

**1200V/150A 2 in one-package**

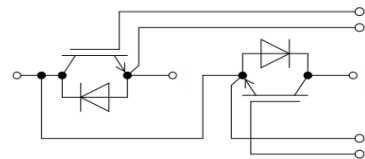
**Features:**

- 1200V150A, VCE(sat)(typ.)=3.0V
- Ultrafast switching speed
- Excellent short circuit ruggedness
- 62mm half bridge module



**General Applications:**

Daxin's IGBTs offer ultrafast switching speed for application such as welding, inductive heating, UPS and other high frequency applications



Equivalent Circuit Schematic

**Absolute Maximum Ratings of IGBT**

|                  |  |  |             |    |
|------------------|--|--|-------------|----|
| V <sub>CES</sub> | Collector to Emitter Voltage                 |  | 1200        | V  |
| V <sub>GES</sub> | Continuous Gate to Emitter Voltage           |  | ±30         | V  |
| I <sub>C</sub>   | Continuous Collector Current                 | T <sub>C</sub> = 25°C                            | 300         | A  |
|                  |  | T <sub>C</sub> = 100°C                           | 150         |    |
| I <sub>CM</sub>  | Pulse Collector Current                      | T <sub>J</sub> = 150°C                           | 300         | A  |
| P <sub>D</sub>   | Maximum Power Dissipation (IGBT)             | T <sub>C</sub> = 25°C,<br>T <sub>J</sub> = 150°C | 740         | W  |
| t <sub>sc</sub>  | Short Circuit Withstand Time                 |  | > 10        | μs |
| T <sub>J</sub>   | Maximum IGBT Junction Temperature            |  | 150         | °C |
| T <sub>JOP</sub> | Maximum Operating Junction Temperature Range |  | -40 to +150 | °C |
| T <sub>stg</sub> | Storage Temperature Range                    |  | -40 to +125 | °C |

**Absolute Maximum Ratings of Freewheeling Diode**

|                  |  |                        |      |   |
|------------------|--|------------------------|------|---|
| V <sub>RRM</sub> | Repetitive Peak Reverse Voltage Preliminary Data |                        | 1200 | V |
| I <sub>F</sub>   | Diode Continuous Forward Current                 | T <sub>C</sub> = 25°C  | 300  | A |
|                  |  | T <sub>C</sub> = 100°C | 150  |   |
| I <sub>FM</sub>  | Diode Maximum Forward Current                    |                        | 300  | A |

**Electrical Characteristics of IGBT at T<sub>J</sub> = 25°C** (Unless Otherwise Specified)

| Parameter            | Test Conditions  | Min  | Typ                    | Max  | Unit |   |
|----------------------|--|--|------------------------|------|------|---|
| BV <sub>CES</sub>    | Collector to Emitter Breakdown Voltage                 | V <sub>GE</sub> = 0V, I <sub>C</sub> = 1mA               | 1200                   |      | V    |   |
| I <sub>CES</sub>     | Collector to Emitter Leakage Current                   | V <sub>GE</sub> = 0V, V <sub>CE</sub> = V <sub>CES</sub> |                        | 5    | mA   |   |
| I <sub>GES</sub>     | Gate to Emitter Leakage Current                        | V <sub>GE</sub> = ±30V, V <sub>CE</sub> = 0V             |                        | 400  | nA   |   |
| V <sub>GE(th)</sub>  | Gate Threshold Voltage                                 | I <sub>C</sub> = 1mA, V <sub>CE</sub> = V <sub>GE</sub>  | 4.5                    | 5.7  | V    |   |
| V <sub>CE(sat)</sub> | Collector to Emitter Saturation Voltage (Module Level) | I <sub>C</sub> = 150A,<br>V <sub>GE</sub> = 15V          | T <sub>J</sub> = 25°C  | 3.00 | 3.20 | V |
|                      |  |  | T <sub>J</sub> = 125°C | 3.60 |      |   |

**Switching Characteristics of IGBT**

|                     |   |  |                        |       |      |
|---------------------|---|--|------------------------|-------|------|
| t <sub>d(on)</sub>  | Turn-on Delay Time                          | V <sub>CC</sub> = 600V<br>I <sub>C</sub> = 150A<br>R <sub>G</sub> = 6.8Ω<br>V <sub>GE</sub> = ±15V<br>Inductive Load | T <sub>J</sub> = 25°C  | 40    | ns   |
|                     |   |  | T <sub>J</sub> = 125°C | 45    |      |
| t <sub>r</sub>      | Turn-on Rise Time                           |  | T <sub>J</sub> = 25°C  | 65    | ns   |
|                     |   |  | T <sub>J</sub> = 125°C | 70    |      |
| t <sub>d(off)</sub> | Turn-off Delay Time                         |  | T <sub>J</sub> = 25°C  | 500   | ns   |
|                     |   |  | T <sub>J</sub> = 125°C | 535   |      |
| t <sub>f</sub>      | Turn-off Fall Time                          |  | T <sub>J</sub> = 25°C  | 100   | ns   |
|                     |   |  | T <sub>J</sub> = 125°C | 130   |      |
| E <sub>on</sub>     | Turn-on Switching Loss                      |  | T <sub>J</sub> = 25°C  | 6.0   | mJ   |
|                     |   |  | T <sub>J</sub> = 125°C | 7.4   |      |
| E <sub>off</sub>    | Turn-off Switching Loss                     | T <sub>J</sub> = 25°C  | 3.4                    | mJ    |      |
|                     |   | T <sub>J</sub> = 125°C   | 8.0                    |       |      |
| Q <sub>g</sub>      | Total Gate Charge                           | T <sub>J</sub> = 25°C  | 1300                   | nC    |      |
| R <sub>gint</sub>   | Integrated gate resistor                    | f = 1M;<br>V <sub>pp</sub> = 1V  | T <sub>J</sub> = 25°C  | 1.3   | Ω    |
| C <sub>ies</sub>    | Input Capacitance                           | V <sub>CE</sub> = 25V<br>V <sub>GE</sub> = 0V<br>f = 1MHz  | T <sub>J</sub> = 25°C  | 13.0  | nF   |
| C <sub>oes</sub>    | Output Capacitance                          |  | T <sub>J</sub> = 25°C  | 1.80  |      |
| C <sub>res</sub>    | Reverse Transfer Capacitance                |  | T <sub>J</sub> = 25°C  | 1.05  |      |
| R <sub>θJC</sub>    | Thermal Resistance, Junction-to-Case (IGBT) |  |                        | 0.169 | °C/W |

**Electrical and Switching Characteristics of Freewheeling Diode**

|                  |  |  |                        |       |       |      |
|------------------|--|--|------------------------|-------|-------|------|
| V <sub>F</sub>   | Diode Forward Voltage                        | I <sub>F</sub> = 150A ,<br>V <sub>GE</sub> = 0V                      | T <sub>J</sub> = 25°C  | 1.90  | 2.20  | V    |
|                  |  |  | T <sub>J</sub> = 125°C | 1.90  |       |      |
| t <sub>rr</sub>  | Diode Reverse Recovery Time                  | I <sub>F</sub> = 150A,<br>di/dt=2240A/μs,<br>V <sub>rr</sub> = 600V, | T <sub>J</sub> = 25°C  | 130   |       | ns   |
|                  |  |  | T <sub>J</sub> = 125°C | 220   |       |      |
| I <sub>rr</sub>  | Diode Peak Reverse Recovery Current          | I <sub>F</sub> = 150A,<br>di/dt=2240A/μs,<br>V <sub>rr</sub> = 600V, | T <sub>J</sub> = 25°C  | 135   |       | A    |
|                  |  |  | T <sub>J</sub> = 125°C | 170   |       |      |
| Q <sub>rr</sub>  | Diode Reverse Recovery Charge                | I <sub>F</sub> = 150A,<br>di/dt=2240A/μs,<br>V <sub>rr</sub> = 600V, | T <sub>J</sub> = 25°C  | 11.00 |       | nC   |
|                  |  |  | T <sub>J</sub> = 125°C | 18.50 |       |      |
| E <sub>rr</sub>  | Diode Reverse Recovery Energy                | I <sub>F</sub> = 150A,<br>di/dt=2240A/μs,<br>V <sub>rr</sub> = 600V, | T <sub>J</sub> = 25°C  | 3.40  |       | mJ   |
|                  |  |  | T <sub>J</sub> = 125°C | 6.60  |       |      |
| R <sub>θJC</sub> | Thermal Resistance, Junction-to-Case (Diode) |  |                        |       | 0.175 | °C/W |

**Module Characteristics**

| Parameter        |   | Min. | Typ. | Max. | Unit |
|------------------|---|------|------|------|------|
| V <sub>iso</sub> | Isolation Voltage<br>(All Terminals Shorted), f = 50Hz, 1minute | 2500 |      |      | V    |
| R <sub>ecs</sub> | Case-To-Sink(Conductive Grease Applied)                         |      | 0.1  |      | °C/W |
| M                | Power Terminals Screw: M6                                       | 3.0  |      | 5.0  | N·m  |
| M                | Mounting Screw: M6  | 4.0  |      | 6.0  | N·m  |
| G                | Weight  |      | 315  |      | g    |

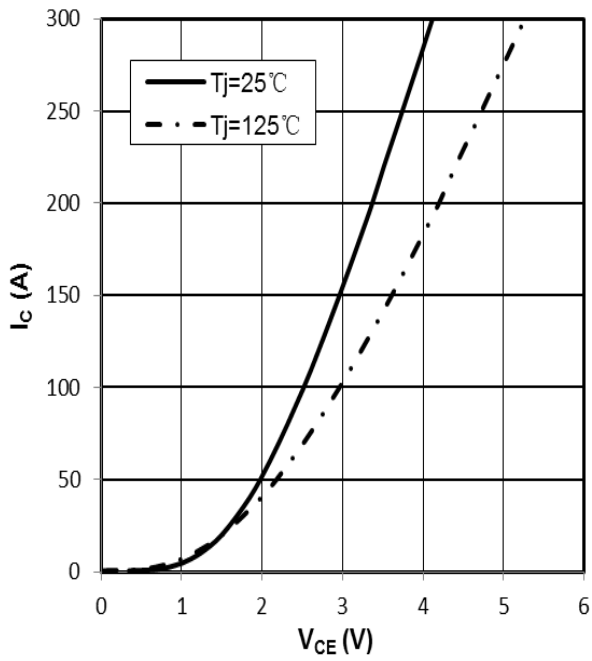


Fig 1. output characteristic IGBT,  
 $I_c=f(V_{CE}), V_{GE}=15V$

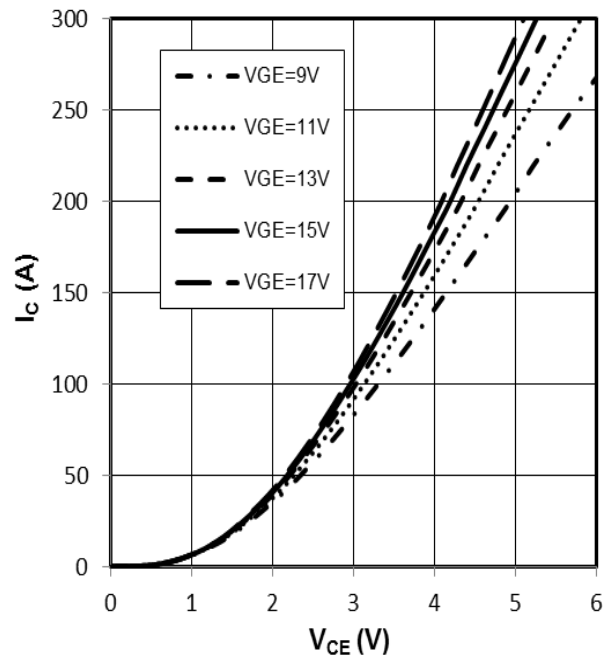


Fig 2. output characteristic IGBT,  
 $I_c=f(V_{CE}), T_j=125^\circ C$

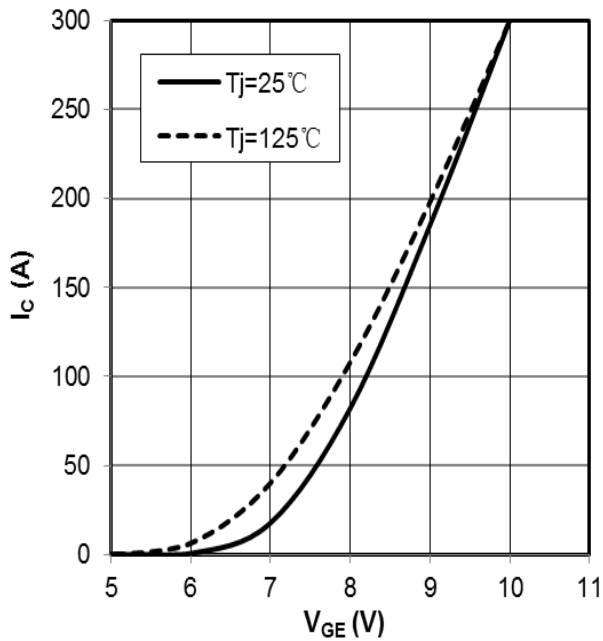


Fig 3. transfer characteristic IGBT,  
 $I_c=f(V_{GE}), V_{CE}=20V$

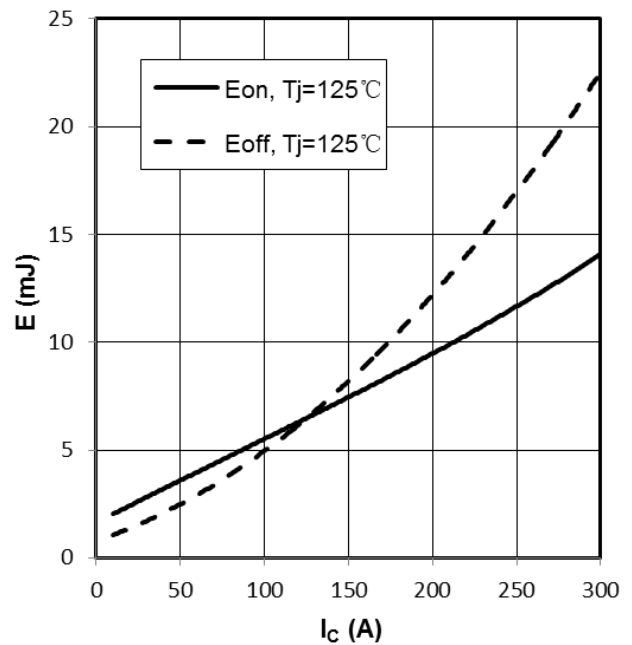


Fig 4. switching losses IGBT,  $E_{on}=f(I_c), E_{off}=f(I_c)$ ,  
 $V_{GE}=\pm 15V, R_{Gon}=6.8\Omega, R_{Goff}=6.8\Omega, V_{CE}=600V$

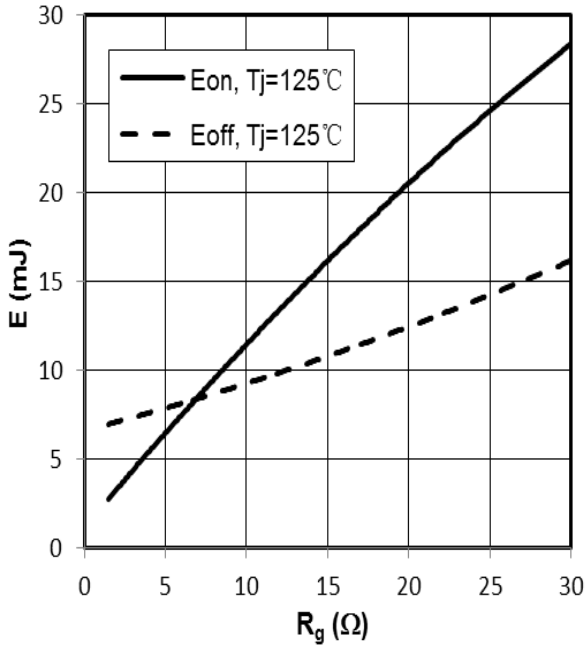


Fig 5. switching losses IGBT,  $E_{on}=f(R_G), E_{off}=f(R_G)$ ,  
 $V_{GE}=\pm 15V, I_c=150A, V_{CE}=600V$

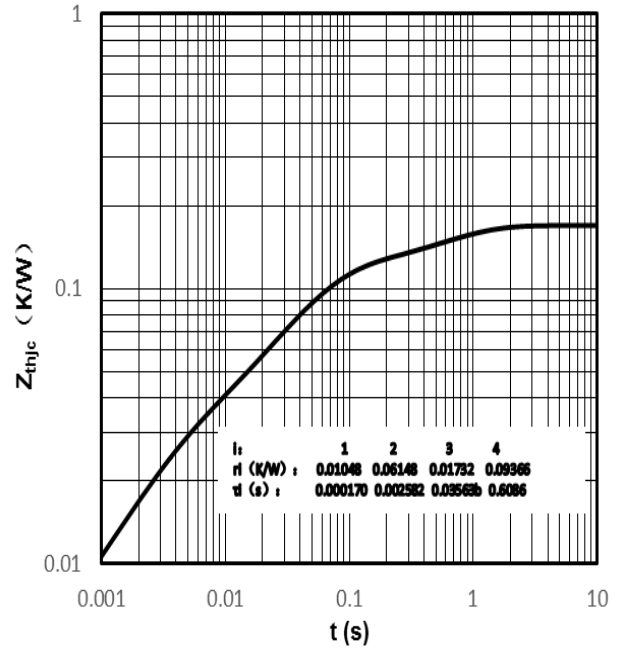


Fig 6. transient thermal impedance IGBT,  $Z_{thjc}=f(t)$

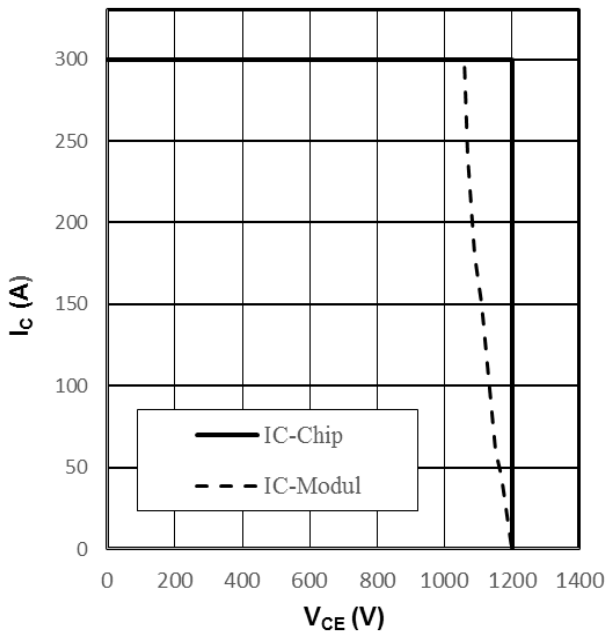


Fig 7. reverse bias safe operating area IGBT,  
 $I_c=f(V_{CE}), V_{GE}=\pm 15V, R_{Goff}=5.6\Omega, T_{vj}=125^\circ C$

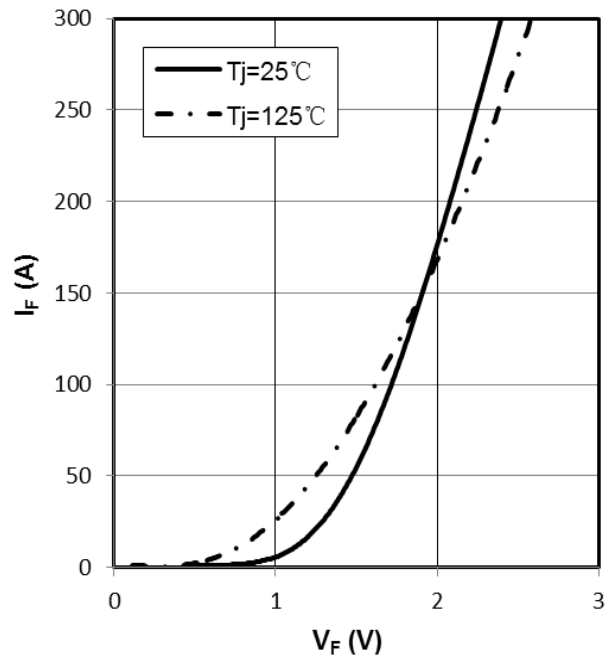


Fig 8. forward characteristic of Diode,  
 $I_F=f(V_F)$

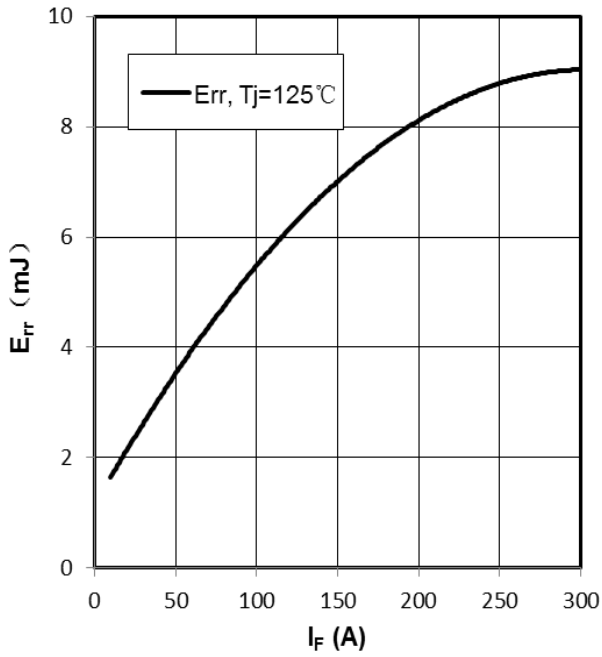


Fig 9. switching losses Diode,  
 $E_{rr}=f(I_F)$ ,  $R_{Gon}=5.6\Omega$ ,  $V_{CE}=600V$

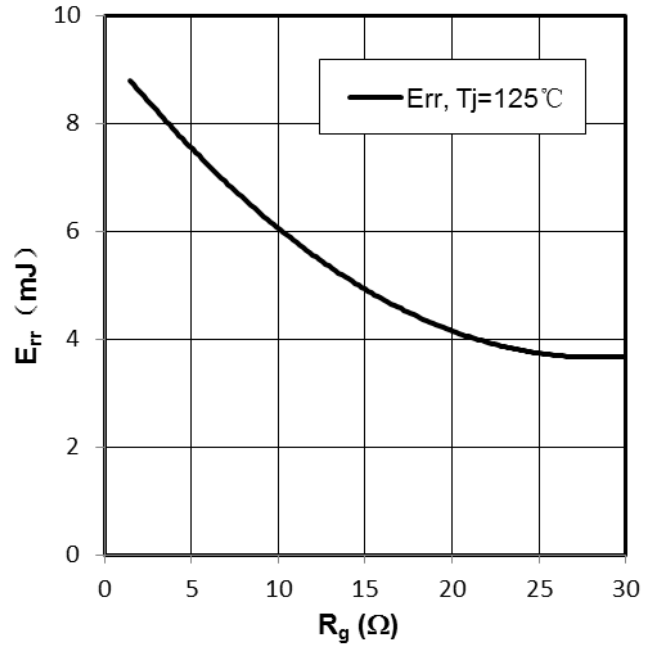
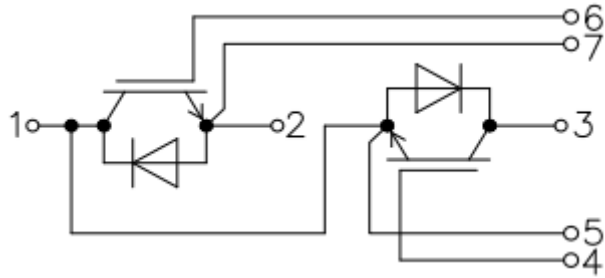


Fig 10. switching losses Diode,  
 $E_{rr}=f(R_g)$ ,  $I_F=150A$ ,  $V_{CE}=600V$

**Internal Circuit:**



**Package Dimension**  
**Dimensions in Millimeters**

