CLASSIC CHIP

# CC3M10080K

750V G1 Silicon Carbide Power

MOSFET N-Channel Enhancement Mode

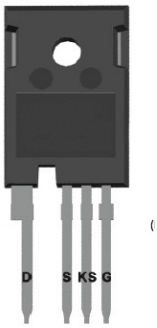
$V_{DS}$ = 800V

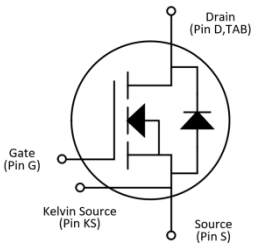
$R_{DS(ON)}$ = 95mΩ

$I_{D(MAX)@25^{\circ}C}$ = 29A

## 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
- Halogen free, RoHS compliant




## Benefits

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

## Applications

- Battery chargers
- DC/DC converters
- Switch mode power supplies
- Power delivery
- PV inverters

| Part number | Package Type |
|---|---|
| CC3M10080K | TO-247-4L |

## 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 | 29 | A | $V_{GS}$ = 18V, $T_C$ = 25˚C |
| | | 20 | | $V_{GS}$ = 18V, $T_C$ = 100˚C |
| $I_{D(pluse)}$ | Pulsed Drain Current | 78 | A | Pulse width $t_P$ limited by $T_{j,max}$ |
| $P_D$ | Power Dissipation | 131 | 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 | 2.2 | 3.2 | 4.2 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 5mA |
| | | - | 2.3 | - | | $V_{DS}$ = $V_{GS}$, $I_D$ = 5mA<br>$T_J$ = 175˚C |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | - | 1 | 50 | μA | $V_{DS}$ = 750V, $V_{GS}$ = 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 | - | 95 | 115 | mΩ | $V_{GS}$ = 18V, $I_D$ = 15A |
| | | - | 130 | - | | $V_{GS}$ = 18V, $I_D$ = 15A<br>$T_J$ = 175˚C |
| $C_{iss}$ | Input Capacitance | - | 760 | - | pF | $V_{DS}$ = 400V, $V_{GS}$ = 0V<br>$V_{AC}$=25mV<br>f = 1MHz |
| $C_{oss}$ | Output Capacitance | - | 46 | - | | |
| $C_{rss}$ | Reverse Transfer Capacitance | - | 3 | - | | |
| $E_{ON}$ | Turn-On Switching Energy | - | 30 | - | μJ | $V_{DS}$ = 400V, $V_{GS}$ = -5/+18V<br>$I_D$ = 15A, $R_G$ = 5.1Ω |
| $E_{OFF}$ | Turn-Off Switching Energy | - | 28 | - | | |
| $t_{d(on)}$ | Turn-On Delay Time | - | 5 | - | ns | |
| $t_r$ | Rise Time | - | 10 | - | | |
| $t_{d(off)}$ | Turn-Off Delay Time | - | 18 | - | | |
| $t_f$ | Fall Time | - | 6 | - | | |
| $R_{g(int)}$ | Internal Gate Resistance | - | 16 | - | Ω | $V_{AC}$=25mV, f = 1MHz |
| $Q_{gs}$ | Gate to Source Charge | - | 13 | - | nC | $V_{DS}$ = 400V, $V_{GS}$ = -5/+18V<br>$I_D$ = 15A |
| $Q_{gd}$ | Gate to Drain Charge | - | 4 | - | | |
| $Q_g$ | Total Gate Charge | - | 32 | - | | |

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

| Symbol | Parameter | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|
| $V_{SD}$ | Diode Forward Voltage | 4.2 | - | V | $V_{GS}$ = -5V, $I_{SD}$ = 7.5A |
| | | 3.8 | - | | $V_{GS}$ = -5V, $I_{SD}$ = 7.5A<br>$T_J$ = 175˚C |
| $I_{SD}$ | Continuous Diode Forward Current | - | 26 | A | $V_{GS}$ = -5V |
| | | - | 15 | | $V_{GS}$ = -5V, $T_C$ = 100˚C |
| $t_{rr}$ | Reverse Recover Time | 12 | - | ns | $V_{DD}$ = 400V, $I_{SD}$ = 15A<br>di/dt = 1000A/μs,$V_{GS}$ = -5V |
| $Q_{rr}$ | Reverse Recovery Charge | 50 | - | nC | |
| $I_{rrm}$ | Peak Reverse Recovery Current | 7 | - | A | |

## Thermal/Package Characteristics

| Symbol | Parameter | Typ. | Unit |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 1.14 | ˚C/W |

## Typical Performance

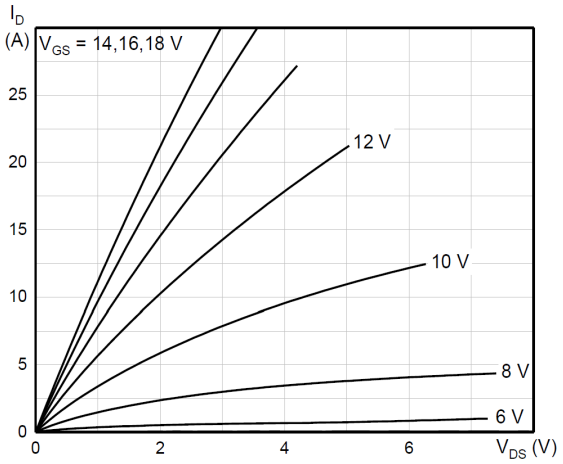



Figure 1. Output Characteristics $T_J$=25℃

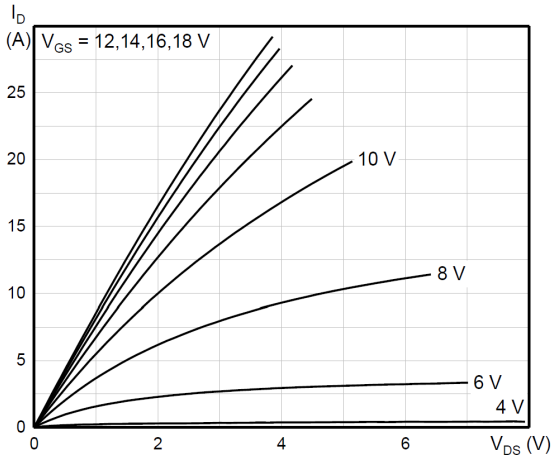



Figure 2. Output Characteristics $T_J$=175℃

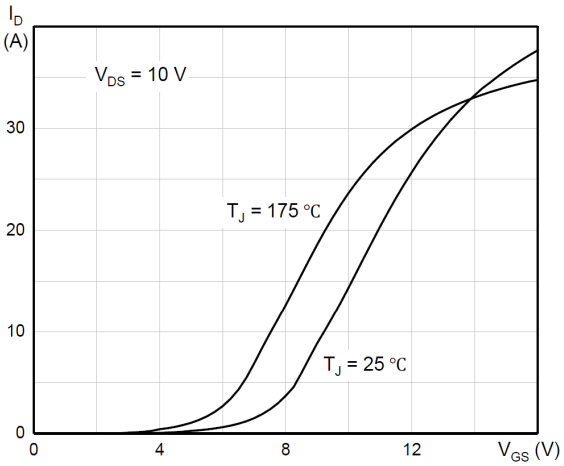



Figure 3. Transfer Characteristic for Various Junction Temperature

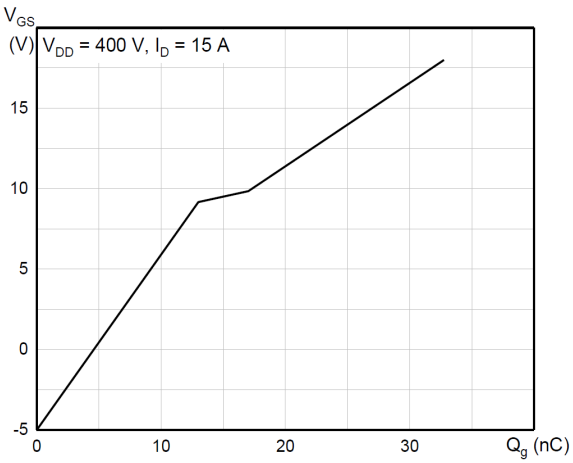



Figure 4. Gate Charge Characteristic

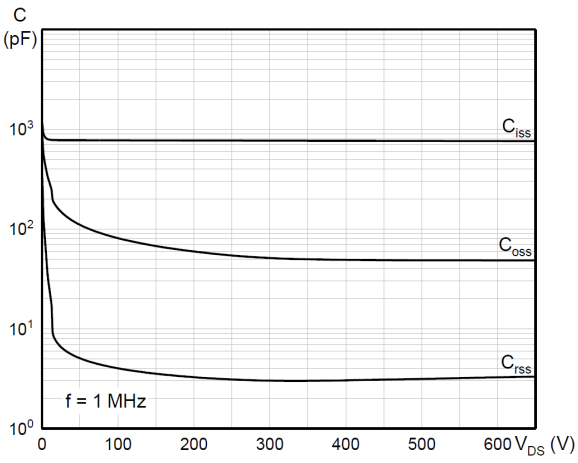



Figure 5. Capacitances vs. Drain to Source Voltage

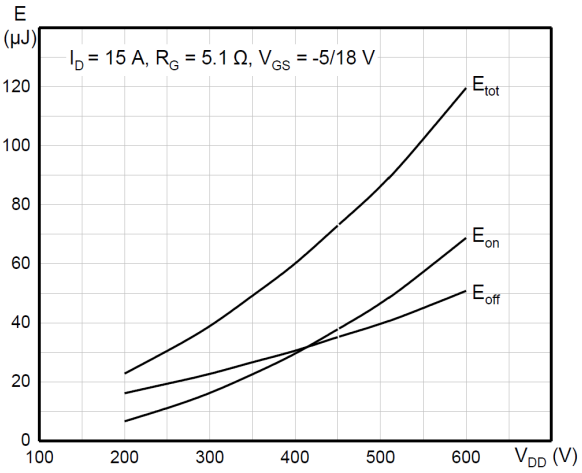



Figure 6. Clamped Inductive Switching Energy vs. Supply Voltage

## Typical Performance

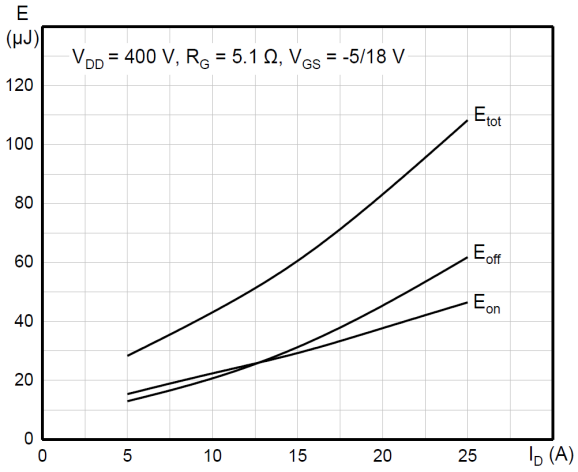



Figure 7. Clamped Inductive Switching Energy vs. Drain Current

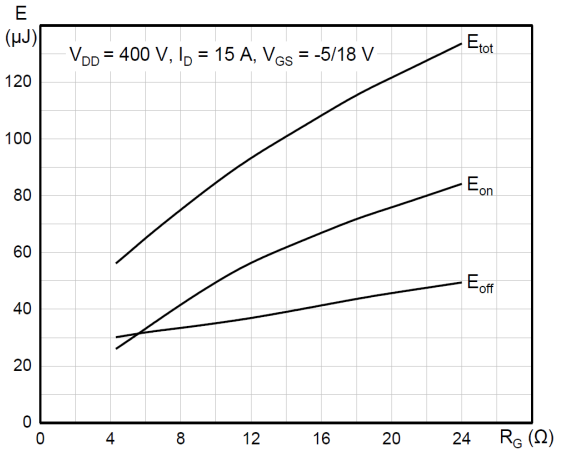



Figure 8. Clamped Inductive Switching Energy vs. $R_{G(ext)}$

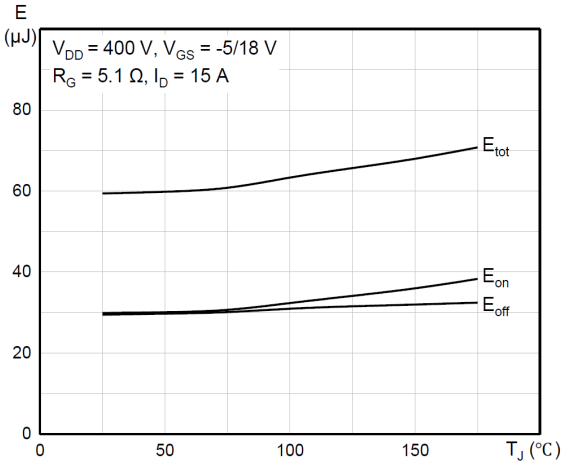



Figure 9. Clamped Inductive Switching Energy vs. Temperature

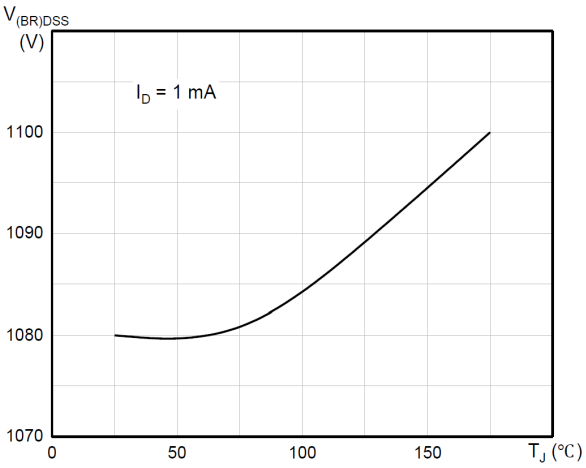



Figure 10. Breakdown Voltage vs. Temperature

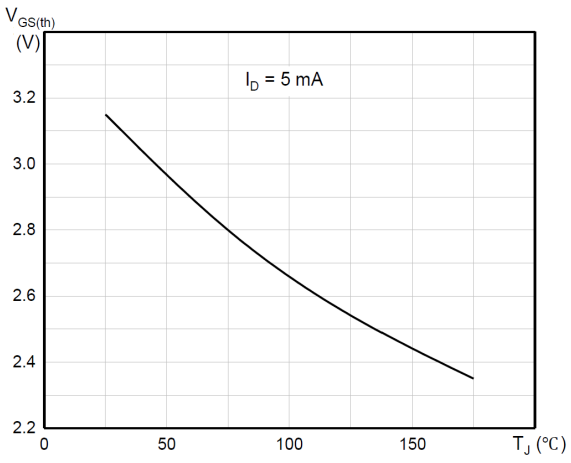



Figure 11. Threshold Voltage vs. Temperature

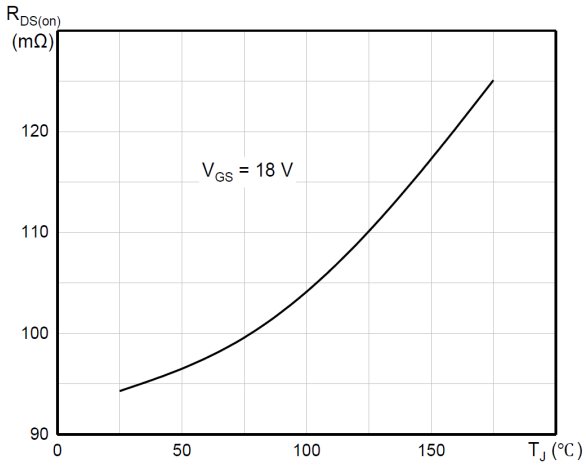



Figure 12. On Resistance vs. Temperature

## Typical Performance

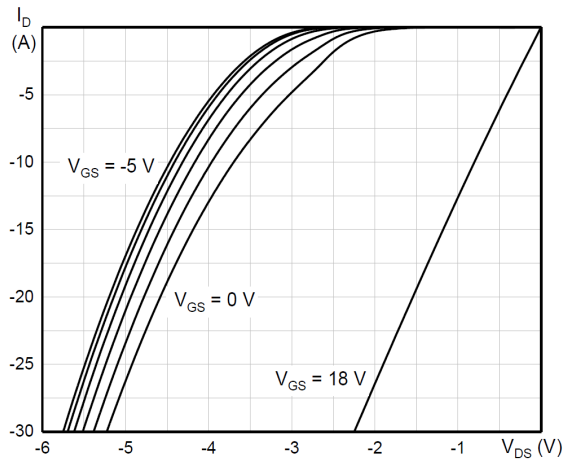



Figure 13. Body Diode Characteristic at $T_J$=25℃

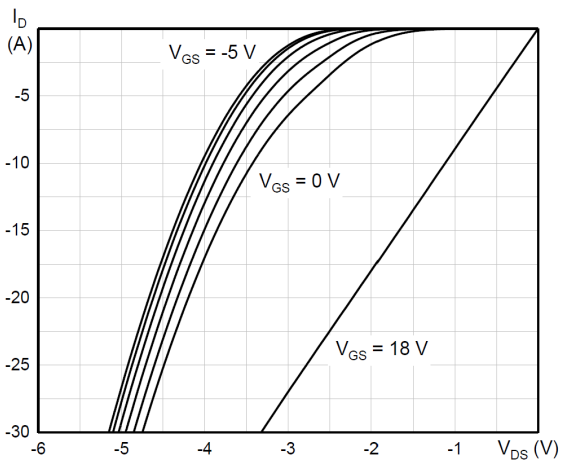



Figure 14. Body Diode Characteristic at $T_J$=175℃

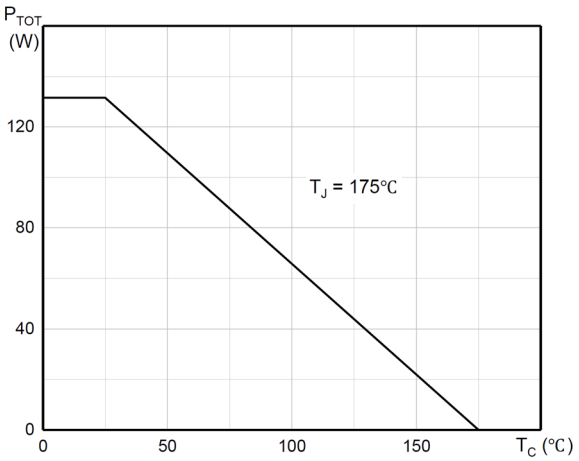
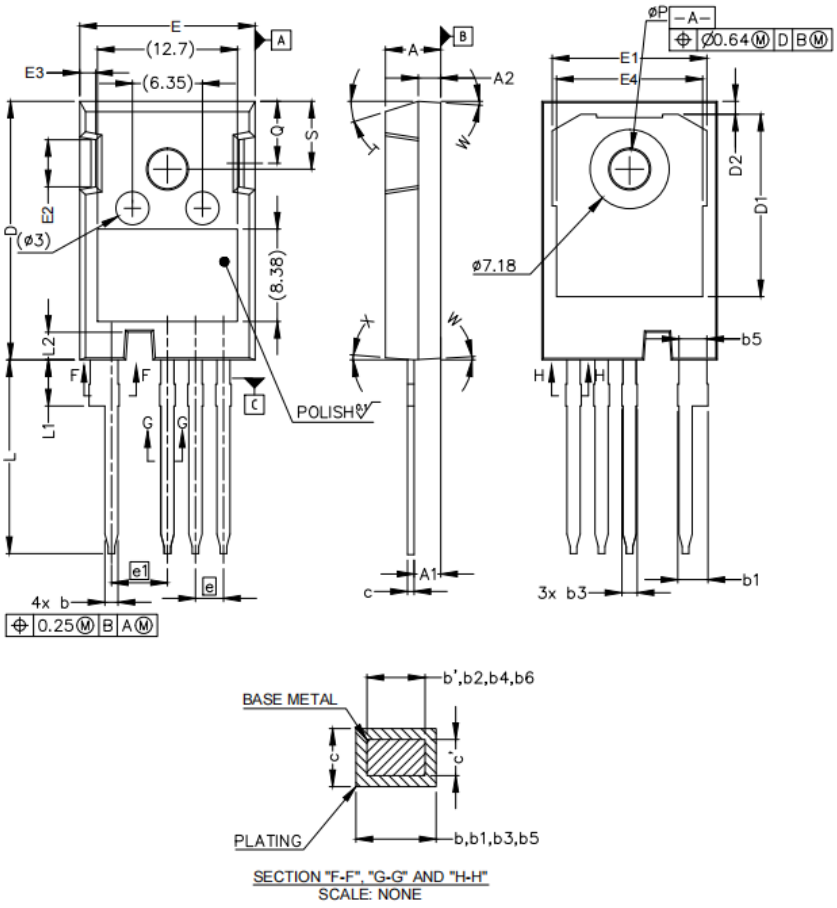



Figure 15. Total Power Dissipation

## Package Dimensions

### TO-247-4L Package Outline




| SYMBOL | MILLMETERS | |
|---|---|---|
| | MIN | MAX |
| A | 4.83 | 5.21 |
| A1 | 2.29 | 2.54 |
| A2 | 1.91 | 2.16 |
| b` | 1.07 | 1.28 |
| b | 1.07 | 1.33 |
| b1 | 2.39 | 2.94 |
| b2 | 2.39 | 1.84 |
| b3 | 1.07 | 1.60 |
| b4 | 1.07 | 1.50 |
| b5 | 2.39 | 2.69 |
| b6 | 2.39 | 2.64 |
| c` | 0.55 | 0.65 |
| c | 0.55 | 0.68 |
| D | 23.30 | 23.60 |
| D1 | 16.25 | 17.65 |
| D2 | 0.95 | 1.25 |
| E | 15.75 | 16.13 |
| E1 | 13.10 | 14.15 |
| E2 | 3.68 | 5.10 |
| E3 | 1.00 | 1.90 |
| E4 | 12.38 | 13.43 |
| e | 2.54BSC | |
| e1 | 5.08BSC | |
| N | 4 | |
| L | 17.31 | 17.82 |
| L1 | 3.97 | 4.37 |
| L2 | 2.35 | 2.65 |
| øP | 3.51 | 3.65 |
| Q | 5.49 | 6.00 |
| S | 6.04 | 6.30 |
| T | 17.5° REF. | |
| W | 3.5° REF. | |
| X | 4° REF. | |

## Revision History

| Document Version | Date of Release | Brief Summary |
|---|---|---|
| Rev.01 | 2026-03-30 | Initial Release. |
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