

Description

The CMN6002GF is the N-Channel enhancement mode power field effect transistors with high cell density, trench technology. This high density process and design have been optimized switching performance and especially tailored to minimize on-state resistance.

Features

- V_{DS} : 60V
- I_D (@ $V_{GS}=10V$): 77A
- $R_{DS(ON)}$ (@ $V_{GS}=10V$): < 3.6m Ω
- High density cell design for extremely low $R_{DS(ON)}$
- Excellent on-resistance and DC current capability

Applications

- AC/DC load switch
- SMPS
- Notebooks and Handhelds adapter
- UPS Power

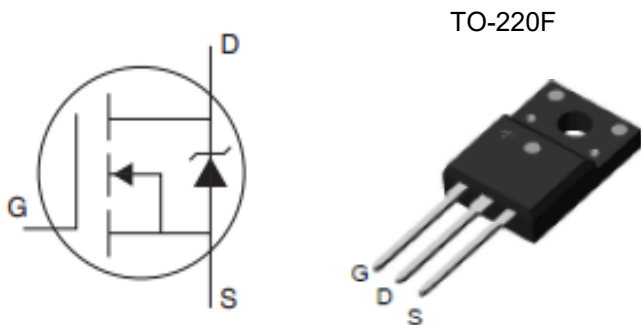
Marking Information



Marking Code = N6002GF

Date Code = XXXX

Equivalent Circuit and Pin Configuration



Ordering Information

| P/N | Package Type | Packaging |
|-----------|--------------|-----------|
| CMN6002GF | TO-220F | Tube |

Absolute Maximum Ratings (T_c=25 °C unless otherwise noted)

| Parameter | Symbol | Maximum | Unit |
|--|----------------------------|-------------------|------|
| Drain-source Voltage | V_{DS} | 60 | V |
| Gate-source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current ⁽¹⁾ | I_D | $T_c=25^\circ C$ | 77 |
| | | $T_c=100^\circ C$ | 48 |
| Pulsed Drain Current ⁽²⁾ | I_{DM} | 306 | A |
| Total Power Dissipation ⁽³⁾ | $P_D @ T_c=25^\circ C$ | 34 | W |
| | Derating Factor above 25°C | 0.27 | W/°C |
| Thermal Resistance Junction-to-Case ⁽³⁾ | $R_{\theta JC}$ | 3.7 | °C/W |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | °C |

Electrical Characteristics (T_c=25 °C unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---------------------------------------|---------------------|--|-----|------|------|-------|
| Static Parameter | | | | | | |
| Drain-Source Breakdown Voltage | BVDSS | V _{GS} =0V, I _D =250μA | 60 | | | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =60V, V _{GS} =0V, T _C =25°C | | | 1 | μA |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} =±20V, V _{DS} =0V | | | ±100 | nA |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | 1.0 | | 3.0 | V |
| Static Drain-Source on-Resistance | R _{DS(on)} | V _{GS} =10V, I _D =20A | | 3.0 | 3.6 | mΩ |
| Diode Forward Voltage | V _{SD} | I _S =20A, V _{GS} =0V | | | 1.2 | V |
| Maximum Body-Diode Continuous Current | I _S | | | | 77 | A |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =30V, V _{GS} =0V, f=1.0MHz | | 5100 | | pF |
| Output Capacitance | C _{oss} | | | 1120 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 45 | | |
| Switching Parameters | | | | | | |
| Total Gate Charge | Q _g | V _{DS} =30V, I _D =20A, V _{GS} =10V | | 80 | | nC |
| Gate Source Charge | Q _{gs} | | | 12.6 | | |
| Gate Drain Charge | Q _{gd} | | | 12.2 | | |
| Turn-on Delay Time | t _{D(on)} | V _{GS} =10V, V _{DD} =30V, I _D =20A, R _{GEN} =4.7Ω | | 6 | | ns |
| Turn-on Rise Time | t _r | | | 11 | | |
| Turn-off Delay Time | t _{D(off)} | | | 23 | | |
| Turn-off Fall Time | t _f | | | 3 | | |

Noted: (1) Pulse Test: Pulse Width ≤ 300μs, Duty cycle ≤ 2%.

(2) Pulse width limited by maximum junction temperature.

(3) Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch. With 2oz Copper, t ≤ 10s.

Typical Performance Characteristics

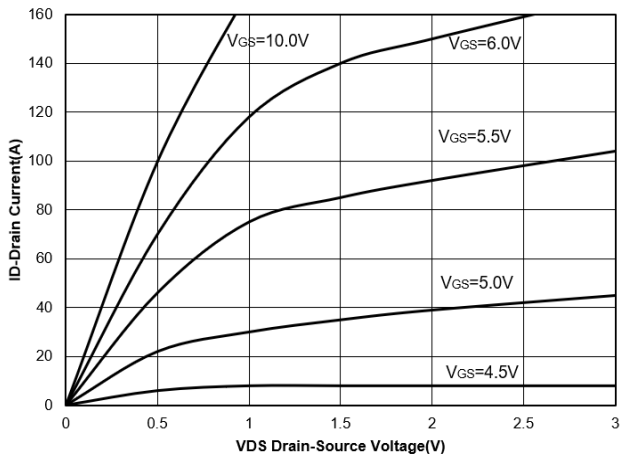


Figure 1. Output Characteristics

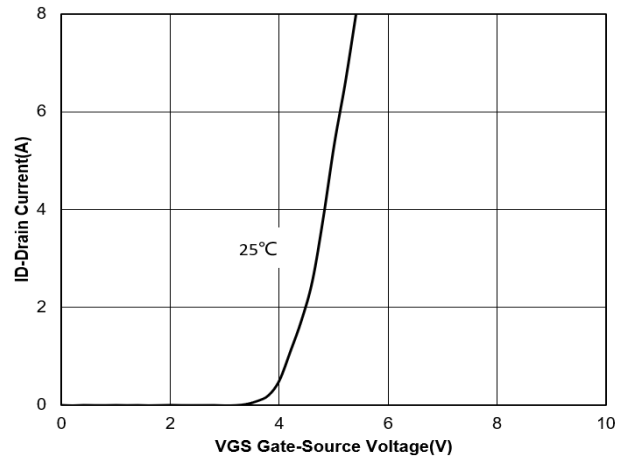


Figure 2. Transfer Characteristics

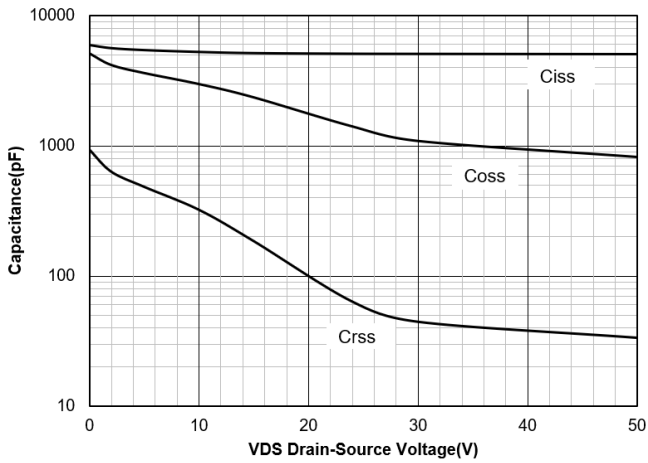


Figure 3. Capacitance Characteristics

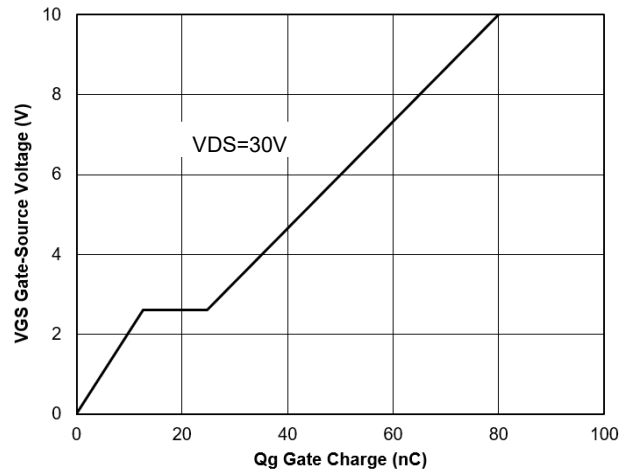


Figure 4. Gate Charge

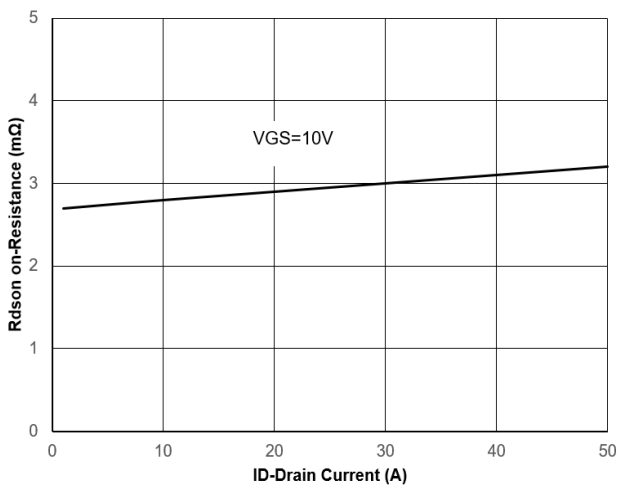


Figure 5. Drain-Source on Resistance

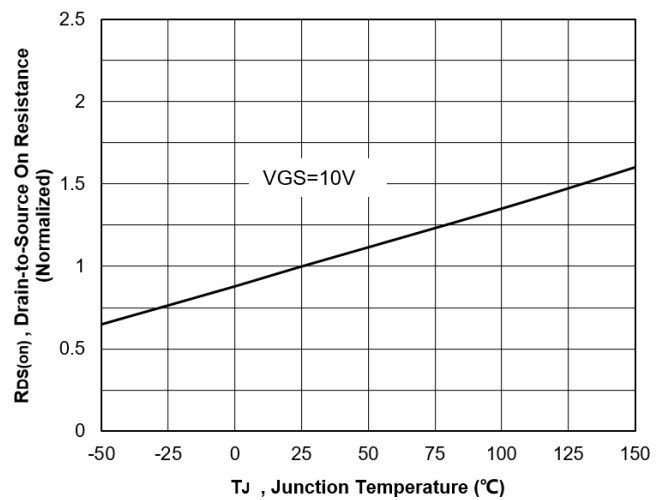


Figure 6. Normalized On-Resistance Vs. Temperature

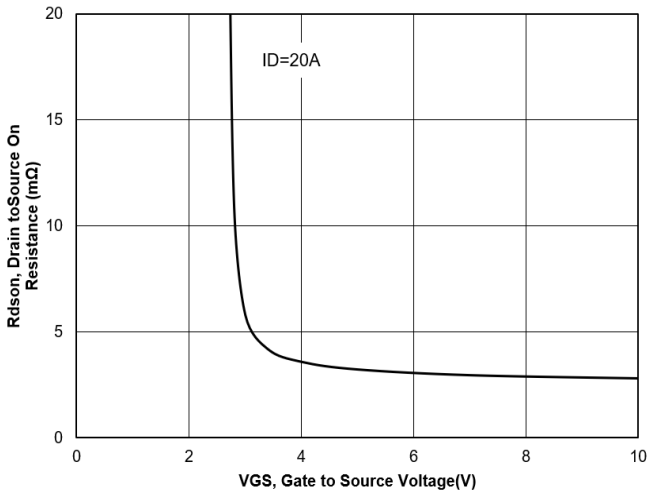


Figure 7. Typical Drain to Source ON Resistance VS Gate Voltage and Drain Current

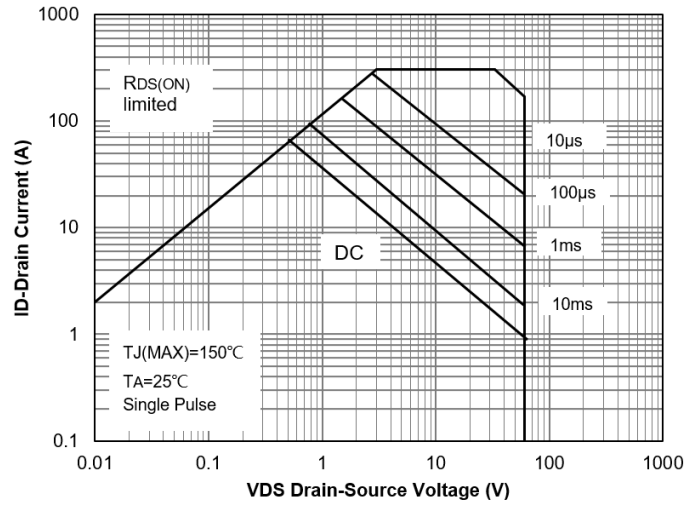


Figure 8. Safe Operation Area

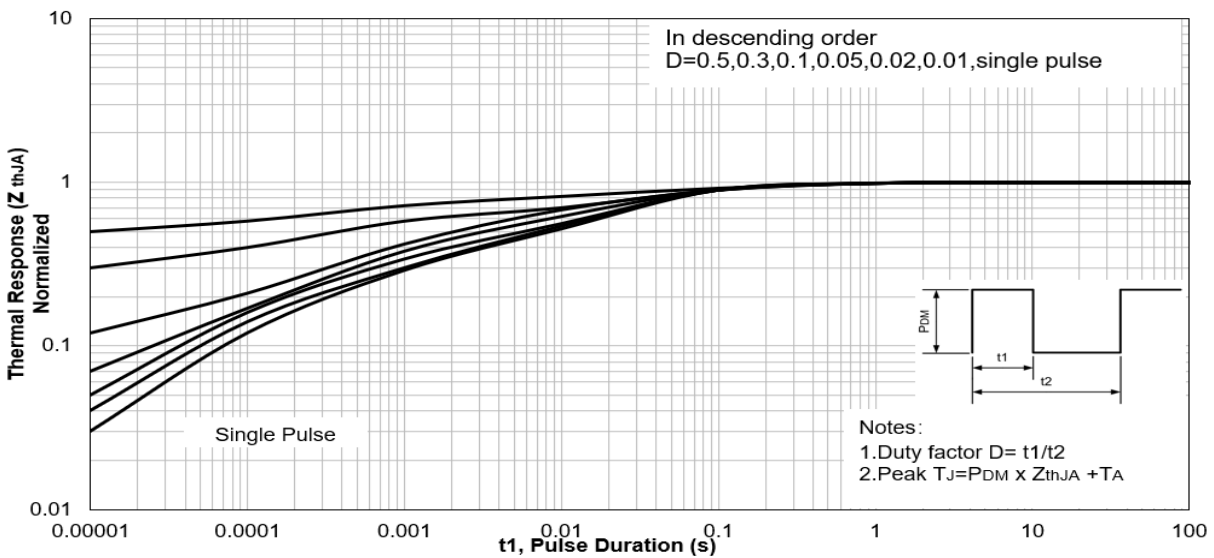


Figure 9. Maximum Effective Transient Thermal Impedance ,Junction-to-Case

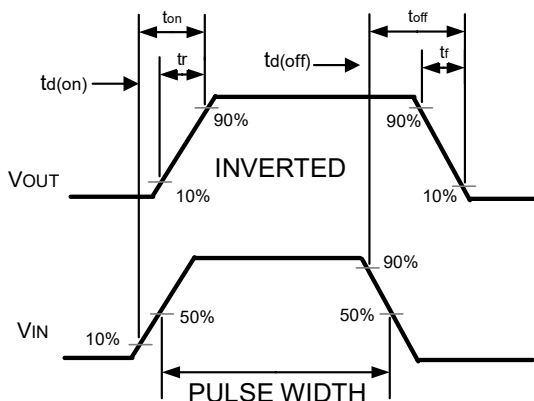
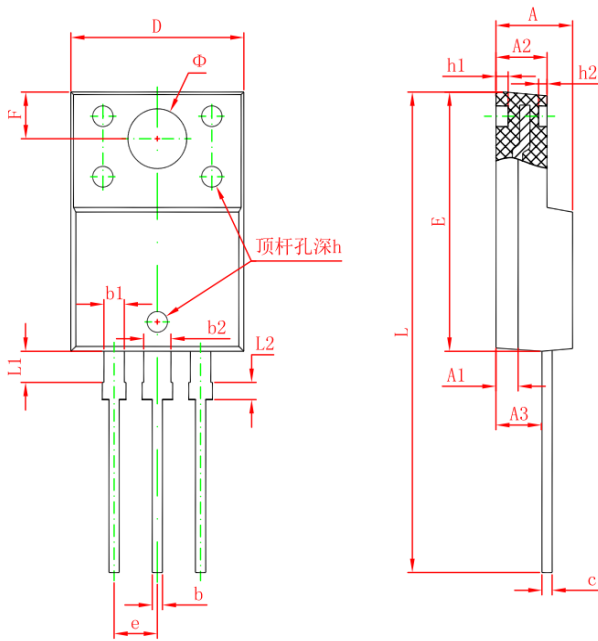


Figure 10. Switching wave

TO-220F Package Outline Drawing



| Symbol | Millimeters | | Inches | |
|--------|-------------|--------|------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.300 | 4.700 | 0.169 | 0.185 |
| A1 | 1.300 REF. | | 0.051 REF. | |
| A2 | 2.800 | 3.200 | 0.110 | 0.126 |
| A3 | 2.500 | 2.900 | 0.098 | 0.114 |
| b | 0.500 | 0.750 | 0.020 | 0.030 |
| b1 | 1.100 | 1.350 | 0.043 | 0.053 |
| b2 | 1.500 | 1.750 | 0.059 | 0.069 |
| c | 0.500 | 0.750 | 0.020 | 0.030 |
| D | 9.960 | 10.360 | 0.392 | 0.408 |
| E | 14.800 | 15.200 | 0.583 | 0.598 |
| e | 2.540 TYP. | | 0.100 TYP. | |
| F | 2.700 REF. | | 0.106 REF. | |
| Φ | 3.500 REF. | | 0.138 REF. | |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| h1 | 0.800 REF. | | 0.031 REF. | |
| h2 | 0.500 REF. | | 0.020 REF. | |
| L | 28.000 | 28.400 | 1.102 | 1.118 |
| L1 | 1.700 | 1.900 | 0.067 | 0.075 |
| L2 | 0.900 | 1.100 | 0.035 | 0.043 |

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