| | | |
|---|---|---|
| $V_{DRM}$ | = | 8400 V |
| $V_{DCN}$ | = | 4000 V |
| $I_{TSM}$ | = | 290x10$^3$ A |
| I2t | = | 94 MA$^2$s |

# Bypass Thyristor
# 5STP 10L8500

Doc. No. 5SYA1085-01 Jun. 20

**Device offers three different operation modes:**

- **Normal operation: Device is blocked permanently**
- **Protection mode: Device is shorted irreversible by surge current event ($I_{TSM}/I^2t$) through gate triggering**
- **SCFM mode: Continuous stable long-term short circuit mode**

## Blocking

| Parameter | Symbol | Conditions | 5STP 10L8500 | Unit |
|---|---|---|---|---|
| Repetitive peak forward off-state voltage | $V_{DRM}$ | Tc = 25 … 70 °C, Note 1 | ≥ 8400 | V |
| DC off-state current | $I_D$ | $V_{DC}$ = $V_{DC0}$, Tc = 70°C | ≤ 30 | mA |
| Maximum DC voltage short term | $V_{DC0}$ | t = 15 s<br>Tc = 70 °C | 5200 | V |
| Maximum DC voltage long term | $V_{DCM}$ | t = stationary<br>Tc = 70 °C | 4600 | V |
| Permanent DC voltage with 100 FIT failure rate | $V_{DCN}$ | t = stationary, sea level,<br>$T_{ambient}$ = 25 °C | 4000 | V |
| Maximum rate of rise of anode-to-cathode voltage | $dV_{AK}/dt$ (10 - 63 %) | $V_D$ = 6500 V<br>Tc ≤ 70 °C | 8100 | V/us |

Note 1: Voltage de-rating factor of 0.11% per °C is applicable for Tc below +25 °C

## Mechanical

| Parameter | Symbol | Conditions | min | typ | max | Unit |
|---|---|---|---|---|---|---|
| Mounting force | $F_M$ | | 38 | 41 | 44 | kN |
| Weight | m | | | | 1.3 | kg |
| Housing thickness | H | In clamped state ($F_M$ > 2kN), Note 2 | 26.8 | | 27.2 | mm |
| Creepage distance anode-gate | | | 33 | | | mm |
| Clearance distance anode-gate | | | 13 | | | mm |
| Pole piece diameter | | | 84.9 | | 85.1 | mm |
| Outline drawing | | Thyristor housing:<br>→ *Figure* 1<br>Gate cable:<br>→ *Figure* 2 | | | | |
| Gate cable | | Coaxial cable Radox GKW 1x1.0/1.0 mm$^2$ | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Gate cable terminals, customer end | | Faston connectors 6.3 x 0.8 | | | | |
| Gate cable length | L | | 730 | | 750 | mm |

Note 2: During SCFM mode device may lose up to 0.5 mm in height

## On-state

| Parameter | Symbol | Conditions | min | max | Unit |
|---|---|---|---|---|---|
| Surge current (non-repetitive) | $I_{TSM}$ | $t_p$ = 0.5 ms, $V_D$ = 0 V, Tc = 25…70 °C, half sine wave, Device fails into sustained short circuit condition, Lower surge current values than $I_{TSM,min}$ not recommended and may result in device pre-damage | 28 | | kA |
| Limiting load integral | $I^2t$ (surge) | $t_p$ = 1 ms, $V_D$ = 0 V, Tc = 25…70 °C, half sine wave, Device fails into sustained short circuit condition | 200 | | $kA^2s$ |
| Case non rupture peak current | $I_{TSM}$ (c.n.r.) | Failure current follows after device turn-on pulse only, Case rupture shall not take place | | 290 | kA |
| Case non rupture integral | $I^2t$ (c.n.r.) | | | 94 | $MA^2s$ |
| Short-Circuit Failure Mode duration | $t_{SCFM}$ | $I_{SCFM} \leq 1300A_{RMS}$, Cooled on both sides, Tc,max = 90 °C | | 1 | year |
| Short-Circuit voltage | $V_{SCFM}$ | | | 3 | V |

## Triggering

| Parameter | Symbol | Conditions | min | max | Unit |
|---|---|---|---|---|---|
| Gate trigger current | $I_{GT}$ | Tc = 25 °C | | 400 | mA |
| Gate trigger voltage | $V_{GT}$ | Tc = 25 °C | | 2.6 | V |
| Gate non trigger voltage | $V_{GD}$ | $V_D = 0.4 \cdot V_{DRM}$, Tc = 70 °C | | 0.3 | V |
| Gate non-trigger current | $I_{GD}$ | $V_D = 0.4 \cdot V_{DRM}$, Tc = 70 °C | | 10 | mA |

## Turn-off switching without Snubber

The device is not required to turn off in this application.

## Thermal

| Parameter | Symbol | Conditions | min | max | Unit |
|---|---|---|---|---|---|
| Operating case temperature | Tc | | 0 | 70 | °C |
| Storage junction temperature | $T_{stg}$ | | -40 | 85 | °C |

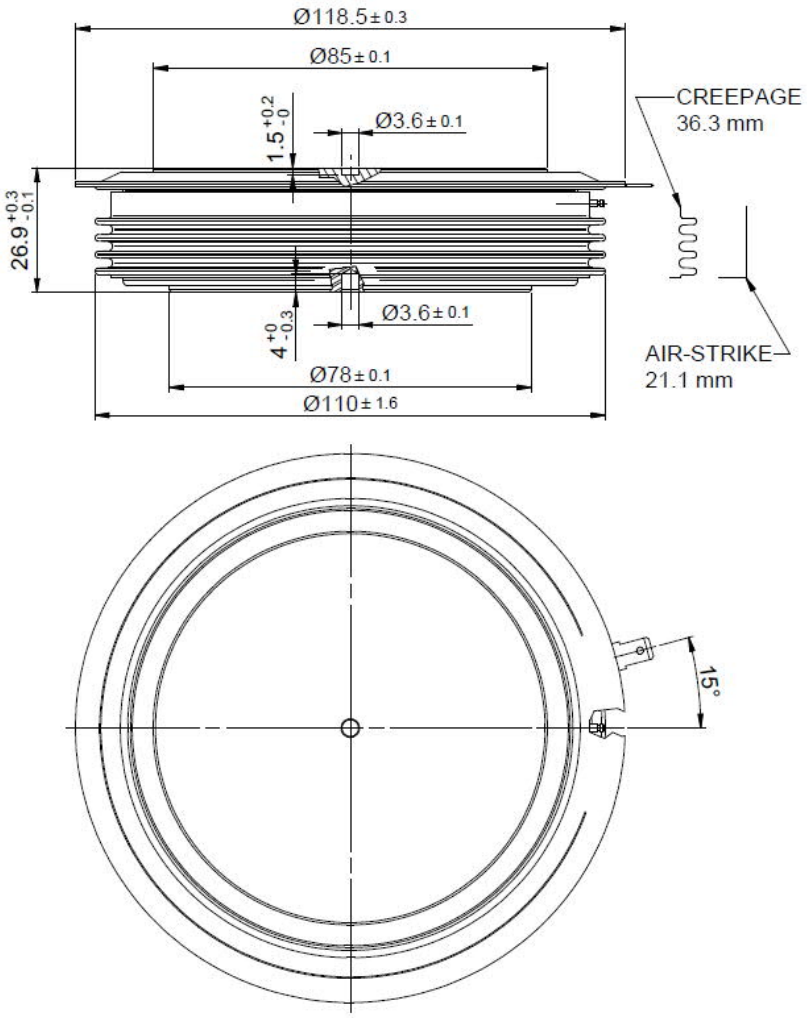


*Figure 1: Thyristor outline drawing*

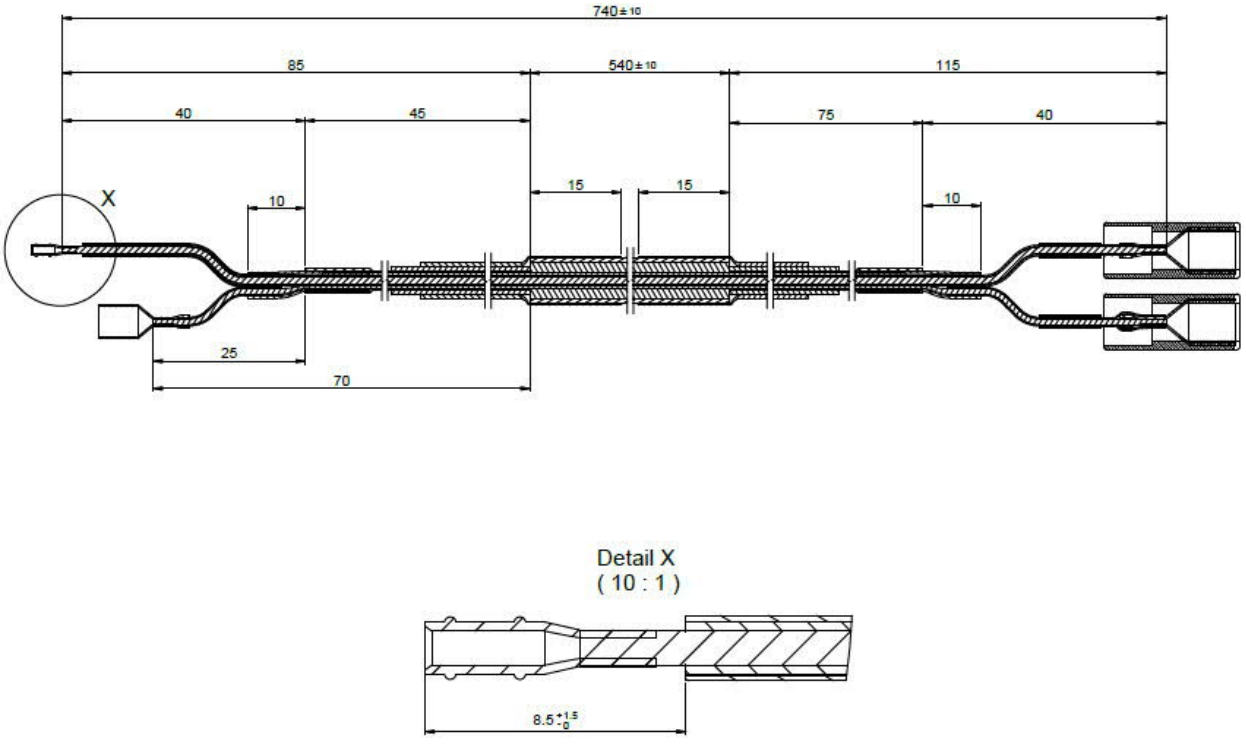


*Figure 2: Gate cable drawing*

## Related documents:

| | |
|---|---|
| 5SYA 2049 | Voltage definitions for phase control and bi-directionally controlled thyristors |
| 5SYA 2051 | Voltage ratings of high power semiconductors |
| 5SYA 2034 | Gate-drive recommendations for phase control and bi-directionally controlled thyristors |
| 5SYA 2036 | Recommendations regarding mechanical clamping of Press-Pack High Power Semiconductors |
| 5SZK 9118 | General Environmental Conditions for High Power Semiconductors |

Please refer to http://www.abb.com/semiconductors for current version of documents.



**ABB Power Grids Switzerland Ltd**
**Semiconductors**
Fabrikstrasse 3
CH-5600 Lenzburg, Switzerland

Telephone +41 (0)58 586 1419
Fax +41 (0)58 586 1306
Email abbsem@ch.abb.com
Internet www.abb.com/semiconductors

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