

Description

The CMN6003GSP 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 (@ $V_{GS}=10V$): 120A
- $R_{DS(ON)}$ (@ $V_{GS}=10V$): < 3m 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

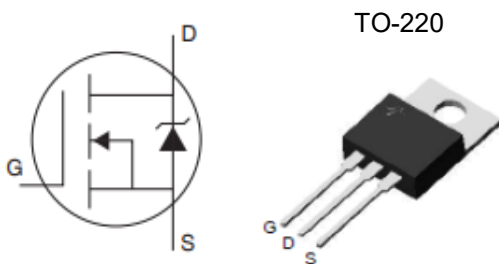
Marking Information



Marking Code = N6003GSP

Date Code = XXXX

Equivalent Circuit and Pin Configuration



Ordering Information

| P/N | Package Type | Packaging |
|------------|--------------|-----------|
| CMN6003GSP | TO-220 | Tube |

Absolute Maximum Ratings ($T_c=25^\circ\text{C}$ 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⁾ | $T_c=25^\circ\text{C}$ | 222 | A |
| | $T_c=100^\circ\text{C}$ | 157 | |
| | $T_c=25^\circ\text{C}$ (Package Limit) | 120 | |
| Pulsed Drain Current ⁽²⁾ | I_{DM} | 444 | A |
| Total Power Dissipation ⁽³⁾ | $PD @ T_c=25^\circ\text{C}$ | 259 | W |
| | Derating Factor above 25°C | 1.7 | W/ $^\circ\text{C}$ |
| Thermal Resistance Junction-to-Case | $R_{\theta JC}$ | 0.58 | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to +175 | $^\circ\text{C}$ |

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

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---------------------------------------|---------------------|---|-----|------|------|-------|
| Static Parameter | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 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 | 2 | | 4 | V |
| Static Drain-Source on-Resistance | R _{DS(on)} | V _{GS} =10V, I _D =30A | | 2.5 | 3.0 | mΩ |
| Diode Forward Voltage | V _{SD} | I _S =30A, V _{GS} =0V | | 0.85 | 1.2 | V |
| Maximum Body-Diode Continuous Current | I _S | | | | 120 | A |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =25V, V _{GS} =0V, f=1.0MHz | | 4460 | | pF |
| Output Capacitance | C _{oss} | | | 2280 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 78 | | |
| Switching Parameters | | | | | | |
| Total Gate Charge | Q _g | V _{DS} =48V, I _D =30A, V _{GS} =10V | | 63.8 | | nC |
| Gate Source Charge | Q _{gs} | | | 19.2 | | |
| Gate Drain Charge | Q _{gd} | | | 13.2 | | |
| Turn-on Delay Time | t _{D(on)} | V _{GS} =10V, V _{DS} =48V, R _L =1Ω, R _{GEN} =6Ω | | 75 | | ns |
| Turn-on Rise Time | t _r | | | 43 | | |
| Turn-off Delay Time | t _{D(off)} | | | 102 | | |
| Turn-off Fall Time | t _f | | | 47 | | |

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

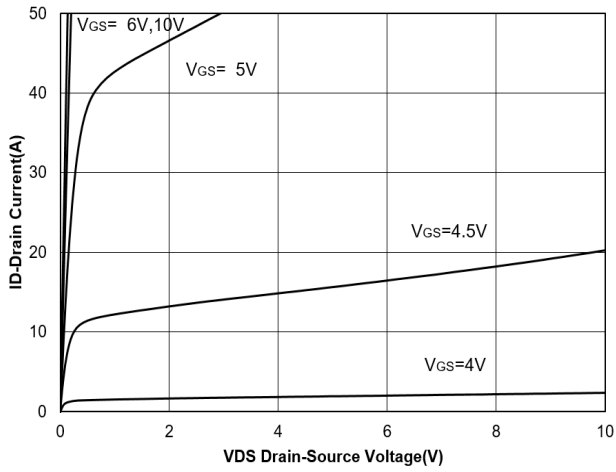


Figure 1. Output Characteristics

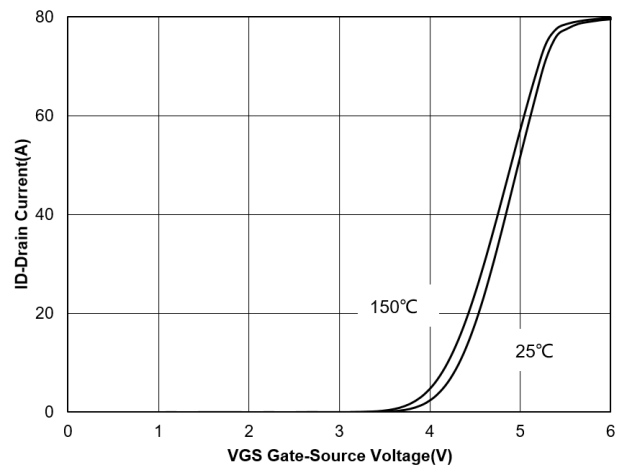


Figure 2. Transfer Characteristics

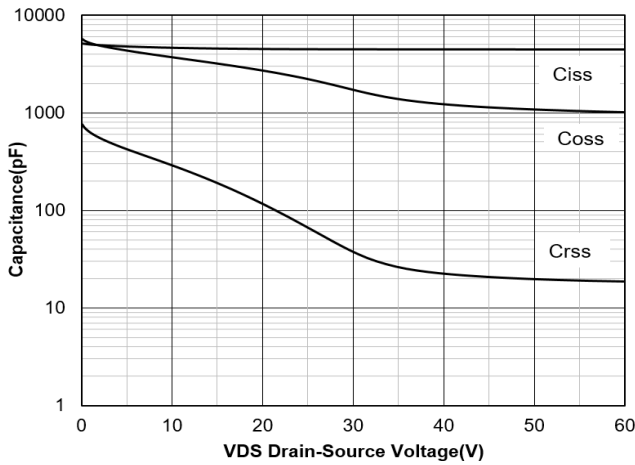


Figure 3. Capacitance Characteristics

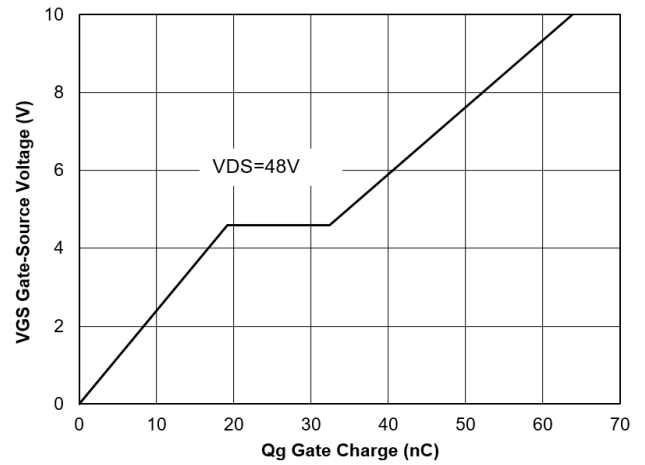


Figure 4. Gate Charge

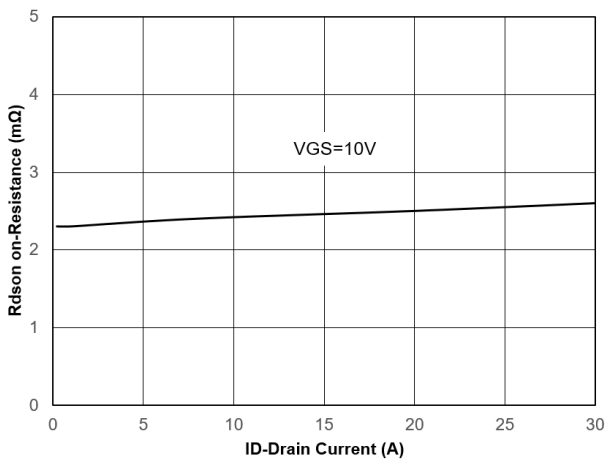


Figure 5. Drain-Source on Resistance

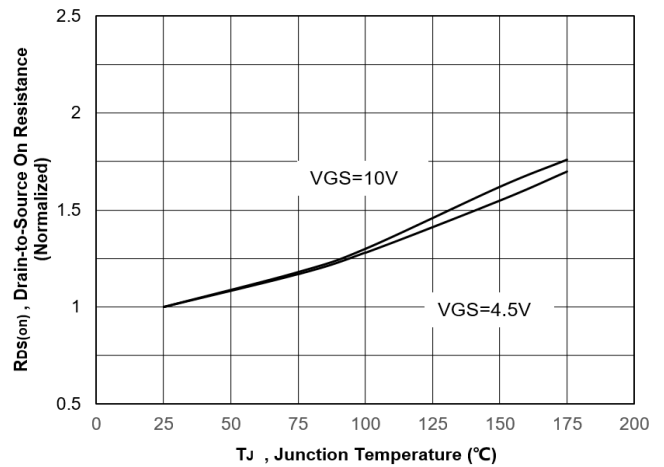


Figure 6. Normalized On-Resistance Vs. Temperature

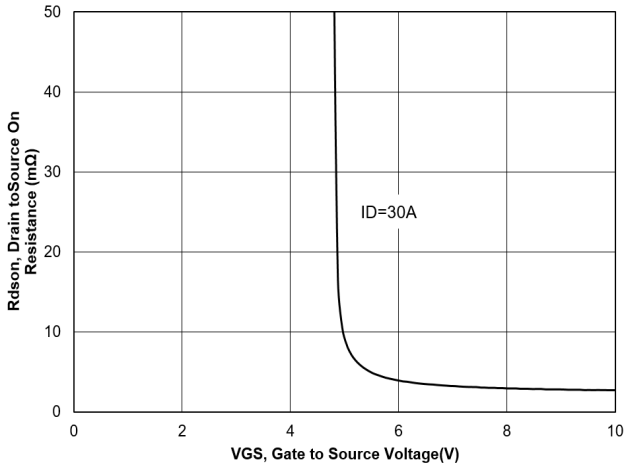


Figure 7. Typical Drain to Source ON Resistance VS Gate Voltage and Drain Current

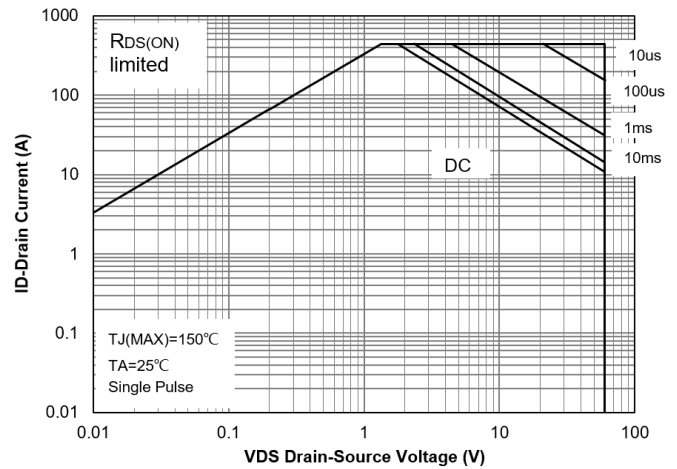


Figure 8. Safe Operation Area

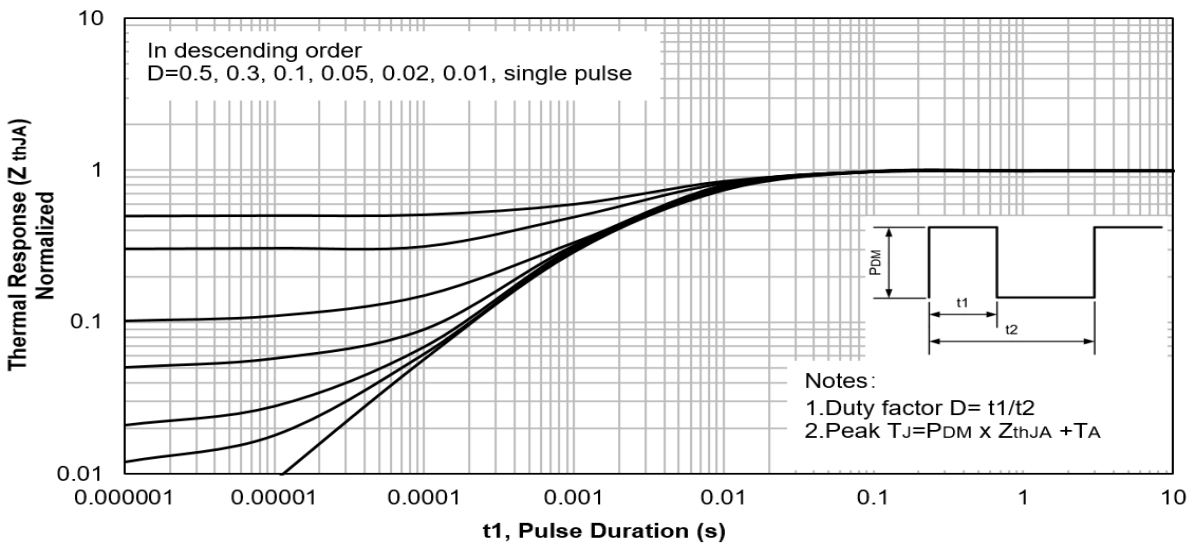


Figure 9. Maximum Effective Transient Thermal Impedance ,Junction-to-Case

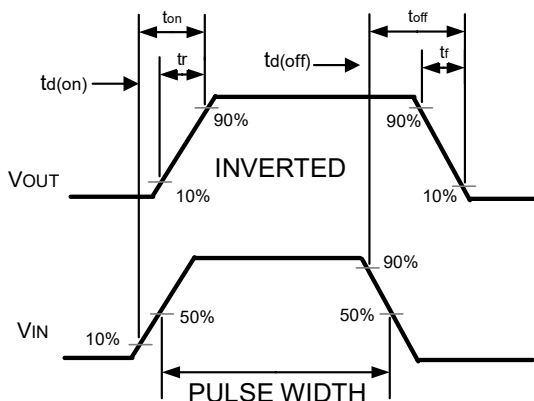
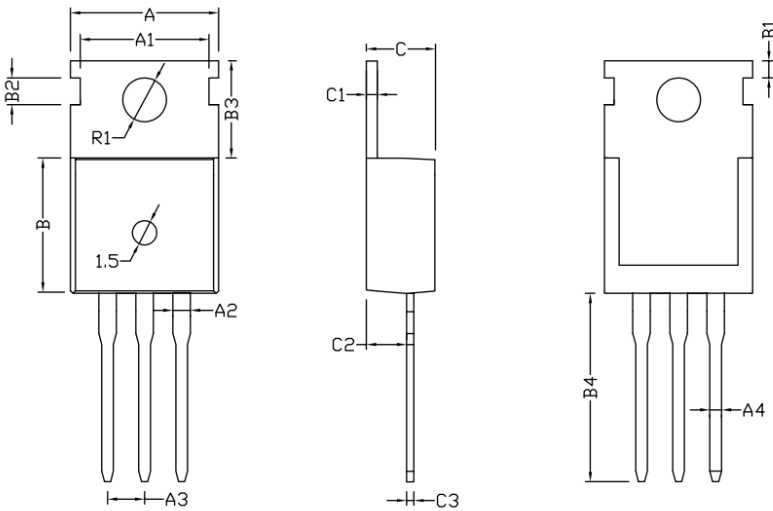


Figure 10. Switching wave

TO-220 Package Outline Drawing



| SYMBOL | MM | | |
|--------|-------|-------|-------|
| | MIN | NOM | MAX |
| A | 9.78 | 9.88 | 9.98 |
| A1 | 8.65 | 8.70 | 8.75 |
| A2 | 1.22 | 1.27 | 1.35 |
| A3 | 2.50 | 2.54 | 2.59 |
| A4 | 0.77 | 0.80 | 0.83 |
| B | 8.70 | 9.20 | 9.70 |
| B1 | 1.25 | 1.30 | 1.35 |
| B2 | 1.65 | 1.70 | 1.75 |
| B3 | 6.50 | 6.60 | 6.70 |
| B4 | 12.90 | 13.08 | 13.18 |
| C | 4.42 | 4.50 | 4.58 |
| C1 | 1.27 | 1.30 | 1.33 |
| C2 | 2.37 | 2.40 | 2.43 |
| C3 | 0.48 | 0.50 | 0.52 |
| R | 3.60 | 3.65 | 3.70 |

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