

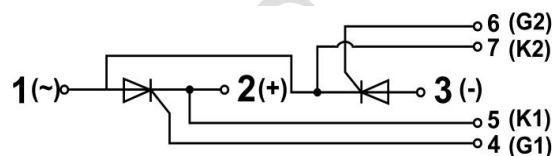


# RS55HF180A9H

## Thyristor Module

### Features:

- Blocking Voltage:1800V
- Corner Gate Chip in Chip Carrier
- Heat Transfer Through Aluminum Oxide DBC Ceramic
- Isolated Copper Baseplate
- Mesa Glass Passivation Technology and Multilayer Metallization Technology



### Applications:

- Power Converters
- Reactive Power Compensation
- DC Motor Control
- Softstart AC Motor Control
- Lighting and Temperature Control

### Maximum Rated

| Symbol            | Description                                       | Conditions                                      | Min.  | Typ. | Max. | Units                  |
|-------------------|---------------------------------------------------|-------------------------------------------------|-------|------|------|------------------------|
| $V_{RSM}/V_{DSM}$ | Non-Repetitive Reverse / Forward Blocking Voltage | $T_{VJ}=25^{\circ}\text{C}$                     | 1900  |      |      | V                      |
| $V_{RRM}/V_{DRM}$ | Repetitive Reverse / Forward Blocking Voltage     | $T_{VJ}=25^{\circ}\text{C}$                     | 1800  |      |      | V                      |
| $I_{TAV}$         | Average Forward Current                           | $T_C=85^{\circ}\text{C}$ , 180° Sine            | 55    |      |      | A                      |
| $I_{T(RMS)}$      | RMS Forward Current                               | 180° sine                                       | 90    |      |      | A                      |
| $I_{TSM}$         | Surge Current                                     | $T_{VJ}=25^{\circ}\text{C}$ , $t_p=10\text{ms}$ | 1500  |      |      | A                      |
| $I^2t$            | $I^2t$ - value                                    | $T_{VJ}=25^{\circ}\text{C}$ , $t_p=10\text{ms}$ | 11250 |      |      | $\text{A}^2\text{s}$   |
| $di/dt$           | $I_G=2 I_{GT}$ , $T_{VJ}=125^{\circ}\text{C}$     |                                                 |       |      | 150  | $\text{A}/\mu\text{s}$ |
| $dv/dt$           | $T_{VJ}=125^{\circ}\text{C}$                      |                                                 |       |      | 1000 | $\text{V}/\mu\text{s}$ |



## Electrical Characteristics

| Symbol            | Description                     | Conditions                                                                                                                         |                       | Min. | Typ. | Max. | Units      |
|-------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|------|------|------------|
| $V_{TM}$          | Forward Voltage Drop            | $I_T=100A$                                                                                                                         | $T_{VJ}=25^{\circ}C$  |      |      | 1.32 | V          |
|                   |                                 |                                                                                                                                    | $T_{VJ}=125^{\circ}C$ |      |      | 1.33 | V          |
|                   |                                 | $I_T=180A$                                                                                                                         | $T_{VJ}=25^{\circ}C$  |      |      | 1.55 | V          |
|                   |                                 |                                                                                                                                    | $T_{VJ}=125^{\circ}C$ |      |      | 1.65 | V          |
| $I_{RRM}/I_{DRM}$ | Reverse Current / Drain Current | $V_{R/D}=V_{RRM}$                                                                                                                  | $T_{VJ}=125^{\circ}C$ |      |      | 20   | mA         |
| $P_{GM}$          | Maximum Peak Gate Power         |                                                                                                                                    |                       |      |      | 10   | W          |
| $P_{G(AV)}$       | Maximum Average Gate Power      |                                                                                                                                    |                       |      |      | 0.5  | W          |
| $V_{TO}$          | Threshold Voltage               | $T_{VJ}=T_{VJmax}$                                                                                                                 |                       |      | 0.8  | 1.0  | V          |
| $r_T$             | Slope Resistance                | $T_{VJ}=T_{VJmax}$                                                                                                                 |                       |      | 4.7  | 5.0  | m $\Omega$ |
| $V_{GT}$          | Gate Trigger Voltage            | $T_{VJ}=25^{\circ}C$ , d.c.                                                                                                        |                       |      |      | 1.3  | V          |
| $I_{GT}$          | Gate Trigger Current            | $T_{VJ}=25^{\circ}C$ , d.c.                                                                                                        |                       |      |      | 80   | mA         |
| $V_{GD}$          | Gate Non-trigger Voltage        | $T_{VJ}=125^{\circ}C$ , d.c.                                                                                                       |                       |      |      | 0.25 | V          |
| $I_{GD}$          | Gate Non-trigger Current        | $T_{VJ}=125^{\circ}C$ , d.c.                                                                                                       |                       |      |      | 4    | mA         |
| $I_L$             | Latching Current                | $I_G=1.2 I_{GT}$ , $T_{VJ}=25^{\circ}C$                                                                                            |                       |      |      | 250  | mA         |
| $I_H$             | Holding Current                 | $I_T=1A$ , $T_{VJ}=25^{\circ}C$                                                                                                    |                       |      |      | 150  | mA         |
| $t_{gd}$          | Gate Controlled Delay Time      | $V_D=1/2 V_{DRM}$ , $I_G=0.45A$ ,<br>$di_G/dt=0.45A/\mu s$ , $T_{VJ}=25^{\circ}C$                                                  |                       |      |      | 2    | $\mu s$    |
| $t_q$             | Turn-off Time                   | $V_R=100V$ , $I_T=120A$ , $V_D=2/3 V_{DRM}$ ,<br>$t_p=200\mu s$ , $di/dt=10A/\mu s$ ,<br>$dv/dt=20V/\mu s$ , $T_{VJ}=100^{\circ}C$ |                       |      | 150  |      | $\mu s$    |

## Thermal Characteristics

| Symbol        | Description                                                    | Min. | Typ. | Max. | Units         |
|---------------|----------------------------------------------------------------|------|------|------|---------------|
| $R_{th(j-c)}$ | Thyristor Thermal Resistance: Junction-to-Case (per Thyristor) |      |      | 0.37 | $^{\circ}C/W$ |
| $R_{th(c-s)}$ | Case-to-Sink Thermally (Conductive Grease Applied)             |      |      | 0.12 | $^{\circ}C/W$ |



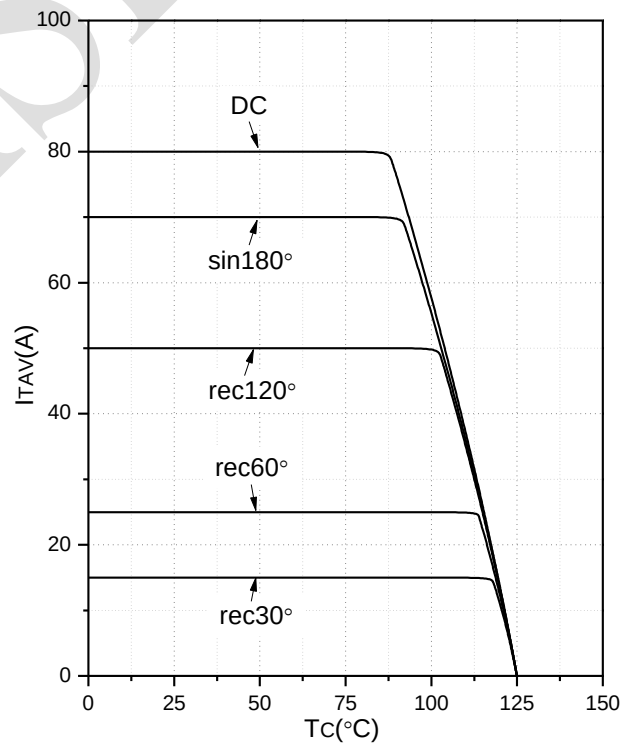
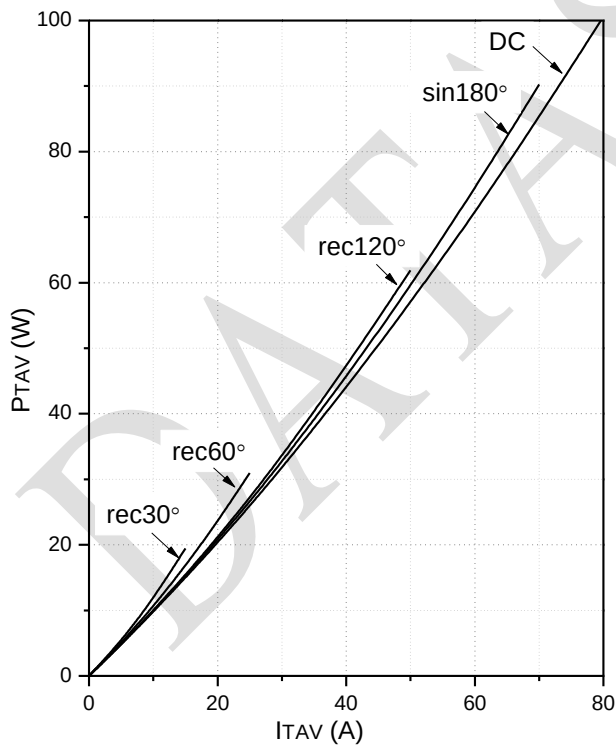
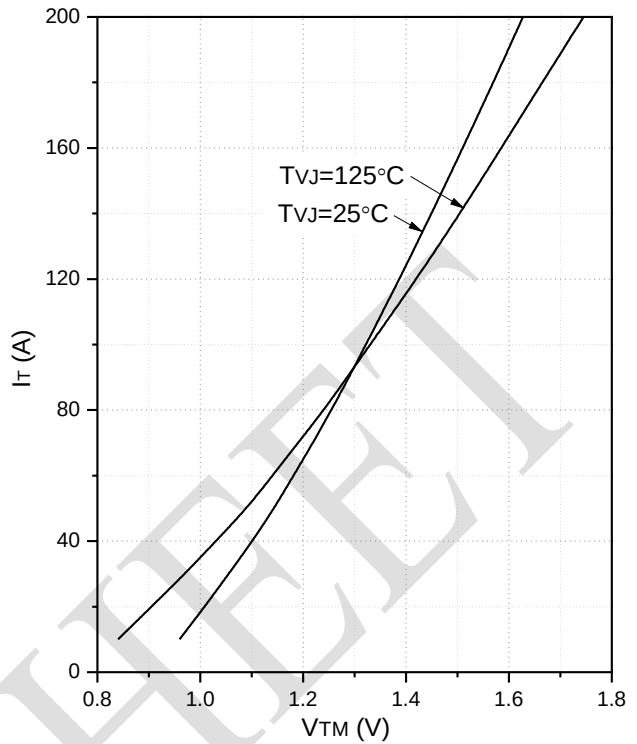
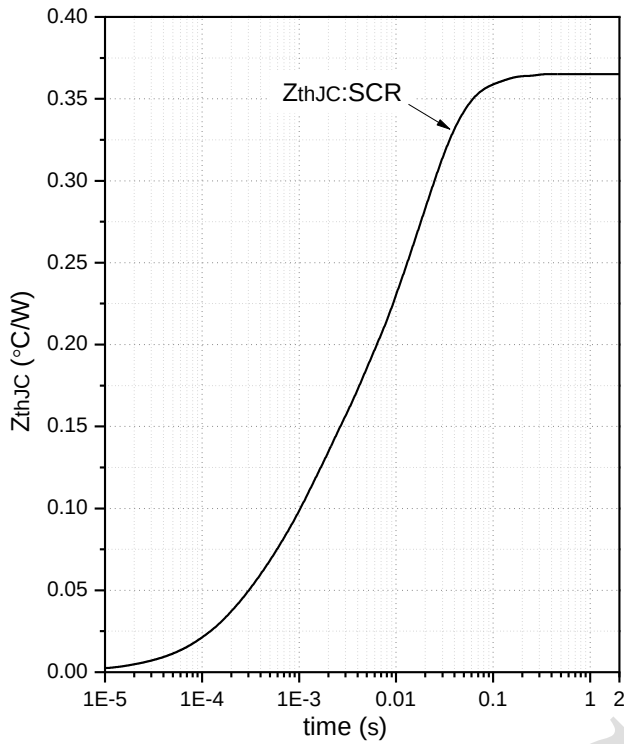
## Module

| Symbol             | Description                                  |                                     | Min.      | Typ. | Max. | Units |
|--------------------|----------------------------------------------|-------------------------------------|-----------|------|------|-------|
| $V_{ISOL}$         | Isolation Voltage<br>(All Terminals Shorted) | AC 50Hz,RMS,1s, $I_{ISOL} \leq 1mA$ | 3600      |      |      | V     |
| Internal Isolation |                                              |                                     | $Al_2O_3$ |      |      |       |
| $d_{creep}$        | Creepage Distance on Surface                 | terminal to terminal                | 9.7       |      |      | mm    |
|                    |                                              | terminal to backside                | 16.0      |      |      | mm    |
| $T_{VJ}$           | Maximum Junction Temperature                 |                                     |           |      | 125  | °C    |
| $T_{VJOP}$         | Operating Junction Temperature Range         |                                     | -40       |      | 125  | °C    |
| $T_{stg}$          | Storage Temperature                          |                                     | -40       |      | 125  | °C    |
| CTI                | Comparative Tracking Index                   |                                     | 200       |      |      |       |
| M                  | Power Terminals Screw:M5                     |                                     | 3.0       |      | 5.0  | N·m   |
| M                  | Mounting Screw:M6                            |                                     | 4.0       |      | 6.0  | N·m   |
| G                  | Weight                                       |                                     |           | 90   |      | g     |

## Ordering Information Table

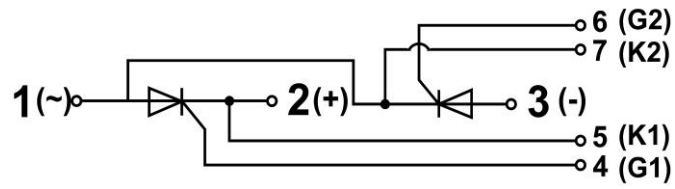
|             |    |    |    |     |    |   |
|-------------|----|----|----|-----|----|---|
| Device code | RS | 55 | HF | 180 | A9 | H |
|             | ①  | ②  | ③  | ④   | ⑤  | ⑥ |

- ① - SCR Module
- ② - Rated Current (55=55A)
- ③ - Circuit Configuration (HF=Half Bridge)
- ④ - Rated Voltage (180=1800V)
- ⑤ - Package Type
- ⑥ - Test Level (Pass the Important Reliability Test-Industrial Grade)

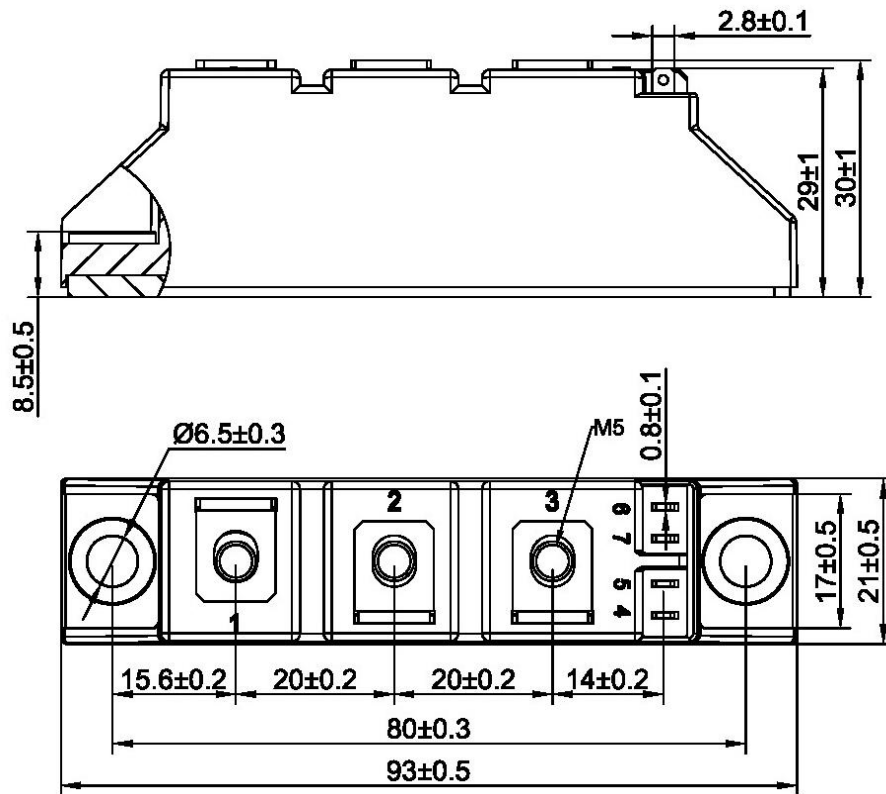




### Internal Circuit:



### Package Outline (Unit: mm):





| Date       | Revision | Notes                  |
|------------|----------|------------------------|
| 04/22/2021 | A        | Final Version          |
| 11/02/2022 | B        | Update Circuit Diagram |
| 02/16/2023 | C        | Update Outlines        |

## Announcement

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The datasheet with “REV.” + “Arabic numerals” is based on engineering data for initial reference purpose only.

The released datasheet would be issued with “REV.” + “alphabet characters”.