# **Heavy Duty Disc - Type EMIFIL®** series

(Three-terminal capacitor) **Reference Specification** 

#### 1.Scope

This reference specification applies to Heavy Duty Disc-Type EMIFIL®(Three-terminal capacitor).

#### 2.Part Numbering

(Ex.) DS N 9 H B3 2E 271 Q93 A 1) 2) 3) 4) 5) 6)

- 1 Product ID (Disc-Type EMIFIL®)
- ② Structure N: No Ferrite Beads Type
- 3 Style4 Features
- ⑤ Temperature Characteristics
- 6 Rated Voltage
- ⑦ Capacitance



Marked three digits system.(Ex. 270pF→271)

#### 8 Lead Type

Q5□: Bulk (in mm) Long Lead Type Straight Lead Type Q55 Lead Length(I) 25.0 min.

Lead Length (I): See item 9.

Q9□ : Taping			(in mm)
Straight Lead Type	Q91	Q92	Q93
Dimension H	20.0±1.0	16.5±1.0	18.5±1.0

Dimension H: See item 9.

 Packaging Code A: Ammo Pack / B: Bulk

#### 3.Rating

Operating temperature : -40 to +105°C Storage Temperature : -55 to +105°C

Insulation Resistance :  $10000M\Omega$  min. Rated Current : 6A(DC)

Equivalent Circuit : 3 (3) (1) 

Others : See Table 1

Table 1

Customer	Murata	Temperature Characteristics		Capacitance	Rated	Withstanding	Unit Mass
Part Number	Part Number	-25~+85°C	-40~+105°C	Capacitarice	Voltage	Voltage	(Typical value)
	DSN9HB32E220Q55B						
	DSN9HB32E220Q91A		22pF ± 20%	22pF			0.50%
	DSN9HB32E220Q92A					0.59g	
	DSN9HB32E220Q93A						<u> </u>
	DSN9HB32E101Q55B						
	DSN9HB32E101Q91A	±10%	±20%	100pF			
	DSN9HB32E101Q92A		±20%	± 20%			
	DSN9HB32E101Q93A				250V	625\//DC\	0.52~
	DSN9HB32E271Q55B				(DC)	625V(DC)	0.52g
	DSN9HB32E271Q91A		270pF				
	DSN9HB32E271Q92A			± 20%			
	DSN9HB32E271Q93A						
	DSN9HB32E222Q55B						
	DSN9HB32E222Q91A		. 200/	2200pF			0.50-
	DSN9HB32E222Q92A		±30%	± 20 <sup>°</sup> %			0.58g
	DSN9HB32E222Q93A						

## Spec No. JENF243F-0022F-01

# Reference Only

<In case of doubt>

Temperature : 20 ± 2°C

## 4.Testing Conditions

<Unless otherwise specified>
 Temperature : Ordinary Temperature 15 to 35°C

Humidity : Ordinary Humidity 25 to 85 %(RH) Humidity : 60 to 70 %(RH)

Atmospheric Pressure : 86 to 106 kPa

#### 5. Style and Dimension

See item 9.

#### 6.Marking

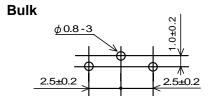
Characteristics	Marked letter code : B (Temperature Charasteristics Number: B3)		
Capacitance	Marked real number. (22pF) Ex. 22pF→22		
Marked three digits system. (100pF to 2200pF) Ex.2200pF→222			
Capacitance Tolerance	Marked letter code. M (±20%)		
Rated Voltage	Marked voltage value. (250V)		
Trade Mark	Marked as €		

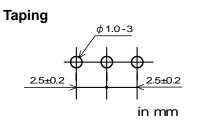
#### 7.Performance

No.	Item	Specification	Test Method			
7.1	Appearance and Dimensions	Meet item 9.	Visual Inspection and measured with Slide Caliper			
7.2	Marking	Marking is able to be read easily.	Visual Inspection.			
7.3	Capacitance	Meet item 3.	Table 2			
	and		Frequency Test Voltage Capacitance			
	Tolerance		1±0.1MHz 1±0.2V(rms) 22pF~270pF			
			1±0.1kHz 1±0.2√(IIII3) 2200pF			
7.4	Insulation	Meet item 3.	Test Voltage : Rated Voltage			
	Resistance(I.R.)		Time: 1 minute.			
7.5	Withstanding	Products shall not be damaged.	Test Voltage : 2.5 times for Rated Voltage Time : 1 to 5 seconds			
	Voltage		Charge Current : 10 mA max.			
7.6	Temperature	Meet item 3.	Capacitance shall be measured at each step			
7.0	Characteristics	Weet item 5.	specified in Table 3 after reaching the thermal			
			equilibrium.			
			The capacitance change against the capacitance			
			at step 3 shall be calculated.			
			Table3			
			-25 to 85°C			
			Step 1 2 3 4 5			
			Temp. +20±2 -25±2 +20±2 +85±2 +20±2			
			(°C)			
			-40 to 105°C			
			Step 1 2 3 4 5			
			Temp. +20±2 -40±2 +20±2 +105±2 +20±2			
			(°C)   12022   1022   12022   13032   12032			
7.7	Solderability	Along the circumference of	Flux : Ethanol solution of rosin,25(wt)%			
		terminal shall be covered with new	(dipped for 5 to 10 seconds)			
		solder at least 75%.	Pre-heat : 150±10°C, 60~90 s Solder : Sn-3.0Ag-0.5Cu			
			Solder Temperature : 245±5°C			
			Immersion Time : 2 ± 0.5 seconds			
			Immersion Depth:			
			2 to 2.5 mm from the bottom of the body.			

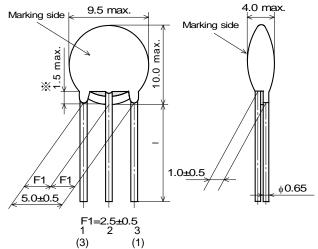
No.	Item	Specification	Test Method
7.8	Resistance to Soldering Heat	Meet Table 4.  Table 4  Appearance No damaged. Capacitance Change within ± 5%  Withstanding Voltage No damaged.	Flux: Ethanol solution of rosin,25(wt)% (dipped for 5 to 10 seconds) Pre-heat: 150±10°C, 60~90 s Solder: Sn-3.0Ag-0.5Cu Solder Temperature: 270 ± 5 °C Immersion Time: 3± 0.5 seconds Immersion Depth: 1.6 ± 0.8 mm from the bottom of the body. Then measured after exposure in the room Condition for 4 to 24hours.
7.9	Humidity	Meet Table 5.  Table 5  Appearance No damaged. Capacitance within ± 10%	Temperature: 40 ± 2°C Humidity: 90 to 95 %(RH) Time: 1000 hours(+48-0 hours) Then measured after exposure in the room condition for 20 to 24hours.
7.10	Humidity Life	Insulation Resistance 1000MΩ min.	Temperature: 40 ± 2°C Humidity: 90 to 95 %(RH) Time: 1000 hours(+48-0 hours) Charge Voltage: Rated Voltage Then measured after exposure in the room condition for 20 to 24hours.
7.11	Heat Life	$\begin{tabular}{lll} Meet Table 6. \\ \hline Table 6 \\ \hline & Appearance & No evidence of mechanical damage. (It may become dark.) \\ \hline Capacitance & within \pm 10% \\ \hline Change & Insulation Resistance & 1000M\Omega min.$	Temperature: 105 ± 3°C Time: 1000 hours(+48-0 hours) Applying Voltage: 2 times of DC rated voltage Charge Current: 10 mA max. Then measured after exposure in the room condition for 4 to 24hours.
7.12	Cold Resistance	$\begin{tabular}{lll} Meet Table 7. \\ \hline Table 7 \\ \hline & Appearance & No damaged. \\ \hline & Capacitance & within \pm 10% \\ \hline & Insulation & 10000M\Omega min. \\ \hline & Resistance & \\ \hline \end{tabular}$	Temperature: -55 ± 2°C Time: 1000 hours(+48-0 hours) Then measured after exposure in the room condition for 4 to 24hours.
7.13	Temperature Cycling	Meet Table 5.	Step1 -55°C(+0°C,-3°C) / 30 min. Step2 Ordinary Temp. / within 5 min. Step3 +105°C(+3°C,-0°C) / 30 min. Step4 Ordinary Temp. / within 5 min. Total 100 cycle. Then measured after exposure in the room condition for 4 to 24 hours.

## 8.Mounting Hole





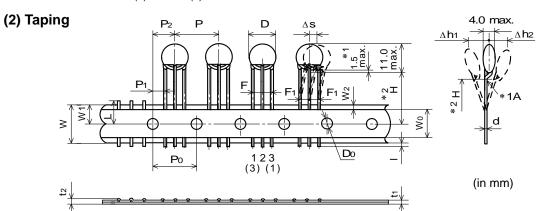
# 9.Style and Dimension (1) Bulk



 Coating extending on leads does not exceed the tangent line.
 Exposed electrodes are covered with solder.

Lead Type	
Q55	25.0 min.

(in mm)



\*1.Coating extending on leads does not exceed the start of bend.(Point A) Exposed electrodes are covered with solder.

\*2.H: to be measured from the forming Point A.

Table 7

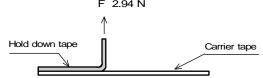
Code	Description	Dim	ensions	Remark
P	Pitch of Component	12.7		Product Inclination
	•			ΔS Determines Crossing
P <sub>0</sub>	Pitch of Sprocket Hole	12	2.7±0.2	
P1	Length from Hole Center to Lead	3.8	85±0.7	
P2	Length from Hole Center to Component Center	6.3	35±1.3	Shift In Tape In Direction of Feed
D	Width of Body	9.	5 max.	
ΔS	Deviation along tape,Left or Right	(	)±1.0	
W	Carrier Tape Width	18	3.0±0.5	
W1	Position of Sprocket Hole	9.0-	+0 / -0.5	Tape Widthwise Shift
	Protrusion Length	+0.5 ~ -1.0		
D <sub>0</sub>	Diameter of Sprocket Hole	φ 4.0±0.1		
d	Lead Diameter	φ 0.6		
t1	Total Tape Thickness	0.7±0.2		Includes Thickness of
t2	Total Thickness, Tape and Lead Wire	1.5 max.		Bonding Tape
∆h1	Deviation across Tape, front	1.0 max.		
∆h2	Deviation across Tape,rear	1.0 max.		
L	Portion to Cut in Case of Defect	11.0+0 / -1.0		
Wo	Hold Down Tape Width	12.0±0.5		
W2	Hold Down Tape Position	1.5±1.5		
	Load langth batturan aprophat	Q91	20.0±1.0	
Н	Lead length between sprocket hole and forming position	Q92	16.5±1.0	
		Q93	18.5±1.0	
F	Load Spacing	5.0+	0.8 / -0.2	
F1	F <sub>1</sub> Lead Spacing		0.4 / -0.2	

(in mm)

#### 10.Taping

#### 10.1 Supplement condition of taping

- (1) A maximum of 0.3% of the components quantity per ammo pack may be missing without consecutive missing components.
- (2) The adhesive power of the tape shall have over 2.94N at the following condition.



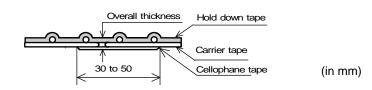
Direction of feed

(3) Splicing method of tape

1. Carrier tape

Carrier tape shall be spliced by cellophane tape.

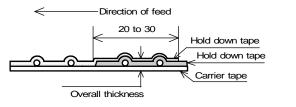
Overall thickness shall be less than 1.05 mm.



2. Hold down tape

Hold down tape shall be spliced with overlapping.

Overall thickness shall be less than 1.05 mm.



3. Both carrier tape and hold down tape

Both tapes shall be cut zigzag and spliced with splicing tape.

#### 11. Packing

#### 11.1 Packing quantity

The standard packing quantity is as follows.

(The packing quantity may be changed due to a fraction of order.)

Minimum Packing Form and Quantity

Terminal Configuration		A Unit Quantity	* Standard Quantity
		Bulk : in a plastic bag	in a container
		Taping : in an Ammo pack	(corrugated cardboard box)
Bulk Long Lead Type (Q55)		250 pcs.	5000 pcs.
Taping	(Q9□)	2000 pcs.	20000 pcs.

\* A quantity in a container is depending on a quantity of an order.

#### 11.2 Packing Form

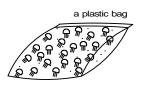
(1) Bulk

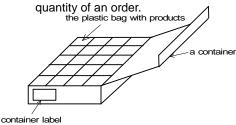
<A plastic bag pack>

1. Products are packed into a plastic bag.

2. The plastic bags are put into a container (corrugated cardboard box) depending on a

(in mm)



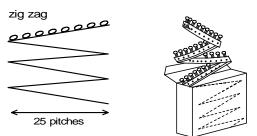


(2) Taping

[Fig 1]

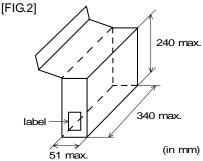
<An Ammo pack >

- 1 .Folding the tape per 25 pitches,products are packed into an ammo package so that each product of each layer wound zigzag is put on top of one another.[Fig.1]
- 2. The dimensions of the ammo package are indicated in [Fig 2].
- 3. The ammo packages are put into a container (corrugated cardboard box) depending on a quantity of an order.
- 4. Not less than 3 consecutive of component shall be missing on both edge of tape.



The unloading direction: Right The hold down tape: Upper

The product body: Left along the unloading direction



## 12.Marking on package

## 12.1 Unit Package

Bulk : Marked on a plastic bag.

Taping: Marked on a label stuck on an ammo package.

Marking on a unit package consists of :

Customer part number, MURATA part number, Inspection number(\*1), RoHS marking (\*2), Quantity, etc

\*1) « Expression of Inspection No. »

 $\begin{array}{c|c} \square \square & OOOO & \times \times \times \\ \hline (1) & (2) & (3) \end{array}$ 

(1) Factory Code

(2) Date First digit : Year / Last digit of year

Second digit : Month / Jan. to Sep.  $\rightarrow$  1 to 9, Oct. to Dec.  $\rightarrow$  O,N,D

Third, Fourth digit: Day

(3) Serial No.

\*2) « Expression of RoHS marking » ROHS –  $\underline{\underline{Y}}$  ( $\underline{\underline{A}}$ 

(1) RoHS regulation conformity parts.

(2) MURATA classification number

#### 12.2 Container

Marking on the label sticked on a container consists of :

Customer name Purchasing Order Number, Customer Part Number, MURATA part number, RoHS marking (\*2), Quantity, etc

## 13. / Caution

#### 13.1 Mounting holes

Mounting holes should be designed as specified in this specifications. (See item 8.)

Or different design from this specifications may cause cracks in ceramics which may lead to smoking / firing.

#### 13.2 Mounting for P.C.B. (Applied only to bulk type.)

Form of mounting hole is a triangle.(See item 8.)

Product should be inserted and soldered to each holes correct way as Fig.2.(The center terminal and the other terminals become parallel when seeing a product from the side.)

Smorking and firing maybe caused by wrong way like a Fig.3.(The center terminal and the other terminals cross when seeing a product from the side.)

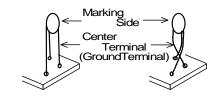


Fig.2 Right Way Fig.3 Wrong Way

#### 13.3 Caution for the product angle adjust work

Take care not to apply any mechanical stress to product body at the lead terminal bending process for product angle adjustment after insertion.



#### 13.4 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

(7) Traffic signal equipment

(2) Aerospace equipment

(8) Disaster prevention / crime prevention equipment

(3) Undersea equipment

(9) Data-processing equipment

(4) Power plant control equipment

(10) Applications of similar complexity and /or reliability requirements

(5) Medical equipment

to the applications listed in the above

(6) Transportation equipment (vehicles, trains, ships, etc.)

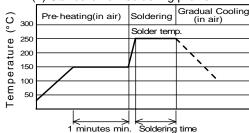
#### 14. Notice

#### 14.1 Soldering

 Use rosin-based flux. Do not use strong acidic flux with halide content exceeding 0.2(wt)% (chlorine conversion value).

Use Sn-3.0Ag-0.5Cu solder

(2) Standard flow soldering profile.



Solder	Soldering
temperature	time
250~260 °C	4~6s

- (3) Resistance to soldering iron goes in the following condition that tip temperature is 350 °C max. and soldering time is 5 s max.
- (4) Products and the leads should not be subject to any mechanical stress during soldering process. (and also while subject to the equivalent high temperature.)

#### 14.2 Cleaning

Products shall be cleaned on following conditions.

- (1) Cleaning Temperature: 60°C max.(40°C max. for Isopropyl alcohol).
- (2) Ultrasonic cleaning shall comply with the following conditions, avoiding the resonance phenomenon at the mounted products and P.C.B.

Power: 20W / I max. / Frequency: 28kHz ~ 40kHz / Time: 5 minutes max.

- (3) Cleaning agent
  - 1. alcohol cleaning agents.
    - · Isopropyl alcohol (IPA)
  - 2. Aqueous cleaning agent
    - · Pine Alpha ST-100S
- (4) Ensure that residual flux and residual cleaning agent is completely removed.

Products should be thoroughly dried after aqueous agent has been removed with de-ionized water.

(5) For other cleaning methods, please contact Murata engineering.

#### 14.3 Operating Environment

- (1) Do not use products in corrosive gases such as chlorine gas, acid or sulfide gas.
- (2) Do not use products in the environment where water, oil or organic solvents may adhere to products.
- (3) Do not adhere any resin to products, coat nor mold products with any resin (including adhesive)to prevent mechanical and chemical stress on products.

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#### 14.4 Storage and handling requirements.

(1) Storage period

Use the products within 12 months after delivered.

Solderability should be checked if this period is exceeded.

(2) Storage environment condition

To prevent products quality deterioration, storage conditions should be controlled as follows;

- 1. Temperature : -10 to 40 degrees centigrade
- 2. Humidity : 15 to 85% relative humidity
- 3. Products should be stored without sudden changes in temperature and humidity.

Don't keep products in corrosive gases such as sulfur, chlorine gas or acid, or it may cause oxidization of lead terminals resulting in poor solderability.

- 4. Products should be stored on the palette for the prevention of the influence from humidity, dust and so on.
- 5. Products should be stored in the warehouse without heat shock, vibration, direct sunlight and so on.
- (3) Handling Conditions

Care should be taken when transporting or handling product to avoid excessive vibration or mechanical shock.

### 15. / 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 the reference specifications.
- (3)The contents of this reference specification are subject to change without advance notice. Please approve our product specifications or transact the approval sheet for product specifications before ordering.

# **Mouser Electronics**

**Authorized Distributor** 

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## Murata:

DSN9HB32E271Q55B DSN9HB32E222Q55B DSN9HB32E222Q91A DSN9HB32E220Q55B DSN9HB32E101Q55 DSN9HB32E222Q92A DSN9HB32E222Q93A DSN9HB32E271Q91A