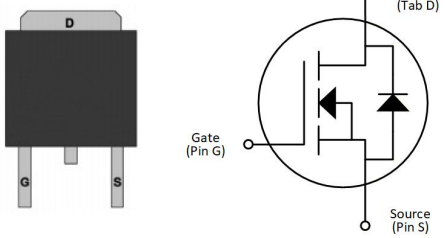
# 800V G2 Silicon Carbide Power MOSFET

## N-Channel Enhancement Mode

| | | |
|---|---|---|
| $V_{DS}$ | = | 800V |
| $R_{DS(ON)}$ | = | 380mΩ |
| $I_{D(MAX)@25^{\circ}C}$ | = | 9.7A |

## Features

- High blocking voltage with low on-resistance
- High speed switching with low capacitances
- Very low switching losses
- Avalanche ruggedness
- Temperature independent turn-off switching losses
- Integrated lumped gate resistance
- Robust against parasitic turn-on even at 0V turn-off gate voltage




## Benefits

- Higher system efficiency
- Reduce cooling requirements
- Increase power density
- Increase system switching frequency

## Applications

- PD Charger
- High voltage DC/DC converters
- Switch mode power supplies
- EV battery chargers
- PV inverters

| Part number | Package Type |
|---|---|
| CC3M38080E | TO-252-3L |

## Maximum Ratings ($T_C$=25˚C unless otherwise specified)

| Symbol | Parameter | Value | Unit | Test Conditions |
|---|---|---|---|---|
| $V_{DSmax}$ | Drain - Source Voltage | 800 | V | $V_{GS}$ = 0V, $I_D$ = 100μA |
| $V_{GSmax}$ | Gate - Source Voltage | -10 /+22 | V | Absolute maximum values |
| $V_{GSop}$ | Gate - Source Voltage | -5 /+18 | V | Recommended operational values |
| $I_D$ | Continuous Drain Current | 9.7 | A | $V_{GS}$ = 18V, $T_C$ = 25˚C |
| | | 6.9 | | $V_{GS}$ = 18V, $T_C$ = 100˚C |
| $I_{D(pluse)}$ | Pulsed Drain Current | 20 | A | Pulse width $t_P$ limited by $T_{j,max}$ |
| $P_D$ | Power Dissipation | 47 | W | $T_C$ = 25˚C, $T_J$ = 175˚C |
| $T_J$, $T_{stg}$ | Operating Junction and Storage Temperature | -55 to +175 | ˚C | / |
| $T_L$ | Soldering Temperature | 260 | ˚C | 1.6mm (0.063”) from case for 10s |

## Electrical Characteristics ($T_C$ = 25˚C unless otherwise specified)

| Symbol | Parameter | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | 800 | - | - | V | $V_{GS}$ = 0V, $I_D$ = 100μA |
| $V_{GS(th)}$ | Gate Threshold Voltage | 2.0 | 3.0 | 4.0 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 2mA |
| | | - | 2.1 | - | | $V_{DS}$ = $V_{GS}$, $I_D$ = 2mA<br>$T_J$ = 175˚C |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | - | 1 | 10 | μA | $V_{DS}$ = 800V, $V_{GS}$ = 0V |
| $I_{GSS}$ | Gate-Source Leakage Current | - | - | 200 | nA | $V_{GS}$ = 22V, $V_{DS}$ = 0V |
| | | -200 | - | - | nA | $V_{GS}$ = -10V, $V_{DS}$ = 0V |
| $R_{DS(on)}$ | Drain-Source On-State Resistance | - | 380 | 475 | mΩ | $V_{GS}$ = 18V, $I_D$ = 4A |
| | | - | 450 | - | | $V_{GS}$ = 18V, $I_D$ = 4A<br>$T_J$ = 175˚C |
| $g_{fs}$ | Transconductance | - | 6 | - | S | $V_{DS}$ = 20V, $I_D$ = 4A |
| | | - | - | - | | $V_{DS}$ = 20V, $I_D$ = 4A<br>$T_J$ = 175˚C |
| $C_{iss}$ | Input Capacitance | - | 193 | - | pF | $V_{DS}$ = 400V<br>$V_{GS}$ = 0V<br>f = 1MHz, $V_{AC}$=25mV |
| $C_{oss}$ | Output Capacitance | - | 16 | - | | |
| $C_{rss}$ | Reverse Transfer Capacitance | - | 2.2 | - | | |
| $E_{oss}$ | $C_{oss}$ Stored Energy | - | 2.6 | - | μJ | |
| $E_{ON}$ | Turn-On Switching Energy | - | 21 | - | μJ | $V_{DS}$ = 400V<br>$V_{GS}$ = -5/+18V, $I_D$ = 4A<br>$R_G$ = 2.5Ω |
| $E_{OFF}$ | Turn-Off Switching Energy | - | 6 | - | | |
| $t_{d(on)}$ | Turn-On Delay Time | - | 3 | - | ns | |
| $t_r$ | Rise Time | - | 6 | - | | |
| $t_{d(off)}$ | Turn-Off Delay Time | - | 5 | - | | |
| $t_f$ | Fall Time | - | 10 | - | | |
| $R_{g(int)}$ | Internal Gate Resistance | - | 13 | - | Ω | $V_{AC}$=25mV, f = 1MHz |
| $Q_{gs}$ | Gate to Source Charge | - | 3 | - | nC | $V_{DS}$ = 400V<br>$V_{GS}$ = -5/+18V, $I_D$ = 4A |
| $Q_{gd}$ | Gate to Drain Charge | - | 5 | - | | |
| $Q_g$ | Total Gate Charge | - | 10 | - | | |

## Reverse Diode Characteristics ($T_C$ = 25˚C unless otherwise specified)

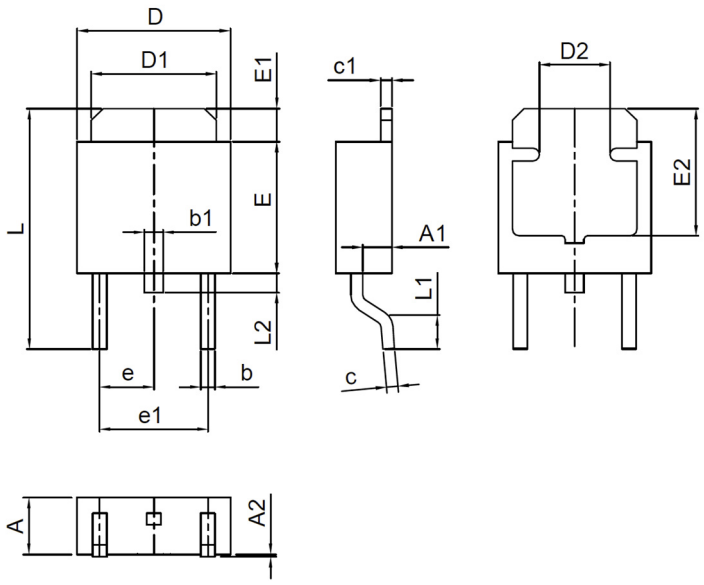
| Symbol | Parameter | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|
| $V_{SD}$ | Diode Forward Voltage | 4.0 | - | V | $V_{GS}$ = -5V, $I_{SD}$ = 2A |
| | | 3.7 | - | | $V_{GS}$ = -5V, $I_{SD}$ = 2A<br>$T_J$ = 175˚C |
| $I_{SD}$ | Continuous Diode Forward Current | - | 9 | A | $V_{GS}$ = -5V |
| | | - | 5 | | $V_{GS}$ = -5V, $T_C$ = 100˚C |
| $t_{rr}$ | Reverse Recover Time | 8 | - | ns | $V_{DD}$ = 400V, $V_{GS}$ = -5V<br>$I_{SD}$ = 4A<br>di/dt = 1000A/μs |
| $Q_{rr}$ | Reverse Recovery Charge | 41 | - | nC | |
| $I_{rrm}$ | Peak Reverse Recovery Current | 6 | - | A | |

## Thermal/Package Characteristics

| Symbol | Parameter | Typ. | Unit |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 3.2 | ˚C/W |

## Product Dimensions

## TO-252-3L Package Outline




| Dim | Millimeter | | Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 2.20 | 2.50 | 0.087 | 0.094 |
| A1 | 1.00 | 1.40 | 0.039 | 0.055 |
| A2 | 0.00 | 0.15 | 0.000 | 0.006 |
| b | 0.50 | 0.70 | 0.020 | 0.028 |
| b1 | 0.70 | 0.90 | 0.028 | 0.035 |
| c | 0.40 | 0.60 | 0.016 | 0.024 |
| c1 | 0.40 | 0.60 | 0.016 | 0.024 |
| D | 6.20 | 6.70 | 0.244 | 0.264 |
| D1 | 5.10 | 5.50 | 0.201 | 0.217 |
| D2 | 2.70 | 3.20 | 0.106 | 0.126 |
| E | 5.20 | 5.80 | 0.205 | 0.228 |
| E1 | 1.20 | 1.60 | 0.047 | 0.063 |
| E2 | 5.00 | 5.60 | 0.197 | 0.220 |
| e | 2.20 | 2.40 | 0.087 | 0.094 |
| e1 | 4.40 | 4.80 | 0.173 | 0.189 |
| L | 9.70 | 10.40 | 0.382 | 0.409 |
| L1 | 1.40 | 1.70 | 0.055 | 0.063 |
| L2 | 0.60 | 1.20 | 0.024 | 0.047 |

## Revision History

| Document Version | Date of Release | Brief Summary |
|---|---|---|
| Rev.0.1 | 2026-04-25 | Draft. |
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