



Slow Blow Fuses

Available in industry standard 1206 and 0603 chip sizes, Raychem Slow Blow fuses help provide overcurrent protection on systems that experience large and frequent current surges as part of their normal operation.

The Slow Blow fuse's monolithic, multilayer design helps provide some of the highest current ratings available in the 1206 and 0603 footprints and enhances high temperature performance in a wide range of circuit protection designs. The devices' small size, high reliability and strong arc suppression characteristics make them ideal for overcurrent protection of power supplies, capacitor filter banks, LCD (Liquid Crystal Display) backlight inverters, electric motors and portable electronics.



Benefits

- Time delayed design prevents nuisance openings in pulsed and high inrush current applications
- Small size with high current ratings
- Strong arc suppression characteristics

Features

- RoHS compliant
- Monolithic multilayer design
- High temperature performance
- -55°C to +125°C operating temperature range

Applications

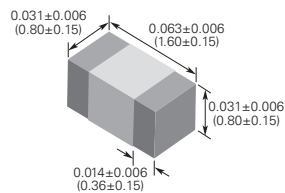
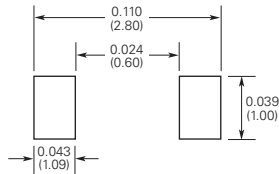
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|------------------------|-----------------------------|-------------------|
| • Small motors systems | • Power over Ethernet (POE) | • Computer drives |
| • Portable electronics | • Test equipment | • Displays |
| • Input power ports | • POL Converter Protection | • Printers |

Table FS1 Clear Time Characteristics for Slow Blow Fuses**0603SFS Series**

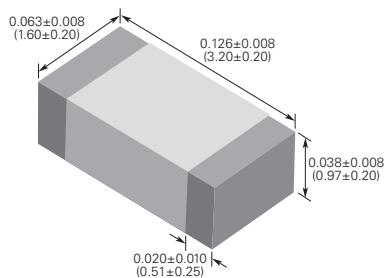
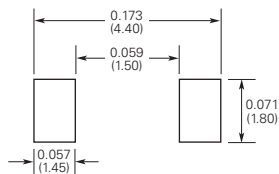
% of rated current	Clear time at 25°C	
100%	4 hours (min.)	
200%	1 second (min.)	120 seconds (max.)
300%	0.1 second (min.)	3 seconds (max.)
800%(1.0A-1.5A)	0.0005 second (min.)	0.05 seconds (max.)
800%(2.0A-5.0A)	0.001 second (min.)	0.05 seconds (max.)

1206SFS Series

% of rated current	Clear time at 25°C	
100%	4 hours (min.)	
200%	1 second (min.)	120 seconds (max.)
300%	0.1 second (min.)	3 seconds (max.)
800%	0.002 second (min.)	0.05 seconds (max.)

Table FS2 Typical Electrical Characteristics, Dimensions and Recommended Pad Layout for Slow Blow Fuses**0603 (1608mm) Slow Blow Surface-mount Chip Fuses****Shape and Dimensions**
Inch (mm)**Recommended Pad Layout**
Inch (mm)**Typical Electrical Characteristics****Max Interrupt Ratings**

Part Number	Typical Electrical Characteristics			Max Interrupt Ratings	
	Rated Current (A)	Nominal Cold DCR (Ω)*	Nominal I ² t (A ² sec)†	Voltage (V _{DC})	Current (A)
0603SFS100F/32	1.0	0.200	0.093	32	40
0603SFS150F/32	1.5	0.100	0.18	32	40
0603SFS200F/32	2.0	0.052	0.32	32	40
0603SFS250F/32	2.5	0.041	0.63	32	40
0603SFS300F/32	3.0	0.031	0.87	32	40
0603SFS350F/32	3.5	0.021	1.20	32	40
0603SFS400F/32	4.0	0.017	2.30	32	40
0603SFS450F/32	4.5	0.015	2.70	32	40
0603SFS500F/32	5.0	0.013	3.20	32	40

1206 (3216mm) Slow Blow Surface-mount Chip Fuses**Shape and Dimensions**
Inch (mm)**Recommended Pad Layout**
Inch (mm)**Typical Electrical Characteristics****Max Interrupt Ratings**

Part Number	Typical Electrical Characteristics			Max Interrupt Ratings	
	Rated Current (A)	Nominal Cold DCR (Ω)*	Nominal I ² t (A ² sec)†	Voltage (V _{DC})	Current (A)
1206SFS100F/63	1.0	0.360	0.11	63	50
1206SFS125F/63	1.25	0.200	0.22	63	50
1206SFS150F/63	1.5	0.150	0.23	63	50
1206SFS200F/63	2.0	0.082	0.63	63	50
1206SFS250F/32	2.5	0.070	0.90	32	50
1206SFS300F/32	3.0	0.032	1.20	32	50
1206SFS350F/32	3.5	0.028	1.60	32	50
1206SFS400F/32	4.0	0.024	2.20	32	50
1206SFS450F/32	4.5	0.020	3.60	32	50
1206SFS500F/32	5.0	0.016	5.30	32	50
1206SFS550F/24	5.5	0.014	6.40	24	50
1206SFS600F/24	6.0	0.011	8.50	24	60
1206SFS700F/24	7.0	0.010	10.00	24	60
1206SFS800F/24	8.0	0.009	16.90	24	60

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

† Melting I²t at 0.001 sec clear time

Figure FS1-FS4 Family Average Clear Time

Figure FS1

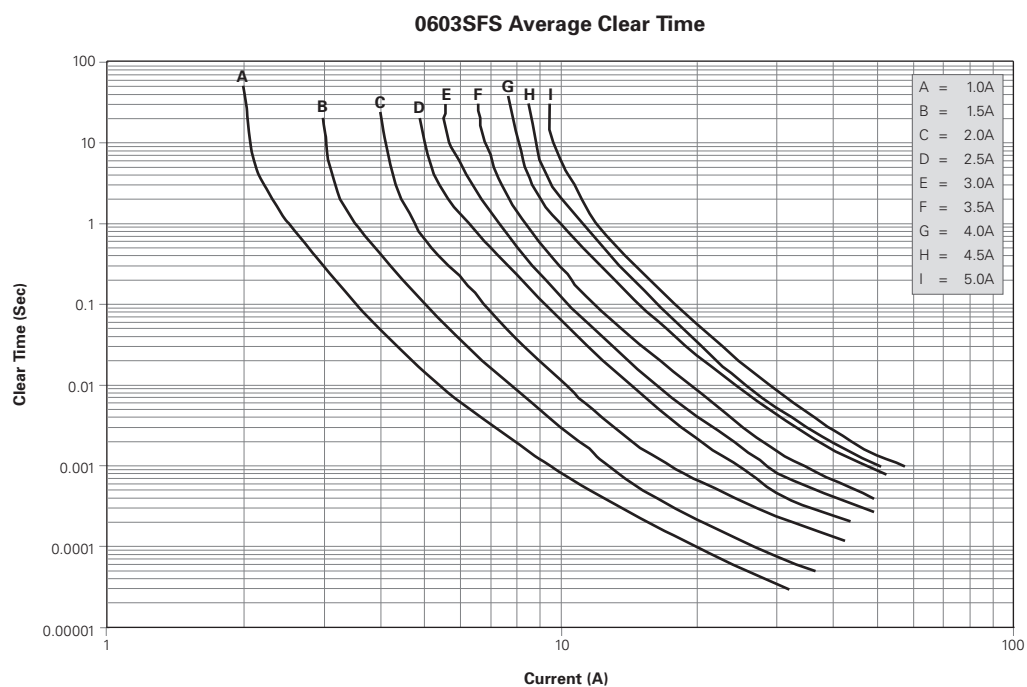
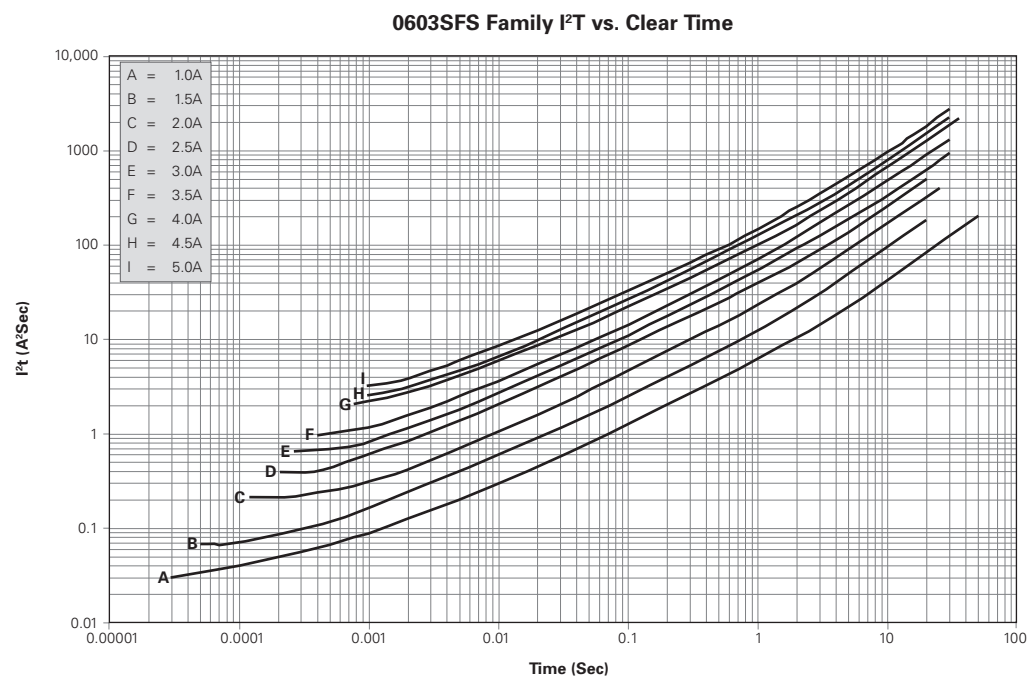


Figure FS2



Note: Curves are typical

Figure FS3

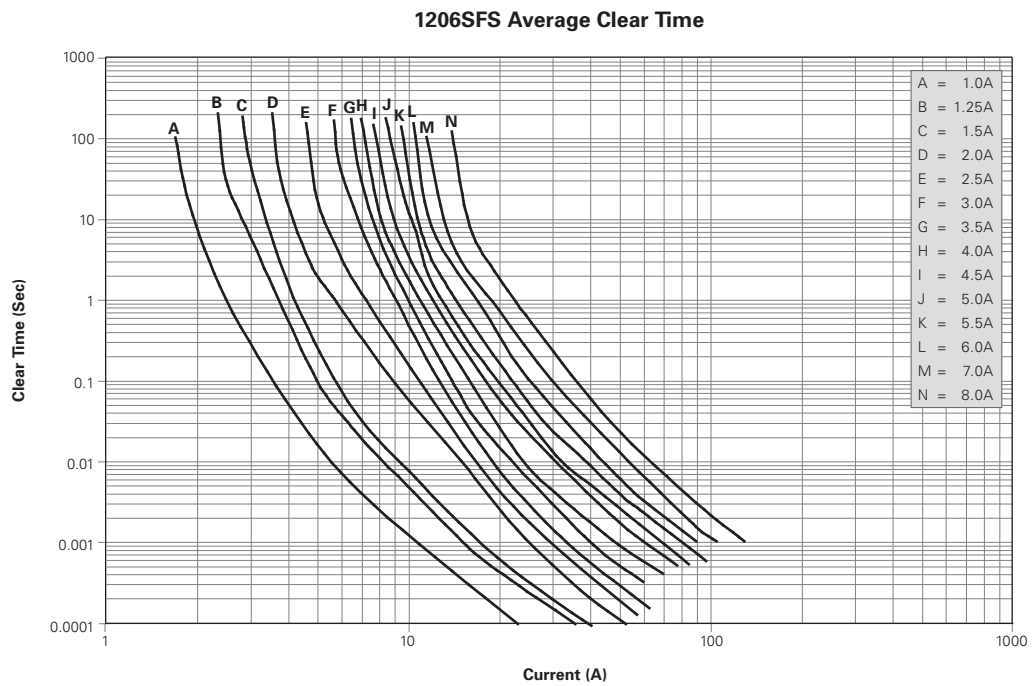
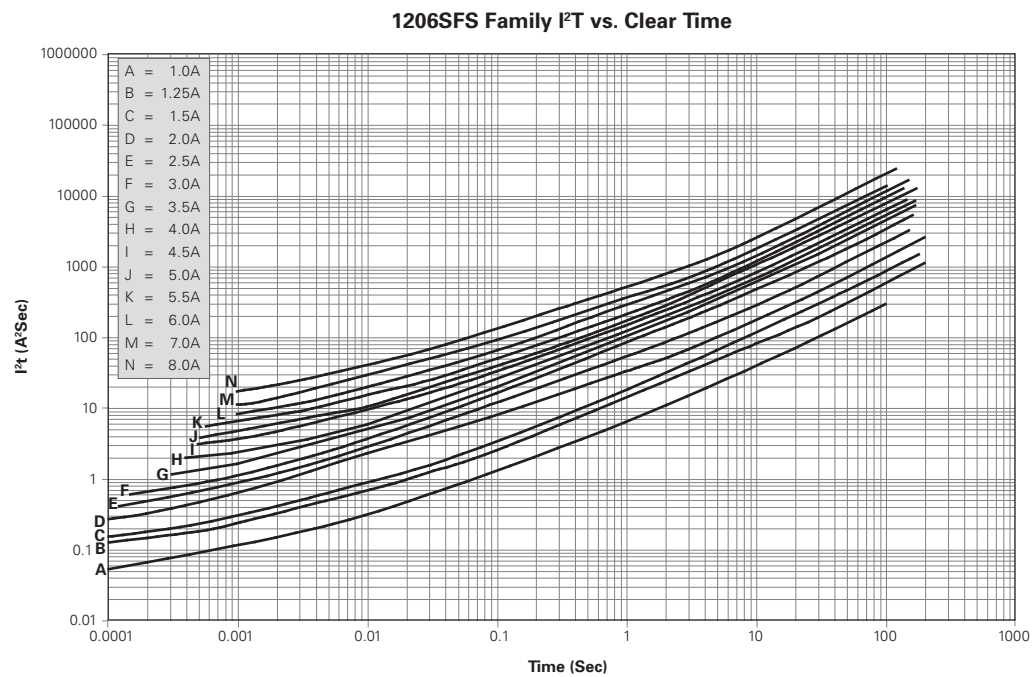


Figure FS4



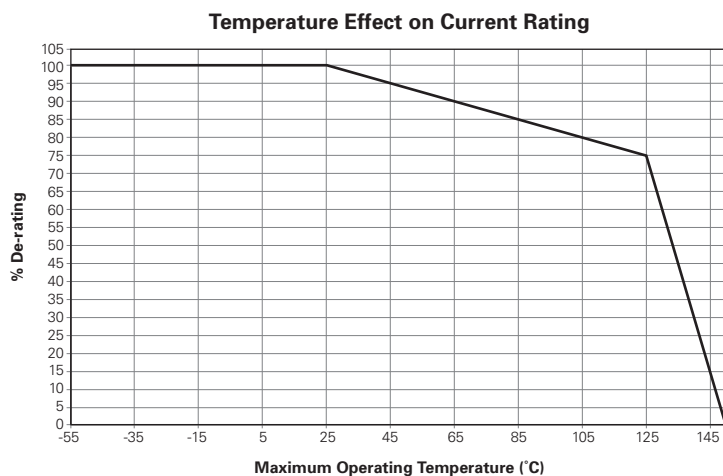
Note: Curves are typical

Table FS3 Environmental Specifications for Slow Blow 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 FS4 Material Specifications for Slow Blow Fuses

Construction Body Material	Ceramic
Termination Material	Silver, Nickel, Tin
Fuse Element	Silver
Terminal Strength: Hanging test	1.5kg, 30 seconds

Figure FS5 Thermal Derating Current for Slow Blow Fuses**Table FS5 Electrical Specifications for Slow Blow 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 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 FS6 Packaging Information for Slow Blow Fuses

Size	Reel Quantity (pcs)	Reel Diameter	Reel Width	Carrier Tape Size	Tape Type	Reels per Outside Shipment Box	Outside Shipment Boxes per Overpack
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

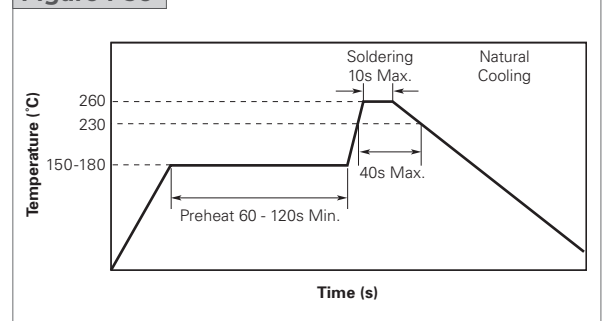
Agency Approvals for Slow Blow Fuses

UL

File # E197536

Recommended Soldering Temperature Profile for Slow Blow Fuses**Recommended conditions for hand soldering:**

- 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
- 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.

Figure FS6**Table FS7 Tape and Reel Material Characteristics for Slow Blow Fuses**

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

Performance	Testing Method	Range	
		Min	Max
M.V.R.	ASTM D1238	3.60	4.40
Vicat Softening Temperature	ASTM D1525	97.8	-
Elasticity at Break	ASTM D638	50.0	-

Table FS8 Tape and Reel Specifications for Slow Blow Fuses

Mark	Dimension in inches (mm)			
	0603 (1608)		1206 (3216)	
E ₁	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)
W	0.318±0.004	(8.00±0.10)	0.318±0.004	(8.00±0.10)
P ₁	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)
P ₂	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)
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)
A ₀	0.038±0.004	(0.96±0.10)	0.071±0.004	(1.80±0.10)
B ₀	0.071±0.004	(1.80±0.10)	0.138±0.004	(3.50±0.10)
K ₀	0.037±0.004	(0.94±0.10)	0.048±0.004	(1.20±0.10)

Figure FS7 Taped Component Dimensions for Slow Blow Fuses

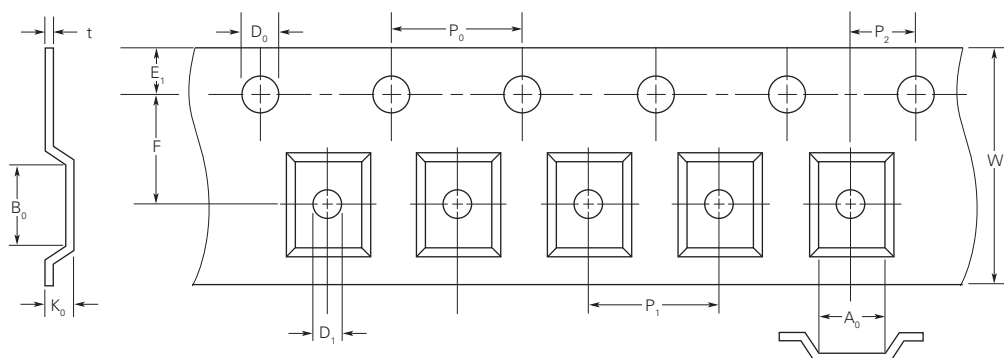
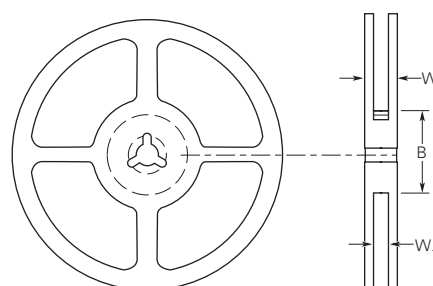
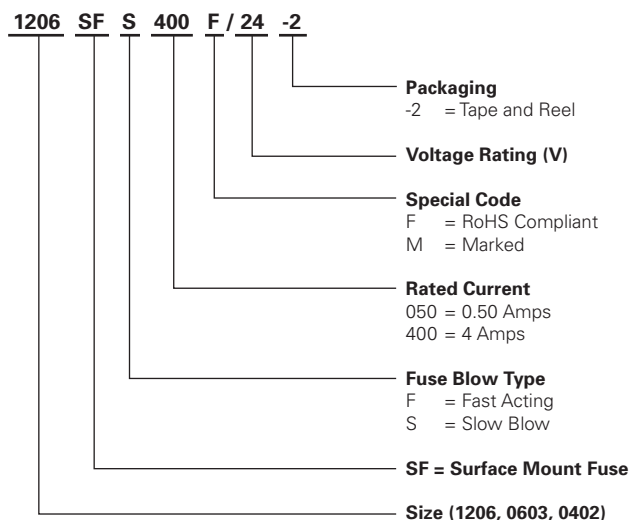


Figure FS8 Reel Dimensions for Slow Blow Fuses

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



Part Numbering System for Slow Blow Fuses



Warning :

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