



**STHC**  
AC Output Industrial SSR with LED & Snubber



**Description**

The **STHC** series is a Single-Phase AC relay with antiparallel thyristor output stands as a cornerstone in industrial applications, accommodating resistive, inductive, and capacitive loads. Safety measures are paramount, and this relay integrates a built-in snubber for transient protection, LED indicator for the control input for users can monitor its status with ease, and IP20 clip-on cover for touch protection. Moreover, the output terminals are designed to handle cables up to 16 mm<sup>2</sup>, ensuring robust performance in various industrial scenarios.

**Main Features**

- Zero-cross or Random switching
- AC Solid State Relay
- Direct copper bonding (DCB) technology
- LED indication
- Clip-on IP 20 protection cover
- Self-lifting terminals
- Housing free of moulding mass
- 2 input ranges: 3-32 VDC and 20-280 VAC/22-48 VDC
- Operational ratings: Up to 125 AACrms and 690VACrms
- Blocking voltage: Up to 1600 V<sub>p</sub>
- Opto-isolation: > 4000 VACrms
- Integrated overvoltage protection by self switching available (Contact factory)

**Part Numbering System**

Code	Option	Description	Notes
STHC		Product Series	
-	23	Operational Voltage Range: 24-265 VAC (230 VAC Nom.)	
-	60	Operational Voltage Range: 42-660 VAC (600 VAC Nom.)	
-	D	Control Voltage: Zero Cross, 3-32 VDC*	*4-32 VDC for 600 VAC models
-	A	Control Voltage: Zero Cross, 20-280 VAC, 22-48 VDC	
-	R	Control Voltage: Random Turn-On, 4-32 VDC	
-	E	Random Turn-On, Control Voltage: 20-280 VAC, 22-48 VDC	
-	25	Rated Load Current: 25A	
-	50	Rated Load Current: 50A	
-	75	Rated Load Current: 75A	
-	125	Rated Load Current: 125A	

Example: **STHC 60 D 125**





**General Specifications**

	STHC23	STHC60
<b>Operational Voltage Range</b> STHCxxA or STCHxxD STHCxxR	24 to 265 VAC <sub>rms</sub> 42 to 265 VAC <sub>rms</sub>	42 to 660 VAC <sub>rms</sub> 42 to 660 VAC <sub>rms</sub>
<b>Blocking Voltage</b>	≥ 650 Vp	≥ 1200 Vp
<b>Zero Voltage Turn-On</b>	≤ 10 V	≤ 10 V
<b>Operational Frequency Range</b>	45 to 65 Hz	45 to 65 Hz
<b>Power Factor</b>	> 0.5 @ 230 VAC <sub>rms</sub>	> 0.5 @ 600 VAC <sub>rms</sub>
<b>Approvals</b>	UR, cUR, CSA	UR, cUR, CSA
<b>CE Marking</b>	Yes	Yes*
<b>UKCA Marking</b>	Yes	Yes*
<b>Isolation</b> Input to Output Input and Output to Case	4000 V <sub>rms</sub> 4000 V <sub>rms</sub>	4000 V <sub>rms</sub> 4000 V <sub>rms</sub>

\* Heatsink must be connected to ground

**Input Specifications**

	Specification
<b>Control Voltage Range</b> STHC23D, STHC23R STHC60D, STHC60R, STHC69D, STHC69R STHC23A, STHC60A, STHC69A	3-32 VDC 4-32 VDC 20-280 VAC, 22-48 VDC
<b>Pick-up Voltage @ Ta = 25°C</b> STHC23D, STHC23R STHC60D, STHC60R, STHC69D, STHC69R STHC23A, STHC60A, STHC69A	2.5 VDC 3.5 VDC 18 VAC/DC
<b>Reverse Voltage</b> STHCxxD or STHCxxR	32 VDC
<b>Drop-out Voltage</b> STHCxxD or STHCxxR STHCxxA	1.2 VDC 6.0 VAC/DC
<b>Input Current @ Max Input Voltage</b> STHC23D, STHC23R STHC60D, STHC60R, STHC69D, STHC69R STHC23A, STHC60A, STHC69A	≤ 12 mA ≤ 15 mA ≤ 20 mA
<b>Response Time Pick-up</b> STHC23D, STHC23R STHC60D, STHC60R STHC23A, STHC60A	≤ 1/2 cycle ≤ 0.1 ms ≤ 12 ms
<b>Response Time Drop-out</b> STHC23D, STHC23R STHC60D, STHC60R STHC23A, STHC60A	≤ 1/2 cycle ≤ 1/2 cycle ≤ 40 ms



**Output Specifications**

	STHCxxx25	STHCxxx50	STHCxxx75	STHCxxx100	STHCxxx125
Rated Operational Current AC51 @ Ta=25°C AC53a @ Ta=25°C	25 A <sub>rms</sub> 5 A <sub>rms</sub>	50 A <sub>rms</sub> 15 A <sub>rms</sub>	75 A <sub>rms</sub> 17 A <sub>rms</sub>	100 A <sub>rms</sub> 20 A <sub>rms</sub>	125 A <sub>rms</sub> 30 A <sub>rms</sub>
Min. Operational Current	150 mA	250 mA	400 mA	400 mA	500 mA
Rep. Overload Current t=1 s	< 55 AAC <sub>rms</sub>	< 125 AAC <sub>rms</sub>	< 130 AAC <sub>rms</sub>	< 150 AAC <sub>rms</sub>	< 200 AAC <sub>rms</sub>
Non-Rep. Surge Current t=10 ms	325 A <sub>p</sub>	600 A <sub>p</sub>	800 A <sub>p</sub>	1150 A <sub>p</sub>	1900 A <sub>p</sub>
Off State Leakage Current	< 3 mA <sub>rms</sub>	< 3 mA <sub>rms</sub>	< 3 mA <sub>rms</sub>	< 3 mA <sub>rms</sub>	< 3 mA <sub>rms</sub>
Rated Voltage and Frequency	< 3 mA <sub>rms</sub>	< 3 mA <sub>rms</sub>	< 3 mA <sub>rms</sub>	< 3 mA <sub>rms</sub>	< 3 mA <sub>rms</sub>
I <sup>2</sup> t for fusing t=10 ms	< 525 A <sup>2</sup> s	< 1800 A <sup>2</sup> s	< 3200 A <sup>2</sup> s	< 6600 A <sup>2</sup> s	< 18000 A <sup>2</sup> s
Critical dV/dt Off-state Min.	1000 V/μs	1000 V/μs	1000 V/μs	1000 V/μs	1000 V/μs
Endurance Testing acc. to UL 508	100,000 cycles	100,000 cycles	100,000 cycles	100,000 cycles	6,000 cycles

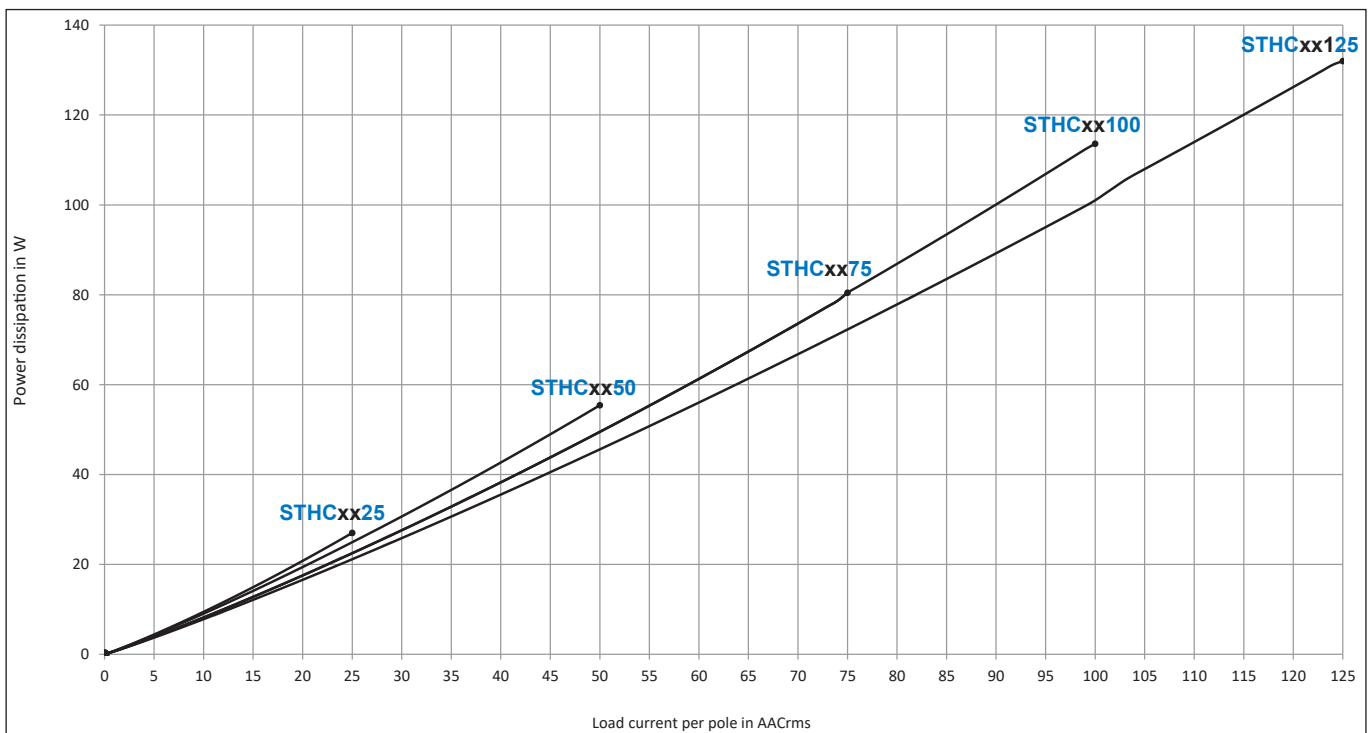
**Motor Ratings\*: HP (UL508)**

- STHCxx25
- STHCxx50
- STHCxx75
- STHCxx100
- STHCxx125

	230VAC	600VAC
STHCxx25	1.5HP	5HP
STHCxx50	3HP	10HP
STHCxx75	5HP	15HP
STHCxx100	7.5HP	25HP
STHCxx125	10HP	30HP

\* with suitable heatsink

**Output Power Dissipation**





**Electromagnetic Compatibility**

<b>Immunity</b>	EN60947-4-3	<b>Radiated Radio Frequency Immunity</b>	IEC/EN 61000-4-3
<b>Electrostatic Discharge (ESD) Immunity</b>	IEC/EN 61000-4-2	10V/m, 80 - 1000 MHz	Performance Criteria 1
Air discharge, 8kV	Performance Criteria 2	10V/m, 1.4 - 2.0GHz	Performance Criteria 1
Contact, 4kV	Performance Criteria 2	3 V/m, 2.0 - 2.7GHz	Performance Criteria 1
<b>Electrical Fast Transient (Burst) Immunity</b>	IEC/EN 61000-4-4	<b>Conducted Radio Frequency Immunity</b>	IEC/EN 61000-4-6
Output: 2kV, 5kHz	Performance Criteria 1	10V/m, 0.15 - 80 MHz	Performance Criteria 1
Input: 1kV, 5kHz	Performance Criteria 1	<b>Voltage Dips Immunity</b>	IEC/EN 61000-4-11
<b>Electrical Surge Immunity</b>	IEC/EN 61000-4-5	0% for 0.5, 1 cycle	Performance Criteria 2
Output, line to line, 1kV	Performance Criteria 2	40% for 10 cycles	Performance Criteria 2
Output, line to earth, 1kV	Performance Criteria 2	70% for 25 cycles	Performance Criteria 2
Output, line to earth, 2kV	Performance Criteria 2 with external varistor	80% for 250 cycles	Performance Criteria 2
Input, line to line, 1kV	Performance Criteria 2	<b>Voltage Interruptions Immunity</b>	IEC/EN 61000-4-11
Input, line to earth, 2kV	Performance Criteria 2	0% for 5000ms	Performance Criteria 2
<b>EMC Emission</b>	EN60947-4-3	<b>Radio Interference Field Emission (Radiated)</b>	IEC/EN 55011
<b>Radio Interference Voltage Emission (Conducted) 0.15 - 30MHz</b>	IEC/EN 55011	30 - 1000MHz	Class B
	Class A (industrial) with filters		

Notes:

- Use of AC solid state relays may, according to the application and the load current, cause conducted radio interferences. Use of mains filters may be necessary for cases where the user must meet E.M.C requirements. The capacitor values given inside the filtering specification tables should be taken only as indications, the filter attenuation will depend on the final application.
- The control terminals shall be supplied by a power limited (short-circuit rating limit <1500VA) secondary circuit; if not, then additional suppression may be required.
- Control input lines must be installed together to maintain products' susceptibility to Radio Frequency interference.
- Performance Criteria 1: No degradation of performance or loss of function is allowed when the product is operated as intended.
- Performance Criteria 2: During the test, degradation of performance or partial loss of function is allowed. However, when the test is complete the product should return operating as intended by itself.
- Performance Criteria 3: Temporary loss of function is allowed, provided the function can be restored by manual operation of the controls.



## Housing Specifications

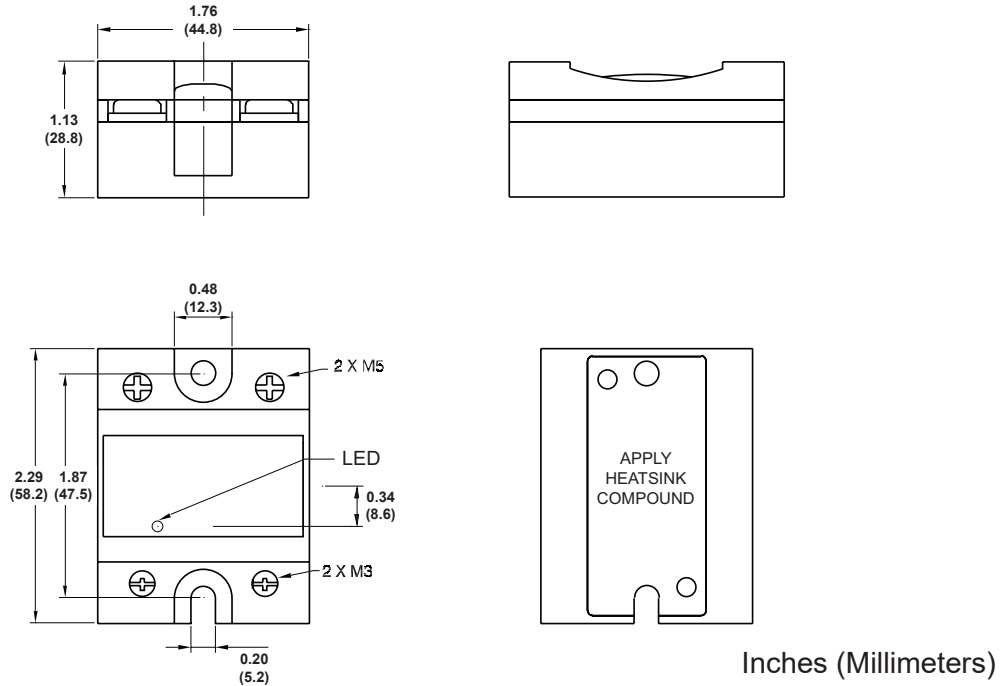
<b>Weight</b> 25A, 50A 75A, 100A, 125A	Approx. 60g Approx. 100g	<b>Relay</b> Mounting screws Mounting torque	M5 1.5-2.0Nm
<b>Housing material</b>	Noryl, black		
<b>Baseplate</b> 25A, 50A 75A, 100A, 125A	Aluminium Copper, nickel-plated		

## Connection Specifications

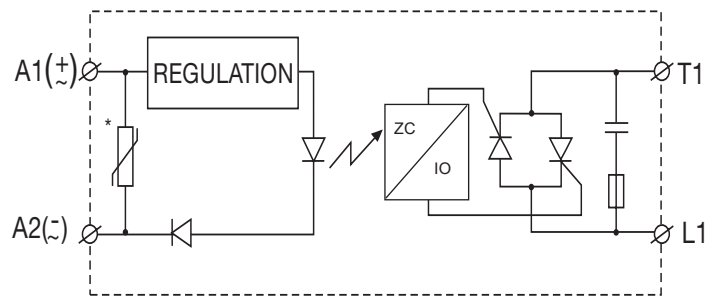
Connection terminals		L1, T1	A1, A2		
Stripping length (X)		12 mm	8 mm		
Connection Type		M5 screw with captivated washer	M3 screw with captivated washer		
Rigid (solid & stranded) UR rated data		1x 2.5 - 6.0 mm <sup>2</sup> 1x 14 - 10 AWG	2x 2.5 - 6.0 mm <sup>2</sup> 2x 14 - 10 AWG	1x 0.5 - 2.5 mm <sup>2</sup> 1x 18 - 12 AWG	2x 0.5 - 2.5 mm <sup>2</sup> 2x 18 - 12 AWG
Flexible with end sleeve		1x 1.0 - 4.0 mm <sup>2</sup> 1x 18 - 12 AWG	2x 1.0 - 2.5 mm <sup>2</sup> 2x 2.5 - 4.0 mm <sup>2</sup> 2x 18 - 14 AWG 2x 14 - 12 AWG	1x 0.5 - 2.5 mm <sup>2</sup> 1x 18 - 12 AWG	2x 0.5 - 2.5 mm <sup>2</sup> 2x 18 - 12 AWG
Flexible without end sleeve		1x 1.0 - 6.0 mm <sup>2</sup> 1x 18 - 10 AWG	2x 1.0 - 2.5 mm <sup>2</sup> 2x 2.5 - 6.0 mm <sup>2</sup> 2x 18 - 14 AWG 2x 14 - 10 AWG		
Torque specification		Pozidrive 2 2.4 Nm (21.2 lb-in)	Pozidrive 1 0.5 Nm (4.4 lb-in)		
Aperture for termination lug		12 mm	7.5 mm		



**Dimensions**

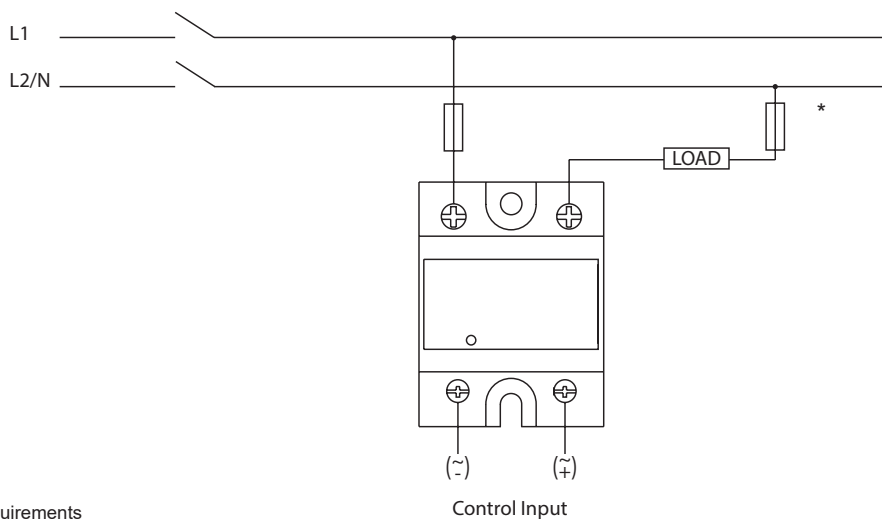


**Block Diagram**



\* Varistor across input applies to AC control versions only.

**Connection Diagram**



\* Depends on system requirements



**Heatsink Dimensions (Load Current vs Ambient Temperature)**

**STHCxx25**

Load Current (A)	Thermal Resistance (°C/W)						
	20	30	40	50	60	70	80
25.0	3.23	2.80	2.37	1.94	1.51	1.09	0.66
22.5	3.70	3.21	2.73	2.24	1.75	1.26	0.78
20.0	4.30	3.74	3.17	2.61	2.05	1.49	0.92
17.5	5.07	4.41	3.76	3.10	2.44	1.78	1.12
15.0	6.12	5.33	4.54	3.75	2.96	2.17	1.38
12.5	7.58	6.61	5.64	4.66	3.69	2.72	1.75
10.0	9.80	8.55	7.30	6.05	4.80	3.55	2.30
7.5	13.5	11.80	10.09	8.37	6.66	4.94	3.23
5.0	-	18.3	15.7	13.04	10.39	7.74	5.09
2.5	-	-	-	-	-	16.2	10.7

**STHCxx50**

Load Current (A)	Thermal Resistance (°C/W)						
	20	30	40	50	60	70	80
50.0	1.25	1.07	0.88	0.70	0.52	0.34	0.16
45.0	1.46	1.25	1.04	0.84	0.63	0.42	0.21
40.0	1.73	1.49	1.25	1.01	0.77	0.52	0.28
35.0	2.08	1.80	1.51	1.23	0.94	0.66	0.37
30.0	2.56	2.22	1.87	1.53	1.18	0.84	0.49
25.0	3.24	2.81	2.38	1.95	1.52	1.09	0.66
20.0	4.26	3.71	3.15	2.59	2.03	1.47	0.92
15.0	5.99	5.22	4.45	3.67	2.90	2.12	1.35
10.0	9.49	8.27	7.06	5.85	4.64	3.43	2.22
5.0	-	17.5	15.0	12.4	9.91	7.39	4.86

Junction to ambient thermal resistance, $R_{th\ j-a}$	< 20.0	°C/W
Junction to case thermal resistance, $R_{th\ j-c}$	< 0.80	°C/W
Case to heatsink thermal resistance, $R_{th\ c-s}$	< 0.20	°C/W
Maximum allowable case temperature	100	°C
Maximum allowable junction temperature	125	°C

Junction to ambient thermal resistance, $R_{th\ j-a}$	< 20.0	°C/W
Junction to case thermal resistance, $R_{th\ j-c}$	< 0.50	°C/W
Case to heatsink thermal resistance, $R_{th\ c-s}$	< 0.20	°C/W
Maximum allowable case temperature	100	°C
Maximum allowable junction temperature	125	°C

**STHCxx75**

Load Current (A)	Thermal Resistance (°C/W)						
	20	30	40	50	60	70	80
75.0	0.94	0.82	0.70	0.58	0.47	0.35	0.23
67.5	1.10	0.96	0.82	0.69	0.55	0.41	0.27
60.0	1.30	1.14	0.98	0.81	0.65	0.49	0.33
52.5	1.57	1.38	1.18	0.98	0.79	0.59	0.39
45.0	1.95	1.70	1.46	1.22	0.97	0.73	0.49
37.5	2.48	2.17	1.86	1.55	1.24	0.93	0.62
30.0	3.32	2.90	2.49	2.07	1.66	1.24	0.83
22.5	4.75	4.15	3.56	2.97	2.37	1.78	1.19
15.0	7.68	6.72	5.76	4.80	3.84	2.88	1.92
7.5	-	14.59	12.50	10.42	8.34	6.25	4.17

**STHCxx100**

Load Current (A)	Thermal Resistance (°C/W)						
	20	30	40	50	60	70	80
100.0	0.60	0.52	0.43	0.34	0.26	0.17	0.09
90.0	0.74	0.64	0.54	0.44	0.34	0.24	0.14
80.0	0.91	0.79	0.68	0.56	0.45	0.33	0.22
70.0	1.09	0.96	0.82	0.68	0.55	0.41	0.27
60.0	1.33	1.16	1.00	0.83	0.66	0.50	0.33
50.0	1.66	1.45	1.24	1.04	0.83	0.62	0.41
40.0	2.16	1.89	1.62	1.35	1.08	0.81	0.54
30.0	3.01	2.64	2.26	1.88	1.51	1.13	0.75
20.0	4.73	4.14	3.55	2.96	2.37	1.78	1.18
10.0	9.94	8.70	7.45	6.21	4.97	3.73	2.48

Junction to ambient thermal resistance, $R_{th\ j-a}$	< 20.0	°C/W
Junction to case thermal resistance, $R_{th\ j-c}$	< 0.35	°C/W
Case to heatsink thermal resistance, $R_{th\ c-s}$	< 0.10	°C/W
Maximum allowable heatsink temperature	100	°C
Maximum allowable junction temperature	125	°C

Junction to ambient thermal resistance, $R_{th\ j-a}$	< 20.0	°C/W
Junction to case thermal resistance, $R_{th\ j-c}$	< 0.35	°C/W
Case to heatsink thermal resistance, $R_{th\ c-s}$	< 0.10	°C/W
Maximum allowable heatsink temperature	100	°C
Maximum allowable junction temperature	125	°C

Note: The thermal resistance values,  $R_{th\ c-s}$ , indicated in the tables above are applicable if a fine layer of thermal paste is applied between heatsink and SSR.



**Heatsink Dimensions (cont.)**

**Thermal Specifications**

**STHCxx125**

Load Current (A)	Thermal Resistance (°C/W)							
	20	30	40	50	60	70	80	T <sub>A</sub>
125.0	0.63	0.55	0.47	0.40	0.32	0.24	0.16	
112.5	0.73	0.64	0.54	0.45	0.36	0.27	0.18	
100.0	0.84	0.74	0.63	0.53	0.42	0.32	0.21	
87.5	0.99	0.87	0.74	0.62	0.50	0.37	0.25	
75.0	1.20	1.05	0.90	0.75	0.60	0.45	0.30	
62.5	1.48	1.30	1.11	0.93	0.74	0.56	0.37	
50.0	1.92	1.68	1.44	1.20	0.96	0.72	0.48	
37.5	2.65	2.32	1.98	1.65	1.32	0.99	0.66	
25.0	4.12	3.60	3.09	2.57	2.06	1.54	1.03	
12.5	8.55	7.48	6.41	5.34	4.27	3.21	2.14	

<b>Operating temperature</b>	-40° to +80°C (-40° to +176°F)
<b>Storage temperature</b>	-40° to +100°C (-40° to +212°F)
<b>Junction temperature</b>	≤ 125°C (257°F)

Junction to ambient thermal resistance, R <sub>th j-a</sub>	< 20.0	°C/W
Junction to case thermal resistance, R <sub>th j-c</sub>	< 0.30	°C/W
Case to heatsink thermal resistance, R <sub>th c-s</sub>	< 0.10	°C/W
Maximum allowable heatsink temperature	100	°C
Maximum allowable junction temperature	125	°C





### Short Circuit Protection

Protection Co-ordination, Type 1 vs. Type 2:

Type 1 protection implies that after a short circuit, the device under test will no longer be in a functioning state. In type 2 co-ordination, the device under test will still be functional after the short circuit. In both cases, however, the short circuit has to be interrupted. The fuse between enclosure and supply shall not open. The door or cover of the enclosure shall not be blown open. There shall be no damage to conductors of terminals and the conductors shall not separate from terminals. There shall be no breakage or cracking of insulating bases to the extent that the integrity of the mounting of live parts is impaired. Discharge of parts or any risk of fire shall not occur.

The product variants listed in the table hereunder are suitable for use on a circuit capable of delivering not more than 65,000A rms Symmetrical Amperes, 600Volts maximum when protected by fuses. Tests at 65,000A were performed with Class J, fast acting: please refer to the table below for maximum allowed ampere rating of the fuse. Use fuses only.

### Co-ordination Type 1 (UL508)

Part No.	Prospective short circuit current (kArms)	Max. fuse size (A)	Class	Voltage (Vac)
STHCxx25	65	30	J / CC	600
STHCxx50	65	30	J	600
		20	HSJ20 (Mersen*)	600
STHCxx75	65	100	J	600
STHCxx100	65	80	J	600
		60	HSJ60 (Mersen*)	600
STHCxx125	65	125	J	600
		60	HSJ60 (Mersen*)	600

### Co-ordination Type 2 (IEC/EN60947-4-3)

Part No.	Prospective short circuit current (kArms)	Max. fuse size (A)	Brand	Model	Size
STHC23x25	10	25	Mersen*	6.9gRB 10-25	10.3 x 38
STHC60x25	10	20	Mersen*	6.9gRB 10-20	10.3 x 38
STHC23x50	10	50	Mersen*	6.9zz CP gRC 14x51/50	14 x 51
STHC60x50	10	50	Mersen*	6.9zz CP gRC 22x58/50	22 x 58
STHC23x75 & STHC60x75	10	63	Mersen*	6.9zz CP gRC 22x58/63	22 x 58
STHC23x100	10	100	Mersen*	6.9zz CP gRC 22x58/100	22 x 58
STHC60x100	10	80	Mersen*	6.9zz CP gRC 22x58/80	22 x 58
STHC23x125 & STHC60x125	10	125	Mersen*	6.921 CP URGD 27x60/125	27 x 60

zz = 00, without fuse trip indication

zz = 21, with fuse trip indication

\* Formerly Ferraz Shawmut



**Type 2 Protection with Miniature Circuit Breakers (M.C.B.s)**

Solid State Relay type	ABB Model no. for Z - type M. C. B. (rated current)	ABB Model no. for B - type M. C. B. (rated current)	Wire cross sectional area [mm <sup>2</sup> ]	Minimum length of Cu wire conductor [m]*
<b>STHCxx25</b>	<b>1-pole</b>			
	S201-Z4 (4A)	S201-B2 (2A)	1.0	21.0
	S201-Z6 UC (6A)	S201-B2 (2A)	1.0	21.0
			1.5	31.5
<b>STHCxx50</b>	<b>1-pole</b>			
	S201-Z10 (10A)	S201-B4 (4A)	1.0	7.6
			1.5	11.4
			2.5	19.0
	S201-Z16 (16A)	S201-B6 (6A)	1.0	5.2
			1.5	7.8
			2.5	13.0
			4.0	20.8
	S201-Z20 (20A)	S201-B10 (10A)	1.5	12.6
			2.5	21.0
	S201-Z25 (25A)	S201-B13 (13A)	2.5	25.0
			4.0	40.0
	<b>2-poles</b>			
	S202-Z25 (25A)	S202-B13 (13A)	2.5	19.0
4.0			30.4	
<b>STHC..75..</b> <b>STHC..100..</b>	<b>1-pole</b>			
	S201-Z20 (20A)	S201-B10 (10A)	1.5	4.2
			2.5	7.0
			4.0	11.2
	S201-Z32 (32A)	S201-B16 (16A)	2.5	13.0
			4.0	20.8
			6.0	31.2
	<b>2-poles</b>			
	S202-Z20 (20A)	S202-B10 (10A)	1.5	1.8
			2.5	3.0
			4.0	4.8
	S202-Z32 (32A)	S202-B16 (16A)	2.5	5.0
			4.0	8.0
			6.0	12.0
10.0			20.0	
S202-Z50 (50A)	S202-B25 (25A)	4.0	14.8	
		6.0	22.2	
		10.0	37.0	
<b>STHC..125..</b>	<b>1-pole</b>			
	S201-Z50 (50A)	S201-B25 (25A)	4.0	4.8
			6.0	7.2
			10.0	12.0
			16.0	19.2
	S201-Z63 (63A)	S201-B32 (32A)	6.0	7.2
			10.0	12.0
16.0			19.2	

\* Between MCB and Load (including return path which goes back to the mains).

Note: A prospective current of 6kA and a 230/400V power supply system is assumed for the above suggested specifications. For cables with different cross section than those mentioned above please consult Teledyne Relays' Technical Support Group.



**Environmental Information**

The declaration in this section is prepared in compliance with People’s Republic of China Electronic Industry Standard SJ/T11364-2014: Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products.

Part Name	Toxic or Harardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Power Unit Assembly	x	O	O	O	O	O

O: Indicates that said hazardous substance contained in homogeneous materials for this part are below the limit requirement of GB/T 26572.

X: Indicates that said hazardous substance contained in one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

Questions? Scan the QR code or contact us at:  
<https://www.teledynedefenseelectronics.com/relays/contactus/Pages/Contact-Us.aspx>

