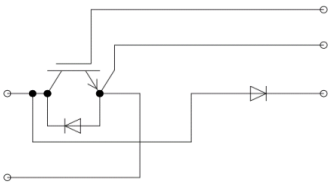
# 62mm Chopper IGBT Module

$V_{CES}$=1200V， $I_{C\ nom}$=300A / $I_{CRM}$=600A

D5



## Electrical characteristics：

- 1200V Trench /Field Stop process
- Low switching losses
- Vcesat has a positive temperature coefficient

## Applications:

- High Frequency Power Supplies
- UPS
- Variable Frequency Drive

## IGBT, Inverter

### Maximum Ratings

| Parameter | Conditions | Symbol | Value | Unit |
|---|---|---|---|---|
| Collector-Emitter voltage | $T_{vj}$=25°C | $V_{CES}$ | 1200 | V |
| Continuous DC collector current | $T_C$=100°C, $T_{vj\ max}$=175°C | $I_{C\ nom}$ | 300 | A |
| Repetitive peak collector current | $t_P$=1 ms | $I_{CRM}$ | 600 | A |
| Total power dissipation | $T_C$ = 25°C, $T_{vj\ max}$ = 175°C | $P_{tot}$ | 1470 | W |
| Gate emitter voltage | | $V_{GE}$ | ±20 | V |

## Characteristic Values

| Parameter | Conditions | Symbol | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| Collector-Emitter saturation voltage | $V_{GE}$=15V, $I_C$=300A $T_{vj}$=25°C<br>$V_{GE}$=15V, $I_C$=300A $T_{vj}$=125°C<br>$V_{GE}$=15V, $I_C$=300A $T_{vj}$=150°C | $V_{CEsat}$ | | 2.23<br>2.74<br>2.86 | 2.70 | V |
| Gate-Emitter threshold voltage | $I_C$=8mA, $V_{GE}$= $V_{CE}$ $T_{vj}$=25°C | $V_{GE(th)}$ | 5.00 | 5.65 | 6.20 | |
| Gate charge | $V_{GE}$=-15V…+15V | $Q_G$ | | 1.52 | | µC |
| Internal gate resistor | | $R_{Gint}$ | | 2.0 | | Ω |
| Input capacitance | f=1 MHz, $V_{CE}$=25 V, $V_{GE}$=0 V $T_{vj}$=25°C | $C_{ies}$ | | 22.53 | | nF |
| Reverse transfer capacitance | | $C_{res}$ | | 0.85 | | nF |
| Collector-emitter cut-off current | $V_{CE}$=1200V , $V_{GE}$= 0 V $T_{vj}$=25°C | $I_{CES}$ | | | 1 | mA |
| Gate-emitter leakage current | $V_{CE}$=0 V, $V_{GE}$= 20 V $T_{vj}$=25°C | $I_{GES}$ | | | 200 | nA |
| Turn-on delay time | $I_C$=300A, $V_{CE}$=600 V $T_{vj}$=25°C<br>$V_{GE}$=±15 V, $R_G$=2.5Ω $T_{vj}$=125°C<br>(inductive load) $T_{vj}$=150°C | $t_{d\,on}$ | | 196<br>205<br>209 | | ns |
| Rise time | $I_C$=300A, $V_{CE}$=600 V $T_{vj}$=25°C<br>$V_{GE}$=±15 V, $R_G$=2.5Ω $T_{vj}$=125°C<br>(inductive load) $T_{vj}$=150°C | $t_r$ | | 56<br>61<br>62 | | |
| Turn-off delay time | $I_C$=300A, $V_{CE}$=600 V $T_{vj}$=25°C<br>$V_{GE}$=±15 V, $R_G$=2.5Ω $T_{vj}$=125°C<br>(inductive load) $T_{vj}$=150°C | $t_{d\,off}$ | | 257<br>294<br>303 | | |
| Fall time | $I_C$=300A, $V_{CE}$=600 V $T_{vj}$=25°C<br>$V_{GE}$=±15 V, $R_G$=2.5Ω $T_{vj}$=125°C<br>(inductive load) $T_{vj}$=150°C | $t_f$ | | 85<br>141<br>136 | | |
| Turn-on energy loss per pulse | $I_C$=300A, $V_{CE}$=600 V $T_{vj}$=25°C<br>$V_{GE}$=±15 V, $R_G$=2.5Ω $T_{vj}$=125°C<br>(inductive load) $T_{vj}$=150°C | $E_{on}$ | | 9.47<br>19.02<br>22.82 | | mJ |
| Turn-off energy loss per pulse | $I_C$=300A, $V_{CE}$=600 V $T_{vj}$=25°C<br>$V_{GE}$=±15 V, $R_G$=2.5Ω $T_{vj}$=125°C<br>(inductive load) $T_{vj}$=150°C | $E_{off}$ | | 18.28<br>22.20<br>23.10 | | |
| SC data | $V_{GE}$≤15V, Vcc=800V<br>$V_{CEmax}$=$V_{CES}$-$L_{sCE}$·di/dt $t_P$≤10us, $T_{vj}$=150°C | $I_{SC}$ | | 979 | | A |
| Thermal resistance, junction to case | per IGBT | $R_{thJC}$ | | | 0.10 | K/W |
| Temperature under switching conditions | | $T_{vj\,op}$ | -40 | | 150 | °C |

# Diode, Inverter

### Maximum Ratings

| Parameter | Conditions | Symbol | Value | Unit |
|---|---|---|---|---|
| Repetitive peak reverse voltage | $T_{vj}$=25°C | $V_{RRM}$ | 1200 | V |
| Continuous DC forward current | | $I_F$ | 300 | A |
| Repetitive peak forward current | $t_p$=1ms | $I_{FRM}$ | 600 | A |
| $I^2t$-value | $t_p$=10ms，sin180°，$T_j$=125°C | $I^2t$ | 4050 | $A^2s$ |

### Characteristic Values

| Parameter | Conditions | Symbol | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| Forward voltage | $I_F$=300A, $V_{GE}$=0V $T_{vj}$=25°C<br>$I_F$=300A, $V_{GE}$=0V $T_{vj}$=125°C<br>$I_F$=300A, $V_{GE}$=0V $T_{vj}$=150°C | $V_F$ | | 2.23<br>2.31<br>2.24 | 2.75 | V |
| Peak reverse recovery current | $I_F$=300A, $T_{vj}$=25°C<br>-di$_F$/dt=4233A/µs($T_{vj}$=150°C) $T_{vj}$=125°C<br>$V_R$=600V, $V_{GE}$=-15V $T_{vj}$=150°C | $I_{RM}$ | | 186<br>218<br>230 | | A |
| Recovered charge | $I_F$=300A, $T_{vj}$=25°C<br>-di$_F$/dt=4233A/µs($T_{vj}$=150°C) $T_{vj}$=125°C<br>$V_R$=600V, $V_{GE}$=-15V $T_{vj}$=150°C | $Q_r$ | | 11.30<br>29.50<br>38.40 | | µC |
| Reverse recovered energy | $I_F$=300A, $T_{vj}$=25°C<br>-di$_F$/dt=4233A/µs($T_{vj}$=150°C) $T_{vj}$=125°C<br>$V_R$=600V, $V_{GE}$=-15V $T_{vj}$=150°C | $E_{rec}$ | | 5.25<br>12.71<br>16.10 | | mJ |
| Thermal resistance, junction to case | per diode | $R_{thJC}$ | | | 0.15 | K/W |
| Temperature under switching conditions | | $T_{vj\ op}$ | -40 | | 150 | °C |

# Module

| Parameter | Conditions | Symbol | Value | | | Unit |
|---|---|---|---|---|---|---|
| Isolation test voltage | RMS, f=50Hz, t=1min | $V_{ISOL}$ | 4000 | | | V |
| Internal isolation | | | $Al_2O_3$ | | | |
| Storage temperature | | $T_{stg}$ | -40 | | 125 | °C |
| Mounting torque for modul mounting | | M | 3.0 | | 6.0 | Nm |
| Weight | | W | | 313 | | g |

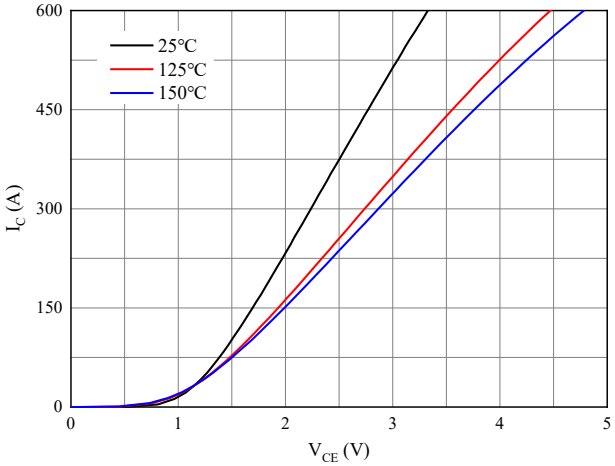



Fig 1. Typical output characteristics ($V_{GE}$=15V)

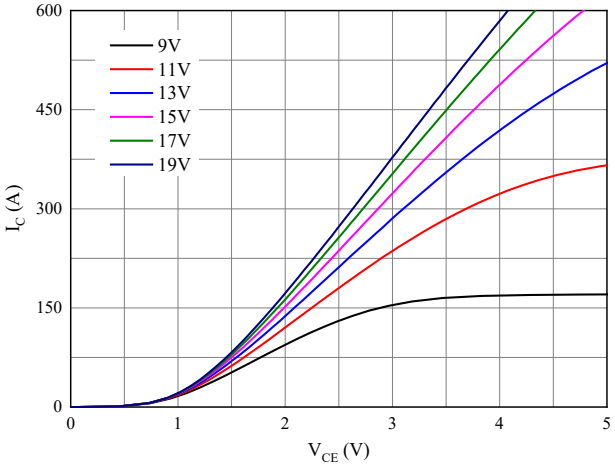



Fig 2. Typical output characteristics ($T_{vj}$=150°C)

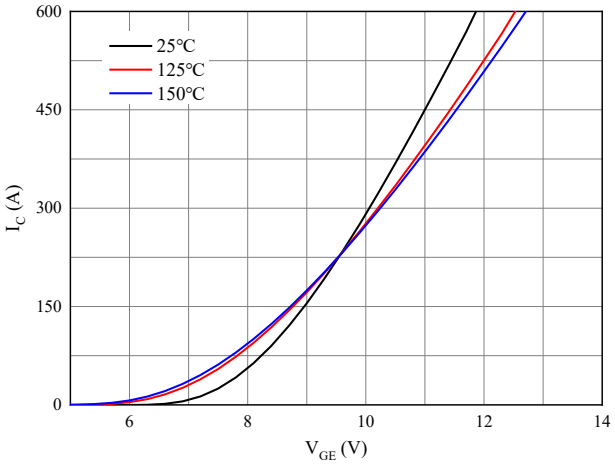



Fig 3. Typical transfer characteristic($V_{CE}$=20V)

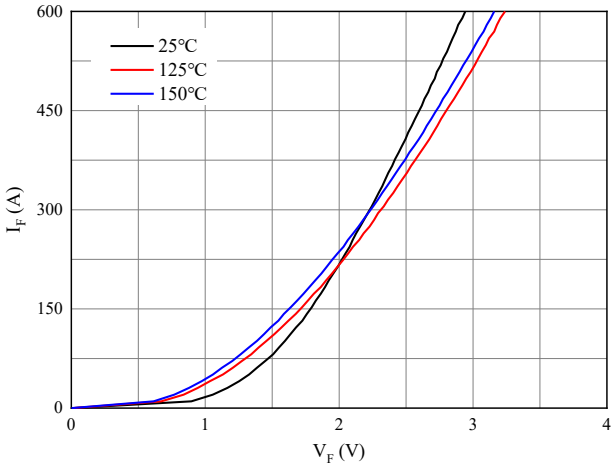



Fig 4. Forward characteristic of Diode

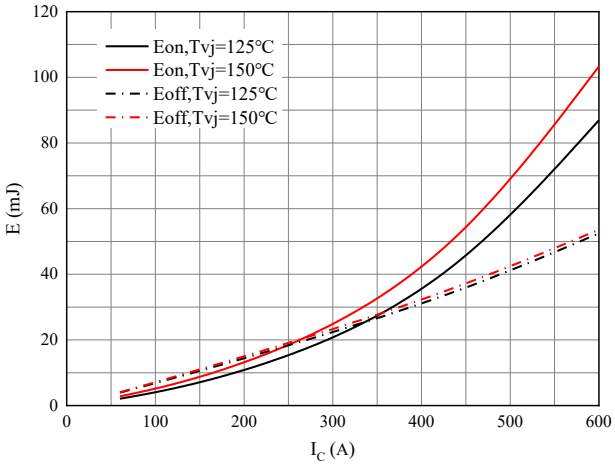



Fig 5. Switching losses of IGBT
$V_{GE}$=±15V, $R_{Gon}$=2.5Ω, $R_{Goff}$=2.5Ω, $V_{CE}$=600V

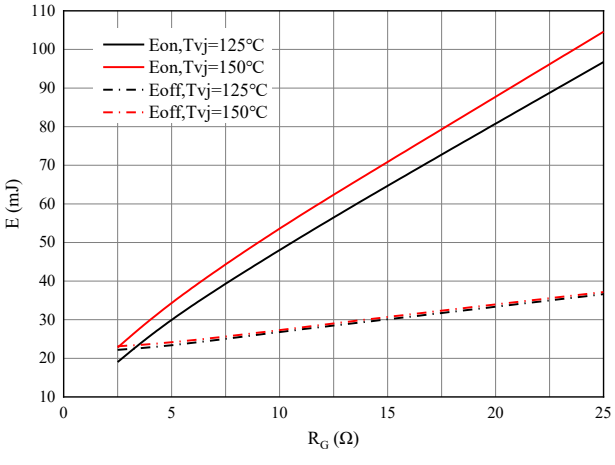



Fig 6. Switching losses of IGBT
$V_{GE}$=±15V, $I_C$=300A, $V_{CE}$=600V

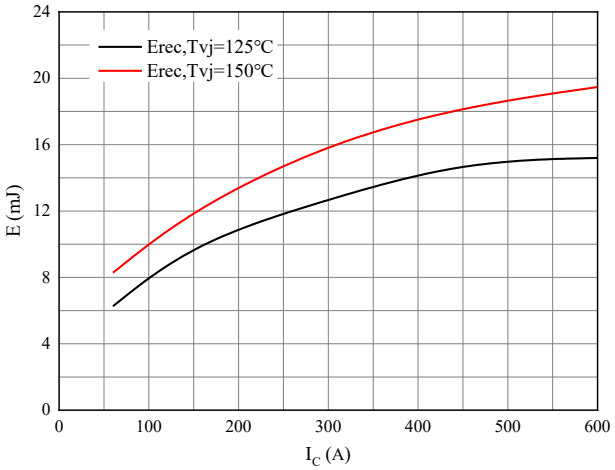



Fig 7. Switching losses of Diode
$R_{Gon}$=2.5Ω, $V_{CE}$=600V

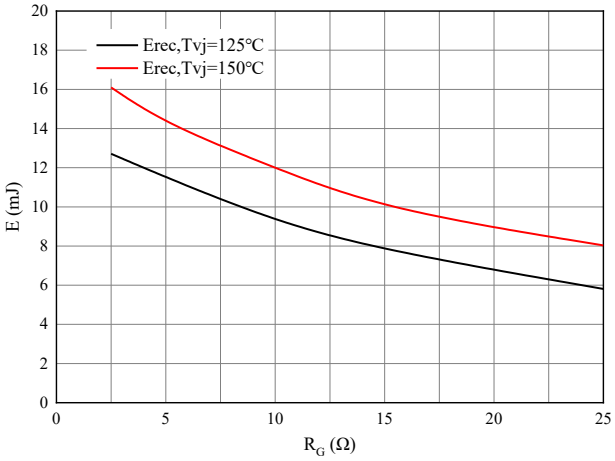



Fig 8. Switching losses of Diode
$I_F$=300A, $V_{CE}$=600V

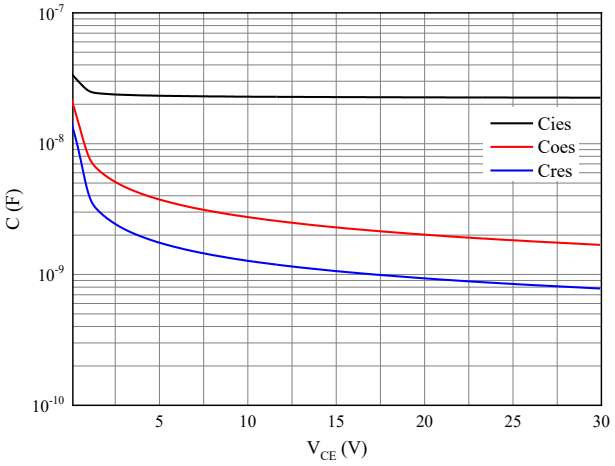
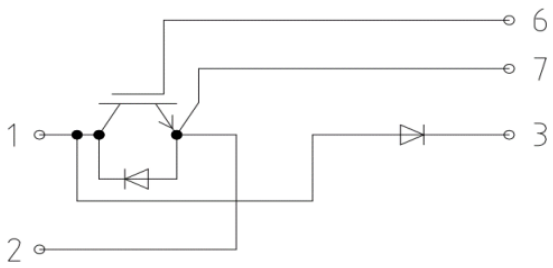



Fig 9. Capacitance characteristic

**Circuit diagram**




**Package outlines**