



CST10N10Q N-Ch 100V Fast Switching MOSFET

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

CST10N10Q Product Summary

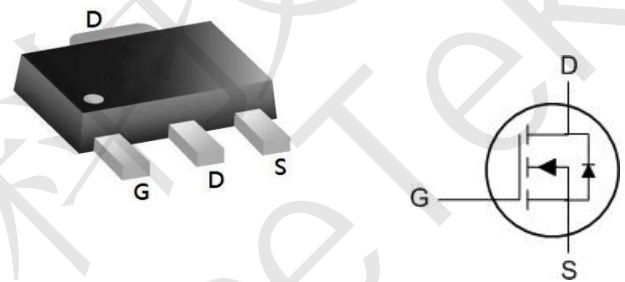


| BVDSS | RDSON | ID |
|-------|-------|-----|
| 100V | 85 mΩ | 10A |

CST10N10Q Description

The CST10N10Q 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 CST10N10Q meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

CST10N10Q SOT89-3LPin Configuration



CST10N10Q Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|-----------------------|--|------------|------------|
| V_{DS} | Drain-Source Voltage | 100 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D@T_C=25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 10 | A |
| $I_D@T_C=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 7.0 | A |
| $I_D@T_A=25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 3 | A |
| $I_D@T_A=70^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 2.4 | A |
| I_{DM} | Pulsed Drain Current ² | 24 | A |
| EAS | Single Pulse Avalanche Energy ³ | 6.1 | mJ |
| I_{AS} | Avalanche Current | 10 | A |
| $P_D@T_C=25^\circ C$ | Total Power Dissipation ³ | 34.7 | W |
| $P_D@T_A=25^\circ C$ | Total Power Dissipation ³ | 2 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ C$ |

CST10N10Q Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient ¹ | --- | 62 | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | 3.6 | $^\circ C/W$ |



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CST10N10Q Electrical Characteristics (T_J=25 °C, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|--|---|------|-------|------|-------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 100 | --- | --- | V |
| ΔBV _{DSS} /ΔT _J | BVDSS Temperature Coefficient | Reference to 25°C, I _D =1mA | --- | 0.098 | --- | V/°C |
| R _{DS(ON)} | Static Drain-Source On-Resistance ² | V _{GS} =10V, I _D =10A | --- | 85 | 112 | mΩ |
| | | V _{GS} =4.5V, I _D =8A | --- | 105 | 120 | mΩ |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.0 | --- | 2.5 | V |
| ΔV _{GS(th)} | V _{GS(th)} Temperature Coefficient | | --- | -4.57 | --- | mV/°C |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =80V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =80V, V _{GS} =0V, T _J =55°C | --- | --- | 5 | |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±20V, V _{DS} =0V | --- | --- | ±100 | nA |
| g _{fs} | Forward Transconductance | V _{DS} =5V, I _D =10A | --- | 13 | --- | S |
| R _g | Gate Resistance | V _{DS} =0V, V _{GS} =0V, f=1MHz | --- | 2 | --- | Ω |
| Q _g | Total Gate Charge (10V) | V _{DS} =80V, V _{GS} =10V, I _D =10A | --- | 26.2 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 4.6 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 5.1 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DD} =50V, V _{GS} =10V, R _G =3.3Ω I _D =10A | --- | 4.2 | --- | ns |
| T _r | Rise Time | | --- | 8.2 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 35.6 | --- | |
| T _f | Fall Time | | --- | 9.6 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =15V, V _{GS} =0V, f=1MHz | --- | 1535 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 60 | --- | |
| C _{riss} | Reverse Transfer Capacitance | | --- | 37 | --- | |

CST10N10Q Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|--|---|------|------|------|------|
| I _S | Continuous Source Current ^{1,5} | V _G =V _D =0V, Force Current | --- | --- | 10 | A |
| I _{SM} | Pulsed Source Current ^{2,5} | | --- | --- | 20 | A |
| V _{SD} | Diode Forward Voltage ² | V _{GS} =0V, I _S =1A, T _J =25°C | --- | --- | 1.2 | V |
| t _{rr} | Reverse Recovery Time | I _F =10A, di/dt=100A/μs, T _J =25°C | --- | 37 | --- | nS |
| Q _{rr} | Reverse Recovery Charge | | --- | 27.3 | --- | nC |

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=11A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.



CST10N10Q Typical Characteristics

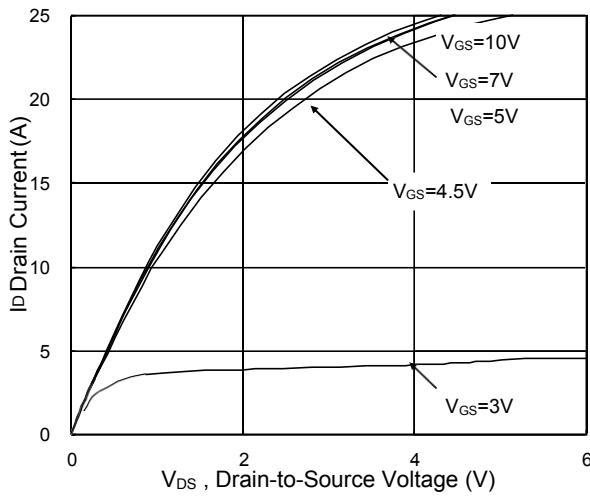


Fig.1 Typical Output Characteristics

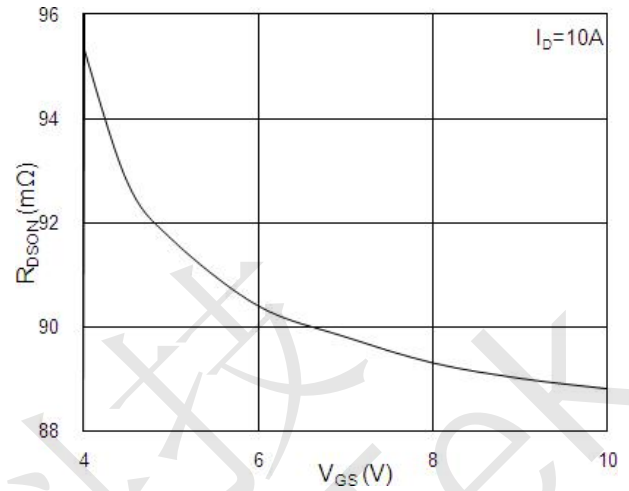


Fig.2 On-Resistance vs. Gate-Source

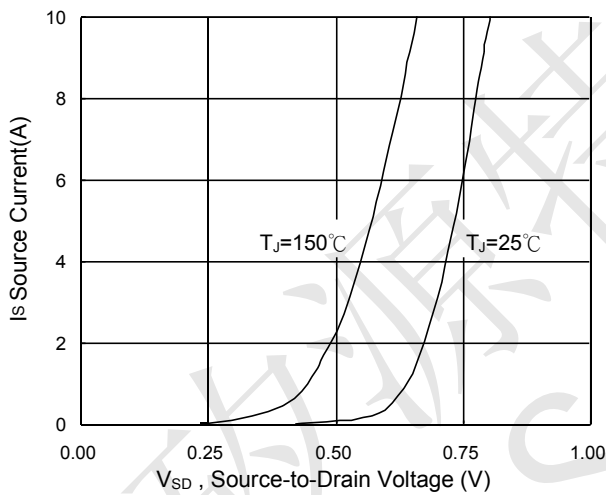


Fig.3 Forward Characteristics Of Reverse

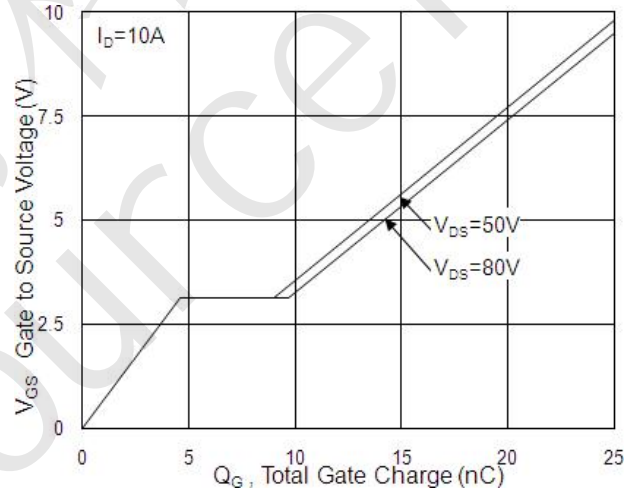


Fig.4 Gate-Charge Characteristics

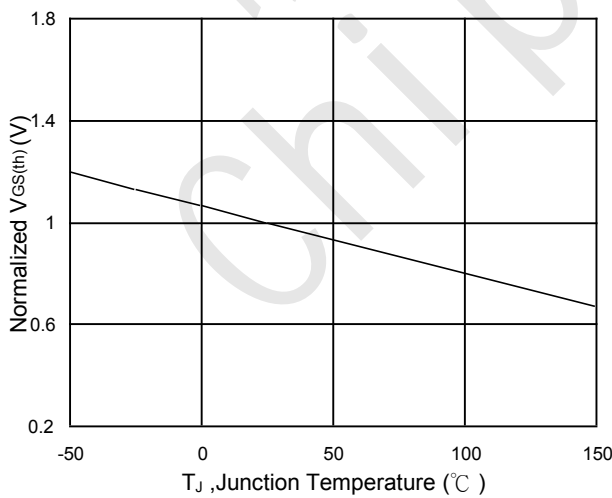


Fig.5 Normalized VGS(th) vs. TJ

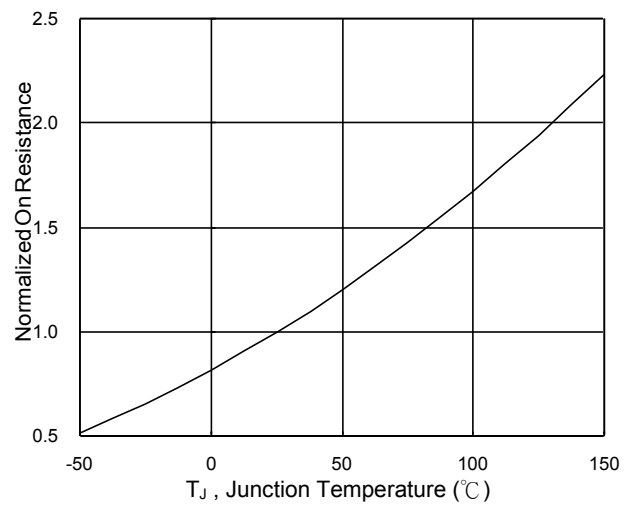


Fig.6 Normalized RDS(on) vs. TJ



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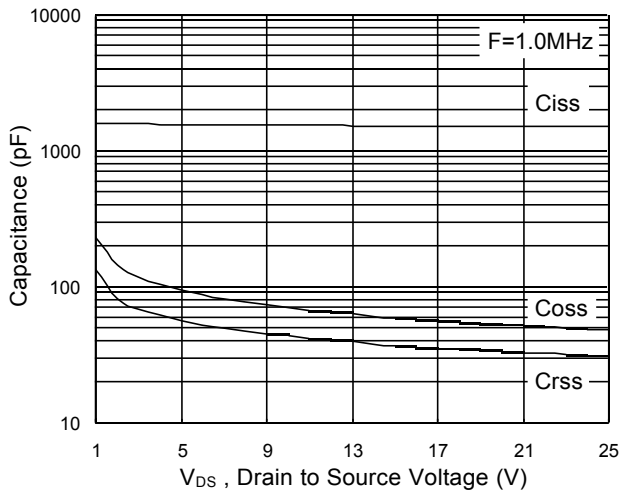


Fig.7 Capacitance

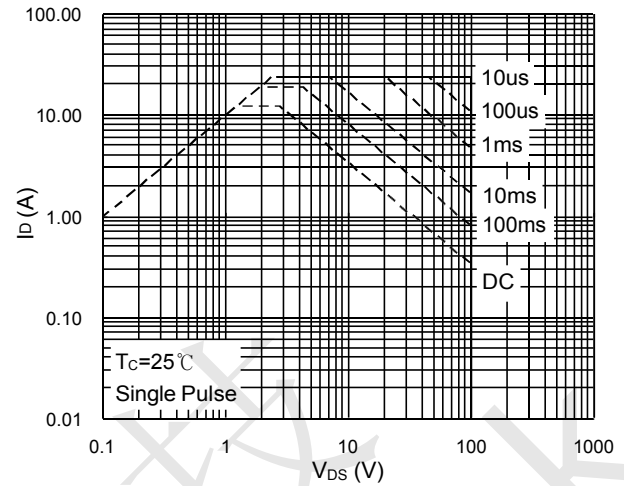


Fig.8 Safe Operating Area

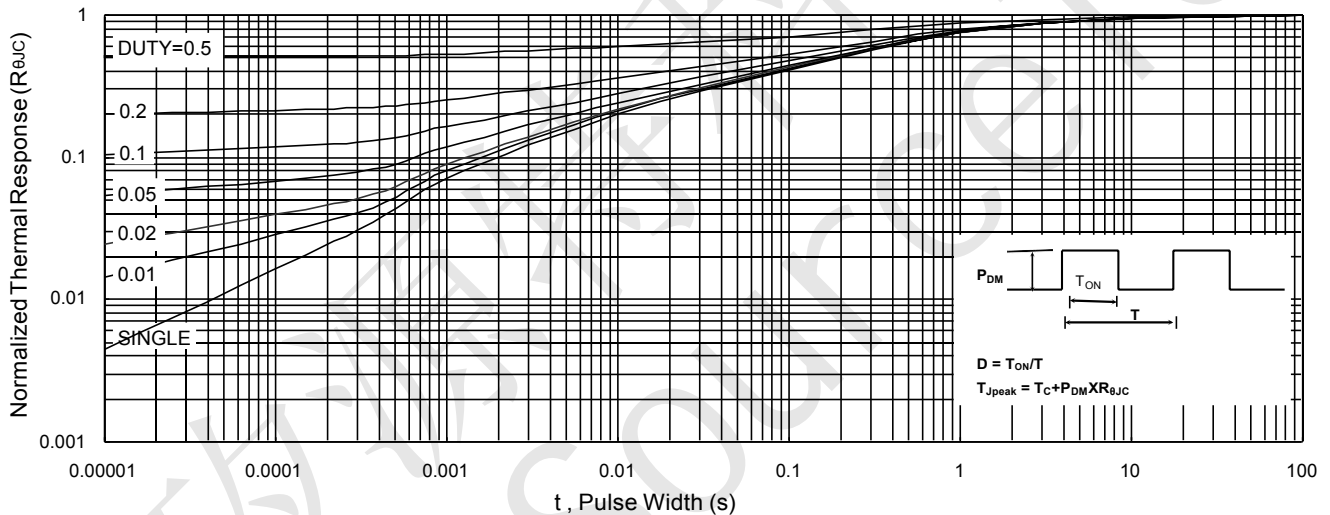


Fig.9 Normalized Maximum Transient Thermal Impedance

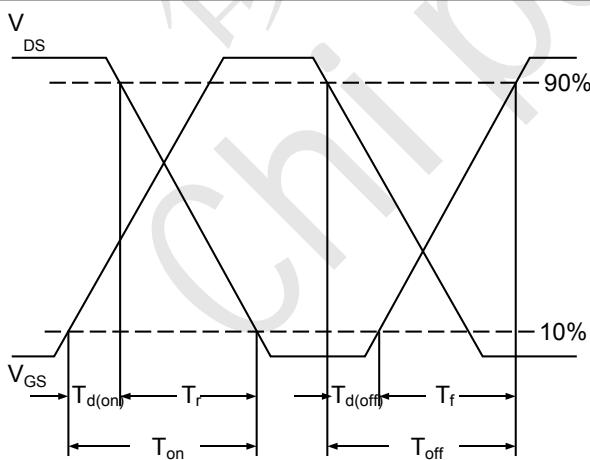


Fig.10 Switching Time Waveform

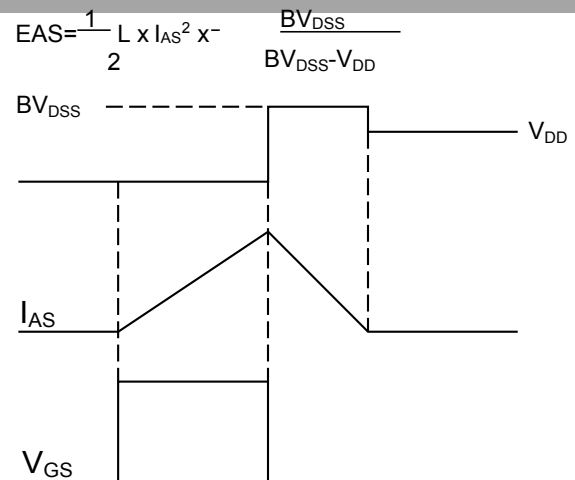
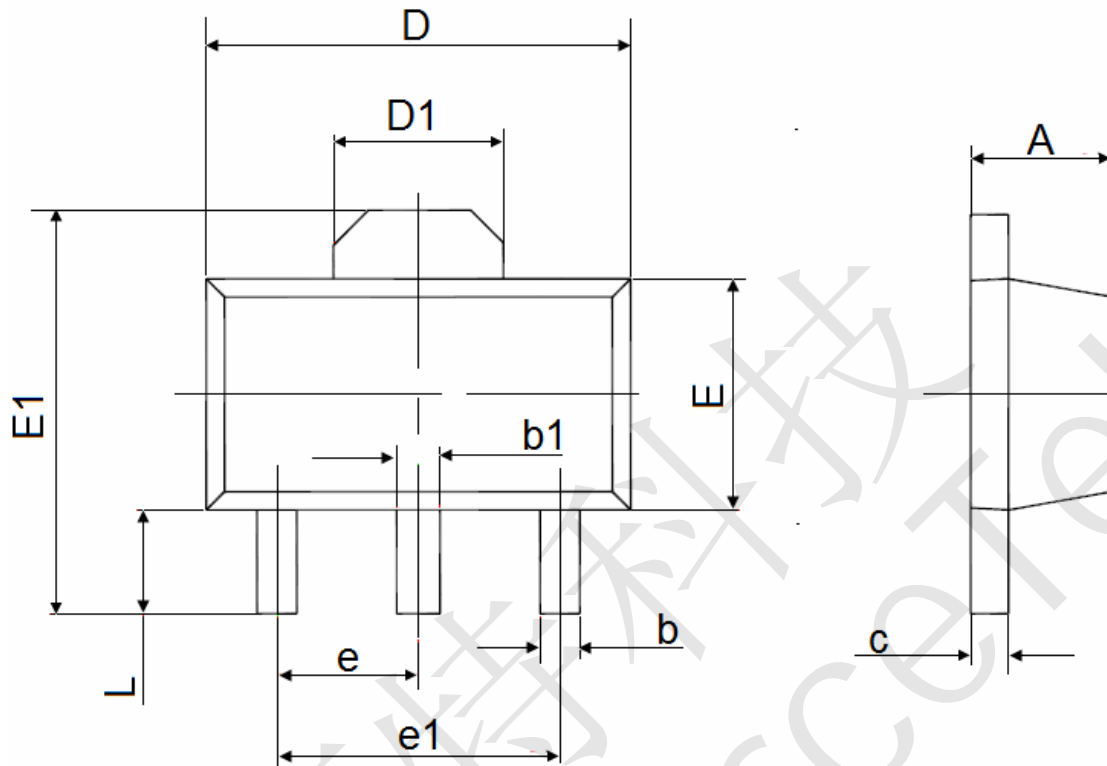


Fig.11 Unclamped Inductive Switching Waveform



CST10N10Q SOT-89-3L Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.400 | 1.600 | 0.055 | 0.063 |
| b | 0.320 | 0.520 | 0.013 | 0.020 |
| b1 | 0.400 | 0.580 | 0.016 | 0.023 |
| c | 0.350 | 0.440 | 0.014 | 0.017 |
| D | 4.400 | 4.600 | 0.173 | 0.181 |
| D1 | 1.550 REF. | | 0.061 REF. | |
| E | 2.300 | 2.600 | 0.091 | 0.102 |
| E1 | 3.940 | 4.250 | 0.155 | 0.167 |
| e | 1.500 TYP. | | 0.060 TYP. | |
| e1 | 3.000 TYP. | | 0.118 TYP. | |
| L | 0.900 | 1.200 | 0.035 | 0.047 |