

# CMD60R290Q/CMU60R290Q

600V, 0.27Ω typ., 13.8A N-Channel Super Junction Power MOSFET

## General Description

The 60R290Q is power MOSFET using CMOS's advanced super junction technology that can realize very low on resistance and gate charge. It will provide much high efficiency by using optimized charge coupling technology. These user friendly devices give an advantage of Low EMI to designers as well as low switching loss.

## Features

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

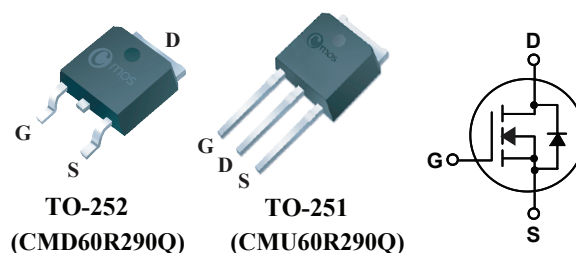
## Product Summary

| BVDSS | R <sub>DS(on)</sub> max. | ID    |
|-------|--------------------------|-------|
| 600V  | 300mΩ                    | 13.8A |

## Applications

- Adapter
- PFC Power Supply Stages
- Switching Applications

## TO-252/251 Pin Configuration



## Absolute Maximum Ratings

| Symbol                                | Parameter                                  | Rating     | Units |
|---------------------------------------|--|------------|-------|
| V <sub>DS</sub>                       | Drain-Source Voltage                       | 600        | V     |
| V <sub>GS</sub>                       | Gate-Source Voltage                        | ±30        | V     |
| I <sub>D</sub> @T <sub>C</sub> =25°C  | Continuous Drain Current                   | 13.8       | A     |
| I <sub>D</sub> @T <sub>C</sub> =100°C | Continuous Drain Current                   | 8.7        | A     |
| I <sub>DM</sub>                       | Pulsed Drain Current                       | 55.2       | A     |
| EAS                                   | Single Pulse Avalanche Energy <sup>1</sup> | 375        | mJ    |
| P <sub>D</sub> @T <sub>C</sub> =25°C  | Total Power Dissipation                    | 85         | W     |
| T <sub>STG</sub>                      | Storage Temperature Range                  | -55 to 150 | °C    |
| T <sub>J</sub>                        | Operating Junction Temperature Range       | 150        | °C    |

## Thermal Data

| Symbol           | Parameter                           | Typ. | Max. | Unit |
|------------------|-------------------------------------|------|------|------|
| R <sub>θJA</sub> | Thermal Resistance Junction-ambient | ---  | 62.5 | °C/W |
| R <sub>θJC</sub> | Thermal Resistance Junction-case    | ---  | 1.47 | °C/W |

### Electrical Characteristics(T<sub>J</sub>=25°C, unless otherwise noted)

| Symbol              | Parameter                         | Conditions   | Min. | Typ. | Max. | Unit |
|---------------------|-----------------------------------|--|------|------|------|------|
| BV <sub>DSS</sub>   | Drain-Source Breakdown Voltage    | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA               | 600  | ---  | ---  | V    |
| R <sub>DS(ON)</sub> | Static Drain-Source On-Resistance | V <sub>GS</sub> =10V, I <sub>D</sub> =6.5A               | ---  | 270  | 300  | mΩ   |
| V <sub>GS(th)</sub> | Gate Threshold Voltage            | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA | 2    | ---  | 4    | V    |
| I <sub>DSS</sub>    | Drain-Source Leakage Current      | V <sub>DS</sub> =600V, V <sub>GS</sub> =0V               | ---  | ---  | 1    | μA   |
| I <sub>GSS</sub>    | Gate-Source Leakage Current       | V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V               | ---  | ---  | ±100 | nA   |
| g <sub>fs</sub>     | Forward Transconductance          | V <sub>DS</sub> =10V, I <sub>D</sub> =6.5A               | ---  | 10.5 | ---  | S    |
| R <sub>g</sub>      | Gate Resistance                   | V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz         | ---  | 7    | ---  | Ω    |
| Q <sub>g</sub>      | Total Gate Charge                 | I <sub>D</sub> =13.8A                                    | ---  | 31   | ---  | nC   |
| Q <sub>gs</sub>     | Gate-Source Charge                | V <sub>DS</sub> =480V                                    | ---  | 8    | ---  |      |
| Q <sub>gd</sub>     | Gate-Drain Charge                 | V <sub>GS</sub> =10V                                     | ---  | 11   | ---  |      |
| T <sub>d(on)</sub>  | Turn-On Delay Time                | V <sub>DS</sub> =300V                                    | ---  | 20   | ---  | ns   |
| T <sub>r</sub>      | Rise Time                         | V <sub>GS</sub> =10V                                     | ---  | 43   | ---  |      |
| T <sub>d(off)</sub> | Turn-Off Delay Time               | R <sub>G</sub> =25Ω                                      | ---  | 91   | ---  |      |
| T <sub>f</sub>      | Fall Time                         | I <sub>D</sub> =13.8A                                    | ---  | 42   | ---  |      |
| C <sub>iss</sub>    | Input Capacitance                 | V <sub>DS</sub> =100V, V <sub>GS</sub> =0V, f=1MHz       | ---  | 940  | ---  | pF   |
| C <sub>oss</sub>    | Output Capacitance                |  | ---  | 45   | ---  |      |
| C <sub>rss</sub>    | Reverse Transfer Capacitance      |  | ---  | 10   | ---  |      |

### Diode Characteristics

| Symbol          | Parameter                 | Conditions  | Min. | Typ. | Max. | Unit |
|-----------------|---------------------------|---|------|------|------|------|
| I <sub>S</sub>  | Continuous Source Current | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current | ---  | ---  | 13.8 | A    |
| I <sub>SM</sub> | Pulsed Source Current     |   | ---  | ---  | 55.2 | A    |
| V <sub>SD</sub> | Diode Forward Voltage     | V <sub>GS</sub> =0V, I <sub>S</sub> =12A          | ---  | 0.87 | 1.4  | V    |
| t <sub>rr</sub> | Reverse Recovery Time     | V <sub>DD</sub> =100V, I <sub>S</sub> =13.8A      | ---  | 364  | ---  | ns   |
| Q <sub>rr</sub> | Reverse Recovery Charge   | di/dt=100A/μs                                     | ---  | 4.7  | ---  | μC   |

Note :

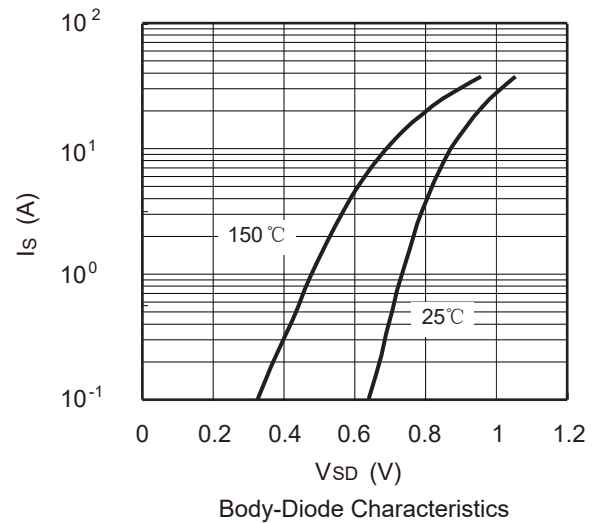
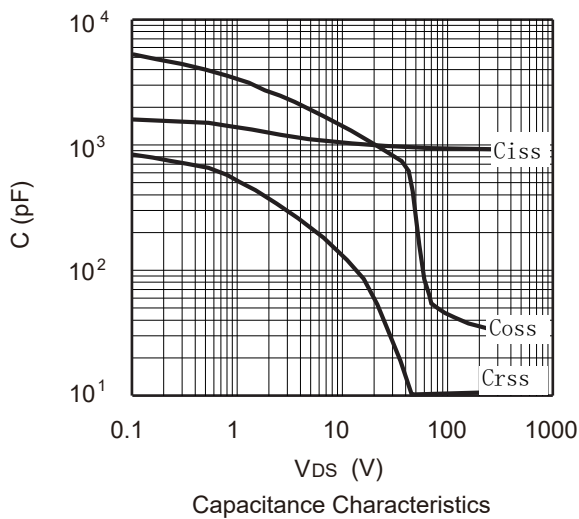
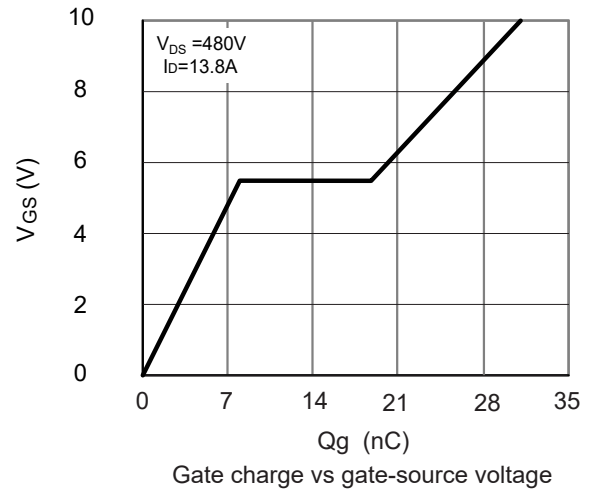
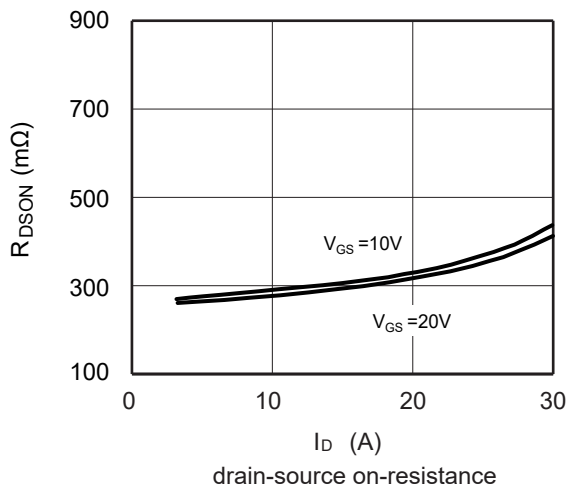
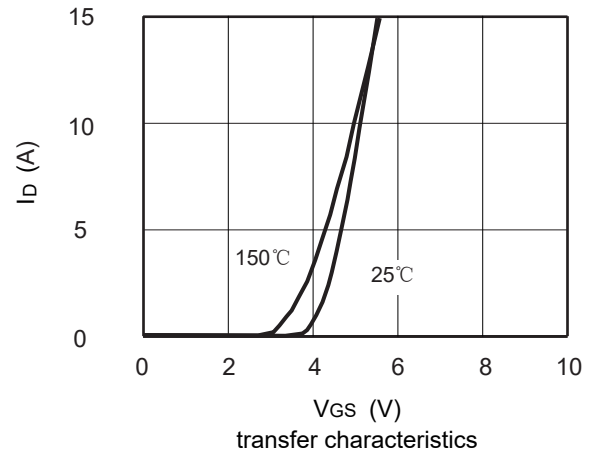
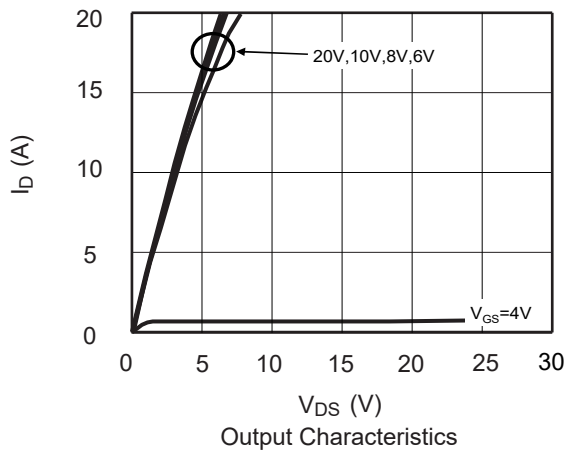
1. The EAS data shows Max. rating . The test condition is V<sub>DD</sub>=100V, V<sub>GS</sub>=10V, L=30mH, I<sub>AS</sub>=5A.

This product has been designed and qualified for the consumer market.

Cmos assumes no liability for customers' product design or applications.

Cmos reserves the right to improve product design, functions and reliability without notice. Please refer to the latest version of specification.

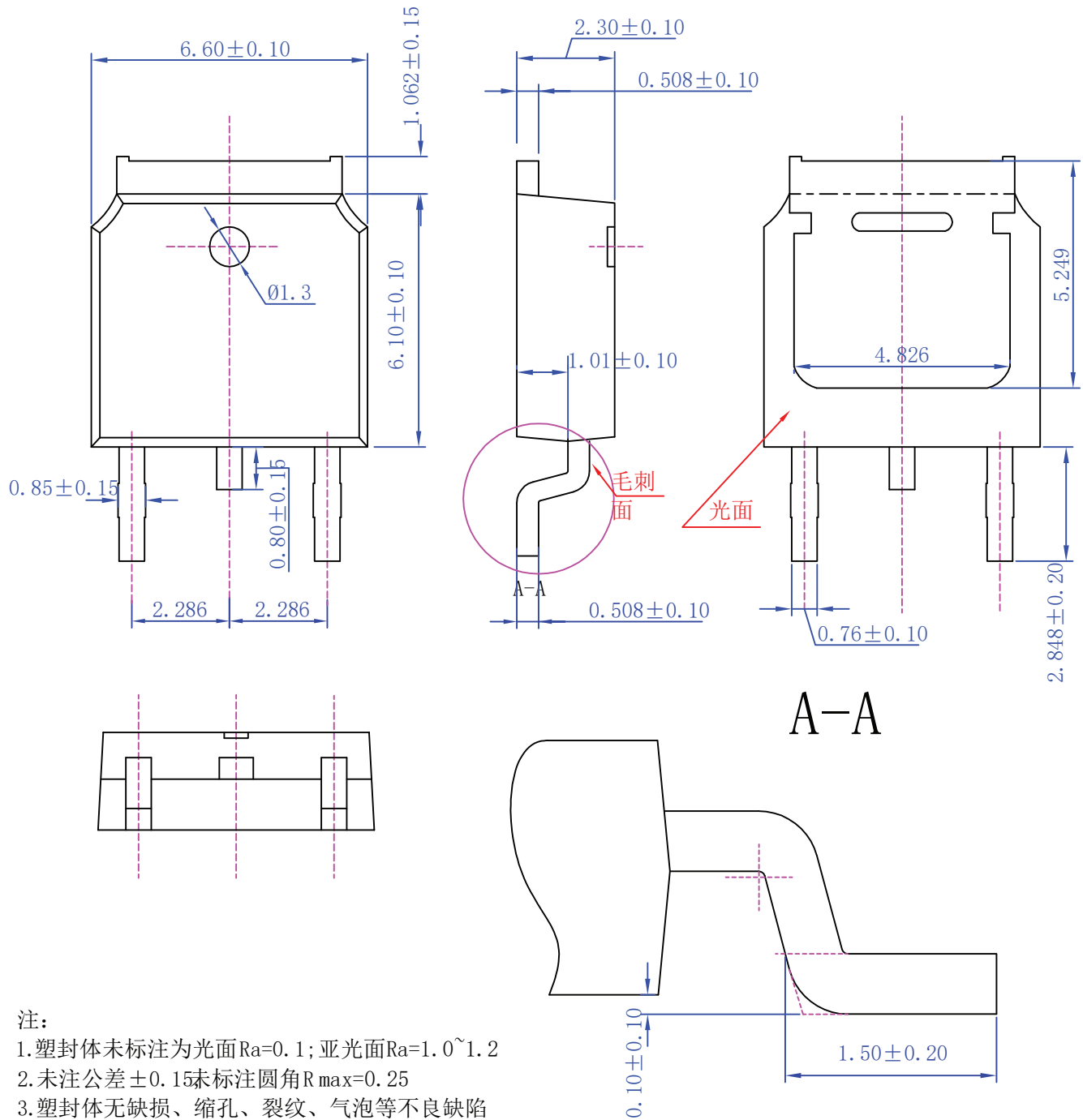
Typical Characteristics



Package Dimension

TO-252

Unit :mm



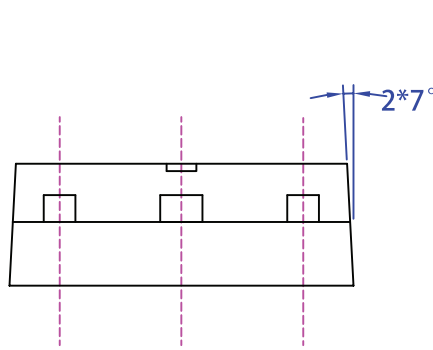
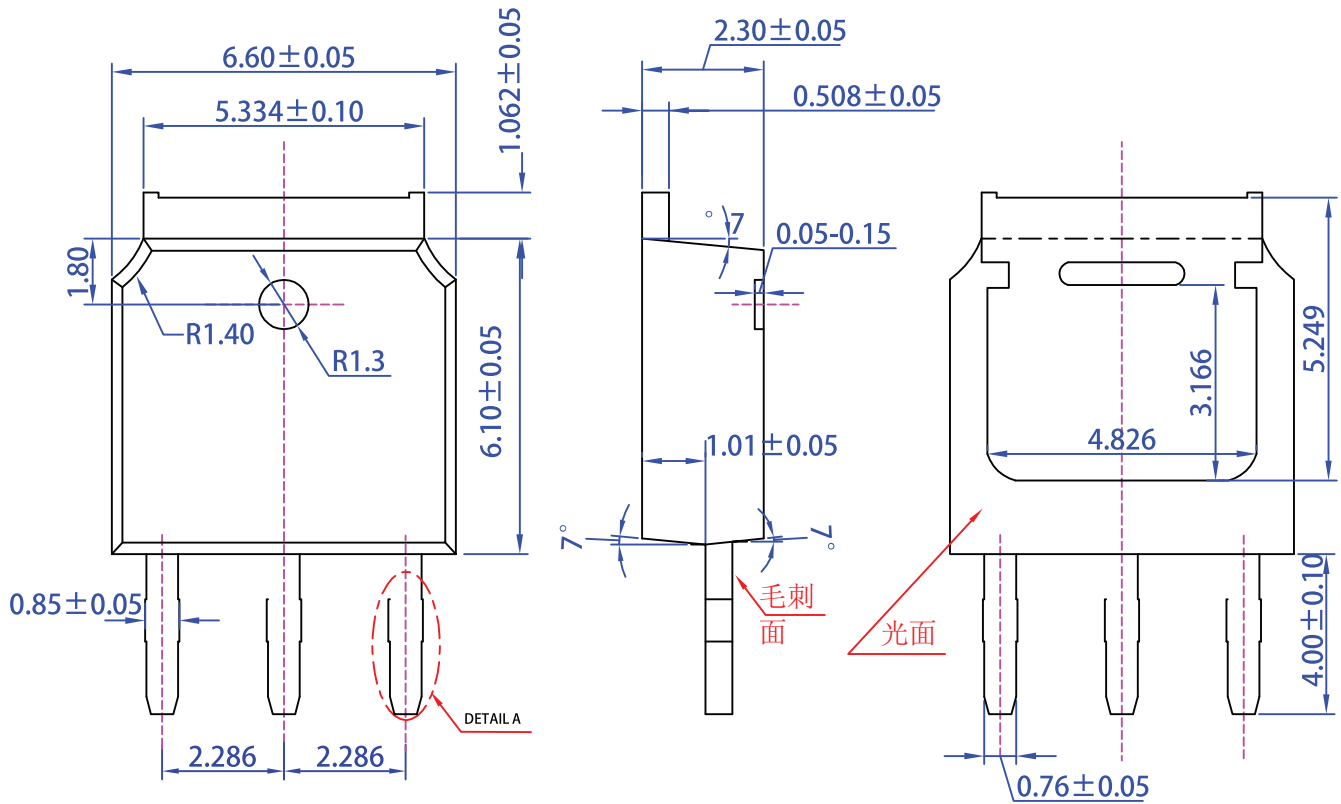
注:

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



**DETAIL A**  
 $0 < A1 \text{ or } A2 < 0.05$

