



CST30G30D N-Ch and P-Ch Fast Switching MOSFETs

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

CST30G30D Product Summary

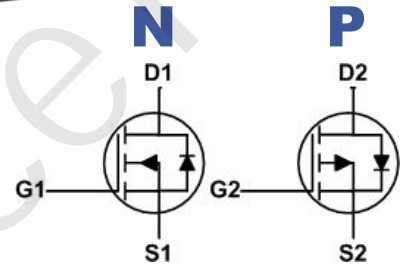
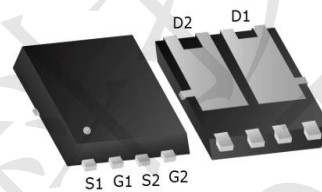


| BVDSS | RDSON | ID |
|-------|-------|------|
| 30V | 9.5mΩ | 20A |
| -30V | 16 mΩ | -20A |

CST30G30D Description

The CST30G30D is the high performance complementary N-ch and P-ch MOSFETs with high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The CST30G30D meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

CST30G30D PDFN3333-8L Pin Configuration



CST30G30D Absolute Maximum Ratings

| Symbol | Parameter | Rating | | Units |
|-------------------------|--|------------|------------|-------------|
| | | N-Ch | P-Ch | |
| V_{DS} | Drain-Source Voltage | 30 | -30 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | ± 20 | V |
| $I_{D@Ta=25^{\circ}C}$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 20 | -20 | A |
| $I_{D@Ta=100^{\circ}C}$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 10 | -10 | A |
| I_{DM} | Pulsed Drain Current ² | 72 | -48 | A |
| EAS | Single Pulse Avalanche Energy ³ | 48 | 66 | mJ |
| $P_{D@Tc=25^{\circ}C}$ | Total Power Dissipation ⁴ | 15 | 15.3 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | -55 to 150 | $^{\circ}C$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | -55 to 150 | $^{\circ}C$ |

CST30G30D Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|---------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ | --- | 48 | $^{\circ}C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | 5 | $^{\circ}C/W$ |



CST30G30D N-Ch and P-Ch Fast Switching MOSFETs

CST30G30D N-Channel Electrical Characteristics $T = 25^{\circ}\text{C}$ unless otherwise specified

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|------|------|-----------|------------|
| Off Characteristic | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 30 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=30V, V_{GS}=0V,$ | - | - | 1.0 | μA |
| I_{GSS} | Gate to Body Leakage Current | $V_{DS}=0V, V_{GS}=\pm 20V$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.0 | 1.5 | 2.5 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance <small>note3</small> | $V_{GS}=10V, I_D=10A$ | - | 9.5 | 13 | m Ω |
| | | $V_{GS}=4.5V, I_D=5A$ | - | 16 | 22.5 | |
| Dynamic Characteristics | | | | | | |
| C_{iss} | Input Capacitance | $V_{DS}=15V, V_{GS}=0V,$ $f=1.0\text{MHz}$ | - | 633 | - | pF |
| C_{oss} | Output Capacitance | | - | 120 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | | - | 99 | - | pF |
| Q_g | Total Gate Charge | $V_{DS}=15V, I_D=10A,$ $V_{GS}=10V$ | - | 15 | - | nC |
| Q_{gs} | Gate-Source Charge | | - | 4.7 | - | nC |
| Q_{gd} | Gate-Drain("Miller") Charge | | - | 3.6 | - | nC |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DS}=30V, I_D=18A,$ $R_{GEN}=3\Omega, V_{GS}=10V$ | - | 5 | - | ns |
| t_r | Turn-on Rise Time | | - | 8 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 21 | - | ns |
| t_f | Turn-off Fall Time | | - | 7 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I_S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 20 | A |
| I_{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 72 | A |
| V_{SD} | Drain to Source Diode Forward Voltage | $V_{GS}=0V, I_S=18A$ | - | - | 1.2 | V |
| t_{rr} | Body Diode Reverse Recovery Time | $I_F=18A, di/dt=100A/\mu s$ | - | 7 | - | ns |
| Q_{rr} | Body Diode Reverse Recovery Charge | | - | 5.9 | - | nC |

Note :

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=20A$
- The power dissipation is limited by 150°C junction temperature
- The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.



CST30G30D N-Ch and P-Ch Fast Switching MOSFETs

CST30G30D P-Channel 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 | -30 | - | - | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} = -30V, V _{GS} =0V | - | - | -1 | μA |
| I _{GSS} | Gate to Body Leakage Current | V _{DS} =0V, V _{GS} =±20V | - | - | ±100 | nA |
| On Characteristics | | | | | | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D = -250μA | -1.0 | -1.6 | -2.5 | V |
| R _{DS(on)} | Static Drain-Source on-Resistance <small>note3</small> | V _{GS} = -10V, I _D = -10A | - | 16 | 25 | mΩ |
| | | V _{GS} = -4.5V, I _D = -5A | - | 29 | 40 | |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} = -15V, V _{GS} =0V, f=1.0MHz | - | 1240 | - | pF |
| C _{oss} | Output Capacitance | | - | 151 | - | pF |
| C _{rss} | Reverse Transfer Capacitance | | - | 138 | - | pF |
| Q _g | Total Gate Charge | V _{DS} = -15V, I _D = -6A, V _{GS} = -10V | - | 24 | - | nC |
| Q _{gs} | Gate-Source Charge | | - | 3.7 | - | nC |
| Q _{gd} | Gate-Drain("Miller") Charge | | - | 4.8 | - | nC |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DD} = -15V, I _D = -10A, V _{GS} = -10V, R _{GEN} =3Ω | - | 11 | - | ns |
| t _r | Turn-on Rise Time | | - | 5.5 | - | ns |
| t _{d(off)} | Turn-off Delay Time | | - | 3.5 | - | ns |
| t _f | Turn-off Fall Time | | - | 4.6 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I _S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | -20 | A |
| I _{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | -48 | A |
| V _{SD} | Drain to Source Diode Forward Voltage | V _{GS} =0V, I _S = -10A | - | - | -1.2 | V |

- Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
 2. EAS condition: T_J=25°C, V_{DD}=-15V, V_G=-10V, R_G=25Ω, L=0.1mH, I_{AS}= -27A
 3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%



CST30G30D Typical Performance Characteristics-N

Figure 1: Output Characteristics

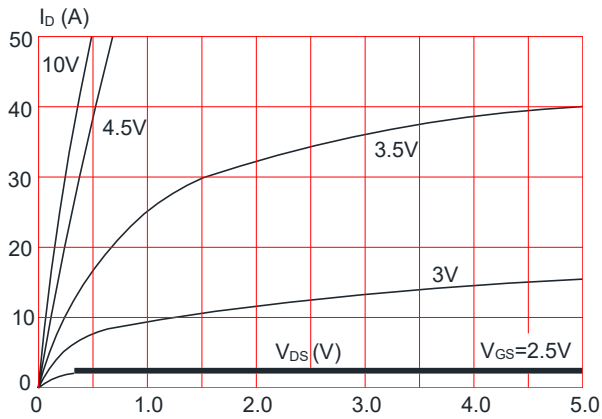


Figure 2: Typical Transfer Characteristics

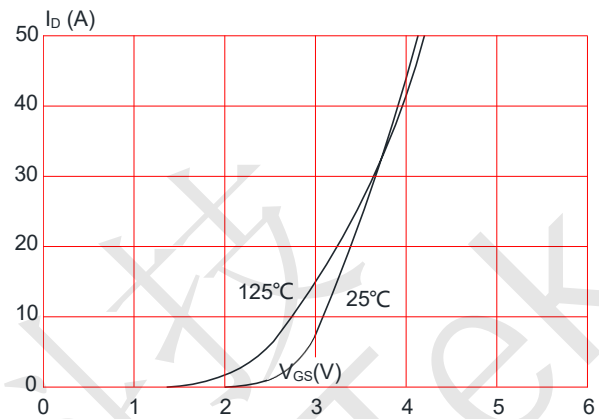


Figure 3: On-resistance vs. Drain Current

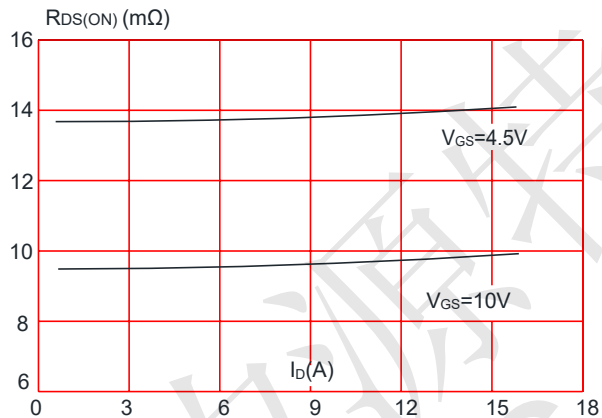


Figure 4: Body Diode Characteristics

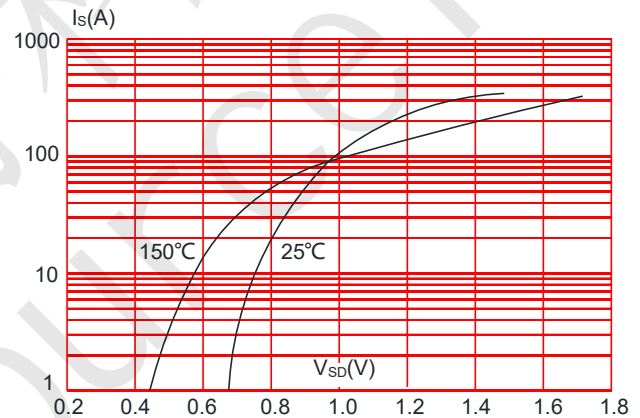


Figure 5: Gate Charge Characteristics

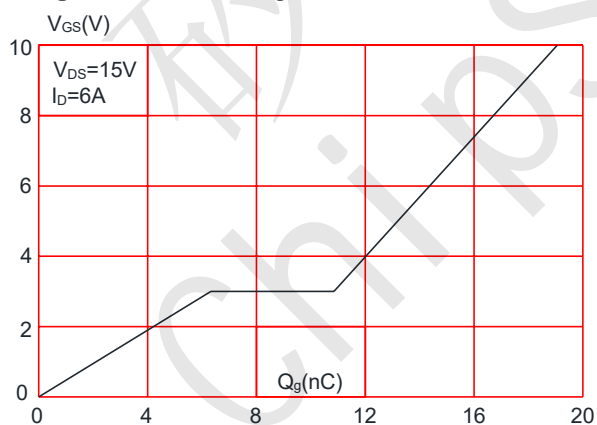
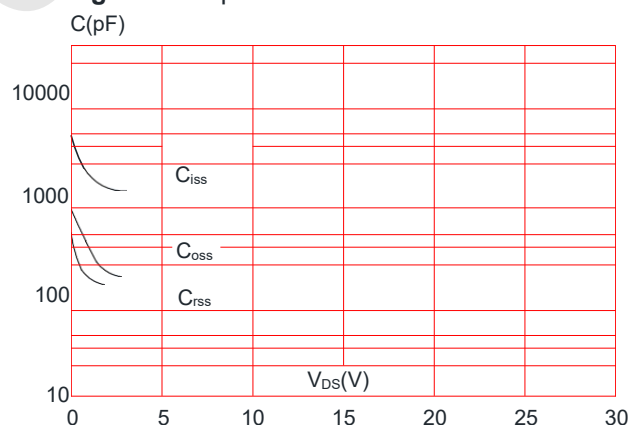


Figure 6: Capacitance Characteristics





CST30G30D N-Ch and P-Ch Fast Switching MOSFETs

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

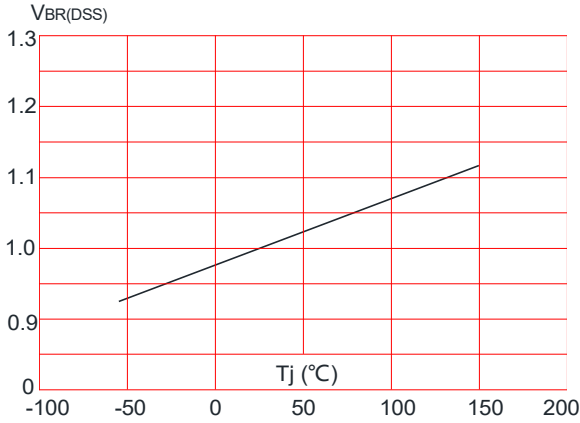


Figure 8: Normalized on Resistance vs. Junction Temperature

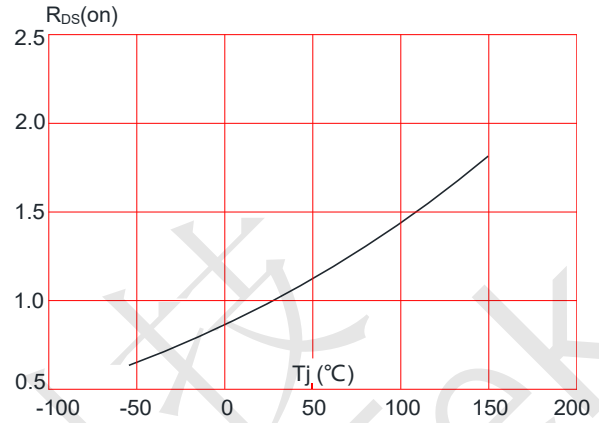


Figure 9: Maximum Safe Operating Area

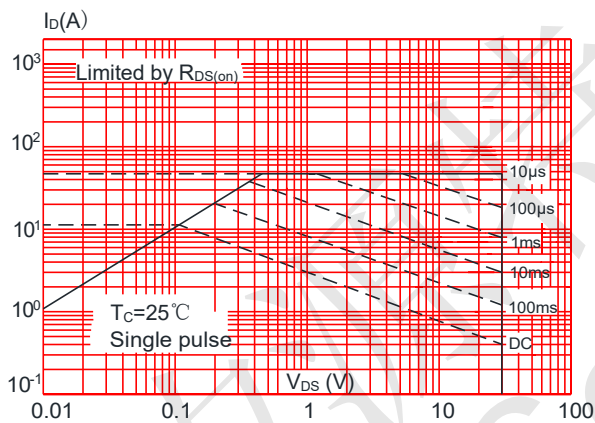


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

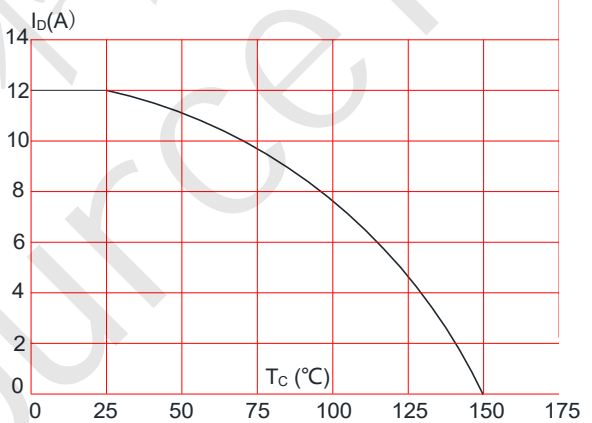
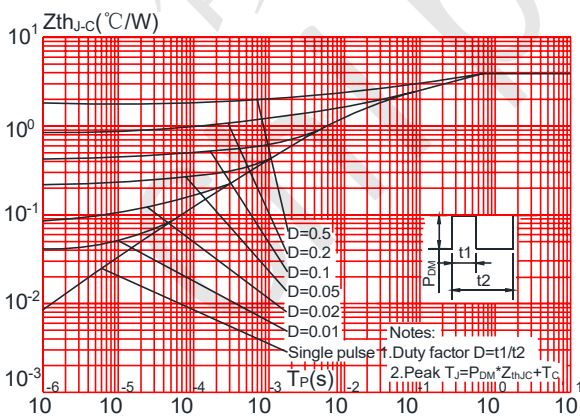


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case





CST30G30D Test Circuit-N

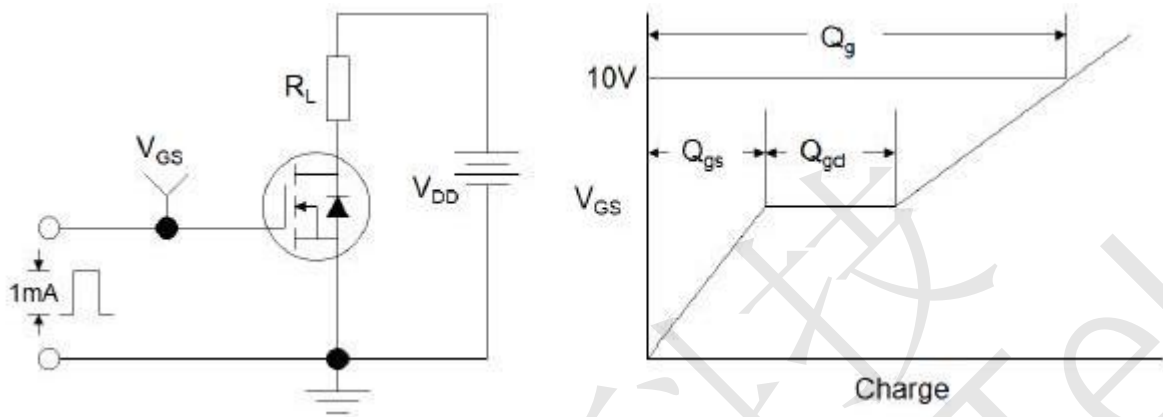


Figure1:Gate Charge Test Circuit & Waveform

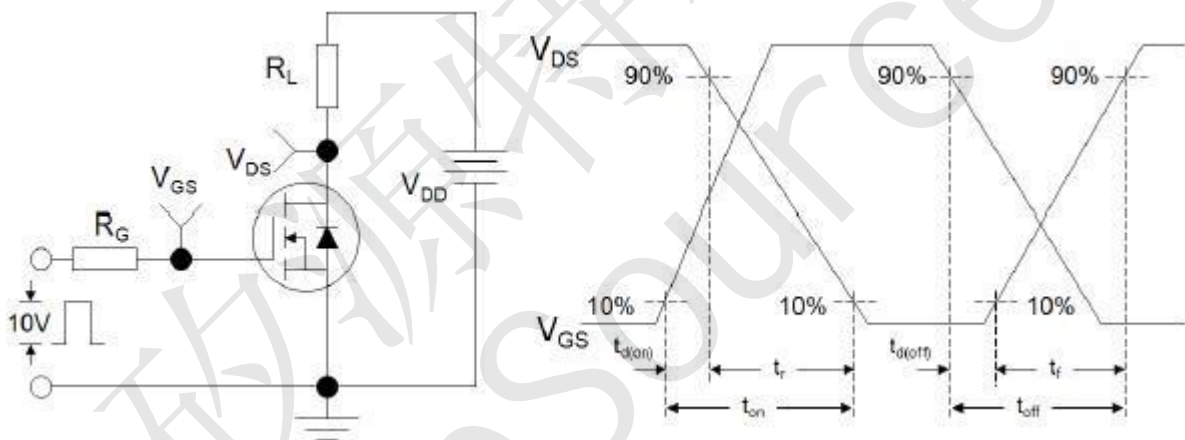


Figure 2: Resistive Switching Test Circuit & Waveforms

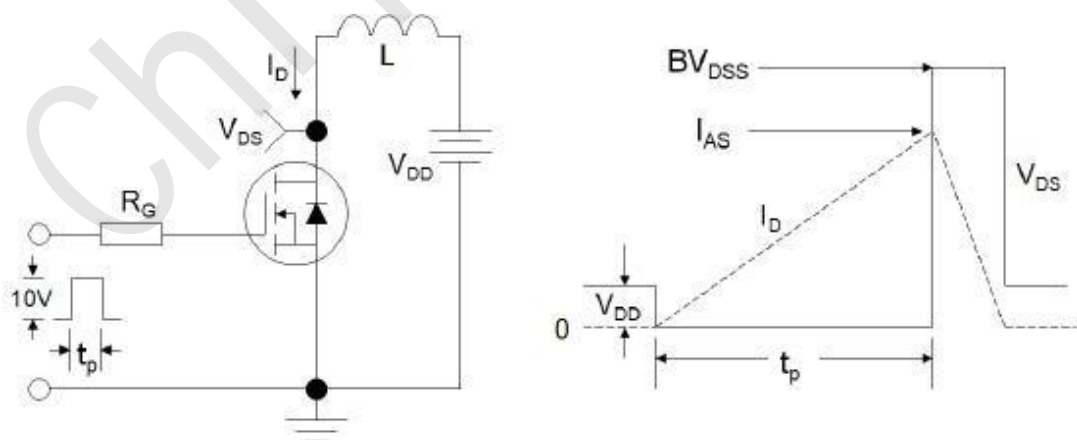


Figure 3:Unclamped Inductive Switching Test Circuit & Waveform



CST30G30D Typical Performance Characteristics-P

Figure 1: Output Characteristics

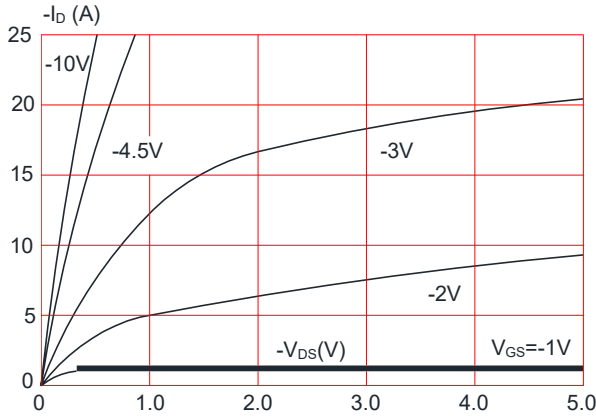


Figure 2: Typical Transfer Characteristics

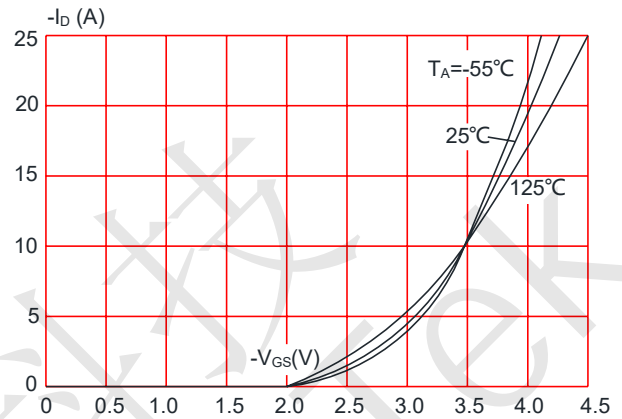


Figure 3: On-resistance vs. Drain Current

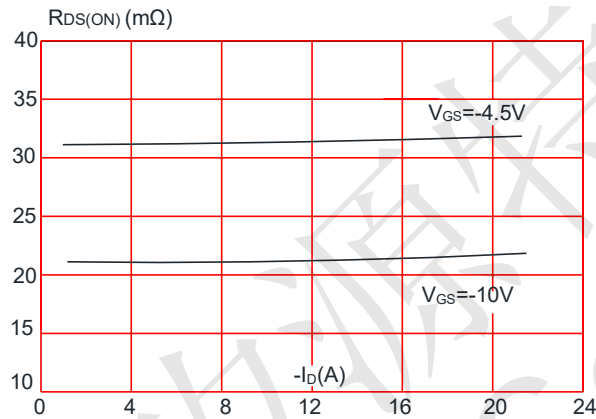


Figure 4: Body Diode Characteristics

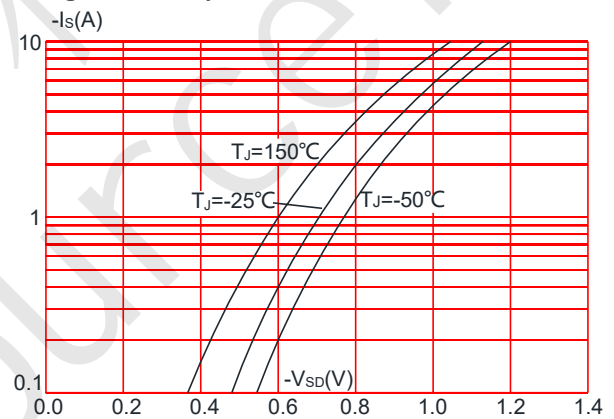


Figure 5: Gate Charge Characteristics

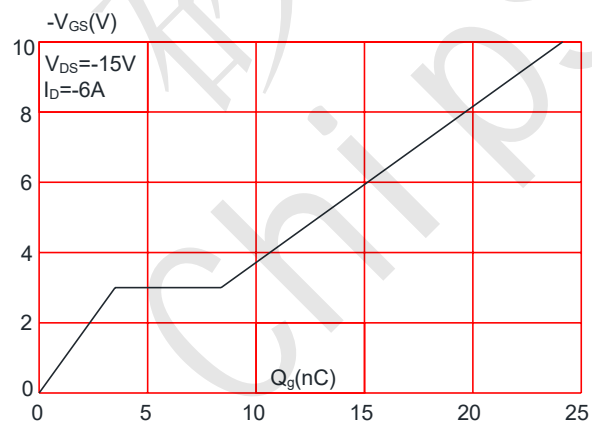
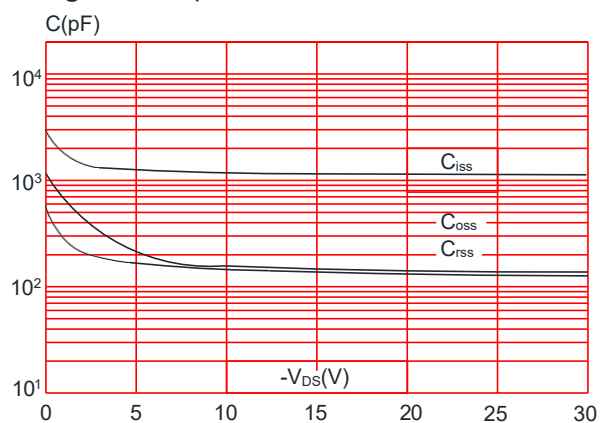


Figure 6: Capacitance Characteristics





CST30G30D N-Ch and P-Ch Fast Switching MOSFETs

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

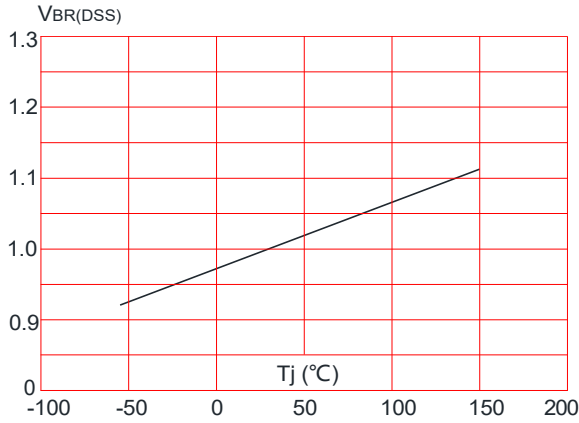


Figure 8: Normalized on Resistance vs. Junction Temperature

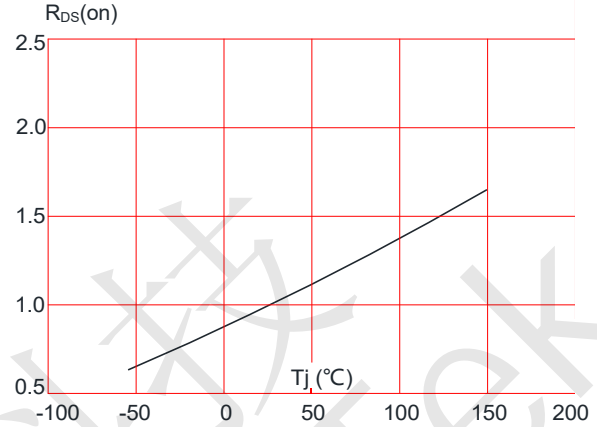


Figure 9: Maximum Safe Operating Area

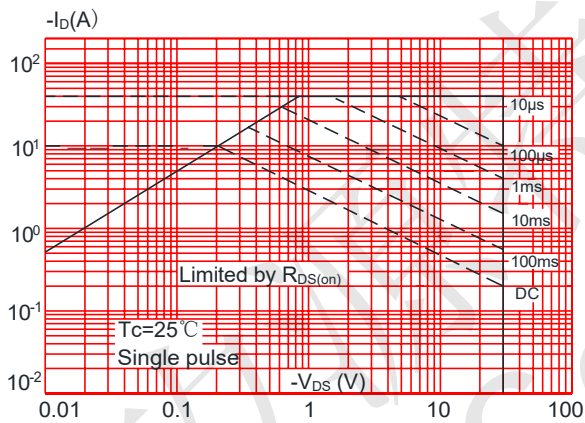


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

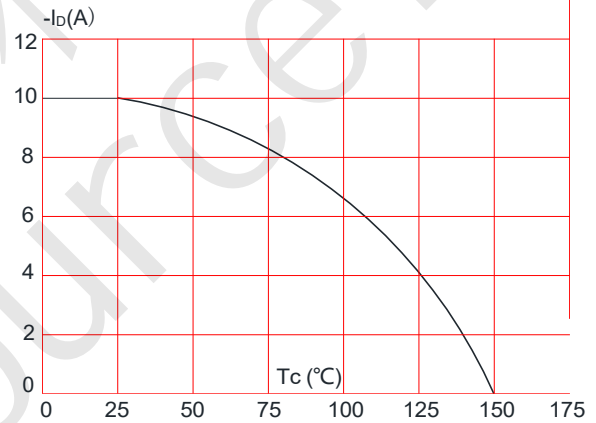
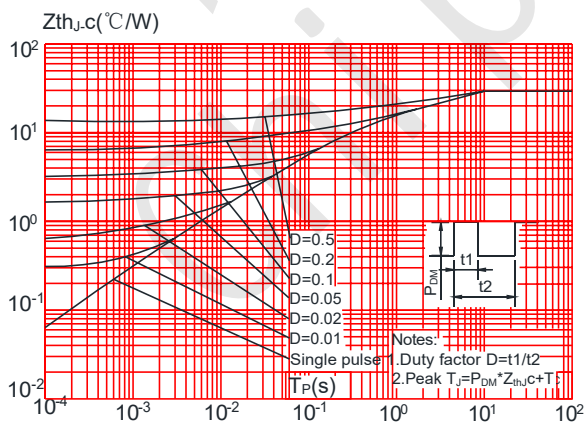


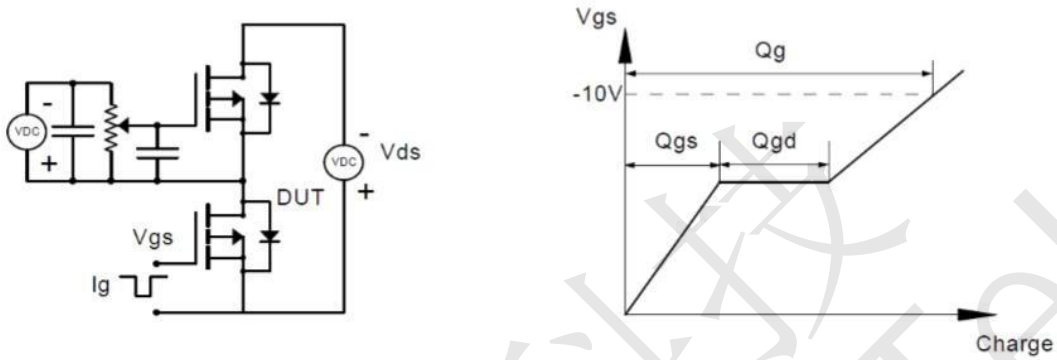
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



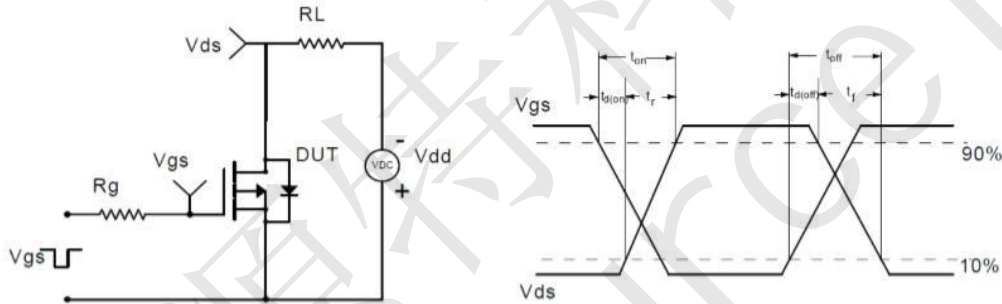


CST30G30D Test Circuit-P

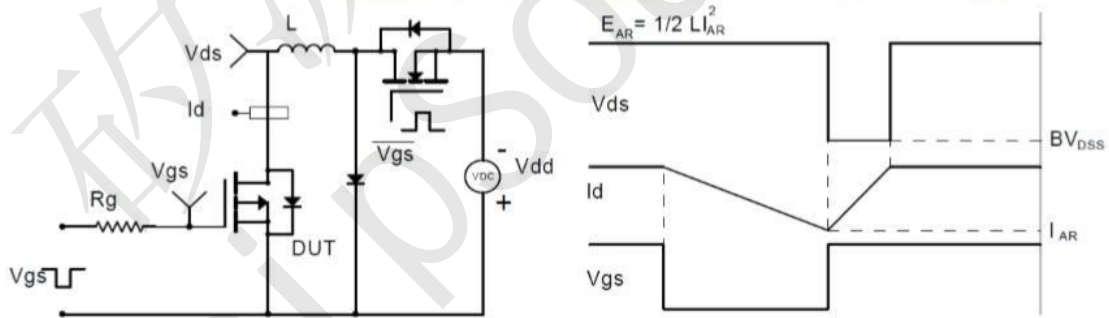
Gate Charge Test Circuit & Waveform



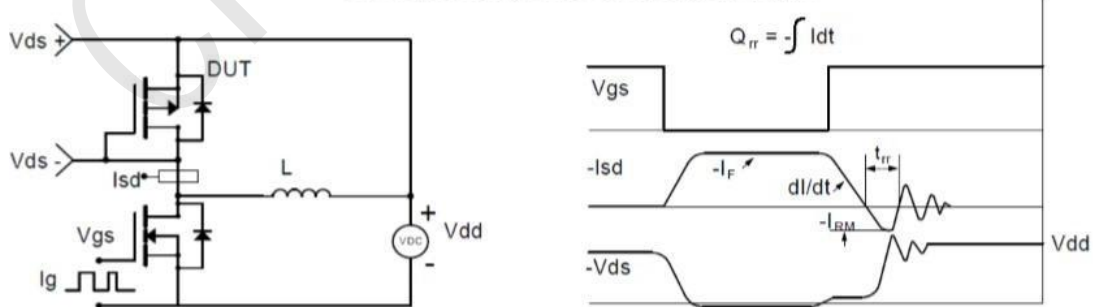
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



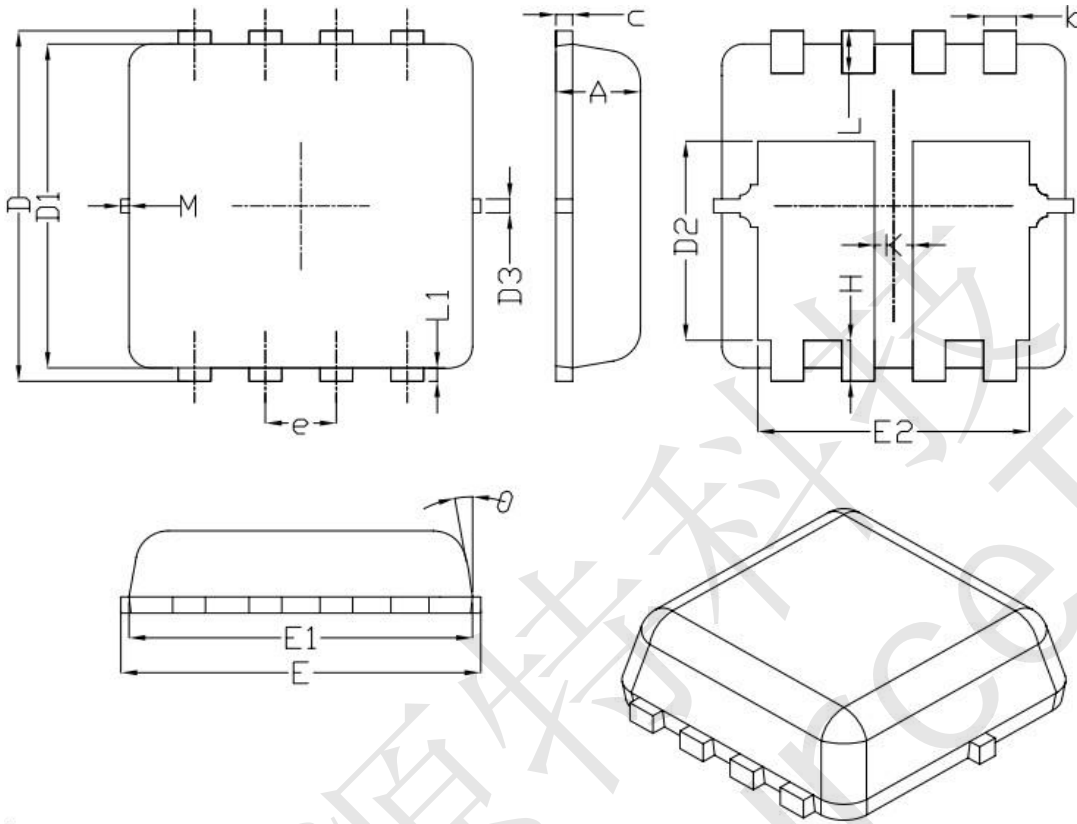
Diode Recovery Test Circuit & Waveforms





CST30G30D N-Ch and P-Ch Fast Switching MOSFETs

CST30G30D Dual PDFN3333-8L Package Outline Data



| Symbol | Dimensions (unit: mm) | | |
|------------------------|-----------------------|------|------|
| | Min | Typ | Max |
| A | 0.70 | 0.75 | 0.80 |
| b | 0.25 | 0.30 | 0.35 |
| c | 0.10 | 0.15 | 0.25 |
| D | 3.25 | 3.35 | 3.45 |
| D1 | 3.00 | 3.10 | 3.20 |
| D2 | 1.78 | 1.88 | 1.98 |
| D3 | -- | 0.13 | -- |
| E | 3.20 | 3.30 | 3.40 |
| E1 | 3.00 | 3.15 | 3.20 |
| E2 | 2.39 | 2.49 | 2.59 |
| e | 0.65 BSC | | |
| H | 0.30 | 0.39 | 0.50 |
| L | 0.30 | 0.40 | 0.50 |
| L1 | -- | 0.13 | -- |
| K | 0.30 | -- | -- |
| θ | -- | 10° | 12° |
| M | * | * | 0.15 |
| * Not Specified | | | |

Notes:

1. Refer to JEDEC MO-240 variation CA.
2. Dimensions "D1" and "E1" do NOT include mold flash protrusions or gate burrs.
3. Dimensions "D1" and "E1" include interterminal flash or protrusion.