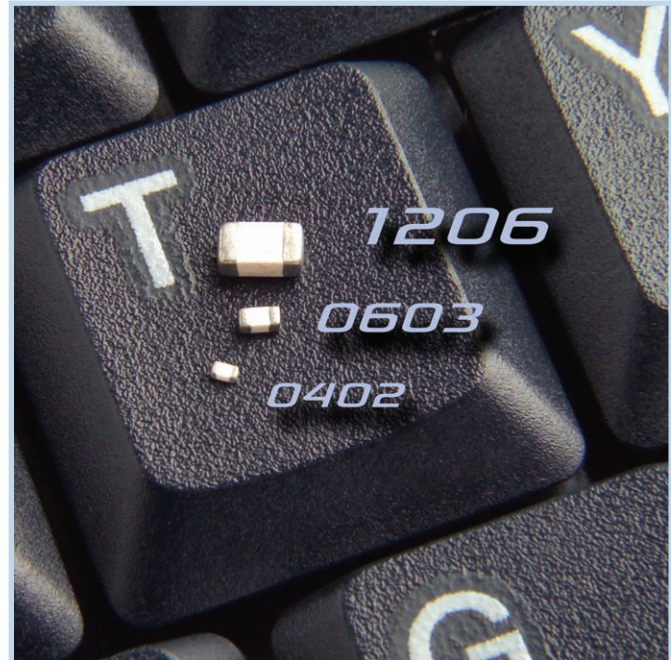




Fast-Acting Chip Fuses

Fast-acting chip fuses help provide overcurrent protection on systems using DC power sources up to 63V_{DC}. The fuse's monolithic, multilayer design provides the highest hold current in the smallest footprint, reduces diffusion-related aging, improves product reliability and resilience, and enhances high-temperature performance in a wide range of circuit designs.

These RoHS-compliant surface mount devices offer strong arc suppression characteristics and facilitate the development of more reliable, high performance consumer electronics such as laptops, multimedia devices, cell phones, and other portable electronics.



Benefits

- Small size with high-current ratings
- Excellent temperature stability
- High reliability and resilience
- Strong arc suppression characteristics

Features

- RoHS compliant
- Halogen free
(refers to: Br≤900ppm, Cl≤900ppm, Br+Cl≤1500ppm)
- Monolithic, multilayer design
- High-temperature performance
- -55°C to +125°C operating range

Applications

- | | | |
|-------------------|------------------------|----------------|
| • Laptops | • Printers | • Game systems |
| • Digital cameras | • DVD players | • LCD monitors |
| • Cell phones | • Portable electronics | • Scanners |

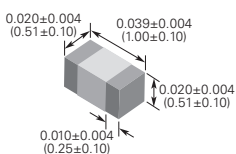
Table FF1 Clear Time Characteristics for Fast-Acting Chip Fuses

% of rated current	Clear time at 25°C
100%	4 hours min.
250%	5 seconds max.
400%	0.05 seconds max.

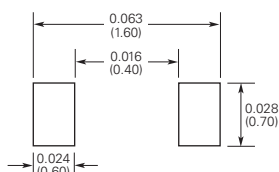
Table FF2 Typical Electrical Characteristics, Dimensions and Recommended Pad Layout for Fast-Acting Chip Fuses

0402 (1005mm) Fast-Acting Chip Fuses

Shape and Dimensions
Inch (mm)



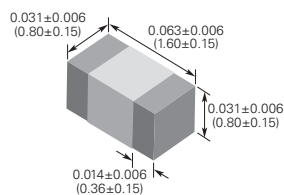
Recommended Pad Layout
Inch (mm)



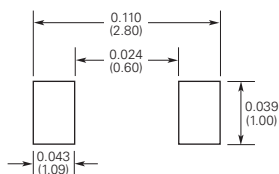
Part Number	Typical Electrical Characteristics		Max. Interrupt Ratings	
	Rated Current (A)	Nominal Cold DCR* (Ω)	Voltage (V _{DC})	Current (A)
0402SFF050F/24	0.50	0.380	24	35
0402SFF075F/24	0.75	0.210	24	35
0402SFF100F/24	1.00	0.120	24	35
0402SFF150F/24	1.50	0.056	24	35
0402SFF200F/24	2.00	0.035	24	35
0402SFF300F/24	3.00	0.021	24	35
0402SFF400F/24	4.00	0.014	24	35

0603 (1608mm) Fast-Acting Chip Fuses

Shape and Dimensions
Inch (mm)



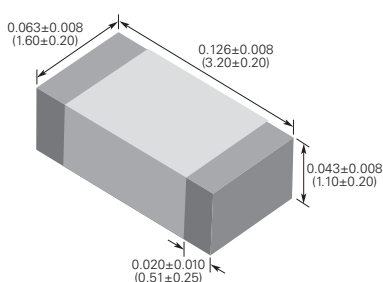
Recommended Pad Layout
Inch (mm)



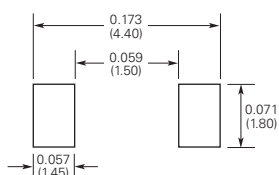
Part Number	Typical Electrical Characteristics		Max. Interrupt Ratings	
	Rated Current (A)	Nominal Cold DCR* (Ω)	Voltage (V _{DC})	Current (A)
0603SFF050F/32	0.50	0.485	32	50
0603SFF075F/32	0.75	0.254	32	50
0603SFF100F/32	1.00	0.131	32	50
0603SFF150F/32	1.50	0.059	32	35
0603SFF200F/32	2.00	0.044	32	35
0603SFF250F/32	2.50	0.032	32	35
0603SFF300F/32	3.00	0.025	32	35
0603SFF350F/32	3.50	0.024	32	35
0603SFF400F/32	4.00	0.018	32	35
0603SFF500F/32	5.00	0.013	32	35
0603SFF600F/24	6.00	0.010	24	35

1206 (3216mm) Fast-Acting Chip Fuses

Shape and Dimensions
Inch (mm)



Recommended Pad Layout
Inch (mm)



Part Number	Typical Electrical Characteristics		Max. Interrupt Ratings	
	Rated Current (A)	Nominal Cold DCR* (Ω)	Voltage (V _{DC})	Current (A)
1206SFF050F/63	0.50	0.500	63	50
1206SFF075F/63	0.75	0.330	63	50
1206SFF100F/63	1.00	0.220	63	50
1206SFF150F/63	1.50	0.120	63	50
1206SFF175F/63	1.75	0.100	63	50
1206SFF200F/63	2.00	0.050	63	50
1206SFF250F/32	2.50	0.035	32	50
1206SFF300F/32	3.00	0.031	32	50
1206SFF400F/32	4.00	0.022	32	45
1206SFF500F/32	5.00	0.015	32	45
1206SFF600F/24	6.00	0.012	24	45
1206SFF700F/24	7.00	0.011	24	45
1206SFF800F/24	8.00	0.008	24	45

* Measured at ≤10% of rated current and 25°C ambient temperature.

Figure FF1-FF6 Family Performance Curves

Figure FF1

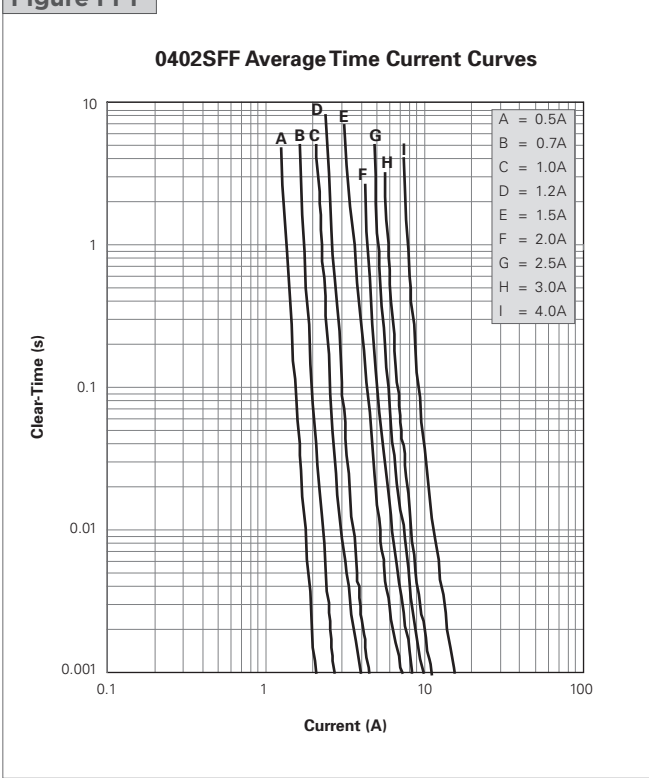


Figure FF2

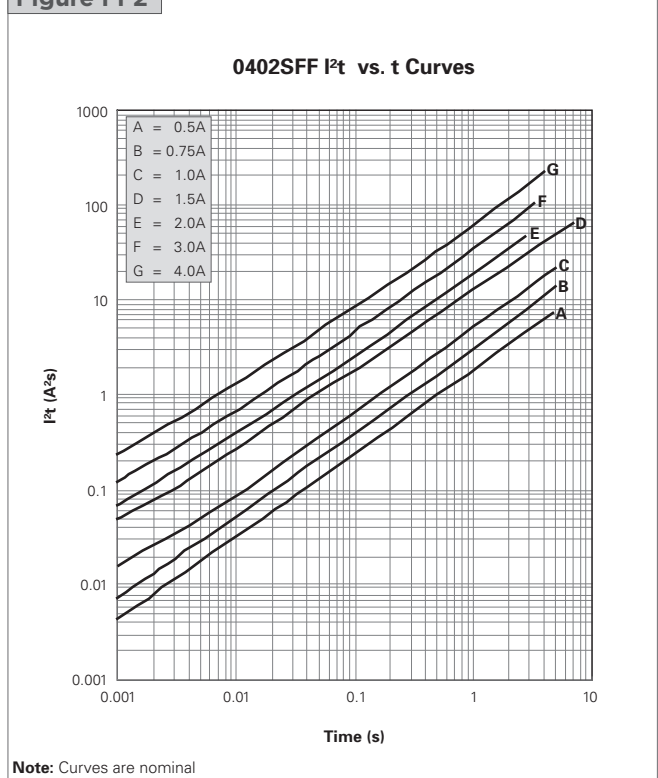


Figure FF3

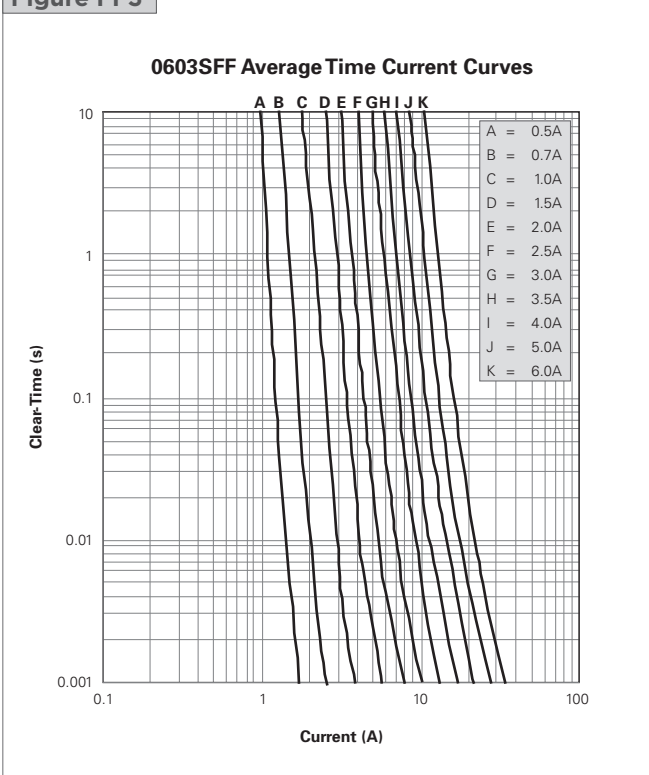


Figure FF4

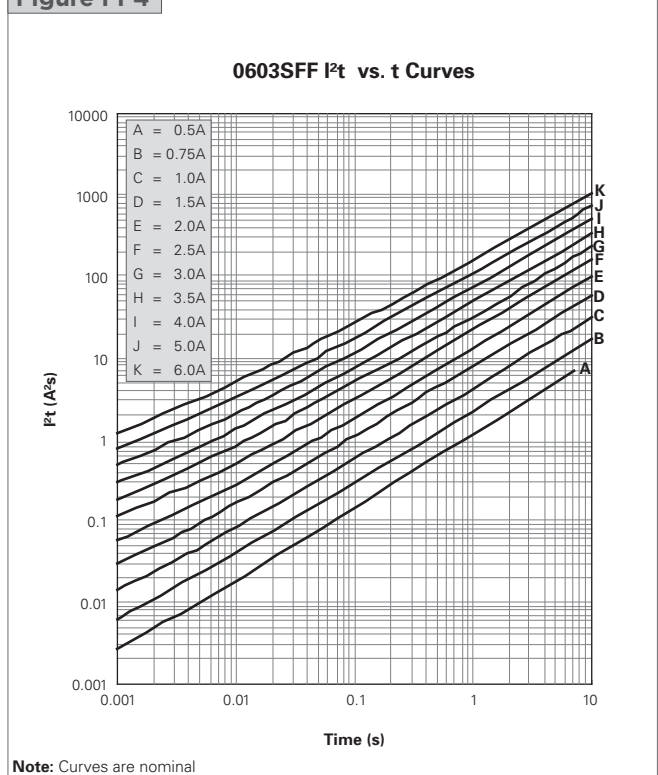


Figure FF5

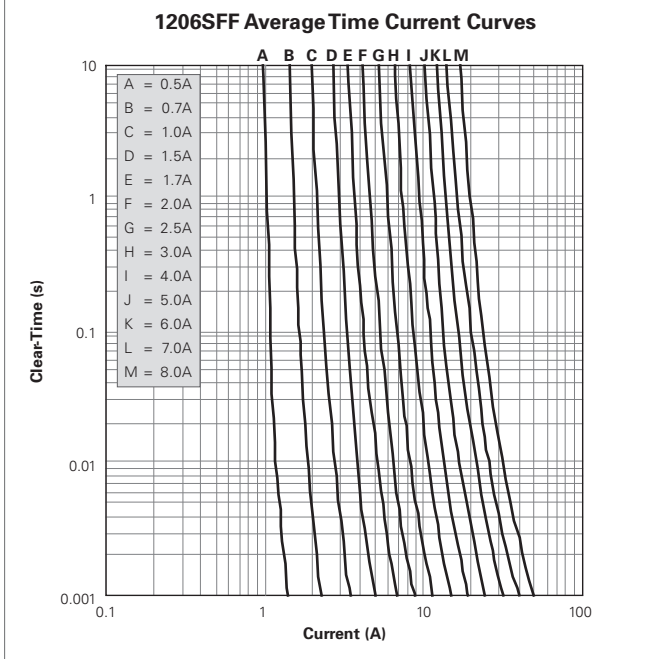


Figure FF6

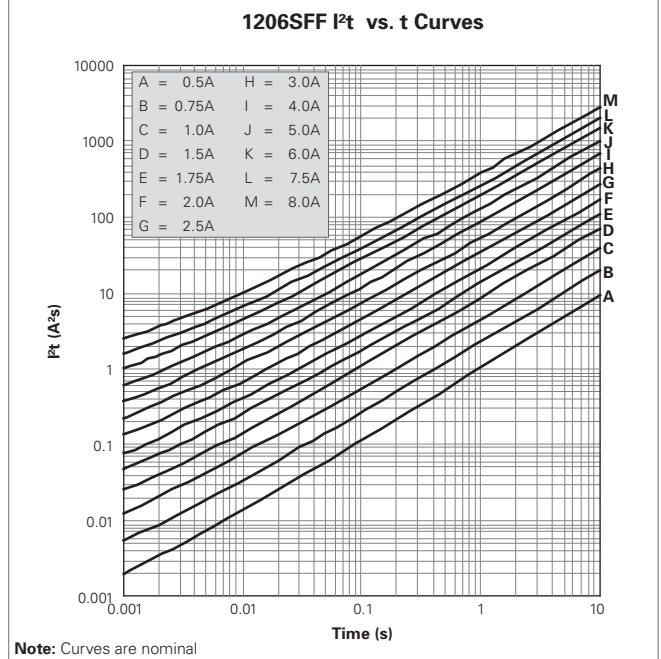


Table FF3 Environmental Specifications for Fast-Acting Chip Fuses

Operating temperature	-55°C to +125°C
Mechanical vibration	Withstands 5-3000 Hz at 30 Gs when evaluated per Method 204 of MIL-STD-202
Mechanical shock	Withstands 1500 Gs, 0.5 millisecond half-sine pulses when evaluated per Method 213 of MIL-STD-202
Thermal shock	Withstands 100 cycles from -65°C to +125°C when evaluated per Method 107 of MIL-STD-202
Resistance to soldering heat	Withstands 60 seconds at +260°C when evaluated per Method 210 of MIL-STD-202
Solderability	Meets 95% minimum coverage requirement when evaluated per Method 208 of MIL-STD-202
Moisture resistance	Withstands 10 cycles when evaluated per Method 106 of MIL-STD-202
Salt spray	Withstands 48-hour exposure when evaluated per Method 101 of MIL-STD-202

Table FF4 Material Specifications for Fast-Acting Chip Fuses

Construction body material	Ceramic
Termination material	Silver, Nickel, Tin
Fuse element	Silver

Figure FF7 Thermal Derating Current for Fast-Acting Chip Fuses

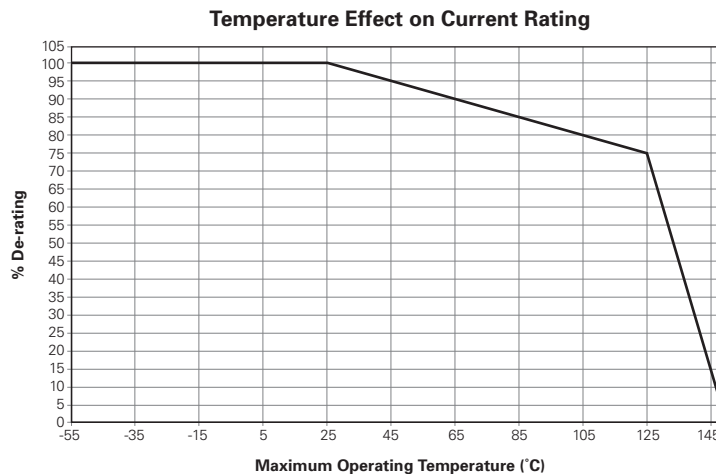


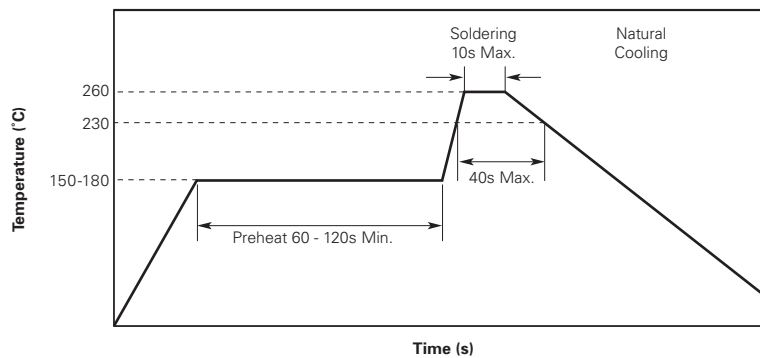
Table FF5 Electrical Specifications for Fast-Acting Chip Fuses

Insulation resistance after opening	20,000Ω minimum @ rated voltage. Fuse clearing under low voltage conditions may result in lower - post-clearing insulation values. Under normal fault conditions values. Under normal fault conditions Raychem fuses provide sufficient insulation resistance for circuit protection.
Current carrying capacity	Withstands 100% rated current at +25°C ambient for 4 hours when evaluated per MIL-PRF-23419.

Table FF6 Packaging Information for Fast-Acting Chip Fuses

Size	Reel Quantity (pcs)	Reel Diameter	Reel Width	Carrier Tape Size	Tape Type	Reels per Outside Shipment Box	Outside Shipment Boxes per Overpack
0402 (1005)	10,000	178mm white plastic	9.0 ± 0.5mm	8.00 ± 0.10mm	Paper	5	5
0603 (1608)	4,000	178mm white plastic	9.0 ± 0.5mm	8.00 ± 0.10mm	Plastic	5	5
1206 (3216)	3,000	178mm white plastic	9.0 ± 0.5mm	8.00 ± 0.10mm	Plastic	5	5

Figure FF8 Recommended Soldering Temperature Profile for Fast-Acting Chip Fuses



Recommended conditions for hand soldering:

- Using hot air rework station that can reflow the solder on both terminations at the same time is strongly recommended, do not directly contact the chip termination with the tip of soldering iron.
- Preheating: 150°C, 60s (min).
Appropriate temperature (max) of soldering iron tip/soldering time (max): 280°C / 10s or 350°C / 3s.
Maximum temperature of soldering iron tip/soldering time: 350°C / 9s or 400°C / 8s.

Table FF7 Tape and Reel Material Characteristics for Fast-Acting Chip Fuses

Tolerance X ± 1mm; 0.X ± 0.5mm; 0.XX ± 0.2mm

Performance	Testing Method	Range	
		Min.	Max.
MVR	ASTM D1238	3.60	4.40
Vicat softening temperature	ASTM D1525	97.8	-
Elasticity at break	ASTM D638	50.0	-

Table FF8 Tape and Reel Specifications for Fast-Acting Chip Fuses

Mark	Dimension in inches (mm)					
	0402 (1005)		0603 (1608)		1206 (3216)	
E ₁	0.069±0.004	(1.75±0.10)	0.069±0.004	(1.75±0.10)	0.069±0.004	(1.75±0.10)
F	0.138±0.002	(3.50±0.05)	0.138±0.002	(3.50±0.05)	0.138±0.002	(3.50±0.05)
W	0.318±0.004	(8.00±0.10)	0.318±0.004	(8.00±0.10)	0.318±0.004	(8.00±0.10)
P ₁	0.079±0.004	(2.00±0.10)	0.157±0.004	(4.00±0.10)	0.157±0.004	(4.00±0.10)
P ₀	0.157±0.004	(4.00±0.10)	0.157±0.004	(4.00±0.10)	0.157±0.004	(4.00±0.10)
P ₂	0.040±0.002	(1.00±0.05)	0.079±0.002	(2.00±0.05)	0.079±0.002	(2.00±0.05)
D ₀	0.059±0.004	(1.50+0.10/-0.00)	0.059±0.004	(1.50+0.10/-0.00)	0.059±0.004	(1.50+0.10/-0.00)
D ₁	-	-	-	-	0.039 max	(1.00 max)
t	0.009±0.001	(0.23±0.02)	0.009±0.001	(0.23±0.02)	0.009±0.001	(0.23±0.02)
A ₀	0.026±0.004	(0.67±0.10)	0.036±0.004	(0.92±0.10)	0.071±0.004	(1.80±0.10)
B ₀	0.046±0.004	(1.17±0.10)	0.071±0.004	(1.80±0.10)	0.138±0.004	(3.50±0.10)
K ₀	0.025±0.004	(0.63±0.10)	0.033±0.004	(0.85±0.10)	0.050±0.004	(1.27±0.10)

Figure FF9 Taped Component Dimensions for Fast-Acting Chip Fuses

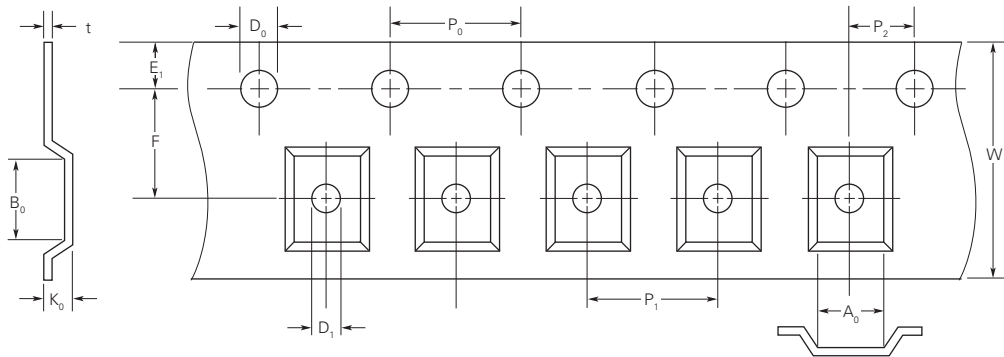
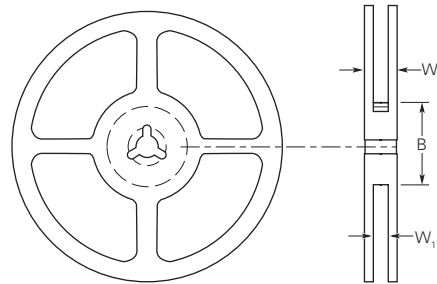


Figure FF10 Reel Dimensions for Fast-Acting Chip Fuses

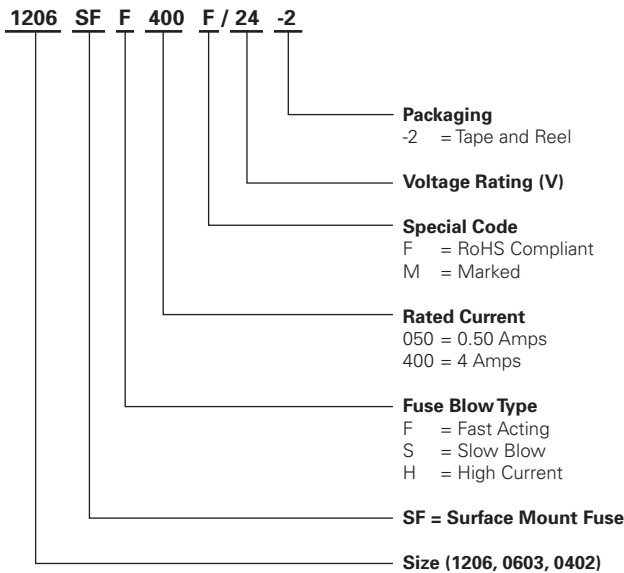
Dimension Description	Mark	Dimensions (mm)
Hub outer diameter	B	60
Reel inside width	W ₁	9
Reel outside width	W ₂	11.4
Tape width		8



Agency Approvals for Fast-Acting Chip Fuses

UL File # E197536

Part Numbering System for Fast-Acting Chip Fuses



Warning :

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