

*New Jersey Semi-Conductor Products, Inc.*

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U.S.A.

## MCC255, MCD255 Thyristor Modules Thyristor/Diode Modules

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| $V_{RSM}$<br>$V_{DSM}$<br>V | $V_{RRM}$<br>$V_{DRM}$<br>V | Type          |               |
|-----------------------------|-----------------------------|---------------|---------------|
| 1300                        | 1200                        | MCC 255-12Io1 | MCD 255-12Io1 |
| 1500                        | 1400                        | MCC 255-14Io1 | MCD 255-14Io1 |
| 1700                        | 1600                        | MCC 255-16Io1 | MCD 255-16Io1 |
| 1900                        | 1800                        | MCC 255-18Io1 | MCD 255-18Io1 |

### Features

- International standard package
- Direct Copper Bonded  $Al_2O_3$ -ceramic with copper base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered, E 72873
- Keyed gate/cathode twin pins

### Applications

- Motor control, softstarter
- Power converter
- Heat and temperature control for industrial furnaces and chemical processes
- Lighting control
- Solid state switches

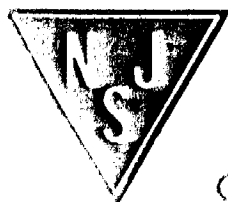
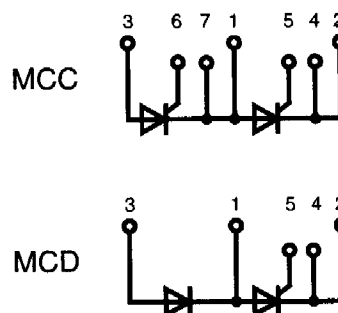
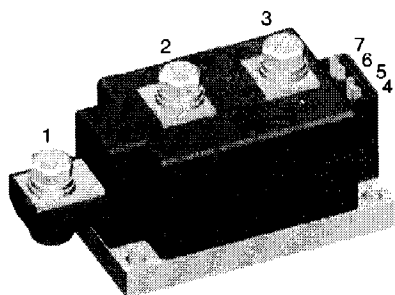
### Advantages

- Simple mounting
- Improved temperature and power cycling
- Reduced protection circuits

$$I_{TRMS} = 2 \times 450 \text{ A}$$

$$I_{TAVM} = 2 \times 250 \text{ A}$$

$$V_{RRM} = 1200-1800 \text{ V}$$



Quality Semi-Conductors

| Symbol                   | Conditions                                                                                                             | Maximum Ratings |                  |
|--------------------------|------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|
| $I_{T(RMS)}, I_{F(RMS)}$ | $T_{VJ} = T_{VJM}$                                                                                                     | 450             | A                |
| $I_{T(AVM)}, I_{F(AVM)}$ | $T_C = 85^\circ\text{C}; 180^\circ \text{ sine}$                                                                       | 250             | A                |
| $I_{TSM}, I_{FSM}$       | $T_{VJ} = 45^\circ\text{C}; t = 10 \text{ ms}$ (50 Hz)                                                                 | 9000            | A                |
|                          | $V_R = 0; t = 8.3 \text{ ms}$ (60 Hz)                                                                                  | 9600            | A                |
|                          | $T_{VJ} = T_{VJM}; t = 10 \text{ ms}$ (50 Hz)                                                                          | 7800            | A                |
|                          | $V_R = 0; t = 8.3 \text{ ms}$ (60 Hz)                                                                                  | 8600            | A                |
| $I^2t$                   | $T_{VJ} = 45^\circ\text{C}; t = 10 \text{ ms}$ (50 Hz)                                                                 | 405 000         | A <sup>2</sup> s |
|                          | $V_R = 0; t = 8.3 \text{ ms}$ (60 Hz)                                                                                  | 382 000         | A <sup>2</sup> s |
|                          | $T_{VJ} = T_{VJM}; t = 10 \text{ ms}$ (50 Hz)                                                                          | 304 000         | A <sup>2</sup> s |
|                          | $V_R = 0; t = 8.3 \text{ ms}$ (60 Hz)                                                                                  | 307 000         | A <sup>2</sup> s |
| $(di/dt)_{cr}$           | $T_{VJ} = T_{VJM};$ repetitive, $I_T = 860 \text{ A}$<br>$f = 50 \text{ Hz}; t_p = 200 \mu\text{s};$                   | 100             | A/ $\mu\text{s}$ |
|                          | $V_D = 2/3 V_{DRM};$<br>$I_G = 1 \text{ A};$ non repetitive, $I_T = I_{T(AVM)}$<br>$di_G/dt = 1 \text{ A}/\mu\text{s}$ | 500             | A/ $\mu\text{s}$ |
| $(dv/dt)_{cr}$           | $T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM};$<br>$R_{GK} = \infty;$ method 1 (linear voltage rise)                            | 1000            | V/ $\mu\text{s}$ |
| $P_{GM}$                 | $T_{VJ} = T_{VJM}; t_p = 30 \mu\text{s}$                                                                               | 120             | W                |
| $P_{GAV}$                | $I_T = I_{T(AVM)}; t_p = 500 \mu\text{s}$                                                                              | 60              | W                |
|                          |                                                                                                                        | 20              | W                |
| $V_{RGM}$                |                                                                                                                        | 10              | V                |
| $T_{VJ}$                 |                                                                                                                        | -40...+130      | $^\circ\text{C}$ |
| $T_{VJM}$                |                                                                                                                        | 130             | $^\circ\text{C}$ |
| $T_{stg}$                |                                                                                                                        | -40...+125      | $^\circ\text{C}$ |
| $V_{ISOL}$               | 50/60 Hz, RMS $t = 1 \text{ min}$                                                                                      | 3000            | V~               |
|                          | $I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$                                                                         | 3600            | V~               |
| $M_d$                    | Mounting torque (M6)                                                                                                   | 4.5 - 7         | Nm               |
|                          | Terminal connection torque (M8)                                                                                        | 11 - 13         | Nm               |
| Weight                   | Typical including screws                                                                                               | 750             | g                |

| Symbol             | Conditions                                                                                                                                                                           | Characteristic Values        |                   |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------|
|                    |                                                                                                                                                                                      | typ.                         | max.              |
| $I_{RRM}, I_{DRM}$ | $V_R / V_D = V_{RRM} / V_{DRM}$ $T_{VJ} = T_{VJM}$                                                                                                                                   |                              | 40 mA             |
| $V_T, V_F$         | $I_T, I_F = 600 \text{ A}$ $T_{VJ} = 25^\circ\text{C}$                                                                                                                               |                              | 1.36 V            |
| $V_{T0}$           | For power-loss calculations only                                                                                                                                                     |                              | 0.8 V             |
| $r_t$              | $T_{VJ} = T_{VJM}$                                                                                                                                                                   |                              | 0.68 m $\Omega$   |
| $V_{GT}$           | $V_D = 6 \text{ V}$ $T_{VJ} = 25^\circ\text{C}$                                                                                                                                      |                              | 2 V               |
| $I_{GT}$           | $V_D = 6 \text{ V}$                                                                                                                                                                  | $T_{VJ} = -40^\circ\text{C}$ | 3 V               |
|                    |                                                                                                                                                                                      | $T_{VJ} = 25^\circ\text{C}$  | 150 mA            |
|                    |                                                                                                                                                                                      | $T_{VJ} = -40^\circ\text{C}$ | 220 mA            |
| $V_{GD}$           | $V_D = 2/3 V_{DRM};$ $T_{VJ} = T_{VJM}$                                                                                                                                              |                              | 0.25 V            |
| $I_{GD}$           |                                                                                                                                                                                      |                              | 10 mA             |
| $I_L$              | $t_p = 30 \mu\text{s}; V_D = 6 \text{ V}$ $T_{VJ} = 25^\circ\text{C}$<br>$I_G = 0.45 \text{ A}; di_G/dt = 0.45 \text{ A}/\mu\text{s}$                                                |                              | 200 mA            |
| $I_H$              | $V_D = 6 \text{ V}; R_{GK} = \infty;$ $T_{VJ} = 25^\circ\text{C}$                                                                                                                    |                              | 150 mA            |
| $t_{gd}$           | $V_D = 1/2 V_{DRM}$ $T_{VJ} = 25^\circ\text{C}$<br>$I_G = 1 \text{ A}; di_G/dt = 1 \text{ A}/\mu\text{s}$                                                                            |                              | 2 $\mu\text{s}$   |
| $t_q$              | $V_D = 2/3 V_{DRM}$ $T_{VJ} = T_{VJM}$<br>$dv/dt = 50 \text{ V}/\mu\text{s}; -di/dt = 10 \text{ A}/\mu\text{s}$<br>$I_T = 300 \text{ A}; V_R = 100 \text{ V}; t_p = 200 \mu\text{s}$ | 200                          | $\mu\text{s}$     |
| $Q_S$              | $I_T = 300 \text{ A}; -di/dt = 50 \text{ A}/\mu\text{s}$ $T_{VJ} = T_{VJM}$                                                                                                          |                              | 760 $\mu\text{C}$ |
| $R_{thJC}$         | per thyristor; DC current                                                                                                                                                            |                              | 275 A             |
| $R_{thJK}$         | per module                                                                                                                                                                           | 0.139                        | K/W               |
|                    | per thyristor; DC current                                                                                                                                                            | 0.07                         | K/W               |
| $d_s$              | per module                                                                                                                                                                           | 0.179                        | K/W               |
|                    |                                                                                                                                                                                      | 0.09                         | K/W               |
| $d_A$              | Creeping distance on surface                                                                                                                                                         | 12.7                         | mm                |
| $a$                | Creepage distance in air                                                                                                                                                             | 9.6                          | mm                |
|                    | Maximum allowable acceleration                                                                                                                                                       | 50                           | m/s <sup>2</sup>  |

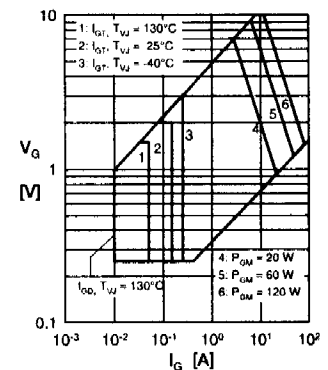
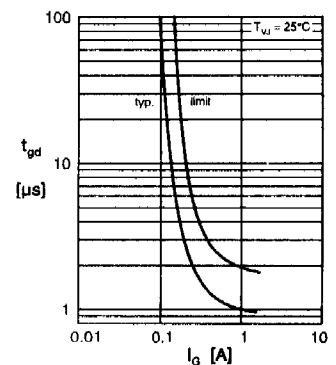
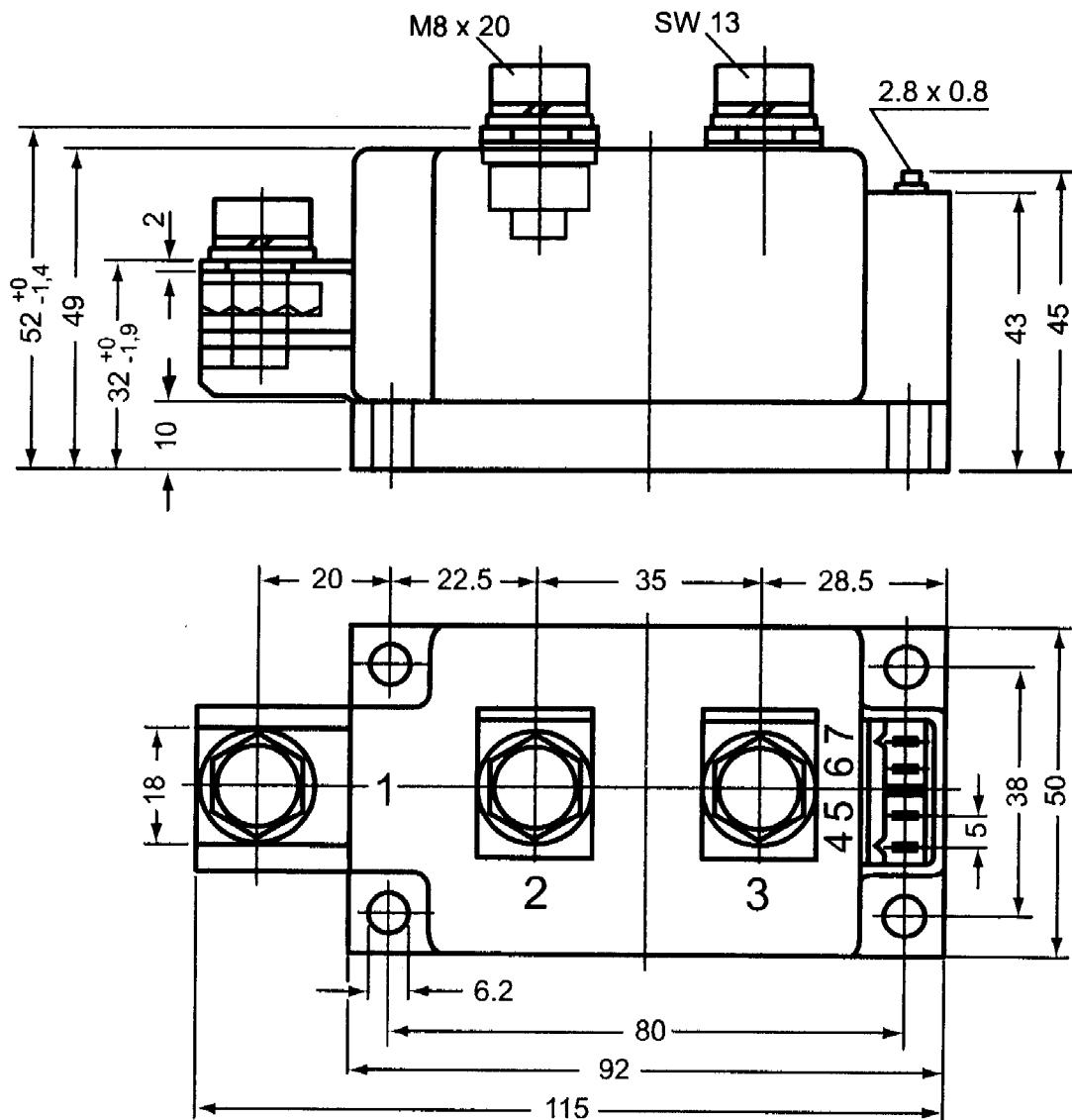


Fig. 3 Surge overload current  
 $I_{TSM/FSM}$ : Crest value,  $t$ : duration



Dimensions in mm (1 mm = 0.0394")



Optional accessories for modules

Keyed gate/cathode twin plugs with wire length = 350 mm, gate = white, cathode = red

Type ZY 180L (L = Left for pin pair 4/5)

Type ZY 180R (R = Right for pin pair 6/7) } UL 758, style 3751