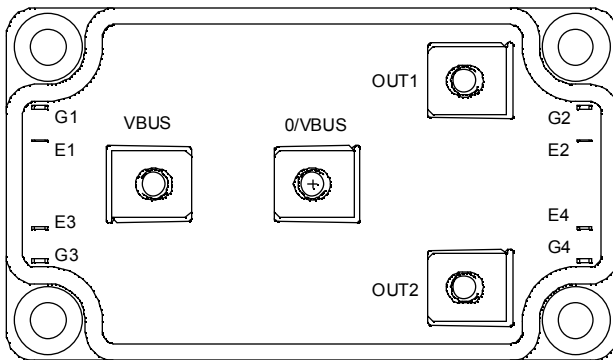
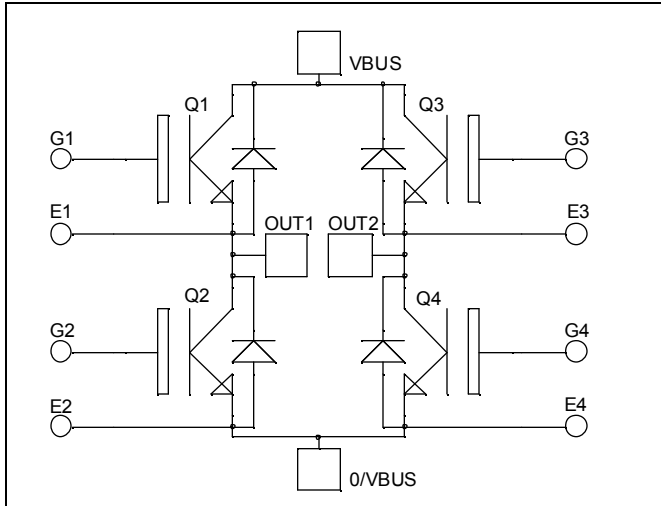


**Full - Bridge  
Trench + Field Stop IGBT®  
Power Module**

www.datasheet4u.com

$$V_{CES} = 600V$$

$$I_C = 300A @ T_c = 80^{\circ}C$$



## Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

## Features

- Trench + Field Stop IGBT® Technology
  - Low voltage drop
  - Low tail current
  - Switching frequency up to 20 kHz
  - Soft recovery parallel diodes
  - Low diode VF
  - Low leakage current
  - Avalanche energy rated
  - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- Very low stray inductance
  - Symmetrical design
  - M5 power connectors
- High level of integration

## Benefits

- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of VCEsat
- Low profile

## Absolute maximum ratings

| Symbol    | Parameter                             | Max ratings                                              | Unit |
|-----------|---------------------------------------|----------------------------------------------------------|------|
| $V_{CES}$ | Collector - Emitter Breakdown Voltage | 600                                                      | V    |
| $I_C$     | Continuous Collector Current          | $T_C = 25^{\circ}C$<br>430<br>$T_C = 80^{\circ}C$<br>300 | A    |
| $I_{CM}$  | Pulsed Collector Current              | $T_C = 25^{\circ}C$<br>500                               |      |
| $V_{GE}$  | Gate - Emitter Voltage                | $\pm 20$                                                 | V    |
| $P_D$     | Maximum Power Dissipation             | $T_C = 25^{\circ}C$<br>1150                              | W    |
| RBSOA     | Reverse Bias Safe Operating Area      | $T_j = 150^{\circ}C$<br>600A @ 550V                      |      |

**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

All ratings @  $T_j = 25^\circ\text{C}$  unless otherwise specified

## Electrical Characteristics

| Symbol        | Characteristic                       | Test Conditions                              | Min                                                   | Typ        | Max | Unit          |
|---------------|--------------------------------------|----------------------------------------------|-------------------------------------------------------|------------|-----|---------------|
| $I_{CES}$     | Zero Gate Voltage Collector Current  | $V_{GE} = 0\text{V}, V_{CE} = 600\text{V}$   |                                                       |            | 350 | $\mu\text{A}$ |
| $V_{CE(sat)}$ | Collector Emitter Saturation Voltage | $V_{GE} = 15\text{V}$<br>$I_C = 300\text{A}$ | $T_j = 25^\circ\text{C}$<br>$T_j = 150^\circ\text{C}$ | 1.4<br>1.5 | 1.8 | V             |
| $V_{GE(th)}$  | Gate Threshold Voltage               | $V_{GE} = V_{CE}, I_C = 1.5\text{ mA}$       | 5.0                                                   | 5.8        | 6.5 | V             |
| $I_{GES}$     | Gate – Emitter Leakage Current       | $V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$    |                                                       |            | 500 | nA            |

## Dynamic Characteristics

| Symbol       | Characteristic               | Test Conditions                                                                                                                                 | Min | Typ  | Max | Unit |
|--------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|-----|------|
| $C_{ies}$    | Input Capacitance            | $V_{GE} = 0\text{V}$                                                                                                                            |     | 24   |     | nF   |
| $C_{oes}$    | Output Capacitance           | $V_{CE} = 25\text{V}$                                                                                                                           |     | 1.5  |     |      |
| $C_{res}$    | Reverse Transfer Capacitance | $f = 1\text{MHz}$                                                                                                                               |     | 0.75 |     |      |
| $T_{d(on)}$  | Turn-on Delay Time           | Inductive Switching ( $25^\circ\text{C}$ )<br>$V_{GE} = \pm 15\text{V}$<br>$V_{Bus} = 300\text{V}$<br>$I_C = 300\text{A}$<br>$R_G = 3.3\Omega$  |     | 115  |     | ns   |
| $T_r$        | Rise Time                    |                                                                                                                                                 |     | 45   |     |      |
| $T_{d(off)}$ | Turn-off Delay Time          |                                                                                                                                                 |     | 200  |     |      |
| $T_f$        | Fall Time                    |                                                                                                                                                 |     | 55   |     |      |
| $T_{d(on)}$  | Turn-on Delay Time           | Inductive Switching ( $150^\circ\text{C}$ )<br>$V_{GE} = \pm 15\text{V}$<br>$V_{Bus} = 300\text{V}$<br>$I_C = 300\text{A}$<br>$R_G = 3.3\Omega$ |     | 120  |     | ns   |
| $T_r$        | Rise Time                    |                                                                                                                                                 |     | 50   |     |      |
| $T_{d(off)}$ | Turn-off Delay Time          |                                                                                                                                                 |     | 250  |     |      |
| $T_f$        | Fall Time                    |                                                                                                                                                 |     | 70   |     |      |
| $E_{on}$     | Turn on Energy               |                                                                                                                                                 |     | 5.2  |     | mJ   |
| $E_{off}$    | Turn off Energy              |                                                                                                                                                 |     | 10.5 |     |      |

## Reverse diode ratings and characteristics

| Symbol      | Characteristic                          | Test Conditions                                                                  | Min                                                   | Typ          | Max        | Unit          |
|-------------|-----------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------|--------------|------------|---------------|
| $V_{RRM}$   | Maximum Peak Repetitive Reverse Voltage |                                                                                  | 600                                                   |              |            | V             |
| $I_{RM}$    | Maximum Reverse Leakage Current         | $V_R = 600\text{V}$                                                              | $T_j = 25^\circ\text{C}$<br>$T_j = 150^\circ\text{C}$ |              | 350<br>600 | $\mu\text{A}$ |
| $I_{F(AV)}$ | Maximum Average Forward Current         | 50% duty cycle                                                                   | $T_c = 80^\circ\text{C}$                              | 300          |            | A             |
| $V_F$       | Diode Forward Voltage                   | $I_F = 300\text{A}$<br>$V_{GE} = 0\text{V}$                                      | $T_j = 25^\circ\text{C}$<br>$T_j = 150^\circ\text{C}$ | 1.5<br>1.4   | 1.9        | V             |
| $t_{rr}$    | Reverse Recovery Time                   | $I_F = 300\text{A}$<br>$V_R = 300\text{V}$<br>$di/dt = 3100\text{A}/\mu\text{s}$ | $T_j = 25^\circ\text{C}$<br>$T_j = 150^\circ\text{C}$ | 120<br>210   |            | ns            |
| $Q_{rr}$    | Reverse Recovery Charge                 |                                                                                  | $T_j = 25^\circ\text{C}$<br>$T_j = 150^\circ\text{C}$ | 13.5<br>28.5 |            |               |

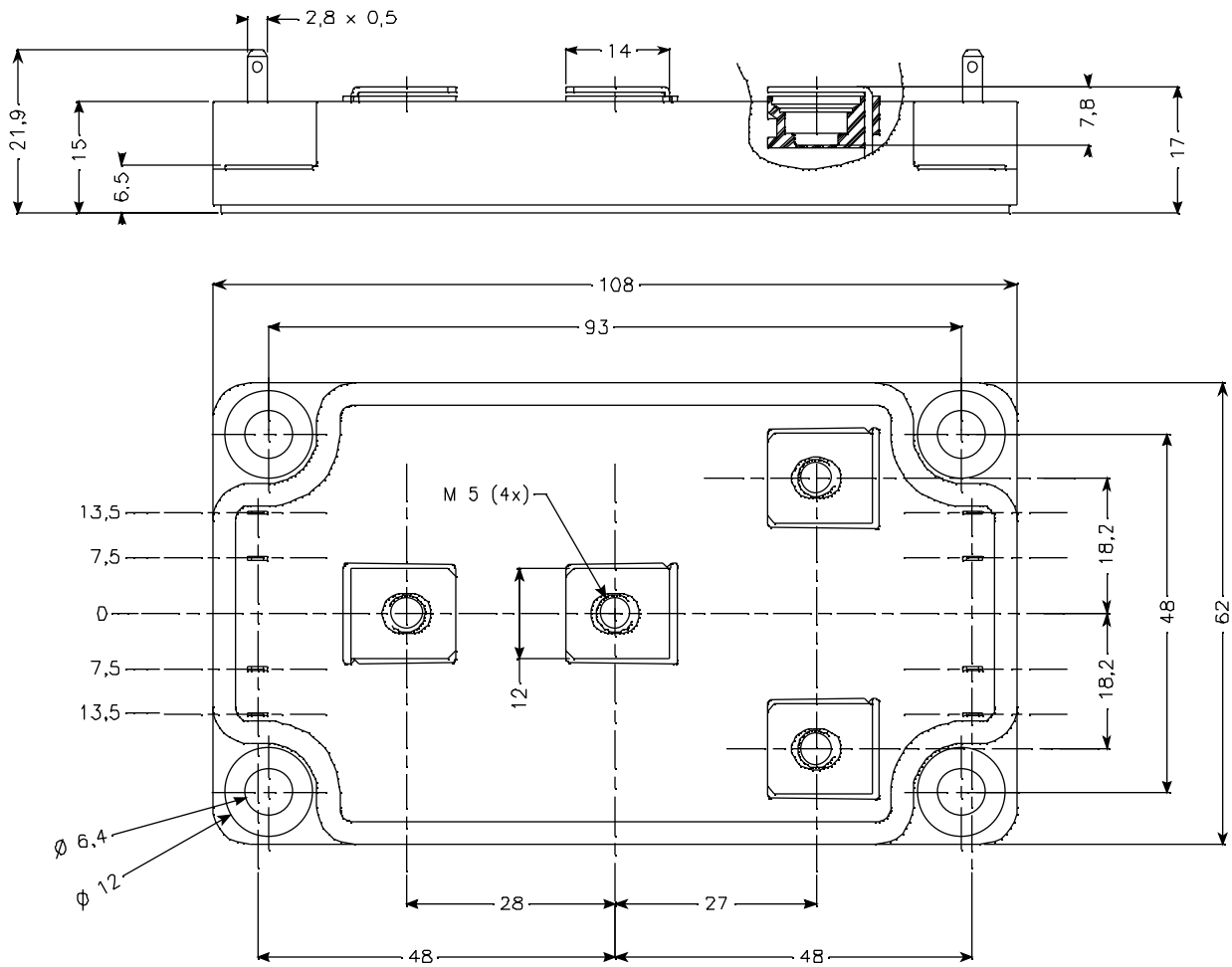
## Thermal and package characteristics

Symbol Characteristic

Min Typ Max Unit

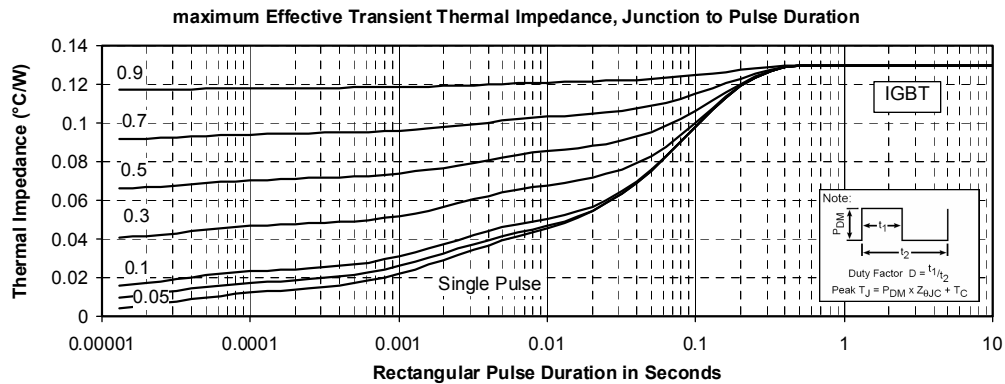
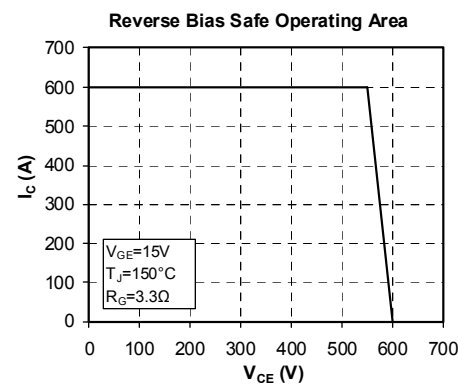
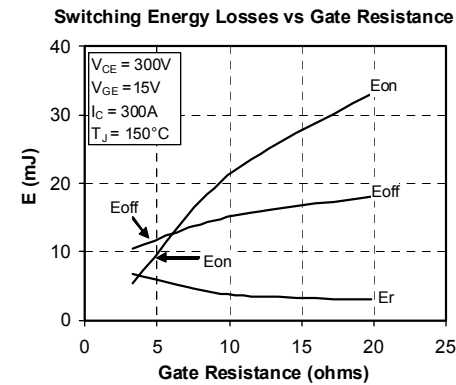
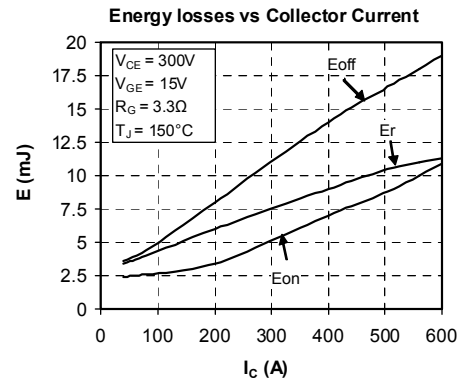
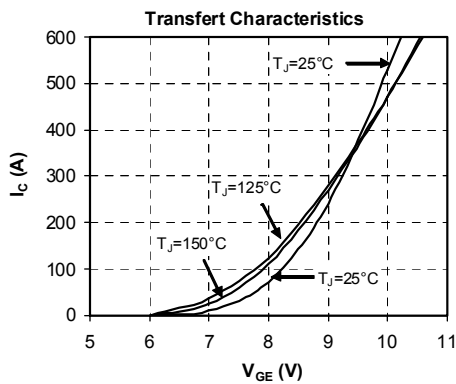
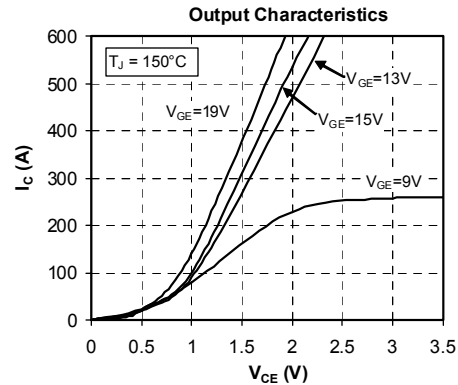
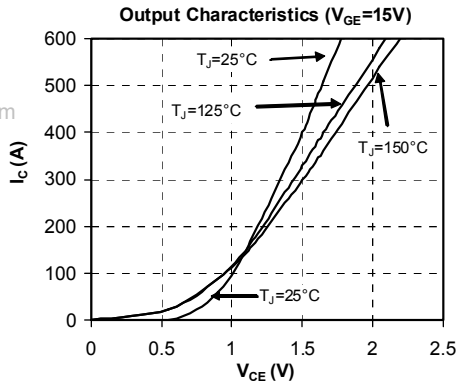
|                   |                                                                                         |               |      |   |      |      |
|-------------------|-----------------------------------------------------------------------------------------|---------------|------|---|------|------|
| R <sub>thJC</sub> | Junction to Case                                                                        | IGBT          |      |   | 0.13 | °C/W |
|                   |                                                                                         | Diode         |      |   | 0.21 |      |
| V <sub>ISOL</sub> | RMS Isolation Voltage, any terminal to case t = 1 min, I <sub>isol</sub> < 1mA, 50/60Hz |               | 2500 |   |      | V    |
| T <sub>J</sub>    | Operating junction temperature range                                                    |               | -40  |   | 175  | °C   |
| T <sub>STG</sub>  | Storage Temperature Range                                                               |               | -40  |   | 125  |      |
| T <sub>C</sub>    | Operating Case Temperature                                                              |               | -40  |   | 100  |      |
| Torque            | Mounting torque                                                                         | To heatsink   | M6   | 3 | 5    | N.m  |
|                   |                                                                                         | For terminals | M5   | 2 | 3.5  |      |
| Wt                | Package Weight                                                                          |               |      |   | 280  | g    |

## Package outline (dimensions in mm)

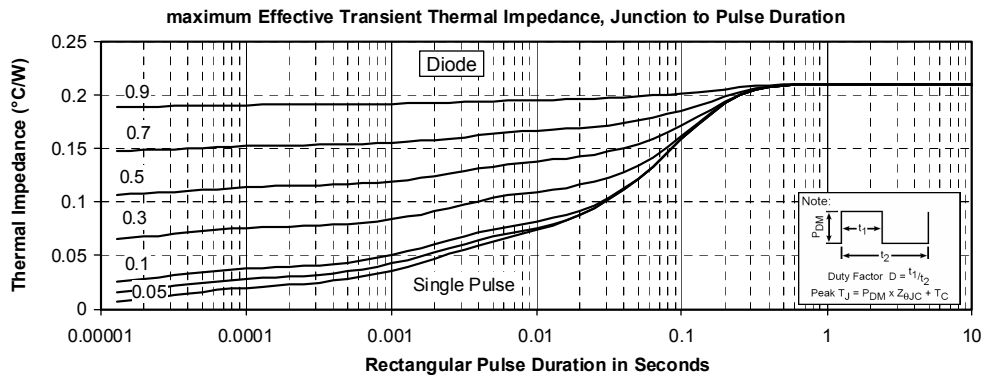
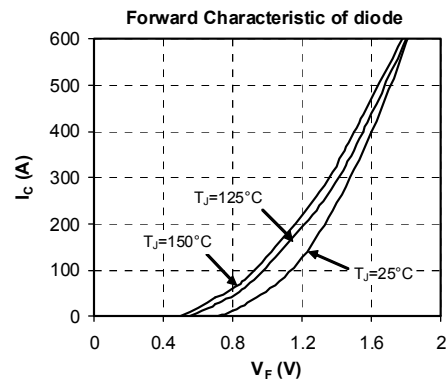
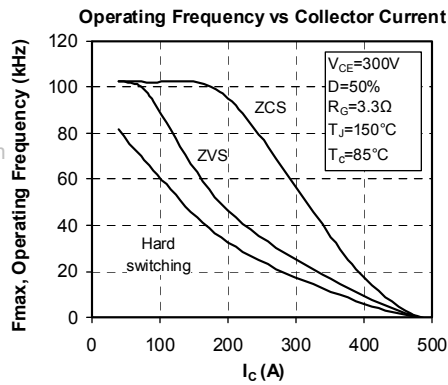


## Typical Performance Curve

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