# SOT-23-6L 19.5V $BV_{DSS}$, 19.5mΩ $R_{DS(ON)}$, N-channel MOSFET

## 1. Description

The CCX8205 is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product CCX8205 is Pb-free.

## 2. Features

- 19.5V, $R_{DS(ON)}$=19.5mΩ(TYP.) @$V_{GS}$=4.5V
  $R_{DS(ON)}$=26.5mΩ(TYP.) @$V_{GS}$=2.5V
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

## 3. Applications

- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

## 4. Ordering Information

| Part Number | Package | Marking | Material | Packing | Quantity per reel | Flammability Rating | Reel Size |
|---|---|---|---|---|---|---|---|
| CCX8205 | SOT-23-6L | 8205 | Halogen free | Tape & Reel | 3,000 PCS | UL 94V-0 | 7 inches |

Table-1 Ordering information

## 5. Pin Configuration and Functions

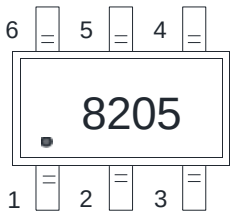
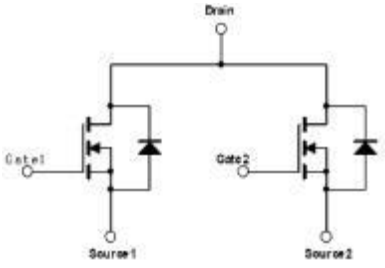
| Pin | Function | Outline | Circuit Diagram |
|---|---|---|---|
| 6 | Gate1 |  |  |
| 1 | Source1 | | |
| 2/5 | Drain | | |
| 4 | Gate2 | | |
| 3 | Source2 | | |





Table-2 Pin configuration

# 6. Specification

## Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 ˚C ambient temperature unless otherwise specified.

| Parameter | | Symbol | Limit | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $BV_{DSS}$ | 19.5 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±10 | V |
| Continuous Drain Current [a] | $T_A$=25°C | $I_D$ | 5.0 | A |
| | $T_A$=75°C | | 4.0 | |
| Maximum Power Dissipation [a] | $T_A$=25°C | $P_D$ | 1.12 | W |
| | $T_A$=75°C | | 0.67 | |
| Pulsed Drain Current [b] | | $I_{DM}$ | 20 | A |
| Operating Junction Temperature | | $T_J$ | 150 | °C |
| Lead Temperature | | $T_L$ | 260 | °C |
| Storage Temperature Range | | $T_{stg}$ | -55 to 150 | °C |

Thermal resistance ratings

| Single Operation | | | | | |
|---|---|---|---|---|---|
| Parameter | | Symbol | Typical | Maximum | Unit |
| Junction-to-Ambient Thermal Resistance [a] | t ≤ 10 s | $R_{\theta JA}$ | 90 | 112 | °C/W |
| Junction-to-Case Thermal Resistance | Steady State | $R_{\theta JC}$ | 63 | 78 | |

Note:

a: Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper

b: Repetitive rating, pulse width limited by junction temperature, tp=10μs, Duty Cycle=1%

## Electrical Characteristics

At TA = 25℃ unless otherwise specified

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| OFF CHARACTERISTICS | | | | | | |
| Drain-to-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=250uA | 19.5 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=19.5V, $V_{GS}$=0V | | | 1 | uA |
| Gate-to-source Leakage Current | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=±12V | | | ±100 | nA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{GS}$=$V_{DS}$, $I_D$=250uA | 0.5 | 0.7 | 1.2 | V |
| Drain-to-source On-resistance | $R_{DS(on)}$ | $V_{GS}$=4.5V, $I_D$=4A | | 19.5 | 26 | mΩ |
| | | $V_{GS}$=2.5V, $I_D$=3A | | 26.5 | 35 | |
| CHARGES, CAPACITANCESAND GATE RESISTANCE | | | | | | |
| Input Capacitance | $C_{ISS}$ | $V_{GS}$=0V, f=1MHz, $V_{DS}$=10V | | 550 | | pF |
| Output Capacitance | $C_{OSS}$ | | | 105 | | |
| Reverse Transfer Capacitance | $C_{RSS}$ | | | 88 | | |
| Total Gate Charge | $Q_{G(TOT)}$ | $V_{GS}$=4.5V, $V_{DS}$=10V, $I_D$=4.8A | | 8 | | nC |
| Gate-to-Source Charge | $Q_{GS}$ | | | 2.3 | | |
| Gate-to-Drain Charge | $Q_{GD}$ | | | 3.2 | | |
| SWITCHING CHARACTERISTICS | | | | | | |
| Turn-On Delay Time | $t_{d(ON)}$ | $V_{GS}$=4.5V, $V_{DS}$=10V, $R_L$=1.5Ω, $R_G$=3Ω | | 0.5 | | ns |
| Rise Time | $t_r$ | | | 1 | | |
| Turn-Off Delay Time | $t_{d(OFF)}$ | | | 11 | | |
| Fall Time | $t_f$ | | | 5 | | |
| BODY DIODE CHARACTERISTICS | | | | | | |
| Forward Voltage | $V_{SD}$ | $V_{GS}$=0V, $I_S$=1.0A | | 0.8 | 1.2 | V |

## 7. Typical Characteristic

**Figure1:** Output Characteristics

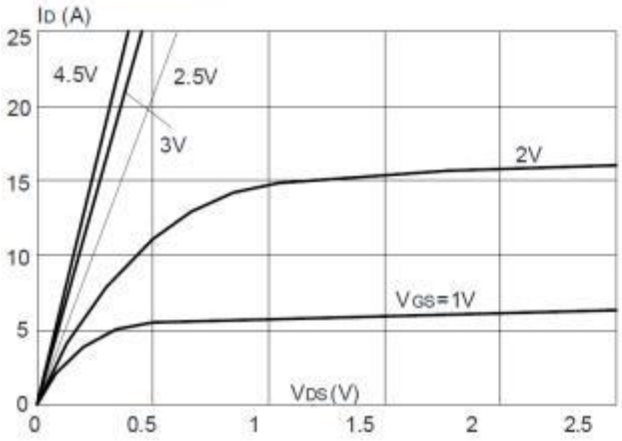



**Figure 2:** Typical Transfer Characteristics

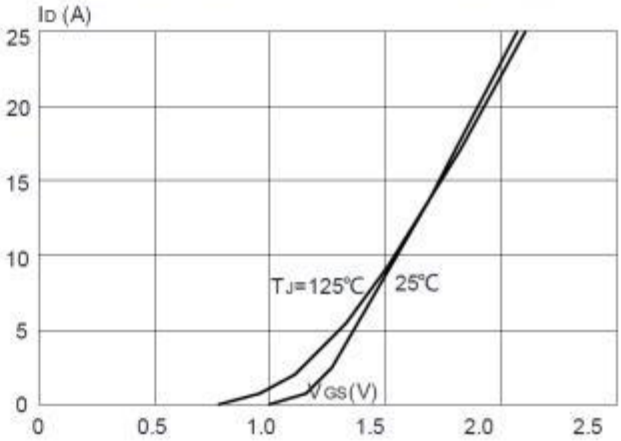



**Figure 3:** On-resistance vs. Drain Current

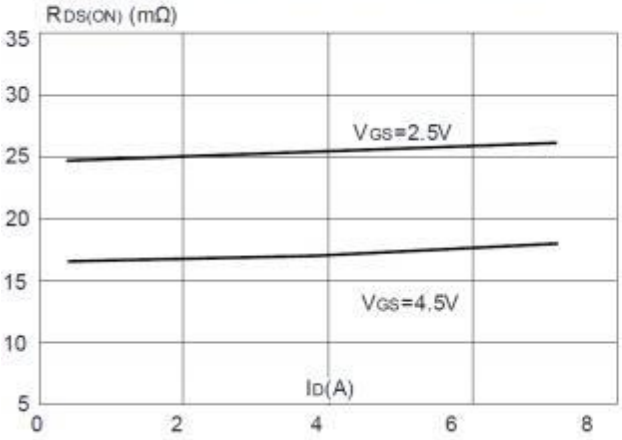



**Figure 4**: Body Diode Characteristics

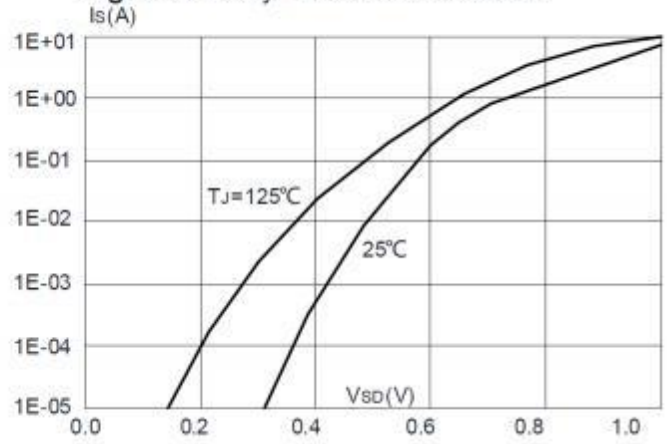



**Figure 5:** Gate Charge Characteristics

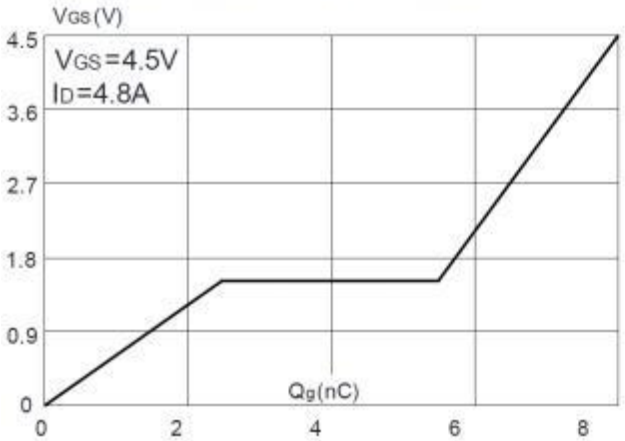



**Figure 6:** Capacitance Characteristics

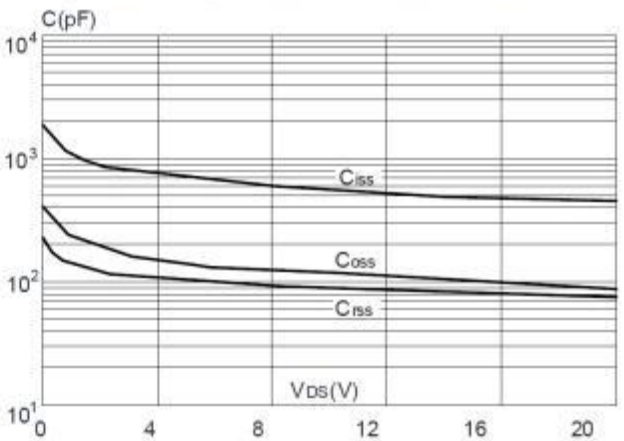


**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature

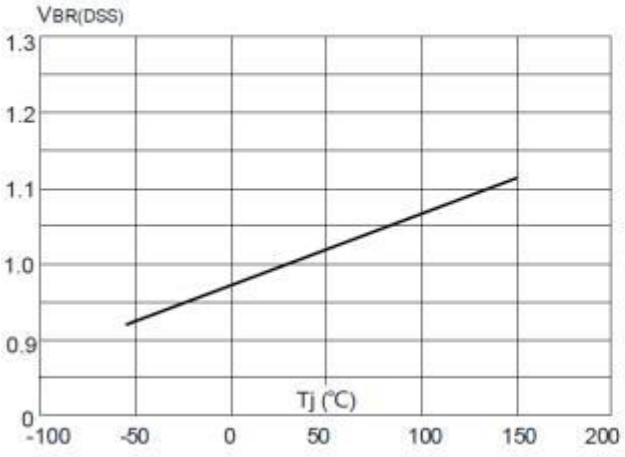



**Figure 8:** Normalized on Resistance vs. Junction Temperature

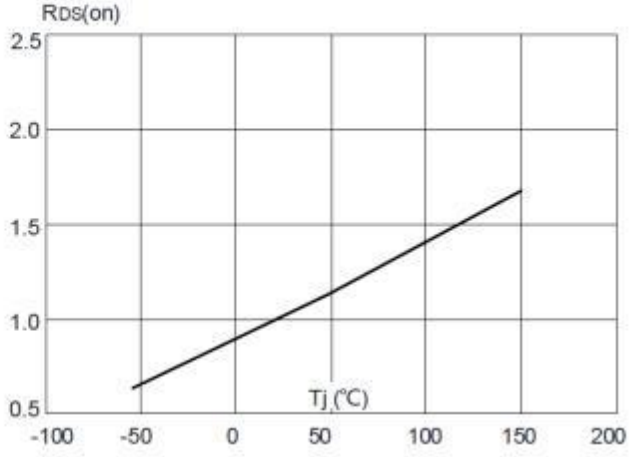



**Figure 9:** Maximum Safe Operating Area

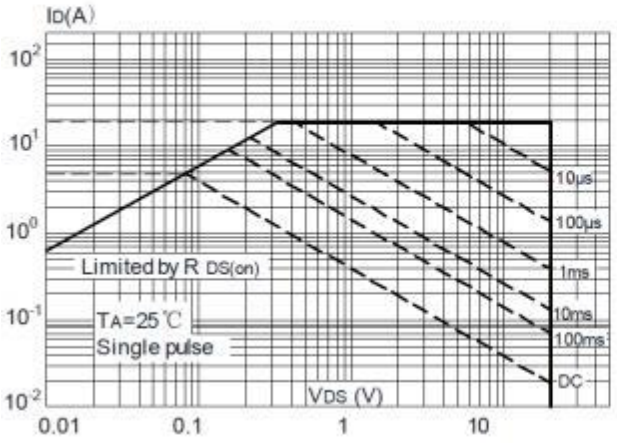



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature

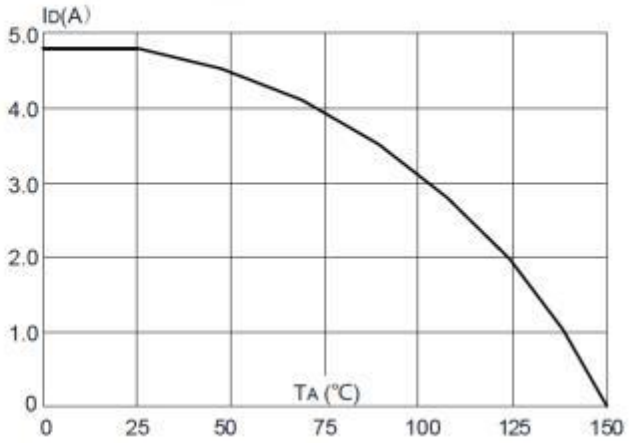
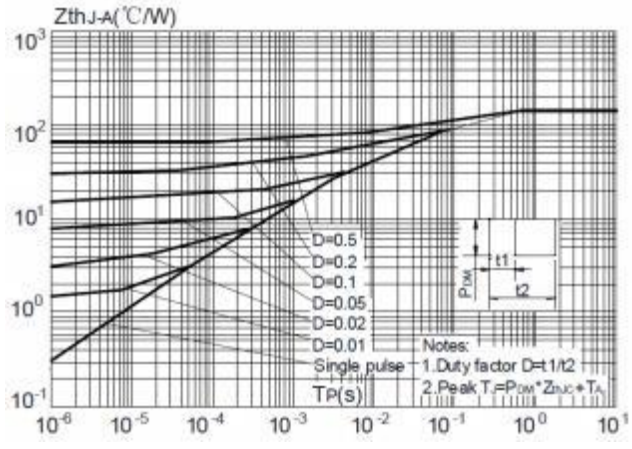
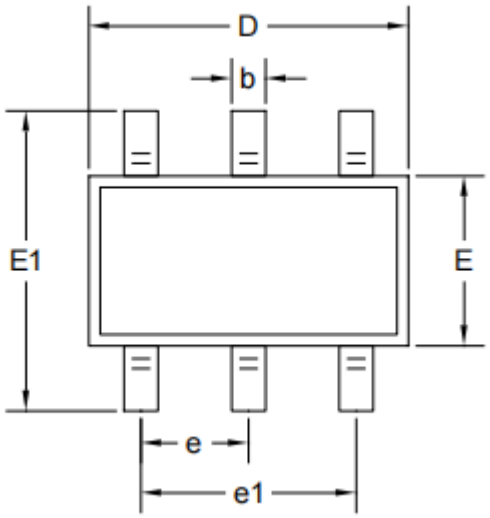
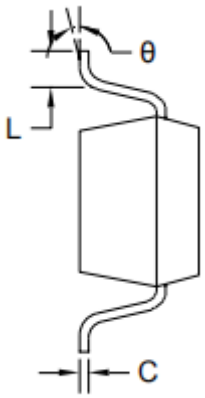


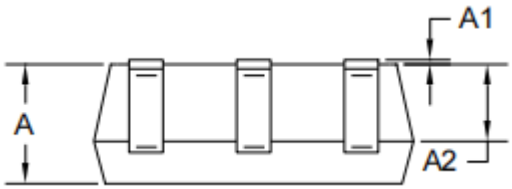

**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



## 8. Dimension (SOT-23-6L)






Unit: mm

| Symbol | | A | A1 | A2 | b | c | D |
|---|---|---|---|---|---|---|---|
| Spec | Min | 1.050 | 0.000 | 1.050 | 0.300 | 0.100 | 2.820 |
| | Max | 1.250 | 0.100 | 1.150 | 0.500 | 0.200 | 3.020 |
| Symbol | | E | E1 | e | e1 | L | θ |
| Spec | Min | 1.500 | 2.650 | 0.950BSC | 1.800 | 0.300 | 0 ° |
| | Max | 1.700 | 2.950 | | 2.000 | 0.600 | 8 ° |

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