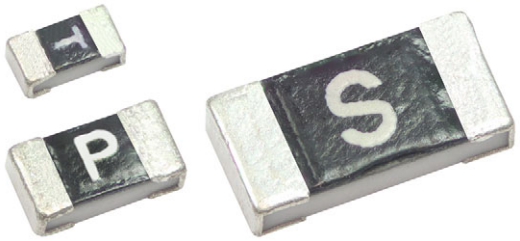
Time Lag Acting Thin Film Chip Fuses



FEATURES

- 3 sizes: 0402, 0603, and 1206
- Maximal protection as fuses are designed to open in **t < 5 s at 250 % overload**
- UL 248-14 compliant
- From 0.4 A to 7 A
- Low resistance
- Body temperature rising < 75 °C at 100 % rated current
- Termination: thin film technology
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

RoHS COMPLIANT

HALOGEN FREE

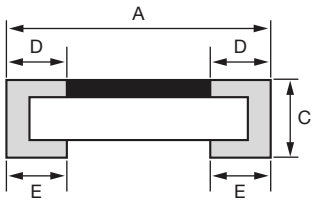
LINKS TO ADDITIONAL RESOURCES

3D Models

SFT thin film chip fuses are designed for equipment such as motors and transformers that generate inrush currents during startup. These fuses can endure temporary, non-damaging spikes while still providing reliable overcurrent protection. Particularly adapted to being compatible with numerous applications in the sector of electronics, they comply with industrial and government standards, as well as Vishay quality and reliability requirements.

TECHNICAL SPECIFICATIONS			
DESCRIPTION	**SFT0402**	**SFT0603**	**SFT1206**
Imperial size	0402	0603	1206
Rated current I_N range	0.50 A to 4.00 A	0.40 A to 6.00 A	0.50 A to 7.00 A
Rated voltage $U_{max.}$ DC	32 V	32 V and 50 V	32 V and 63 V
Cold resistance at $I \leq 0.1 \times I_N$	10 mΩ to 300 mΩ	6 mΩ to 350 mΩ	7 mΩ to 596 mΩ
Fusing time	Open within 5 seconds at 250 % rated power		
Body temperature rise	< 75 °C at 100 % rated current		
Operating temperature range	-25 °C to 125 °C with proper derating factor		
Approved UL 248-14 recognition file	E548286		

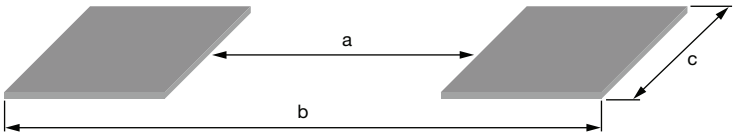
DIMENSIONS



DIMENSIONS AND TOLERANCES in millimeters (inches)					
TYPE	**A**	**B**	**C**	**D**	**E**
SFT0402	1.00 ± 0.10 (0.039 ± 0.004)	0.52 ± 0.05 (0.020 ± 0.002)	0.35 ± 0.05 (0.014 ± 0.002)	0.20 ± 0.10 (0.008 ± 0.004)	0.25 ± 0.10 (0.010 ± 0.004)
SFT0603	1.60 ± 0.10 (0.063 ± 0.004)	0.80 ± 0.10 (0.031 ± 0.004)	0.45 ± 0.10 (0.018 ± 0.004)	0.30 ± 0.20 (0.012 ± 0.008)	0.35 ± 0.20 (0.014 ± 0.008)
SFT1206	3.10 ± 0.10 (0.122 ± 0.004)	1.55 ± 0.10 (0.061 ± 0.004)	0.60 ± 0.10 (0.024 ± 0.004)	0.50 ± 0.30 (0.020 ± 0.012)	0.50 ± 0.20 (0.020 ± 0.008)

MECHANICAL SPECIFICATIONS	
Substrate	Ceramic
Technology	Thin film
Termination	Cu / Ni plating

LAND PATTERN DIMENSIONS



SUGGESTED LAND PATTERN DIMENSIONS in millimeters (inches)			
TYPE	a	b	c
SFT0402	0.55 to 0.65 (0.022 to 0.026)	1.40 to 1.60 (0.055 to 0.063)	0.74 to 0.94 (0.029 to 0.037)
SFT0603	0.85 to 0.95 (0.033 to 0.037)	2.00 to 2.20 (0.079 to 0.087)	1.50 to 1.70 (0.059 to 0.067)
SFT1206	0.95 to 1.05 (0.037 to 0.041)	4.40 to 5.00 (0.173 to 0.197)	2.30 to 2.50 (0.091 to 0.098)

SFT0402 RATING

PART DESIGNATION	MARKING	RATED CURRENT (A)	FUSING TIME	RESISTANCE [1] (mΩ), TOLERANCE: ± 25 %	RATED VOLTAGE (V_{DC})	BREAKING CAPACITY
SFT040232VA500TT	F	0.50	Open within 5 s at 250 % rated current	300	32	32 V_{DC}, 35 A
SFT040232VA800TT	K	0.80		78		
SFT040232V1A00TT	L	1.00		75		
SFT040232V1A25TT	M	1.25		44		
SFT040232V1A50TT	P	1.50		34.5		
SFT040232V1A60TT	N	1.60		29.5		
SFT040232V2A00TT	S	2.00		23		
SFT040232V2A50TT	T	2.50		18		
SFT040232V3A00TT	3	3.00		15		
SFT040232V3A15TT	U	3.15		14		
SFT040232V4A00TT	W	4.00		10		

SFT0603 RATING

PART DESIGNATION	MARKING	RATED CURRENT (A)	FUSING TIME	RESISTANCE [1] (mΩ), TOLERANCE: ± 25 %	RATED VOLTAGE (V_{DC})	BREAKING CAPACITY
SFT060350VA400TT	E	0.40	Open within 5 s at 250 % rated current	350	50	50 V_{DC}, 50 A 35 V_{AC}, 50 A
SFT060350VA500TT	F	0.50		232		
SFT060332VA630TT	I	0.63		150	32	32 V_{DC}, 50 A 35 V_{AC}, 50 A
SFT060332VA700TT	J	0.70		148		
SFT060332VA800TT	K	0.80		113		
SFT060332V1A00TT	L	1.00		67		
SFT060332V1A25TT	M	1.25		50		
SFT060332V1A50TT	P	1.50		42		
STF060332V1A60TT	N	1.60		40		
SFT060332V2A00TT	S	2.00		27		
SFT060332V2R50TT	T	2.50		19.5		
SFT060332V3R00TT	3	3.00		16		
SFT060332V3A15TT	U	3.15		15		
SFT060332V4A00TT	W	4.00		11		
SFT060332V5A00TT	Y	5.00		8		
SFT060332V6A00TT	6	6.00		6		

Note

[1] Resistance value was measured with less than 10 % of rated current

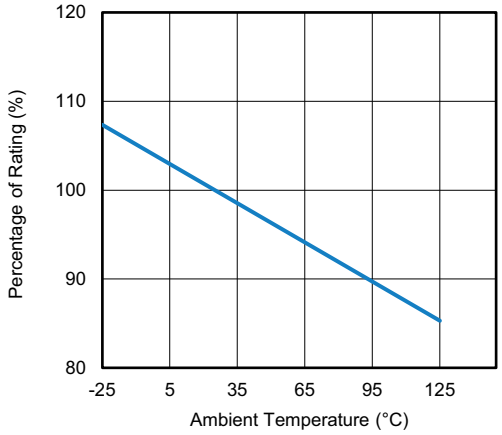
SFT1206 RATING						
PART DESIGNATION	MARKING	RATED CURRENT (A)	FUSING TIME	RESISTANCE [1] (mΩ), TOLERANCE: ± 25 %	RATED VOLTAGE (V_{DC})	BREAKING CAPACITY
SFT120663VA500TT	F	0.50	Open within 5 s at 250 % rated current	596	63	63 V_{DC}, 50 A
SFT120663VA800TT	K	0.80		165		
SFT120663V1A00TT	L	1.00		132		
SFT120663V1A25TT	M	1.25		90		
SFT120663V1A50TT	P	1.50		79		
SFT120663V2A00TT	S	2.00		41		
SFT120632V2A50TT	T	2.50		33	32	32 V_{DC}, 50 A
SFT120632V3A00TT	3	3.00		23		
SFT120632V4A00TT	W	4.00		15.5		
SFT120632V5A00TT	Y	5.00		13		
SFT120632V7A00TT	Z	7.00		7		

Note
(1) Resistance value was measured with less than 10 % of rated current

TEMPERATURE DERATING

Normal ambient temperature: 25 °C

Operating temperature range: -25 °C to +125 °C, with proper derating factor as below:



Chip Fuse Temperature

PERFORMANCES		
TESTS	CONDITIONS	REQUIREMENTS PERMISSIBLE CHANGES
Carrying capacity	Rated current, 4 h	No fusing
Fusing time	250 % of its rated current	Within 5 s
Interrupting ability	After the fuse is interrupted, rated voltage applied for 30 s again	No mechanical damages
Bending test	Distance between holding points: 90 mm Bending: 3 mm, 1 time, 30 s	No mechanical damages
Resistance to solder heat	260 °C ± 5 °C, 10 s ± 1 s	± 20 %
Solderability	235 °C ± 5 °C, 2 s ± 0.5 s 245 °C ± 5 °C, 2 s ± 0.5 s (lead (Pb)-free)	95 % coverage minimum
Temperature rise	100 % of its rated current, measurement of surface temperature	$\Delta T < 75$ °C
Resistance to dry heat	105 °C ± 5 °C, 1000 h	± 20 %
Resistance to solvent	23 °C ± 5 °C in isopropyl alcohol, 90 s	No evident damages on protective coating and marking
Residual resistance	DC measurement resistance after fusing	10 kΩ and more
Thermal shock	-25 °C / 25 °C / 125 °C / 25 °C, 10 cycles	$\frac{\Delta R}{R} < 10$ %

PACKAGING				
SIZE	MOQ	TAPE WIDTH	TAPE PITCH	PACKAGING DIMENSIONS
0402	10 000	8 mm	2 mm	Ø 180 mm / 7"
0603	5000		4 mm	Ø 180 mm / 7"
1206	5000		4 mm	Ø 180 mm / 7"

Note

- Packaging is compliant to EIA-481 Rev. D (IEC 60286, part 3) standard

SOLDERING / MOUNTING PARAMETERS

Please see the application note (www.vishay.com/doc?52029). The recommended reflow solder process parameters are displayed in pages 4 and 5.

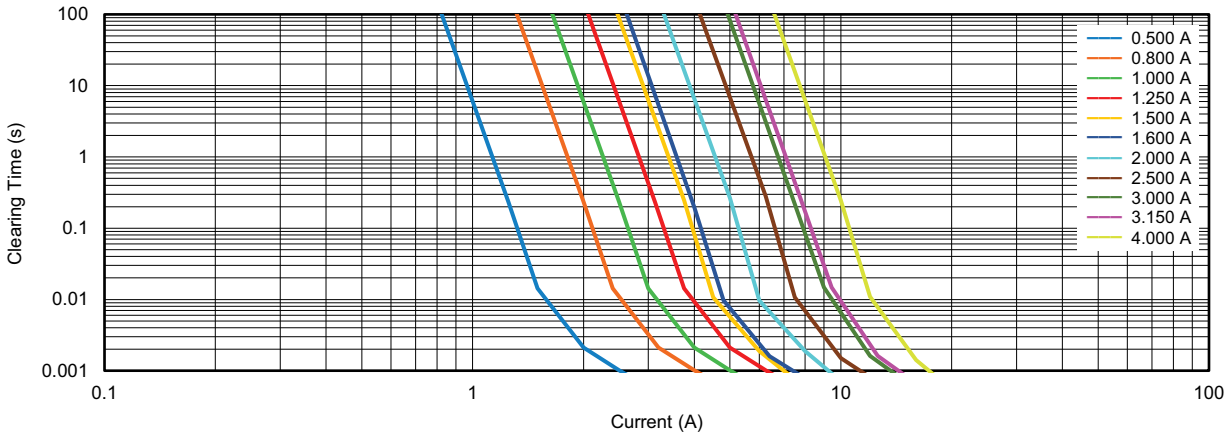
GLOBAL PART NUMBER INFORMATION

Part Number: S2F060332V1A50TT

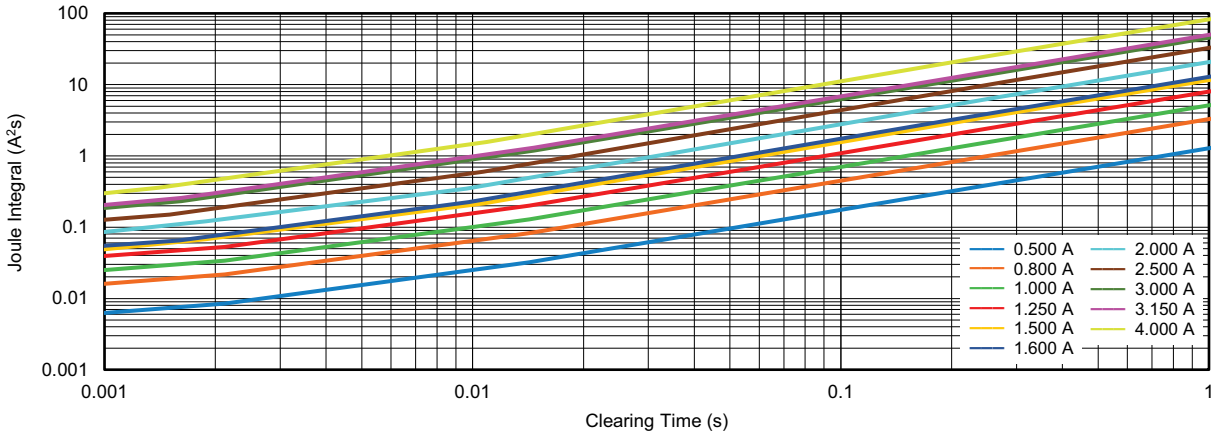
S	F	T	0	6	0	3	3	2	V	1	A	5	0	T	T

MODEL	SIZE	RATING VOLTAGE	RATING CURRENT	TERMINATION	PACKAGING
SFT	**0402** (1005) **0603** (1608) **1206** (3216)	**32V** **50V** **63V**	**A400** = 0.4 A **1A50** = 1.5 A **3A15** = 3.15 A	**T** = Sn	**T** (tape and reel) = paper tape (5000 / 10 000)

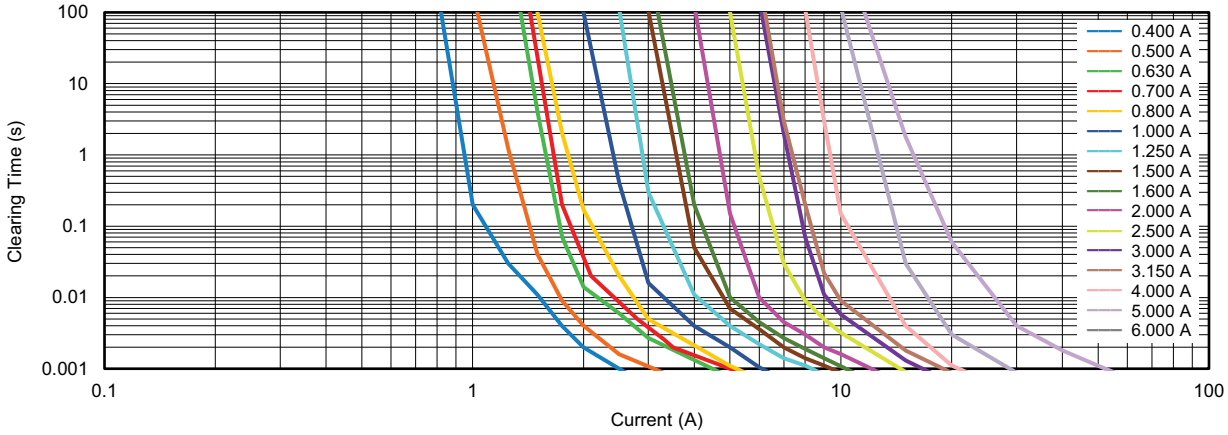
FUNCTIONAL PERFORMANCE



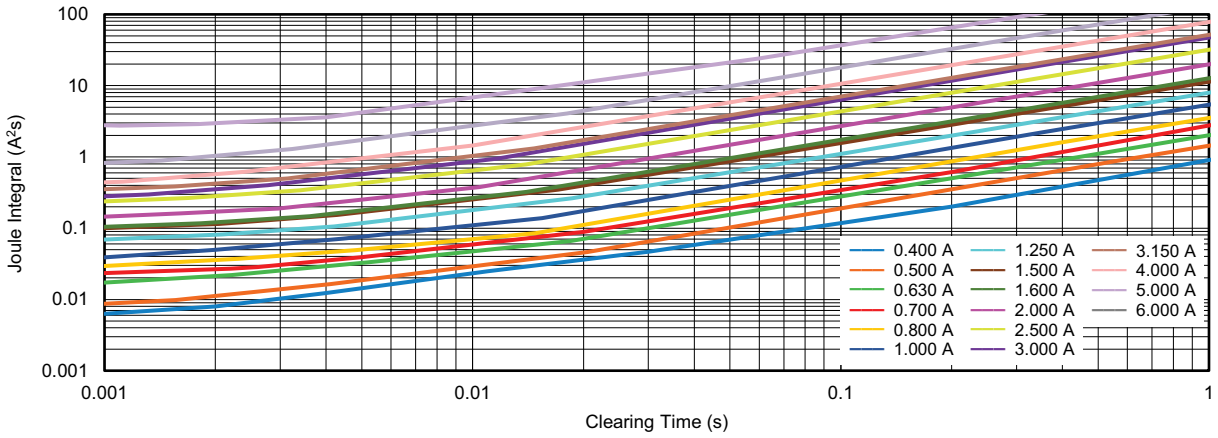
SFT04 (0402 Size) Chip Fuse *I*-t Curve



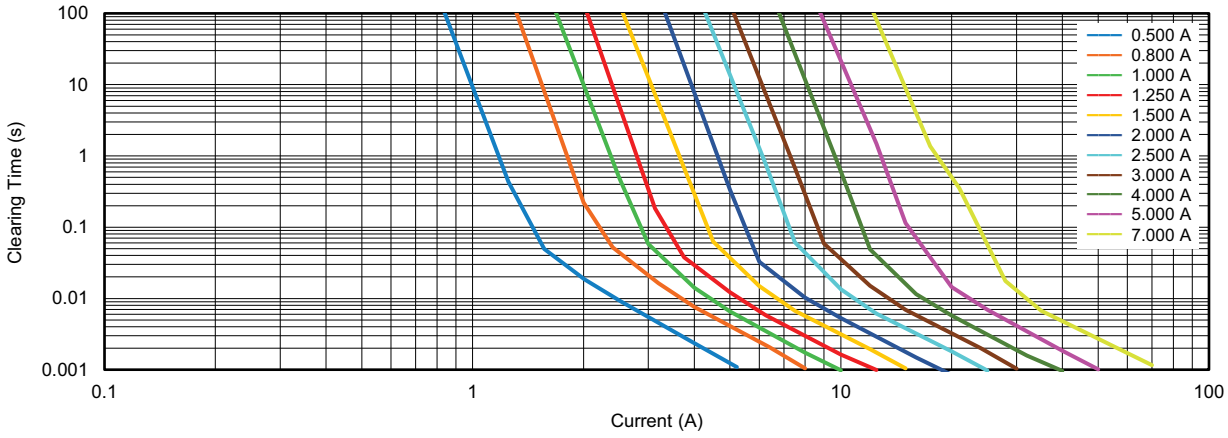
SFT04 (0402 Size) Chip Fuse t-I^2t Curve



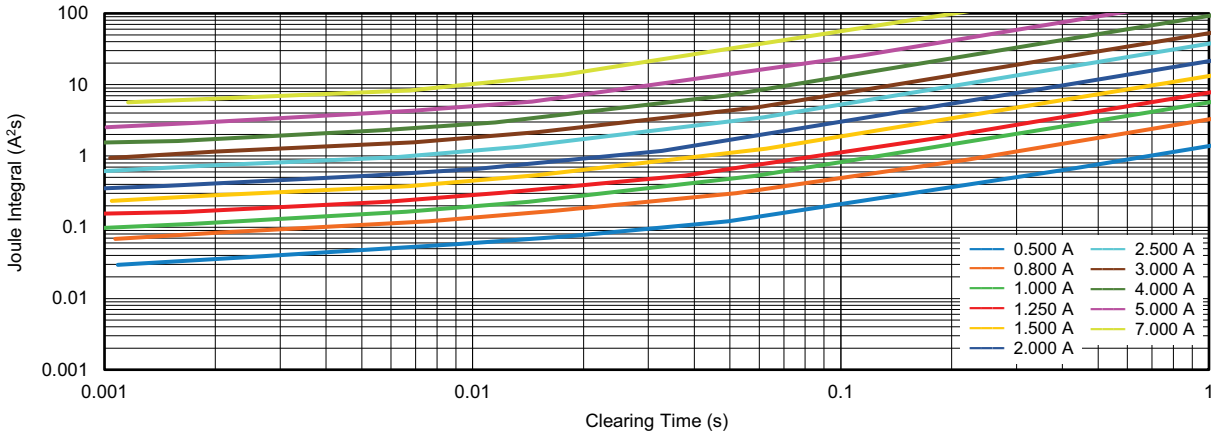
SFT06 (0603 Size) Chip Fuse *I*-t Curve



SFT06 (0603 Size) Chip Fuse t-I^2t Curve



SFT12 (1206 Size) Chip Fuse *I*-t Curve

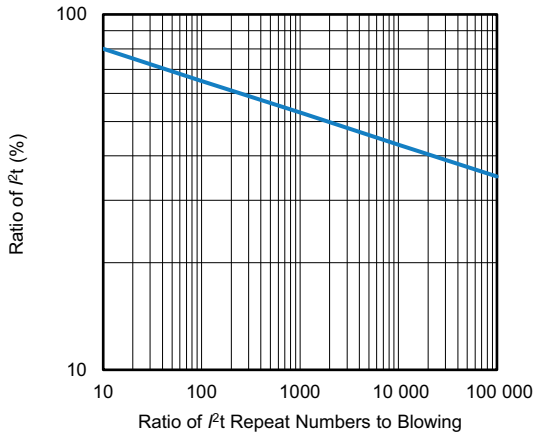


SFT12 (1206 Size) Chip Fuse t-I^2t Curve

Typical Joule integral values ($\int_{t=0}^{t} i^2 .dt$), measured at 10 times rated current, are displayed in the following table:

SFT FUSE I^2t (A^2s)					
PART NUMBER	**TYPICAL I^2t (A^2s)**	**PART NUMBER**	**TYPICAL I^2t (A^2s)**	**PART NUMBER**	**TYPICAL I^2t (A^2s)**
SFT040232VA500TT	0.00370	SFT060350VA400TT	0.004	SFT120663VA500TT	0.030
SFT040232VA800TT	0.00947	SFT060350VA500TT	0.009	SFT120663VA800TT	0.068
SFT043022V1A00TT	0.01479	SFT060332VA630TT	0.017	SFT120663V1A00TT	0.098
SFT040232V1A25TT	0.02310	SFT060332VA700TT	0.023	SFT120663V1A25TT	0.155
SFT040232V1A50TT	0.02400	SFT060332VA800TT	0.024	SFT120663V1A50TT	0.236
SFT040232V1A60TT	0.03734	SFT060332V1A00TT	0.026	SFT120663V2A00TT	0.339
SFT040232V2A00TT	0.04040	SFT060332V1A25TT	0.057	SFT120632V2A50TT	0.605
SFT040232V2A50TT	0.06760	SFT060332V1A50TT	0.081	SFT120632V3A00TT	0.933
SFT040232V3A00TT	0.09860	STF060332V1A60TT	0.086	SFT120632V4A00TT	1.537
SFT040232V3A15TT	0.10868	SFT060332V2A00TT	0.115	SFT120632V5A00TT	2.533
SFT040232V4A00TT	0.11450	SFT060332V2R50TT	0.200	SFT120632V7A00TT	5.684
		SFT060332V3R00TT	0.210		
		SFT060332V3A15TT	0.279		
		SFT060332V4A00TT	0.326		
		SFT060332V5A00TT	0.622		
		SFT060332V6A00TT	2.70		

Furthermore, for repeated numbers of inrush current, another specific derating must be applied:



Chip Fuse Clearing by Repeated Rush Current

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