



CST40P03D P-Ch 30V Fast Switching MOSFETs

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



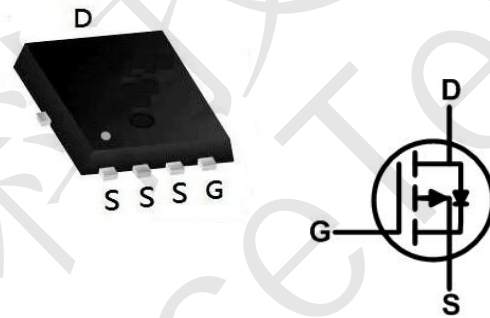
CST40P03D Product Summary

| BVDSS | RDSON | ID |
|-------|-------|------|
| -30V | 12mΩ | -40A |

CST40P03D Description

The CST40P03D 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 CST40P03D meet the RoHS and Gree Product requirement 100% EAS guaranteed with full function reliability approved.

CST40P03D PDFN3333-8L Pin Configuration



CST40P03D Absolute Maximum Ratings

| Symbol | Parameter | Rating | | Units |
|---------------------------------------|---|------------|--------------|-------|
| | | 10s | Steady State | |
| V _{DS} | Drain-Source Voltage | -30 | | V |
| V _{GS} | Gate-Source Voltage | ±20 | | V |
| I _D @T _C =25°C | Continuous Drain Current, V _{GS} @ -10V ¹ | -40 | | A |
| I _D @T _C =100°C | Continuous Drain Current, V _{GS} @ -10V ¹ | -25 | | A |
| I _{DM} | Pulsed Drain Current ² | -120 | | A |
| EAS | Single Pulse Avalanche Energy ³ | 105 | | mJ |
| I _{AS} | Avalanche Current | -50 | | A |
| P _D @T _A =25°C | Total Power Dissipation ⁴ | 15 | | W |
| T _{STG} | Storage Temperature Range | -55 to 150 | | °C |
| T _J | Operating Junction Temperature Range | -55 to 150 | | °C |

CST40P03D Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|------------------|--|------|------|------|
| R _{θJA} | Thermal Resistance Junction-Ambient ¹ | --- | 66 | °C/W |



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CST40P03D 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 | - | 12 | 15 | mΩ |
| | | V _{GS} = -4.5V, I _D = -5A | - | 18 | 27 | |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} = -15V, V _{GS} =0V, f=1.0MHz | - | 1330 | - | pF |
| C _{oss} | Output Capacitance | | - | 183 | - | pF |
| C _{rss} | Reverse Transfer Capacitance | | - | 156 | - | pF |
| Q _g | Total Gate Charge | V _{DS} = -15V, I _D = -5A, V _{GS} = -10V | - | 22 | - | nC |
| Q _{gs} | Gate-Source Charge | | - | 1.0 | - | nC |
| Q _{gd} | Gate-Drain("Miller") Charge | | - | 1.8 | - | nC |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DD} = -15V, I _D = -10A, V _{GS} =-10V, R _{GEN} =2.5Ω | - | 9 | - | ns |
| t _r | Turn-on Rise Time | | - | 13 | - | ns |
| t _{d(off)} | Turn-off Delay Time | | - | 48 | - | ns |
| t _f | Turn-off Fall Time | | - | 20 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I _S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | -40 | A |
| I _{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | -90 | A |
| V _{SD} | Drain to Source Diode Forward Voltage | V _{GS} =0V, I _S = -15A | - | -0.8 | -1.2 | V |
| t _{rr} | Reverse Recovery Time | T _J =25°C, | - | 64 | - | ns |
| Q _{rr} | Reverse Recovery Charge | V _{DD} = -24V, I _F =-2.8A, dI/dt=-100A/μs | - | 25 | - | nC |

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

2. EAS condition: T_J=25°C, V_{GS}=10V, R_G=25Ω, L=0.5mH, I_{AS}=-12.7A

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



CST40P03D Typical Performance Characteristics

Figure 1: Output Characteristics

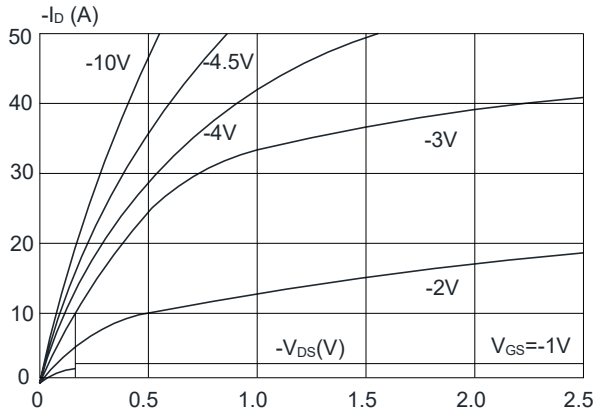


Figure 2: Typical Transfer Characteristics

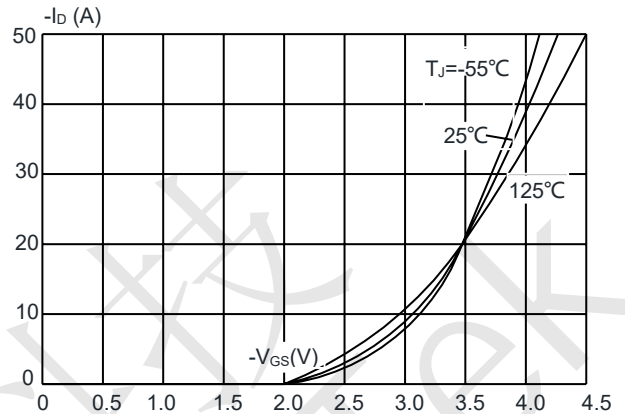


Figure 3: On-resistance vs. Drain Current

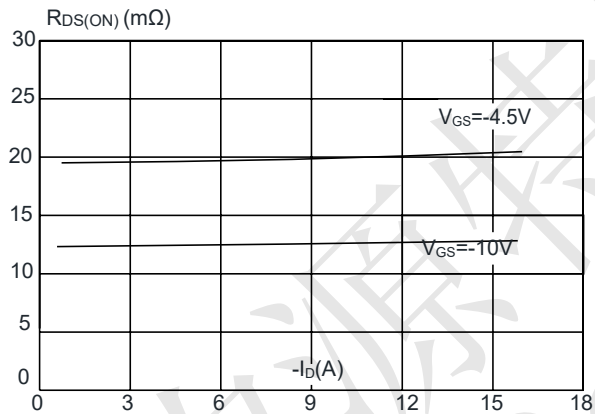


Figure 4: Body Diode Characteristics

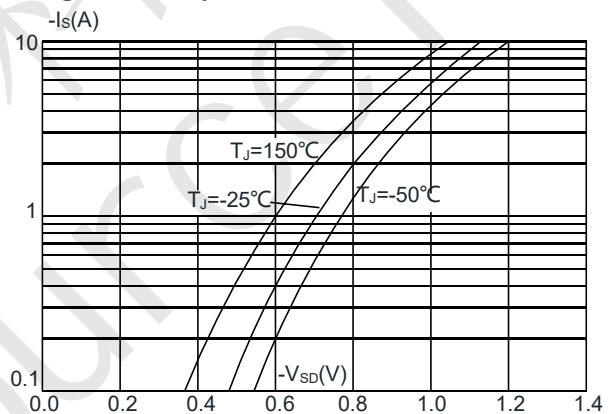


Figure 5: Gate Charge Characteristics

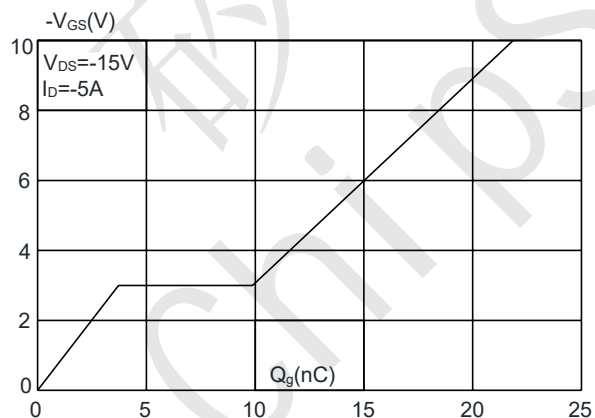
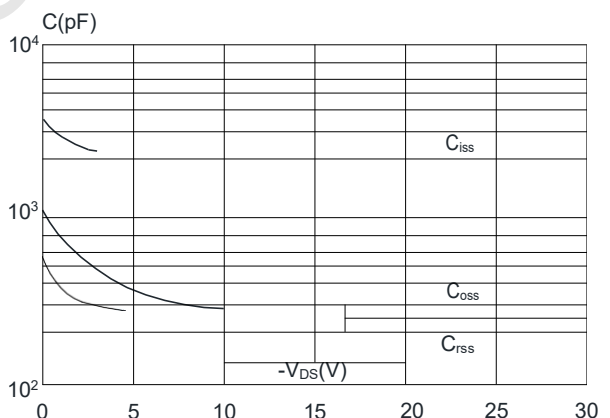


Figure 6: Capacitance Characteristics





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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

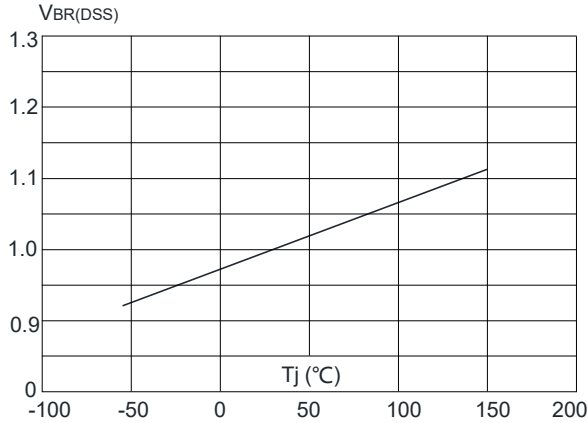


Figure 8: Normalized on Resistance vs. Junction Temperature

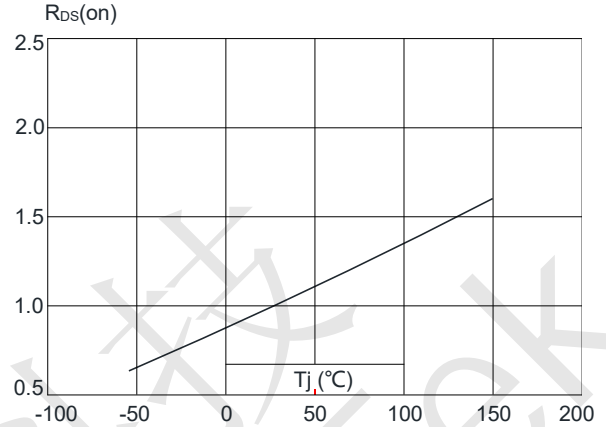


Figure 9: Maximum Safe Operating Area

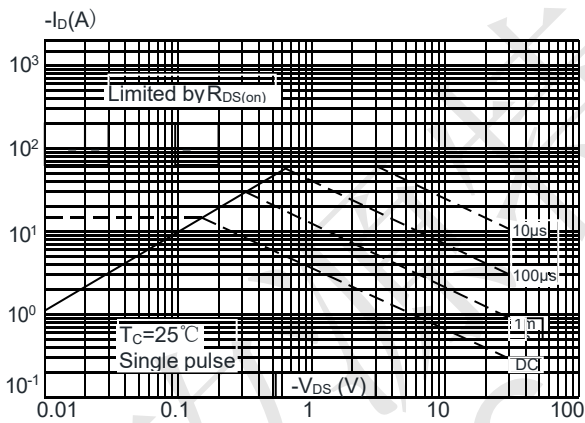


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

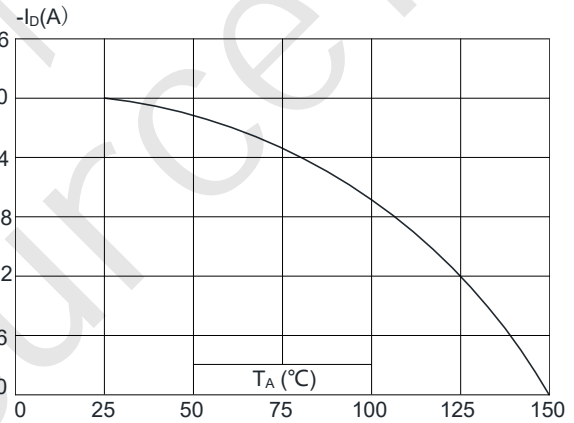
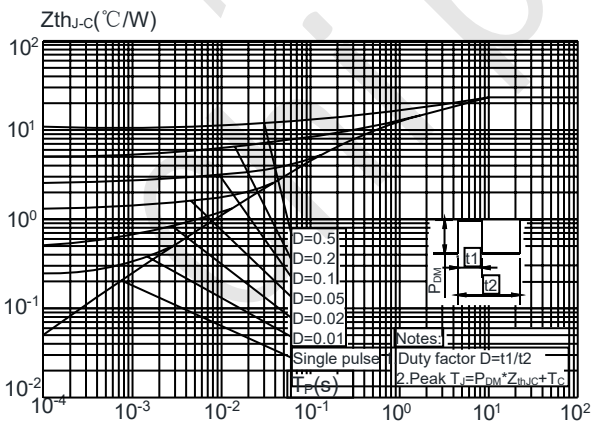


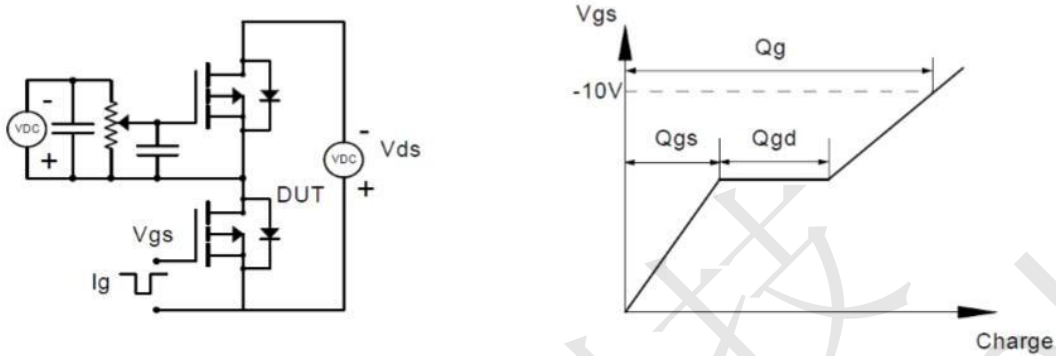
Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



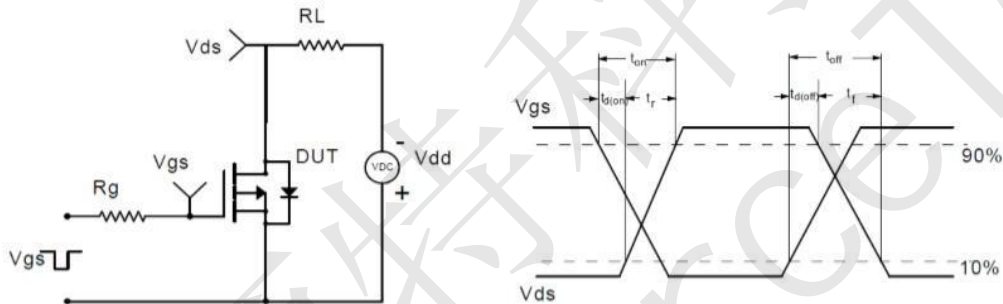


CST40P03D Test Circuit

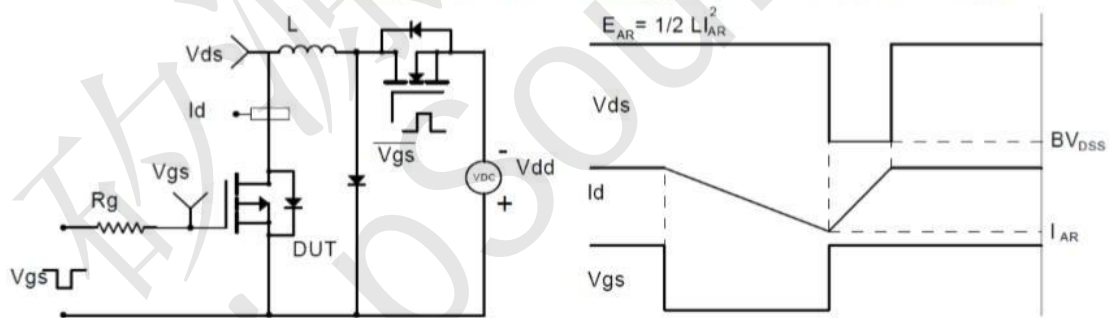
Gate Charge Test Circuit & Waveform



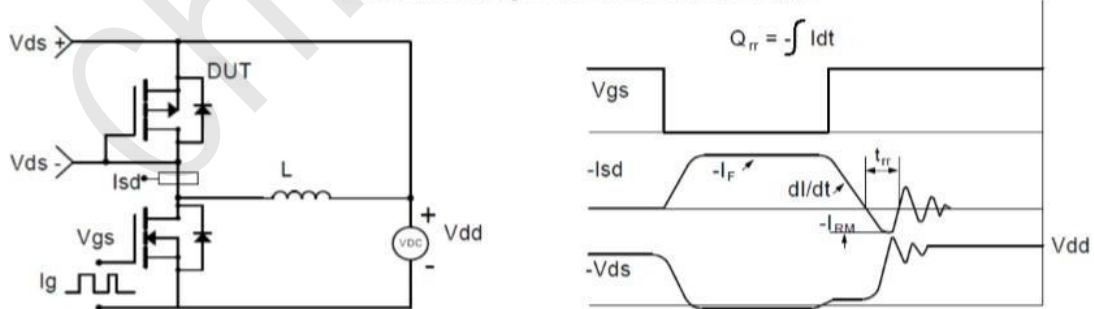
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

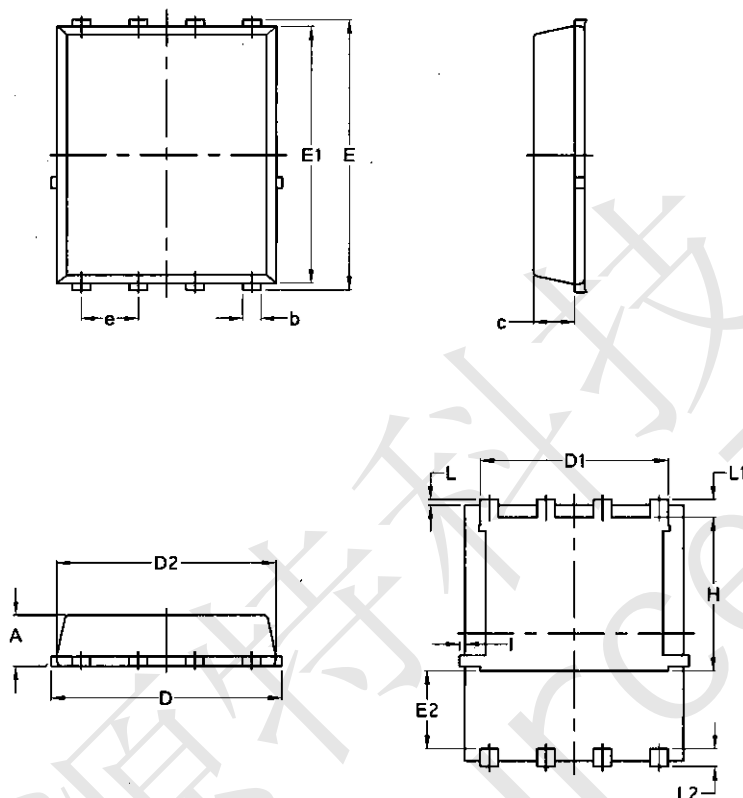


Diode Recovery Test Circuit & Waveforms





CST40P03D Package Mechanical Data-PDFN3333-8L-Single



COMMON DIMENSIONS

(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MIN | NOM | MAX |
|--------|-----------|------|------|
| A | 0.70 | 0.80 | 0.90 |
| A1 | 0.00 | 0.03 | 0.05 |
| b | 0.24 | 0.30 | 0.35 |
| c | 0.10 | 0.15 | 0.20 |
| D | 3.25 | 3.32 | 3.40 |
| D1 | 3.05 | 3.15 | 3.25 |
| D2 | 2.40 | 2.50 | 2.60 |
| E | 3.00 | 3.10 | 3.20 |
| E1 | 1.35 | 1.45 | 1.55 |
| e | 0.65 BSC. | | |
| H | 3.20 | 3.30 | 3.40 |
| L | 0.30 | 0.40 | 0.50 |
| L1 | 0.10 | 0.15 | 0.20 |
| L2 | 1.13 REF. | | |