



4. Electrical Ratings

Table 1: Absolute maximum ratings

| Symbol | Parameter | Value | Unit |
|------------|---|------------|------|
| V_{DS} | Drain-source voltage | 1200 | V |
| V_{GS} | Gate-source voltage | -10 / 22 | V |
| | Gate-source voltage (recommended operating values) | -3 / 18 | |
| I_D | Drain current (continuous) at $T_C = 25\text{ °C}$ | 400 | A |
| | Drain current (continuous) at $T_C = 100\text{ °C}$ | 284 | |
| I_{DM}^* | Drain current (pulsed) | 1188 | A |
| P_{TOT} | Total power dissipation at $T_C = 25\text{ °C}$ | 1764 | W |
| T_{stg} | Storage temperature range | -40 to 125 | °C |
| T_J | Operating junction temperature range | -40 to 175 | |

* Pulse width is limited by safe operating area.

Table 2: Thermal data

| Symbol | Parameter | Value | Unit |
|------------|--------------------------------------|--------|------|
| R_{thJC} | Thermal resistance, junction-to-case | 0.15 | K/W |
| R_{thCH} | Thermal resistance, case-to-heatsink | t.b.d. | K/W |



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| Table 3: Insulation coordination | | | | |
|----------------------------------|----------------------------|------------------------------|-------------|---------------|
| Symbol | Parameter | Test conditions | Value | Unit |
| V_{ISOL} | Isolation test voltage | AC RMS, f = 50 Hz, t = 1 min | 2.5 | kV |
| | Baseplate | Copper | 3 | mm |
| | Internal isolation | IMS Insulation sheet | 110 | μm |
| d_{Creep} | Creepage distance | Terminal to heatsink | 14.5 | mm |
| d_{Creep} | Creepage distance | Terminal to terminal | 13.0 | mm |
| d_{Clear} | Clearance | Terminal to heatsink | 12.5 | mm |
| d_{Clear} | Clearance | Terminal to terminal | 10 | mm |
| CTI | Comparative Tracking Index | IEC 60112 | >600 | V |
| | Case | | PBT (UL-V0) | |

| Table 4: Characteristic values | | | | | | |
|--------------------------------|-----------------------------------|----------------------------------|------|--------|------|------------|
| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
| L_{sDS} | Module stray inductance | | | 14 | | nH |
| $R_{DD'+SS'}$ | Internal lead resistance | $T_c = 25\text{ }^\circ\text{C}$ | | t.b.d. | | m Ω |
| R_{25} | NTC Temperature sensor resistance | $T_c = 25\text{ }^\circ\text{C}$ | | 4.7 | | k Ω |
| $B_{25/50}$ | NTC Temperature sensor B value | | | 3590 | | K |
| $B_{25/85}$ | NTC Temperature sensor B value | | | 3635 | | K |
| $B_{25/100}$ | NTC Temperature sensor B value | | | 3650 | | K |
| M | Mounting torque | M6 screw Main Terminals | 3 | | 6 | Nm |
| M | Mounting torque | M5 screw mounting to heatsink | 3 | | 5 | Nm |
| G | Weight | | | 375 | | g |



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Table 5: On/off states (chip level)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|---------------|-----------------------------------|--|------|------|---------|---------------|
| $V_{(BR)DSS}$ | Drain-source breakdown voltage | $V_{GS} = 0 \text{ V}, I_D = 1 \text{ mA}$ | 1200 | | | V |
| I_{DSS} | Zero gate voltage drain current | $V_{GS} = 0 \text{ V}, V_{DS} = 1200 \text{ V}$ | | | 100 | μA |
| I_{GSS} | Gate-body leakage current | $V_{DS} = 0 \text{ V}, V_{GS} = +22/-10 \text{ V}$ | | | ± 1 | μA |
| $V_{GS(th)}$ | Gate threshold voltage | $V_{DS} = V_{GS}, I_D = 80 \text{ mA}$ | 2.04 | 2.72 | 4.4 | V |
| $R_{DS(on)}$ | Static drain-source on-resistance | | | | | m Ω |
| | | $V_{GS} = 18 \text{ V}, I_D = 160 \text{ A}$ | | 5.5 | 7.5 | |
| | | $V_{GS} = 18 \text{ V}, I_D = 160 \text{ A}, T_J = 175 \text{ }^\circ\text{C}$ | | 10.9 | | |

Table 6: Dynamic (chip level)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-----------|--------------------------------|---|------|------|------|----------|
| C_{iss} | Input capacitance | $V_{DS} = 800 \text{ V}, f = 1 \text{ MHz}, V_{GS} = 0 \text{ V}$ | | 13 | | nF |
| C_{oss} | Output capacitance | | | 584 | | pF |
| C_{rss} | Reverse transfer capacitance | | | 56 | | pF |
| Q_g | Total gate charge | $V_{DS} = 800 \text{ V}, V_{GS} = -5 \text{ to } 18 \text{ V}, I_D = 240 \text{ A}$ | | 568 | | nC |
| Q_{gs} | Gate-source charge | | | 64 | | nC |
| Q_{gd} | Gate-drain charge | | | 152 | | nC |
| R_g | Internal Gate input resistance | $f = 1 \text{ MHz}, I_D = 0 \text{ A}$, included internal gate PCB | | 1.5 | | Ω |

Table 7: Switching energy (inductive load) (chip level)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-----------|---------------------------|---|------|------|------|---------------|
| E_{on} | Turn-on switching energy | $V_{DD} = 800 \text{ V}, I_D = 160 \text{ A}$, | | 1940 | | μJ |
| E_{off} | Turn-off switching energy | $R_G = 4.5 \text{ } \Omega, V_{GS} = -3 \text{ V to } 18 \text{ V}$ | | 880 | | μJ |



Table 8: Switching times (chip level)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------|--|------|------|------|------|
| $t_{d(on)}$ | Turn-on delay time | $V_{DD} = 800\text{ V}, I_D = 160\text{ A},$ $R_G = 4.5\ \Omega, V_{GS} = -3 / 18\text{ V}$ | | 18 | | ns |
| t_r | Rise time | | | 24 | | ns |
| $t_{d(off)}$ | Turn-off delay time | | | 47 | | ns |
| t_f | Fall time | | | 14 | | ns |

Table 9: Reverse SiC diode characteristics (chip level)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit | |
|-----------|---|---|------|------|------|------|---------------|
| I_{SD*} | Continuous diode forward current | $V_{GS} = -3\text{ V}, T_C = 25\text{ }^\circ\text{C}$ | | | 356 | A | |
| I_{SDM} | Pulsed Source-Drain Diode Forward Current | $V_{GS} = -3\text{ V}, T_C = 25\text{ }^\circ\text{C}$ | | | 1188 | A | |
| V_{SD} | Diode forward voltage | $I_{SD} = 160\text{ A}, V_{GS} = -3\text{ V}$ | | 4.5 | | V | |
| t_{rr} | Reverse recovery time | $I_{SD} = 160\text{ A},$ $di/dt = 1000\text{ A}/\mu\text{s},$ $V_{DD} = 800\text{ V}, V_{GS} = -3\text{ V}$ | | 23 | | ns | |
| E_{REC} | Reverse recovery charge | | | | 20 | | μJ |
| I_{RRM} | Reverse recovery current | | | | 52 | | A |

* I_{SD} is limited by package.



7. Package Outlines

