



### CST9928 Dual N-Ch 20V Fast Switching MOSFETs

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent Cdv/dt effect decline
- ★ Advanced high cell density Trench technology

#### CST9928 Product Summary

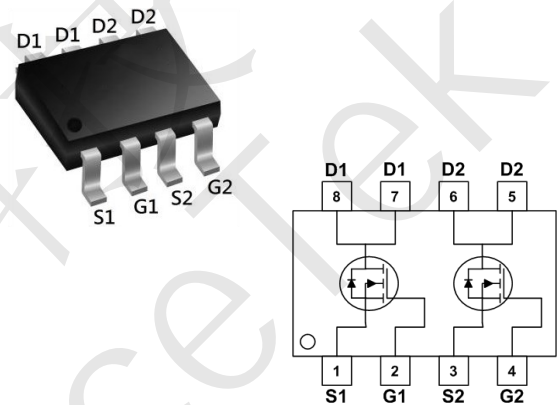


| BVDSS | RDSON | ID   |
|-------|-------|------|
| 20V   | 13mΩ  | 8.0A |

#### CST9928 Description

The CST9928 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications.

#### CST9928 SOP8 Pin Configuration



#### CST9928 Absolute Maximum Rating ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter  | Symbol         | Value      | Unit               |
|--|----------------|------------|--------------------|
| Drain-Source Voltage                             | $V_{DS}$       | 20         | V                  |
| Gate-Source Voltage                              | $V_{GS}$       | $\pm 12$   | V                  |
| Continuous Drain Current                         | $I_D$          | 8          | A                  |
| Pulsed Drain Current <sup>1</sup>                | $I_{DM}$       | 28         | A                  |
| Power Dissipation                                | $P_D$          | 2.25       | W                  |
| Operating Junction and Storage Temperature Range | $T_J, T_{STG}$ | -55 to 150 | $^{\circ}\text{C}$ |

#### CST9928 Thermal Characteristics

| Parameter  | Symbol          | Value | Unit                 |
|--|-----------------|-------|----------------------|
| Thermal Resistance from Junction to Ambient <sup>2</sup> | $R_{\theta JA}$ | 80    | $^{\circ}\text{C/W}$ |



#### CST9928 Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

| Parameter                                     | Symbol                    | Test Condition  | Min. | Typ. | Max. | Unit |
|---|---------------------------|---|------|------|------|------|
| <b>Static Characteristics</b>                 |                           |   |      |      |      |      |
| Drain-Source Breakdown Voltage                | <b>BV<sub>DSS</sub></b>   | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA  | 20   | -    | -    | V    |
| Gate Leakage Current                          | <b>I<sub>GSS</sub></b>    | V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V  | -    | -    | ±100 | nA   |
| Drain Cut-off Current                         | <b>I<sub>DSS</sub></b>    | V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V   | -    | -    | 1    | μA   |
| Gate Threshold Voltage                        | <b>V<sub>GS(th)</sub></b> | V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250μA                                | 0.45 | 0.7  | 1    | V    |
| Drain-Source On-State Resistance <sup>3</sup> | <b>R<sub>DS(on)</sub></b> | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5A   | -    | 13   | 20   | mΩ   |
|   |                           | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 4.7A   | -    | 18   | 30   |      |
|   |                           | V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 4.3A   | -    | 28   | 57   |      |
| <b>Dynamic Characteristics<sup>4</sup></b>    |                           |   |      |      |      |      |
| Input Capacitance                             | <b>C<sub>iss</sub></b>    | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 10V,<br>f = 1MHz                                  | -    | 700  | -    | pF   |
| Output Capacitance                            | <b>C<sub>oss</sub></b>    |   | -    | 120  | -    |      |
| Reverse Transfer Capacitance                  | <b>C<sub>rss</sub></b>    |   | -    | 105  | -    |      |
| <b>Switching Characteristics<sup>4</sup></b>  |                           |   |      |      |      |      |
| Total Gate Charge                             | <b>Q<sub>g</sub></b>      | V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V,<br>I <sub>D</sub> = 5A                     | -    | 10.5 | -    | nC   |
| Gate-Source Charge                            | <b>Q<sub>gs</sub></b>     |   | -    | 2    | -    |      |
| Gate-Drain Charge                             | <b>Q<sub>gd</sub></b>     |   | -    | 2.5  | -    |      |
| Turn-On Time                                  | <b>t<sub>d(on)</sub></b>  | V <sub>GS</sub> = 5V, V <sub>DD</sub> = 10V,<br>I <sub>D</sub> = 5A, R <sub>G</sub> = 3Ω, | -    | 10   | -    | ns   |
| Rise Time                                     | <b>t<sub>r</sub></b>      |   | -    | 20   | -    |      |
| Turn-Off Time                                 | <b>t<sub>d(off)</sub></b> |   | -    | 32   | -    |      |
| Fall Time                                     | <b>t<sub>f</sub></b>      |   | -    | 12   | -    |      |
| <b>Source-Drain Diode Characteristics</b>     |                           |   |      |      |      |      |
| Body Diode Voltage <sup>3</sup>               | <b>V<sub>SD</sub></b>     | I <sub>S</sub> = 4A, V <sub>GS</sub> = 0V   | -    | -    | 1.2  | V    |
| Continuous Source Current                     | <b>I<sub>S</sub></b>      |   | -    | -    | 8    | A    |

#### Notes:

1. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub> = 150°C.
2. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width ≤ 300μs, duty cycle ≤ 2%.
4. This value is guaranteed by design hence it is not included in the production test.



CST9928 Typical Characteristics

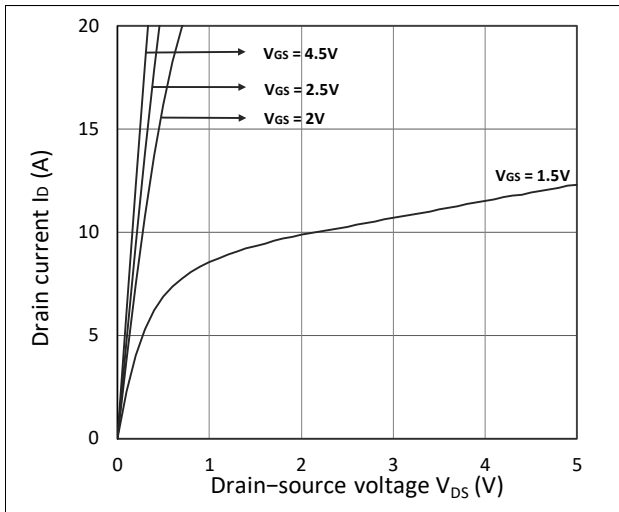


Figure 1. Output Characteristics

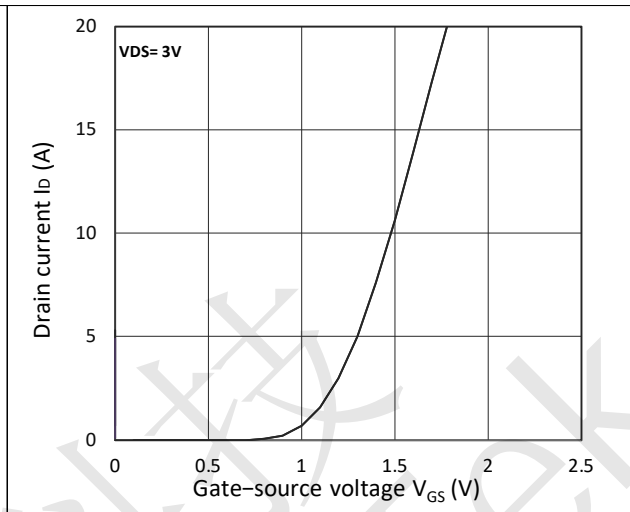


Figure 2. Transfer Characteristics

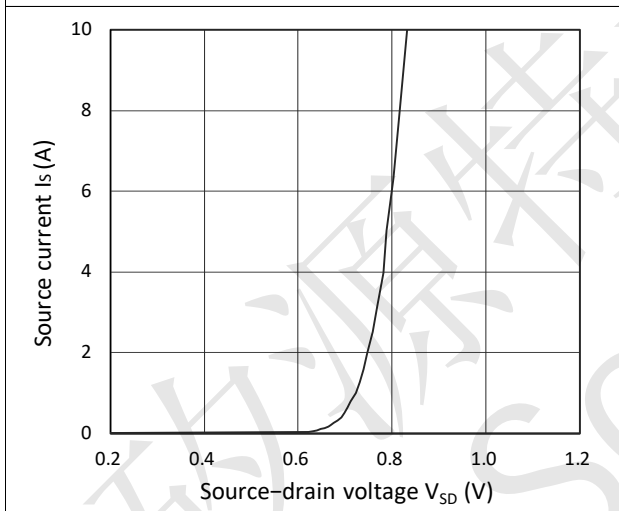


Figure 3. Forward Characteristics of Reverse

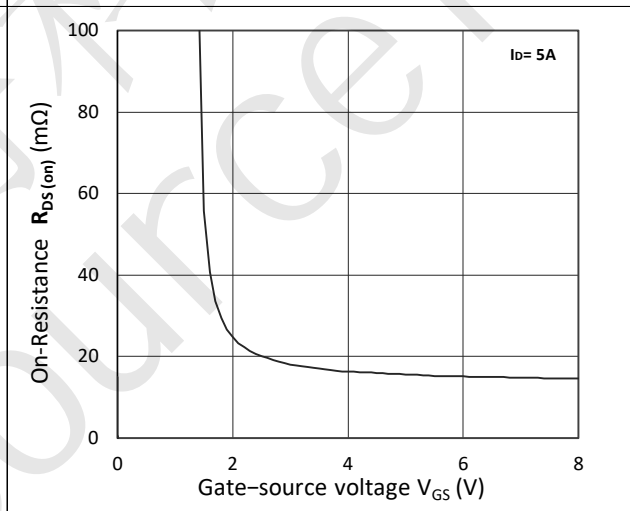


Figure 4.  $R_{DS(ON)}$  vs.  $V_{GS}$

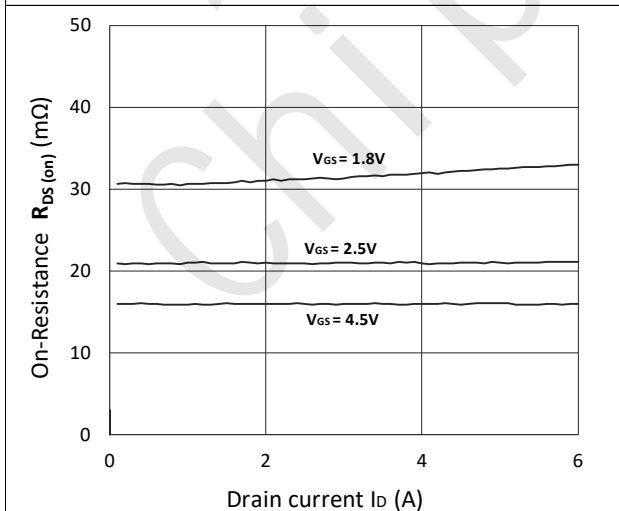


Figure 5.  $R_{DS(ON)}$  vs.  $I_D$

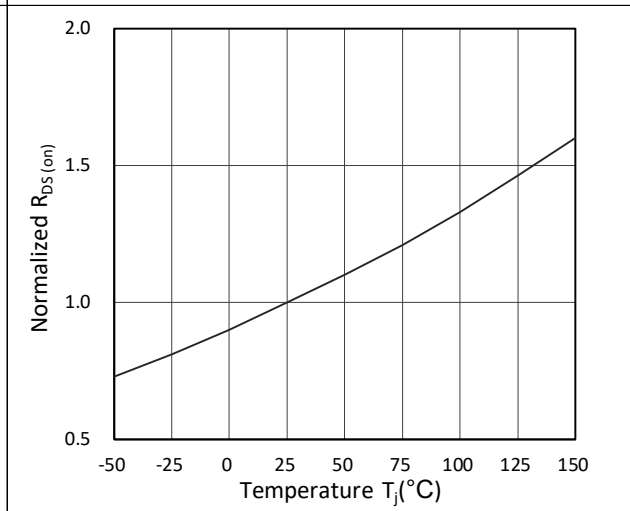


Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature

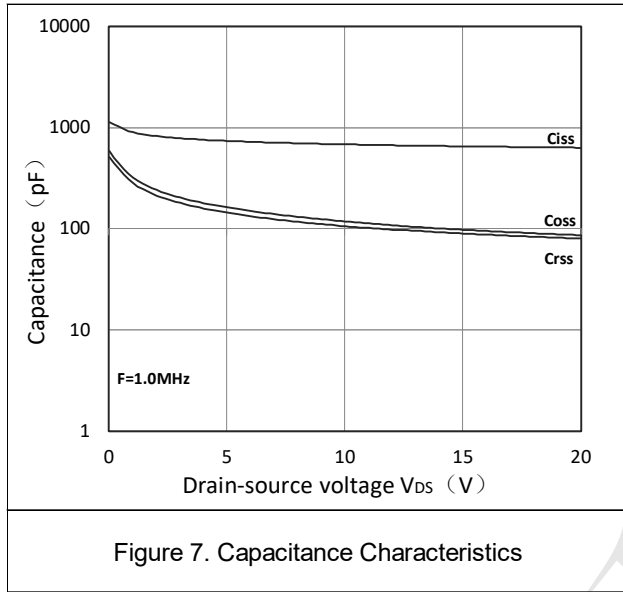


Figure 7. Capacitance Characteristics

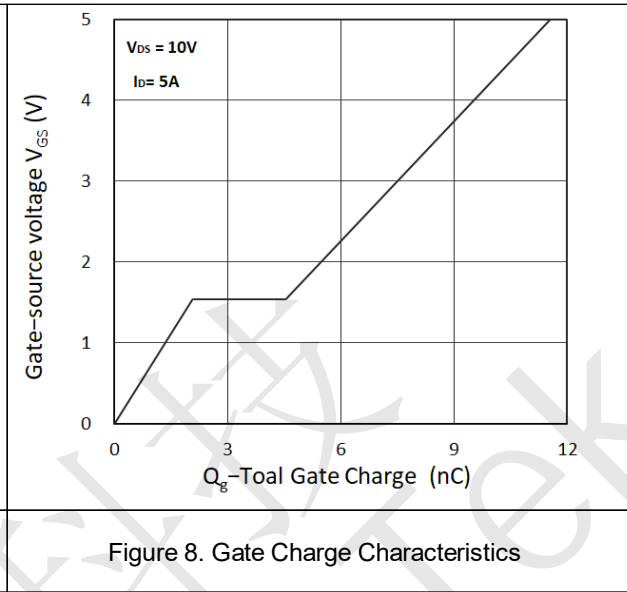
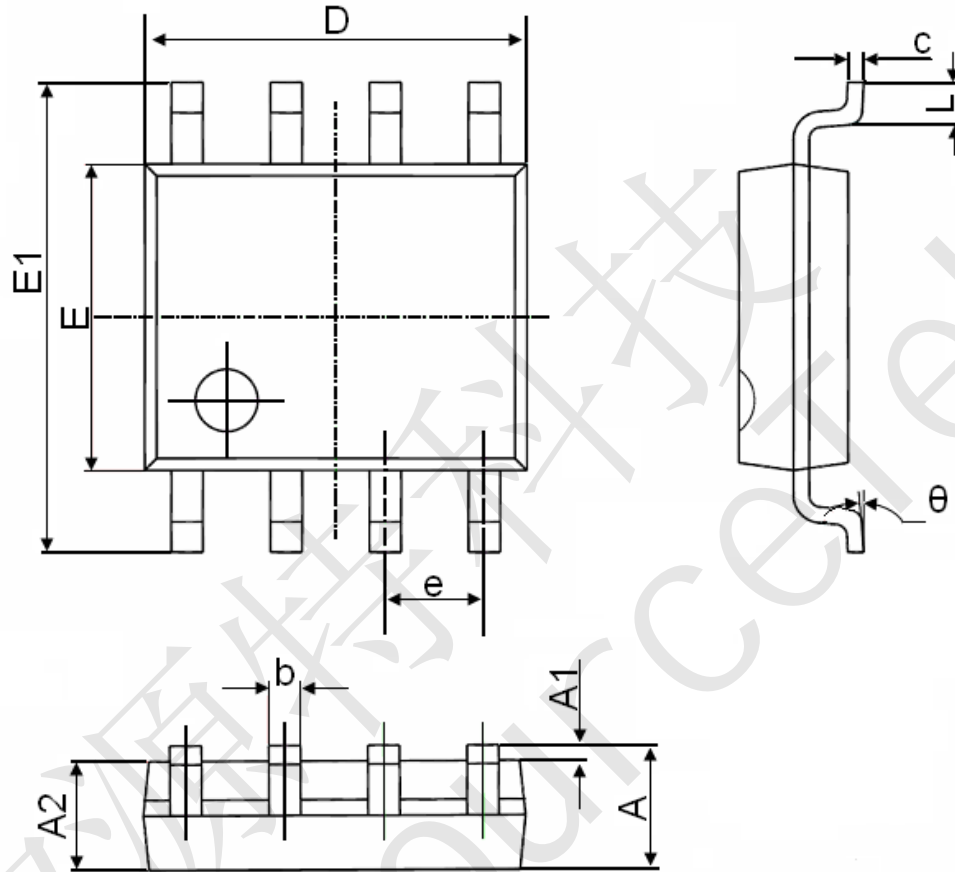


Figure 8. Gate Charge Characteristics



Package Mechanical Data-SOP-8



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 1.350                     | 1.750 | 0.053                | 0.069 |
| A1     | 0.100                     | 0.250 | 0.004                | 0.010 |
| A2     | 1.350                     | 1.550 | 0.053                | 0.061 |
| b      | 0.330                     | 0.510 | 0.013                | 0.020 |
| c      | 0.170                     | 0.250 | 0.006                | 0.010 |
| D      | 4.700                     | 5.100 | 0.185                | 0.200 |
| E      | 3.800                     | 4.000 | 0.150                | 0.157 |
| E1     | 5.800                     | 6.200 | 0.228                | 0.244 |
| e      | 1.270(BSC)                |       | 0.050(BSC)           |       |
| L      | 0.400                     | 1.270 | 0.016                | 0.050 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |