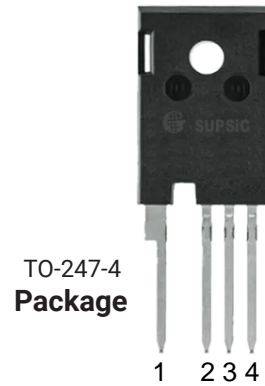


Features

- 1) Low on-resistance
- 2) Fast switching speed
- 3) Fast reverse recovery
- 4) Easy to parallel
- 5) Simple to drive
- 6) Pb-free lead plating ; RoHS compliant

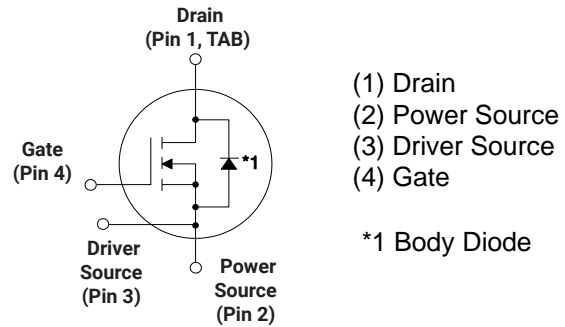
Applications

- Solar inverters
- DC/DC converters
- Switch mode power supplies
- Induction heating



TO-247-4
Package

Inner circuit



| Part Number | Marking | Package | V_{DS} | $I_D @ 25^\circ C$ | $R_{DS(on)}$ |
|--------------|-------------|---------|----------|--------------------|---------------|
| GC3M0032120K | GC3M0032120 | T0247-4 | 1200 V | 63 A | 32 m Ω |

Maximum Ratings ($T_c = 25^\circ C$ unless otherwise specified)

| Symbol | Parameter | Value | Unit | Test Conditions |
|----------------|--|-------------|------------|---|
| V_{DSmax} | Drain - Source Voltage | 1200 | V | $V_{GS} = 0 V, I_b = 100 \mu A$ |
| V_{GSmax} | Gate - Source Voltage (dynamic) | -8/+19 | V | AC ($f > 1 Hz$) |
| V_{GSop} | Gate - Source Voltage (static) | -4/+15 | V | Static |
| I_D | Continuous Drain Current | 63 | A | $V_{GS} = 15 V, T_c = 25^\circ C$ |
| | | 48 | | $V_{GS} = 15 V, T_c = 100^\circ C$ |
| $I_{D(pulse)}$ | Pulsed Drain Current | 120 | A | Pulse width t_p limited by T_{jmax} |
| P_D | Power Dissipation | 283 | W | $T_c = 25^\circ C, T_j = 175^\circ C$ |
| T_j, T_{stg} | Operating Junction and Storage Temperature | -40 to +175 | $^\circ C$ | |
| T_L | Solder Temperature | 260 | $^\circ C$ | 1.6mm (0.063") from case for 10s |

Note (1): When using MOSFET Body Diode $V_{GSmax} = -4V/+19V$

Note (2): MOSFET can also safely operate at 0/+15 V

Electrical Characteristics ($T_c = 25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Min. | Typ. | Max. | Unit | Test Conditions |
|---------------|--|------|------|------|---------------|--|
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | 1200 | | | V | $V_{GS} = 0\text{ V}, I_D = 100\ \mu\text{A}$ |
| $V_{GS(th)}$ | Gate Threshold Voltage | 1.8 | 2.5 | 3.6 | V | $V_{DS} = V_{GS}, I_D = 11.5\ \text{mA}$ |
| | | | 2.0 | | V | $V_{DS} = V_{GS}, I_D = 11.5\ \text{mA}, T_J = 175^\circ\text{C}$ |
| I_{DSS} | Zero Gate Voltage Drain Current | | 1 | 50 | μA | $V_{DS} = 1200\ \text{V}, V_{GS} = 0\ \text{V}$ |
| I_{GSS} | Gate-Source Leakage Current | | 10 | 250 | nA | $V_{GS} = 15\ \text{V}, V_{DS} = 0\ \text{V}$ |
| $R_{DS(on)}$ | Drain-Source On-State Resistance | 23 | 32 | 43 | m Ω | $V_{GS} = 15\ \text{V}, I_D = 40\ \text{A}$ |
| | | | 57.6 | | | $V_{GS} = 15\ \text{V}, I_D = 40\ \text{A}, T_J = 175^\circ\text{C}$ |
| g_{fs} | Transconductance | | 27 | | S | $V_{DS} = 20\ \text{V}, I_{DS} = 40\ \text{A}$ |
| | | | 22 | | | $V_{DS} = 20\ \text{V}, I_{DS} = 40\ \text{A}, T_J = 175^\circ\text{C}$ |
| C_{iss} | Input Capacitance | | 3350 | | pF | $V_{GS} = 0\ \text{V}, V_{DS} = 1000\ \text{V}$ $f = 100\ \text{kHz}$ $V_{AC} = 25\ \text{mV}$ |
| C_{oss} | Output Capacitance | | 132 | | | |
| C_{rss} | Reverse Transfer Capacitance | | 8 | | | |
| E_{oss} | C_{oss} Stored Energy | | 76 | | | |
| E_{ON} | Turn-On Switching Energy (SiC Diode FWD) | | 367 | | μJ | $V_{DS} = 800\ \text{V}, V_{GS} = -4\ \text{V}/+15\ \text{V}, I_D = 40\ \text{A},$ $R_{G(ext)} = 2.5\ \Omega, L = 65.7\ \mu\text{H}, T_J = 175^\circ\text{C}$ |
| E_{OFF} | Turn Off Switching Energy (SiC Diode FWD) | | 123 | | | |
| E_{ON} | Turn-On Switching Energy (Body Diode FWD) | | 955 | | μJ | $V_{DS} = 800\ \text{V}, V_{GS} = -4\ \text{V}/+15\ \text{V}, I_D = 40\ \text{A},$ $R_{G(ext)} = 2.5\ \Omega, L = 65.7\ \mu\text{H}, T_J = 175^\circ\text{C}$ |
| E_{OFF} | Turn Off Switching Energy (Body Diode FWD) | | 107 | | | |
| $t_{d(on)}$ | Turn-On Delay Time | | 25 | | ns | $V_{DD} = 800\ \text{V}, V_{GS} = -4\ \text{V}/15\ \text{V}$ $R_{G(ext)} = 2.5\ \Omega, I_D = 40\ \text{A}, L = 65.7$ Timing relative to V_{DS} , Inductive load |
| t_r | Rise Time | | 18 | | | |
| $t_{d(off)}$ | Turn-Off Delay Time | | 32 | | | |
| t_f | Fall Time | | 9 | | | |
| $R_{G(int)}$ | Internal Gate Resistance | | 1.7 | | Ω | $f = 1\ \text{MHz}, V_{AC} = 25\ \text{mV}$ |
| Q_{gs} | Gate to Source Charge | | 40 | | nC | $V_{DS} = 800\ \text{V}, V_{GS} = -4\ \text{V}/15\ \text{V}$ $I_D = 40\ \text{A}$ Per IEC60747-8-4 pg 21 |
| Q_{gd} | Gate to Drain Charge | | 34 | | | |
| Q_g | Total Gate Charge | | 118 | | | |

Reverse Diode Characteristics ($T_c = 25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Typ. | Max. | Unit | Test Conditions |
|----------------|----------------------------------|------|------|------|---|
| V_{SD} | Diode Forward Voltage | 4.6 | | V | $V_{GS} = -4\text{ V}, I_{SD} = 20\text{ A}, T_J = 25^\circ\text{C}$ |
| | | 4.2 | | V | $V_{GS} = -4\text{ V}, I_{SD} = 20\text{ A}, T_J = 175^\circ\text{C}$ |
| I_S | Continuous Diode Forward Current | | 62 | A | $V_{GS} = -4\text{ V}, T_c = 25^\circ\text{C}$ |
| $I_{S, pulse}$ | Diode pulse Current | | 120 | A | $V_{GS} = -4\text{ V}$, pulse width t_p limited by T_{jmax} |
| t_{rr} | Reverse Recover time | 27 | | ns | $V_{GS} = -4\text{ V}, I_{SD} = 40\text{ A}, V_R = 800\text{ V}$ $dif/dt = 2250\text{ A}/\mu\text{s}, T_J = 175^\circ\text{C}$ |
| Q_{rr} | Reverse Recovery Charge | 478 | | nC | |
| I_{rrm} | Peak Reverse Recovery Current | 27 | | A | |

Thermal Characteristics

| Symbol | Parameter | Typ. | Unit | Test Conditions |
|-----------------|---|------|---------------------------|-----------------|
| $R_{\theta JC}$ | Thermal Resistance from Junction to Case | 0.45 | $^\circ\text{C}/\text{W}$ | |
| $R_{\theta JA}$ | Thermal Resistance From Junction to Ambient | 40 | | |

