

## Resonant Switching Series

## Maximum Ratings

For optimum lifetime and reliability, Infineon recommends operating conditions that do not exceed 80% of the maximum ratings stated in this datasheet.

| Parameter  | Symbol      | Value                | Unit             |
|--|-------------|----------------------|------------------|
| Collector-emitter voltage  | $V_{CE}$    | 1200                 | V                |
| DC collector current, limited by $T_{vjmax}$<br>$T_c = 25^\circ\text{C}$<br>$T_c = 100^\circ\text{C}$  | $I_C$       | 30.0<br>15.0         | A                |
| Pulsed collector current, $t_p$ limited by $T_{vjmax}$   | $I_{Cpuls}$ | 45.0                 | A                |
| Turn off safe operating area $V_{CE} \leq 1200\text{V}$ , $T_{vj} \leq 175^\circ\text{C}$              | -           | 45.0                 | A                |
| Diode forward current, limited by $T_{vjmax}$<br>$T_c = 25^\circ\text{C}$<br>$T_c = 100^\circ\text{C}$ | $I_F$       | 30.0<br>15.0         | A                |
| Diode pulsed current, $t_p$ limited by $T_{vjmax}$   | $I_{Fpuls}$ | 45.0                 | A                |
| Gate-emitter voltage<br>Transient Gate-emitter voltage ( $t_p \leq 10\mu\text{s}$ , $D < 0.010$ )      | $V_{GE}$    | $\pm 20$<br>$\pm 25$ | V                |
| Power dissipation $T_c = 25^\circ\text{C}$<br>Power dissipation $T_c = 100^\circ\text{C}$              | $P_{tot}$   | 254.0<br>127.0       | W                |
| Operating junction temperature   | $T_{vj}$    | -40...+175           | $^\circ\text{C}$ |
| Storage temperature  | $T_{stg}$   | -55...+175           | $^\circ\text{C}$ |
| Soldering temperature,<br>wave soldering 1.6mm (0.063in.) from case for 10s                            |             | 260                  | $^\circ\text{C}$ |
| Mounting torque, M3 screw<br>Maximum of mounting processes: 3  | $M$         | 0.6                  | Nm               |

## Thermal Resistance

| Parameter                                    | Symbol        | Conditions | Value |      |      | Unit |
|--|---------------|------------|-------|------|------|------|
|  |               |            | min.  | typ. | max. |      |
| <b><math>R_{th}</math> Characteristics</b>   |               |            |       |      |      |      |
| IGBT thermal resistance,<br>junction - case  | $R_{th(j-c)}$ |            | -     | -    | 0.59 | K/W  |
| Diode thermal resistance,<br>junction - case | $R_{th(j-c)}$ |            | -     | -    | 0.59 | K/W  |
| Thermal resistance<br>junction - ambient     | $R_{th(j-a)}$ |            | -     | -    | 40   | K/W  |

## Resonant Switching Series

Electrical Characteristic, at  $T_{vj} = 25^{\circ}\text{C}$ , unless otherwise specified

| Parameter                            | Symbol        | Conditions                                  | Value |      |      | Unit          |
|--------------------------------------|---------------|---|-------|------|------|---------------|
|                                      |               |   | min.  | typ. | max. |               |
| <b>Static Characteristic</b>         |               |   |       |      |      |               |
| Collector-emitter breakdown voltage  | $V_{(BR)CES}$ | $V_{GE} = 0\text{V}, I_C = 0.50\text{mA}$   | 1200  | -    | -    | V             |
| Collector-emitter saturation voltage | $V_{CESat}$   | $V_{GE} = 15.0\text{V}, I_C = 15.0\text{A}$ | -     | 1.48 | 1.70 | V             |
|                                      |               | $T_{vj} = 25^{\circ}\text{C}$               | -     | 1.70 | -    |               |
|                                      |               | $T_{vj} = 125^{\circ}\text{C}$              | -     | 1.80 | -    |               |
| Diode forward voltage                | $V_F$         | $V_{GE} = 0\text{V}, I_F = 15.0\text{A}$    | -     | 1.55 | 1.75 | V             |
|                                      |               | $T_{vj} = 25^{\circ}\text{C}$               | -     | 1.70 | -    |               |
|                                      |               | $T_{vj} = 125^{\circ}\text{C}$              | -     | 1.80 | -    |               |
| Gate-emitter threshold voltage       | $V_{GE(th)}$  | $I_C = 0.40\text{mA}, V_{CE} = V_{GE}$      | 5.1   | 5.8  | 6.4  | V             |
| Zero gate voltage collector current  | $I_{CES}$     | $V_{CE} = 1200\text{V}, V_{GE} = 0\text{V}$ | -     | -    | 100  | $\mu\text{A}$ |
|                                      |               | $T_{vj} = 25^{\circ}\text{C}$               | -     | -    | 2500 |               |
| Gate-emitter leakage current         | $I_{GES}$     | $V_{CE} = 0\text{V}, V_{GE} = 20\text{V}$   | -     | -    | 100  | nA            |
|                                      |               | $T_{vj} = 175^{\circ}\text{C}$              | -     | -    | 100  |               |
| Transconductance                     | $g_{fs}$      | $V_{CE} = 20\text{V}, I_C = 15.0\text{A}$   | -     | 13.9 | -    | S             |
| Integrated gate resistor             | $r_G$         |   |       | none |      | $\Omega$      |

Electrical Characteristic, at  $T_{vj} = 25^{\circ}\text{C}$ , unless otherwise specified

| Parameter  | Symbol    | Conditions  | Value |       |      | Unit |
|--|-----------|---|-------|-------|------|------|
|  |           |   | min.  | typ.  | max. |      |
| <b>Dynamic Characteristic</b>                                  |           |   |       |       |      |      |
| Input capacitance  | $C_{ies}$ | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$      | -     | 1165  | -    | pF   |
| Output capacitance   | $C_{oes}$ |   | -     | 40    | -    |      |
| Reverse transfer capacitance                                   | $C_{res}$ |   | -     | 32    | -    |      |
| Gate charge  | $Q_G$     | $V_{CC} = 960\text{V}, I_C = 15.0\text{A}, V_{GE} = 15\text{V}$ | -     | 165.0 | -    | nC   |
| Internal emitter inductance measured 5mm (0.197 in.) from case | $L_E$     |   | -     | 13.0  | -    | nH   |

## Switching Characteristic, Inductive Load

| Parameter   | Symbol       | Conditions   | Value |      |      | Unit |
|---|--------------|--|-------|------|------|------|
|   |              |  | min.  | typ. | max. |      |
| <b>IGBT Characteristic, at <math>T_{vj} = 25^{\circ}\text{C}</math></b> |              |  |       |      |      |      |
| Turn-off delay time   | $t_{d(off)}$ | $T_{vj} = 25^{\circ}\text{C}, V_{CC} = 600\text{V}, I_C = 15.0\text{A}, V_{GE} = 0.0/15.0\text{V}, R_{G(on)} = 14.6\Omega, R_{G(off)} = 14.6\Omega, L_{\sigma} = 180\text{nH}, C_{\sigma} = 39\text{pF}$<br>$L_{\sigma}, C_{\sigma}$ from Fig. E<br>Energy losses include "tail" and diode reverse recovery. | -     | 300  | -    | ns   |
| Fall time   | $t_f$        |  | -     | 46   | -    | ns   |
| Turn-off energy   | $E_{off}$    |  | -     | 0.70 | -    | mJ   |