CHIP NOISE FILTER for Automotive infotainment/comfort equipment NFZ2MSD□□□SZ10L Murata Standard Reference Specification【AEC-Q200】

1. Scope

This reference specification applies to NFZ2MSD_SZ series based on AEC-Q200.

1.1 Specific applications:

- Automotive infotainment/comfort equipment: Products that can be used for automotive equipment such as car navigation systems and car audio systems that do not directly relate to human life and whose structure, equipment, and performance are not specifically required by law to meet technical standards for safety assurance or environmental protection.
- Industrial equipment: Products that can be used in industrial equipment such as base stations, manufacturing equipment, industrial robotics equipment, and measurement equipment, and whose functions do not directly relate to the protection of human life and property.
- Medical equipment (GHTF Class C) *Except for implant/surgery/auto injector: Products that can be used for medical equipment of Class C of the international classification class GHTF and whose malfunction is considered to pose a relatively high risk to the human body.
- Medical equipment (GHTF Class A and B): Products that can be used for medical equipment regulated by Class A and Class B of the international classification class GHTF and whose functions do not directly relate to the protection of human life and property.
- Consumer equipment: Products that can be used in consumer equipment such as home appliances, audio/visual equipment, communication equipment, information equipment, office equipment, and household robotics, and whose functions are not directly related to the protection of human life and property.

This series is designed for use in Car Multimedia, Car Interior, Car Comfort application and General Electronic equipment. It is not appropriate for use in applications critical to passenger safety and car driving function (e.g. ABS, AIRBAG, etc.).

1.2 Unsuitable application:

Applications critical to passenger safety and car driving function (e.g. ABS, AIRBAG, etc.) and applications listed in “Limitation of applications” in this product specification.

WE DISCLAIM ANY LOSS AND DAMAGES ARISING FROM OR IN CONNECTION WITH THE PRODUCTS INCLUDING BUT NOT LIMITED TO THE CASE SUCH LOSS AND DAMAGES CAUSED BY THE UNEXPECTED ACCIDENT, IN EVENT THAT THE PRODUCT IS APPLIED FOR THE PURPOSE WHICH IS SPECIFIED ABOVE AS THE UNSUITABLE APPLICATION FOR THE PRODUCT.

2.Part Numbering

(ex)	NF	Z	2M	SD	101	S	Z	1	0	L
	Product ID	Structure	Dimension (L×W)	Characteristics	Typical Impedance at 100MHz	Performance	Category	Numbers Of Circuit (T)	Special Specification	Packaging L: Φ180Taping

3.Rating

□Operating Temperature Range
(Ambient temperature; Self-temperature rise is not included) -40 to +85°C
(Product temperature; Self- temperature rise is included) -40 to +125°C
□Storage Temperature Range. -40 to +85°C
□Withstand voltage 20V

Customer Part Number	Murata Part Number	Impedance at 10MHz		Impedance at 100MHz	DC Resistance Max	*1 Rated Current	ESD Rank 1A:0.5kV
		(Ω)	Tolerance	Typ (Ω)	(mΩ)	(A)	
	NFZ2MSD101SZ10L	9	±30%	100	18	5.2	1 A
	NFZ2MSD181SZ10L	15		180	22	4.0	1 A
	NFZ2MSD301SZ10L	21		300	26	3.8	1 A
	NFZ2MSD501SZ10L	29		500	32	3.2	1 A
	NFZ2MSD102SZ10L	46		1000	46	2.5	1 A

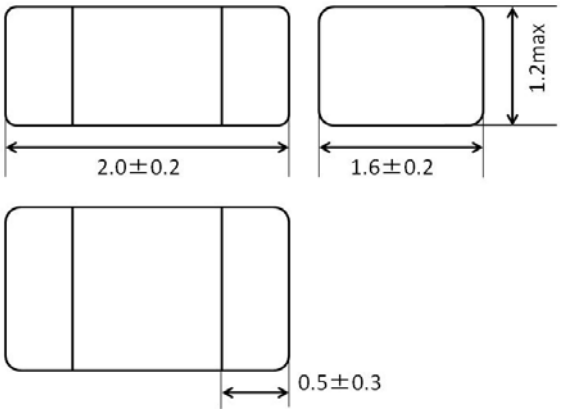
*1: When applied Rated current to the Products, self temperature rise shall be limited to 40℃ max.

4. Testing Conditions (Standard atmospheric conditions)

<Unless otherwise specified>
Temperature : Ordinary Temperature (15 to 35°C)
Humidity : Ordinary Humidity (25 to 85 %(RH))

<In case of doubt>
Temperature : 20 ± 2°C
Humidity : 60 to 70 %(RH)
Atmospheric Pressure : 86 to 106 kPa

5.Appearance and Dimensions



※no marking

(in mm)

■Unit Mass (Typical value) 0.0188g

6. Electrical Performance

No.	Item	Specification	Test Method
6.1	Impedance	Meet item 3.	Measuring Equipment: KEYSIGHT 4287A or equivalent (0.5V) Measuring Frequency: 10MHz
6.2	DC Resistance		Measuring Equipment: Digital multi meter

7. Q200 Requirement

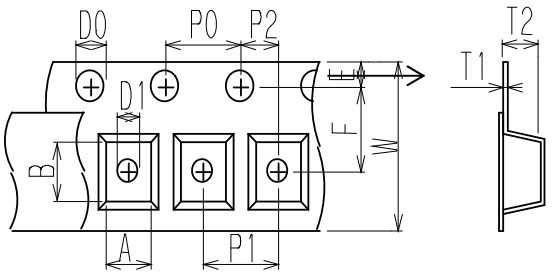
AEC-Q200 Rev.D issued June 1. 2010

AEC-Q200			Murata Specification / Deviation
No.	Stress	Test Method	
3	High Temperature Exposure	1000hours at 125 deg C Set for 24hours at room temperature, then measured.	Meet Table A after testing. Table A Appearance: No damage Impedance Change (at 10MHz): Within ±30%
4	Temperature Cycling	1000cycles -40 deg C to +125 deg C Set for 24hours at room temperature, then measured.	
5	Destructive Physical Analysis	Per EIA469 No electrical tests	Not Applicable
7	Biased Humidity	1000hours at 85 deg C, 85%RH	Meet Table A after testing.

AEC-Q200			Murata Specification / Deviation
No.	Stress	Test Method	
8	Operational Life	Apply 125 deg C 1000hours Set for 24hours at room temperature, then measured	Meet Table A after testing. The operating temperature should be 85 deg C.
9	External Visual	Visual inspection	No abnormalities
10	Physical Dimension	Meet ITEM 5 （Appearance and Dimensions）	No defects
12	Resistance to Solvents	Per MIL-STD-202 Method 215	Not Applicable
13	Mechanical Shock	Per MIL-STD-202 Method 213 Condition C 100g's(0.98N)/6ms/Half sine	Meet Table A after testing.
14	Vibration	5g's(0.049N) for 20 minutes, 12cycles each of 3 oritentations Test from 10-2000Hz.	
15	Resistance to Soldering Heat	Solder temperature 250+5/-5 deg C Immersion time 30±5s	Pre-heating: above 183 deg C, 90 to120s Meet Table A after testing.
17	ESD	Per AEC-Q200-002	Meet Table A after testing. ESD Rank: Meet Item 3 (Rating)
18	Solderability	Per J-STD-002	Method b : Not Applicable 90% of the terminations is to be soldered.
19	Electrical Characterization	Measured : Impedance	No defects
20	Flammability	Per UL-94	Not Applicable
21	Board Flex	Epoxy-PCB(1.6mm) Deflection 2mm(min) 60s minimum holding time	Meet Table A after testing.
22	Terminal Strength	Per AEC-Q200-006	No defects
30	Electrical Transient Conduction	Per ISO-7637-2	Not Applicable

8. Specification of Packaging

8.1 Appearance and Dimensions of plastic tape



Unreeling direction

A	1.85	±0.1	P0	4.0	±0.1
B	2.25	±0.1	P1	4.0	±0.1
D0	φ1.5	$+0.1$ -0	P2	2.0	±0.05
D1	φ1.0	$+0.1$ -0	T1	0.25	±0.05
E	1.75	±0.1	T2	1.3	±0.1
F	3.5	±0.05	W	8.0	±0.2

(in mm)

8.2 Specification of Taping

(1) Packing quantity (standard quantity)
3,000 pcs / reel

(2) Packing Method
Products shall be packed in the each embossed cavity of plastic tape and sealed by cover tape.

(3) Sprocket hole
The sprocket holes are to the right as the tape is pulled toward the user.

(4) Spliced point
Plastic tape and Cover tape has no spliced point.

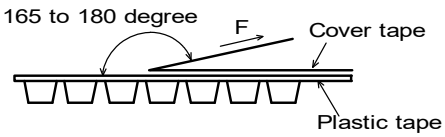
(5) Missing components number
Missing components number within 0.1 % of the number per reel or 1 pc., whichever is greater, and are not continuous. The specified quantity per reel is kept.

8.3 Pull Strength

Embossed carrier tape	9.8N min.
Cover tape	5N min.

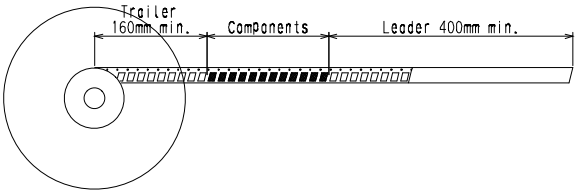
8.4 Peeling off force of cover tape

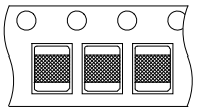
Speed of Peeling off	300mm/min
Peeling off force	0.1 to 0.7N (minimum value is typical)

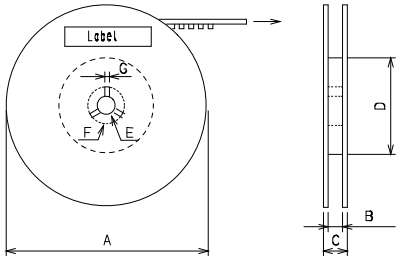


8.5 Dimensions of Leader-tape, Trailer and Reel

There shall be leader-tape(cover tape) and trailer-tape (empty tape) as follows.







A	φ180 $^{+0}_{-3}$
B	9 ±0.3
C	11.4 ±1
D	φ60 ±1
E	φ13 ±0.2
F	φ21 ±0.8
G	2.0 ±0.5

(in mm)

8.6 Marking for reel

Customer part number, MURATA part number, Inspection number(∗1), RoHS marking(∗2), Quantity etc ・・・

∗1) <Expression of Inspection No.> □□ OOOO ×××
(1) (2) (3)

(1) Factory Code

(2) Date
First digit : Year / Last digit of year
Second digit : Month / Jan. to Sep. → 1 to 9, Oct. to Dec. → O, N, D
Third, Fourth digit : Day

(3) Serial No.

∗2) « Expression of RoHS marking » ROHS – Y (△)
(1) (2)

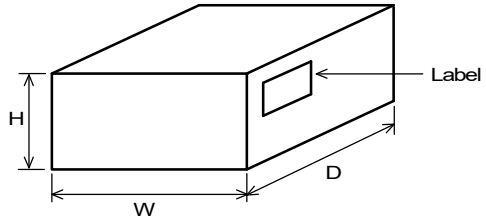
(1) RoHS regulation conformity

(2) MURATA classification number

8.7 Marking for Outside package (corrugated paper box)

Customer name, Purchasing order number, Customer part number, MURATA part number, RoHS marking (∗2) ,Quantity, etc ・・・

8.8. Specification of Outer Case



Outer Case Dimensions (mm)			Standard Reel Quantity in Outer Case (Reel)
W	D	H	
200	185	67	5

Above Outer Case size is typical. It depends on a quantity of an order.

9. ⚠ Caution

9.1 Limitation of applications

The products listed in the reference specification (hereinafter the product(s) is called as the “Product(s)”) are designed and manufactured for applications specified in the reference specification (hereinafter called as the “Specific Application”).

We shall not warrant anything in connection with the Products including fitness, performance, adequateness, safety, or quality, in the case of applications listed in from (1) to (11) written at the end of this precautions, which may generally require high performance, function, quality, management of production or safety. Therefore, the Product shall be applied in compliance with the specific application.

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(1) Aircraft equipment
(2) Aerospace equipment
(3) Undersea equipment
(4) Power plant control equipment
(5) Medical equipment
(6) Transportation equipment
(7) Traffic control equipment
(8) Disaster prevention/security equipment
(9) Industrial data-processing equipment
(10) Combustion/explosion control equipment
(11) Equipment with complexity and/or required reliability equivalent to the applications listed in the above.

For exploring information of the Products which will be compatible with the particular purpose other than those specified in the reference specification, please contact our sales offices, distribution agents, or trading companies with which you make a deal, or via our web contact form.

Contact form: https://www.murata.com/contactform

* We may design and manufacture particular Products for applications listed in (1) to (11). Provided that, in such case we shall unambiguously specify such Specific Application in the reference specification without any exception. Therefore, any other documents and/or performances, whether exist or non-exist, shall not be deemed as the evidence to imply that we accept the applications listed in (1) to (11).

9.2 Precautions on rating

Avoid using in exceeded the rated temperature range, rated voltage, or rated current.
Usage when the ratings are exceeded could lead to wire breakage, burning, or other serious fault.

9.3 Inrush current

If an inrush current (or pulse current or rush current) that significantly exceeds the rated current is applied to the product, overheating could occur, resulting in wire breakage, burning, or other serious fault.

9.4 Fail-safe

Be sure to provide an appropriate fail-safe function on your product to prevent a second damage that may be caused by the abnormal function or the failure of our product.

9.5 Corrosive gas

Please refrain from use since contact with environments with corrosive gases (sulfur gas [hydrogen sulfide, sulfur dioxide, etc.], chlorine, ammonia, etc.) or oils (cutting oil, silicone oil, etc.) that have come into contact with the previously stated corrosive gas environment will result in deterioration of product quality or an open from deterioration due to corrosion of product electrode, etc. We will not bear any responsibility for use under these environments.

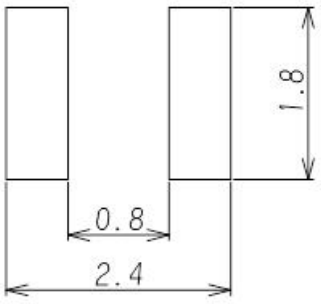
10. Notice

This product is designed for solder mounting.
Please consult us in advance for applying other mounting method such as conductive adhesive.
This product employs a core with low insulation resistance, Pay strict attention when use it.

a) Do not make any through holes and copper pattern under the coil except a copper pattern to the electrode.
b) Design/mount any components not to contact this product.

10.1 Land pattern designing (Reflow Soldering)

Recommended land pattern for reflow soldering is as follows:
It has been designed for Electric characteristics and solderability.
Please follow the recommended patterns. Otherwise, their performance which includes electrical performance or solderability may be affected, or result to "position shift" in soldering process.



(in mm)

10.2 Flux, Solder

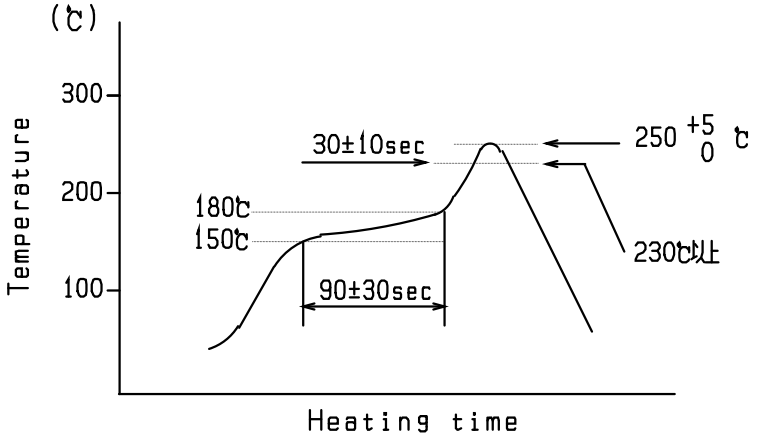
Flux	・Use rosin-based flux. ・Don't use highly acidic flux with halide content exceeding 0.2(wt)% (chlorine conversion value). ・Don't use water-soluble flux.
Solder	・Use Sn-3.0Ag-0.5Cu solder ・Standard thickness of solder paste : 100μm to 150μm

Other flux (except （above) Please contact us for details, then use.

10.3 soldering conditions (Reflow)

・Pre-heating should be in such a way that the temperature difference between solder and product surface is limited to 100°C max. Cooling into solvent after soldering also should be in such a way that the temperature difference is limited to 100°C max.
Insufficient pre-heating may cause cracks on the product, resulting in the deterioration of product quality.

・Standard soldering profile profile is as follows.

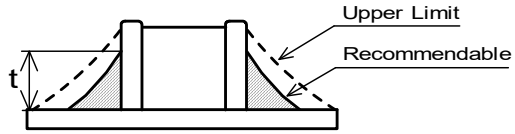


	Standard Profile
Pre-heating	150℃～180℃ 、90s±30s
Heating	above 230℃ 、20s～40s
Peak temperature	250℃+5/-0℃
Cycle of reflow	2 times

10.4 Solder Volume

・Solder shall be used not to be exceeded the upper limits as shown below.

・Accordingly increasing the solder volume, the mechanical stress to Chip is also increased.
Exceeding solder volume may cause the failure of mechanical or electrical performance.



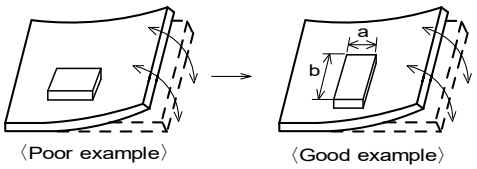
1/3T≦t≦T
T: thickness of electrode

10.5 Product's location

The following shall be considered when designing and laying out P.C.B.'s.

(1) P.C.B. shall be designed so that products are not subject to the mechanical stress due to warping the board.

[Products direction]

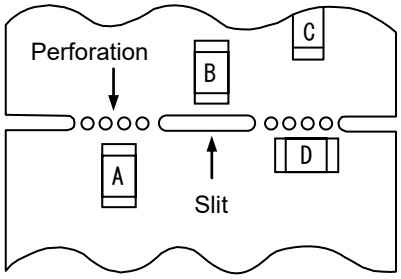


Products shall be located in the sideways direction to the mechanical stress.

(2) Components location on P.C.B. separation.

It is effective to implement the following measures, to reduce stress in separating the board.
It is best to implement all of the following three measures; however, implement as many measures as possible to reduce stress.

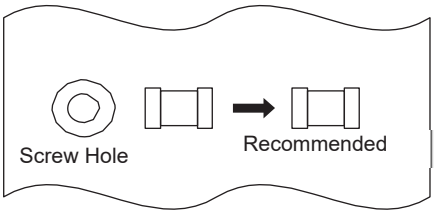
Contents of Measures	Stress Level
(1) Turn the mounting direction of the component parallel to the board separation surface.	A > D *1
(2) Add slits in the board separation part.	A > B
(3) Keep the mounting position of the component away from the board separation surface.	A > C



*1 A > D is valid when stress is added vertically to the perforation as with Hand Separation.
If a Cutting Disc is used, stress will be diagonal to the PCB, therefore A > D is invalid.

(3) Mounting Components Near Screw Holes

When a component is mounted near a screw hole, it may be affected by the board deflection that occurs during the tightening of the screw. Mount the component in a position as far away from the screw holes as possible.



10.6 Resin coating

The Impedance value may change and/or it may affect on the product's performance due to high cure-stress of resin to be used for coating/molding products. So please pay your careful attention when you select resin.
In prior to use, please make the reliability evaluation with the product mounted in your application set.

10.7 Temperature rating of the circuit board and components located around

Temperature may rise up to max. 40 ℃ when applying the rated current to the Products.
Be careful of the temperature rating of the circuit board and components located around.

10.8 Caution for use

There is possibility that the Impedance value change due to magnetism. Don't use a magnet or a pair of tweezers with magnetism when chip coil are handled. (The tip of the tweezers should be molded with resin or pottery.)

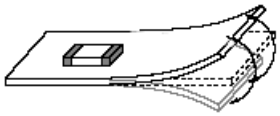
10.9 Magnetic Saturation

When the excessive current over rated current is applied, the Impedance value may change due to magnetism.

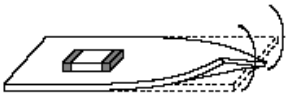
10.10 Handling of a substrate

After mounting products on a substrate, do not apply any stress to the product caused by bending or twisting to the substrate when cropping the substrate, inserting and removing a connector from the substrate or tightening screw to the substrate.
Excessive mechanical stress may cause cracking in the product.

Bending



Twisting



10.11 Storage and Handing Requirements

(1) Storage period

Use the products within 6 months after delivered.
Solderability should be checked if this period is exceeded.

(2) Storage conditions

・Products should be stored in the warehouse on the following conditions.

Temperature : -10°C to 40°C
Humidity : 15% to 85% relative humidity No rapid change on temperature and humidity

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

・Products should be stored on the palette for the prevention of the influence from humidity, dust and so on.

・Products should be stored in the warehouse without heat shock, vibration, direct sunlight and so on.

・Avoid storing the product by itself bare (i.e. exposed directly to air).

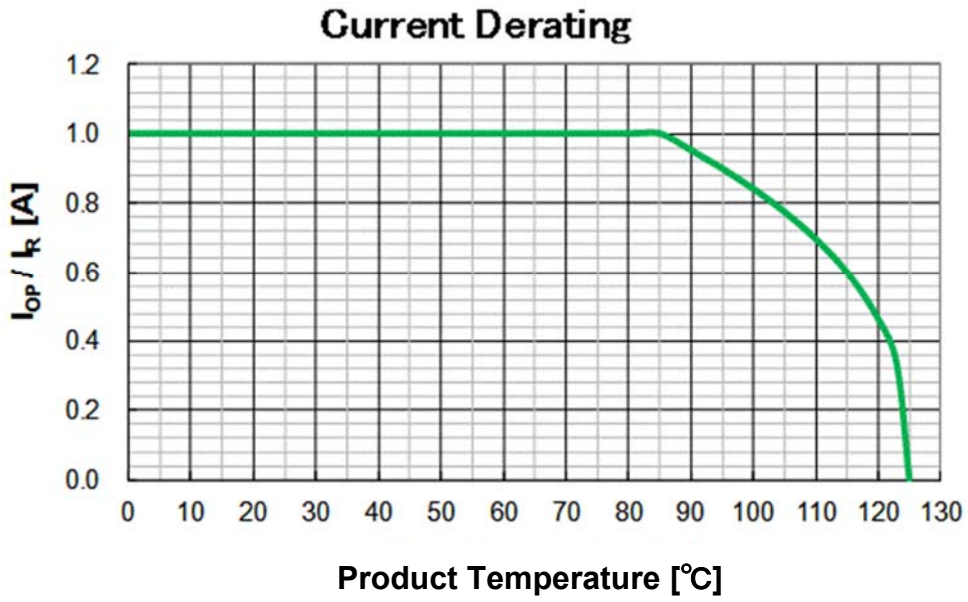
(3) Handling Condition

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

10.12 Derating

Max. current (DC, AC) as function of product temperature (derating curve)

I_{OP} : Loaded Current
I_R : Rated Current



11. ⚠ 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 agreed 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.