

# CMD120N02/CMU120N02

20V, 4.2mΩ typ., 120A N-Channel MOSFET

## General Description

The 120N02 uses advanced trench technology to provide excellent  $R_{DS(on)}$ .

This universal technology is well suited for PWM, load switching and general purpose applications.

## Features

- Low On-Resistance
- 100% avalanche tested
- RoHS Compliant

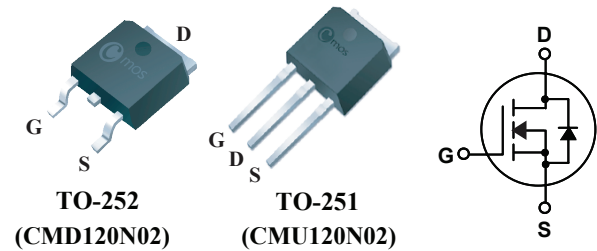
## Product Summary

| BVDSS | $R_{DS(on)}$ max. | ID   |
|-------|-------------------|------|
| 20V   | 4.5mΩ             | 120A |

## Applications

- DC/DC Converters

## TO-252/251 Pin Configuration



## Absolute Maximum Ratings

| Symbol                 | Parameter                                  | Rating     | Units |
|------------------------|--------------------------------------------|------------|-------|
| $V_{DS}$               | Drain-Source Voltage                       | 20         | V     |
| $V_{GS}$               | Gate-Source Voltage                        | ±12        | V     |
| $I_D@T_C=25^{\circ}C$  | Continuous Drain Current                   | 120        | A     |
| $I_D@T_C=100^{\circ}C$ | Continuous Drain Current                   | 80         | A     |
| $I_{DM}$               | Pulsed Drain Current                       | 480        | A     |
| EAS                    | Single Pulse Avalanche Energy <sup>1</sup> | 132        | mJ    |
| $P_D@T_C=25^{\circ}C$  | Total Power Dissipation                    | 85         | W     |
| $T_{STG}$              | Storage Temperature Range                  | -55 to 150 | °C    |
| $T_J$                  | Operating Junction Temperature Range       | -55 to 150 | °C    |

## Thermal Data

| Symbol          | Parameter                           | Typ. | Max. | Unit |
|-----------------|-------------------------------------|------|------|------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient | ---  | 90   | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-case    | ---  | 1.49 | °C/W |

### Electrical Characteristics( $T_J=25^{\circ}\text{C}$ , unless otherwise noted)

| Symbol       | Parameter                         | Conditions                                                          | Min. | Typ. | Max. | Unit |
|--------------|-----------------------------------|---------------------------------------------------------------------|------|------|------|------|
| $BV_{DSS}$   | Drain-Source Breakdown Voltage    | $V_{GS}=0V$ , $I_D=250\mu A$                                        | 20   | ---  | ---  | V    |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}=10V$ , $I_D=28A$                                            | ---  | 4    | 4.5  | mΩ   |
|              |                                   | $V_{GS}=4.5V$ , $I_D=25A$                                           | ---  | 4.2  | 4.9  |      |
|              |                                   | $V_{GS}=2.5V$ , $I_D=20A$                                           | ---  | 5.1  | 6    |      |
| $V_{GS(th)}$ | Gate Threshold Voltage            | $V_{GS}=V_{DS}$ , $I_D=250\mu A$                                    | 0.5  | ---  | 1.5  | V    |
| $I_{DSS}$    | Drain-Source Leakage Current      | $V_{DS}=20V$ , $V_{GS}=0V$                                          | ---  | ---  | 1    | μA   |
| $I_{GSS}$    | Gate-Source Leakage Current       | $V_{GS}=\pm 12V$ , $V_{DS}=0V$                                      | ---  | ---  | ±100 | nA   |
| $g_{fs}$     | Forward Transconductance          | $V_{DS}=5V$ , $I_D=10A$                                             | ---  | 33   | ---  | S    |
| $R_g$        | Gate Resistance                   | $V_{DS}=0V$ , $V_{GS}=0V$ , $f=1\text{MHz}$                         | ---  | 3.2  | ---  | Ω    |
| $Q_g$        | Total Gate Charge                 | $I_D=20A$                                                           | ---  | 31   | ---  | nC   |
| $Q_{gs}$     | Gate-Source Charge                | $V_{DS}=10V$                                                        | ---  | 5.2  | ---  |      |
| $Q_{gd}$     | Gate-Drain Charge                 | $V_{GS}=4.5V$                                                       | ---  | 8    | ---  |      |
| $T_{d(on)}$  | Turn-On Delay Time                | $V_{DS}=10V$<br>$V_{GS}=10V$ , $R_L=0.5\Omega$<br>$R_{GEN}=3\Omega$ | ---  | 8    | ---  | ns   |
| $T_r$        | Rise Time                         |                                                                     | ---  | 15   | ---  |      |
| $T_{d(off)}$ | Turn-Off Delay Time               |                                                                     | ---  | 72   | ---  |      |
| $T_f$        | Fall Time                         |                                                                     | ---  | 21   | ---  |      |
| $C_{iss}$    | Input Capacitance                 | $V_{DS}=20V$ , $V_{GS}=0V$ , $f=1\text{MHz}$                        | ---  | 2000 | ---  | pF   |
| $C_{oss}$    | Output Capacitance                |                                                                     | ---  | 180  | ---  |      |
| $C_{rss}$    | Reverse Transfer Capacitance      |                                                                     | ---  | 170  | ---  |      |

### Diode Characteristics

| Symbol   | Parameter                 | Conditions                                         | Min. | Typ. | Max. | Unit |
|----------|---------------------------|----------------------------------------------------|------|------|------|------|
| $I_S$    | Continuous Source Current | $V_G=V_D=0V$ , Force Current                       | ---  | ---  | 120  | A    |
| $I_{SM}$ | Pulsed Source Current     |                                                    | ---  | ---  | 480  | A    |
| $V_{SD}$ | Diode Forward Voltage     | $V_{GS}=0V$ , $I_S=28A$ , $T_J=25^{\circ}\text{C}$ | ---  | 0.88 | 1.2  | V    |

Note :

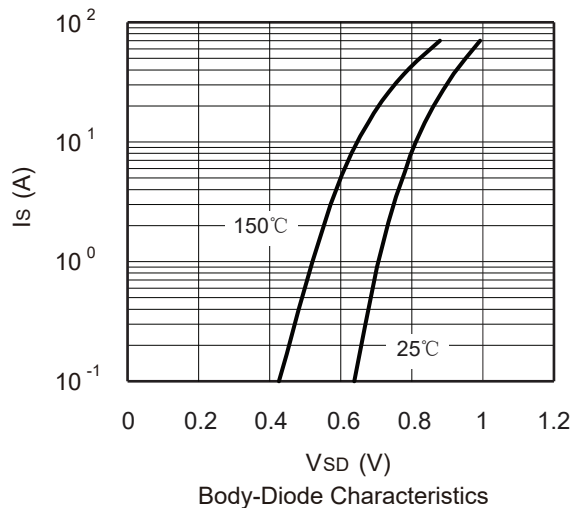
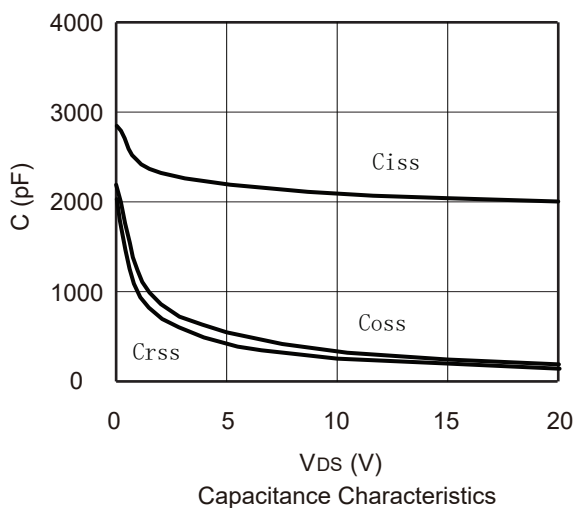
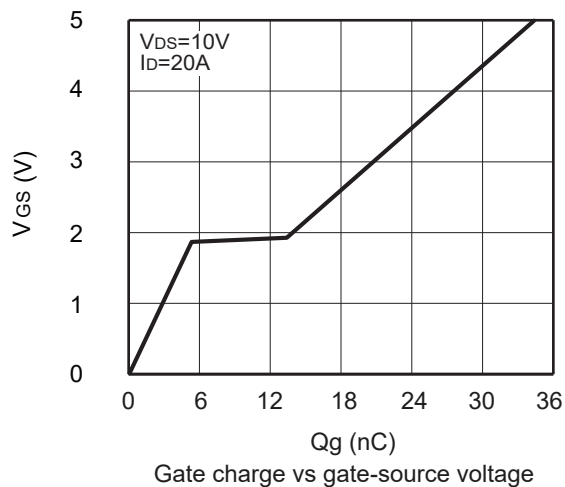
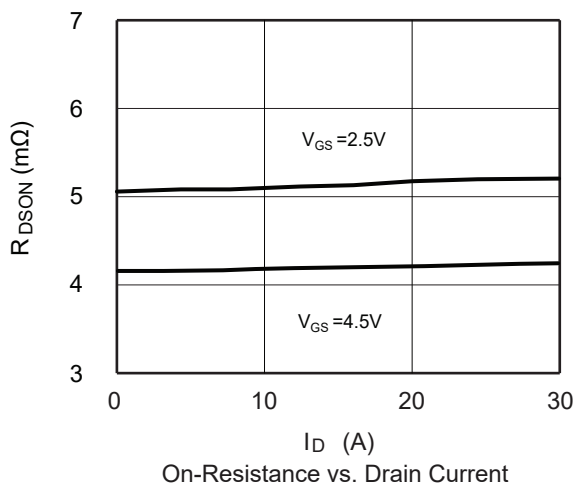
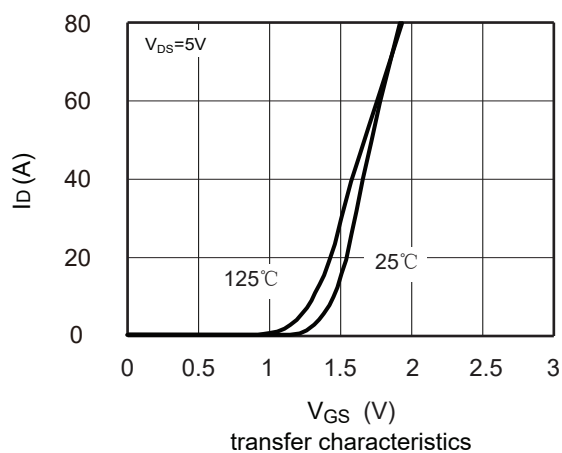
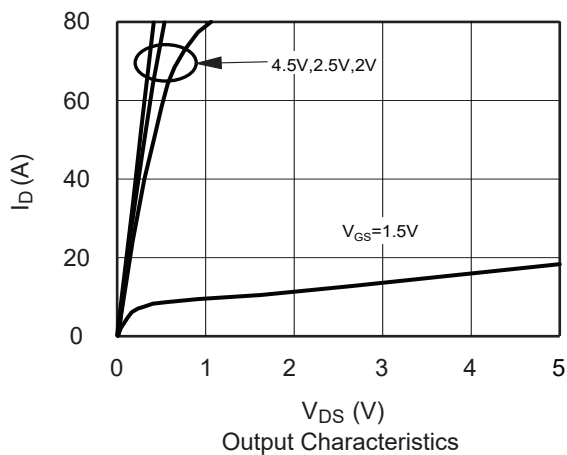
1.The EAS data shows Max. rating . The test condition is  $V_{DD}=20V$ ,  $V_{GS}=10V$ ,  $L=0.5\text{mH}$ ,  $I_{AS}=23A$ .

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

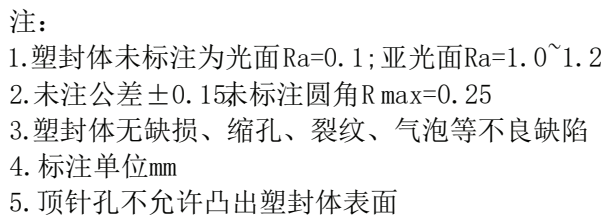
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Typical Characteristics



Unit :mm



Package Dimension

TO-251A

Unit :mm

