

### General Description

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

### Features

- P-channel Enhancement mode
- 100% Avalanche tested
- Low On-Resistance
- RoHS compliant

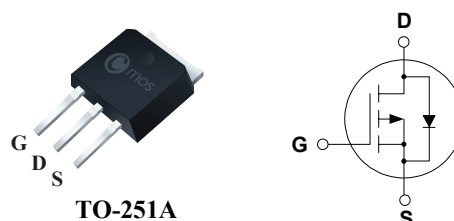
### Product Summary

| BVDSS | $R_{DS(on)}$ max. | ID   |
|-------|-------------------|------|
| -30V  | 8.8mΩ             | -90A |

### Applications

- DC-DC Converters
- LCD Display inverter
- Power Management in Note book

### TO-251A Pin Configuration



| Type     | Package | Marking  |
|----------|---------|----------|
| CMU90P03 | TO-251A | CMU90P03 |

### Absolute Maximum Ratings

| Symbol                | Parameter                                  | Rating     | Units |
|-----------------------|--------------------------------------------|------------|-------|
| $V_{DS}$              | Drain-Source Voltage                       | -30        | V     |
| $V_{GS}$              | Gate-Source Voltage                        | ±12        | V     |
| $I_D@T_C=25^{\circ}C$ | Continuous Drain Current                   | -90        | A     |
| $I_{DM}$              | Pulsed Drain Current                       | -270       | A     |
| EAS                   | Single Pulse Avalanche Energy <sup>1</sup> | 240        | mJ    |
| $P_D@T_C=25^{\circ}C$ | Total Power Dissipation                    | 135        | 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 | ---  | 62   | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction -Case   | ---  | 0.93 | °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    | $V_{GS}=0V$ , $I_D=-1mA$                                      | -30  | ---  | ---       | V         |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}=-10V$ , $I_D=-20A$                                    | ---  | 7    | 8.8       | $m\Omega$ |
|              |                                   | $V_{GS}=-4.5V$ , $I_D=-10A$                                   | ---  | 10   | 16        |           |
| $V_{GS(th)}$ | Gate Threshold Voltage            | $V_{GS}=V_{DS}$ , $I_D=-250\mu A$                             | -1   | ---  | -2.5      | V         |
| $I_{DSS}$    | Drain-Source Leakage Current      | $V_{DS}=-24V$ , $V_{GS}=0V$ , $T_J=25^{\circ}\text{C}$        | ---  | ---  | -1        | $\mu A$   |
|              |                                   | $V_{DS}=-24V$ , $V_{GS}=0V$ , $T_J=125^{\circ}\text{C}$       | ---  | ---  | -100      |           |
| $I_{GSS}$    | Gate-Source Leakage Current       | $V_{GS}=\pm 12V$ , $V_{DS}=0V$                                | ---  | ---  | $\pm 100$ | nA        |
| $g_{fs}$     | Forward Transconductance          | $V_{DS}=-5V$ , $I_D=-15A$                                     | ---  | 30   | ---       | S         |
| $R_g$        | Gate Resistance                   | $V_{DS}=0V$ , $V_{GS}=0V$ , $f=1MHz$                          | ---  | 15   | ---       | $\Omega$  |
| $Q_g$        | Total Gate Charge                 | $V_{DD}=-24V$ , $I_D=-90A$<br>$V_{GS}=0$ to $-10V$            | ---  | 125  | ---       | nC        |
| $Q_{gs}$     | Gate-Source Charge                |                                                               | ---  | 30   | ---       |           |
| $Q_{gd}$     | Gate-Drain Charge                 |                                                               | ---  | 15   | ---       |           |
| $T_{d(on)}$  | Turn-On Delay Time                | $V_{DD}=-15V$ , $V_{GS}=-10V$ , $R_G=3.5\Omega$<br>$I_D=-90A$ | ---  | 20   | ---       | ns        |
| $T_r$        | Rise Time                         |                                                               | ---  | 12   | ---       |           |
| $T_{d(off)}$ | Turn-Off Delay Time               |                                                               | ---  | 140  | ---       |           |
| $T_f$        | Fall Time                         |                                                               | ---  | 40   | ---       |           |
| $C_{iss}$    | Input Capacitance                 | $V_{DS}=-25V$ , $V_{GS}=0V$ , $f=1MHz$                        | ---  | 2900 | ---       | pF        |
| $C_{oss}$    | Output Capacitance                |                                                               | ---  | 250  | ---       |           |
| $C_{rss}$    | Reverse Transfer Capacitance      |                                                               | ---  | 190  | ---       |           |

## Diode Characteristics

| Symbol   | Parameter                 | Conditions                                          | Min. | Typ. | Max. | Unit |
|----------|---------------------------|-----------------------------------------------------|------|------|------|------|
| $I_S$    | Continuous Source Current | $V_G=V_D=0V$ , Force Current                        | ---  | ---  | -90  | A    |
| $I_{SM}$ | Pulsed Source Current     |                                                     | ---  | ---  | -360 | A    |
| $V_{SD}$ | Diode Forward Voltage     | $V_{GS}=0V$ , $I_F=-20A$ , $T_J=25^{\circ}\text{C}$ | ---  | ---  | -1.2 | V    |

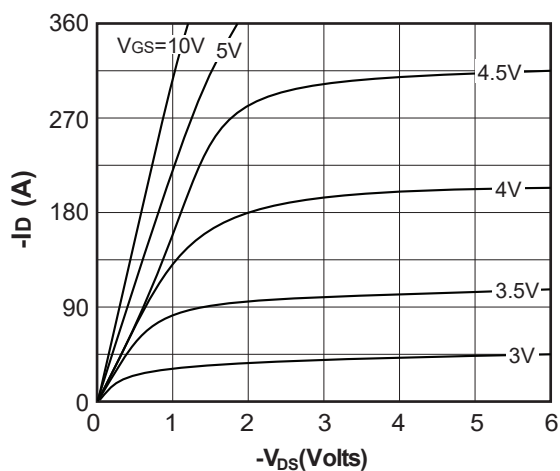
Note :

1.The EAS data shows Max. rating . The test condition is  $V_{DD}=25V$  ,  $V_{GS}=10V$  ,  $L=0.5mH$  ,  $I_{AS}=31A$ .

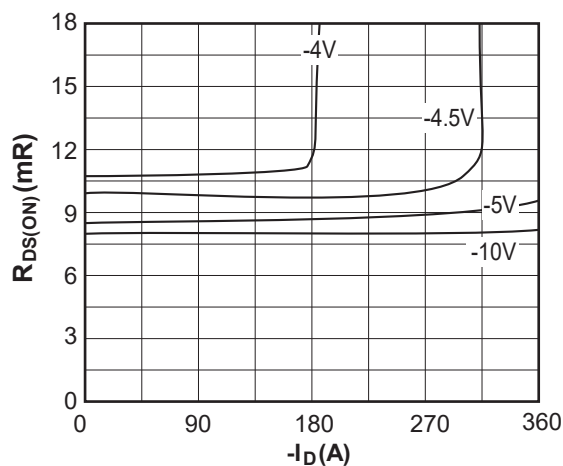
This product has been designed and qualified for the consumer market.

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.

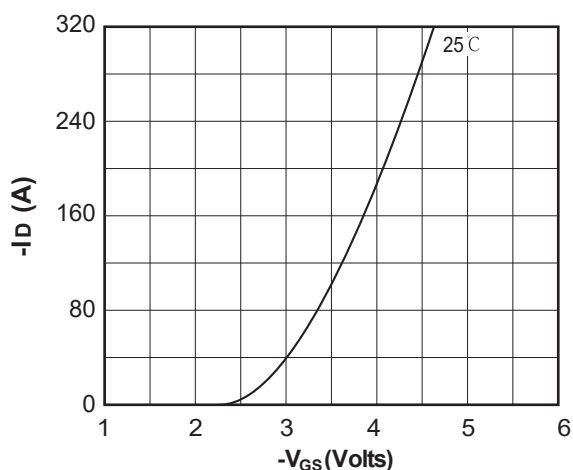


On-Region Characteristics

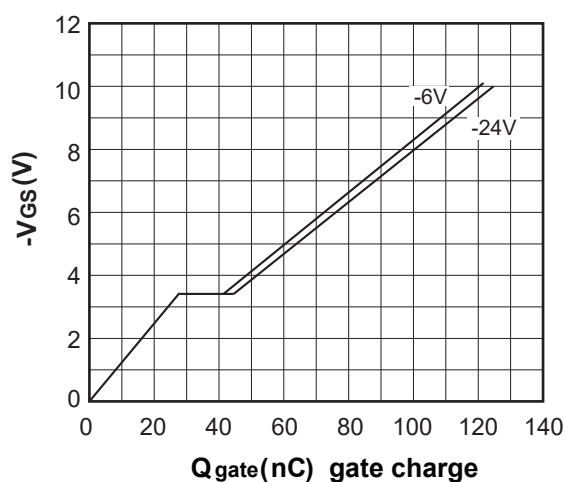


On-Resistance vs. Drain Current and Gate

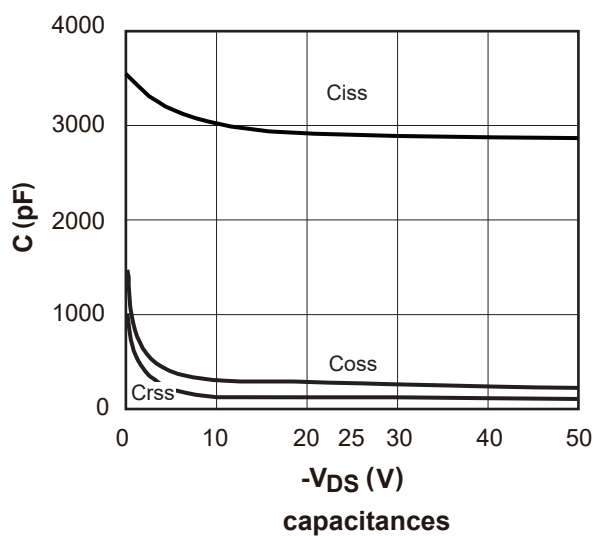
Voltage



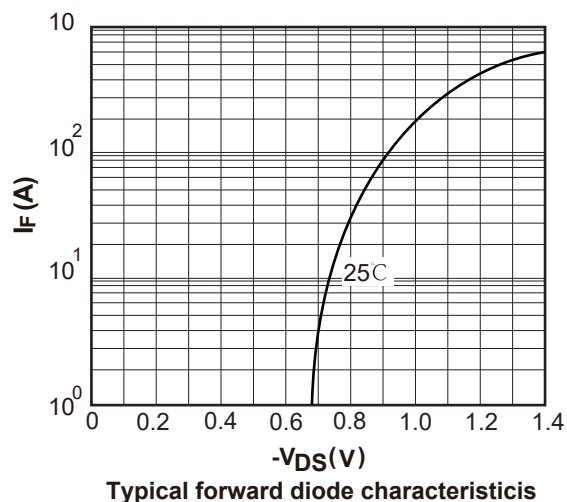
Transfer Characteristics



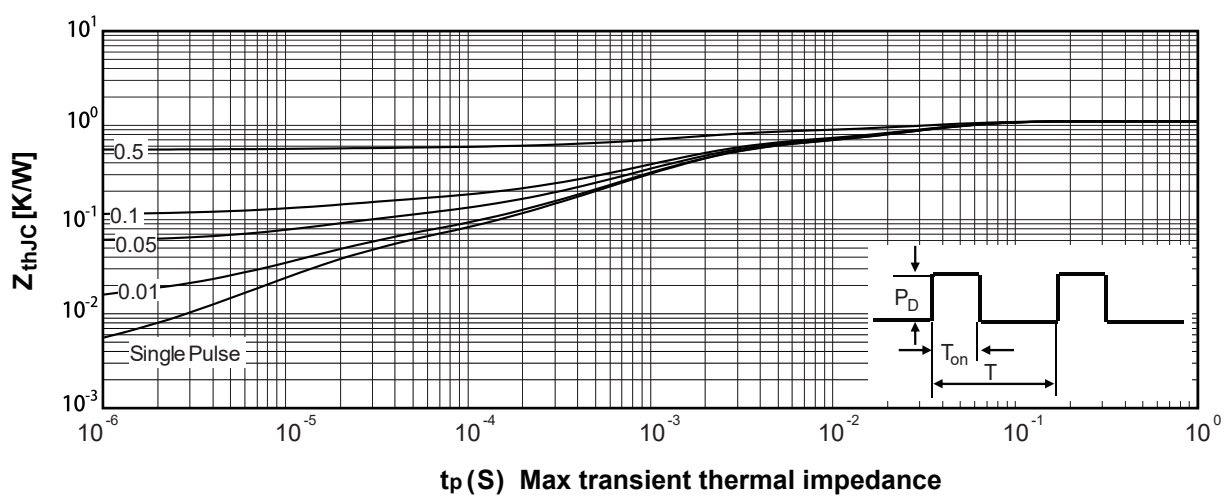
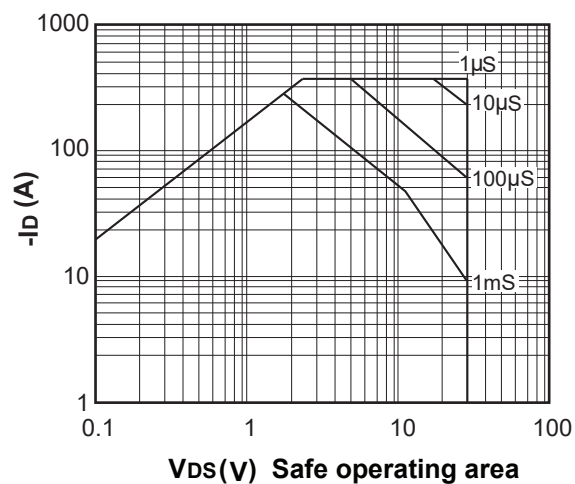
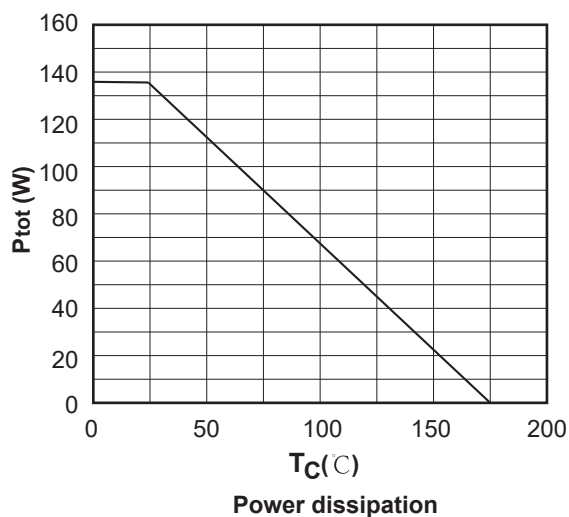
$Q_{gate}$  (nC) gate charge



capacitances



Typical forward diode characteristics



Package Dimension

TO-251A      Unit :mm

