

# CMSL190N25

250V, 17mΩ typ., 100A N-Channel MOSFET

## General Description

The CMSL190N25 uses advanced SGT technology to provide excellent RDS(ON). This device is well suited for high efficiency fast switching applications.

## Features

- Low On-Resistance
- 100% avalanche tested
- Surface Mount Package
- RoHS Compliant

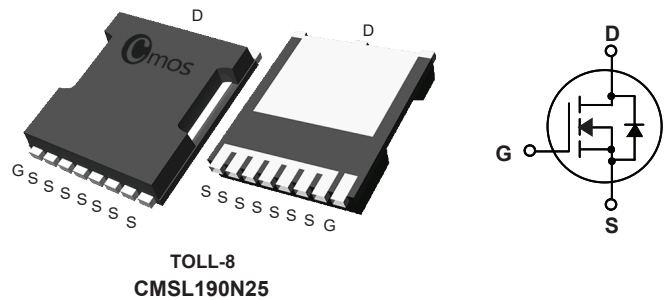
## Product Summary

| BVDSS | RDS(on) max. | ID   |
|-------|--------------|------|
| 250V  | 19mΩ         | 100A |

## Applications

- DC/DC and AC/DC converters
- Battery powered systems
- Brushed and BLDC Motor drive systems

## TOLL-8 Pin Configuration



## Absolute Maximum Ratings

| Symbol                                | Parameter                                  | Rating     | Units |
|---------------------------------------|--------------------------------------------|------------|-------|
| V <sub>DS</sub>                       | Drain-Source Voltage                       | 250        | V     |
| V <sub>GS</sub>                       | Gate-Source Voltage                        | ±20        | V     |
| I <sub>D</sub> @T <sub>C</sub> =25°C  | Continuous Drain Current                   | 100        | A     |
| I <sub>D</sub> @T <sub>C</sub> =100°C | Continuous Drain Current                   | 70         | A     |
| I <sub>DM</sub>                       | Pulsed Drain Current                       | 400        | A     |
| EAS                                   | Single Pulse Avalanche Energy <sup>1</sup> | 2250       | mJ    |
| P <sub>D</sub> @T <sub>C</sub> =25°C  | Total Power Dissipation                    | 375        | W     |
| T <sub>STG</sub>                      | Storage Temperature Range                  | -55 to 150 | °C    |
| T <sub>J</sub>                        | Operating Junction Temperature Range       | -55 to 150 | °C    |

## Thermal Data

| Symbol           | Parameter                                              | Typ. | Max. | Unit |
|------------------|--------------------------------------------------------|------|------|------|
| R <sub>θJA</sub> | Thermal Resistance Junction-ambient(minimal footprint) | ---  | 52   | °C/W |
| R <sub>θJC</sub> | Thermal Resistance Junction-case                       | ---  | 0.33 | °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    | $V_{GS}=0V$ , $I_D=250\mu A$                             | 250  | ---  | ---       | V    |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}=10V$ , $I_D=50A$                                 | ---  | 17   | 19        | mΩ   |
| $V_{GS(th)}$ | Gate Threshold Voltage            | $V_{GS}=V_{DS}$ , $I_D=250\mu A$                         | 2.0  | ---  | 4.0       | V    |
| $I_{DSS}$    | Drain-Source Leakage Current      | $V_{DS}=250V$ , $V_{GS}=0V$                              | ---  | ---  | 1         | uA   |
| $I_{GSS}$    | Gate-Source Leakage Current       | $V_{GS}=\pm 20V$ , $V_{DS}=0V$                           | ---  | ---  | $\pm 100$ | nA   |
| $g_{fs}$     | Forward Transconductance          | $V_{DS}=10V$ , $I_D=20A$                                 | ---  | 57   | ---       | S    |
| $R_g$        | Gate Resistance                   | $V_{DS}=0V$ , $V_{GS}=0V$ , $f=1\text{MHz}$              | ---  | 3.5  | ---       | Ω    |
| $Q_g$        | Total Gate Charge                 | $I_D=40A$                                                | ---  | 72   | ---       | nC   |
| $Q_{gs}$     | Gate-Source Charge                | $V_{DS}=125V$                                            | ---  | 28.6 | ---       |      |
| $Q_{gd}$     | Gate-Drain Charge                 | $V_{GS}=10V$                                             | ---  | 12.6 | ---       |      |
| $T_{d(on)}$  | Turn-On Delay Time                | $V_{DS}=125V$<br>$V_{GS}=10V$<br>$R_{G_{ext}}=2.7\Omega$ | ---  | 15   | ---       | ns   |
| $T_r$        | Rise Time                         |                                                          | ---  | 55   | ---       |      |
| $T_{d(off)}$ | Turn-Off Delay Time               |                                                          | ---  | 56   | ---       |      |
| $T_f$        | Fall Time                         |                                                          | ---  | 51.5 | ---       |      |
| $C_{iss}$    | Input Capacitance                 | $V_{DS}=25V$ , $V_{GS}=0V$ , $f=1\text{MHz}$             | ---  | 4900 | ---       | pF   |
| $C_{oss}$    | Output Capacitance                |                                                          | ---  | 3000 | ---       |      |
| $C_{rss}$    | Reverse Transfer Capacitance      |                                                          | ---  | 140  | ---       |      |

**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     | $V_{GS}=0V$ , $I_S=20A$ , $T_J=25^{\circ}\text{C}$ | ---  | 0.82  | 1.2  | V    |
| $t_{rr}$ | Reverse Recovery Time     | $di/dt=100A/\mu s$                                 | ---  | 156   | ---  | ns   |
| $Q_{rr}$ | Reverse Recovery Charge   | $T_J=25^{\circ}\text{C}$ , $I_{DS}=40A$            | ---  | 1.118 | ---  | μC   |

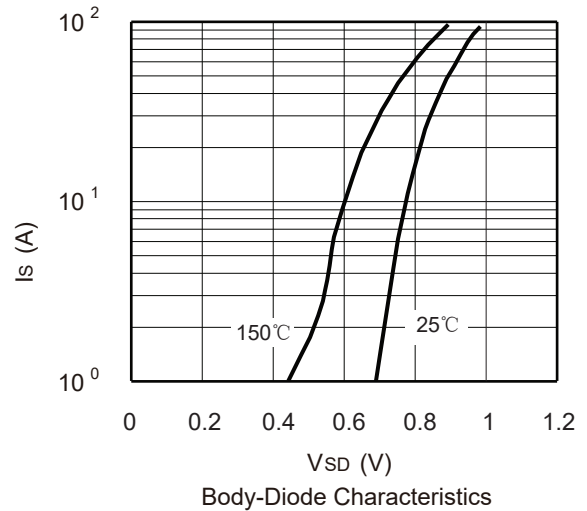
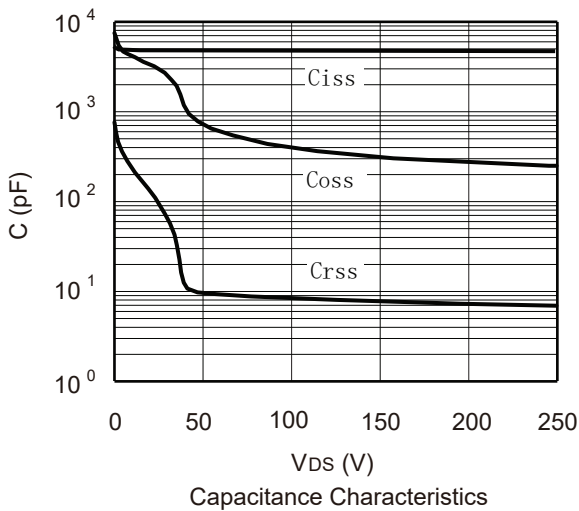
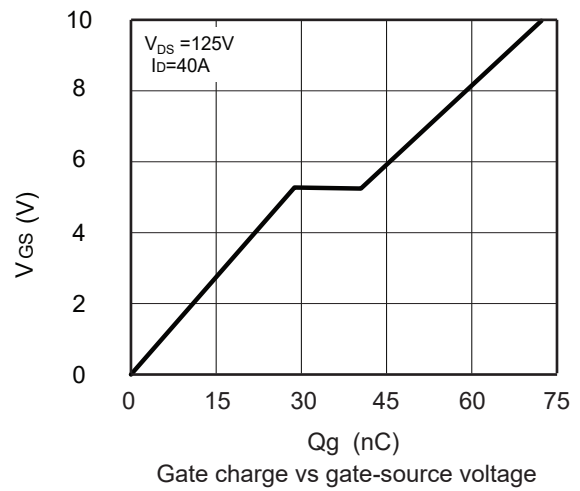
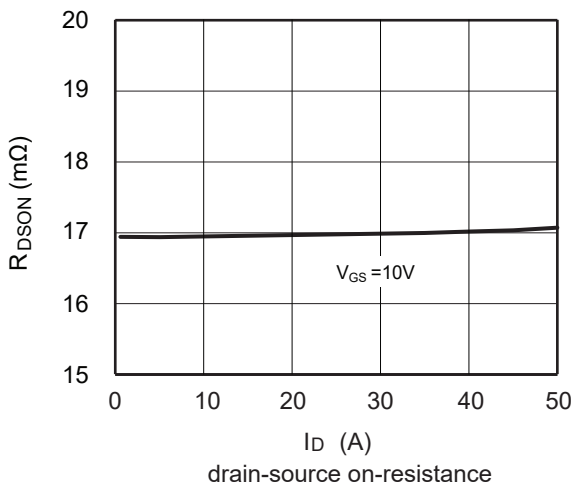
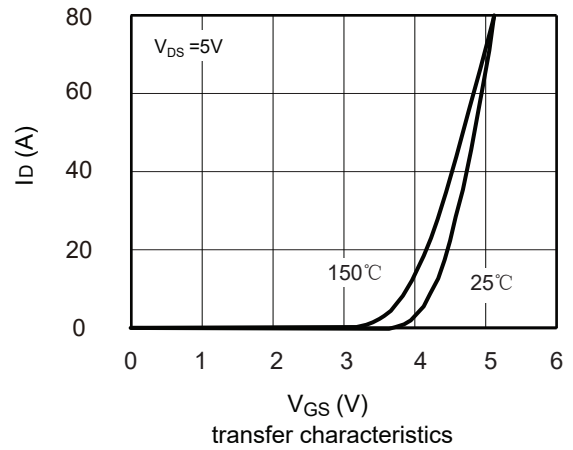
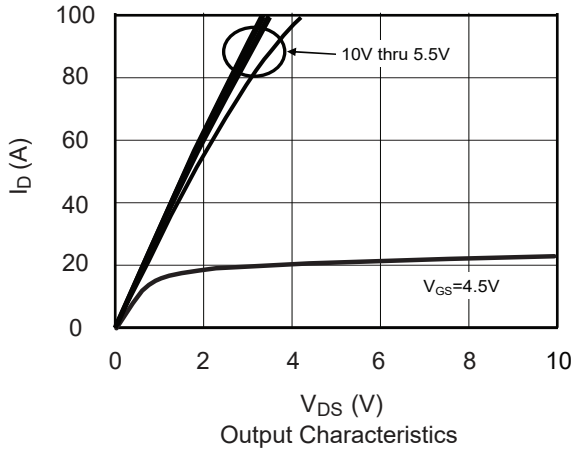
Note :

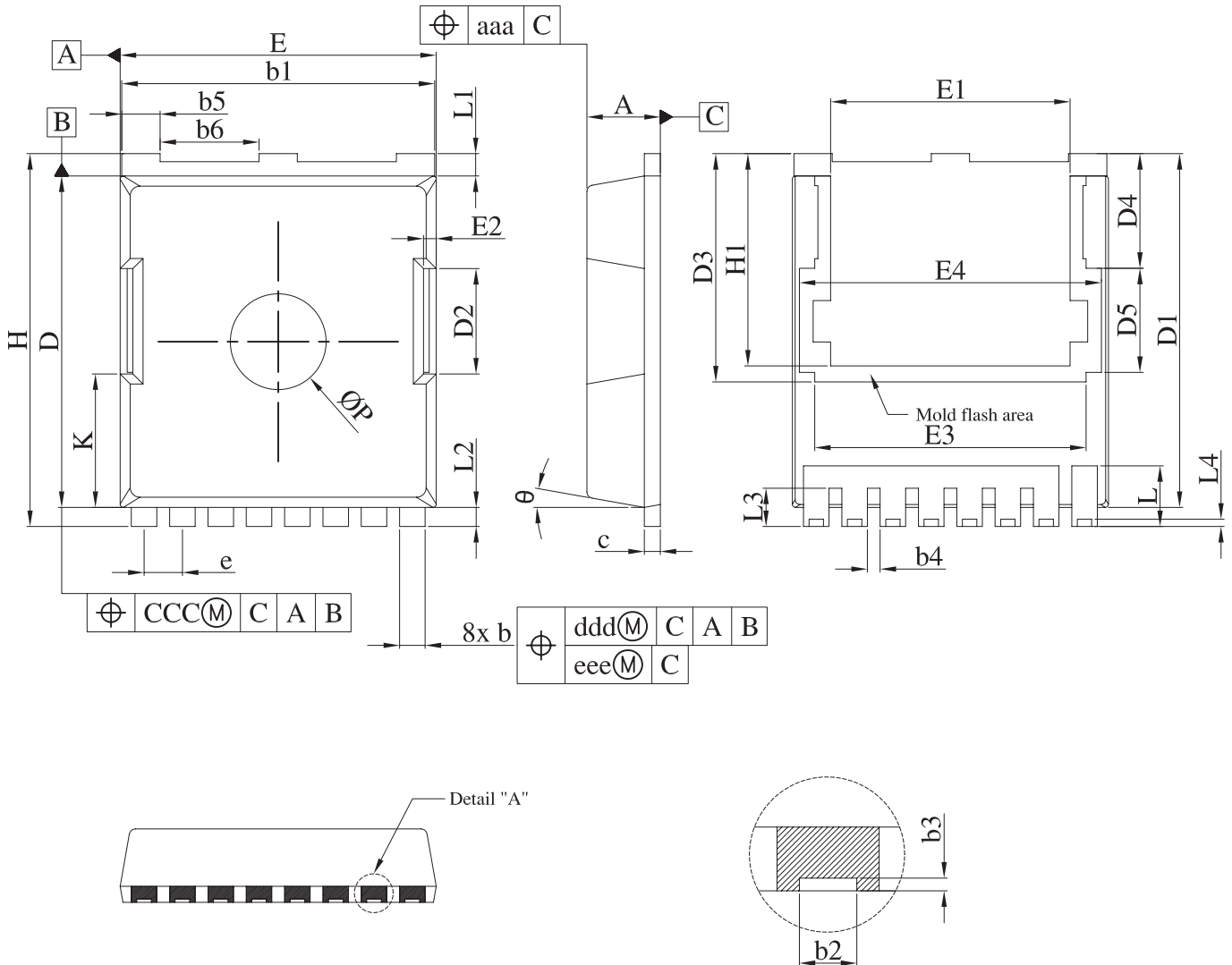
1.The EAS data shows Max. rating . The test condition is  $V_{DD}=80V$  ,  $V_{GS}=10V$  ,  $L=5mH$  ,  $I_{AS}=30A$ .

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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**
**TOLL-8**
**Unit :mm**


| SYMBOL     |      | A   | b   | b1   | b2    | b3   | b4   | b5  | b6  | c   | D     | D1    | D2   | D3      | D4   | D5   | e    | E   | E1  |
|------------|------|-----|-----|------|-------|------|------|-----|-----|-----|-------|-------|------|---------|------|------|------|-----|-----|
| MILLIMETER | MIN. | 2.2 | 0.7 | 9.7  | 0.36  | 0.05 | 0.3  | 1.1 | 3   | 0.4 | 10.28 | 10.98 | 3.2  | 7.15    | 3.59 | 3.26 | 1.1  | 9.8 | 7.4 |
|            | TYP. | 2.3 | 0.8 | 9.8  | 0.45  | 0.1  | 0.4  | 1.2 | 3.1 | 0.5 | 10.38 | 11.08 | 3.3  |         |      |      | 1.2  | 9.9 | 7.5 |
|            | MAX. | 2.4 | 0.9 | 9.9  | 0.55  | /    | 0.5  | 1.3 | 3.2 | 0.6 | 10.55 | 11.18 | 3.4  |         |      |      | 1.3  | 10  | 7.6 |
| SYMBOL     |      | E2  | E3  | E4   | H     | H1   | K    | L   | L1  | L2  | L3    | L4    | P    | θ       | aaa  | ccc  | ddd  | eee |     |
| MILLIMETER | MIN. | 0.3 | 8.5 | 9.46 | 11.5  | 6.55 | 4.08 | 1.6 | 0.5 | 0.5 | 1     | 0.13  | 2.85 | 10° REF | 0.2  | 0.2  | 0.25 | 0.2 |     |
|            | TYP. | 0.4 |     |      | 11.68 | 6.65 | 4.18 | 1.9 | 0.7 | 0.6 | 1.2   | 0.23  | 3    |         |      |      |      |     |     |
|            | MAX. | 0.5 |     |      | 11.85 | 6.75 | 4.28 | 2.1 | 0.9 | 0.7 | 1.3   | 0.33  | 3.15 |         |      |      |      |     |     |