P-Channel 20-V (D-S) MOSFET

## General Description

These P-Channel enhancement mode power field effect transistors use advanced trench technology and design to provide excellent RDS(ON) . This device is suitable for use as a load switch or in PWM applications.

## Product Summary

| BVDSS | RDSON | ID |
|---|---|---|
| -20V | 3.3mΩ | -100A |

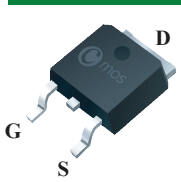
## Applications

- DC-DC Converters
- Load Switches
- BLDC Motor driver

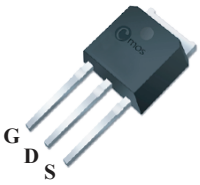
## Features

- Fast switching speed
- Lower On-resistance
- 100% EAS Guaranteed
- RoHS Compliant

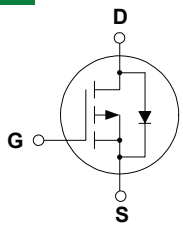
## TO-252 / 251 Pin Configuration




TO-252




TO-251




| Type | Package | Marking |
|---|---|---|
| CMD6411 | TO-252 | CMD6411 |
| CMU6411 | TO-251 | CMU6411 |

## Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | -20 | V |
| $V_{GS}$ | Gate-Source Voltage | ±12 | V |
| $I_D$@$T_C$=25℃ | Continuous Drain Current | -100 | A |
| $I_D$@$T_C$=100℃ | | -70 | A |
| $I_{DM}$ | Pulsed Drain Current | -400 | A |
| $E_{AS}$ | Drain-Source Avalanche Energy [1] | 250 | mJ |
| $P_D$@$T_C$=25℃ | Total Power Dissipation | 70 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |

## Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient | --- | 55 | ℃/W |
| $R_{\theta JC}$ | Thermal Resistance Junction -Case | --- | 1.8 | ℃/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 | -20 | --- | --- | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=-10V , $I_D$=-28A | --- | 2.9 | 3.3 | mΩ |
| | | $V_{GS}$=-4.5V, $I_D$=-25A | --- | 3.2 | 3.7 | |
| | | $V_{GS}$=-2.5V, $I_D$=-20A | --- | 4.1 | 4.7 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$, $I_D$ =-250uA | -0.5 | --- | -1.5 | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=-16V, $V_{GS}$=0V , $T_J$=25℃ | --- | --- | -1 | uA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$ = ±12V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | $V_{DS}$=-5V , $I_D$=-28A | --- | 74 | --- | S |
| $R_g$ | Gate Resistance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 10 | --- | Ω |
| $Q_g$ | Total Gate Charge | $V_{DS}$=-10V , $I_D$=-20A<br>$V_{GS}$=-10V | --- | 235 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 20 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 35 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DS}$=-10V, $V_{GS}$=-10V , $R_{GEN}$=3Ω<br>$R_L$=0.5Ω | --- | 10 | --- | ns |
| $T_r$ | Rise Time | | --- | 20 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 280 | --- | |
| $T_f$ | Fall Time | | --- | 90 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 12500 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 7200 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 5500 | --- | |

## Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current | $V_G$=$V_D$=0V , Force Current | --- | --- | -100 | A |
| $I_{SM}$ | Pulsed Source Current | | --- | --- | -400 | A |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V , $I_F$=-28A | --- | -0.82 | -1.2 | V |

Notes:

1.The EAS data shows Max. rating .The test condition is $V_{DS}$=-20V , $V_{GS}$=-10V , L=0.8mH , $I_{AS}$=-25A.

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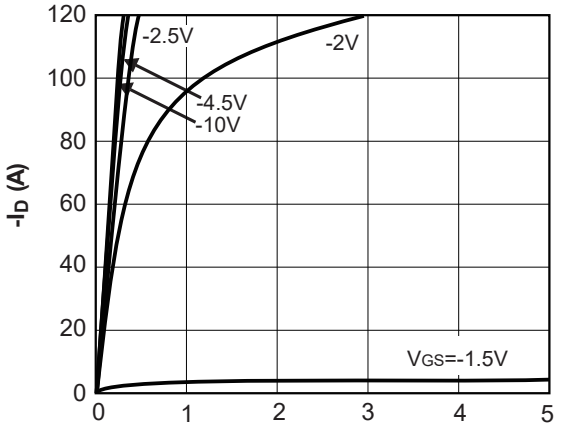
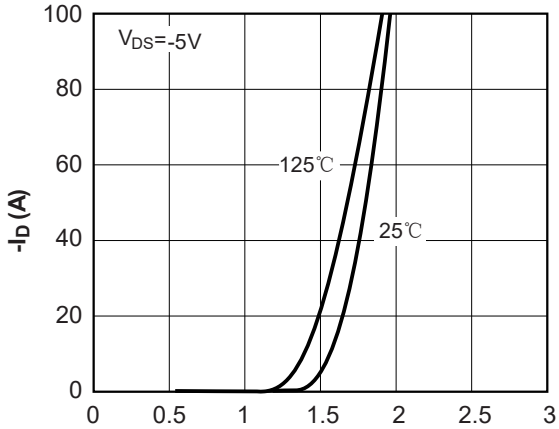
Cmos reserver the right to improve product design ,functions and reliability wihtout notice.

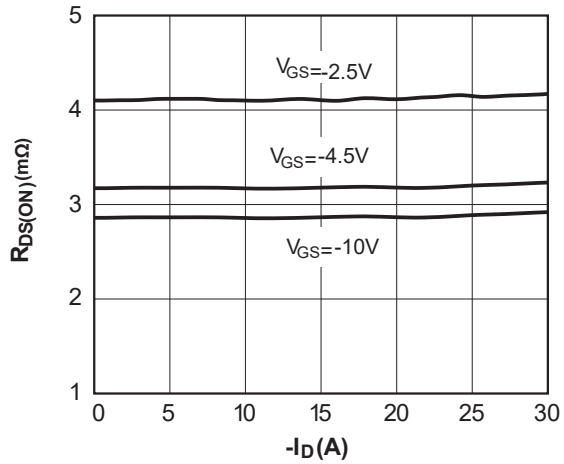
## Typical Characteristics



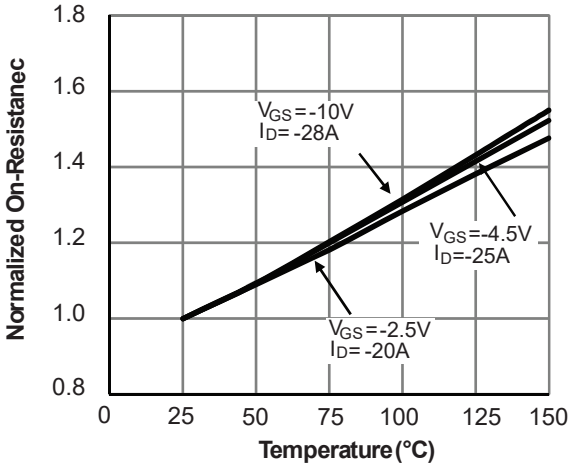

On-Region Characteristics



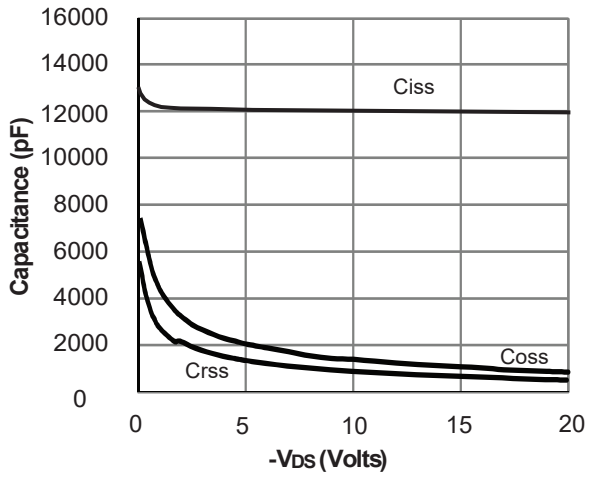

Transfer Characteristics



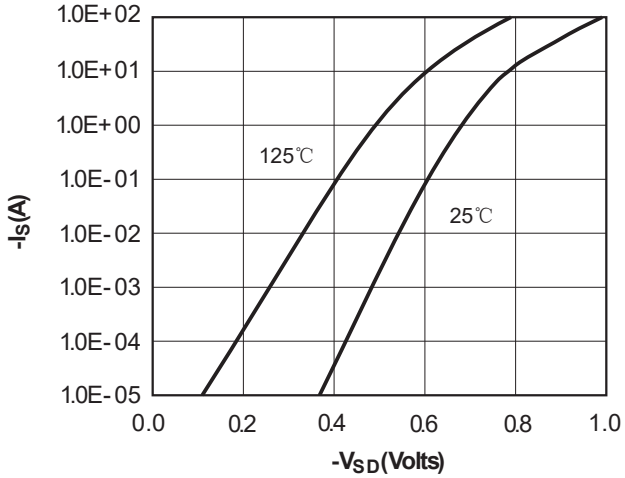

On-Resistance vs. Drain Current and Gate Voltage




On-Resistance vs. Junction Temperature




Capacitance Characteristics




Body-Diode Characteristics