

## PRODUCT FEATURES

- ☐ High Short Circuit Capability
- ☐ Free wheeling diodes with fast and soft reverse recovery
- ☐  $V_{CE(sat)}$  with positive temperature coefficient
- ☐ Ultra Low Loss, High Ruggedness
- ☐ UL recognized, file no. E332185



## APPLICATIONS

- ☐ Inverter Convertor
- ☐ Welder SMPS and UPS
- ☐ Induction Heating

## IGBT-inverter

### ABSOLUTE MAXIMUM RATINGS

$T_C = 25^\circ\text{C}$  unless otherwise specified

| Symbol    | Parameter/Test Conditions         |                          | Values   | Unit |
|-----------|-----------------------------------|--------------------------|----------|------|
| $V_{CES}$ | Collector Emitter Voltage         | $T_J = 25^\circ\text{C}$ | 1200     | V    |
| $V_{GES}$ | Gate Emitter Voltage              |                          | $\pm 20$ |      |
| $I_C$     | DC Collector Current              | $T_C = 25^\circ\text{C}$ | 210      | A    |
|           |                                   | $T_C = 80^\circ\text{C}$ | 150      |      |
| $I_{CM}$  | Repetitive Peak Collector Current | $t_p = 1\text{ms}$       | 300      |      |
| $P_{tot}$ | Power Dissipation Per IGBT        |                          | 1250     | W    |

## Diode-inverter

### ABSOLUTE MAXIMUM RATINGS

$T_C = 25^\circ\text{C}$  unless otherwise specified

| Symbol      | Parameter/Test Conditions       |                                                                   | Values | Unit                 |
|-------------|---------------------------------|-------------------------------------------------------------------|--------|----------------------|
| $V_{RRM}$   | Repetitive Reverse Voltage      | $T_J = 25^\circ\text{C}$                                          | 1200   | V                    |
| $I_{F(AV)}$ | Average Forward Current         | $T_C = 25^\circ\text{C}$                                          | 150    | A                    |
| $I_{FRM}$   | Repetitive Peak Forward Current | $t_p = 1\text{ms}$                                                | 300    |                      |
| $I^2t$      |                                 | $T_J = 125^\circ\text{C}$ , $t = 10\text{ms}$ , $V_R = 0\text{V}$ | 7200   | $\text{A}^2\text{S}$ |

## IGBT-inverter

## ELECTRICAL CHARACTERISTICS

 $T_C = 25^\circ\text{C}$  unless otherwise specified

| Symbol               | Parameter/Test Conditions                        |                                                                                                                | Min.                 | Typ. | Max. | Unit |
|----------------------|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------|------|------|------|
| V <sub>GE(th)</sub>  | Gate Emitter Threshold Voltage                   | V <sub>CE</sub> =V <sub>GE</sub> , I <sub>C</sub> =6mA                                                         | 5.0                  | 6.2  | 7.0  | V    |
| V <sub>CE(sat)</sub> | Collector Emitter Saturation Voltage             | I <sub>C</sub> =150A, V <sub>GE</sub> =15V, T <sub>J</sub> =25℃                                                |                      | 1.8  | 2.4  |      |
|                      |                                                  | I <sub>C</sub> =150A, V <sub>GE</sub> =15V, T <sub>J</sub> =125℃                                               |                      | 2.0  |      |      |
| I <sub>CES</sub>     | Collector Leakage Current                        | V <sub>CE</sub> =1200V, V <sub>GE</sub> =0V, T <sub>J</sub> =25℃                                               |                      |      | 1    | mA   |
|                      |                                                  | V <sub>CE</sub> =1200V, V <sub>GE</sub> =0V, T <sub>J</sub> =125℃                                              |                      |      | 10   | mA   |
| I <sub>GES</sub>     | Gate Leakage Current                             | V <sub>CE</sub> =0V, V <sub>GE</sub> =±15V, T <sub>J</sub> =25℃                                                | -400                 |      | 400  | nA   |
| R <sub>gint</sub>    | Integrated Gate Resistor                         |                                                                                                                |                      | 1.5  |      | Ω    |
| Q <sub>g</sub>       | Gate Charge                                      | V <sub>CE</sub> =600V, I <sub>C</sub> =150A , V <sub>GE</sub> =±15V                                            |                      | 1.5  |      | μC   |
| C <sub>ies</sub>     | Input Capacitance                                | V <sub>CE</sub> =25V, V <sub>GE</sub> =0V, f =1MHz                                                             |                      | 11   |      | nF   |
| C <sub>res</sub>     | Reverse Transfer Capacitance                     |                                                                                                                |                      | 520  |      | pF   |
| t <sub>d(on)</sub>   | Turn on Delay Time                               | V <sub>CC</sub> =600V, I <sub>C</sub> =150A<br>R <sub>G</sub> =5Ω,<br>V <sub>GE</sub> =±15V,<br>Inductive Load | T <sub>J</sub> =25℃  | 100  |      | ns   |
|                      |                                                  |                                                                                                                | T <sub>J</sub> =125℃ | 110  |      | ns   |
| t <sub>r</sub>       | Rise Time                                        |                                                                                                                | T <sub>J</sub> =25℃  | 65   |      | ns   |
|                      |                                                  |                                                                                                                | T <sub>J</sub> =125℃ | 70   |      | ns   |
| t <sub>d(off)</sub>  | Turn off Delay Time                              |                                                                                                                | T <sub>J</sub> =25℃  | 460  |      | ns   |
|                      |                                                  |                                                                                                                | T <sub>J</sub> =125℃ | 530  |      | ns   |
| t <sub>f</sub>       | Fall Time                                        |                                                                                                                | T <sub>J</sub> =25℃  | 70   |      | ns   |
|                      |                                                  |                                                                                                                | T <sub>J</sub> =125℃ | 90   |      | ns   |
| E <sub>on</sub>      | Turn on Energy                                   | V <sub>CC</sub> =600V, I <sub>C</sub> =150A<br>R <sub>G</sub> =5Ω,<br>V <sub>GE</sub> =±15V,<br>Inductive Load | T <sub>J</sub> =25℃  | 8.2  |      | mJ   |
|                      |                                                  |                                                                                                                | T <sub>J</sub> =125℃ | 10.5 |      | mJ   |
| E <sub>off</sub>     | Turn off Energy                                  |                                                                                                                | T <sub>J</sub> =25℃  | 9.5  |      | mJ   |
|                      |                                                  |                                                                                                                | T <sub>J</sub> =125℃ | 14   |      | mJ   |
| I <sub>sc</sub>      | Short Circuit Current                            | tpsc≤10μS , V <sub>GE</sub> =15V<br>T <sub>J</sub> =125℃, V <sub>CC</sub> =900V                                |                      | 840  |      | A    |
| R <sub>thJC</sub>    | Junction to Case Thermal Resistance （ Per IGBT ） |                                                                                                                |                      |      | 0.1  | K /W |

## Diode-inverter

## ELECTRICAL CHARACTERISTICS

 $T_C = 25^\circ\text{C}$  unless otherwise specified

| Symbol             | Parameter/Test Conditions                           |                                                                                                      | Min. | Typ. | Max. | Unit |
|--------------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------------|------|------|------|------|
| V <sub>F</sub>     | Forward Voltage                                     | I <sub>F</sub> =150A , V <sub>GE</sub> =0V, T <sub>J</sub> =25℃                                      |      | 1.8  | 2.3  | V    |
|                    |                                                     | I <sub>F</sub> =150A , V <sub>GE</sub> =0V, T <sub>J</sub> =125℃                                     |      | 1.75 |      |      |
| t <sub>rr</sub>    | Reverse Recovery Time                               | I <sub>F</sub> =150A , V <sub>R</sub> =600V<br>dI <sub>F</sub> /dt=-2500A/μs<br>T <sub>J</sub> =125℃ |      | 180  |      | ns   |
| I <sub>RRM</sub>   | Max. Reverse Recovery Current                       |                                                                                                      |      | 210  |      | A    |
| Q <sub>RR</sub>    | Reverse Recovery Charge                             |                                                                                                      |      | 29   |      | μC   |
| E <sub>rec</sub>   | Reverse Recovery Energy                             |                                                                                                      |      | 11.5 |      | mJ   |
| R <sub>thJCD</sub> | Junction to Case Thermal Resistance   （ Per Diode ） |                                                                                                      |      |      | 0.22 | K /W |

## MODULE CHARACTERISTICS

 $T_C = 25^\circ\text{C}$  unless otherwise specified

| Symbol     | Parameter/Test Conditions   |                            | Values  | Unit             |
|------------|-----------------------------|----------------------------|---------|------------------|
| $T_{Jmax}$ | Max. Junction Temperature   |                            | 150     | $^\circ\text{C}$ |
| $T_{Jop}$  | Operating Temperature       |                            | -40~125 |                  |
| $T_{stg}$  | Storage Temperature         |                            | -40~125 |                  |
| $V_{isol}$ | Isolation Breakdown Voltage | AC, 50Hz(R.M.S), t=1minute | 3000    | V                |
| CTI        | Comparative Tracking Index  |                            | > 225   |                  |
| Torque     | to heatsink                 | Recommended (M6)           | 3~5     | Nm               |
|            | to terminal                 | Recommended (M6)           | 2.5~5   | Nm               |
| Weight     |                             |                            | 300     | g                |

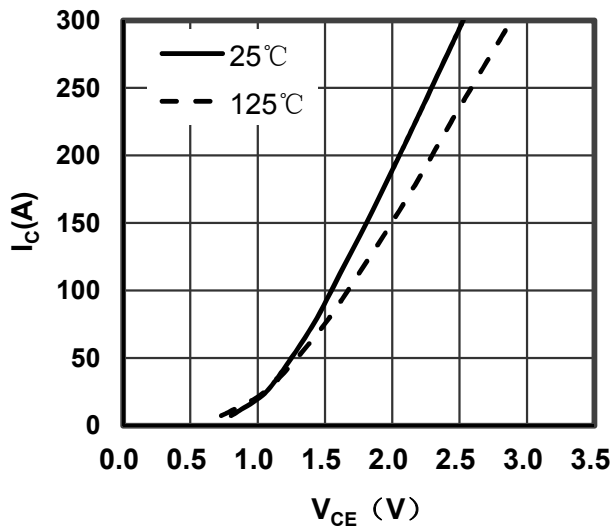


Figure 1. Typical Output Characteristics IGBT-inverter

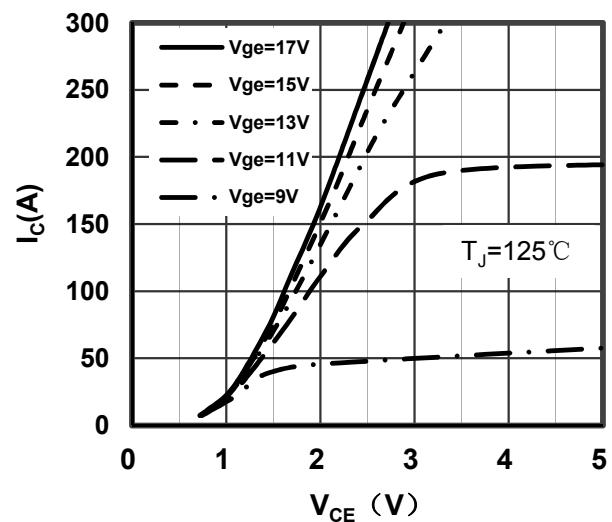


Figure 2. Typical Output Characteristics IGBT-inverter

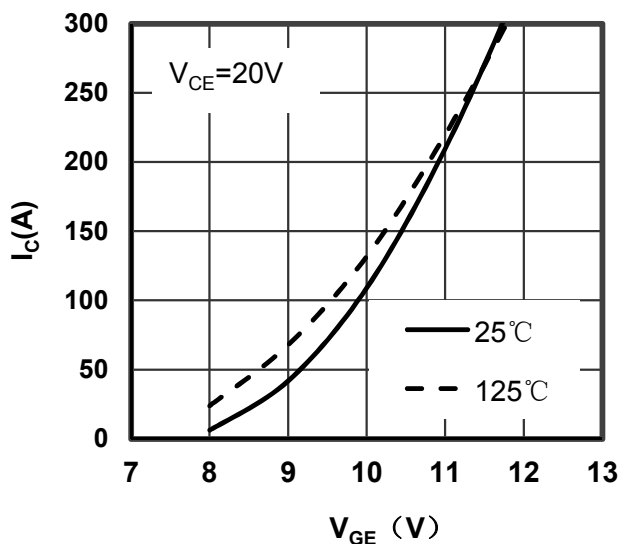


Figure 3. Typical Transfer characteristics IGBT-inverter

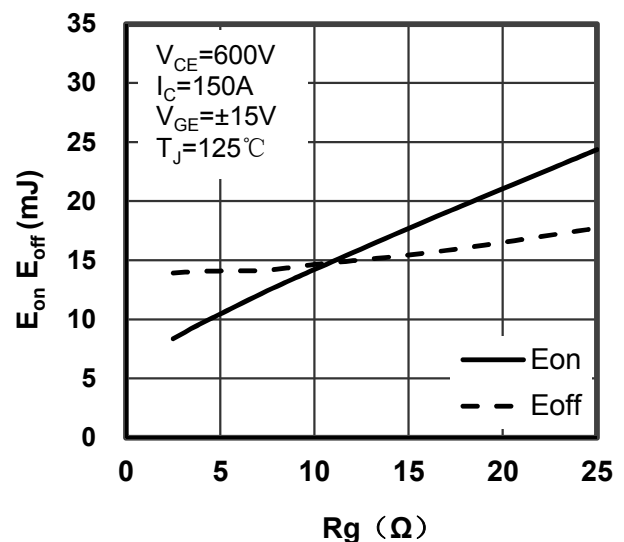


Figure 4. Switching Energy vs Gate Resistor IGBT-inverter

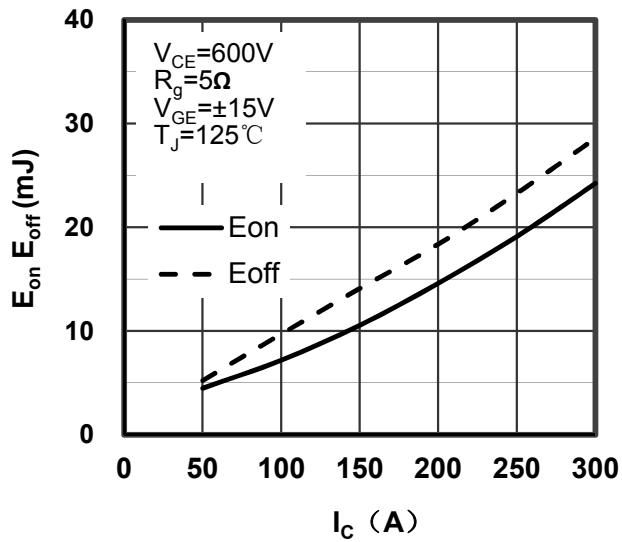


Figure 5. Switching Energy vs Collector Current IGBT-inverter

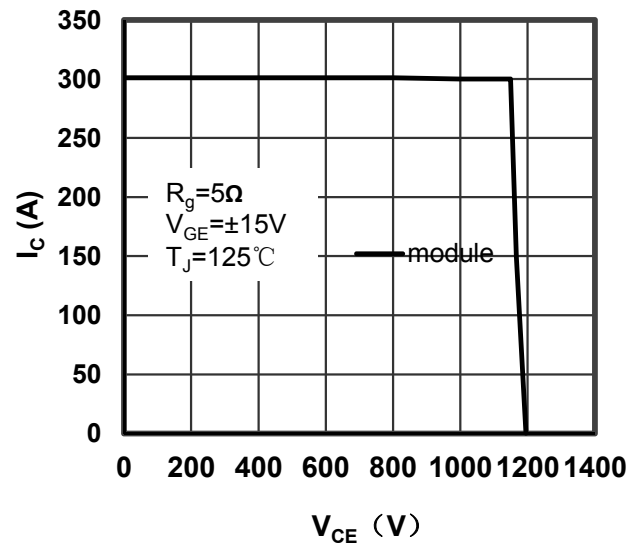


Figure 6. Reverse Biased Safe Operating Area IGBT-inverter

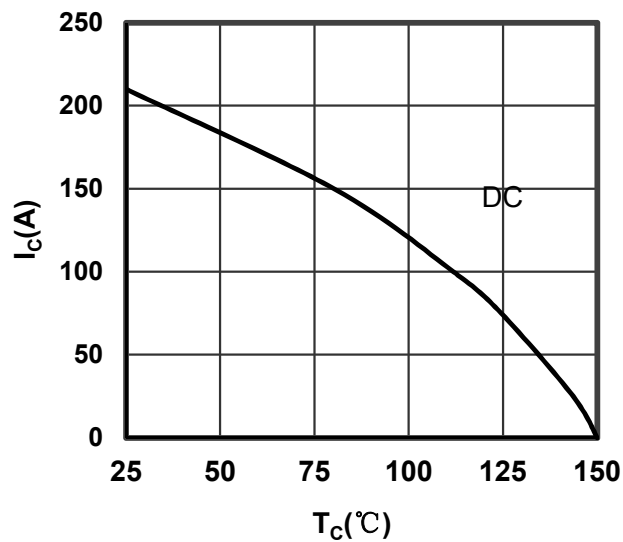


Figure 7. Collector Current vs Case temperature IGBT -inverter

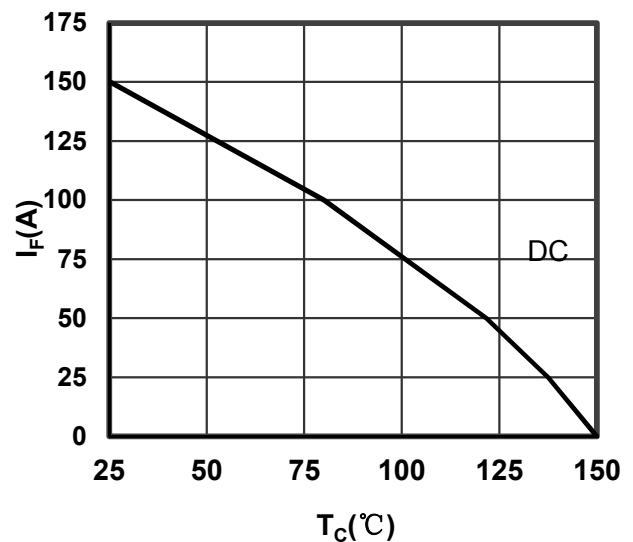


Figure 8. Forward current vs Case temperature Diode -inverter

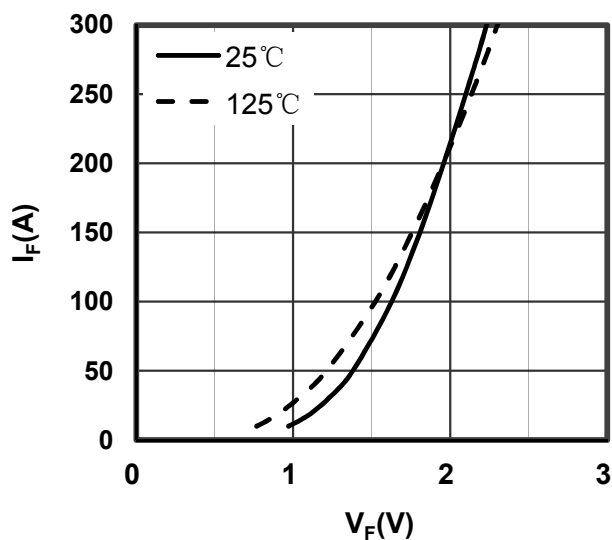


Figure 9. Diode Forward Characteristics Diode -inverter

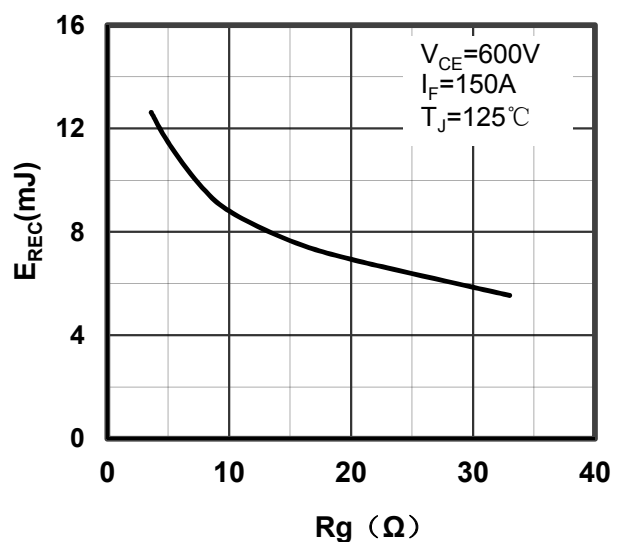


Figure 10. Switching Energy vs Gate Resistor Diode -inverter

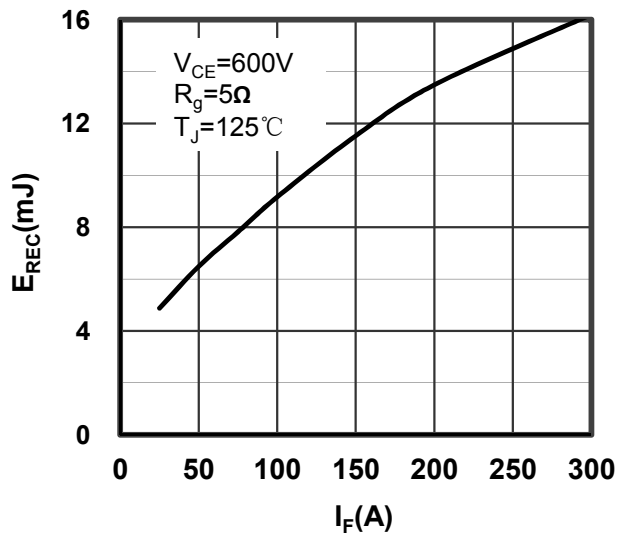


Figure 11. Switching Energy vs Forward Current Diode-inverter

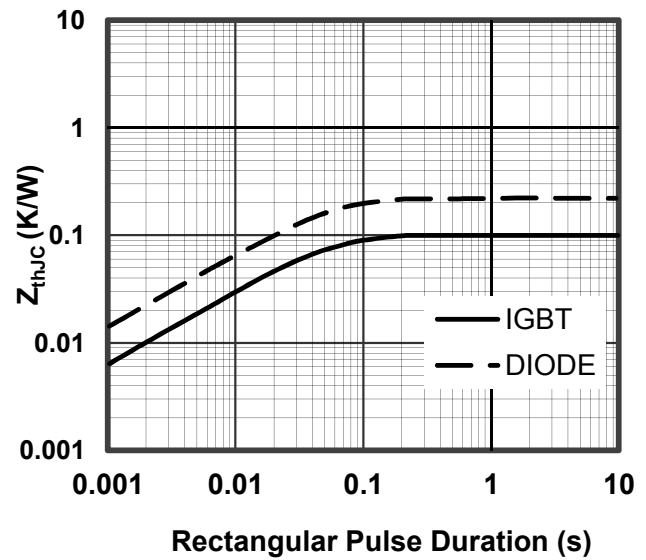


Figure 12. Transient Thermal Impedance of Diode and IGBT-inverter

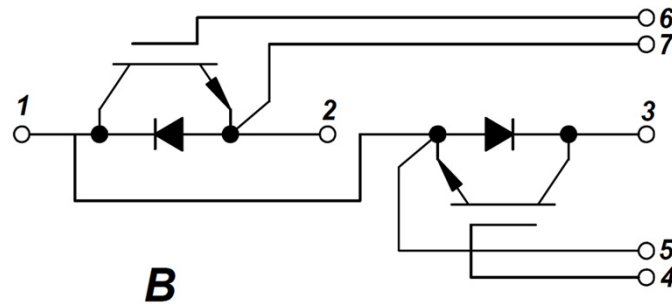
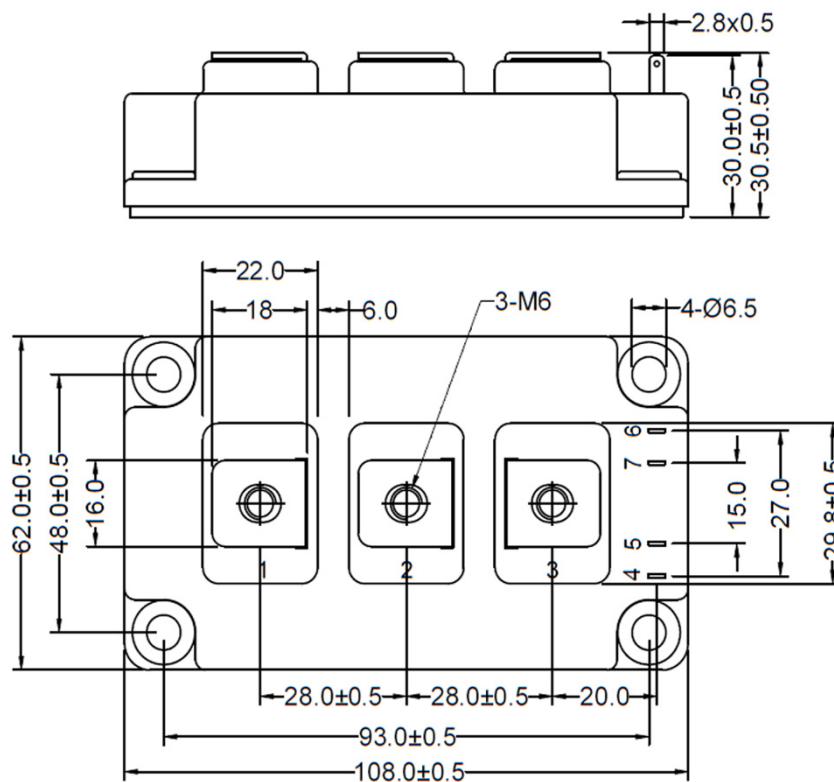


Figure 13. Circuit Diagram



Dimensions in (mm)  
Figure 14. Package Outline