

# TM60SA-6

MEDIUM POWER GENERAL USE  
NON-INSULATED TYPE

TM60SA-6



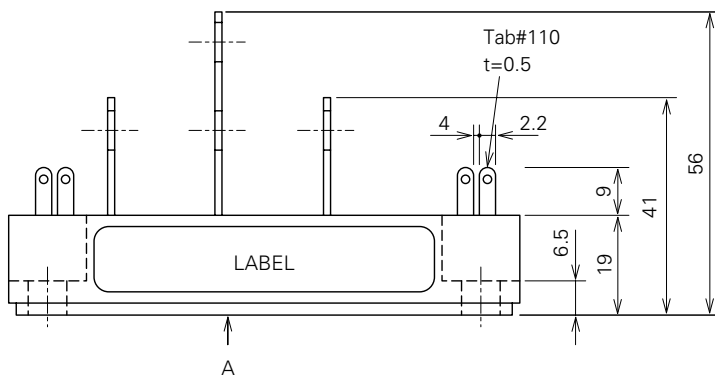
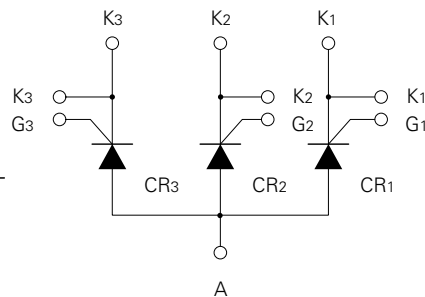
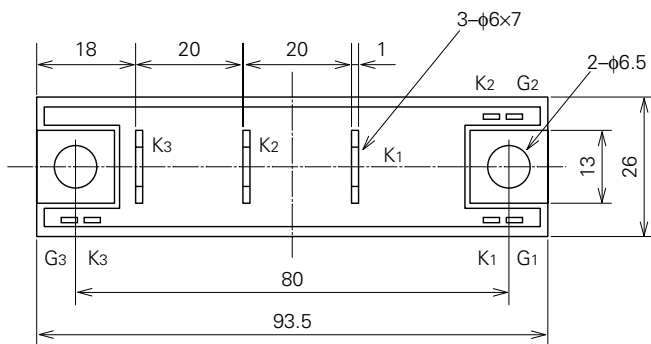
- **IT (AV)** Average on-state current ..... **60A**
- **VRRM** Repetitive peak reverse voltage ..... **300V**
- **VDRM** Repetitive peak off-state voltage ..... **300V**
- **TRIPLE ARMS**
- **Non-Insulated Type**

## APPLICATION

Welders

## OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



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## ABSOLUTE MAXIMUM RATINGS

| Symbol  | Parameter                             | Voltage class |  | Unit |
|---------|---------------------------------------|---------------|--|------|
|         |                                       | 6             |  |      |
| VRRM    | Repetitive peak reverse voltage       | 300           |  | V    |
| VRSM    | Non-repetitive peak reverse voltage   | 360           |  | V    |
| VR (DC) | DC reverse voltage                    | 240           |  | V    |
| VDRM    | Repetitive peak off-state voltage     | 300           |  | V    |
| VDSM    | Non-repetitive peak off-state voltage | 360           |  | V    |
| VD (DC) | DC off-state voltage                  | 240           |  | V    |

| Symbol           | Parameter                                 | Conditions  | Ratings               | Unit             |
|------------------|---|---|-----------------------|------------------|
| IT (RMS)         | RMS on-state current                      |   | 94                    | A                |
| IT (AV)          | Average on-state current                  | Three-phase, half-wave, Tc=125°C  | 60                    | A                |
| ITSM             | Surge (non-repetitive) on-state current   | One half cycle at 60Hz, peak value  | 1200                  | A                |
| I <sup>2</sup> t | I <sup>2</sup> t for fusing               | Value for one cycle of surge current  | 6.0 × 10 <sup>3</sup> | A <sup>2</sup> s |
| di/dt            | Critical rate of rise of on-state current | V <sub>D</sub> =1/2V <sub>DRM</sub> , I <sub>G</sub> =1.0A, T <sub>j</sub> =150°C | 50                    | A/μs             |
| PGM              | Peak gate power dissipation               |   | 5.0                   | W                |
| PG (AV)          | Average gate power dissipation            |   | 0.5                   | W                |
| VFGM             | Peak gate forward voltage                 |   | 10                    | V                |
| VRGM             | Peak gate reverse voltage                 |   | 5.0                   | V                |
| IFGM             | Peak gate forward current                 |   | 2.0                   | A                |
| T <sub>j</sub>   | Junction temperature                      |   | -40~+150              | °C               |
| T <sub>stg</sub> | Storage temperature                       |   | -40~+125              | °C               |
| —                | Mounting torque                           | Main terminal screw M5  | 1.47~1.96             | N·m              |
|                  |   |   | 15~20                 | kg·cm            |
|                  |   | Mounting screw M6   | 1.96~2.94             | N·m              |
|                  |   |   | 20~30                 | kg·cm            |
| —                | Weight                                    | Typical value   | 160                   | g                |

## ELECTRICAL CHARACTERISTICS

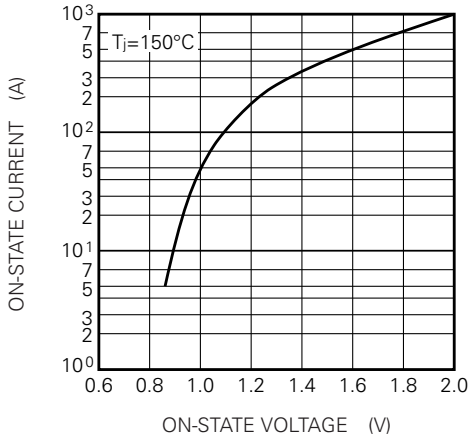
| Symbol                | Parameter                                  | Test conditions   | Limits |      |      | Unit |
|-----------------------|--|---|--------|------|------|------|
|                       |  |   | Min.   | Typ. | Max. |      |
| IRRM                  | Repetitive peak reverse current            | T <sub>j</sub> =150°C, VRRM applied                               | —      | —    | 15   | mA   |
| IDRM                  | Repetitive peak off-state current          | T <sub>j</sub> =150°C, VDRM applied                               | —      | —    | 15   | mA   |
| VTM                   | On-state voltage                           | T <sub>j</sub> =150°C, I <sub>TM</sub> =180A, instantaneous meas. | —      | —    | 1.2  | V    |
| dv/dt                 | Critical rate of rise of off-state voltage | T <sub>j</sub> =150°C, V <sub>D</sub> =2/3V <sub>DRM</sub>        | 200    | —    | —    | V/μs |
| VGT                   | Gate trigger voltage                       | T <sub>j</sub> =25°C, V <sub>D</sub> =6V, R <sub>L</sub> =2Ω      | —      | —    | 3.0  | V    |
| VGD                   | Gate non-trigger voltage                   | T <sub>j</sub> =150°C, V <sub>D</sub> =1/2V <sub>DRM</sub>        | 0.25   | —    | —    | V    |
| IGT                   | Gate trigger current                       | T <sub>j</sub> =25°C, V <sub>D</sub> =6V, R <sub>L</sub> =2Ω      | 15     | —    | 100  | mA   |
| R <sub>th (j-c)</sub> | Thermal resistance                         | Junction to case (per 1/3 module)                                 | —      | —    | 0.3  | °C/W |
| R <sub>th (c-f)</sub> | Contact thermal resistance                 | Case to fin, conductive grease applied (per 1/3 module)           | —      | —    | 0.3  | °C/W |

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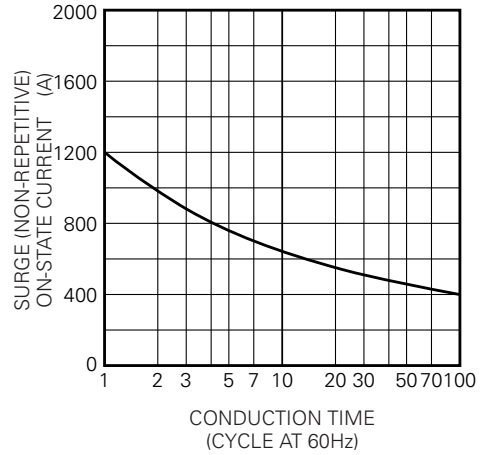
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## PERFORMANCE CURVES

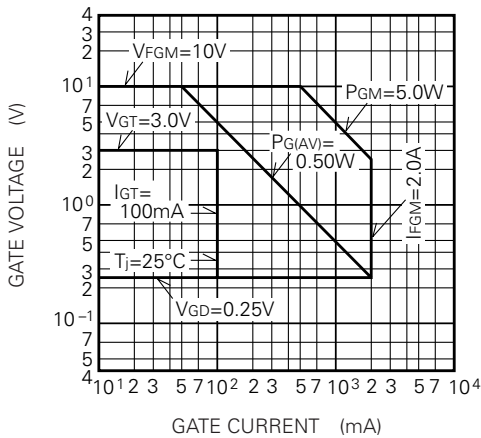
**MAXIMUM ON-STATE CHARACTERISTIC**



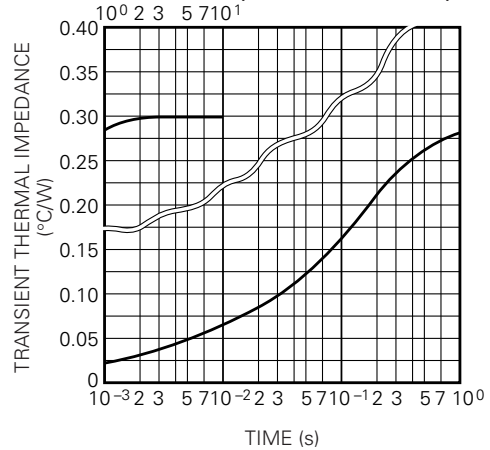
**RATED SURGE (NON-REPETITIVE) ON-STATE CURRENT**



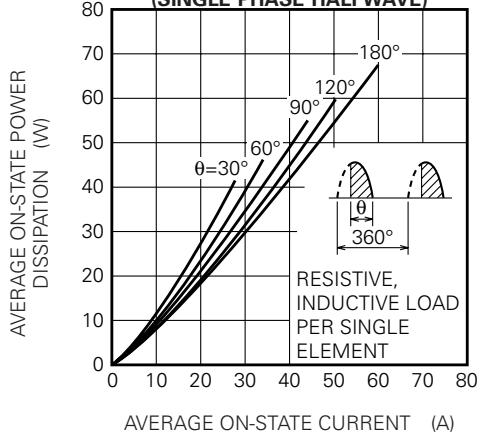
**GATE CHARACTERISTICS**



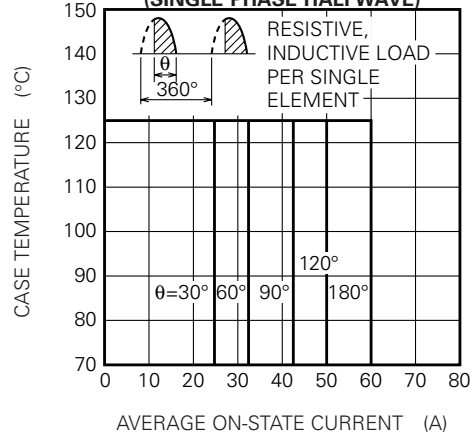
**MAXIMUM TRANSIENT THERMAL IMPEDANCE (JUNCTION TO CASE)**



**MAXIMUM AVERAGE ON-STATE POWER DISSIPATION (SINGLE PHASE HALFWAVE)**



**LIMITING VALUE OF THE AVERAGE ON-STATE CURRENT (SINGLE PHASE HALFWAVE)**



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