# MT30G005CN5

N-Channel Enhancement Mode Power MOSFET

MT Semiconductor®

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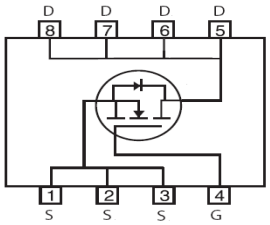
## Feature Description

- 30V/521A
  $R_{DS(ON)}$= 0.5mΩ(typ.)@$V_{GS}$ = 10V
- 100% Avalanche Tested
- Reliable and Rugged
- Halogen- Free Devices Available
- SGT MOSFET

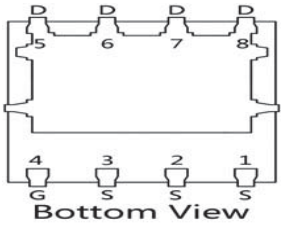
**Simplified Schematic**




## Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Power Tool Application
- Networking DC-DC Power System

**MARKING DIAGRAM & PIN ASSIGNMENT**




### Absolute Maximum Ratings ($T_C$=25℃ unless otherwise noted)

| Symbol | Parameter | Limit | Unit |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage ($V_{GS}$=0V) | 30 | V |
| $V_{GS}$ | Gate-Source Voltage ($V_{DS}$=0V) | ±20 | V |
| $I_D$ | Drain Current-Continuous($T_C$=25℃) | 521 | A |
| | Drain Current-Continuous($T_C$=100℃) | 215 | A |
| $I_{DM\ (pluse)}$ | Drain Current-Continuous@ Current-Pulsed (Note 1) | 992 | A |
| $P_D$ | Maximum Power Dissipation($T_C$=25℃) | 130 | W |
| | Maximum Power Dissipation($T_C$=100℃) | 46 | W |
| $E_{AS}$ | Avalanche energy (Note 2) | 889 | mJ |
| $T_J$, $T_{STG}$ | Operating Junction and Storage Temperature Range | -55 To 150 | ℃ |

### Thermal Characteristic

| Symbol | Parameter | Typ | Max | Unit |
|---|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | | 1.12 | ℃/W |

## Electrical Characteristics ($T_J$=25℃ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **On/Off States** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V $I_D$=250μA | 30 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=30V, $V_{GS}$=0V $T_J$=25℃ | | | 1 | μA |
| | | $V_{DS}$=30V, $V_{GS}$=0V $T_J$=125℃ | | | 100 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0V | | | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 1.1 | | 3 | V |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=5V, $I_D$=20A | | 66 | | S |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance | $V_{GS}$=10V, $I_D$=20A $T_J$=25℃ | | 0.5 | 1.5 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=20V,$V_{GS}$=0V, f=1.0MHz | | 6816 | | pF |
| $C_{oss}$ | Output Capacitance | | | 2265 | | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 160 | | pF |
| $R_g$ | Gate resistance | $V_{GS}$=0V, $V_{DS}$=0V, f=1.0MHz | | 1.8 | | Ω |
| **Switching Parameters** | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{GS}$=10V, $V_{DS}$=20V, $R_L$=1Ω, $R_{GEN}$=3Ω | | 19.6 | | nS |
| $t_r$ | Turn-on Rise Time | | | 27.6 | | nS |
| $t_{d(off)}$ | Turn-Off Delay Time | | | 85 | | nS |
| $t_f$ | Turn-Off Fall Time | | | 31 | | nS |
| $Q_g$ | Total Gate Charge | $V_{GS}$=10V, $V_{DS}$=20V, $I_D$=20A | | 181 | | nC |
| $Q_{gs}$ | Gate-Source Charge | | | 19 | | nC |
| $Q_{gd}$ | Gate-Drain Charge | | | 122 | | nC |
| **Source-Drain Diode Characteristics** | | | | | | |
| $I_{SD}$ | Source-Drain Current (Body Diode) | | | | 248 | A |
| $V_{SD}$ | Forward on Voltage (Note 3) | $V_{GS}$=0V, $I_S$=20A | | | 1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$=20A, dI/dt=100A/μs | | 65.2 | | ns |
| $Q_{rr}$ | Reverse Recovery Charge | $I_F$=20A, dI/dt=100A/μs | | 74.9 | | nC |

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
Notes 2.$E_{AS}$ condition: $T_J$=25℃,$V_{DD}$=40V,$V_G$=10V, Rg=25Ω, L=0.5mH.
Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

## Typical Electrical And Thermal Characteristics (Curves)

**Figure 1. Output Characteristics**

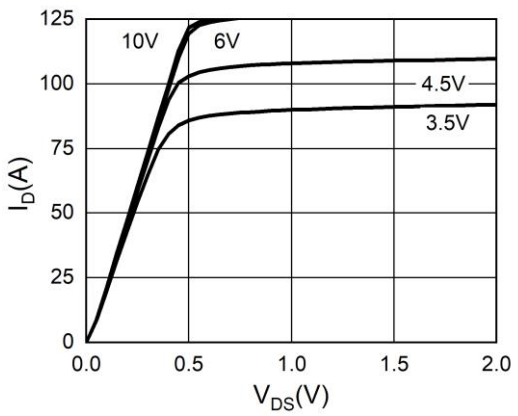



**Figure 2. Transfer Characteristics**

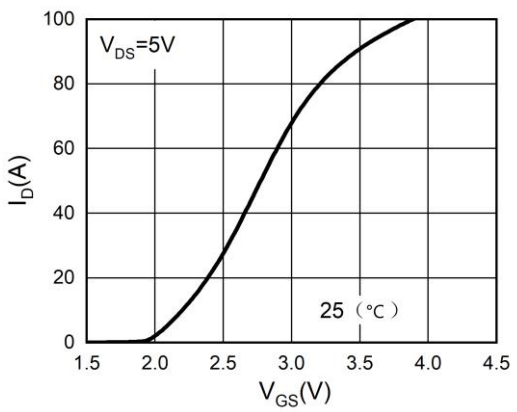



**Figure 3. Power Dissipation**

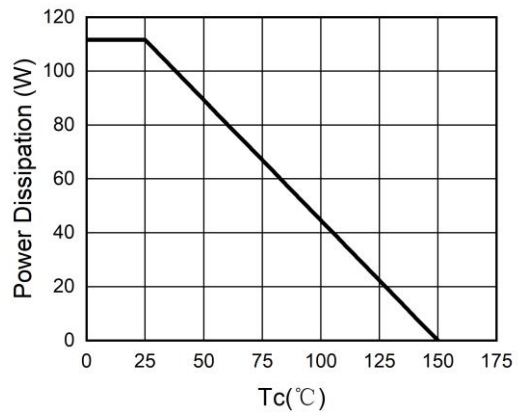



**Figure 4. Drain Current**

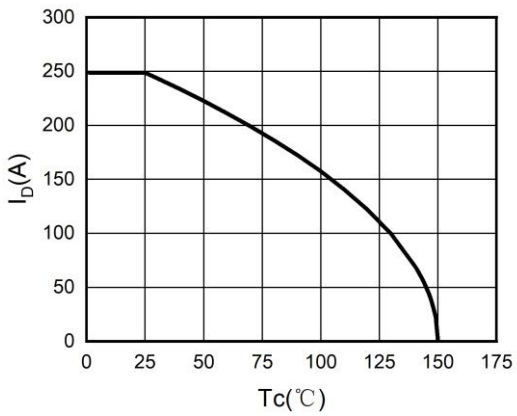



**Figure 5. $BV_{DSS}$ vs Junction Temperature**

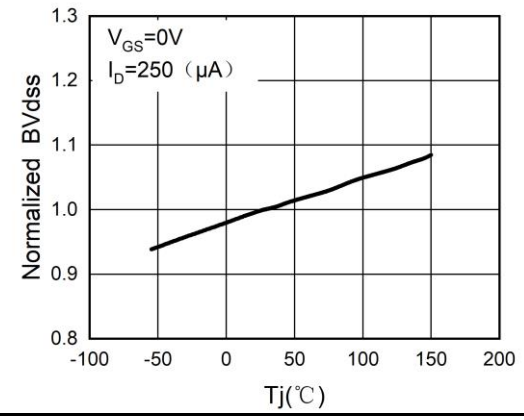
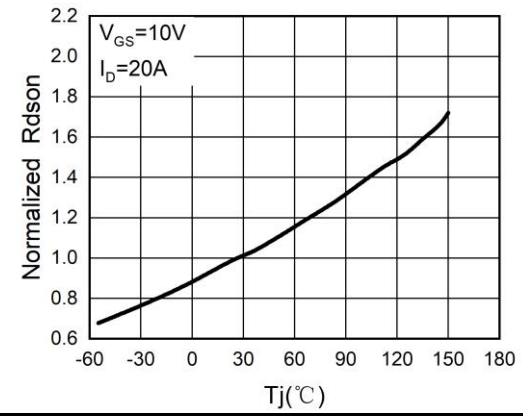



**Figure 6. $R_{DS(ON)}$ vs Junction Temperature**



## Typical Electrical And Thermal Characteristics (Curves)

**Figure 7. Gate Charge Waveforms**

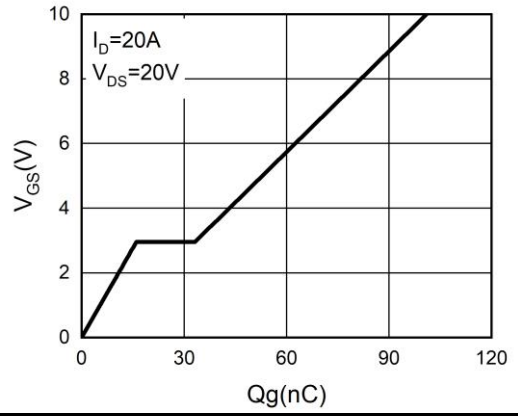



**Figure 8. Capacitance**

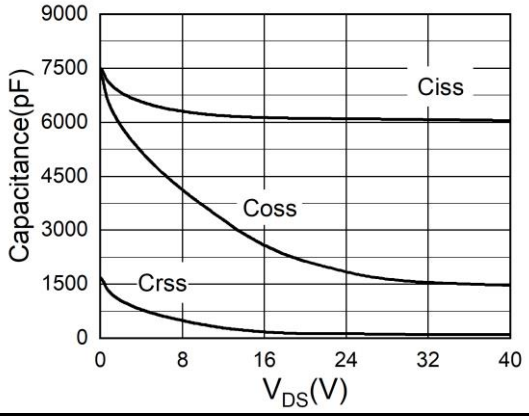



**Figure 9. Body-Diode Characteristics**

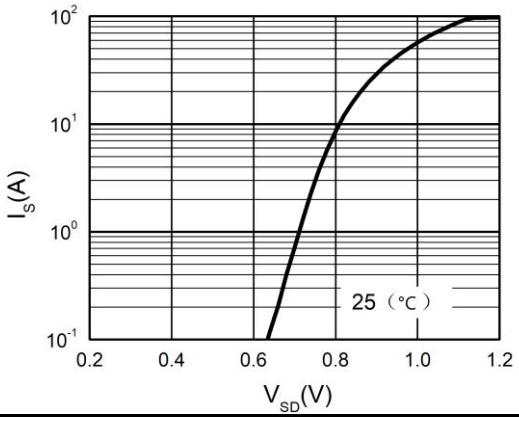
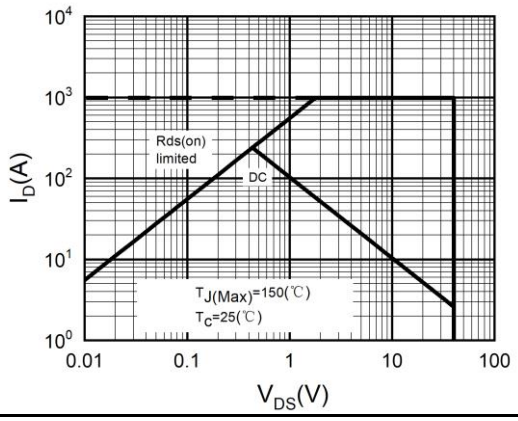
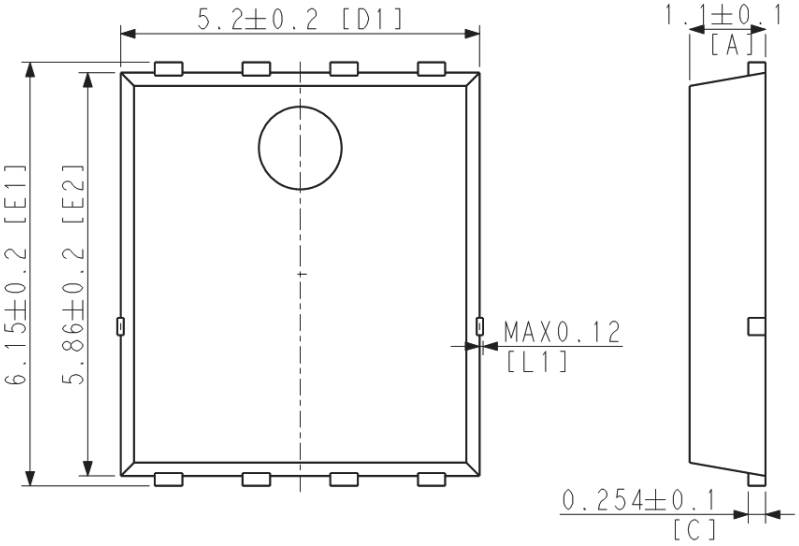


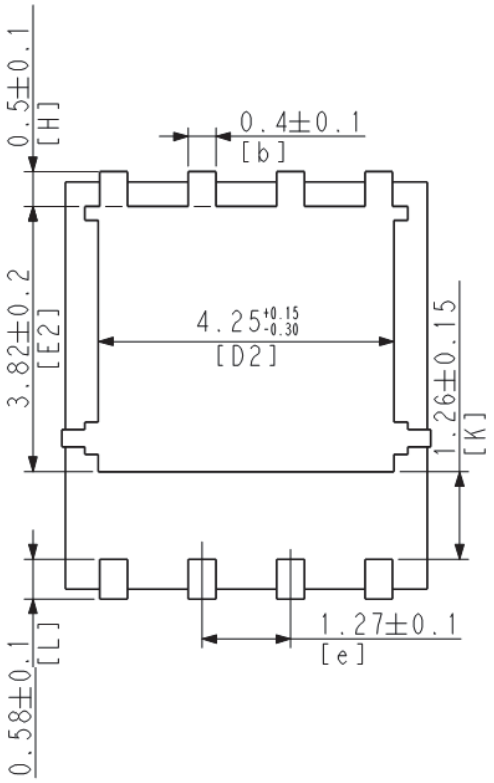

**Figure 10. Maximum Safe Operating Area**



## Package Information

**PDFN5*6-8L**



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