# CMH50N50

**500V N-Channel MOSFET**

## General Description

The CMH50N50 have been fabricated using an advanced high voltage MOSFET process that is designed to deliver high levels of performance and robustness in popular AC-DC applications.These parts can be adopted quickly into new and existing offline power supply designs.

## Product Summary

| BVDSS | RDSON | ID |
|---|---|---|
| 500V | 0.105Ω | 50A |

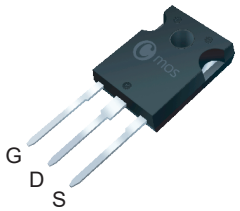
## Applications

- Switching applications

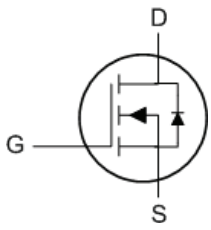
## Features

- Low gate input resistance
- 100% avalanche tested
- RoHS Compliant

## TO-247 Pin Configuration




TO-247




| Type | Package | Marking |
|---|---|---|
| CMH50N50 | TO-247 | CMH50N50 |

## Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 500 | V |
| $V_{GS}$ | Gate-Source Voltage | ±30 | V |
| $I_D$@$T_C$=25℃ | Continuous Drain Current | 50 | A |
| $I_D$@$T_C$=100℃ | Continuous Drain Current | 40 | A |
| $I_{DM}$ | Pulsed Drain Current | 200 | A |
| EAS | Single Pulse Avalanche Energy | 1800 | mJ |
| $P_D$@$T_C$=25℃ | Total Power Dissipation | 625 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |

## Thermal Data

| Symbol | Parameter | Rating | Unit |
|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient | 40 | ℃/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-case | 0.2 | ℃/W |

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

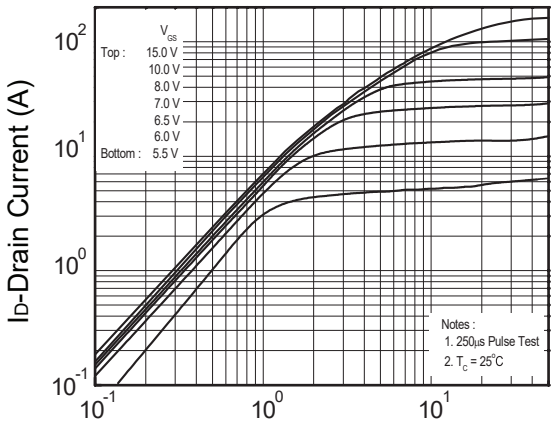
| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 500 | --- | --- | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=10V , $I_D$=25A | --- | --- | 0.105 | Ω |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 2 | --- | 4 | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=500V , $V_{GS}$=0V | --- | --- | 1 | uA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=± 30V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | $V_{DS}$=25V , $I_D$=25A | --- | 50 | --- | S |
| $Q_g$ | Total Gate Charge | $I_D$=48A<br>$V_{DS}$ =400V<br>$V_{GS}$ =10V | --- | 106 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 34 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 46 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=250V<br>$I_D$=48A<br>$R_G$=25Ω | --- | 106 | --- | ns |
| $T_r$ | Rise Time | | --- | 361 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 226 | --- | |
| $T_f$ | Fall Time | | --- | 231 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=25V , $V_{GS}$=0V , f=1MHz | --- | 9500 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 760 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 50 | --- | |

## Diode Characteristics

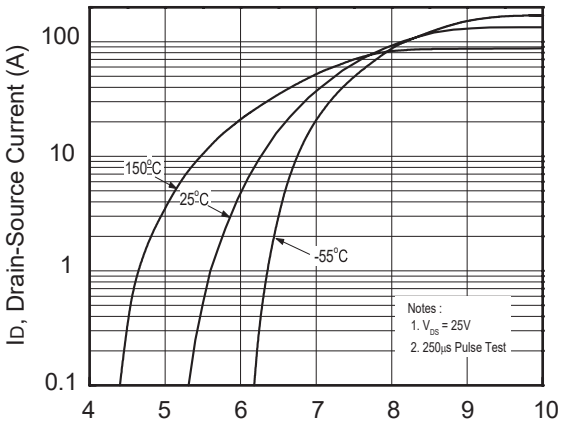
| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current | $V_G$=$V_D$=0V , Force Current | --- | --- | 50 | A |
| $I_{SM}$ | Pulsed Source Current | | --- | --- | 200 | A |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V , $I_S$=48A | --- | --- | 1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $V_{GS}$=0V , $I_S$=48A<br>$dI_F/dt$ =100A/μs | --- | 580 | --- | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | --- | 10 | --- | μC |

Notes:

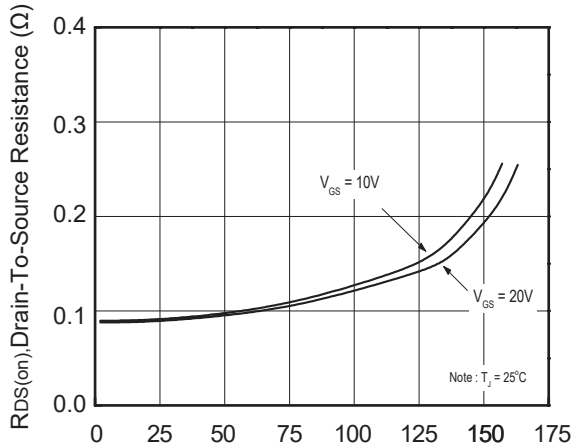
This product has been designed and qualified for the counsumer market.
Cmos assumes no liability for customers' product design or applications.
Cmos reserver the right to improve product design ,functions and reliability wihtout notice.



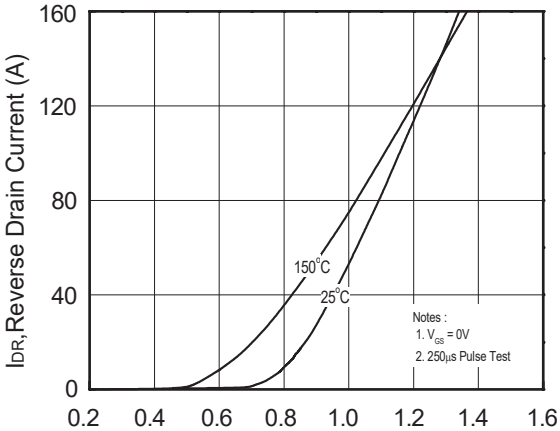

Output Characteristics



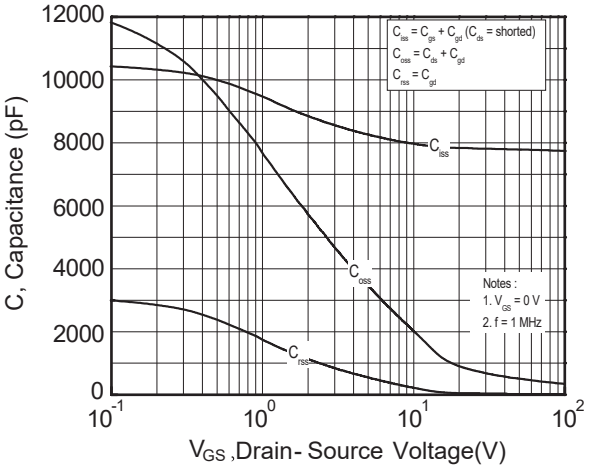

Typical Transfer Characteristics



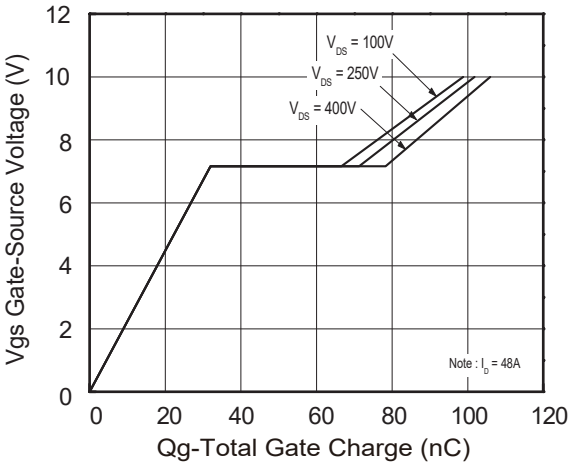

On-Resistance Variation
vs.Drain Current and Gate Voltage



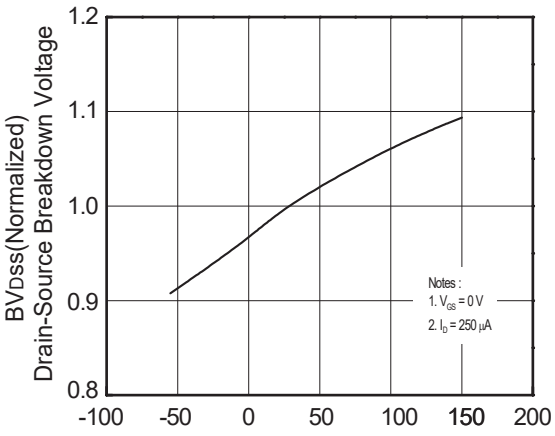

Body Diode Forward Voltage
ariati on vs. Source Current and Temperatue



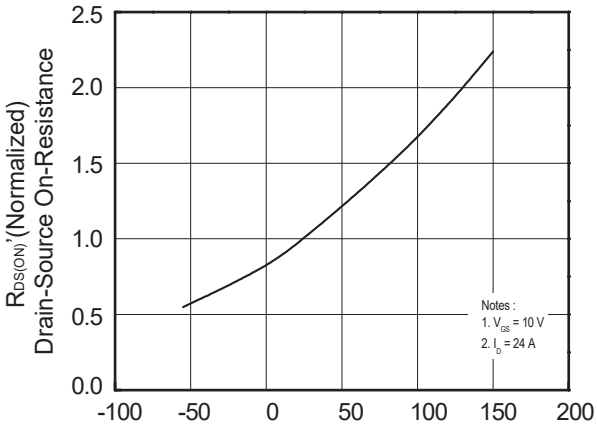

Capacitance Characteristics



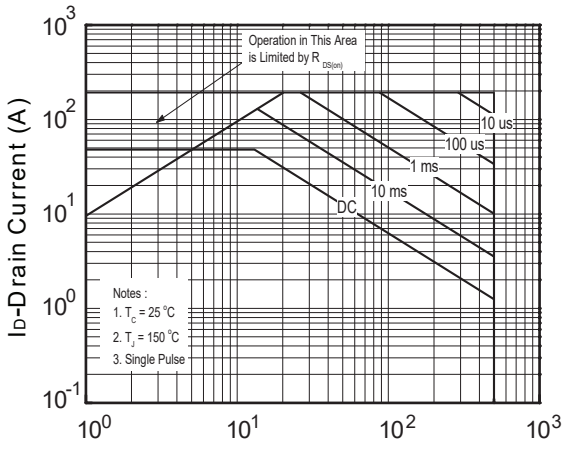

Gate Charge Characteristics



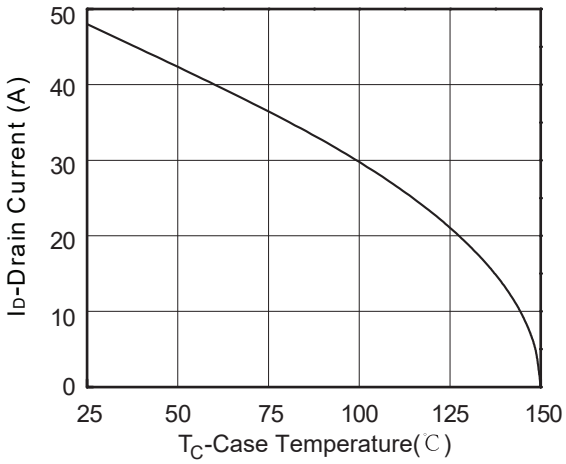

Breakdown Voltage Variation vs. Temperature



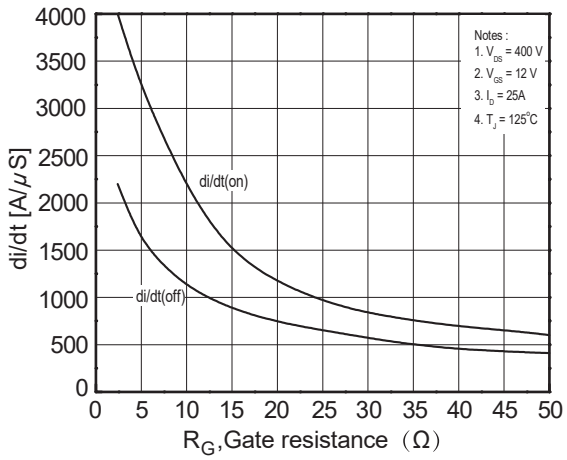

On-Resistance Variation vs. Temperature



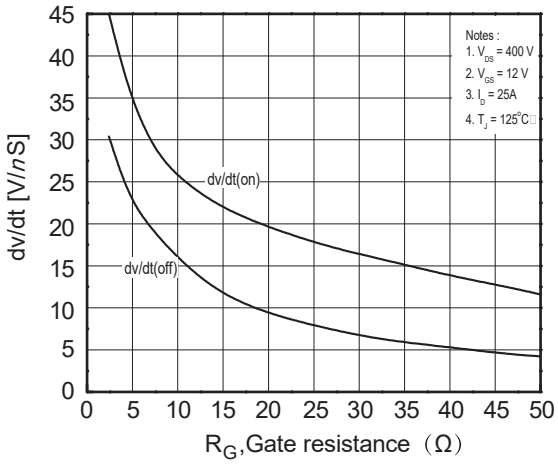

Maximum Safe Operating Area



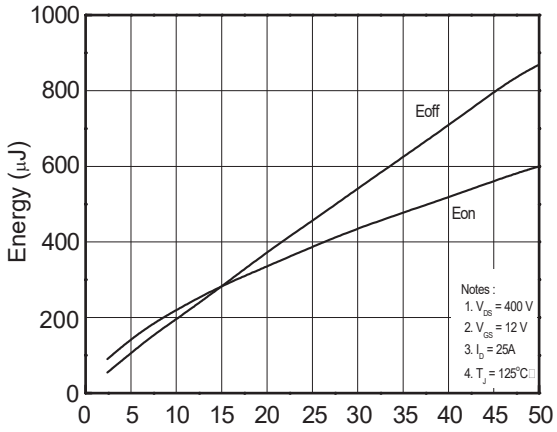

Maximum Drain Current vs. Case Temperature




Typical Drain Current Slope vs. Gate Resistance



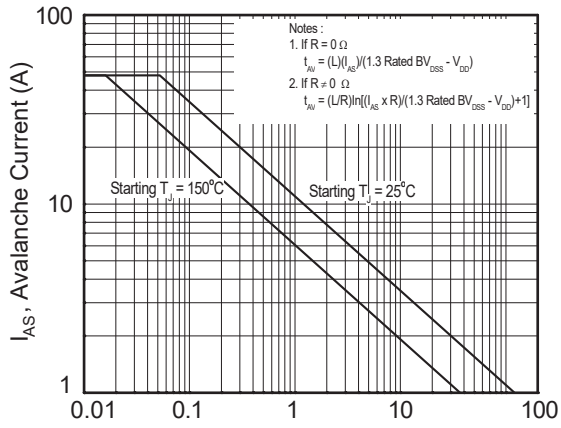

Typical Drain Source Voltage Slope vs. Gate Resistance




$R_G$, Gate resistance (Ω)

Typical Switching Losses

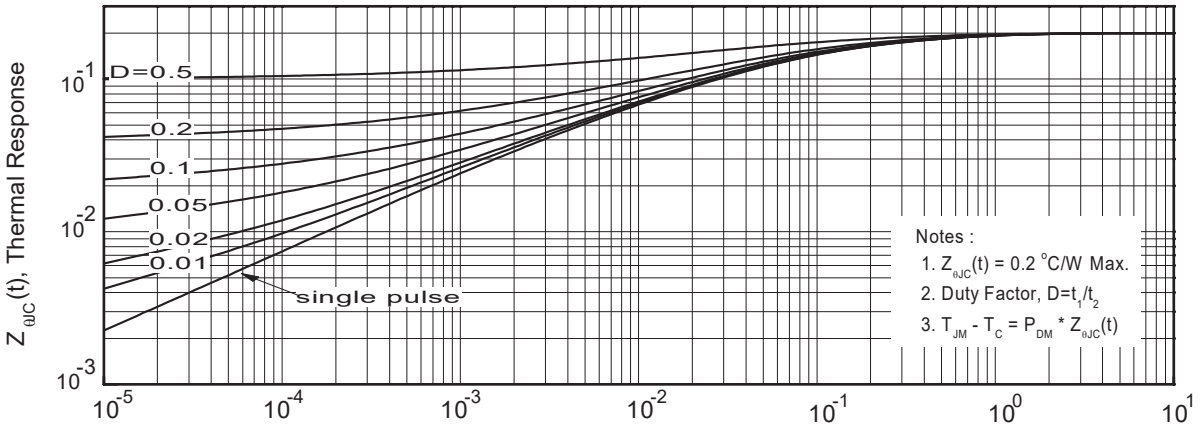
vs. Gate Resistance




$t_{AV}$, Time In Avalanche (ms)

Typical Switching Losses

vs. Gate Resistance




$t_1$, Square Wave Pulse Duration (sec)

Transient Thermal Resistance Curve