No. P-JAJJAK-E002/3
DATE 2026-11

PRODUCTS DATA SHEET

MICRO FUSE

Type JAJ, JAK

Size 3.2 mm x 1.6 mm

UL. cUL Recognized File No. E170721
RoHS directive compliant product <RoHS COMPLIANT LEAD FREE>
Applied for a structural patent



Type JAJ, JAK are *1 small size *2 high current products designed for circuit protection against excessive current in LED power circuits and motors, solenoid drive circuits, and small lithium-ion batteries for notebook PC, etc.

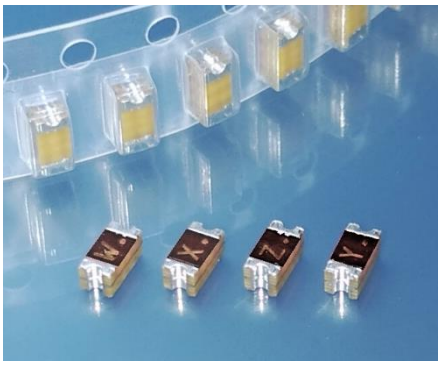
*1 Size 3.2 mm x 1.6 mm
*2 Maximum rated current 20A
Fusing characteristics 60VDC、100A

MATSUO ELECTRIC CO., LTD.

MICRO FUSE　　Type JAJ　JAK

FEATURES

1. Rated current of 20A, rated voltage of 60VDC, and rated breaking current of 100A achieved in spite of its compact size of 3.2x1.6x1.4mm by our original structure.
2. Fast-acting type fuse with little variation in fusing characteristics.
3. Performance against rush current is excellent since plate material is used for fuse element.
4. Surface temperature rise is 75°C or less when applying rated current for fusing. This gives less influence to the peripheral units.
5. Resistance to soldering heat: Reflow or flow soldering 10 seconds at 260 °C.
6. Our original terminal construction makes almost no occurrence of Tombstone phenomenon.
7. Suitable for automatic mounting
8. Precise dimensions allows high-density mounting and symmetrical construction of terminals provide “Self-Alignment”.
9. Complete lead-free, bromine-free.



CLEARING CHARACTERISTICS

Rated Voltage	Breaking Current
60 VDC	100 A

CERTIFICATION

Certification Body	File No.	Range of Rated Current
UL cUL Recognized	E170721	10 A ～ 20 A

CATEGORY TEMPERATURE RANGE

−40 ℃ ～ +125 ℃

INSULATION RESISTANCE

1 MΩ （between terminals and case）

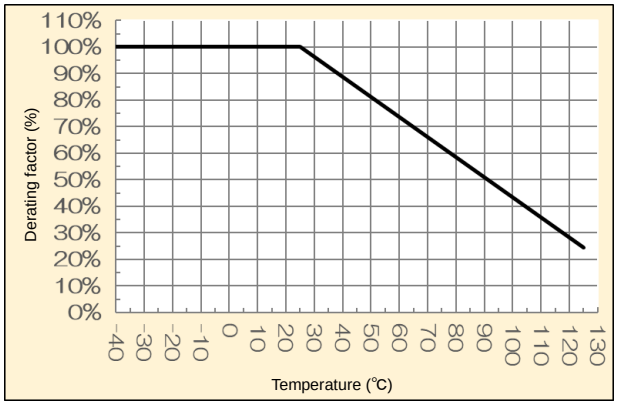
VOLTAGE DROP

Type JAJ	Type JAK
99 mV	83 mV

DERATING（REFERENCE DATA）

Steady current flowing through the fuse must be reduced by the ambient temperature.

Assuming that rated current value is 100%
Derating

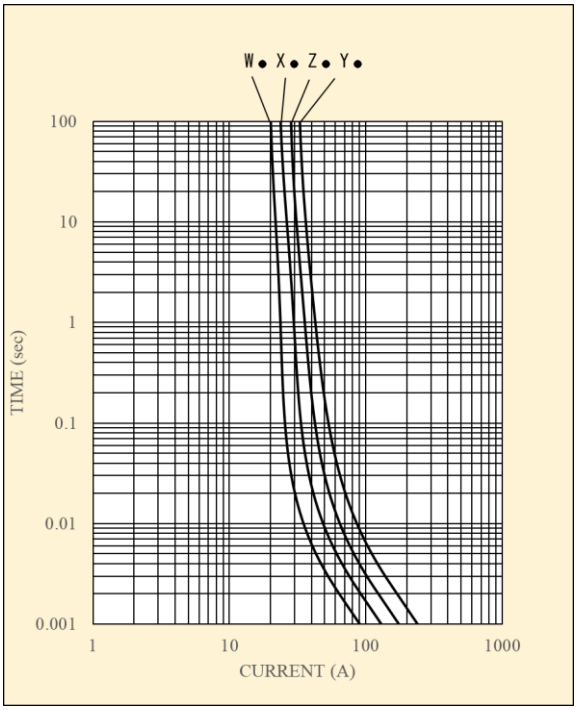


FUSING CHARACTERISTICS

Type	% of current rating	Time
Type JAJ	100 %	Not fusing more than 1 hour
	200 %	Fusing within 1 minute
Type JAK	100 %	Not fusing more than 1 hour
	250 %	Fusing within 1 minute

FUSING CHARACTERISTICS（REFERENCE DATA）

Fusing Characteristics



MARKING

Code	Type JAJ　Rated Current	Type JAK　Rated Current
W .	12.5 A	10 A
X .	16 A	12.5 A
Z .		16 A
Y .		20 A

CATALOG NUMBERS AND RATING

Type JAJ （200% fused product）

Marking Code	Catalog number	Rated current	Resistance （Reference）
W .	JAJ 6002133 NA52	12.5 A	4.59 mΩ
X .	JAJ 6002163 NA52	16 A	3.64 mΩ

Type JAK （250% fused product）

Marking Code	Catalog number	Rated current	Resistance （Reference）
W .	JAK 6002103 NA52	10 A	4.59 mΩ
X .	JAK 6002133 NA52	12.5 A	3.64 mΩ
Z .	JAK 6002163 NA52	16 A	2.98 mΩ
Y .	JAK 6002203 NA52	20 A	2.40 mΩ

Type JAJ and type JAK with the same rating marking code have exactly the same dimension, structure, and performance, and the only difference is the rating marking on the label.

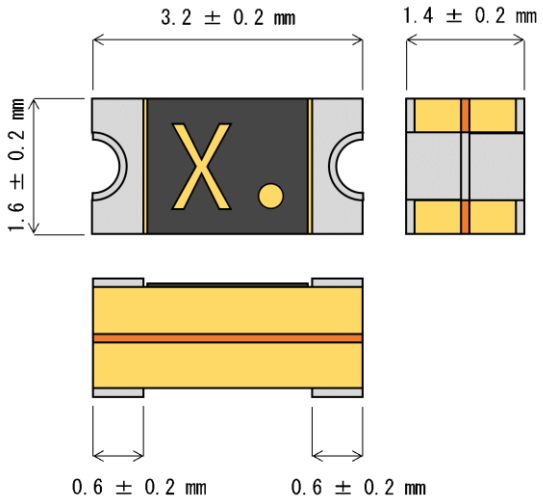
ORDERING INFORMATION

J A J 6 0 0 2 1 6 3 N A 5 2

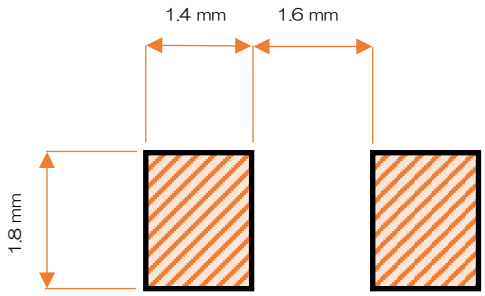
① ② ③ ④ ⑤ ⑥ ⑦

①Type	②Series	③Rated voltage	④Rated current	⑤Blank	⑥Package Code	⑦Case Code
Fusin Characteristics：Type 200%：JAJ 250%：JAK	Blank	60V：6002	10A：103 12.5A：133 16A：163 20A：203		NA	52

DIMENSIONS

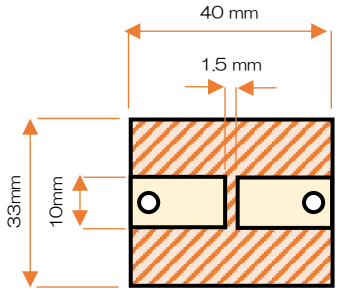


RECOMMENDED PAD DIMENSIONS



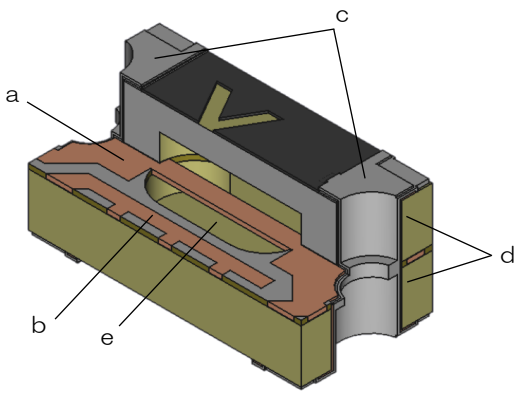
Please refer to the performance below for the temperature conditions of soldering.

STANDARD TEST BODY



Glass epoxy body on one side
Board thickness 1.6mm
Copper layer 70μm

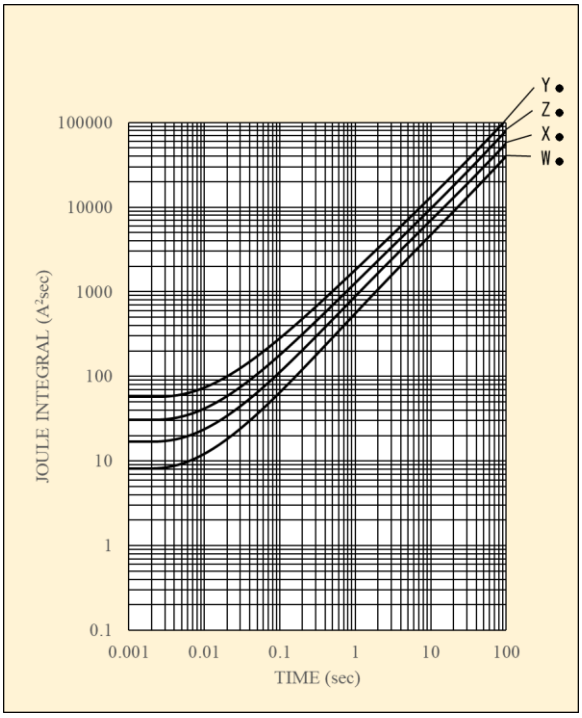
CONSTRUCTION



Code	Parts	Material
a	Fuse frame	Copper
b	Tiebar	Copper
c	Terminal	Copper foil, copper / nickel / tin plating
d	Exterior	Glass epoxy
e	Space	-

I^2t – t CHARACTERISTICS（REFERENCE DATA）

I^2t – t Characteristics



APPLICATION CLASSIFICATION BY USE

The application classification by use which divided the market and use into four is set up supposing our products being used for a broad use.
Please confirm the application classification by use of each product that you intend to use.
Moreover, please be sure to inform to our Sales Department in advance in examination of the use of those other than the indicated use.

PERFORMANCE

Item	Performance	Test method
Temperature rise	Temperature rise shall not exceed 75°C.	Apply rated current.
Current-carrying capacity	Shall not open within 1 hour.	Apply rated current.
Clearing characteristics	Marking shall be legible. Shall not ignite, shall not explode the exterior	60VDC, 100A
Voltage drop	Type JAJ：99mV, Type JAK：83mV	Apply rated current.
Fusing characteristics	Fusing within 1 min.	Ambient temperature : 10 ~ 30°C Type JAJ：Apply 200% of rated current. Type JAK：Apply 250% of rated current.
Insulation resistance	1 MΩ or more	Insulation resistance between terminals and case
Electrode strength (Bending)	No mechanical damage. Resistance change after the test shall be within ± 20%.	Board supporting width : 90 mm Bending : 3 mm Bending speed : Approx. 0.5 mm/sec. Duration : 60±5 sec.
Electrode strength （Shear test）	There is no peeling between the terminal and the substrate. Resistance change after the test shall be within ± 20%.	Applied force : 17.7 N Duration : 10 sec. Tool : R0.5 Pressurize from the side of the product
Substrate bending test	No mechanical damage. Resistance change after the test shall be within ± 20%.	Supporting dimension : 1.6 mm Applied force : 20 N Duration : 10 sec. Tool : R0.5 Direction of the press : thickness direction of product
Solderability (Solder Wetting time)	Solder Wetting time : within 3sec.	Solder : Sn－3Ag－0.5Cu Temperature : 245±3℃ meniscograph method
		Solder : JISZ3282 H60A,H60S,H63A Temperature : 230±2℃ meniscograph method
Solderability (new uniform coating of solder)	The dipping surface of the terminals shall be covered more than 95% with new solder.	Solder : Sn－3Ag－0.5Cu Temperature : 245±3℃ Dipping : 3 sec.
		Solder : JISZ3282 H60A,H60S,H63A Temperature : 230±2℃ Dipping : 3 sec.
Resistance to soldering heat	Marking shall be legible. No mechanical damage. Resistance change after the test shall be within ± 20%.	Measure after 1 hour left under room temperature and humidity. After soldering, leave it in normal temperature and humidity for 1 hour or more, and measure the resistance value. ＜Soldering conditions＞ Dipping (1 cycle) Preconditioning : 100～150℃／60±5s Temperature : 265±3℃／6～7s . Reflow soldering (2 cycles) Preconditioning : 1～2min 180℃ or less Peak : max 250±5℃ 5s Holding : 230～250℃ 30～40s Cooling : more than 2min Manual soldering Temperature : 350±10℃ Duration : 3～4s
Vibration	No mechanical damage. Resistance change after the test shall be within ± 20%.	Vibration amplitude：5G（49m/s^2）, Vibration time：20min Frequency range：10～2000Hz Number of cycles: 12 cycles each in 3 directions of XYZ (36 in total)
Shock	No mechanical damage. Resistance change after the test shall be within ± 20%.	Peak acceleration：1500G（14700m/s^2） Duration：0.5ms, Wave form：Half-sine, Speed change：4.7m/s 6 sides x 3 times (18 times in total)
Temperature cycle	No mechanical damage. Resistance change after the test shall be within ± 20%.	Perform 10 cycles, with steps 1 and 2 below as one cycle. The transition time between stage 1 and stage 2 shall be within 3 min. Step1：-55℃±3℃/30±3min Step2：125±2℃/30±3min
Moisture resistance	No mechanical damage. Resistance change after the test shall be within ± 20%.	Temperature : 85±3℃ Humidity : 85±5%RH Duration : 1000 h
Load life	N No mechanical damage. Resistance change after the test shall be within ± 20%.	Temperature : 85±2℃ Current : rated current × 70% Duration : 1000 h
Moisture resistance load	No mechanical damage. Resistance change after the test shall be within ± 20%.	Temperature : 85±3℃ Humidity : 85±5%RH Current : rated current × 70% Duration : 1000 h
High temperature exposure （Stability）	No mechanical damage. Resistance change after the test shall be within ± 20%.	Temperature : 125±2℃ No electricity. Duration : 1000 h
Solvent resistance	Marking shall be legible. No damage to the appearance. The resistance value after the test must be within ± 20% of the resistance value before the test.	Dipping rinse Solvent : Isopropyl alcohol Duration : 90 sec.

Application Notes for Micro Fuse

1. Circuit Design

Micro Fuse should be designated only after confirming operating conditions and Micro Fuse performance characteristics.
When determining the rated current, be sure to observe the following items :
(1) Micro Fuse should always be operated below the rated current (the value considered in the temperature derating rate) and voltage specifications.
(2) Micro Fuse should always be operated below the rated voltage.
(3) Micro Fuse should be selected with correct rated value to be fused at overload current.
(4) When Micro Fuse are used in inrush current applications, please confirm sufficiently inrush resistance of Micro Fuse.
(5) Please do not apply the current exceeding the breaking current to Micro Fuse.
(6) Use Micro Fuse under the condition of category temperature.
(7) Micro Fuse should not be used in the primary power source (AC side).

Micro Fuse should be selected by determining the operating conditions that will occur after final assembly, or estimating potential abnormalities through cycle testing.

2. Assembly and Mounting

During the entire assembly process, observe Micro Fuse body temperature and the heating time specified in the performance table. In addition, observe the following items :
(1) Mounting and adjusting with soldering irons are not recommended since temperature and time control is difficult.
In case of emergency for using soldering irons, be sure to observe the conditions specified in the performance table.
(2) Micro Fuse body should not contact a soldering iron directly.
(3) Once Micro Fuse mounted on the board, they should never be remounted on boards or substrates.
(4) During mounting, be careful not to apply any excessive mechanical stresses to the Micro Fuse.

3. Solvents

For cleaning of Micro Fuse, immersion in isopropyl alcohol for 90 seconds (at 20 ~ 30°C liquid temp.) will not be damaged.
If organic solvents will be used to Micro Fuse, be sure to preliminarily check that the solvent will not damage Micro Fuse .

4. Ultrasonic Cleaning

Ultrasonic cleaning is not recommended for Micro Fuse. This may cause damage to Micro Fuse such as broken terminals which results in electrical characteristics effects, etc. depending on the conditions.
If Ultrasonic cleaning process must be used, please evaluate the effects sufficiently before use.

5. Caution During Usage

(1) Micro Fuse with electricity should never be touched. Micro Fuse with electricity may cause burning due to Micro Fuse high temperature.
Also, in case of touching Micro Fuse without electricity, please check the safety temperature of Micro Fuse.
(2) Protective eyeglasses should always be worn when performing fusing tests. However, there is a fear that Micro Fuse will explode during test.
During fusing tests, please cover particles not to fly outward from the board or testing fixture. Caution is necessary during usage at all times.

6. Environmental Conditions

(1) Micro Fuse should not be stored or operated in the presence of acids, or alkalis, or corrosive atmosphere.
(2) Micro Fuse should not be vibrated, shocked, or pressed excessively.
(3) Micro Fuse should not be operated in a flammable or explosive atmosphere.
(4) Please do not use Micro fuse in the environment where dew condensation occurs.
In case Micro fuse has to be used under the dew condensation condition, please apply moisture-proof coating over Micro fuse.
Covering Micro fuse with moisture-proof coating may affect electrical characteristics, please evaluate the effects sufficiently before use.

7. Emergency

In case of fire, smoking, or offensive odor during operation, please cut off the power in the circuit or pull the plug out.

8. Storage

(1) Micro Fuse should not be stored in an environment with high temperature, low temperature, high humidity, condensation and dust and avoid direct sunlight or corrosive atmosphere such as H_2S(hydrogen sulfide) or SO_2(sulfur dioxide).
Direct sunlight may cause decolorization and deformation of the exterior and taping.
Also, solderability will be remarkably lower in high humidity.
(2) If the products are stored for an extended period of time, please contact Matsuo Sales Department for recommendation. The longer storage term causes packages and tapings to worsen. If the products will be stored for longer term, please contact us for advice.
(3) The products in taping, package, or box should not be given any kind of physical pressure. Deformation of taping or package may affect automatic mounting.
(4) The plastic reel (made of PS) used for packaging the product is intended for use in ambient temperatures (5-35℃). To prevent issues during automated insertion due to reel deformation or other factors, please keep the reel away from direct sunlight and heat sources, and ensure it does not reach high temperatures (above 60℃), including during transportation.

9. Disposal

When Micro Fuse are disposed of as waste or “scrap”, they should be treated as “industrial waste”. Micro Fuse contain various kinds of metals and resins.

10. Samples

Micro Fuse received as samples should not be used in any products or devices in the market. Samples are provided for a particular purpose such as configuration, confirmation of electrical characteristics, etc.

MATSUO ELECTRIC CO., LTD.

Please feel free to ask our Sales Department for more information on Micro Fuse.

Overseas Sales 5-3,3-Chome,Sennari-cho,Toyonaka-shi,Osaka 561-8558,Japan Tel:06-6332-0883 Fax:06-6332-0920
Head office 5-3,3-Chome,Sennari-cho,Toyonaka-shi,Osaka 561-8558,Japan Tel:06-6332-0871 Fax:06-6331-1386
URL https://www.ncc-matsuo.co.jp/

Specifications on this catalog are subject to change without prior notice. Please inquire of our Sales Department to confirm specifications prior to use.

適用用途分類 / APPLICATION CLASSIFICATION BY USE

Rev.7 (2025.10.03)

市場	適用用途分類	用途		推奨品種	推奨品種
		概要	代表的なアプリケーション例	チップタンタルコンデンサ	回路保護素子
高信頼度機器	1	・高度な安全性や信頼性が要求される機器 ・製品の保守交換が不可能な機器、製品の故障が人命に直接かかわる、または、致命的なシステムダウンを引　き起こす可能性がある機器	・宇宙開発機器関連(衛星、ロケット、人工衛星) ・航空・防衛システム ・原子力・火力・水力発電システム	267型Pシリーズ	該当なし
車載・産業機器	2	・信頼性が重視される機器 ・製品の保守交換が極めて困難な機器や、製品の故障が人命に影響する、あるいは故障の範囲が広範囲である機器	・自動車および鉄道・船舶等の輸送機器の車両制御(エンジン制御,駆動制御,ブレーキ制御) ・新幹線・主要幹線の運行制御システム	267型Nシリーズ 271型Nシリーズ	JAG型Nシリーズ JAJ型Nシリーズ JAK型Nシリーズ JHC型Nシリーズ KAB型Nシリーズ KVA型Nシリーズ
	3-A	・車載用だが一般電装機器で車室内環境において使用される機器	・エアコン,カーナビ等の車室内搭載部品、　車載用通信機器		KAB型Mシリーズ
	3-B	・製品の保守交換が可能な機器や、製品の故障が人命に影響しないが故障によるシステムダウンの損失が大きく保全管理が要求される機器	・家庭用/ビル用等のセキュリティ管理システム ・工業用ロボットや工作機械等の制御機器	267型M,Eシリーズ 279型 281型M,Eシリーズ TCA型 TCD型	JHC型
汎用機器	4	・最先端技術を積極的に適用する小型・薄型品 ・製品の保守交換が可能な機器や、製品の故障によるシステムダウンが部分的な機器向けの市場で広く使用されることを想定した製品	・スマートフォン、携帯電話、モバイルPC(タブレット)、電子辞書 ・デスクトップPC、ノートPC、ホームネットワーク ・アミューズメント機器(パチンコ、ゲーム機)	251型Mシリーズ 267型Cシリーズ TCB型	JAE型、JAG型 JAJ型、JAK型 KAB型 KAB型Tシリーズ KVA型

Market	Application classification by use	Use		Recommendation Type	Recommendation Type
		Outline	Typical example of application	Chip Tantalum Capacitors	Circuit Protection Components
High reliability apparatus	1	- Apparatus in which advanced safety and reliability are demanded. - Whether failure of the apparatus which cannot maintenance exchange products, and a product is direct for a human life, apparatus which changes or may cause a fatal system failure.	- Space development apparatus relation (Satellite, Rocket, Artificial Satellite) - Aviation and a defensive system - Atomic power, fire power, and a water-power generation system	Type 267 P Sereis	With no relevance
In-vehicle - Industrial apparatus	2	- Apparatus in which reliability is important. - The apparatus in which maintenance exchange of a product is very difficult, and failure of a product influence a human life, or the range of failure is wide range.	- Vehicles control of transport machines, such as a car, and a railroad, a vessel (Engine control, drive control, brake control) - The operation control system of the Shinkansen and a main artery	Type 267 N Sereis Type 271 N Sereis	Type JAG N series Type JAJ N series Type JAK N series Type JHC N series Type KAB N series Type KVA N series
	3-A	- General electrical equipment designed for use in vehicles but used in the interior environment	- Vehicle indoor loading parts, such as an air-conditioner and car navigation, and in-vehicle communication facility		Type KAB M series
	3-B	-Apparatus which can maintenance exchange products, and apparatus in which the loss of the system failure is large although failure of a product does not influence a human life, and maintenance engineering is demanded	- Security management system for home/buildings etc. - Control apparatus, such as Industrial use robots and a machine tool etc.	Type 267 M,E Sereis Type 279 Type 281 M,E Sereis Type TCA Type TCD	Type JHC
Apparatus in general	4	- The small size and the thin article which applies leading-edge technology positively - The product supposing being used widely in the market for the apparatus which can maintenance exchange products, and apparatus with a partial system failure by failure of product.	-Smart phone, Mobile phone, Mobile PC (tablet), Electronic dictionary - Desktop PC, Notebook PC, Home network - Amusement apparatus (Pachinko,Game machine)	Type 251 M Series Type 267 C Series Type TCB	Type JAE, Type JAG Type JAJ, Type JAK Type KAB Type KAB T series Type KVA

テーピング数量・リール寸法
Taping Quantity And Carrier Tape Dimensions

チップタンタルコンデンサ
Chip Tantalum Capacitors

定格：251型Mシリーズ, TCB型
Type：251 M Series, TCB

ケース記号 Case Code	ケースサイズ Case size	W (mm)	F (mm)	E (mm)	P_1 (mm)	P_2 (mm)	P_0 (mm)	ϕD_0 (mm)	包装数/リール(個) Quantity/Reel (pcs)	
									ϕ180	ϕ330 ※1
U	1.0×0.5	8.0±0.3	3.5±0.05	1.75±0.1	2.0±0.05	2.0±0.05	4.0±0.1	1.55±0.03	10,000	-
M	1.6×0.8				4.0±0.1			$1.5^{+0.1}_{0}$	3,000	15,000
S	2.0×1.25									10,000
A	3.2×1.6									-

※1. 251 type only.

定格：267型Mシリーズ, 267型Eシリーズ, 267型Pシリーズ, 271Nシリーズ
279型Mシリーズ, 281型Mシリーズ, 281型Eシリーズ
Type：267 M Series, 267 E Series, 267 P Series, 271 N Series
279 M Series, 281 M Series, 281 E Series

ケース記号 Case Code	ケースサイズ Case size	W (mm)	F (mm)	E (mm)	P_1 (mm)	P_2 (mm)	P_0 (mm)	D_0 (mm)	包装数/リール(個) Quantity/Reel (pcs)	
									ϕ180	ϕ330
A	3.2×1.6	8.0±0.3	3.5±0.05	1.75±0.1	4.0±0.1	2.0±0.05	4.0±0.1	$\phi 1.5^{+0.1}_{0}$	2,000	9,000
B	3.5×2.8									8,000
C3	6.0×3.2	12.0±0.3	5.5±0.05		8.0±0.1				500	3,000
D3	7.3×4.4		5.7±0.05	1.5±0.1						2,500
H	7.3×4.4		5.7±0.1							1,500
E	7.3×5.8		5.5±0.05	1.75±0.05						2,000

定格：267型Nシリーズ、TCA型
Type：267 N Series, TCA

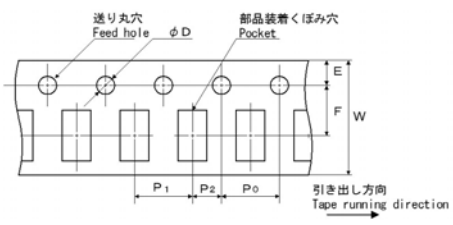
ケース記号 Case Code	ケースサイズ Case size	W (mm)	F (mm)	E (mm)	P_1 (mm)	P_2 (mm)	P_0 (mm)	D_0 (mm)	包装数/リール(個) Quantity/Reel (pcs)	
									ϕ180	ϕ330
A	3.2×1.6	8.0±0.3	3.5±0.05	1.75±0.1	4.0±0.1	2.0±0.05	4.0±0.1	$\phi 1.5^{+0.1}_{0}$	2,000	9,000
B	3.5×2.8									8,000
C	6.0×3.2	12.0±0.3	5.5±0.05		8.0±0.1				500	3,000
D	7.3×4.4		5.7±0.05	1.5±0.1						2,500

回路保護素子
Circuit Protection Components

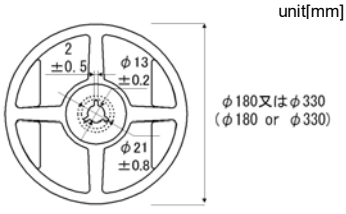
定格：JAE型、JAG型、JAG型Nシリーズ、JAJ型、JAJ型Nシリーズ、JAK型、JAK型Nシリーズ、JHC型、JHC型Nシリーズ
KAB型、KAB型Nシリーズ、KAB型Mシリーズ、KAB型Tシリーズ、KVA型、KVA型Nシリーズ
Type：JAE, JAG, JAG N Series, JAJ, JAJ N Series, JAK, JAK N Series, JHC, JHC N Series
KAB, KAB N Series, KAB M Series, KAB T Series, KVA, KVA N Series

ケース記号 Case Code	ケースサイズ Case size	W (mm)	F (mm)	E (mm)	P_1 (mm)	P_2 (mm)	P_0 (mm)	D_0 (mm)	包装数/リール(個) Quantity/Reel (pcs)	
									ϕ180	ϕ330
29	1.6×0.8	8.0±0.3	3.5±0.05	1.75±0.05	4.0±0.1	2.0±0.05	4.0±0.1	ϕ1.55±0.03	5,000	-
31	2.0×1.25									-
52	3.2×1.6			1.75±0.1				ϕ1.5±0.1	2,000	-
44E	7.3×5.8	12±0.3	5.5±005		8.0±0.1			$\phi 1.5^{+0.1}_{0}$	500	1,500
26F	11.0×7.3	24±0.3	11.5±005		12.0±0.1				-	1,500
59F									-	500

テーピング寸法/Tape dimensions



リール寸法/Reel dimensions　単位[mm]
unit[mm]



チップタンタルコンデンサ テーピング形状記号
Chip Tantalum Capacitors Tape code

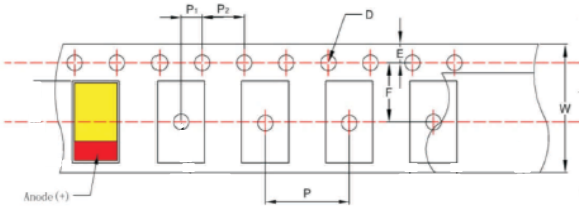
φ180リール φ180Reel	φ330リール φ330Reel	極性 Anode notation
L	P	送り穴側 ＋ Feed hole ＋
R	N	送り穴側 － Feed hole －

チップタンタルコンデンサ
Chip Tantalum Capacitors

定格：TCD型
Type：TCD

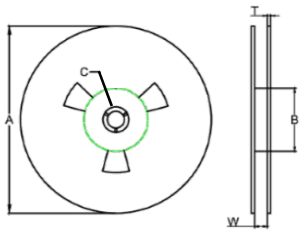
ケース記号 Case Code	ケースサイズ Case size	W (mm)	F (mm)	E (mm)	P (mm)	P_1 (mm)	P_2 (mm)	φD (mm)	包装数/リール(個) Quantity/Reel (pcs)
									φ180
B	3.5×2.8×2.1	8±0.30	3.5±0.05	1.75±0.10	4±0.10	4±0.10	2±0.10	1.55±0.20	2,000
D	7.3×4.3×2.8	12±0.30	5.5±0.05	1.75±0.10	4±0.10	8±0.10	2±0.10	1.55±0.20	500

テーピング寸法/Tape dimensions



単位[mm]
unit[mm]

リール寸法/Reel dimensions



リール Reel	テープ幅 Tape width	A	B	C	W	T
φ180	12	178±2.00	50 min	13.0±0.50	12.4+1.5/-0	1.50±0.50