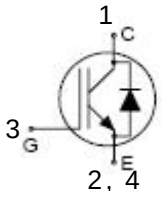
## PRELIMINARY DATASHEET

**IGBT in Trench & Field Stop technology with soft, fast recovery anti-parallel diode, in Isolated SOT227 Package**

- High switching speed
- Low $V_{CE(sat)}$
- Short circuit withstand time – 5 us
- Designed for frequency converters and UPS
- Very tight parameter distribution
- High ruggedness, temperature stability
  - parallel switching capability
- Very soft, fast recovery anti-parallel diode
- Pb-free lead finish; RoHS compliant





**MAXIMUM RATINGS,** at $T_j$ = 25°C, unless otherwise specified

| Parameter | Symbol | Value | Units |
|---|---|---|---|
| Collector-emitter voltage | $V_{CE}$ | 600 | V |
| DC collector current, limited by $T_{jmax}$<br>$T_C$= 25°C<br>$T_C$= 80°C | $I_C$ | <br>150<br>75 | A |
| Pulsed collector current, $t_p$ limited by $T_{jmax}$ | $I_{Cpulse}$ | 225 | |
| Turn off safe operating area<br>$V_{CE} \leq 600V$, $T_j \leq 150°C$ | - | 225 | |
| Diode forward current<br>$T_C$= 25°C<br>$T_C$= 80°C | $I_F$ | <br>120<br>75 | |
| Diode pulsed current, $t_p$ limited by $T_{jmax}$ | $I_{Fpulse}$ | 225 | |
| Gate-emitter voltage | $V_{GE}$ | ± 20 | V |
| Short circuit withstand time[1]<br>$V_{GE}$ = 15V, $V_{CC} \leq 400V$, $T_j \leq 150°C$ | $t_{SC}$ | 5 | µs |
| Soldering temperature<br>Wave soldering, 1.6 mm (0.063 in.) from case for 10s | $T_S$ | 260 | °C |
| Operating junction and storage temperature | $T_j$, $T_{stg}$ | -55… +175 | °C |

### Thermal and Isolation Characteristics

| Parameter | Symbol | Max. Value | Units |
|---|---|---|---|
| **Characteristics** | | | |
| IGBT thermal resistance, junction to case | $R_{thJC}$ | 0.46 | K/W |
| Diode thermal resistance, junction to case | $R_{thJCD}$ | 0.78 | |
| Thermal resistance, junction to ambient | $R_{thJA}$ | 40 | |
| Isolation voltage, RMS (measured between terminals and mounting base, 50-60 Hz, for 1-3 seconds) | $V_{iso}$ | 3000 | V |

[1] *Allowed number of short circuits: < 1000; time between short circuits: > 1s.*

CAUTION: These devices are ESD sensitive. Use proper handling procedure.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**ELECTRICAL CHARACTERISTICS,** at $T_j$ = 25°C, unless otherwise specified

| Parameter | Symbol | Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| **Static Characteristics** | | | | | | |
| Collector-emitter breakdown voltage | $V_{(BR)CES}$ | $V_{GE}$ = 0V, $I_C$ = 0.2mA | 600 | - | - | V |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $V_{GE}$ = 15V, $I_C$ = 75A<br>$T_j$ = 25°C<br>$T_j$ = 175°C | -<br>- | 1.5<br>1.9 | 2.0<br>- | |
| Diode forward voltage | $V_F$ | $V_{GE}$ = 0V, $I_F$ = 75A<br>$T_j$ = 25°C<br>$T_j$ = 175°C | -<br>- | 1.65<br>1.6 | 2.0<br>- | |
| Gate-emitter threshold voltage | $V_{GE(th)}$ | $I_C$ = 1.2mA, $V_{CE}$ = $V_{GE}$ | 4.1 | 4.9 | 5.7 | |
| Zero gate voltage collector current | $I_{CES}$ | $V_{CE}$ = 600V, $V_{GE}$ = 0<br>$T_j$ = 25°C<br>$T_j$ = 150°C | -<br>- | -<br>- | 40<br>1000 | µA |
| Gate-emitter leakage current | $I_{GES}$ | $V_{CE}$ = 0V, $V_{GE}$ = 20V | - | - | 100 | nA |
| Transconductance | $g_{fs}$ | $V_{CE}$ = 20V, $I_C$ = 75A | - | 41 | - | S |
| **Dynamic Characteristics** | | | | | | |
| Input capacitance | $C_{iss}$ | $V_{CE}$ = 25V,<br>$V_{GE}$ = 0V,<br>f = 1MHz | - | 4620 | - | pF |
| Output capacitance | $C_{oss}$ | | - | 288 | - | |
| Reverse transfer capacitance | $C_{rss}$ | | - | 137 | - | |
| Gate charge | $Q_{Gate}$ | $V_{CC}$ = 480V, $I_C$ = 75A<br>$V_{GE}$ = 15V | - | 470 | - | nC |
| Internal emitter inductance measured 5mm (0,197 in.) from case | $L_E$ | | - | 13 | - | nH |
| Short circuit collector current[1] | $I_{C(SC)}$ | $V_{GE}$ = 15V, $t_{SC}$ ≤ 5 µS<br>$V_{CC}$ ≤ 600V,<br>$T_j$ = 150°C | - | 690 | - | A |

**SWITCHING CHARACTERISTICS, Inductive Load** at $T_j$ = 25°C

| Parameter | Symbol | Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| **IGBT Characteristics** | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | $T_j$ = 25°C,<br>$V_{CC}$=400V, $I_C$=75A,<br>$V_{GE}$=0/15V,<br>$R_G$=5Ω,<br>$L_\sigma$[2] = 100nH,<br>$C_\sigma$[2] = 39pF<br>Energy losses include tail and diode reverse recovery. | - | 33 | - | ns |
| Rise time | $t_r$ | | - | 36 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 330 | - | |
| Fall time | $t_f$ | | - | 35 | - | |
| Turn-on energy | $E_{on}$ | | - | 2.0 | - | mJ |
| Turn-off energy | $E_{off}$ | | - | 2.5 | - | |
| Total switching energy | $E_{ts}$ | | - | 4.5 | - | |
| **Anti-Parallel Diode Characteristics** | | | | | | |
| Diode reverse recovery time | $t_{rr}$ | $T_j$ = 25°C,<br>$V_R$=300V, $I_F$=75A,<br>$di_F/dt$ = 200A/ µS | - | 264 | - | ns |
| Diode reverse recovery charge | $Q_{rr}$ | | - | 908 | - | nC |
| Diode peak reverse recovery current | $I_{rrm}$ | | - | 8.3 | - | A |

1 *Allowed number of short circuits: < 1000; time between short circuits: > 1s.*
2 *Leakage inductance Lσ and Stray capacity Cσ due to dynamic test circuit.*



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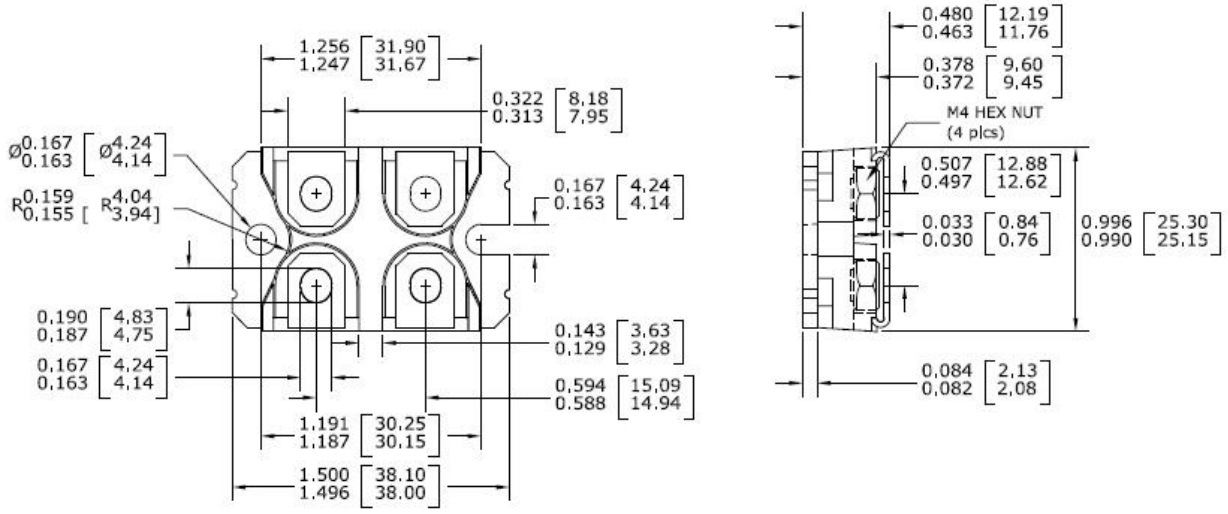
**Package Outline Drawing**

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## Disclaimer

These specifications may not be considered as a guarantee of components characteristics. Components have to be tested depending on intended application as adjustments may be necessary. The use of **iQXPRZ Power Inc.** components in life support appliances and systems are subject to written approval of **iQXPRZ Power Inc.**



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