



CST2302A N-Ch 20V Fast Switching MOSFETs



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

CST2302A Product Summary

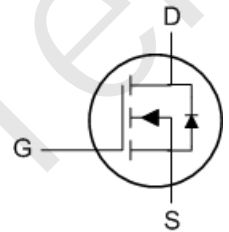
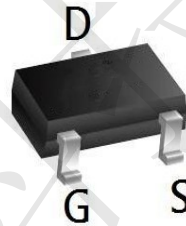
| BVDSS | RDSON | ID |
|-------|-------|-------|
| 20V | 35mΩ | 3.6 A |

CST2302A Description

The CST2302A is the high cell density trenched N-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications.

The CST2302A meet the RoHS and Green Product requirement with full function reliability approved.

CST2302A SOT23 Pin Configuration



CST2302A Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|----------------------|--|------------|------------|
| V_{DS} | Drain-Source Voltage | 20 | V |
| V_{GS} | Gate-Source Voltage | ± 12 | V |
| $I_D@T_A=25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 3.6 | A |
| $I_D@T_A=70^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 1.5 | A |
| I_{DM} | Pulsed Drain Current ² | 12 | A |
| $P_D@T_A=25^\circ C$ | Total Power Dissipation ³ | 1.05 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ C$ |

CST2302A Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient ¹ | --- | 112 | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | --- | $^\circ C/W$ |



CST2302A N-Ch 20V Fast Switching MOSFETs

CST2302A Electrical Characteristics $T_c = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|--------|-----------|-----------------|-----|-----|-----|-------|
|--------|-----------|-----------------|-----|-----|-----|-------|

Off Characteristics

| | | | | | | |
|------------|------------------------------------|---|----|----|------|---------------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$ | 20 | -- | -- | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}$ | -- | -- | 1 | μA |
| | | $V_{DS} = 16\text{ V}, T_c = 125^\circ\text{C}$ | -- | -- | 10 | μA |
| I_{GSSF} | Gate-Body Leakage Current, Forward | $V_{GS} = 10\text{ V}, V_{DS} = 0\text{ V}$ | -- | -- | 100 | nA |
| I_{GSSR} | Gate-Body Leakage Current, Reverse | $V_{GS} = -10\text{ V}, V_{DS} = 0\text{ V}$ | -- | -- | -100 | nA |

On Characteristics

| | | | | | | |
|--------------|-----------------------------------|---|------|----|-----|------------|
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$ | 0.45 | - | 1.1 | V |
| $R_{DS(on)}$ | Static Drain-Source On-Resistance | $V_{GS} = 4.5\text{ V}, I_D = 3.5\text{ A}$ | -- | 35 | 45 | m Ω |
| | | $V_{GS} = 2.5\text{ V}, I_D = 2.0\text{ A}$ | - | 46 | 57 | |

Dynamic Characteristics

| | | | | | | |
|-----------|------------------------------|--|----|-----|---|----|
| C_{iss} | Input Capacitance | $V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$ | -- | 180 | - | pF |
| C_{oss} | Output Capacitance | | -- | 37 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | | -- | 34 | - | pF |

Switching Characteristics

| | | | | | | |
|--------------|---------------------|--|----|------|----|----|
| $t_{d(on)}$ | Turn-On Delay Time | $V_{GS} = 5\text{ V}, V_{DS} = 10\text{ V}, I_D = 3\text{ A},$ $R_G = 6\text{ }\Omega, R_L = 2.7\text{ }\Omega$ | -- | 4.5 | -- | ns |
| t_r | Turn-On Rise Time | | -- | 31 | -- | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | -- | 12 | -- | ns |
| t_f | Turn-Off Fall Time | | -- | 4.0 | -- | ns |
| Q_g | Total Gate Charge | $V_{DS} = 10\text{ V}, I_D = 3\text{ A},$ $V_{GS} = 5\text{ V}$ | -- | 6.23 | -- | nC |
| Q_{gs} | Gate-Source Charge | | -- | 6 | -- | nC |
| Q_{gd} | Gate-Drain Charge | | -- | 0.5 | -- | nC |

Drain-Source Diode Characteristics and Maximum Ratings

| | | | | | |
|----------|---|----|----|------|---|
| I_S | Maximum Continuous Drain-Source Diode Forward Current | -- | -- | 3.5 | A |
| I_{SM} | Maximum Pulsed Drain-Source Diode Forward Current | -- | -- | 10.5 | A |
| V_{SD} | Drain to Source Diode Forward Voltage, $V_{GS} = 0\text{ V}, I_{SD} = 3.5\text{ A}, T_J = 25^\circ\text{C}$ | -- | -- | 1.2 | V |

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Device mounted on FR-4 PCB, 1inch x 0.85inch x 0.062 inch
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$



CST2302A Typical Performance Characteristics

N- Channel Typical Characteristics

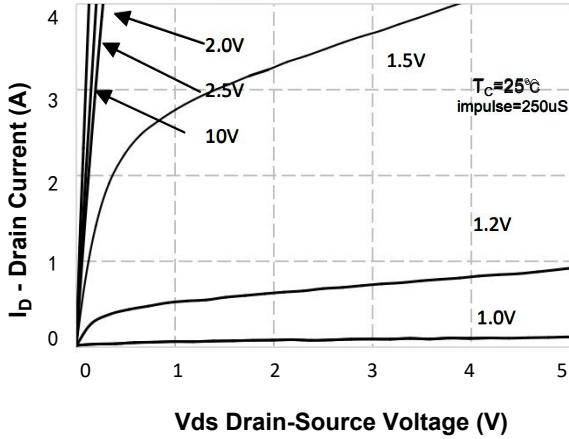


Figure 1. On-Region Characteristics

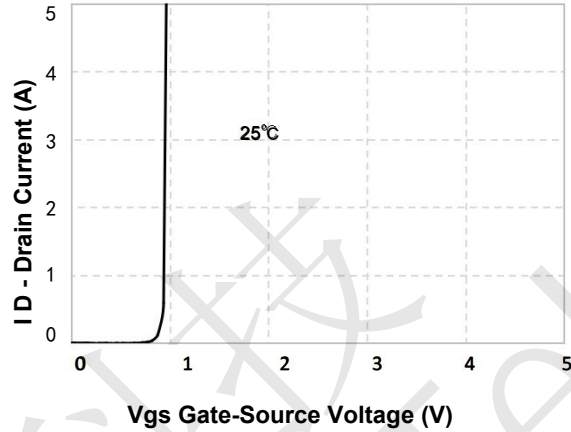


Figure 2. Transfer Characteristics

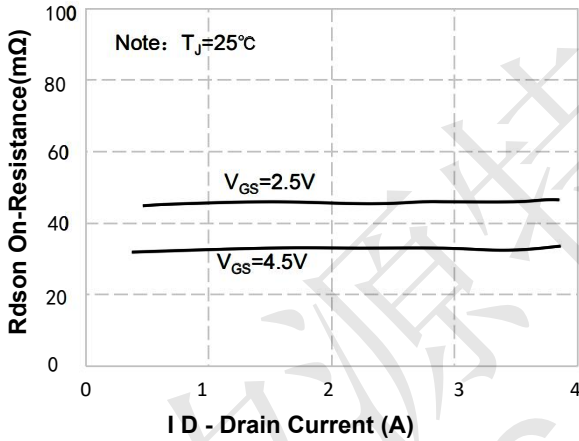


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

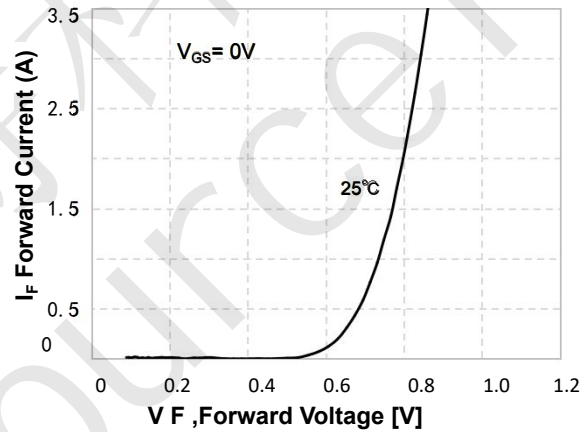


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

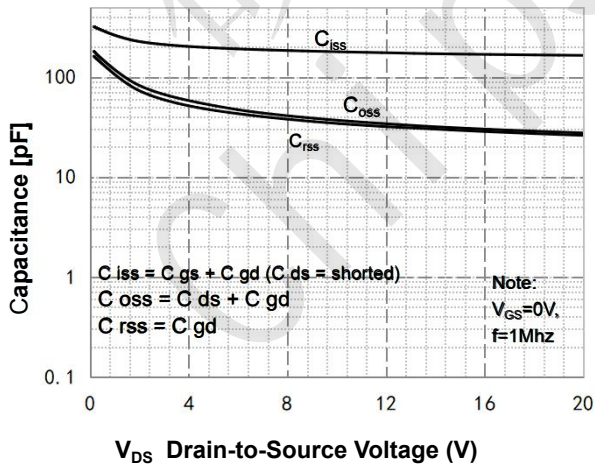


Figure 5. Capacitance Characteristics

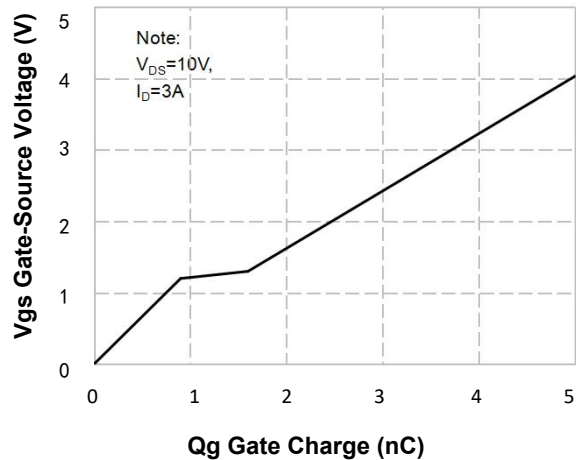


Figure 6. Gate Charge Characteristics



N- Channel Typical Characteristics (Continued)

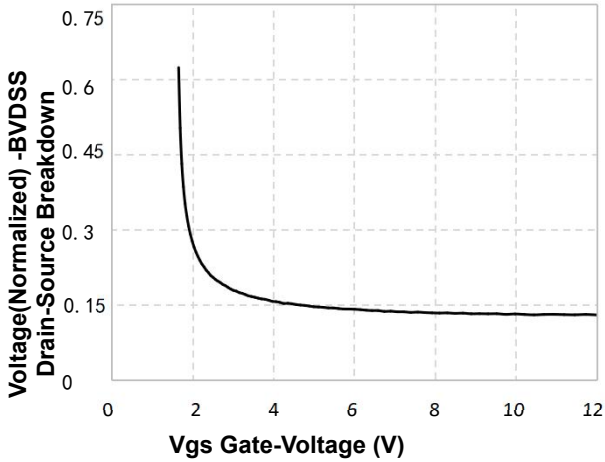


Figure 7. Breakdown Voltage Variation vs Gate-Voltage

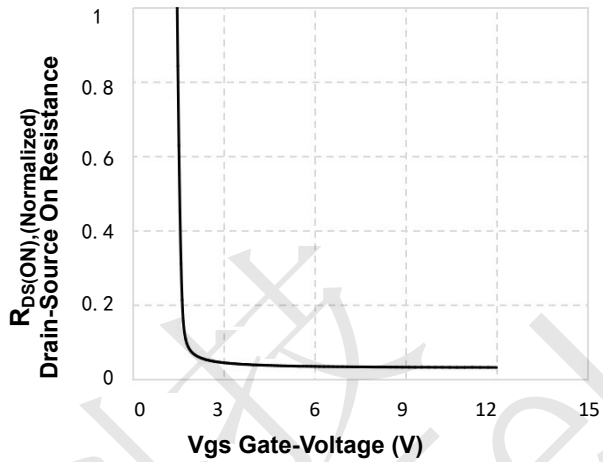


Figure 8. On-Resistance Variation vs Gate Voltage

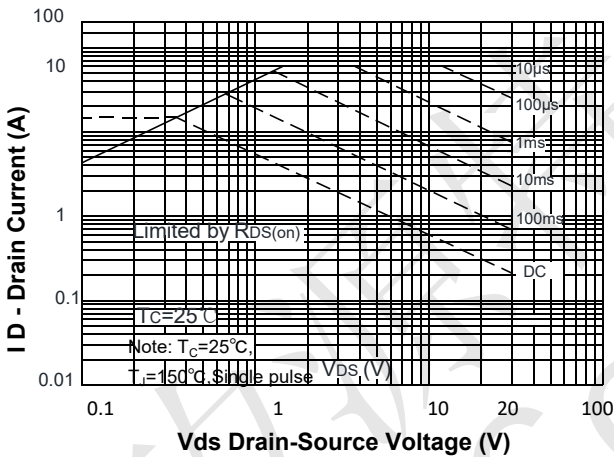


Figure 9. Maximum Safe Operating Area

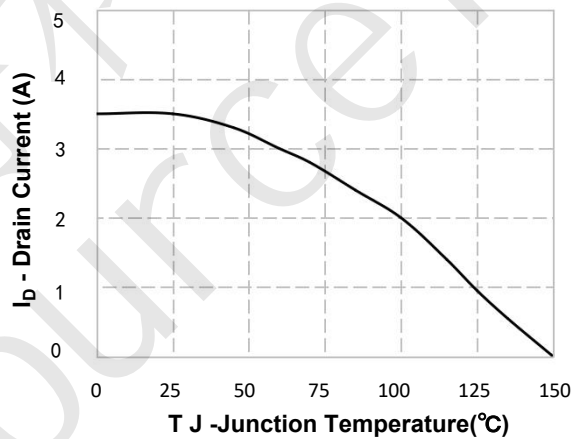


Figure 10. Maximum PContinuous Drain Current vs Case Temperature

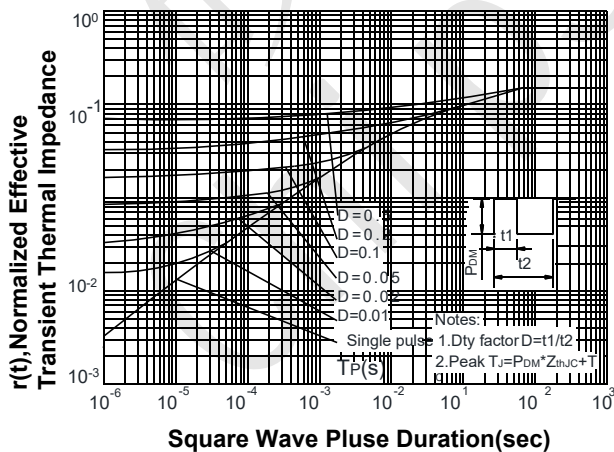
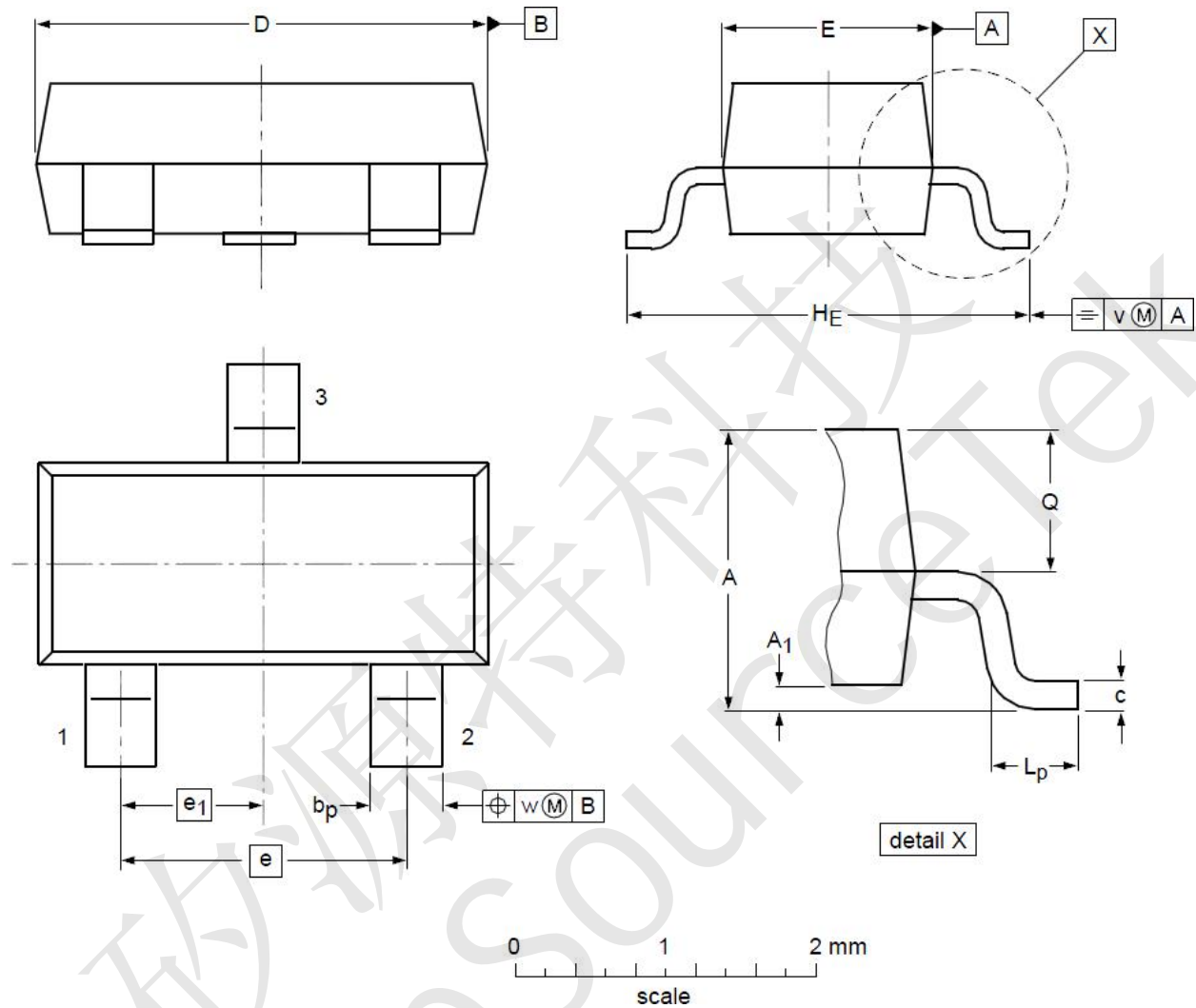


Figure 11. Transient Thermal Response Curve



CST2302A SOT23 Mechanical Data



DIMENSIONS (unit : mm)

| Symbol | Min | Typ | Max | Symbol | Min | Typ | Max |
|----------------|------|------|------|----------------|------|------|------|
| A | 0.90 | 1.01 | 1.15 | A ₁ | 0.01 | 0.05 | 0.10 |
| b _p | 0.30 | 0.42 | 0.50 | c | 0.08 | 0.13 | 0.15 |
| D | 2.80 | 2.92 | 3.00 | E | 1.20 | 1.33 | 1.40 |
| e | -- | 1.90 | -- | e ₁ | -- | 0.95 | -- |
| H _E | 2.25 | 2.40 | 2.55 | L _p | 0.30 | 0.42 | 0.50 |
| Q | 0.45 | 0.49 | 0.55 | v | -- | 0.20 | -- |
| w | -- | 0.10 | -- | | | | |