



CST4614C N-Ch and P-Ch Fast Switching MOSFETs

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

CST4614C Product Summary

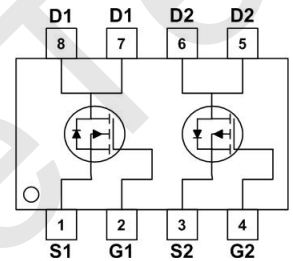
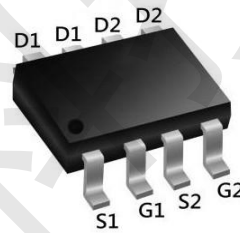


| BVDSS | RDSON | ID |
|-------|-------|-------|
| 40V | 26mΩ | 7.2A |
| -40V | 62mΩ | -5.5A |

CST4614C Description

The CST4614C 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 CST4614C meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

CST4614C SOP8 Pin Configurations



CST4614C Absolute Maximum Ratings

| Symbol | Parameter | Rating | | Units |
|-----------------------|--|------------|------------|------------|
| | | N-Ch | P-Ch | |
| V_{DS} | Drain-Source Voltage | 40 | -40 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | ± 20 | V |
| $I_D@T_C=25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 7.2 | -5.5 | A |
| $I_D@T_C=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 5.6 | -4.1 | A |
| I_{DM} | Pulsed Drain Current ² | 14.5 | -15 | A |
| EAS | Single Pulse Avalanche Energy ³ | 28 | 26 | mJ |
| I_{AS} | Avalanche Current | 10.8 | -7.2 | A |
| $P_D@T_C=25^\circ C$ | Total Power Dissipation ⁴ | 2.5 | 2.1 | 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 | $^\circ C$ |



CST4614C 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 | 40 | - | - | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =40V, V _{GS} =0V, | - | - | 1.0 | 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 | 1.5 | 2.2 | V |
| R _{DS(on)} | Static Drain-Source on-Resistance <small>note3</small> | V _{GS} =10V, I _D =4A | - | 26 | 40 | mΩ |
| | | V _{GS} =4.5V, I _D =3A | - | 35 | 60 | |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} =20V, V _{GS} =0V, f=1.0MHz | - | 435 | - | pF |
| C _{oss} | Output Capacitance | | - | 58 | - | pF |
| C _{rss} | Reverse Transfer Capacitance | | - | 35 | - | pF |
| Q _g | Total Gate Charge | V _{DS} =20V, I _D =3A, V _{GS} =10V | - | 11 | - | nC |
| Q _{gs} | Gate-Source Charge | | - | 2 | - | nC |
| Q _{gd} | Gate-Drain("Miller") Charge | | - | 2.5 | - | nC |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DD} =20V, I _D =4A, R _L =1Ω, R _{GEN} =3Ω, V _{GS} =10V | - | 10 | - | ns |
| t _r | Turn-on Rise Time | | - | 8 | - | ns |
| t _{d(off)} | Turn-off Delay Time | | - | 29 | - | ns |
| t _f | Turn-off Fall Time | | - | 12 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I _S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 7.2 | A |
| I _{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 20 | A |
| V _{SD} | Drain to Source Diode Forward Voltage | V _{GS} =0V, I _S =5A | - | - | 1.2 | V |
| t _{rr} | Body Diode Reverse Recovery Time | T _J =25°C, I _F =5A, dI/dt=100A/μs | - | 20 | - | ns |
| Q _{rr} | Body Diode Reverse Recovery Charge | | - | 11 | - | nC |

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

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



CST4614C Electrical Characteristics (T_J=25°C unless otherwise noted)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|--|----------------------|--|------|------|------|-------|
| Static Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} = 0V, I _D = -250μA | -40 | - | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = -40V, V _{GS} = 0V | - | - | -1 | μA |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0V, V _{GS} = ±20V | - | - | ±100 | nA |
| Gate-Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = -250μA | -1.2 | -1.5 | -2.5 | V |
| Drain-Source on-Resistance ³ | R _{DS(on)} | V _{GS} = -10V, I _D = -5A | - | 62 | 85 | mΩ |
| | | V _{GS} = -4.5V, I _D = -4A | - | 80 | 125 | |
| Dynamic Characteristics⁴ | | | | | | |
| Input Capacitance | C _{iss} | V _{GS} = 0V, V _{DS} = -20V, f=1.0MHz | - | 553 | - | pF |
| Output Capacitance | C _{oss} | | - | 50 | - | |
| Reverse Transfer Capacitance | C _{rss} | | - | 42 | - | |
| Switching Characteristics⁴ | | | | | | |
| Total Gate Charge | Q _g | V _{GS} = -10V, V _{DS} = -20V, I _D = -5A | - | 11.8 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 2.2 | - | |
| Gate-Drain Charge | Q _{gd} | | - | 3 | - | |
| Turn-on Delay Time | t _{d(on)} | V _{DS} = -20V, V _{GS} = -10V R _L = 2.5Ω, R _G = 3Ω | - | 7 | - | ns |
| Rise Time | t _r | | - | 6.5 | - | |
| Turn-off Delay Time | t _{d(off)} | | - | 24 | - | |
| Fall Time | t _f | | - | 7.8 | - | |
| Drain-Source Body Diode Characteristics | | | | | | |
| Body Diode voltage ³ | V _{DS} | I _S = -5A, V _{GS} =0V | - | - | -1.2 | V |
| Continuous Source Current | I _S | | - | - | -5.5 | A |

Notes:

1. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C.
2. 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.
3. Pulse Test: Pulse width≤300μs, duty cycle≤2%.
4. This value is guaranteed by design hence it is not included in the production test.



CST4614C Typical Performance Characteristics-N

Figure 1: Output Characteristics

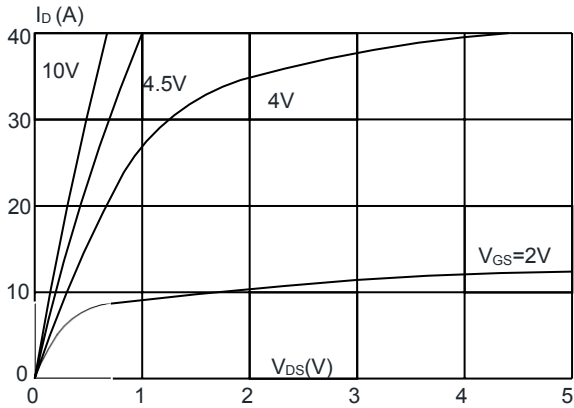


Figure 2: Typical Transfer Characteristics

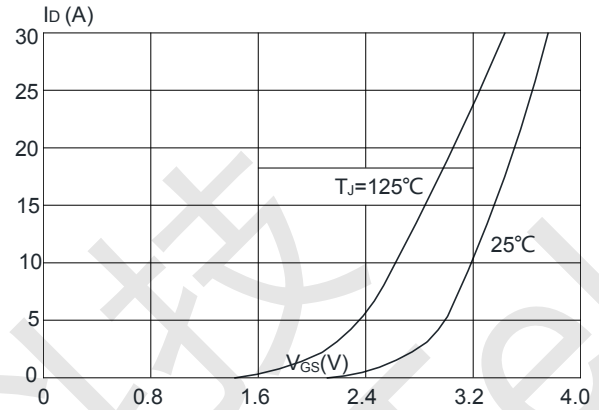


Figure 3: On-resistance vs. Drain Current

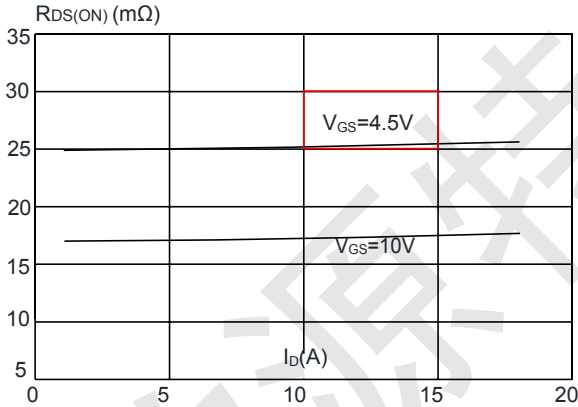


Figure 4: Body Diode Characteristics

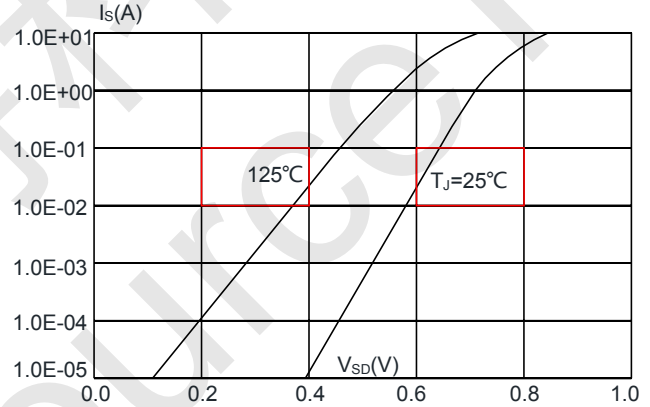


Figure 5: Gate Charge Characteristics

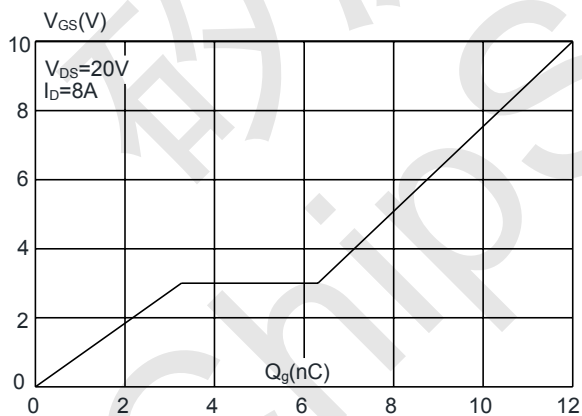
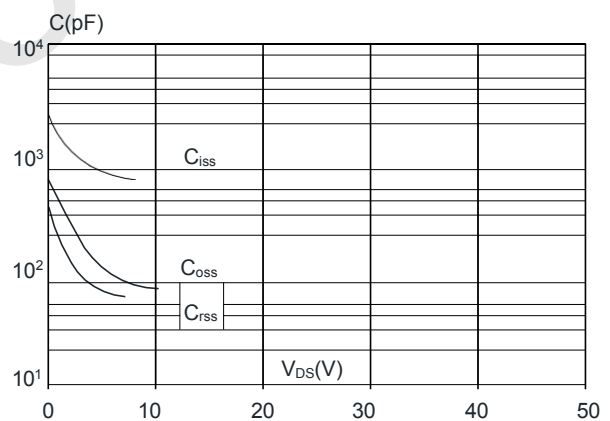


Figure 6: Capacitance Characteristics





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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

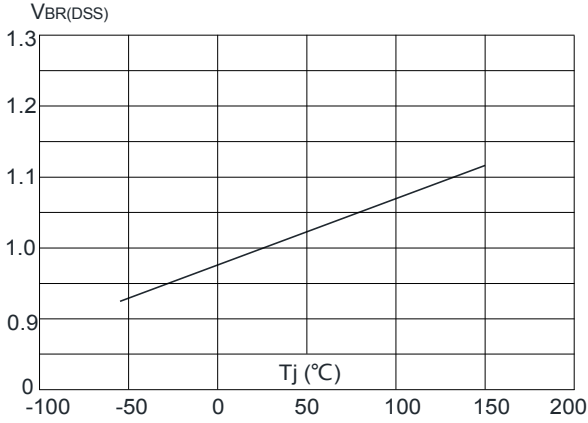


Figure 8: Normalized on Resistance vs. Junction Temperature

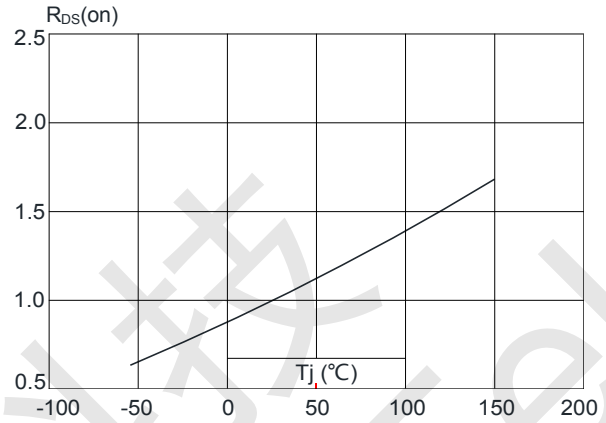


Figure 9: Maximum Safe Operating Area

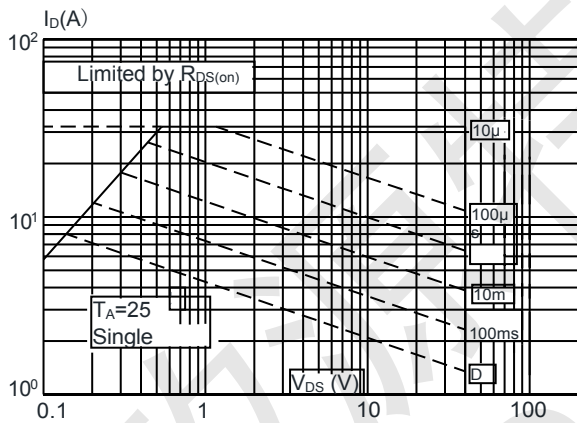


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

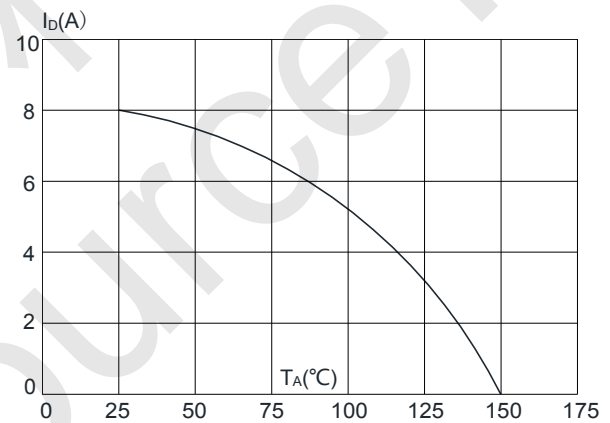
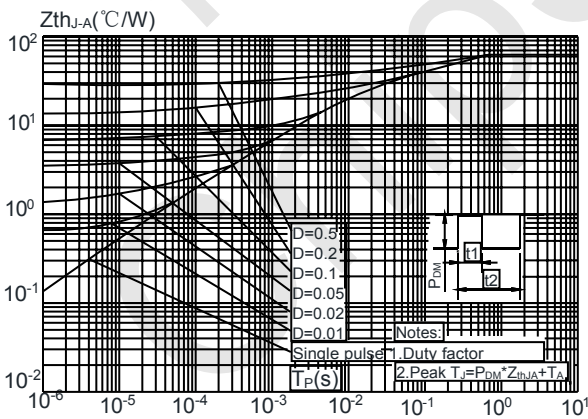


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





CST4614C Typical Performance Characteristics-P

Figure 1: Output Characteristics

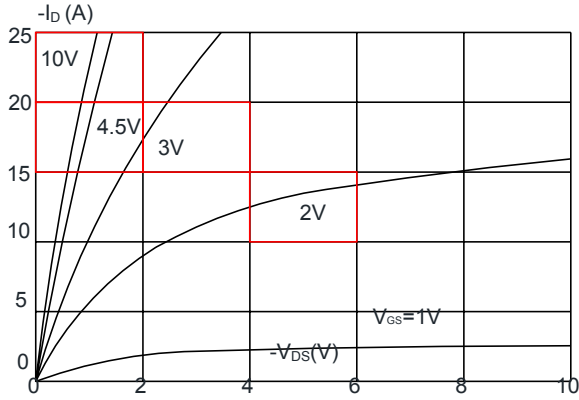


Figure 2: Typical Transfer Characteristics

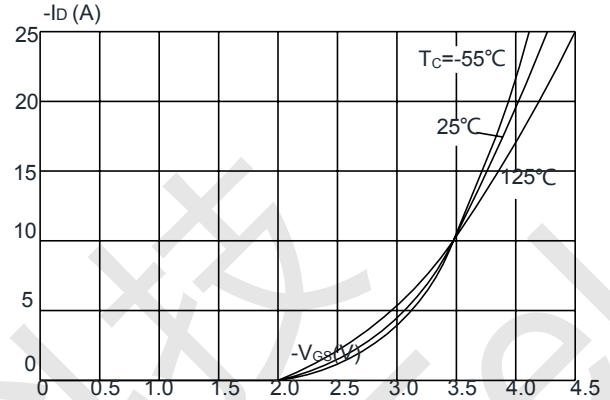


Figure 3: On-resistance vs. Drain Current

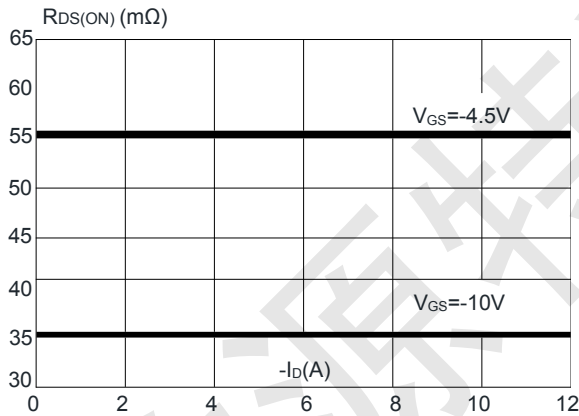


Figure 4: Body Diode Characteristics

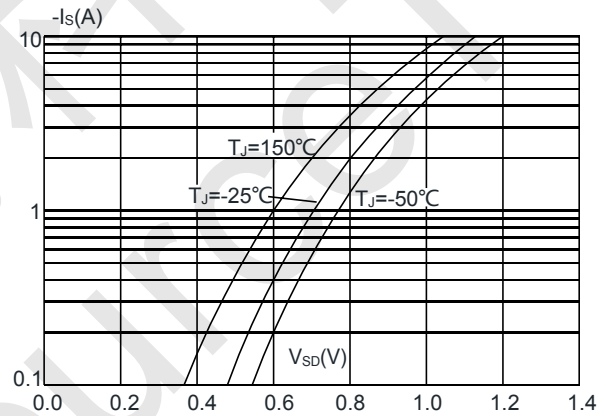


Figure 5: Gate Charge Characteristics

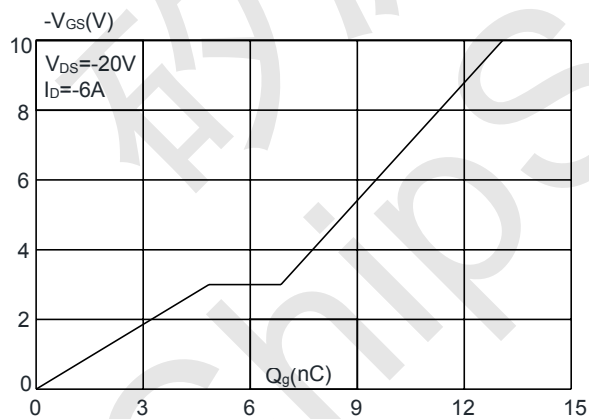
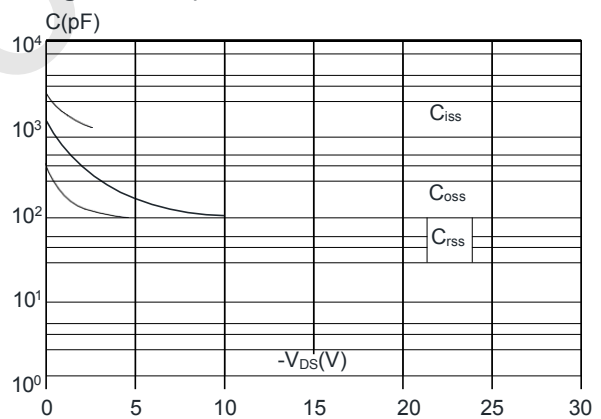


Figure 6: Capacitance Characteristics





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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

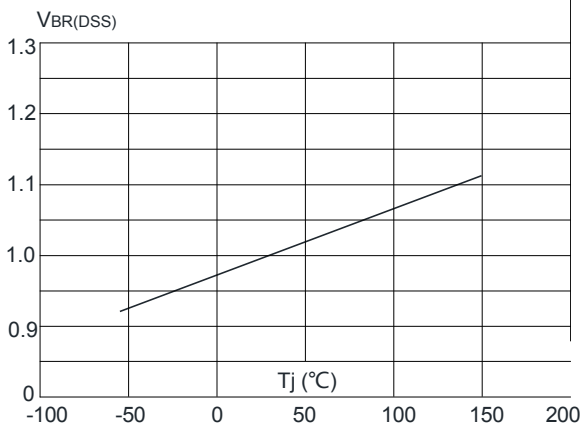


Figure 8: Normalized on Resistance vs. Junction Temperature

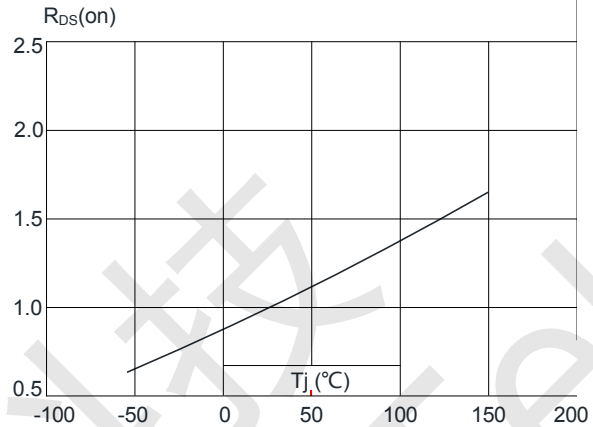


Figure 9: Maximum Safe Operating Area

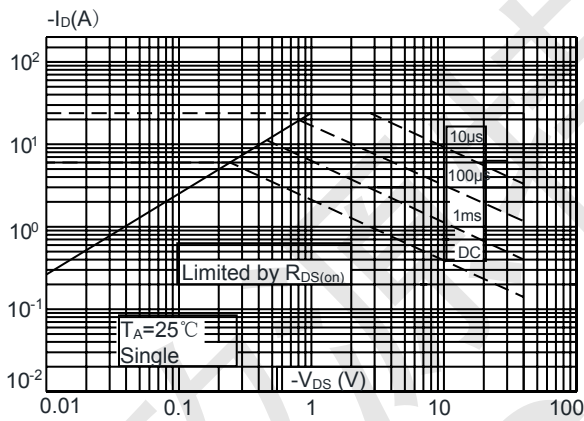


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

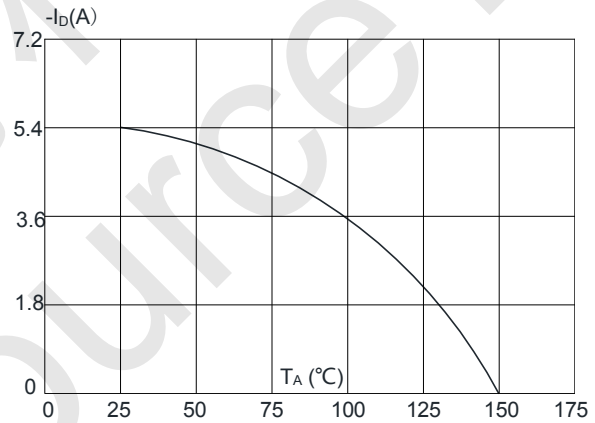
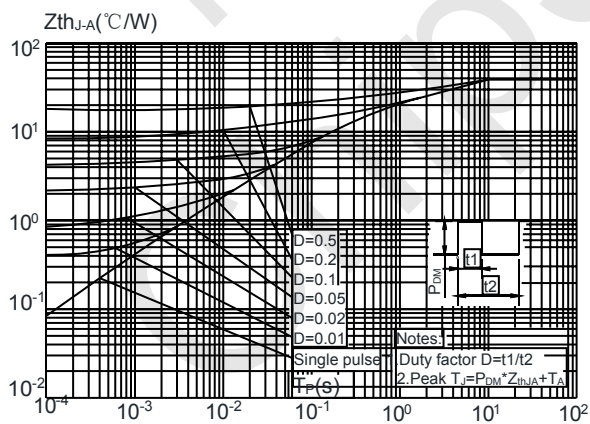
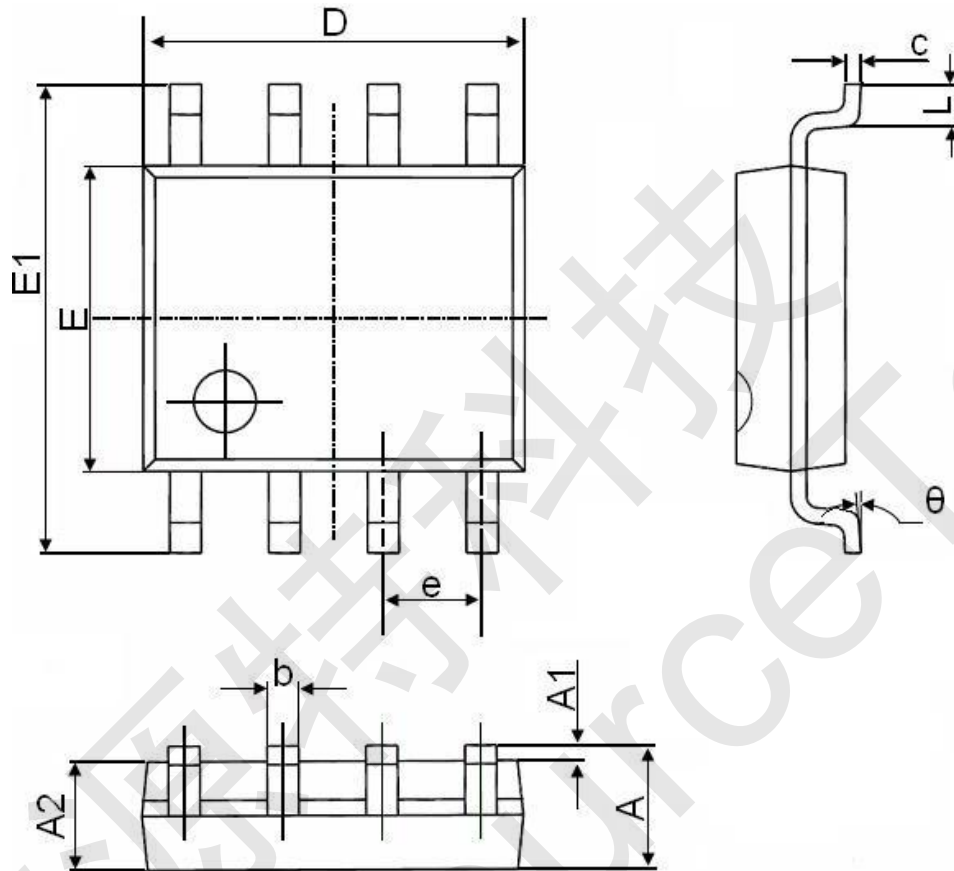


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





CST4614C SOP-8 Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.006 | 0.010 |
| D | 4.700 | 5.100 | 0.185 | 0.200 |
| E | 3.800 | 4.000 | 0.150 | 0.157 |
| E1 | 5.800 | 6.200 | 0.228 | 0.244 |
| e | 1.270(BSC) | | 0.050(BSC) | |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |