# CMD60R180S6ZD/CMU60R180S6ZD

## 600V, 0.16Ω typ., 20A N-Channel Super Junction Power MOSFET

### General Description

The 60R180S6ZD is power MOSFET using Cmos's advanced super junction technology that can realize very low on resistance , gate charge and reduced tendency for ringing. As a result, its switching loss is very low, making it optimized for switching applications. Moreover, these user friendly devices offer the advantages of improved ruggedness and remarkable ESD capability by integrated Zener diode, making it an ideal choice for designers.

### Product Summary

| BVDSS | $R_{DS(on)}$ max. | ID |
|---|---|---|
| 600V | 0.18Ω | 20A |

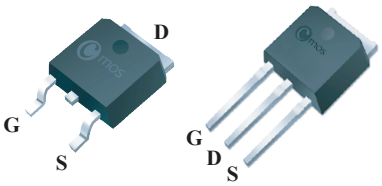
### Applications

- Adapter
- PFC power supply stages
- DC-DC converters

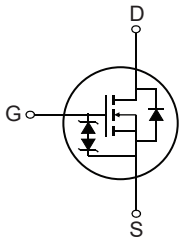
### Features

- Multi-layer Epitaxial Chip Technology
- Low On-Resistance
- 100% avalanche tested
- RoHS Compliant

### TO-252/251 Pin Configuration




TO-252 (CMD60R180S6ZD)  TO-251 (CMU60R180S6ZD)




### Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 600 | V |
| $V_{GS}$ | Gate-Source Voltage | ±25 | V |
| $I_D$@$T_C$=25℃ | Continuous Drain Current | 20 | A |
| $I_D$@$T_C$=100℃ | Continuous Drain Current | 14 | A |
| $I_{DM}$ | Pulsed Drain Current | 80 | A |
| EAS | Single Pulse Avalanche Energy[1] | 93 | mJ |
| $P_D$@$T_C$=25℃ | Total Power Dissipation | 75 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | 150 | ℃ |

### Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient | --- | 40.6 | ℃/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-case | --- | 1.67 | ℃/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 | 600 | --- | --- | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=10V , $I_D$=5.6A | --- | 160 | 180 | mΩ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 2.5 | --- | 4.5 | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=600V , $V_{GS}$ =0V | --- | --- | 1 | μA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$ =±25V , $V_{DS}$=0V | --- | --- | 10 | μA |
| gfs | Forward Transconductance | $V_{DS}$=5V , $I_D$=20A | --- | 8.7 | --- | S |
| $R_g$ | Gate Resistance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 10 | --- | Ω |
| $Q_g$ | Total Gate Charge | $I_D$=5.6A<br>$V_{DD}$=400V<br>$V_{GS}$=10V | --- | 28.6 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 7.1 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 8.9 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$ =300V<br>$V_{GS}$ =10V<br>$R_G$ =25Ω , $I_D$=18A | --- | 28 | --- | ns |
| $T_r$ | Rise Time | | --- | 35 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 93 | --- | |
| $T_f$ | Fall Time | | --- | 5.6 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=25V , $V_{GS}$=0V , f=1MHz | --- | 1400 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 280 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 3 | --- | |

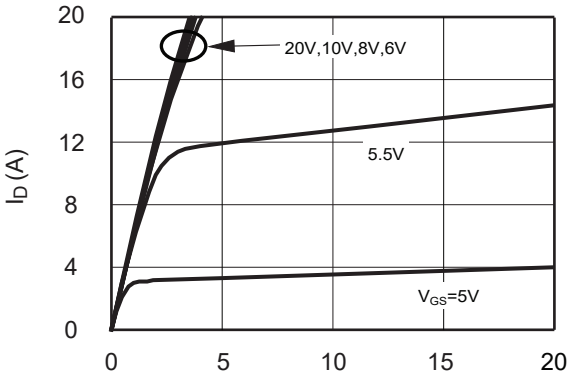
## Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current | $V_G$=$V_D$=0V , Force Current | --- | --- | 20 | A |
| $I_{SM}$ | Pulsed Source Current | | --- | --- | 80 | A |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V , $I_S$=5.6A ,$T_J$=25℃ | --- | 0.8 | 1.4 | V |
| $t_{rr}$ | Reverse Recovery Time | di/dt = 100A/μs<br>$V_{DD}$=400V , $I_{SD}$=5.6A | --- | 203 | --- | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | --- | 1.6 | --- | μC |

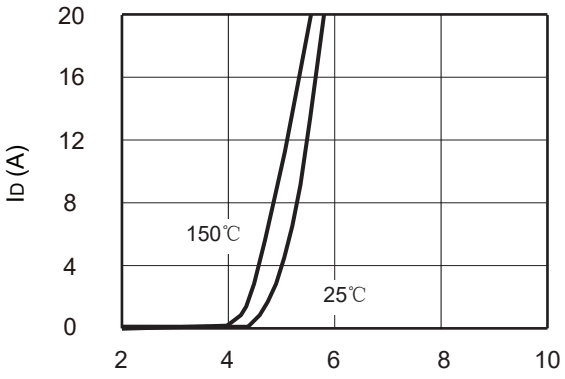
Note :

1.The EAS data shows Max. rating . The test condition is $V_{DD}$=100V , $V_{GS}$=10V , L=30mH , $I_{AS}$=2.5A.

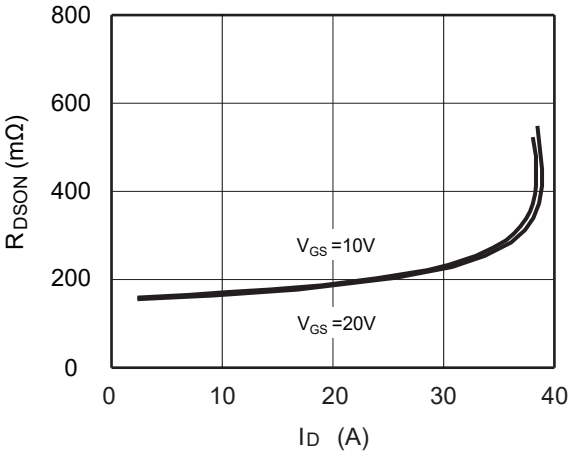
## Typical Characteristics



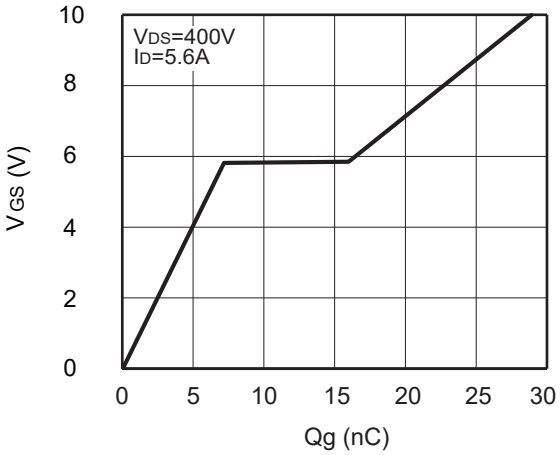

Output Characteristics



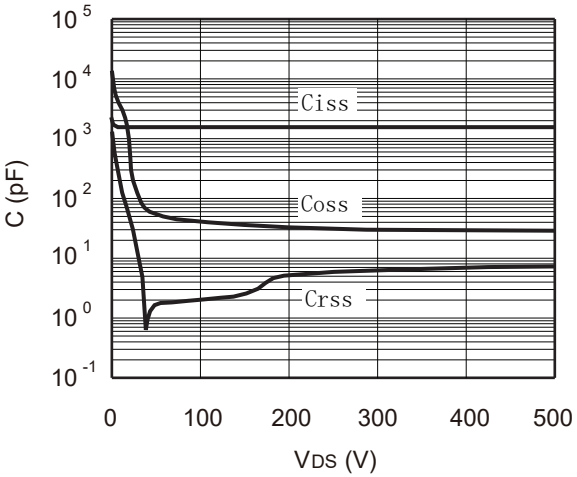

transfer characteristics



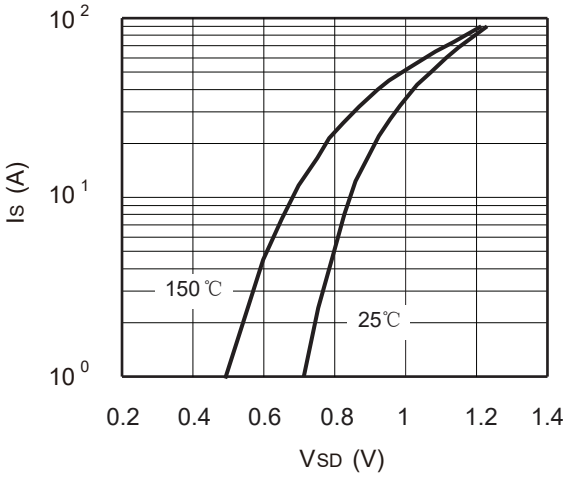

On-Resistance vs. Drain Current




Gate charge vs gate-source voltage



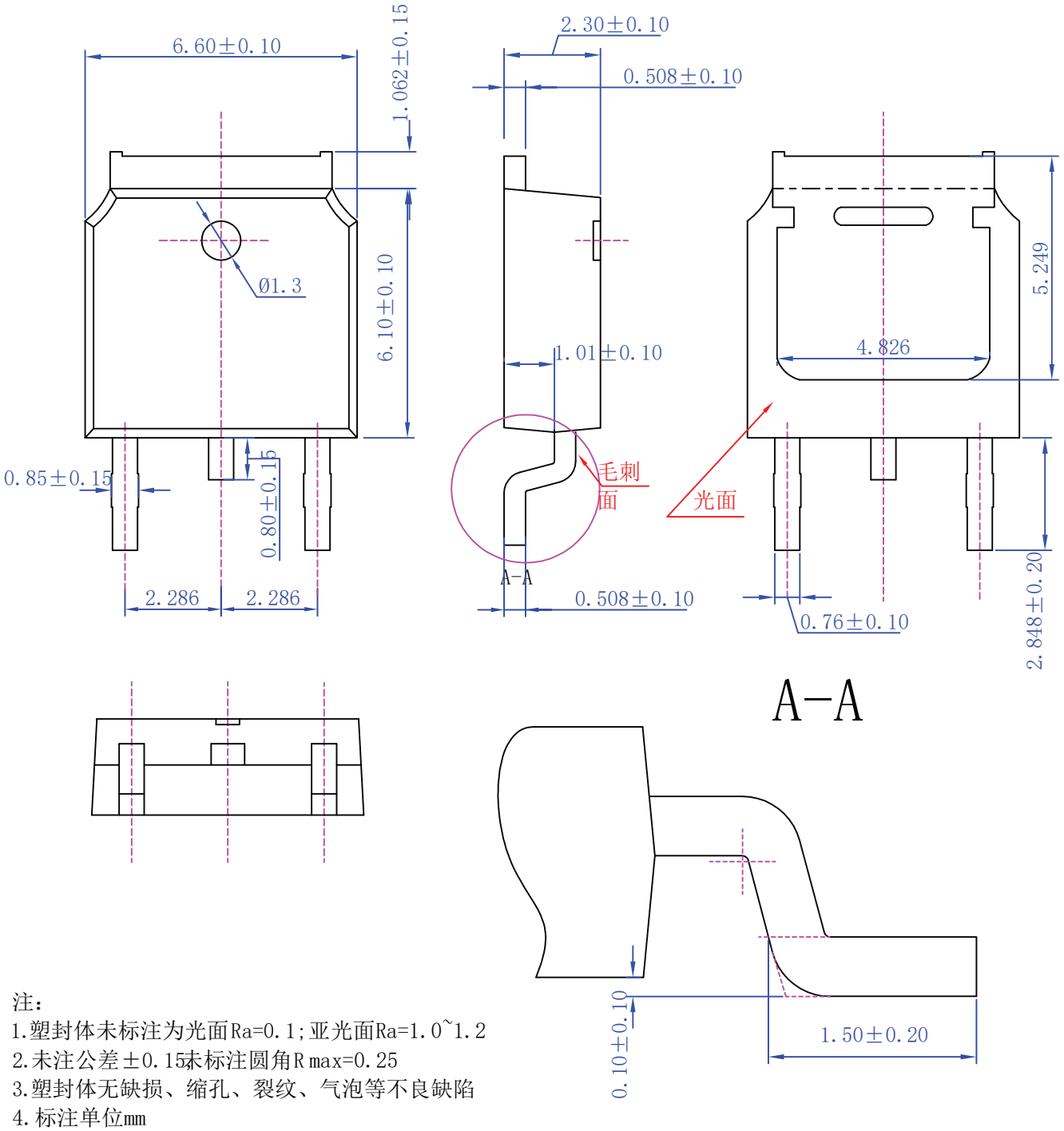

Capacitance Characteristics




Body-Diode Characteristics

## Package Dimension

TO-252 Unit :mm




注：
1.塑封体未标注为光面Ra=0.1;亚光面Ra=1.0~1.2
2.未注公差±0.15未标注圆角R max=0.25
3.塑封体无缺损、缩孔、裂纹、气泡等不良缺陷
4.标注单位mm
5.顶针孔不允许凸出塑封体表面

## Package Dimension

TO-251A Unit :mm