

# IGBT MODULE

# GCA300BA60



UL;E76102 (M)

**SanRex** IGBT Module **GCA300BA60** is designed for high speed, high current switching applications. This Module is electrically isolated and contains two IGBTs connected in series with a fast switching, soft recovery diode ( $t_{rr}=0.1\ \mu\text{s}$ ) reverse connected across each IGBT.

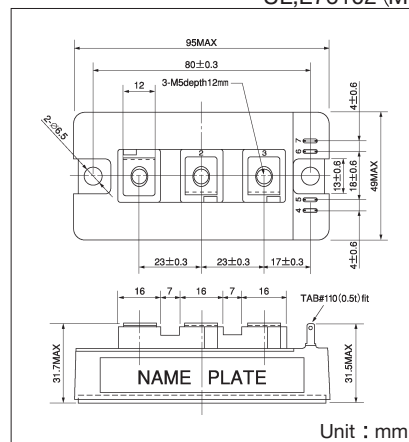
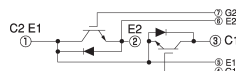
- $I_c=300\text{A}$   $V_{CES}=600\text{V}$
- $V_{CES(sat)}=2.4\text{V Typ}$
- $t_f=0.10\ \mu\text{s Typ}$
- Soft recovery diode

### (Applications)

Inverter for motor control (VVF)

UPS, AC servo

DC power supply, Welder



### Maximum Ratings

(Unless otherwise  $T_j=25^\circ\text{C}$ )

| Symbol    | Item                       |               | Conditions                            | Ratings         |  |  | Unit             |
|-----------|----------------------------|---------------|---------------------------------------|-----------------|--|--|------------------|
|           |                            |               |                                       | GCA300BA60      |  |  |                  |
| $V_{CES}$ | Collector-Emitter Voltage  |               | with gate terminal shorted to emitter | 600             |  |  | V                |
| $V_{GES}$ | Gate-Emitter Voltage       |               | with collector shorted to emitter     | $\pm 20$        |  |  | V                |
| $I_c$     | Collector Current          | DC            |                                       | 300             |  |  | A                |
| $I_{CP}$  |                            | Pulse (1 ms)  |                                       | 600             |  |  |                  |
| $-I_c$    | Reverse Collector Current  |               |                                       | 300             |  |  | A                |
| $P_T$     | Total Power Dissipation    |               | $T_c=25^\circ\text{C}$                | 1100            |  |  | W                |
| $T_j$     | Junction Temperature       |               |                                       | 150             |  |  | $^\circ\text{C}$ |
| $T_{stg}$ | Storage Temperature        |               |                                       | $-40 \sim +125$ |  |  | $^\circ\text{C}$ |
| $V_{iso}$ | Isolation Voltage (R.M.S.) |               | A.C. 1 minute                         | 2500            |  |  | V                |
|           | Mounting Torque            | Mounting (M6) | Recommended Value 2.5~3.9 (25~40)     | 4.7 (48)        |  |  | N·m<br>(kgf·cm)  |
|           |                            | Terminal (M5) | Recommended Value 1.5~2.5 (15~25)     | 2.7 (28)        |  |  |                  |
|           | Mass                       |               | Typical Value                         | 225             |  |  | g                |

### Electrical Characteristics

(Unless otherwise  $T_j=25^\circ\text{C}$ )

| Symbol        | Item                                 |                     | Conditions  | Ratings |      |           | Unit                      |
|---------------|--------------------------------------|---------------------|---|---------|------|-----------|---------------------------|
|               |                                      |                     |   | Min.    | Typ. | Max.      |                           |
| $I_{GES}$     | Gate Leakage Current                 |                     | $V_{GE}=\pm 20\text{V}$ , $V_{CE}=0\text{V}$  |         |      | $\pm 500$ | nA                        |
| $I_{CES}$     | Collector Cut-Off Current            |                     | $V_{CE}=600\text{V}$ , $V_{GE}=0\text{V}$   |         |      | 1.0       | mA                        |
| $V_{(BR)CES}$ | Collector-Emitter Breakdown Voltage  |                     | $V_{GE}=0\text{V}$ , $I_c=1\text{mA}$   | 600     |      |           | V                         |
| $V_{GE(th)}$  | Gate Threshold Voltage               |                     | $V_{CE}=10\text{V}$ , $I_c=30\text{mA}$   | 3.0     |      | 7.0       | V                         |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage |                     | $I_c=300\text{A}$ , $V_{GE}=15\text{V}$   |         | 2.4  | 2.8       | V                         |
| $C_{ies}$     | Input Capacitance                    |                     | $V_{CE}=10\text{V}$ , $V_{GE}=0\text{V}$ , $f=1\text{MHz}$                                    |         | 20   | 30        | nF                        |
| $t_r$         | Switching Time                       | Rise Time           | $I_c=300\text{A}$ , $V_{GE}=+15\text{V}/-5\text{V}$<br>$V_{CC}=300\text{V}$ , $R_G=2\ \Omega$ |         | 0.10 | 0.20      | $\mu\text{s}$             |
| $t_{d(on)}$   |                                      | Turn-on Delay Time  |   |         | 0.20 | 0.40      |                           |
| $t_f$         |                                      | Fall Time           |   |         | 0.10 | 0.20      |                           |
| $t_{d(off)}$  |                                      | Turn-off Delay Time |   |         | 0.40 | 0.80      |                           |
| $V_{ECS}$     | Emitter-Collector Voltage            |                     | $-I_c=300\text{A}$ , $V_{GE}=0\text{V}$   |         | 2.30 | 2.80      | V                         |
| $t_{rr}$      | Reverse Recovery Time                |                     | $-I_c=300\text{A}$ , $V_{GE}=-10\text{V}$ , $di/dt=600\text{A}/\mu\text{s}$                   |         | 0.1  | 0.15      | $\mu\text{s}$             |
| $R_{th(j-c)}$ | Thermal Resistance                   |                     | IGBT-Case   |         |      | 0.11      | $^\circ\text{C}/\text{W}$ |
|               |                                      |                     | Diode-Case  |         |      | 0.40      |                           |

