NCC	PRODUCTS DATA SHEET	No. P-JAD-001 DATE 2003-09

UL. cUL Approved
File No.170721

MICRO FUSE

Type JAD

MATSUO ELECTRIC CO., LTD.

With wide use of portable electronic equipment, the demand for high capacity batteries is increasing.
Type JAD is designed for protection of circuits using batteries against excessive current.
Surface mount technology provides suitable products for miniaturization and portability.
Also, the ecology design of Type JAD is kind to the environment due to lead free terminals.

FEATURES

Type JAD is a micro fuse approved by UL.
Thermal element with a low melting point offers excellent fusing characteristics.
Component surface temperature shall be less than 100°C in fusing.(2 × Rated Current)
Small and precise dimensions with epoxy resin mold 3216 (3.2 × 1.6 × 1.6mm)
Suitable for automatic mounting.
Symmetrical construction of positive and negative terminal provides “Self Alignment”.
Reflow or flow soldering 10 seconds at 260°C.
Reel package with 8 mm width as standard.

CHARACTERISTICS

ITEM	CHARACTERISTICS
Operating Temperature Range	-40 - +125°C
Rated Current	0.5 - 0.8 - 1.0 - 1.25 - 1.6 - 2.0 - 2.5 - 3.15 - 4.0A
Rated Voltage	24VDC
Voltage Drop	See below “Ratings and Catalog Numbers”
Insulation Resistance	1000MΩ or more
Fusing Characteristics	Fusing within 1 minutes 2.0 × Rated Current

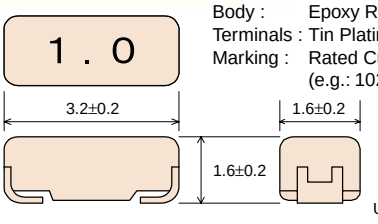
RATINGS AND CATALOG NUMBERS

Table-1

Catalog Number	Rated Current (In) (A)	Typical Internal Resistance(mΩ) (Typ)	Voltage Drop mV (Max)	I^2t* A^2s (Typ)	Rated Voltage VDC
JAD 2402 501 □□010	0.5	210	150	0.016	
JAD 2402 801 □□010	0.8	127	150	0.020	
JAD 2402 102 □□010	1.0	92	130	0.043	
JAD 2402 132 □□010	1.25	69	120	0.085	
JAD 2402 162 □□010	1.6	54	120	0.13	24
JAD 2402 202 □□010	2.0	44	120	0.24	
JAD 2402 252 □□010	2.5	36	120	0.40	
JAD 2402 322 □□010	3.15	25	120	0.56	
JAD 2402 402 □□010	4.0	20	120	0.75	

∗ Standard of I^2t is when the 10 times of RC is applied.

DIMENSION



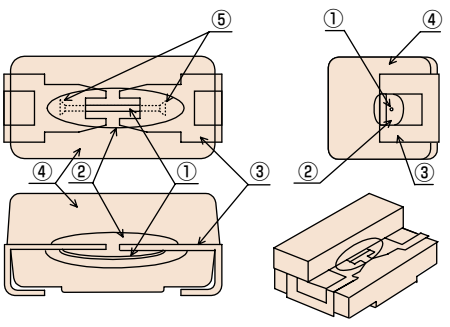
Body : Epoxy Resin
Terminals : Tin Plating
Marking : Rated Current
(e.g.: 102=RC at 1.0A)

Unit: mm

MARKING

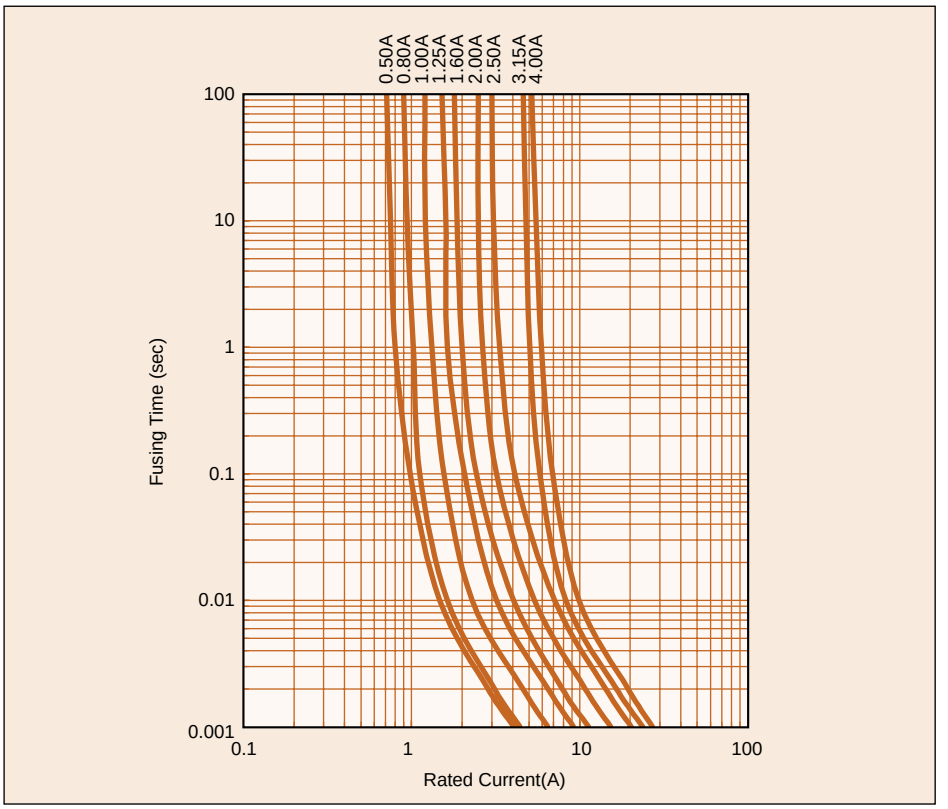
CODE	Rated Current
501	0.5 A
801	0.8 A
102	1.0 A
132	1.25A
162	1.6 A
202	2.0 A
252	2.5 A
322	3.15A
402	4.0 A

CONFIGURATION



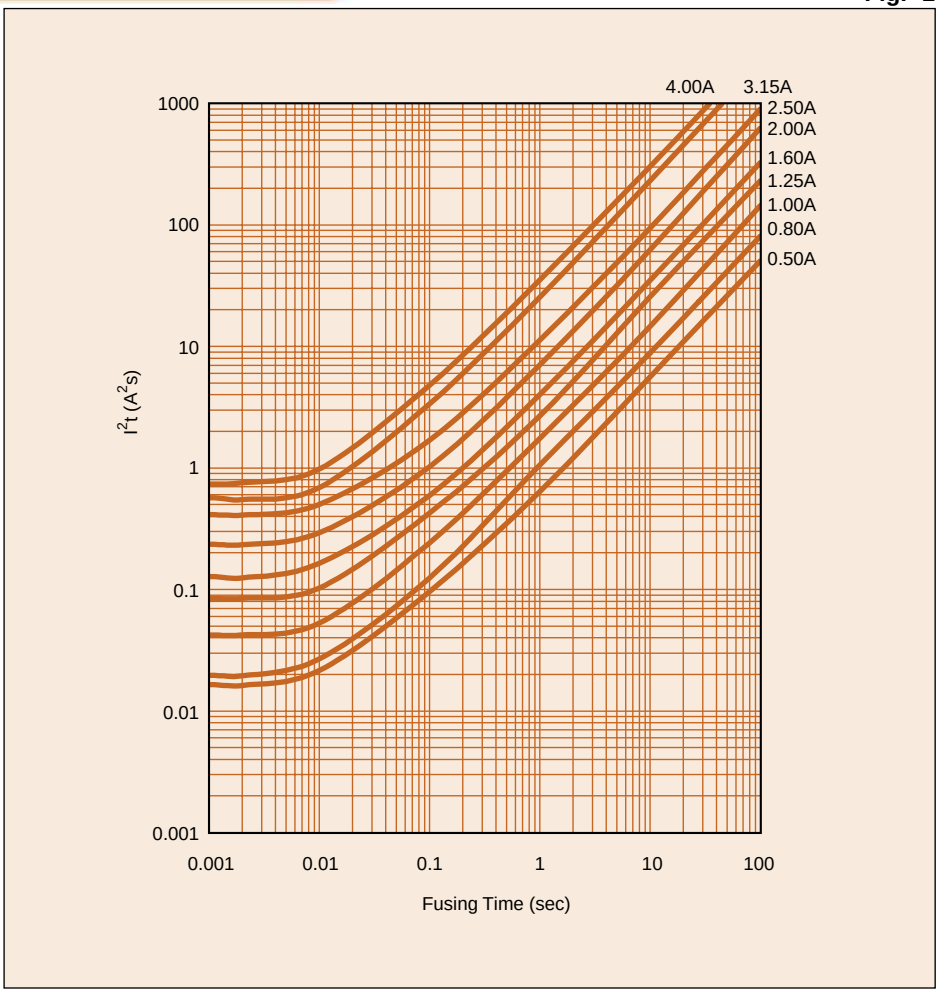
NO	NAME	MATERIAL	MEMO
①	Fuse Wire	Lead Alloy	–
②	Arc-extinguishing Material	Silicon	Potting
③	Lead Terminals	Phospher Bronze	Tin Plating
④	Molding	Epoxy Resin	Transfer Mold
⑤	Welding Point	–	Resistance Welding

FUSING CHARACTERISTICS



I^2t – t CHARACTERISTICS

Fig. -1



PERFORMANCE

ITEM	PERFORMANCE	TEST METHOD
Temperature rise	The temperature rise shall not exceed 70°C	Apply rated current with ambient temp. 10-30°C
Current-carrying capacity	Shall not open within 1 hour	Apply 110% of rated current at 70°C
Voltage drop	Voltage drop is below the value of table 1.	Apply rated current with 24V
Fusing characteristics	Fusing within 1 minutes	Apply 200% of rated current
Insulation resistance	1000MΩ or more	Insulation resistance between case and terminals
Bent Strength	No mechanical damage Satisfactory electrical performance	Supporting width of substrate : 90mm Bending speed : 0.5mm/second Holding time : 30 sec. Bending : 3mm
Adhesion	No mechanical damage Satisfactory electrical performance	Applied force : 20N (2.04kgf) Duration : 10 seconds
Body strength	No mechanical damage Satisfactory electrical performance	Supporting jig : 1.2mm Applied force : 10N (1.02kgf)
Resistance to soldering heat	Marking shall be legible No mechanical damage Satisfactory electrical performance	Dipping (1 cycle) Preconditioning : 100-150°C/60 seconds Temperature : 260±5°C 10±1 sec. Reflow Soldering (2 cycle) Preconditioning : Below180°C/1–2 minutes Peak : 250±5°C 5 sec. Hold : 230–250°C 30–40 sec. Cooling off : More than 2 min. Hand Soldering Temp of soldering iron : 350±10°C Time : 3–4 sec.
Solderability	The dipped surface of the terminals shall be covered more than 95% with new solder	Dipping Temperature : 245±3°C Composition : Sn-3Ag-0.5Cu
		Dipping Temperature : 235±5°C Composition : JISZ3282–H60A, H60S, H63A
Solvent resistance	Marking shall be legible No mechanical damage Satisfactory electrical performance	Microwave rinse Solvent : isopropyl alcohol Microwave : 20mW/cm^3 28kHz Time : 60 seconds Dipping rinse Solvent : isopropyl alcohol Time : 90 sec.
Vibration	No mechanical damage Satisfactory electrical performance	Frequency range : 10–50–10 Hz/minute Vibration amplitude : 1.5mm in each of XYZ directions Duration : 2 hours (Total 6 hours)
Shock		Peak value : 490m/s^2 (50G) Duration : 11ms 6 aspects × 3 times (Total 18 times)
Thermal shock		Step 1 : -55±3°C 30 minutes. Step 2&4 : Room temperature 2–3 min. Step 3 : +125±2°C 30 min. Repeat Step 1-4 for 10 cycles
Salt spray		Temperature : 35±2°C Salt solution : 5±1% Length of test : 24 hours
Moisture resistance		Temperature : 85±3°C Humidity : 85±3% R.H. Duration : 1000, +48, -0h
Load life		Temperature : 85±3°C Applied current : RC x 0.78 Duration : 1000, +48, -0h
Stability at high temp.		Temperature : 125±3°C Duration : 1000, +48, -0h

ORDERING INFORMATION

J A D 2 4 0 2 1 0 2 N A 0 1 0

Type	Code	RV
JAD	2402	24V

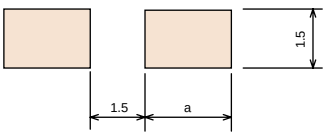
Code	Rated Current
501	0.5 A
801	0.8 A
102	1.0 A
132	1.25A
162	1.6 A
202	2.0 A
252	2.5 A
322	3,15A
402	4.0 A

Code	Style
NA	ϕ180 Reel
ND	ϕ330 Reel

Special Spec.
010*

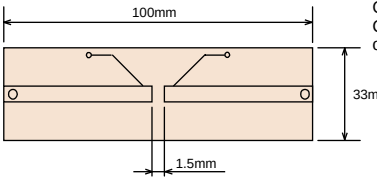
*Special spec 010 indicates lead-free terminals.

RECOMMENDED PAD DIMENSIONS



a (mm)
3.0 for flow
2.0 for reflow

STANDARD TEST BOARD



Glass/epoxy 1.6mm
Copper layer (35μm)
on one side

■Application Notes for Circuit Protection Components (Micro Fuse: Type JAD)

⚠Circuit Design

1. Circuit Protection Components (hereinafter called “CPCs”) should be designated only after confirming operating conditions and the CPCs’ performance characteristics.
2. CPCs should always be operated under the rated current (the value considered in the temperature derating rate) and voltage specifications.
3. For best results, please set the fusing current (irregular current) at 2.5 times the rated current. When CPCs are used in inrush current applications, please confirm sufficiently inrush resistance of CPCs.
4. CPCs should not be used in circuits exceeding the rated voltage.
5. CPCs should be selected by determining the operating conditions that will occur after final assembly, or estimating potential abnormalities through cycle testing.
6. CPCs should not be used in the primary power source.

⚠Assembly and Mounting

7. During the entire assembly process, CPCs body temperature should not exceed 10 seconds at 260°C.
8. CPCs’ body should not have contact with a soldering iron.
9. Once CPCs mounted on the board, they should never be remounted on boards or substrates.
10. Fixing with soldering iron should not be performed. In case of emergency, the iron tip contacting the terminals should not exceed 3 seconds at 300°C.

⚠Solvents

11. For cleaning CPCs, immersion in isopropyl alcohol for 5 minutes (at 20-30°C liquid temp.) is recommended. If organic solvents will be applied to the CPCs, please evaluate sufficiently for effects before usage.

⚠Ultrasonic Cleaning

12. Ultrasonic cleaning is not recommended for CPCs. This may cause damage to the CPCs such as broken terminals, electrical characteristics effects, etc depending on the conditions.
    If Ultrasonic cleaning process must be used, please evaluate the effects sufficiently before usage.

⚠Caution During Usage

13. CPCs with electricity should never be touched. CPCs with electricity may cause burning due to the CPCs’ high temperature. Also, in case of touching CPCs without electricity, please check the safety temperature of CPCs.
14. Protective eyeglasses should always be worn when performing fusing tests. However, it is possible that CPCs will explode during testing. During fusing tests, please cover particles not to fly outward from the board or testing fixture. Caution is necessary during usage at all times.

⚠Environmental Conditions

15. CPCs should not be operated in acid, alkali, or active gas atmosphere.
16. CPCs should not be vibrated, shocked, or pressed excessively.
17. CPCs should not be operated in a flammable or explosive atmosphere.

⚠Emergency

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

⚠Storage

19. CPCs should be stored at room temperature (-10°C to +40°C) without direct sunlight. Direct sunlight may cause decolonization and deformation of the exterior and taping. Also, it is possible that solderability will be remarkably lower in high humidity.
20. If the products are stored for an extended period of time, please contact the 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 the Matsuo Sales Department for advice.
21. 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.

⚠Disposal

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

⚠Samples

23. CPCs received as samples should not be used in 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 the Circuit Protection Components.

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Export Dep.	Takara Bldg., 8-7 Toyotsu-cho, Suita-shi, Osaka 564-0051, Japan	Tel : 06-6337-6450	Fax : 06-6337-6456
USA	Matsuo Electronics of America, Inc. 2134 Main Street, Suite 200, Huntington Beach, CA 92648	Tel : 714-969-2491	Fax : 714-960-6492
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