

# IGBT Modules

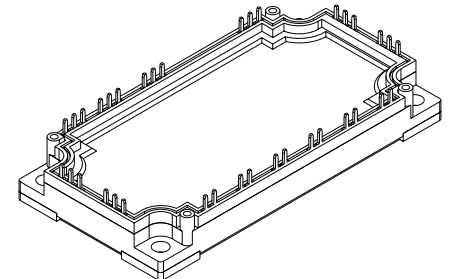
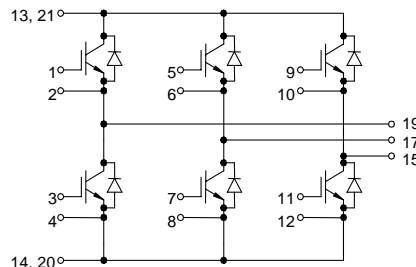
## Sixpack

Short Circuit SOA Capability  
Square RBSOA

$$I_{C25} = 160 \text{ A}$$

$$V_{CES} = 1200 \text{ V}$$

$$V_{CE(sat) \text{ typ.}} = 2.2 \text{ V}$$



| IGBTs                      |  |  |               |
|----------------------------|--|--|---------------|
| Symbol                     | Conditions   | Maximum Ratings                          |               |
| $V_{CES}$                  | $T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$  | 1200                                     | V             |
| $V_{GES}$                  |  | $\pm 20$                                 | V             |
| $I_{C25}$                  | $T_C = 25^{\circ}\text{C}$   | 160                                      | A             |
| $I_{C80}$                  | $T_C = 80^{\circ}\text{C}$   | 110                                      | A             |
| <b>RBSOA</b>               | $V_{GE} = \pm 15 \text{ V}; R_G = 6.8 \Omega; T_{VJ} = 125^{\circ}\text{C}$<br>Clamped inductive load; $L = 100 \mu\text{H}$ | $I_{CM} = 200$<br>$V_{CEK} \leq V_{CES}$ | A             |
| $t_{SC}$<br><b>(SCSOA)</b> | $V_{CE} = V_{CES}; V_{GE} = \pm 15 \text{ V}; R_G = 6.8 \Omega; T_{VJ} = 125^{\circ}\text{C}$<br>non-repetitive              | 10                                       | $\mu\text{s}$ |
| $P_{tot}$                  | $T_C = 25^{\circ}\text{C}$   | 640                                      | W             |

### Features

- NPT IGBT technology
- low saturation voltage
- low switching losses
- switching frequency up to 30 kHz
- square RBSOA, no latch up
- high short circuit capability
- positive temperature coefficient for easy paralleling
- MOS input, voltage controlled
- ultra fast free wheeling diodes
- solderable pins for PCB mounting
- package with copper base plate

### Advantages

- space savings
- reduced protection circuits
- package designed for wave soldering

### Typical Applications

- AC motor control
- AC servo and robot drives
- power supplies

| Symbol   | Conditions   | Characteristic Values<br>( $T_{VJ} = 25^{\circ}\text{C}$ , unless otherwise specified) |                        |                      |          |
|--|--|--|------------------------|----------------------|----------|
|  |  | min.   | typ.                   | max.                 |          |
| $V_{CE(sat)}$  | $I_C = 100 \text{ A}; V_{GE} = 15 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$<br>$T_{VJ} = 125^{\circ}\text{C}$                                      |  | 2.2<br>2.5             | V<br>V               |          |
| $V_{GE(th)}$   | $I_C = 4 \text{ mA}; V_{GE} = V_{CE}$  | 4.5  |                        | 6.5 V                |          |
| $I_{CES}$  | $V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$<br>$T_{VJ} = 125^{\circ}\text{C}$  |  | 4                      | 6.3 mA<br>mA         |          |
| $I_{GES}$  | $V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$  |  |                        | 400 nA               |          |
| $t_{d(on)}$<br>$t_r$<br>$t_{d(off)}$<br>$t_f$<br>$E_{on}$<br>$E_{off}$ | Inductive load, $T_{VJ} = 125^{\circ}\text{C}$<br>$V_{CE} = 600 \text{ V}; I_C = 100 \text{ A}$<br>$V_{GE} = \pm 15 \text{ V}; R_G = 6.8 \Omega$ |  | 100<br>60<br>600<br>90 | ns<br>ns<br>ns<br>ns |          |
|  |  |  |                        | 16.1<br>14.6         | mJ<br>mJ |
| $C_{ies}$  |  | $V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}; f = 1 \text{ MHz}$                       |                        | 6.5                  | nF       |
| $Q_{Gon}$  |  | $V_{CE} = 600 \text{ V}; V_{GE} = 15 \text{ V}; I_C = 100 \text{ A}$                   |                        | 475                  | nC       |
| $R_{thJC}$   |  | (per IGBT)   |                        |                      | 0.19 K/W |

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**Diodes**

| Symbol    | Conditions               | Maximum Ratings |   |
|-----------|--------------------------|-----------------|---|
| $I_{F25}$ | $T_C = 25^\circ\text{C}$ | 200             | A |
| $I_{F80}$ | $T_C = 80^\circ\text{C}$ | 130             | A |

| Symbol               | Conditions   | Characteristic Values |      |         |
|----------------------|--|-----------------------|------|---------|
|                      |  | min.                  | typ. | max.    |
| $V_F$                | $I_F = 100\text{ A}; V_{GE} = 0\text{ V}; T_{VJ} = 25^\circ\text{C}$<br>$T_{VJ} = 125^\circ\text{C}$                               | 2.2                   | 2.5  | V       |
| $I_{RM}$<br>$t_{rr}$ | $I_F = 120\text{ A}; di_F/dt = -750\text{ A}/\mu\text{s}; T_{VJ} = 125^\circ\text{C}$<br>$V_R = 600\text{ V}; V_{GE} = 0\text{ V}$ | 82                    |      | A       |
|                      |  | 200                   |      | ns      |
| $R_{thJC}$           | (per diode)  |                       |      | 0.3 K/W |

**Module**

| Symbol     | Conditions                                   | Maximum Ratings |                  |
|------------|--|-----------------|------------------|
| $T_{VJ}$   |  | -40...+150      | $^\circ\text{C}$ |
| $T_{stg}$  |  | -40...+125      | $^\circ\text{C}$ |
| $V_{ISOL}$ | $I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}$ | 2500            | V~               |
| $M_d$      | Mounting torque (M5)                         | 3 - 6           | Nm               |

| Symbol         | Conditions                   | Characteristic Values |      |            |
|----------------|------------------------------|-----------------------|------|------------|
|                |                              | min.                  | typ. | max.       |
| $R_{pin-chip}$ |                              |                       | 1.8  | m $\Omega$ |
| $d_s$          | Creepage distance on surface | 10                    |      | mm         |
| $d_A$          | Strike distance in air       | 10                    |      | mm         |
| $R_{thCH}$     | with heatsink compound       |                       | 0.01 | K/W        |
| <b>Weight</b>  |                              |                       | 300  | g          |

**Dimensions in mm (1 mm = 0.0394")**
