diameter of sprocket hole	φ <b>D</b> 0	4.0±0.1		
Lead diameter	φd	0.60±0.05		
Total tape thickness	t1	0.6±0.3		
Total thickness, tape and lead wire	t2	1.5 max.	They include hold down tape thickness.	
Deviation across tape, front	∆h1	2.0		
Deviation across tape, rear	∆h2	2.0 max.		
Portion to cut in case of defect	L	11.0±00		
Hold down tape width	W0	11.5 min.		
Hold down tape position	W2	1.5±1.5		
Coating extension on lead	е	Up to the end of crimp		
Body thickness	Т	Please refer to [ Part number list ].		

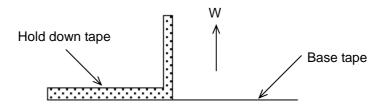
# Straight taping type < Lead code: P2 > Pitch of component 12.7mm / Lead spacing 5.0mm



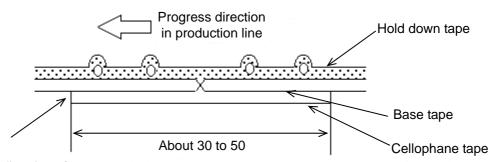
Item	Code	Dimensions	Remarks	
Pitch of component	Р	12.7±1.0		
Pitch of sprocket hole	P0	12.7±0.3		
Lead spacing	F	5.0±0.2		
Length from hole center to component center	P2	6.35±1.3	Deviation of progress direction	
Length from hole center to lead	P1	3.85±0.7		
Body diameter	D	Please refer to [ Part number list ].		
Deviation along tape, left or right	ΔS	0±1.0	They include deviation by lead bend .	
Carrier tape width	W	18.0±0.5		
Position of sprocket hole	W1	9.0±0.5	Deviation of tape width direction	
Lead distance between reference and bottom	Н	20.0±1.5 20.0±1.0		
planes		20.0± <sub>1.0</sub>		
Protrusion length	Q	+0.5~-1.0		
Diameter of sprocket hole	φ <b>D</b> 0	4.0±0.1		
Lead diameter	φd	0.60±0.05		
Total tape thickness	t1	0.6±0.3		
Total thickness, tape and lead wire	t2	1.5 max.	They include hold down tape thickness.	
Deviation across tape, front	∆h1	1.0 may		
Deviation across tape, rear	∆h2	1.0 max.		
Portion to cut in case of defect	L	11.0± <sup>0</sup> 1.0		
Hold down tape width	W0	11.5 min.		
Hold down tape position	W2	1.5±1.5		
Coating extension on lead	е	3.0 max.		
Body thickness	Т	Please refer to [ Part number list ].		

## 7-2. Splicing way of tape

1) Adhesive force of tape is over 3N at test condition as below.



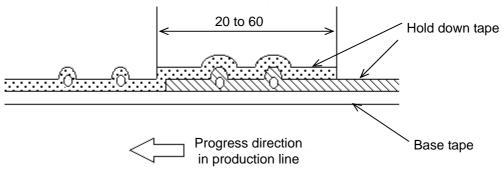
- 2) Splicing of tape
  - a) When base tape is spliced
    - •Base tape should be spliced by cellophane tape. (Total tape thickness should be less than 1.05mm.)



No lifting for the direction of progressing

Unit: mm

- b) When hold down tape is spliced
  - •Hold down tape should be spliced with overlapping. (Total tape thickness should be less than 1.05mm.)



- c) When both tape are spliced
  - •Base tape and hold down tape should be spliced with splicing tape.
- 3) Missing components
  - •There should be no consecutive missing of more than three components.
  - •The number of missing components should be not more than 0.5% of total components that should be present in a Ammo pack.

#### **EU RoHS**

This products of the following crresponds to EU RoHS.

# **RoHS**

maximum concentration values tolerated by weight in homogeneous materials

- •1000 ppm maximum Lead
- •1000 ppm maximum Mercury
- •100 ppm maximum Cadmium
- •1000 ppm maximum Hexavalent chromium
- •1000 ppm maximum Polybrominated biphenyls (PBB)
- •1000 ppm maximum Polybrominated diphenyl ethers (PBDE)

# **Mouser Electronics**

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

# Murata:

DEBF33A103ZN2A	DEBE33A222ZA2E	DEBE33A102ZA1B	DEBB33A221KN2A	DEBB33A471KA1B
DEBB33A332KN2A	DEBE33A103ZA3B	DEBB33A152KA2B	DEBB33A102KQ1A	DEBB33A681KA2B
DEBB33A102KA2B	DEBB33A221KA1B	DEBB33A101KA1B	DEBB33A151KP2A	DEBB33A152KN2A
DEBB33A331KC1B	DEBE33A102ZC1B	DEBB33A471KC1B	DEBB33A151KC1B	DEBB33A221KC1B
DEBB33A101KC1B	DEBB33A471KP2A	DEBE33A472ZN2A	DEBB33A472KA2B	DEBB33A472KA3B
DEBB33A682KA3B	DEBB33A472KN3A	DEBB33A221KP2A	DEBF33A222ZN2A	DEBF33A472ZN2A
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DEBF33A103ZA2B	DEBB33A222KA2B	DEBB33A222KN2A	DEBB33A101KP2A	DEBF33A222ZA2B
DEBB33A102KN2A	DEBF33A472ZA2B	DEBB33A101KD1B	DEBB33A102KB2B	DEBB33A151KD1B
DEBB33A152KB2B	DEBB33A221KD1B	DEBB33A222KB2B	DEBB33A331KP2A	DEBB33A332KB2B
DEBB33A472KB3B	DEBB33A681KB2B	DEBB33A681KN2A	DEBB33A682KB3B	DEBB33A682KN7A
DEBE33A102ZD1B	DEBE33A102ZP2A	DEBE33A222ZB2B	DEBE33A222ZN2A	DEBE33A472ZB2B
DEBF33A222ZB2B	DEBF33A472ZB2B	DEBB33A471KD1B	DEBE33A103ZB3B	DEBF33A103ZB2B
DEBB33A331KD1B				