



CST2312AL N-Ch 20V Fast Switching MOSFETs

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

CST2312AL Product Summary

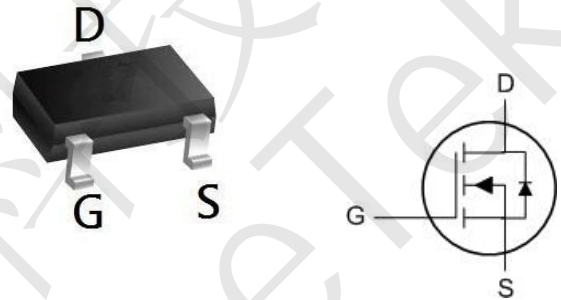


| BVDSS | RDSON | ID |
|-------|-------|------|
| 20V | 16mΩ | 7.5A |

CST2312AL Description

The CST2312AL 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 CST2312AL meet the RoHS and Green Product requirement with full function reliability approved.

CST2312AL SOT23-3L Pin Configuration



CST2312AL 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, $V_{GS} @ 4.5V^1$ | 7.5 | A |
| $I_D@T_A=70^\circ C$ | Continuous Drain Current, $V_{GS} @ 4.5V^1$ | 5.0 | A |
| I_{DM} | Pulsed Drain Current ² | 32 | A |
| $P_D@T_A=25^\circ C$ | Total Power Dissipation ³ | 2 | W |
| $P_D@T_A=70^\circ C$ | Total Power Dissipation ³ | 0.66 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ C$ |

CST2312AL Thermal Data

| Symbol | Parameter | Max. | Unit |
|-----------------|--|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient ¹ | 120 | $^\circ C/W$ |



CST2312AL Electrical Characteristics (T_J=25°C unless otherwise specified)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|--|---|------|------|------|-------|
| Off Characteristic | | | | | | |
| V _{(BR)DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250μA | 20 | - | - | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =20V, V _{GS} =0V, | - | - | 1.0 | μA |
| I _{GSS} | Gate to Body Leakage Current | V _{DS} =0V, V _{GS} =±12V | - | - | ±100 | nA |
| On Characteristics | | | | | | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 0.5 | 0.75 | 1.2 | V |
| R _{DS(on)} | Static Drain-Source on-Resistance note2 | V _{GS} =4.5V, I _D =8A | - | 16 | 21 | mΩ |
| | | V _{GS} =2.5V, I _D =5A | - | 20 | 30 | |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} =10V, V _{GS} =0V, f=1.0MHz | - | 700 | - | pF |
| C _{oss} | Output Capacitance | | - | 132 | - | pF |
| C _{rss} | Reverse Transfer Capacitance | | - | 114 | - | pF |
| Q _g | Total Gate Charge | V _{DS} =10V, I _D =4A, V _{GS} =4.5V | - | 15 | - | nC |
| Q _{gs} | Gate-Source Charge | | - | 2 | - | nC |
| Q _{gd} | Gate-Drain("Miller") Charge | | - | 5.2 | - | nC |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DS} =10V, I _D =4A, R _{GEN} =3Ω, V _{GS} =4.5V | - | 9 | - | ns |
| t _r | Turn-on Rise Time | | - | 25 | - | ns |
| t _{d(off)} | Turn-off Delay Time | | - | 37 | - | ns |
| t _f | Turn-off Fall Time | | - | 14 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I _S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 7.5 | A |
| I _{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 32 | A |
| V _{SD} | Drain to Source Diode Forward Voltage | V _{GS} =0V, I _S =8A | - | - | 1.2 | V |

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%



CST2312AL Typical Performance Characteristics

Figure 1: Output Characteristics

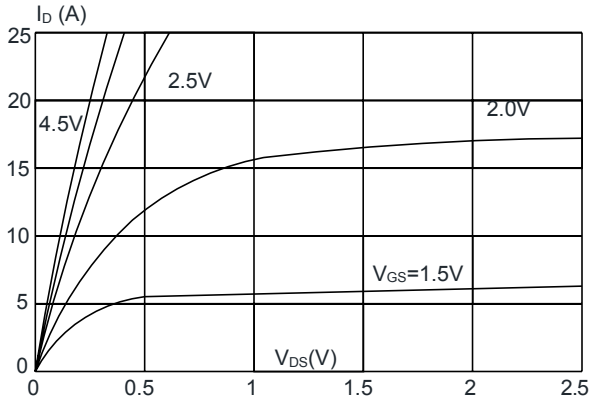


Figure 2: Typical Transfer Characteristics

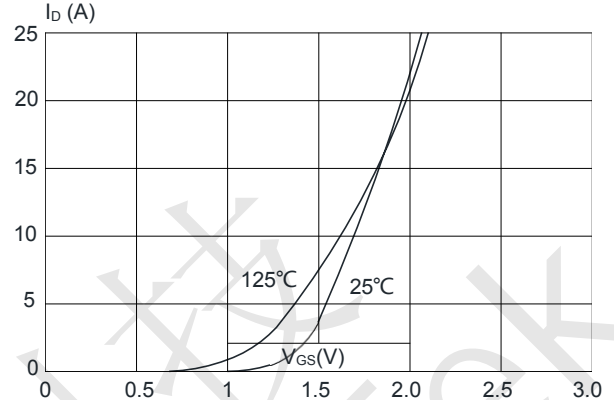


Figure 3: On-resistance vs. Drain Current

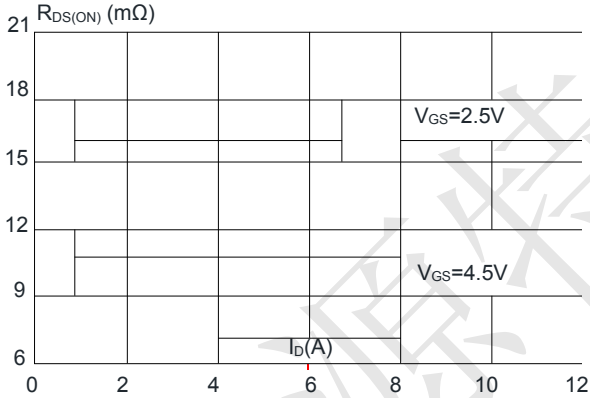


Figure 4: Body Diode Characteristics

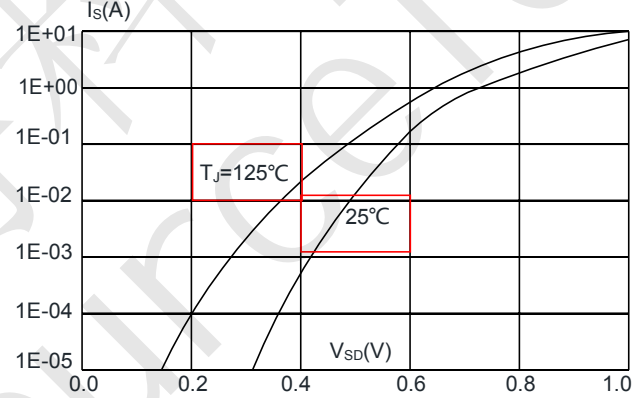


Figure 5: Gate Charge Characteristics

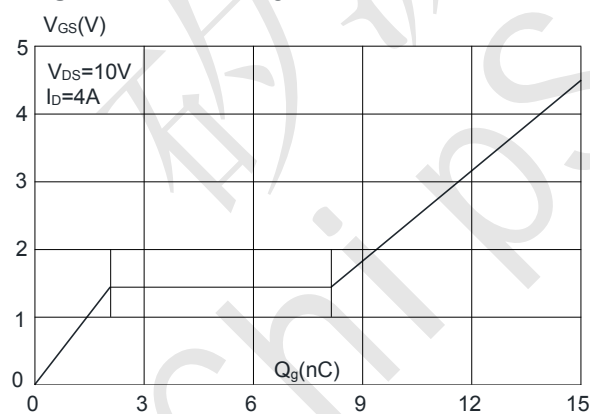
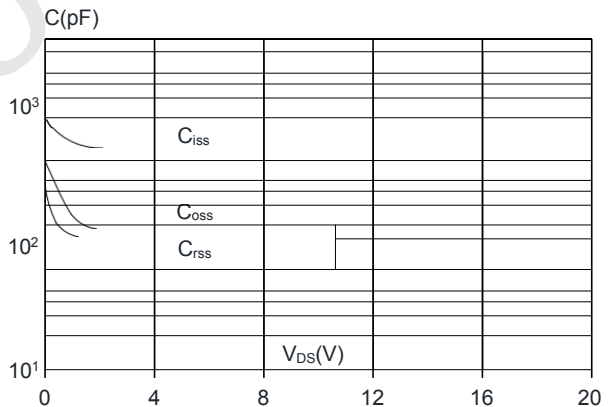


Figure 6: Capacitance Characteristics





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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

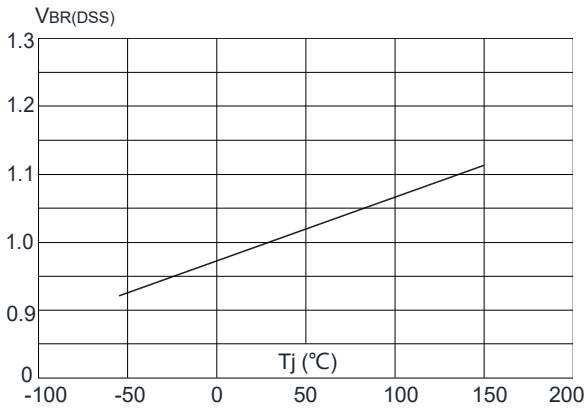


Figure 8: Normalized on Resistance vs. Junction Temperature

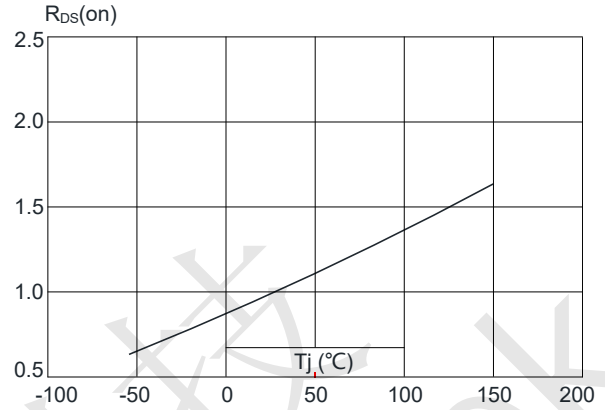


Figure 9: Maximum Safe Operating Area

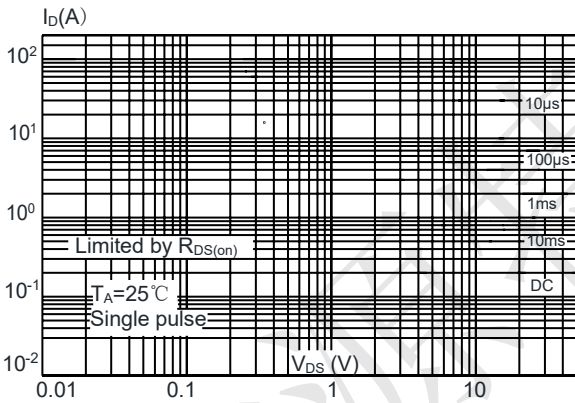


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

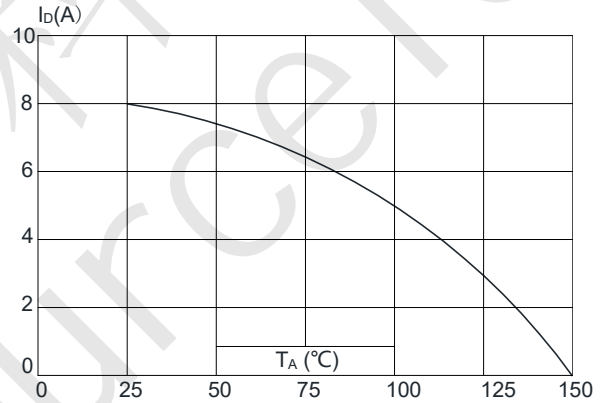
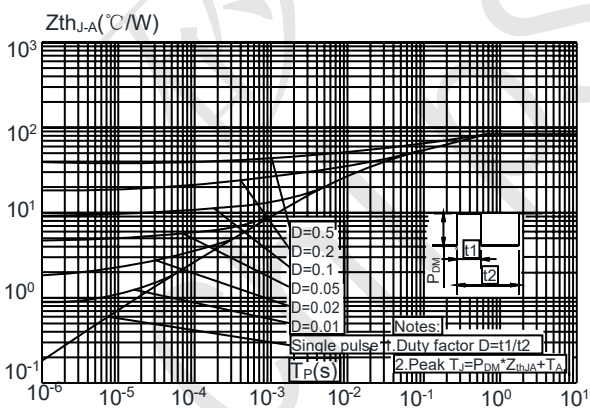
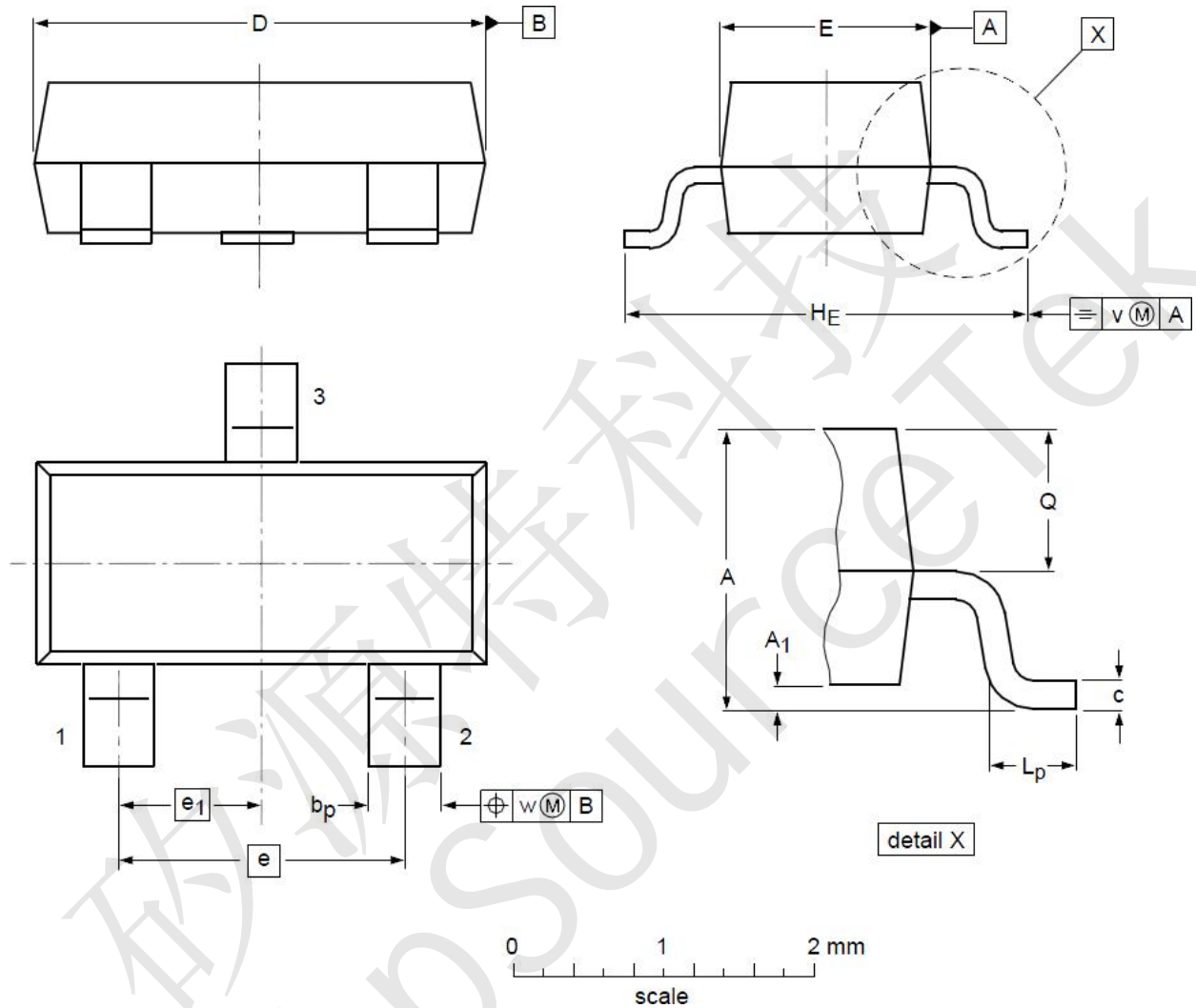


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





CST2312AL Package Mechanical Data-SOT-23-3L



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950(BSC) | | 0.037(BSC) | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |