



CST20N06 N-Ch 60V Fast Switching MOSFETs

- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

CST20N06 Product Summary

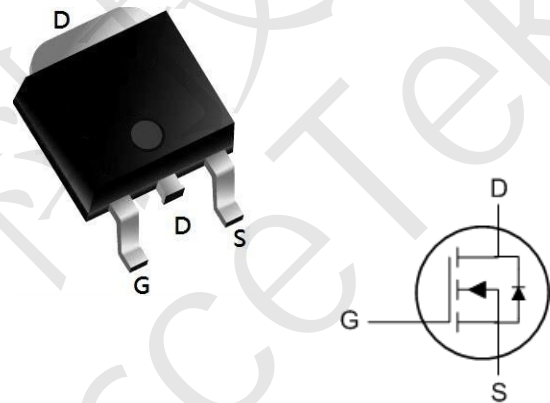


| BVDSS | RDSON | ID |
|-------|-------|-----|
| 60V | 25mΩ | 20A |

CST20N06 Description

The CST20N06 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The CST20N06 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

CST20N06 TO252 Pin Configuration



CST20N06 Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

| Symbol | Parameter | Max. | Units |
|-----------------------------------|---|------------------------|-------|
| V _{DSS} | Drain-Source Voltage | 60 | V |
| V _{GSS} | Gate-Source Voltage | ±30 | V |
| I _D | Continuous Drain Current | T _C = 25°C | 20 |
| | | T _C = 100°C | 10 |
| I _{DM} | Pulsed Drain Current ^{note1} | 80 | A |
| EAS | Single Pulsed Avalanche Energy ^{note2} | 39 | mJ |
| P _D | Power Dissipation | 41.7 | W |
| R _{θJC} | Thermal Resistance, Junction to Case | 50 | °C/W |
| T _J , T _{STG} | Operating and Storage Temperature Range | -55 to +175 | °C |



CST20N06 N-Ch 60V Fast Switching MOSFETs

CST20N06 Electrical Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise noted)

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit | |
|--|---------------|--|---------------------------|------|-----------|------------|---------|
| Static Characteristics | | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$ | 60 | - | - | V | |
| Gate-Body Leakage Current | I_{GSS} | $V_{DS} = 0V, V_{GS} = \pm 20V$ | - | - | ± 100 | nA | |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 60V, V_{GS} = 0V$ | $T_J = 25^\circ\text{C}$ | - | - | 1 | μA |
| | | | $T_J = 100^\circ\text{C}$ | - | - | 100 | |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 1.2 | 1.7 | 2.5 | V | |
| Drain-Source on-Resistance ⁴ | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 10A$ | - | 25 | 32 | m Ω | |
| | | $V_{GS} = 4.5V, I_D = 5A$ | - | 31.5 | 40 | | |
| Forward Transconductance ⁴ | g_{fs} | $V_{DS} = 5V, I_D = 10A$ | - | 15.5 | - | S | |
| Dynamic Characteristics⁵ | | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = 30V, V_{GS} = 0V, f = 1MHz$ | - | 1355 | - | pF | |
| Output Capacitance | C_{oss} | | - | 60 | - | | |
| Reverse Transfer Capacitance | C_{rss} | | - | 49 | - | | |
| Gate Resistance | R_G | $f = 1MHz$ | - | 1.2 | - | Ω | |
| Switching Characteristics⁵ | | | | | | | |
| Total Gate Charge | Q_g | $V_{GS} = 10V, V_{DD} = 30V, I_D = 10A$ | - | 22 | - | nC | |
| Gate-Source Charge | Q_{gs} | | - | 4.2 | - | | |
| Gate-Drain Charge | Q_{gd} | | - | 6.9 | - | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{GS} = 10V, V_{DD} = 30V, R_G = 3\Omega, I_D = 10A$ | - | 6.4 | - | ns | |
| Rise Time | t_r | | - | 15.3 | - | | |
| Turn-off Delay Time | $t_{d(off)}$ | | - | 25 | - | | |
| Fall Time | t_f | | - | 7.6 | - | | |
| Body Diode Reverse Recovery Time | t_{rr} | $I_F = 10A, di/dt = 100A/\mu s$ | - | 26 | - | ns | |
| Body Diode Reverse Recovery Charge | Q_{rr} | | - | 45 | - | nC | |
| Drain-Source Body Diode Characteristics | | | | | | | |
| Diode Forward Voltage ⁴ | V_{SD} | $I_S = 10A, V_{GS} = 0V$ | - | - | 1.2 | V | |
| Continuous Source Current | I_S | $T_C = 25^\circ\text{C}$ | - | - | 20 | A | |

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$
2. The EAS data shows Max. rating . The test condition is $V_{DD} = 25V, V_{GS} = 10V, L = 0.4mH, I_{AS} = 14A$
3. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
5. This value is guaranteed by design hence it is not included in the production test.



CST20N06 Typical Characteristics

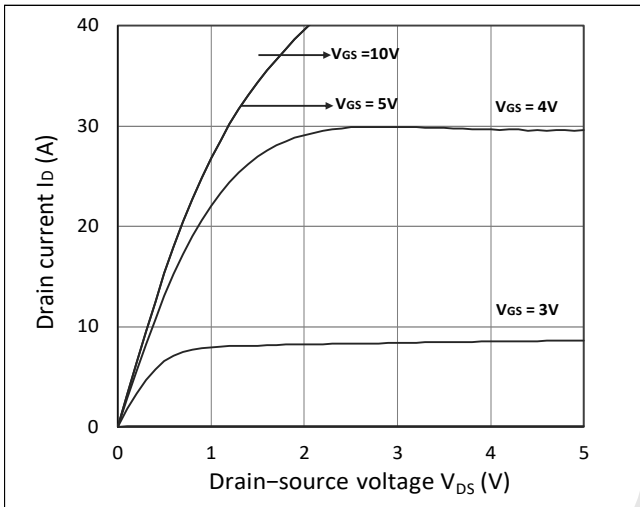


Figure 1. Output Characteristics

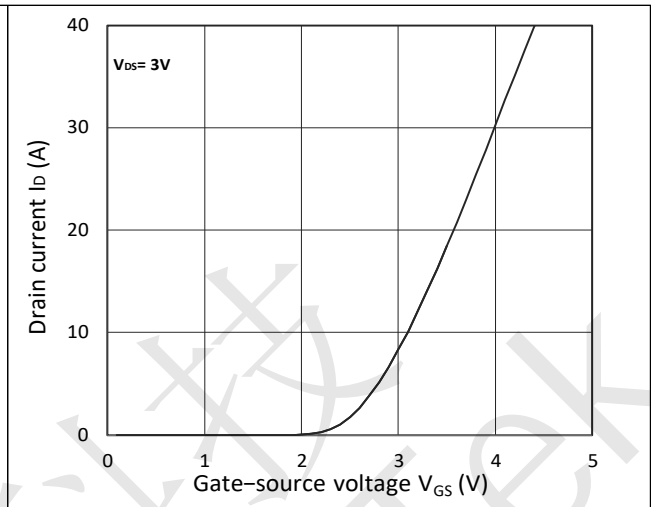


Figure 2. Transfer Characteristics

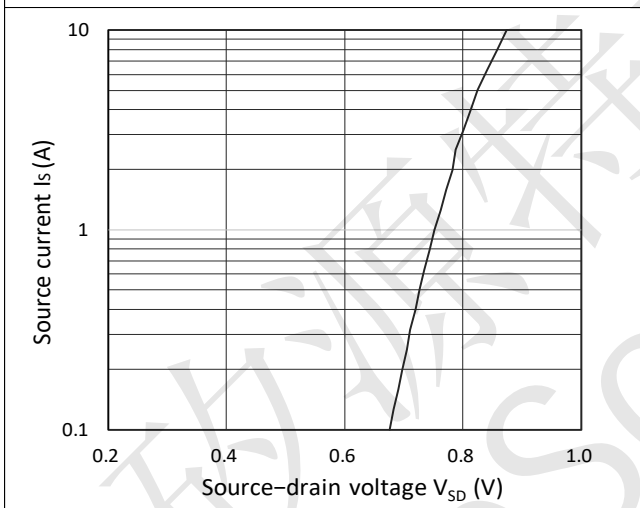


Figure 3. Forward Characteristics of Reverse

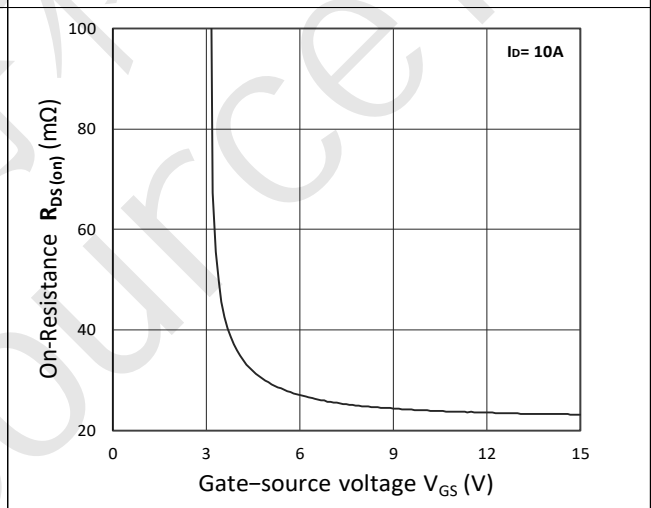


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

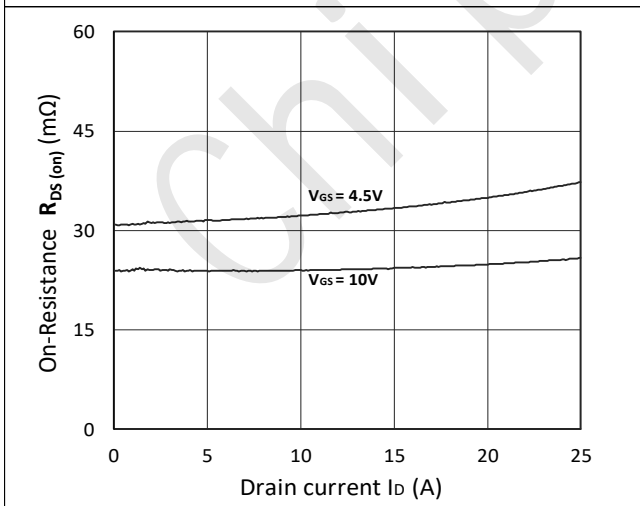


Figure 5. $R_{DS(ON)}$ vs. I_D

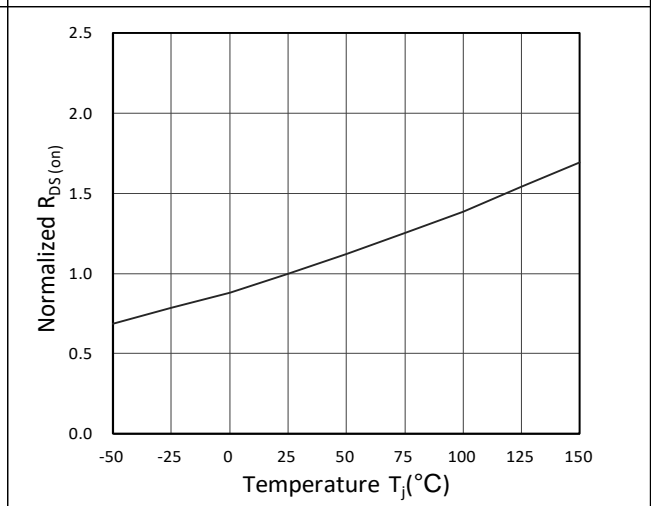


Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature



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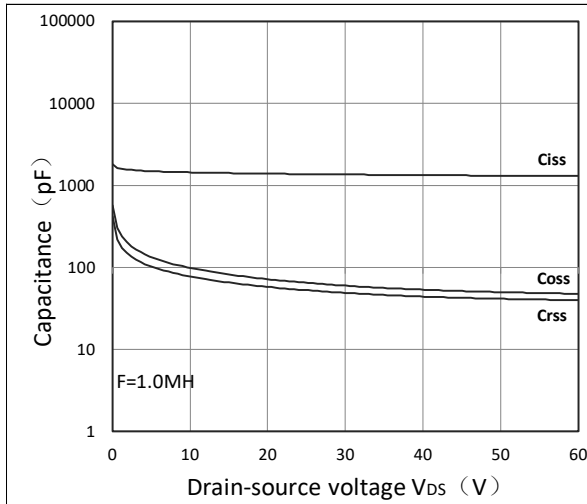


Figure 7. Capacitance Characteristics

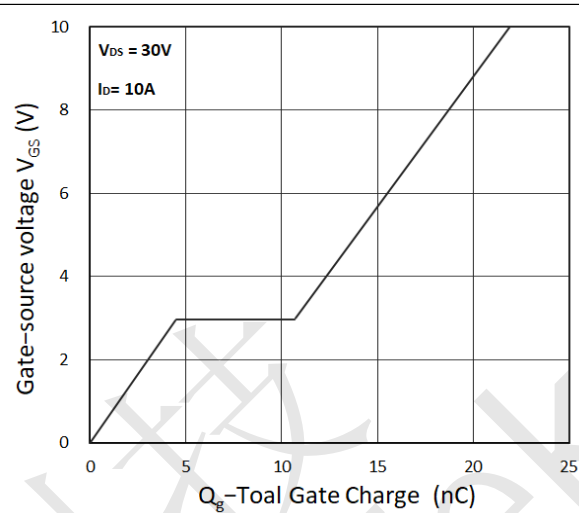


Figure 8. Gate Charge Characteristics

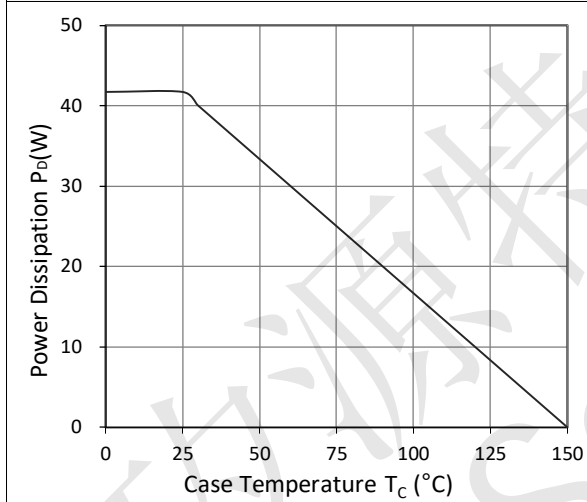


Figure 9. Power Dissipation

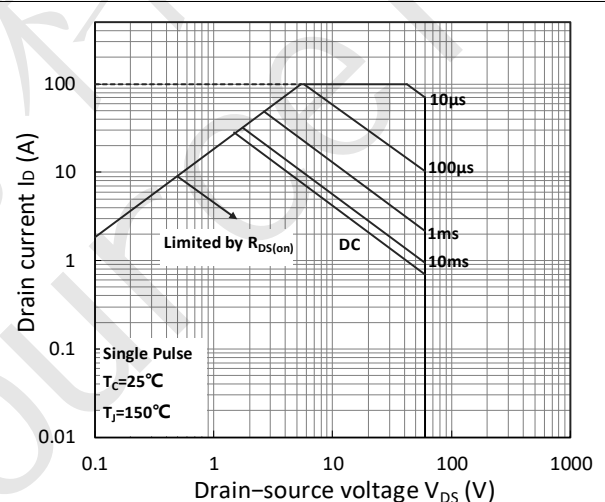


Figure 10. Safe Operating Area

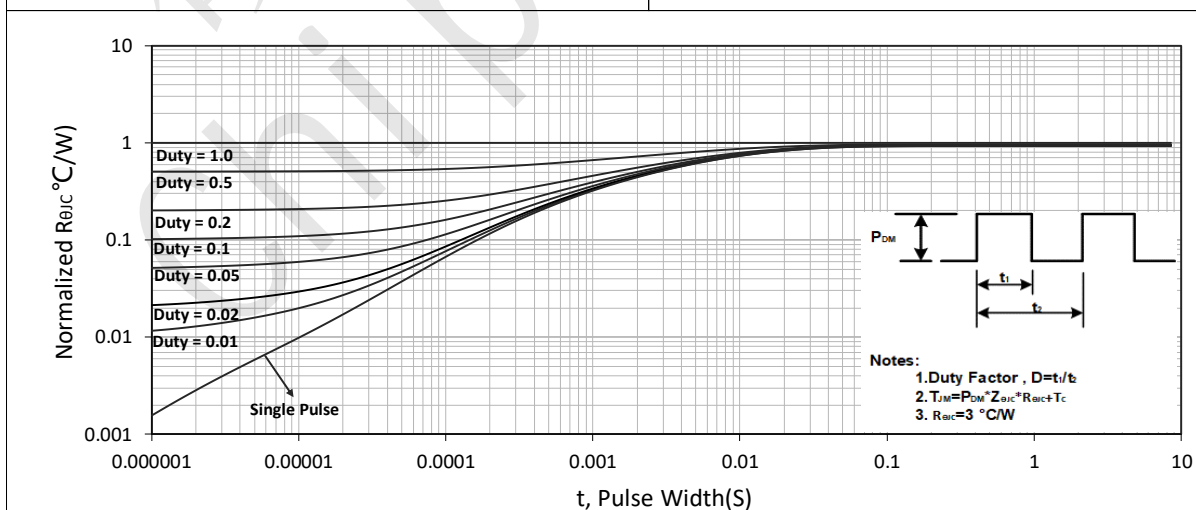
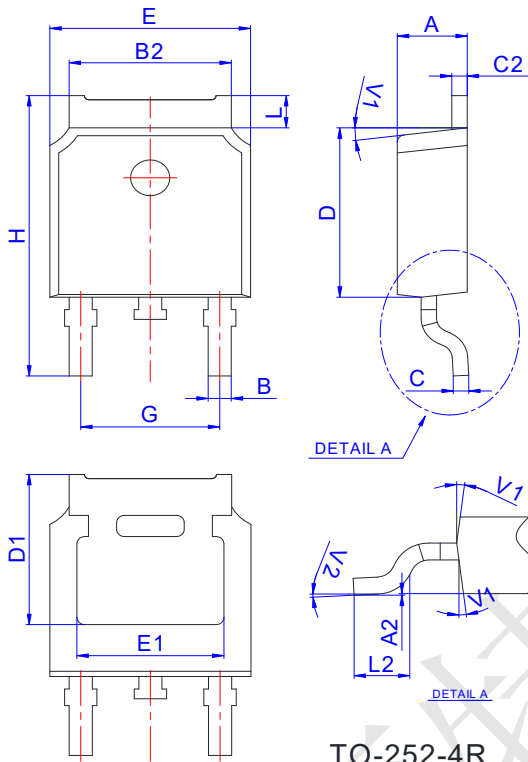


Figure 11. Normalized Maximum Transient Thermal Impedance



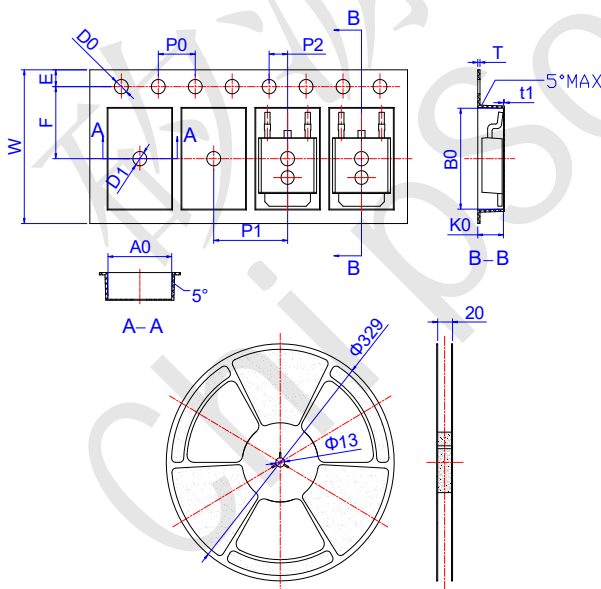
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CST20N06 Package Mechanical Data-TO-252



| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|----------|------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.10 | | 2.50 | 0.083 | | 0.098 |
| A2 | 0 | | 0.10 | 0 | | 0.004 |
| B | 0.66 | | 0.86 | 0.026 | | 0.034 |
| B2 | 5.18 | | 5.48 | 0.202 | | 0.216 |
| C | 0.40 | | 0.60 | 0.016 | | 0.024 |
| C2 | 0.44 | | 0.58 | 0.017 | | 0.023 |
| D | 5.90 | | 6.30 | 0.232 | | 0.248 |
| D1 | 5.30REF | | | 0.209REF | | |
| E | 6.40 | | 6.80 | 0.252 | | 0.268 |
| E1 | 4.63 | | | 0.182 | | |
| G | 4.47 | | 4.67 | 0.176 | | 0.184 |
| H | 9.50 | | 10.70 | 0.374 | | 0.421 |
| L | 1.09 | | 1.21 | 0.043 | | 0.048 |
| L2 | 1.35 | | 1.65 | 0.053 | | 0.065 |
| V1 | | 7° | | 7° | | |
| V2 | 0° | | 6° | 0° | | 6° |

CST20N06 Reel Specification-TO-252



| Ref. | Dimensions | | | | | |
|------|-------------|-------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| W | 15.90 | 16.00 | 16.10 | 0.626 | 0.630 | 0.634 |
| E | 1.65 | 1.75 | 1.85 | 0.065 | 0.069 | 0.073 |
| F | 7.40 | 7.50 | 7.60 | 0.291 | 0.295 | 0.299 |
| D0 | 1.40 | 1.50 | 1.60 | 0.055 | 0.059 | 0.063 |
| D1 | 1.40 | 1.50 | 1.60 | 0.055 | 0.059 | 0.063 |
| P0 | 3.90 | 4.00 | 4.10 | 0.154 | 0.157 | 0.161 |
| P1 | 7.90 | 8.00 | 8.10 | 0.311 | 0.315 | 0.319 |
| P2 | 1.90 | 2.00 | 2.10 | 0.075 | 0.079 | 0.083 |
| A0 | 6.85 | 6.90 | 7.00 | 0.270 | 0.271 | 0.276 |
| B0 | 10.45 | 10.50 | 10.60 | 0.411 | 0.413 | 0.417 |
| K0 | 2.68 | 2.78 | 2.88 | 0.105 | 0.109 | 0.113 |
| T | 0.24 | | 0.27 | 0.009 | | 0.011 |
| t1 | 0.10 | | | 0.004 | | |
| 10P0 | 39.80 | 40.00 | 40.20 | 1.567 | 1.575 | 1.583 |