TYPE KAB M Series 720

(P-KABM720-E004)

Type KAB M series 720 micro fuse is designed for circuit protection against excessive current in navigation systems, in-vehicle camera systems interior automotive components and other machinery equipments etc, which is significantly reliable type.
It is qualified for AEC-Q200 that the standard is globally applied by automotive industry.
Also, the ecology design of Type KAB M series 720 is friendly to environment due to complete lead free.

FEATURES

1. New type fuses were developed by our original technology. They show no variation in fusing characteristics and have excellent fast-blow capability.
2. Surface temperature rise is 75°C or less when applying rated current. This offers less influence on the peripheral units.
3. The fuses come in ultra-small size 1608 (1.6×0.8×0.45 mm) and 2012 (2.0×1.25×0.5 mm).
4. Precise dimensions allows high-density mounting and symmetrical construction of terminals makes possible for automatic mounting and “Self-Alignment” by chip placer.
5. Resistance to soldering heat : Reflow or flow soldering 10 seconds at 260°C
6. High accuracy carrier tape by using pressed pocket paper ensures excellent mounting.
7. LEAD-FREE and RoHS Compliant
8. Due to its high reliability, KAB M series 720 are suitable for circuit designs for automotive interiors.
   (Matsuo Usage Application : category 3, see below)

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.

Market	Application classification by use	Use		Recommendation Type
		Outline	Typical example of application	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	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 KAB N series Type JAG N series Type KVA N series
	3	-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	- Vehicle indoor loading parts, such as an air-conditioner and car navigation, and in-vehicle communication facility - Security management system for home/buildings etc. - Control apparatus, such as Industrial use robots and a machine tool etc.	Type KAB M series
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 KAB Type KAB T series Type KAH Type JAE, Type JAG Type JAH, Type JAH L series Type JHB, Type JHC, Type JHC H series Type KVA

RATING

Item	Rating	
Category Temperature Range	-40 ～ +125℃	
Rated Current	1.6×0.8	0.5-0.63-0.8-1.0-1.25-1.6-2.0-2.5-3.15-4.0-5.0-6.3A
	2.0×1.25	0.5-0.63-0.8-1.0-1.25-1.6-2.0-2.5-3.15-4.0-5.0-6.3-8.0A
Rated Voltage	24VDC, 32VDC, 50VDC	
Voltage Drop	Refer to CATALOG NUMBERS AND RATING	
Insulation Resistance (between Terminals and Case)	1000MΩ or more	
Fusing Characteristics	Fusing within 1 min if the current is 200% of rated current.	
Clearing Characteristics	Breaking voltage：24V, 32V, 50V	
	Breaking current：50A	

ORDERING INFORMATION

K A B　M　2 4 0 2　1 0 2　N A　3 1　7 2 0

Type
KAB

Serie
M

Code	Voltage
2402	24V
3202	32V
5002	50V

Code	Rated current
501	0.5 A
631	0.63 A
801	0.8 A
102	1.0 A
132	1.25 A
162	1.6 A
202	2.0 A

Code	Rated current
252	2.5 A
322	3.15 A
402	4.0 A
502	5.0 A
632	6.3 A
802	8.0 A

Code	Packaging type
NA	φ180 Real

Code	Case size
29	1.6 × 0.8
31	2.0 × 1.25

Special product code
720

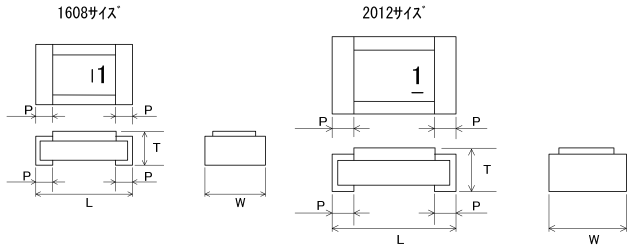
CATALOG NUMBERS AND RATING

May., 2018

Catalog number	Case size	Rated current A	Internal resistance mΩ (Typical)	Voltage drop mV (Max.)	Rated voltage VDC	Breaking current A
KABM 5002 501 □□29 720	1.6×0.8	0.5	210	140	50	50
KABM 3202 631 □□29 720	1.6×0.8	0.63	144	115	32	
KABM 3202 801 □□29 720	1.6×0.8	0.8	100	110		
KABM 3202 102 □□29 720	1.6×0.8	1.0	80	110		
KABM 3202 132 □□29 720	1.6×0.8	1.25	60	110		
KABM 3202 162 □□29 720	1.6×0.8	1.6	46	110		
KABM 3202 202 □□29 720	1.6×0.8	2.0	35	110		
KABM 2402 252 □□29 720	1.6×0.8	2.5	27	110	24	
KABM 2402 322 □□29 720	1.6×0.8	3.15	20	110		
KABM 2402 402 □□29 720	1.6×0.8	4.0	15	110		
KABM 2402 502 □□29 720	1.6×0.8	5.0	13	110		
KABM 2402 632 □□29 720	1.6×0.8	6.3	10	110		
KABM 2402 501 □□31 720	2.0×1.25	0.5	260	170	24	50
KABM 2402 631 □□31 720	2.0×1.25	0.63	175	150		
KABM 2402 801 □□31 720	2.0×1.25	0.8	120	145		
KABM 2402 102 □□31 720	2.0×1.25	1.0	90	135		
KABM 2402 132 □□31 720	2.0×1.25	1.25	67	130		
KABM 2402 162 □□31 720	2.0×1.25	1.6	48	120		
KABM 2402 202 □□31 720	2.0×1.25	2.0	36	115		
KABM 2402 252 □□31 720	2.0×1.25	2.5	28	110		
KABM 2402 322 □□31 720	2.0×1.25	3.15	21	105		
KABM 2402 402 □□31 720	2.0×1.25	4.0	16	95		
KABM 2402 502 □□31 720	2.0×1.25	5.0	13	95		
KABM 2402 632 □□31 720	2.0×1.25	6.3	10	95		
KABM 2402 802 □□31 720	2.0×1.25	8.0	8.5	95		

※For taping specification, the package code (NA) is entered □□. One reel contains 5000 pcs.

DIMENSIONS



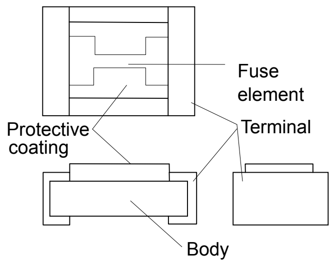
(mm)

Case size	Case code	L	W	T max.	P
1608	29	1.6 ± 0.1	0.8 ± 0.1	0.45	0.3 ± 0.2
2012	31	2.0 ± 0.1	1.25 ± 0.1	0.5	0.3 ± 0.2

MARKING

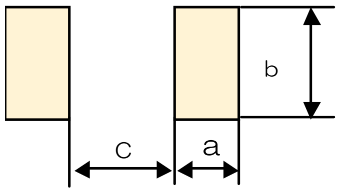
Code 1608	Code 2012	:	Rated current	Code 1608	Code 2012	:	Rated current
T	T	:	0.5 A	Y	Y	:	2.5 A
U	U	:	0.63 A	3	3	:	3.15 A
V	V	:	0.8 A	4	4	:	4.0 A
1	1	:	1.0 A	5	5	:	5.0 A
W	W	:	1.25 A	6	6	:	6.3 A
X	X	:	1.6 A		8	:	8.0 A
2	2	:	2.0 A				

CONSTRUCTION



Name	Material
Fuse element	Copper alloy
Body	Alumina ceramic
Protective coating	Silicone resin
Terminal	Tin plating

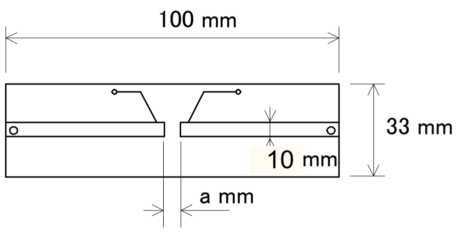
RECOMMENDED PAD DIMENSIONS



	Size 1608	Size 2012
a	1.0	1.4
b	1.2	1.65
c	1.0	1.2

(mm)

STANDARD TEST BOARD



Glass epoxy on one side
Board thickness : 1.6mm
Copper layer : 0.5～6.3A･･･35 μ m
（2012Size 4.0～8.0A･･･70 μ m）

Case size	Size a
1608	1.2
2012	1.5

(mm)

PERFORMANCE

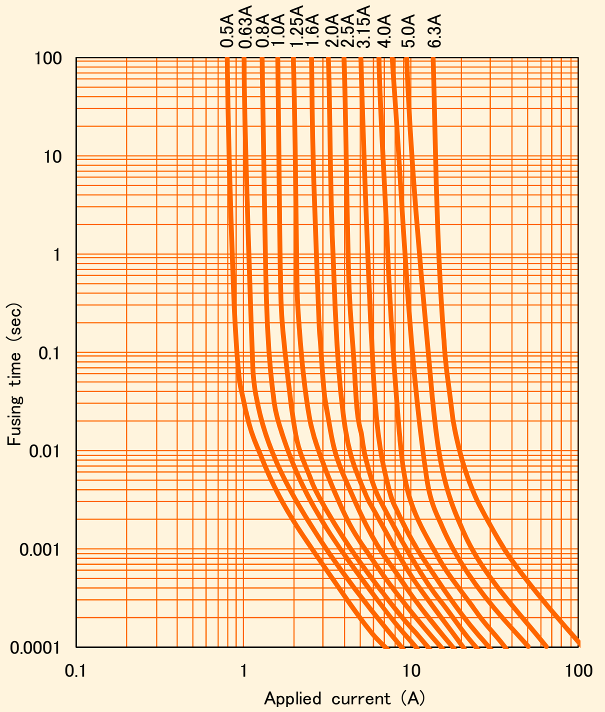
No.	Item	Performance	Test method
1	Temperature rise	Temperature rise shall not exceed 75°C.	Apply rated current.
2	Current-carrying capacity	Shall not open within 1 hour.	Apply rated current.
3	Clearing characteristics	Arc shall not be continued. No ignition. Marking shall be legible No bursting of the fuse	Breaking voltage : Rated voltage Breaking current : 50 A
4	Voltage drop	Voltage drop is below the value specified in CATALOG NUMBERS AND RATING.	Apply rated current.
5	Fusing characteristics	Fusing within 1 min.	Apply 200% of rated current. (Ambient temperature : 10 ~ 30°C)
6	Insulation resistance	1000 MΩ or more	Insulation resistance between terminals and case (alumina ceramic)
7	Electrode strength (Bending)	No mechanical damage. Resistance change after the test shall be within ± 20%	Board supporting width : 90 mm Bending speed : Approx. 0.5 mm/sec Duration : 60 sec Bending : 3 mm

No.	Item	Performance	Test method
8	Shear test	No mechanical damage. Resistance change after the test shall be within ± 20%	Applied force : 17.7 N Duration : 60 sec Tool : R0.5 Direction of the press : side face
9	Substrate bending test	No mechanical damage. Resistance change after the test shall be within ± 20%	Supporting dimension : 1.2 mm (size 2012) 0.8 mm (size 1608) Applied force : 10 N Tool : R0.5 Direction of the press : thickness direction of product
10	Solderability (Solder Wetting time)	Solder Wetting time : within 3sec.	Solder : Sn–3Ag–0.5Cu Temperature : 245 ± 5°C meniscograph method Solder : JISZ3282 H60A, H60S, H63A Temperature : 235 ± 5°C meniscograph method
11	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 ± 5°C Dipping : 3 sec. Solder : JISZ3282 H60A, H60S, H63A Temperature : 235 ± 5°C Dipping : 3 sec.
12	Resistance to soldering heat	Marking shall be legible. No mechanical damage. Resistance change after the test shall be within ± 20%	Dipping (1 cycle) Preconditioning : 100 ~ 150°C, 60±5 sec Temperature : 265 ± 3°C /6 ~ 7 sec Reflow soldering (2 cycles) Preconditioning : 1 ~ 2 min, 180°C or less Peak : 250°C± 5°C, 5 sec Holding : 230 ~ 250°C, 30 ~ 40 sec Cooling : more than 2 min Manual soldering Temperature : 350 ± 10°C Duration : 3 ~ 4 sec Measure after 1 hour left under room temp. and humidity.
13	Solvent resistance	Marking shall be legible. No mechanical damage. Resistance change after the test shall be within ± 20%	Dipping rinse Solvent : Isopropyl alcohol Duration : 90 sec
14	Vibration Proof	No mechanical damage. Resistance change after the test shall be within ± 20%	Amplitude by Vibration : 49m/s2 (Peak) Vibration Time : 20min Frequency Range : 10 - 20000Hz Number of Cycles : XYZ direction, 12 cycles each (36 cycles in total)
15	Impact Resistance	No mechanical damage. Resistance change after the test shall be within ± 20%	Maximum Acceleration : 14700m/s2 Reaction Time : 0.5ms Waveform : Half-Sine Shock Pulse Velocity Variation : 4.7m/s 6 x 3 times (total 18 times)
16	Thermal shock	No mechanical damage. Resistance change after the test shall be within ± 20%	The following 1-2 steps as one cycle, Applied 1000 cycles in total Step 1 : -40±3℃/30±3min Step 2 : 85±2℃/30±3min within 3 min from step 1 to step 2
17	Atomizing salt water	No mechanical damage. Resistance change after the test shall be within ± 20%	Temperature : 35 ± 2°C Concentration (weight ratio) : 5 ± 1% Duration : 24 hours
18	Moisture resistance	No mechanical damage. Resistance change after the test shall be within ± 20%	Temperature : 85 ± 2°C Humidity : 85 ± 5% RH Duration : 1000 hours
19	Load life	No mechanical damage. Resistance change after the test shall be within ± 20%	Temperature : 85 ± 2°C Applied current : Rated current × 70% Duration : 1000 hours Temperature : 125 ± 2°C Applied current : Rated current × 50% Duration : 1000 hours
20	Stability	No mechanical damage. Resistance change after the test shall be within ± 20%	Temperature : 125 ± 2°C Duration : 1000 hours
21	Accelerated damp heat steady state	No mechanical damage. Resistance change after the test shall be within ± 20%	Temperature : 85 ± 3°C Humidity : 85 ± 5% RH Applied current : Rated current × 70% Duration : 1000 hours
22	Whisker	Checking by microscope more than 50 times, No whisker more than 50um	a)Temperature Cycle 1 : -55±3℃/5－10min 2 : 85±2℃/5－10min 1 and 2, repeating 3 times/1h is one cycle : 1000 cycles b) Shelf Test Ⅰ 30±2℃/60±3%RH/3000h c)Shelf Test Ⅱ 60±5℃/87+3-2%RH/3000h
23	ESD Resistance	No mechanical damage, resistance change ratio is within ±20% after the test	ESD-HBM Circuit Rd=2kOhm, Cd=150pF Withstand Voltage : 4000 - 6000V by contact discharge
24	High and Low Temp	No mechanical damage, and the resistance value cleared the following standard. (1) Step 1 (20±2℃) : Initial resistance value (2) Step 2 (-40±3℃) : Within -15% to -35% of Step 1 result (3) Step 3 (20±2℃) : Within ±5% of Step 1 result (4) Step 4 (85±2℃) : Within +15% to +35% of Step 1 result (5) Step 5 (125±2℃) : Within +35% to +50% of Step 1 result (6) Step 6 (20±2℃) : Within ±5% of Step 1 result	(1) Step 1 (20±2℃) (2) Step 2 (-40±3℃) (3) Step 3 (20±2℃) (4) Step 4 (85±2℃) (5) Step 5 (125±2℃) (6) Step 6 (20±2℃) In order from (1) to (6), changing the temp and measuring the resistance change

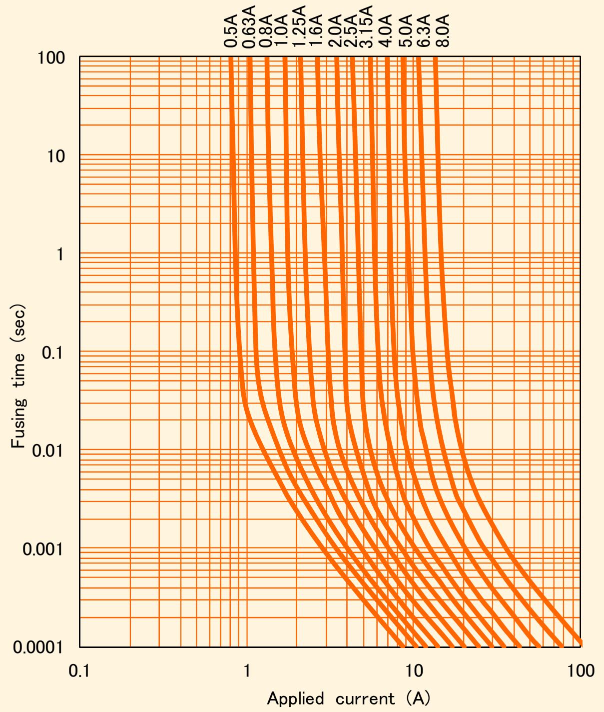
FUSING CHARACTERISTICS

Reference

Size 1608



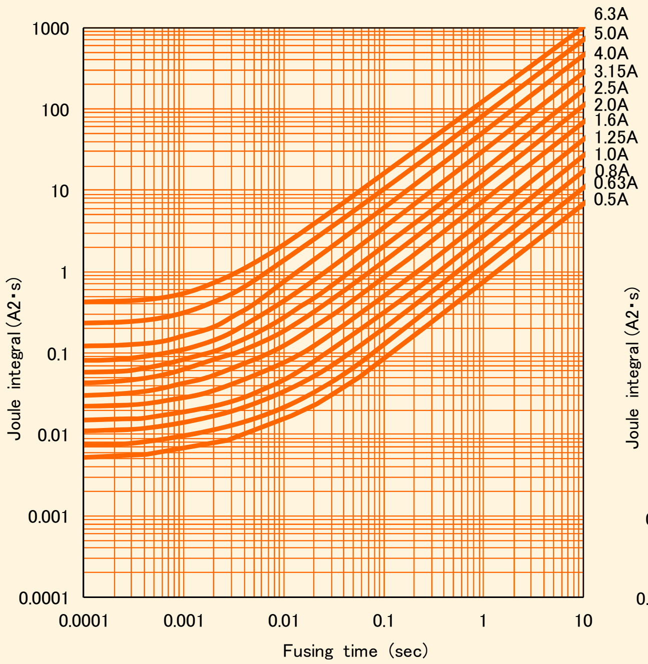
Size 2012



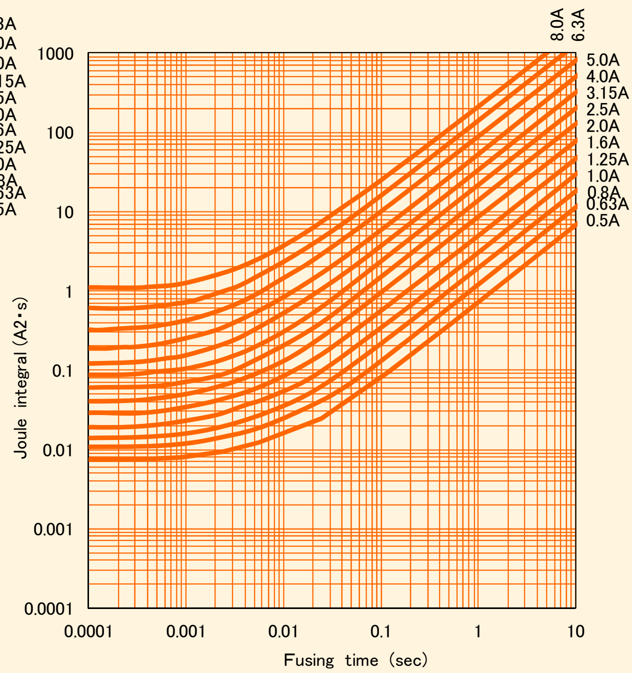
I^2T–T CHARACTERISTICS

Reference

Size 1608

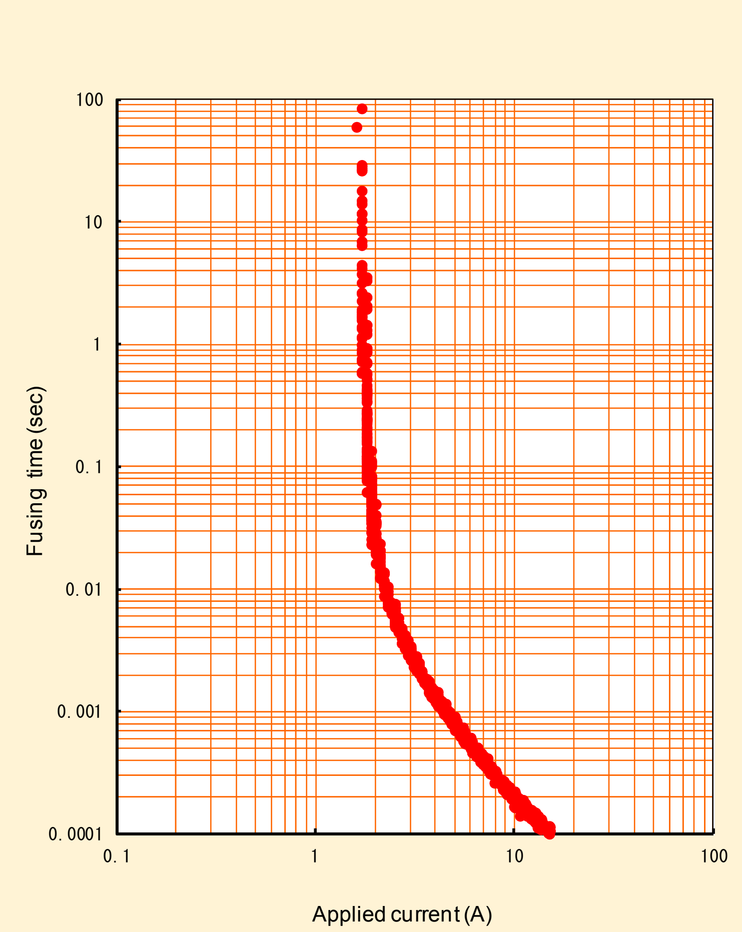


Size 2012



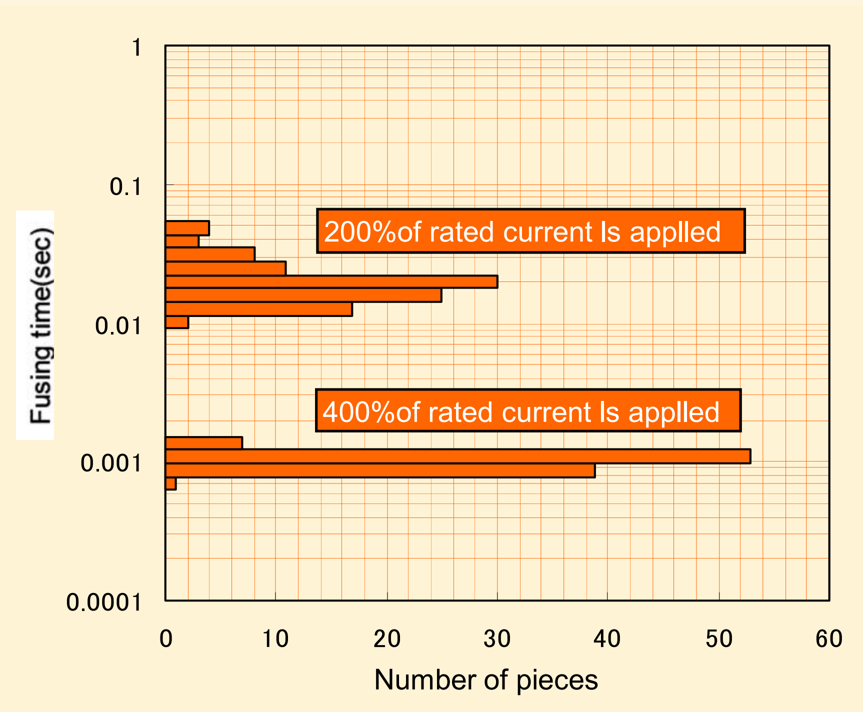
DISTRIBUTION OF FUSING CHARACTERISTICS

KABM 3202 102 NA29720



DISTRIBUTION OF FUSING TIME

KABM 3202 102 NA29720



DETERMINATION OF RATED VALUE AND SELECTION OF MICRO FUSE （TYPE KAB M Series 720）

Determine the rated value of the micro fuse, and select the correct micro fuse for your circuit. If you select the correct micro fuse, safety of your circuit can be ensured.
How to determine the rated value of the micro fuse is described below :

■ Flow for fuse selection

1. Measurement of circuit values using acute device
   Measure the circuit values, such as operating current of the circuit.
2. Calculation from operating current
   From the obtained operating current and the category temperature, calculate the minimum rated value to determine the applicable fuse.
3. Calculation from overload current
   From the obtained overload current, calculate the maximum rated value to determine the applicable fuse.
4. Calculation from inrush current
   From the inrush current, calculate the minimum rated value to determine the applicable fuse.
5. Final determination of rated value
   From the calculation results of steps 2 through 4, determine the rated value.
6. Operation check using actual device
   After selecting the rating, confirm if the device works properly under the pre-determined conditions.

■ Fuse selection

1. Measurement of circuit values using actual device

Before determining the rated value of the fuse, preliminarily measure the following using the actual device.

1–1 Operating current
Using an oscilloscope or equivalents, measure the operating current of the circuit.

1–2 Overload current
Using an oscilloscope or equivalents, measure the overload current that needs to break the circuit.

1–3 Inrush current
Using an oscilloscope or equivalents, measure the inrush current of the circuit at power-on or power-off. In addition, determine the number of inrush current applied.

1–4 Category temperature
Measure the ambient temperature of the fuse circuit.

EXAMPLE TO SELECT RATINGS OF TYPE KAB

<Fuse selection>

Effective operating current : 1.2 A
Effective overload current : 6.0 A
Inrush current waveform : Fig. A
(Pulse width : 1 ms, Wave height : 6.0 A)
Numbers to withstand inrush current : 100,000 times
Category temperature : 85°C

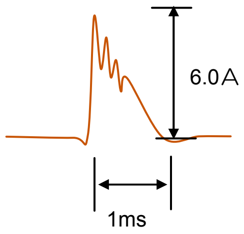


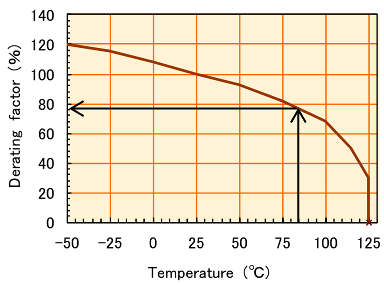
Fig. A : Inrush current waveform

2. Calculation from operating current

2–1 Measurement of operating current
Using an oscilloscope or equivalents, measure operating current (effective current) of the actual circuit.
Example : Effective operating current = 1.2 A

2–2 Derating
①Temperature derating factor
Using Fig. B, find the temperature derating factor correspond to the temperature.
②Rated derating factor
Rated derating factor = 0.75

Fig. B



Use Formula 1 to calculate the rated current of the fuse to be used for the circuit.
Rated current of fuse ≥ Operating current/ (①×②) ... Formula 1)

Example : Category temperature = 85°C, Operating current = 1.2 A
①Temperature derating factor = 0.76 (Refer to Fig. B.)
②Rated derating factor = 0.75
Calculation using Formula 1 :
Rated current ≥ 1.2/ (0.76×0.75) = 2.105 A

The above calculation result shows that the fuse with rated current of 2.11 A or more should be selected for this circuit.
Type KAB M Series 720 with rated current of 2.5 A or more can be selected.

3. Calculation from overload current

3–1 Measurement of overload current

Using an oscilloscope or equivalents, measure the overload current that needs to break the circuit.
Example : Effective overload current = 6.0 A

3–2 Calculation from overload current

Determine the rated current so that the overload current can be 2 times larger than the rated current.
Use Formula 2 to calculate the rated current of the fuse.

Rated current of fuse ≤ Overload current/2.0 ... Formula 2

Example : Overload current = 6.0 A
Use Formula 2 to calculate the rated current.
Rated current ≤ 6.0/2.0 = 3.0 A

The above calculation result shows that the fuse with rated current of 3.0 A or less should be selected for this circuit.

Type KAB M Series 720, with rated current of 2.5 A or less can be selected.

4. Calculation from inrush current

4–1 Measurement of inrush current waveform

Using an oscilloscope or equivalent, measure the waveform of the inrush current of the actual circuit.

4–2 Creation of approximate waveform

Generally, the waveform of inrush current is complicated. For this reason, create the approximate waveform of inrush current as shown on Fig. C to simplify calculation.

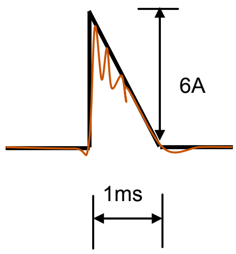


Fig. C : Inrush current waveform
Red line : Actual measurement waveform
Black line : Approximate waveform

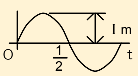
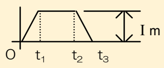
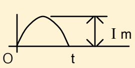
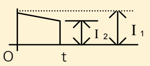
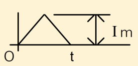
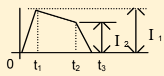
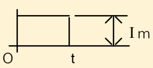
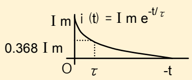
4–3 Calculation of I^2t of inrush current

Calculate I^2t (Joule integral) of the approximate waveform.
The formula for this calculation depends on the approximate waveform.
Refer to Table A.

Example : Pulse applied = 1 ms, Peak value = 6.0 A,
Approximate waveform = Triangular wave
Since the approximate waveform is a triangular wave, use the following formula for calculation
I^2t of rush current = $1/3 \times Im^2 \times t$ ... Formula 3
(Im : Peak value, t : Pulse applying time)
Use Formula 3 to calculate the I^2t of the rush current :
$I^2t = 1/3 \times 6 \times 6 \times 0.001 = 0.012\ (A^2s)$

JOULE-INTEGRAL VALUES FOR EACH WAVEFORM

Table A

Name	Waveform	I^2t	Name	Waveform	I^2t
Sine wave (1 cycle)		$\frac{1}{2} Im^2 t$	Trapezoidal wave		$\frac{1}{3} Im^2 t_1 + Im^2 (t_2 - t_1) + \frac{1}{3} Im^2 (t_3 - t_2)$
Sine wave (half cycle)		$\frac{1}{2} Im^2 t$	Various wave 1		$I_1 I_2 t + \frac{1}{3} (I_1 - I_2)^2 t$
Triangular wave		$\frac{1}{3} Im^2 t$	Various wave 2		$\frac{1}{3} I_1^2 t_1 + \{I_1 I_2 + \frac{1}{3} (I_1 - I_2)^2\} (t_2 - t_1) + \frac{1}{3} I_2^2 (t_3 - t_2)$
Rectangular wave		$Im^2 t$	Charge/ discharge waveform		$\frac{1}{2} Im^2 \tau$

* Following formula is generally used for calculation of I^2t as i(t) equal to current.

$$I^2 t = \int_0^t i^2 (t)\, dt$$

4–4 Search of load ratio

①Set up the number of cycles to withstand. (generally 100,000 times)

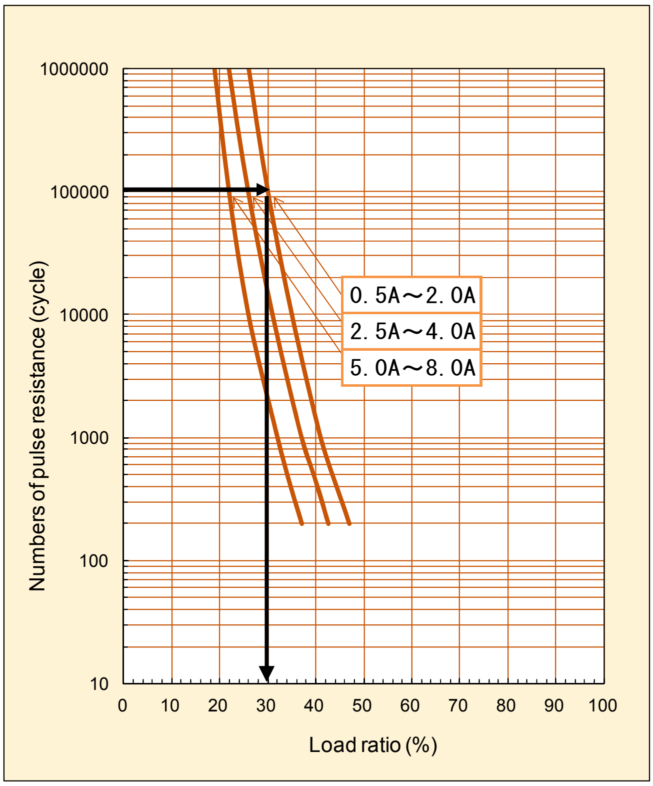
②Obtain the load ratio from Pulse resistance characteristics. (Fig. D)

Example : 100,000 times is required against inrush current applied.

Determine the load ratio using Fig. D.
If the rated current is 0.5 ~ 2.0 A : 30% or less
If the rated current is 2.5 ~ 4.0 A : 26% or less
If the rated current is 5.0 ~ 8.0 A : 22% or less

PULSE RESISTANCE CHARACTERISTCS

Fig. D



4–5 Calculation from Joule integral and load ratio

Use Formula 4 to calculate the standard I^2t for the fuse to be used.

Standard I^2t of fuse > (I^2t of inrush current/load ratio) ....
..........Formula 4

Example : I^2t of pulse = 0.012 A^2s,
Required load ratio = 30% (at 0.5 ~ 2.0 A Fuse),
26% (at 2.5 ~ 4.0 A Fuse) or
22% (at 5.0 ~ 8.0 A Fuse)

Example of 2.0 A Fuse : Use Formula 4 to calculate the standard I^2t of fuse.
Standard I^2t of fuse > 0.012/0.3 = 0.04 (A^2s)

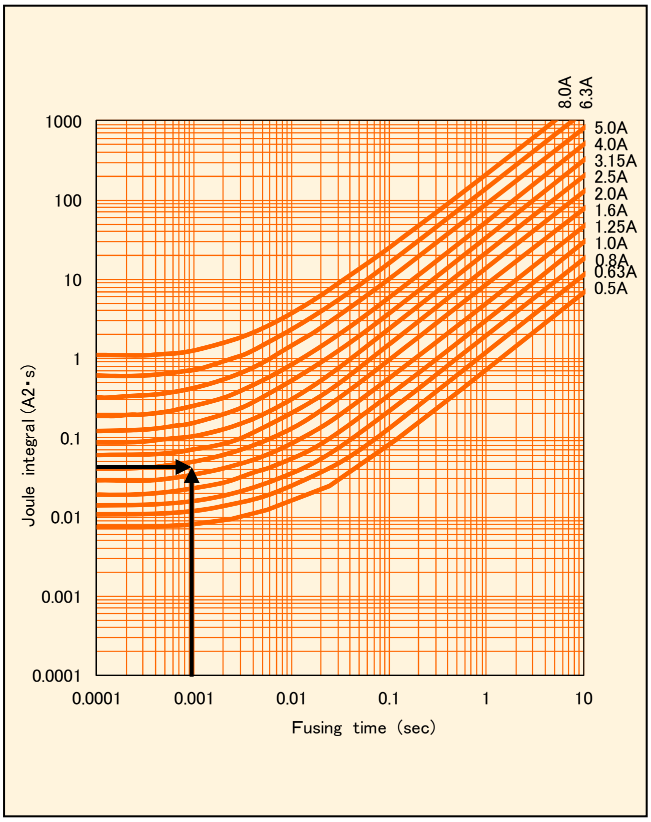
The standard I^2t of the fuse should be 0.04 (A^2s) or more.

Since the rush pulse applied is 1 ms, obtain the intersection of 1 ms (horizontal axis) and 0.04 A^2s (vertical axis) from Fig. E (refer to the arrow shown on Fig. E).

Select a fuse whose curve is above the intersection. Type KAB M Series 720, with rated current of 1.6 A or more should be selected.

JOULE INTEGRAL VS. FUSING TIME

Fig. E



5. Final determination of rated value

Determine the rated current of the micro fuse. The rated current should meet all the above calculation results.

Example : Rated current of 2.0 A and 2.5 A meet the all requirements.

6. Operation check using actual device

After selecting the rating, confirm if the device works properly under the pre-determined conditions.

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.

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.
(5) Should not rub the protective coat surface with a cotton swab or a brush,it might cause the lack for marking and protective coat.

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 (Pine Alpha™, Techno Care™, Clean Through™, etc.) will be applied to the 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 operated in acid or alkali 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 be stored at room temperature (-10°C ~ +40°C) without direct sunlight or corrosive atmosphere such as H2S(hydrogen sulfide) or SO2(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.

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.

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Head Office : 5-3, 3-Chome, Sennari-cho, Toyonaka-shi, Osaka 561-8558, Japan Tel : 06-6332-0871 Fax : 06-6331-1386
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