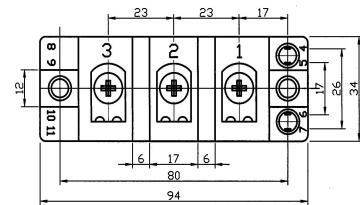
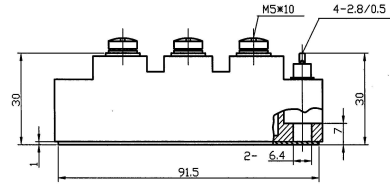
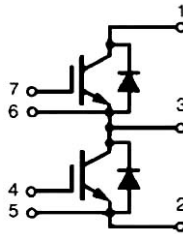
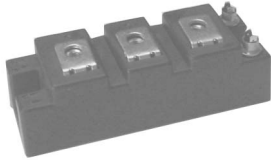


# SII145S12

## SPT IGBT Modules

Dimensions in mm (1mm = 0.0394")



### Absolute Maximum Ratings

$T_c = 25^\circ\text{C}$ , unless otherwise specified

| Symbol                    | Conditions  | Values                | Units            |
|---------------------------|---|-----------------------|------------------|
| <b>IGBT</b>               |   |                       |                  |
| $V_{CES}$                 |   | 1200                  | V                |
| $I_C$                     | $T_c = 25(80)^\circ\text{C}$                          | 190(135)              | A                |
| $I_{CRM}$                 | $T_c = 25(80)^\circ\text{C}$ , $t_P = 1\text{ms}$     | 380(270)              | A                |
| $V_{GES}$                 |   | $\pm 20$              | V                |
| $T_{Vj}, (T_{stg})$       | $T_{OPERATION} \leq T_{stg}$                          | $-40 \dots +150(125)$ | $^\circ\text{C}$ |
| $V_{isol}$                | AC, 1min  | 4000                  | V                |
| <b>Inverse Diode</b>      |   |                       |                  |
| $I_F = -I_C$              | $T_c = 25(80)^\circ\text{C}$                          | 130(90)               | A                |
| $I_{FRM}$                 | $T_c = 25(80)^\circ\text{C}$ , $t_P = 1\text{ms}$     | 380(270)              | A                |
| $I_{FSM}$                 | $t_P = 10\text{ms}$ ; sin.; $T_j = 150^\circ\text{C}$ | 1100                  | A                |
| <b>Freewheeling diode</b> |   |                       |                  |
| $I_F = -I_C$              | $T_c = 25(80)^\circ\text{C}$                          | 130(90)               | A                |
| $I_{FRM}$                 | $T_c = 25(80)^\circ\text{C}$ , $t_P = 1\text{ms}$     | 350(260)              | A                |
| $I_{FSM}$                 | $t_P = 10\text{ms}$ ; sin.; $T_j = 150^\circ\text{C}$ | 1100                  | A                |

# SII145S12

## SPT IGBT Modules

### Characteristics

$T_c = 25^\circ\text{C}$ , unless otherwise specified

| Symbol   | Conditions   | min. | typ.      | max.       | Units            |
|--|--|------|-----------|------------|------------------|
| <b>IGBT</b>                                      |  |      |           |            |                  |
| $V_{GE(th)}$                                     | $V_{GE} = V_{CE}, I_c = 2\text{mA}$                                      | 4.5  | 5.5       | 6.5        | V                |
| $I_{CES}$  | $V_{GE} = 0; V_{CE} = V_{CES}; T_j = 25(125)^\circ\text{C}$              |      | 0.1       | 0.3        | mA               |
| $V_{CE(TO)}$                                     | $T_j = 25(125)^\circ\text{C}$  |      | 1(0.9)    | 1.15(1.05) | V                |
| $r_{CE}$   | $V_{GE} = 15\text{V}, T_j = 25(125)^\circ\text{C}$                       |      | 9(12)     | 12(15)     | $\text{m}\Omega$ |
| $V_{CE(sat)}$                                    | $I_c = 100\text{A}; V_{GE} = 15\text{V}; \text{chip level}$              |      | 1.9(2.1)  | 2.35(2.55) | V                |
| $C_{ies}$  | under following conditions   |      | 9         |            | nF               |
| $C_{oes}$  | $V_{GE} = 0, V_{CE} = 25\text{V}, f = 1\text{MHz}$                       |      | 1         |            |                  |
| $C_{res}$  |  |      | 1         |            |                  |
| $L_{CE}$   |  |      |           | 25         | nH               |
| $R_{CC+EE}$                                      | res., terminal-chip $T_c = 25(125)^\circ\text{C}$                        |      | 0.75(1)   |            | $\text{m}\Omega$ |
| $t_{d(on)}$                                      | under following conditions:<br>$V_{CC} = 600\text{V}, I_c = 100\text{A}$ |      | 190       |            | ns               |
| $t_r$  | $R_{Gon} = R_{Goff} = 9\Omega, T_j = 125^\circ\text{C}$                  |      | 50        |            | ns               |
| $t_{d(off)}$                                     | $V_{GE} = \pm 15\text{V}$  |      | 590       |            | ns               |
| $t_f$  |  |      | 50        |            | ns               |
| $E_{on}(E_{off})$                                |  |      | 11.5(9.5) |            | mJ               |
| <b>Inverse Diode</b> under following conditions: |  |      |           |            |                  |
| $V_F = V_{EC}$                                   | $I_F = 100\text{A}; V_{GE} = 0\text{V}; T_j = 25(125)^\circ\text{C}$     |      | 2(1.8)    | 2.5        | V                |
| $V_{(TO)}$                                       | $T_j = 25(125)^\circ\text{C}$  |      | 1.1       | 1.4        | V                |
| $r_T$  | $T_j = 25(125)^\circ\text{C}$  |      | 9         | 13         | $\text{m}\Omega$ |
| $I_{RRM}$  | $I_F = 100\text{A}; T_j = 125^\circ\text{C}$                             |      | 130       |            | A                |
| $Q_{rr}$   | $di/dt = 3500\text{A/us}$  |      | 14        |            | $\mu\text{C}$    |
| $E_{rr}$   | $V_{GE} = V$   |      | 4.8       |            | mJ               |
| <b>FWD</b> under following conditions:           |  |      |           |            |                  |
| $V_F = V_{EC}$                                   | $I_F = 100\text{A}; V_{GE} = 0\text{V}; T_j = 25(125)^\circ\text{C}$     |      | 2.1(1.8)  | 2.5        | V                |
| $V_{(TO)}$                                       | $T_j = 25(125)^\circ\text{C}$  |      | 1.1       | 1.4        | V                |
| $r_T$  | $T_j = 25(125)^\circ\text{C}$  |      | 9         | 13         | $\text{m}\Omega$ |
| $I_{RRM}$  | $I_F = 100\text{A}; T_j = 25(125)^\circ\text{C}$                         |      | 130       |            | A                |
| $Q_{rr}$   | $di/dt = \text{A/us}$  |      | 14        |            | $\mu\text{C}$    |
| $E_{rr}$   | $V_{GE} = V$   |      | 4.8       |            | mJ               |
| <b>Thermal Characteristics</b>                   |  |      |           |            |                  |
| $R_{th(j-c)}$                                    | per IGBT   |      |           | 0.165      | K/W              |
| $R_{th(j-c)D}$                                   | per Inverse Diode  |      |           | 0.36       | K/W              |
| $R_{th(c-s)}$                                    | per module   |      |           | 0.05       | K/W              |
| <b>Mechanical Data</b>                           |  |      |           |            |                  |
| $M_s$  | to heatsink M6   | 3    |           | 5          | Nm               |
| $M_t$  | to terminals M5  | 2.5  |           | 5          | Nm               |
| $w$  |  |      |           | 160        | g                |