



CST50P06 P-Ch 60V Fast Switching MOSFETs

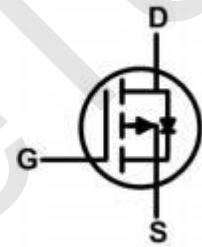
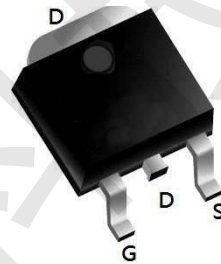
- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

CST50P06 Product Summary



| BVDSS | RDSON | ID |
|-------|--------|------|
| -60V | 22.5mΩ | -50A |

CST50P06 TO252 Pin Configuration



CST50P06 Description

The CST50P06 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The CST50P06 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

CST50P06 Absolute Maximum Ratings (T_A = 25°C, unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--|-----------------------------------|------------------------|------|
| Drain-Source Voltage | V _{DS} | -60 | V |
| Gate-Source Voltage | V _{GS} | ±20 | V |
| Continuous Drain Current | I _D | T _C = 25°C | -50 |
| | | T _C = 100°C | -22 |
| Pulsed Drain Current ¹ | I _{DM} | -140 | A |
| Single Pulse Avalanche Energy ² | EAS | 115.2 | mJ |
| Total Power Dissipation | P _D | 58 | W |
| Operating Junction and Storage Temperature Range | T _J , T _{STG} | -55 to 150 | °C |

Thermal Characteristics

| Parameter | Symbol | Value | Unit |
|--|------------------|-------|------|
| Thermal Resistance from Junction-to-Ambient ³ | R _{θJA} | 65 | °C/W |
| Thermal Resistance from Junction-to-Case | R _{θJC} | 2.15 | °C/W |



CST50P06 P-Ch 60V Fast Switching MOSFETs

CST50P06 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 | $T_J = 25^\circ\text{C}$ | $V_{DS} = -60V, V_{GS} = 0V$ | - | - | -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 | -1.6 | -2.5 | V |
| Drain-Source On-Resistance ⁴ | $R_{DS(on)}$ | $V_{GS} = -10V, I_D = -10A$ | - | 22.5 | 28 | m Ω |
| | | $V_{GS} = -4.5V, I_D = -6A$ | - | 25.5 | 35 | |
| Forward Transconductance ⁴ | g_{fs} | $V_{DS} = -10V, I_D = -10A$ | - | 32 | - | S |
| Dynamic Characteristics⁵ | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = -30V, V_{GS} = 0V, f = 1\text{MHz}$ | - | 4295 | - | pF |
| Output Capacitance | C_{oss} | | - | 168 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 140 | - | |
| Gate Resistance | R_g | $f = 1\text{MHz}$ | - | 4 | - | Ω |
| Switching Characteristics⁵ | | | | | | |
| Total Gate Charge | Q_g | $V_{GS} = -10V, V_{DS} = -30V, I_D = -10A$ | - | 75 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 7.6 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 8.8 | - | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{GS} = -10V, V_{DD} = -30V, R_G = 3\Omega, I_D = -10A$ | - | 22 | - | ns |
| Rise Time | t_r | | - | 25 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 86 | - | |
| Fall Time | t_f | | - | 30 | - | |
| Drain-Source Body Diode Characteristics | | | | | | |
| Diode Forward Voltage ⁴ | V_{SD} | $I_S = -10A, V_{GS} = 0V$ | - | - | -1.2 | V |
| Continuous Source Current | $T_C = 25^\circ\text{C}$ | I_S | - | - | -50 | 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 $V_{DD} = -25V, V_{GS} = -10V, L = 0.4\text{mH}, I_{AS} = -24A$.
3. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z 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.



CST50P06 Typical Characteristics

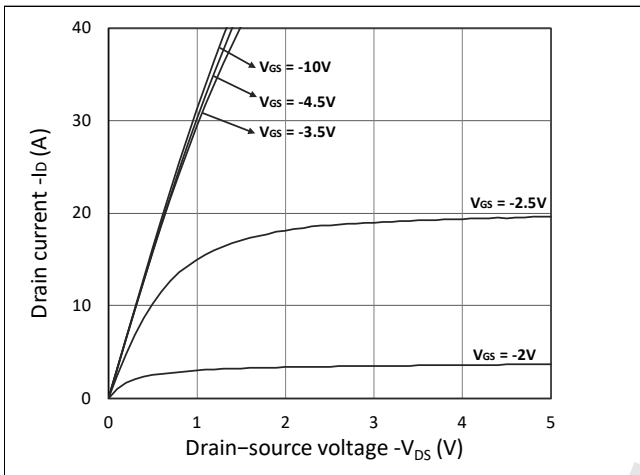


Figure 1. Output Characteristics

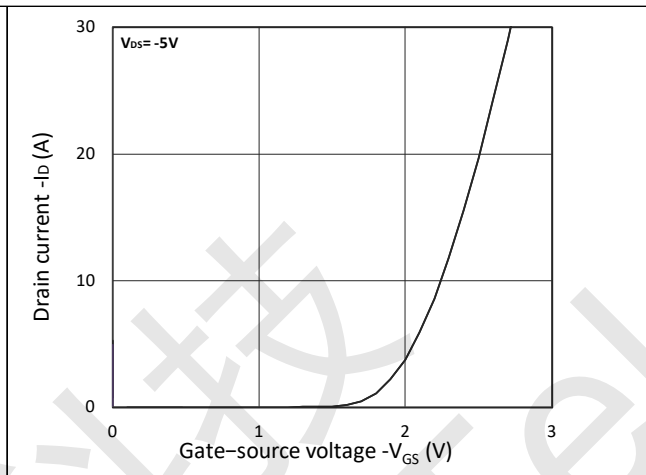


Figure 2. Transfer Characteristics

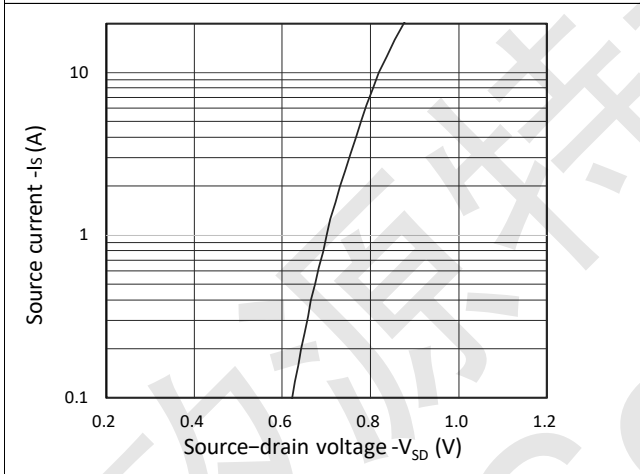


Figure 3. Forward Characteristics of Reverse

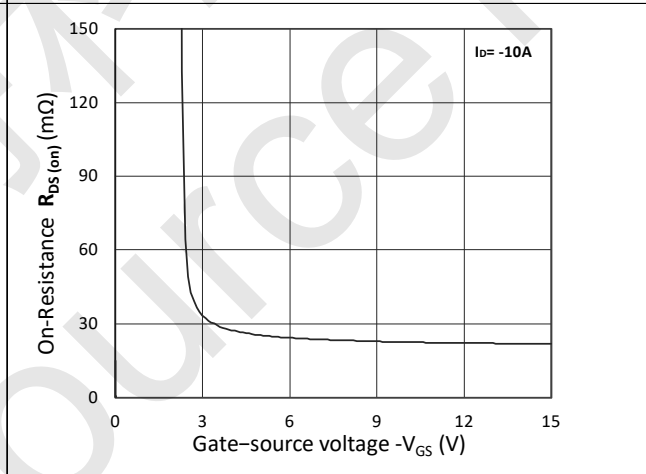


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

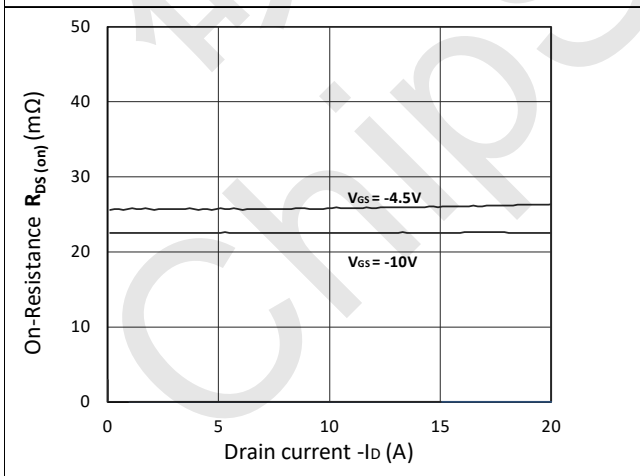


Figure 5. $R_{DS(ON)}$ vs. I_D

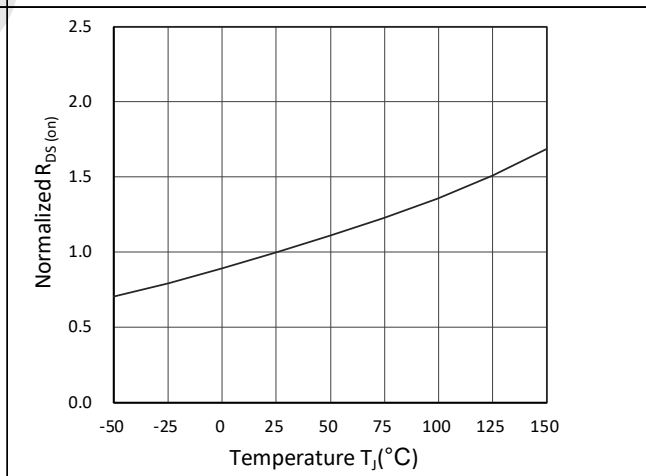


Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature



CST50P06 P-Ch 60V Fast Switching MOSFETs

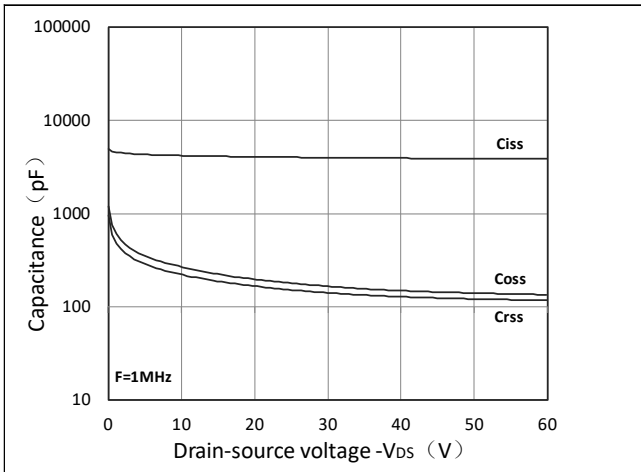


Figure 7. Capacitance Characteristics

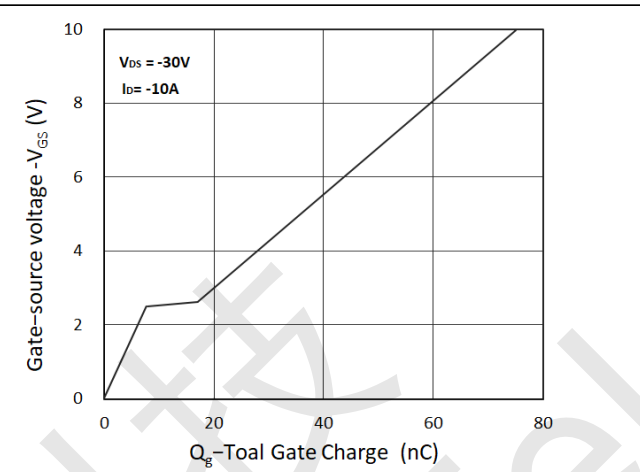


Figure 8. Gate Charge Characteristics

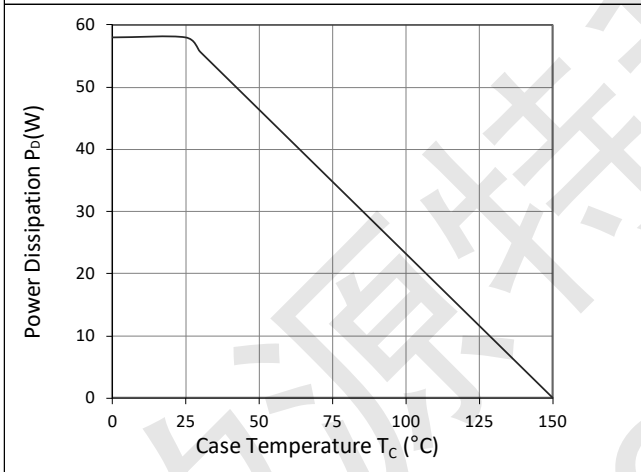


Figure 9. Power Dissipation

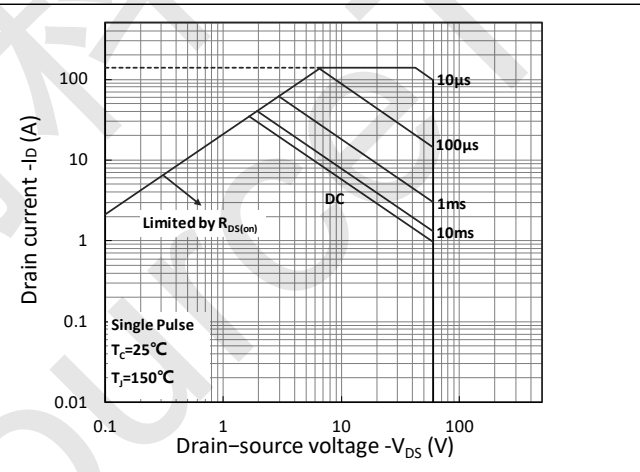


Figure 10. Safe Operating Area

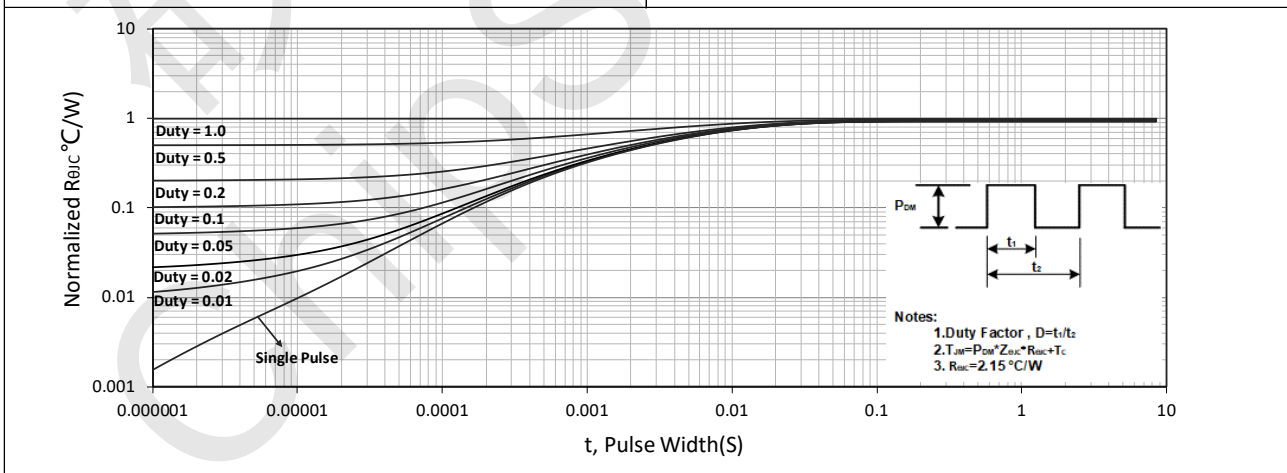


Figure 11. Normalized Maximum Transient Thermal Impedance



CST50P06 Test Circuit

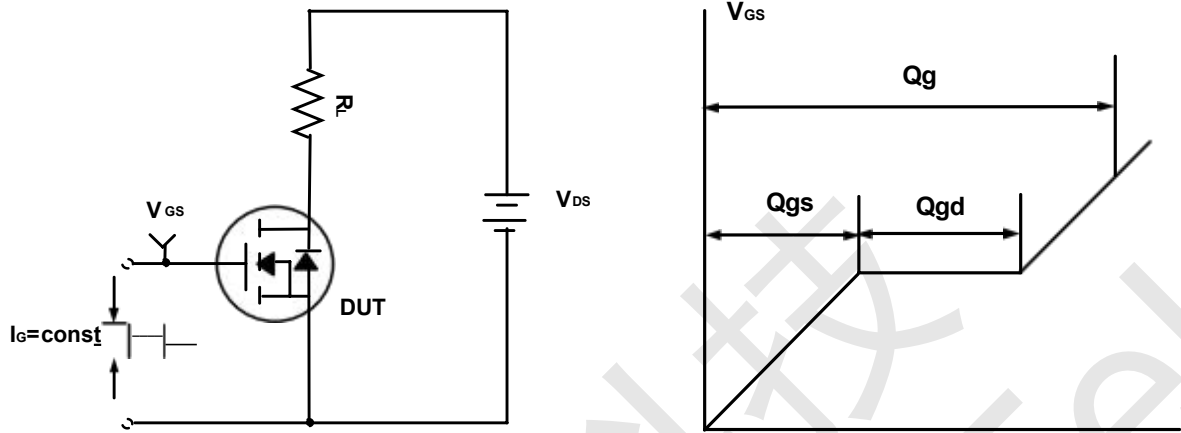


Figure A. Gate Charge Test Circuit & Waveforms

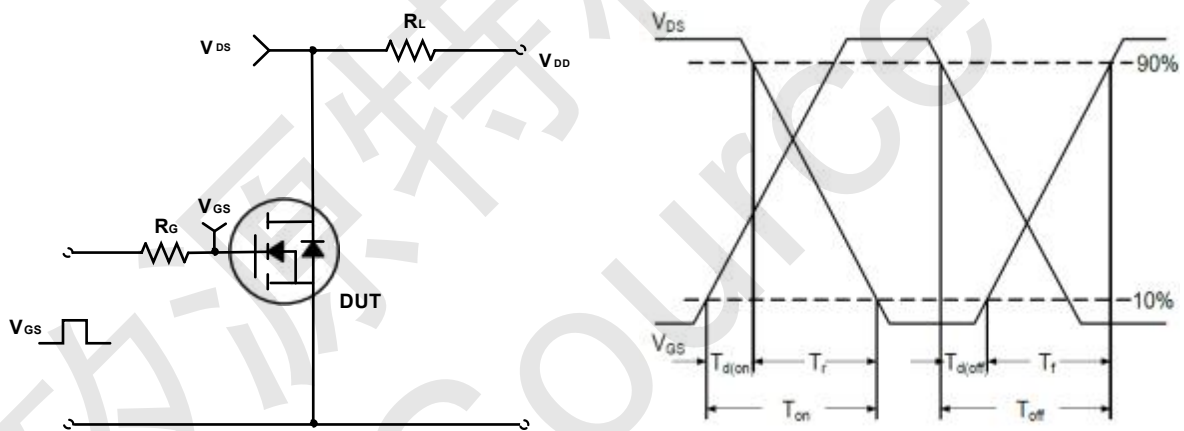


Figure B. Switching Test Circuit & Waveforms

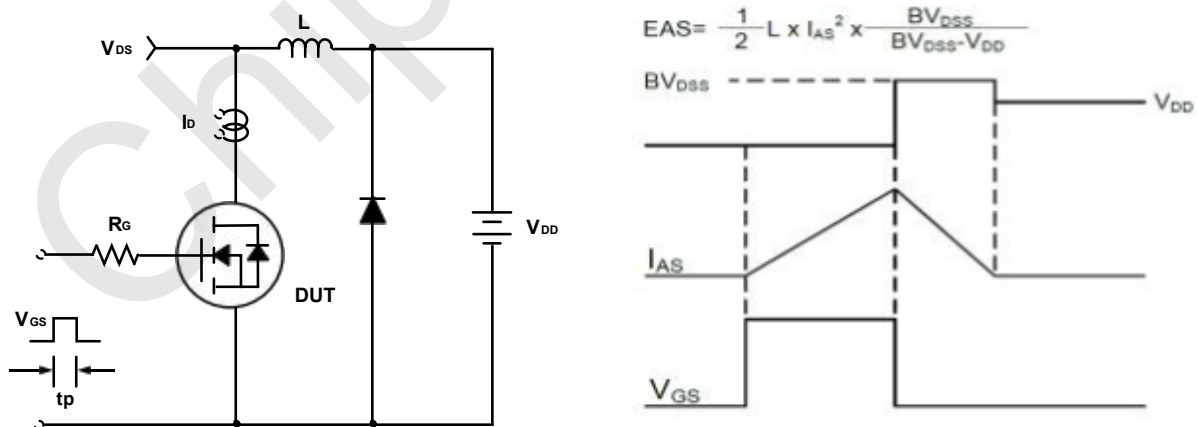
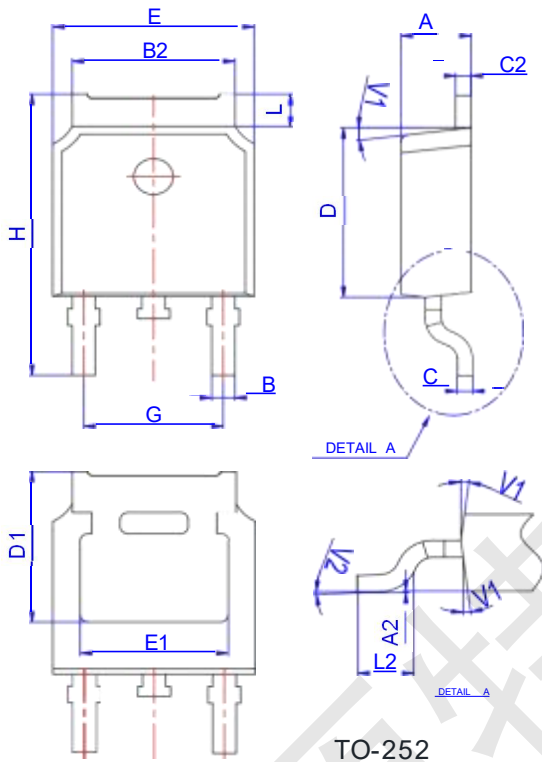


Figure C. Unclamped Inductive Switching Circuit & Waveforms



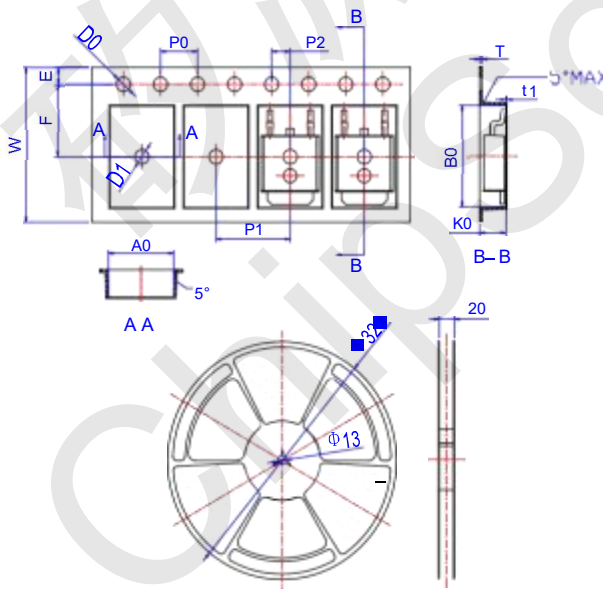
CST50P06 P-Ch 60V Fast Switching MOSFETs

CST50P06 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° |

CST50P06 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 |