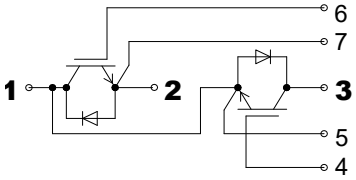
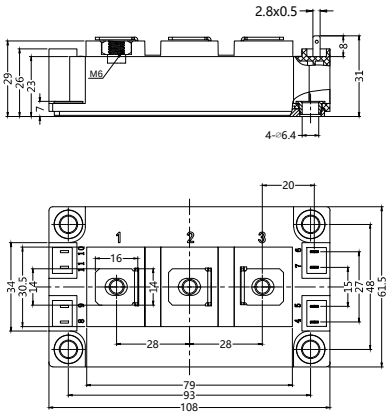
# SGG400T60UC2

## IGBT Modules


**SGG400T60UC2**
**(Half Bridge)**




Dimensions in mm (1mm = 0.0394")




$T_C$=25°C,unless otherwise specified

| Symbol | Conditions | Values | Units |
|---|---|---|---|
| IGBT | | | |
| $V_{CES}$ | | 600 | V |
| $I_C$ | $T_C$=25(100)°C | 800(400) | A |
| $I_{CRM}$ | $T_C$=25°C,$t_P$ =1ms | 800 | A |
| $V_{GES}$ | | ±20 | V |
| $T_{Vj}$ | | -40...+175 | °C |
| Inverse Diode | | | |
| $I_F$ =-$I_C$ | $T_C$=25(80)°C | 800(400) | A |
| $I_{FRM}$ | $T_C$=25°C,$t_P$=1ms | 800 | A |
| $I_{FSM}$ | $t_P$=10ms;sin180°;$T_j$=25°C | 800 | A |
| $V_{RRM}$ | | 600 | V |
| Module $I_{t(RMS)}$ | $T_{teminal}$ = 80°C | 400 | A |
| $T_{stg}$ | | -40~125 | °C |
| $V_{Isol}$ | AC, 1min | 2500 | V |

### *Features*

- Trench FS IGBT technology
- Low switching losses
- Switching frequency up to 30kHz
- Square RBSOA, no latch up
- High short circuit capability
- Positive temperature coefficient for easy parallelling
- MOS input, voltage controlled
- Soft swithcing FWD diode Technology
- Package with copper baseplate
- Isolation voltage 2500 V

### *Application*

- Inverter welding Machines
- UPS systems
- Power converters

### *Advantages*

- space and weight savings
- reduced protection circuits

RoHS Compliant



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## IGBT Modules

### Characteristics

$T_C$=25°C,unless otherwise specified

| Symbol | Conditions | min. | typ. | max. | Units |
|---|---|---|---|---|---|
| IGBT | | | | | |
| $V_{GE(th)}$ | $V_{GE}$=$V_{CE}$,$I_C$=3mA | 4.5 | 5.0 | 6.0 | V |
| $I_{CES}$ | $V_{GE}$=0;$V_{CE}$=$V_{CES}$;$T_j$=25°C | | | 0.10 | mA |
| $V_{CE(TO)}$ | $T_j$=25°C | | 0.9 | 1.0 | V |
| $r_{CE}$ | $V_{GE}$=15V,$T_j$=25(150)°C | | 1.4(0.8) | 2.4(0.9) | mΩ |
| $V_{CE(sat)}$ | $I_C$=400A;$V_{GE}$=15V;chip level | | 1.65 | 2.10 | V |
| $C_{ies}$ | under following conditions | | 25 | | nF |
| $C_{oes}$ | $V_{GE}$=0,$V_{CE}$=25V,f=1MHz | | 0.96 | | |
| $C_{res}$ | | | 0.75 | | |
| $L_{CE}$ | | | | 30 | nH |
| $R_{CC'+EE'}$ | res.,terminal-chip $T_C$=25(125)°C | | 0.65(1.09) | | mΩ |
| $t_{d(on)}$ | under following conditions: | | 108 | | ns |
| $t_r$ | $V_{CC}$=300V, $I_C$=400A | | 52 | | ns |
| $t_{d(off)}$ | $R_{Gon}$=$R_{Goff}$=1Ω,$T_j$=150°C | | 450 | | ns |
| $t_f$ | $V_{GE}$=± 15V | | 69 | | ns |
| $E_{on}$/$E_{off}$/$E_{ts}$ | | | 2.2/16.4/18.6 | | mJ |
| Inverse Diode | under following conditions: | | | | |
| $V_F$ = $V_{EC}$ | $I_F$=400A;$V_{GE}$=0V;$T_j$=25°C | | 1.55 | | V |
| $V_{(FO)}$ | $T_j$=25(125)°C | | 0.9(0.80) | 1.1(1.0) | V |
| $r_F$ | $T_j$=25(125)°C | | 1.7(2.4) | 2.1(2.7) | mΩ |
| $I_{RM}$ | $I_F$=300A;$T_j$=125°C | | 216 | | A |
| $Q_{rr}$ | di/dt=100A/us | | 15 | | uC |
| $E_{rr}$ | $V_{GE}$=±15V | | 4.8 | | mJ |
| Thermal Characteristics | | | | | |
| $R_{th(j-c)}$ | per IGBT | | | 0.12 | K/W |
| $R_{th(j-c)D}$ | per Inverse Diode | | | 0.22 | K/W |
| $R_{th(c-s)}$ | per module | | | 0.08 | K/W |
| Mechanical Data | | | | | |
| $M_s$ | to heatsink M6 | 3 | | 5 | Nm |
| $M_t$ | to terminals M6 | 2.5 | | 5 | Nm |
| Weight | typical | | | 325 | g |



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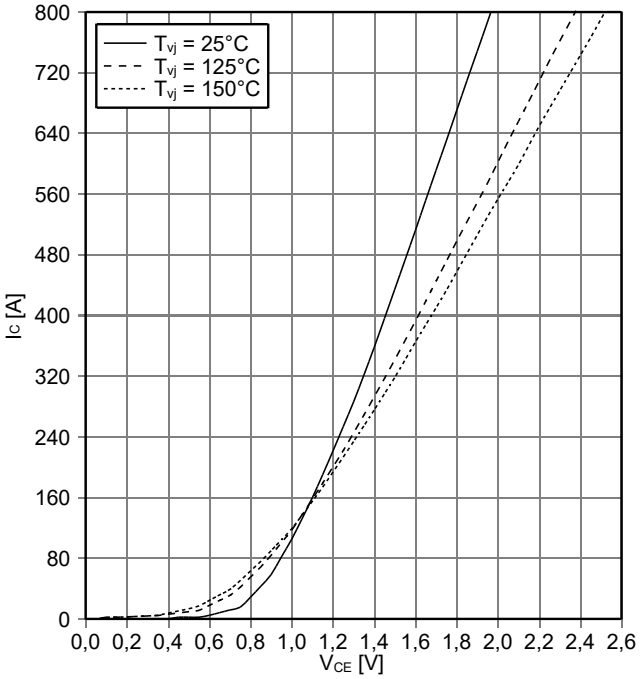


Fig.1 Ou tput characteristic IGBT,Inverter(typical)
$I_C=f(V_{CE})$ $V_{GE}$=15 V

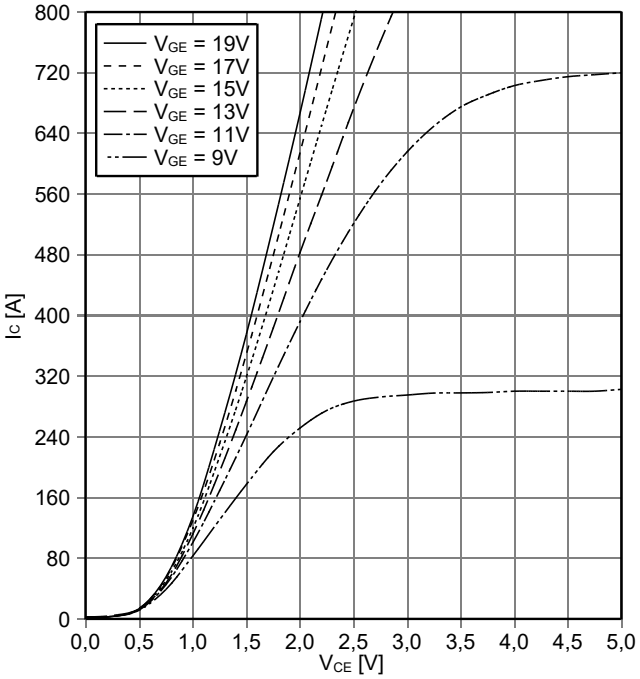


Fig.2 Ou tput characteristic IGBT,Inverter (typical)
$I_C=f(V_{CE})$ $T_{vj}$=150°C

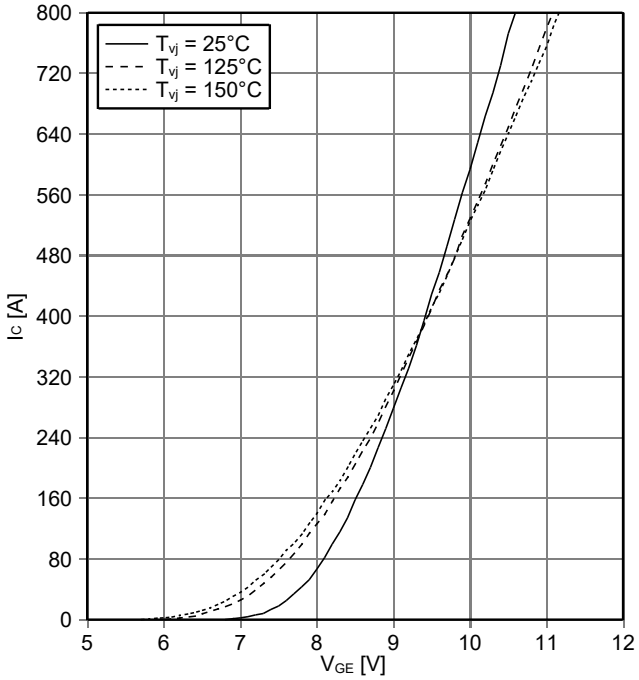


Fig.3 Transfer characteristic IGBT,Inverter(typical)
$I_C=f$ ($V_{GE}$) $V_{CE}$=20V

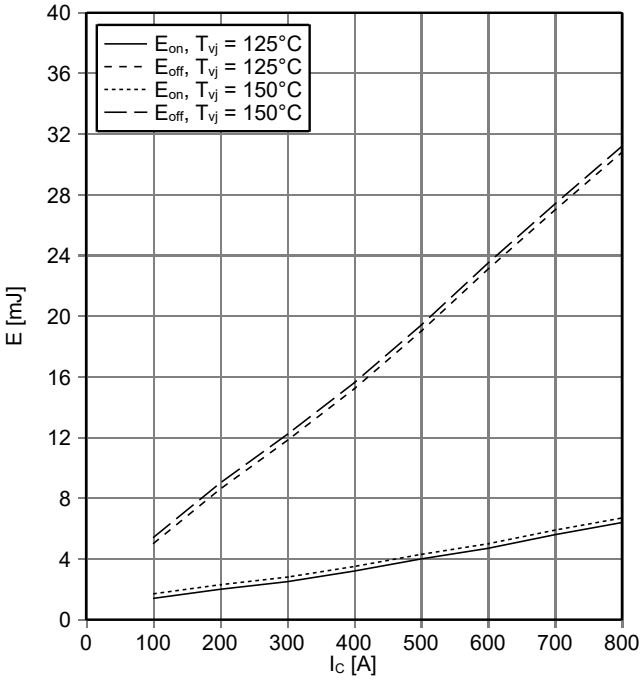


Fig.4 Switching losses IGBT,Inverter (typical)
$E_{on}=f(I_C)$,$E_{off}=f(I_C)$
$V_{GE}$=±15V,$R_{Gon}$=2.4Ω,$R_{Goff}$=2.4Ω,$V_{CE}$=300V



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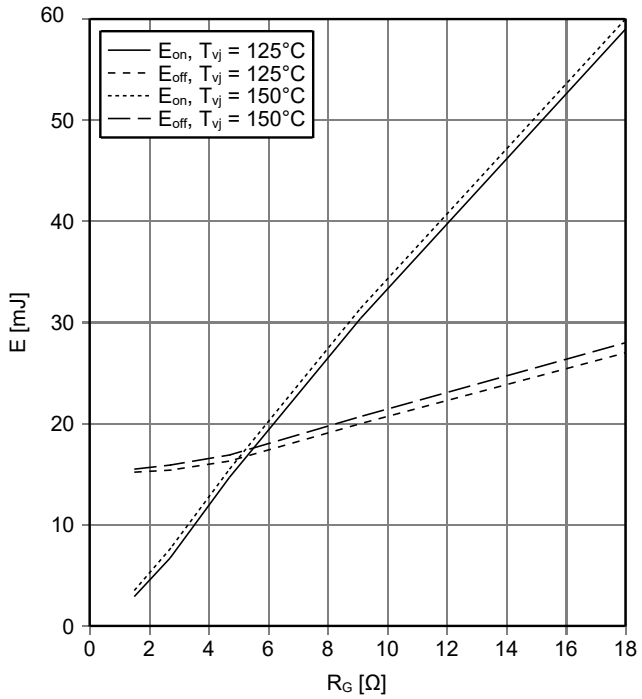


Fig.5 Switching losses IGBT,Inverter
(typical)$E_{on}=f(R_G),E_{off}=f(R_G)$
$V_{GE}=\pm15V,I_C=300A,V_{CE}=300$ V

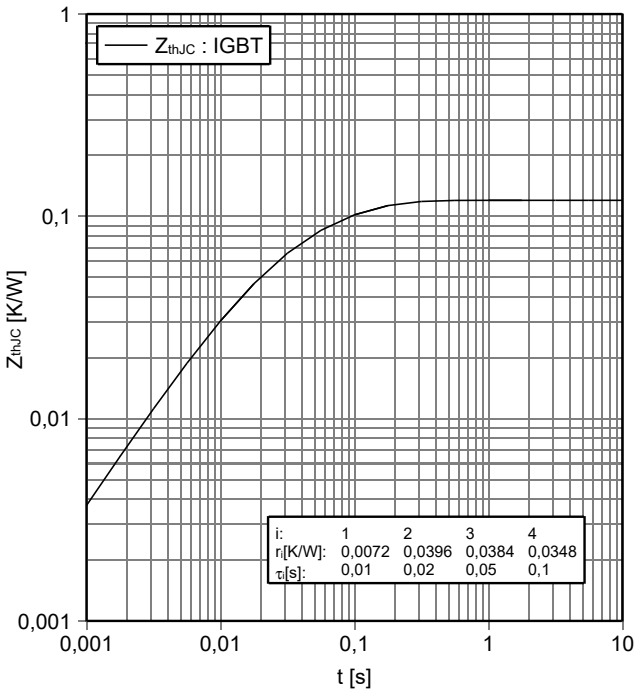


Fig.6 Transient thermal impedance IGBT,Inverter
$Z_{thJC}=f(t)$

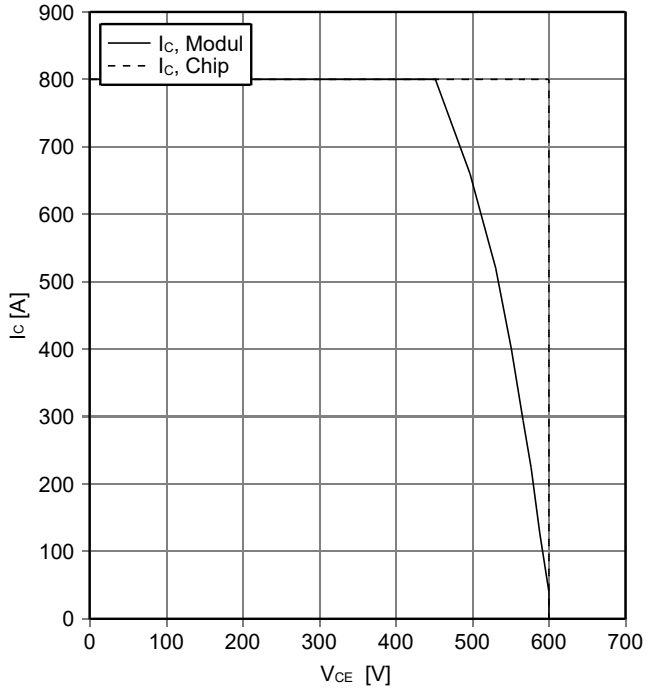


Fig.7 Reverse bias safe operating area IGBT,Inverter(RBSOA)
$I_C=f(V_{CE})$ $V_{GE}=\pm15V,R_{Goff}=2.4\Omega,T_{vj}=150°C$

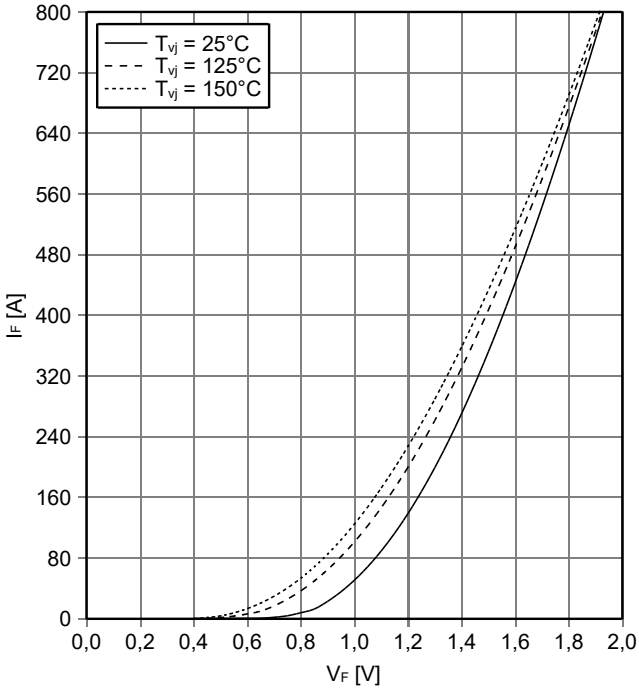


Fig.8 Forward characteristic of Diode,Inverter(typical)
$I_F=f(V_F)$



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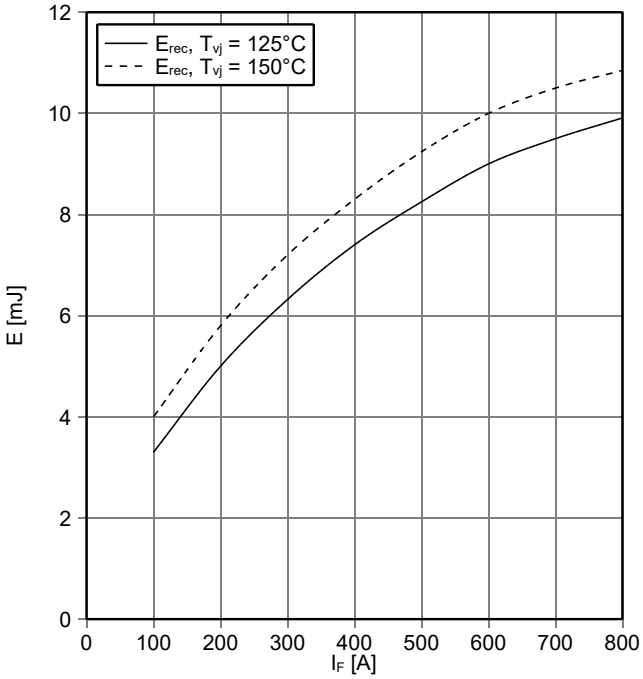


Fig.9 Switching losses Diode,Inverter(typical)
$E_{rec}=f(I_F)$ $R_{Gon}=2.4\Omega$,$V_{CE}=300V$

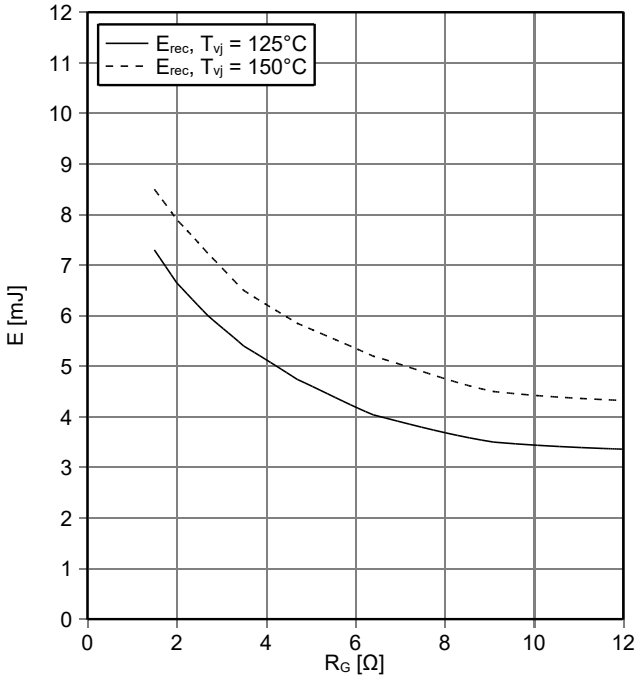


Fig.10 Switching losses Diode,Inverter (typical)
$E_{rec}=f(R_G)$ $I_F=300$ A,$V_{CE}=300V$

Fig.11 Transient thermal impedance Diode, Inverter $Z_{thJC}=f(t)$

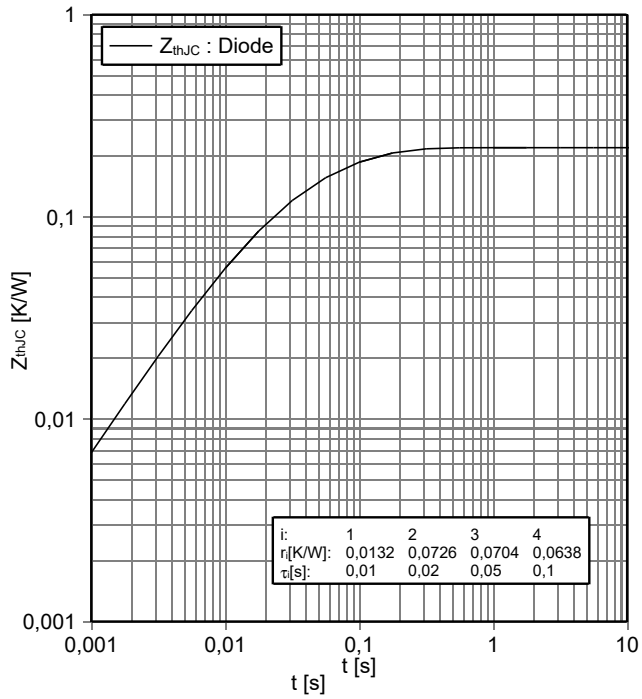


Fig.11 Transient thermal impedance Diode, Inverter $Z_{thJC}=f(t)$



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