# 8205S

## Dual N-ch 20V Fast Switching MOSFETs

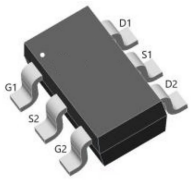
| | | |
|---|---|---|
| $V_{DSS}$ | 20 | V |
| $I_D$ | 5 | A |
| $R_{DS(ON)}$ | 25 | mΩ |

## Features

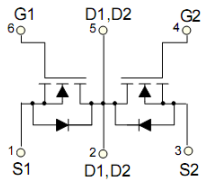
- TrenchFET Power MOSFET
- Excellent $R_{DS(on)}$
- Low Gate Charge
- High Power and Current Handing Capability
- Surface Mount Package

8205A

**SOT 23-6L**




**Equivalent Circuit**




## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

**ABSOLUTE MAXIMUM RATINGS ($T_a$=25℃ unless otherwise noted)**

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 20 | V |
| Gate-Source Voltage | $V_{GS}$ | ±12 | V |
| Continuous Drain Current | $I_D$ | 5 | A |
| Pulsed Drain Current (note 1) | $I_{DM}$ | 15 | A |
| Thermal Resistance from Junction to Ambient (note 2) | $R_{\theta JA}$ | 100 | ℃/W |
| Junction Temperature | $T_J$ | 150 | ℃ |
| Storage Temperature | $T_{STG}$ | -55~+150 | ℃ |
| Lead Temperature for Soldering Purposes(1/8" from case for 10 s) | $T_L$ | 260 | ℃ |

## Electrical Characteristics ($T_a$=25℃unless otherwise noted)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **STATIC CHARACTERICTISCS** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ =250μA | 20 | | | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$ =18V,$V_{GS}$ = 0V | | | 300 | nA |
| Gate-body leakage current | $I_{GSS}$ | $V_{GS}$ =±12V, $V_{DS}$ = 0V | | | ±100 | nA |
| Gate threshold voltage (note 3) | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =250μA | 0.4 | 0.7 | 1.0 | V |
| Drain-source on-resistance (note 3) | $R_{DS(on)}$ | $V_{GS}$ =4.5V, $I_D$ =4A | | 20 | 25 | mΩ |
| | | $V_{GS}$ =2.5V, $I_D$ =3A | | 26 | 34 | mΩ |
| Forward tranconductance (note 3) | $g_{FS}$ | $V_{DS}$ =5V, $I_D$ =5A | | 10 | | S |
| Diode forward voltage (note 3) | $V_{SD}$ | $I_S$=1.25A, $V_{GS}$ = 0V | | | 1.2 | V |
| **DYNAMIC CHARACTERICTISCS** (note4) | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ =10V,$V_{GS}$ =0V,f =1MHz | | 800 | | pF |
| Output Capacitance | $C_{oss}$ | | | 155 | | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 125 | | pF |
| **SWITCHING CHARACTERICTISCS** (note 4) | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=10V,$V_{GS}$=4V, $I_D$=1A,$R_{GEN}$=10Ω | | 18 | | ns |
| Turn-on rise time | $t_r$ | | | 4.8 | | ns |
| Turn-off delay time | $t_{d(off)}$ | | | 43.5 | | ns |
| Turn-off fall time | $t_f$ | | | 20 | | ns |
| Total Gate Charge | $Q_g$ | $V_{DS}$ =10V,$V_{GS}$ =4.5V,$I_D$=4A | | 11 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 2.2 | | nC |
| Gate-Drain Charge | $Q_{gd}$ | | | 2.5 | | nC |

**Notes :**

1.Repetitive rating：Pluse width limited by maximum junction temperature

2.Surface Mounted on FR4 board，t≤10 sec.

3. Pulse test : Pulse width≤300μs, duty cycle≤2%.

4. Guaranteed by design, not subject to production.

## RATING AND CHARACTERISTIC CURVES

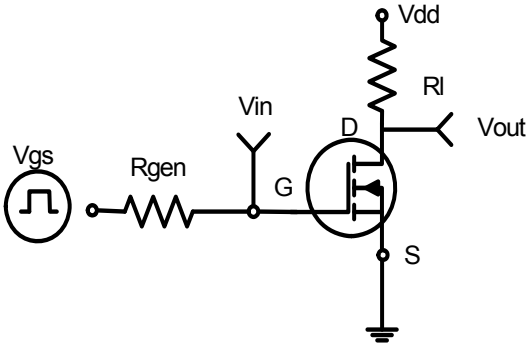



**Figure 1:Switching Test Circuit**

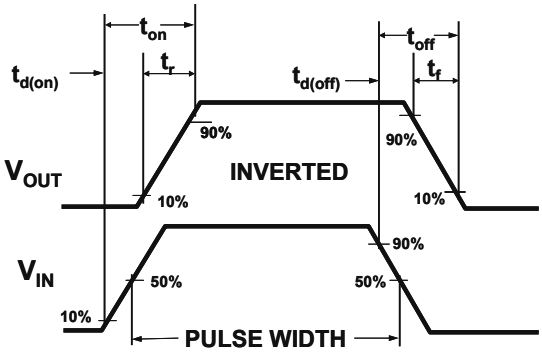



**Figure 2:Switching Waveforms**

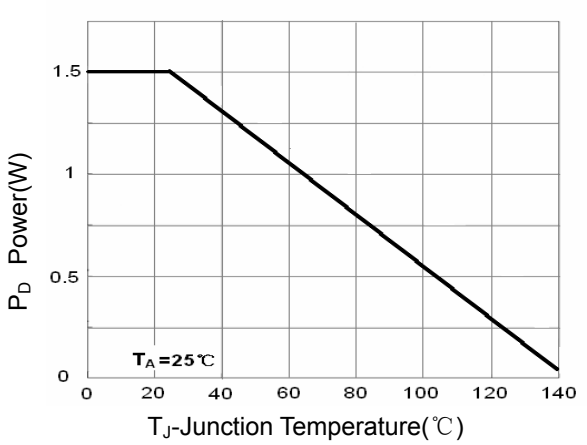



**Figure 3 Power Dissipation**

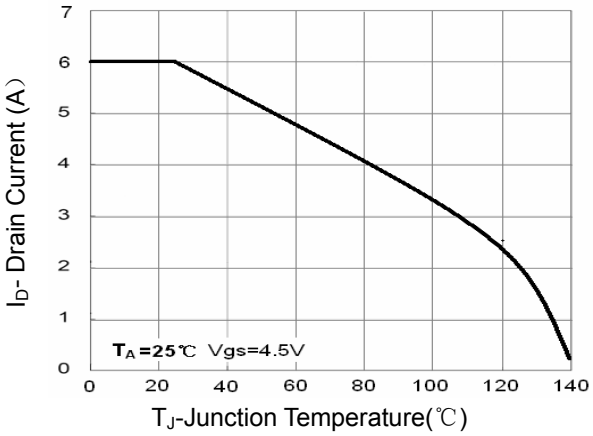



**Figure 4 Drain Current**

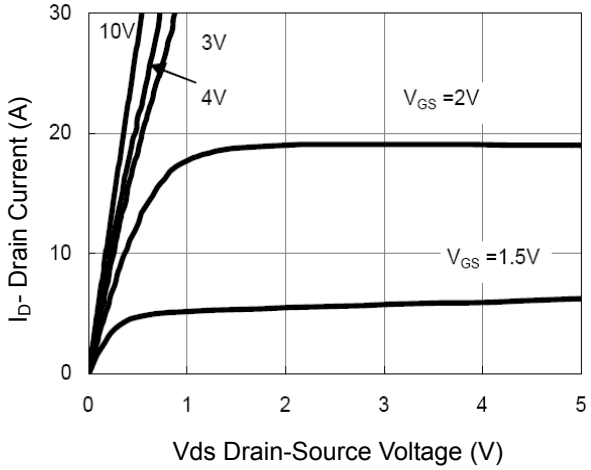



**Figure 5 Output Characteristics**

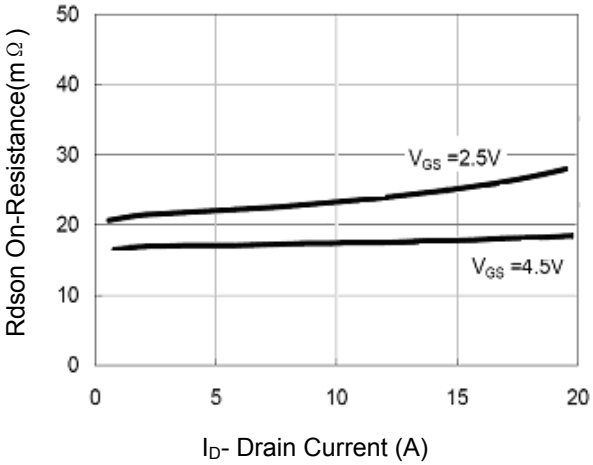



**Figure 6 Drain-Source On-Resistance**

## RATING AND CHARACTERISTIC CURVES

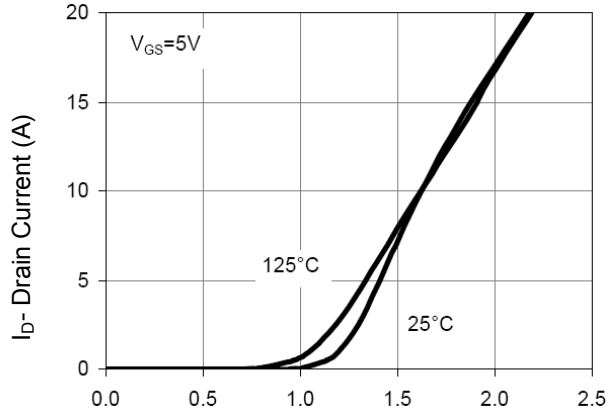



**Figure 7 Transfer Characteristics**

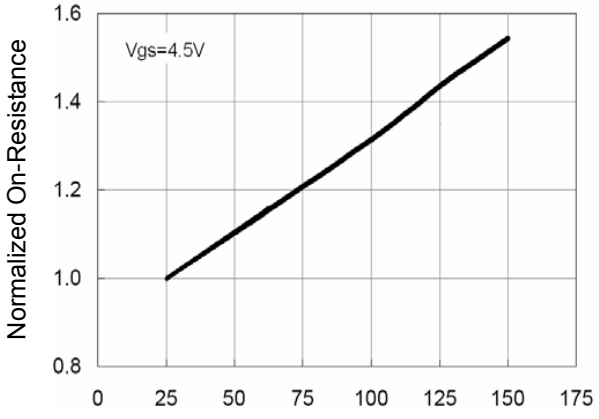



**Figure 8 Drain-Source On-Resistance**

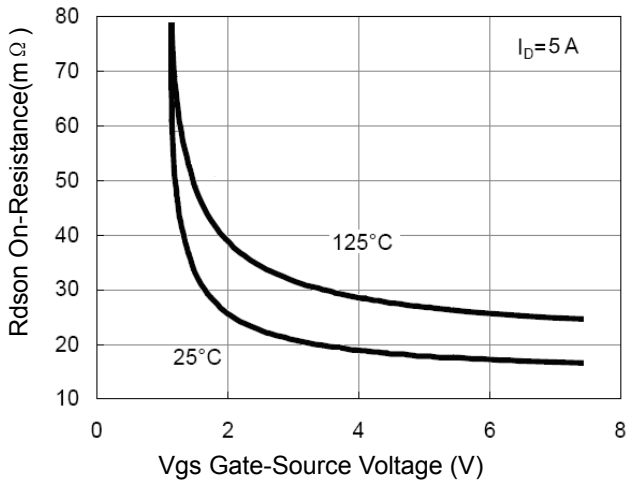



**Figure 9 Rdson vs Vgs**

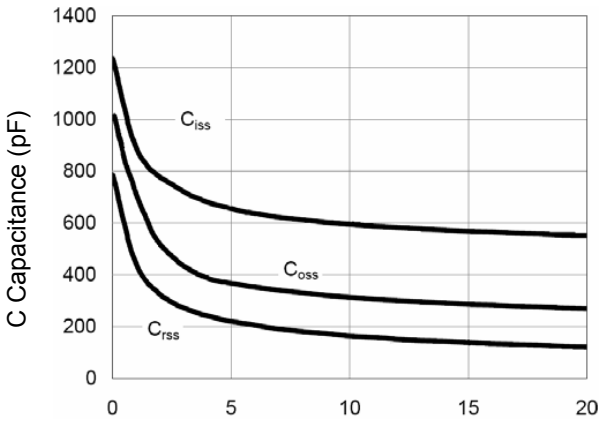



**Figure 10 Capacitance vs Vds**

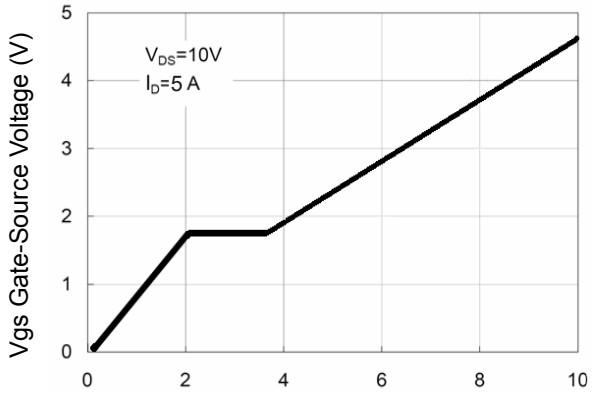



**Figure 11 Gate Charge**

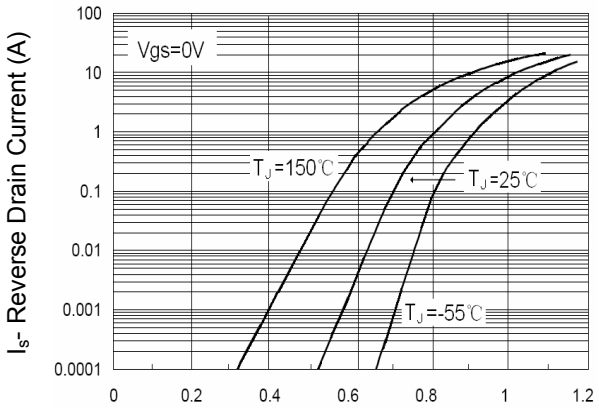



**Figure 12 Source- Drain Diode Forward**

## RATING AND CHARACTERISTIC CURVES

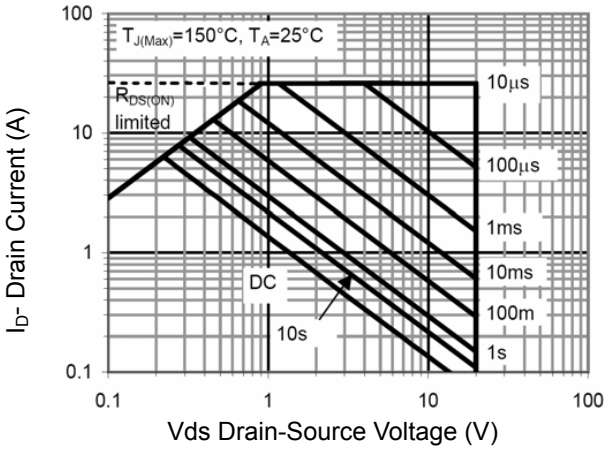



**Figure 13 Safe Operation Area**

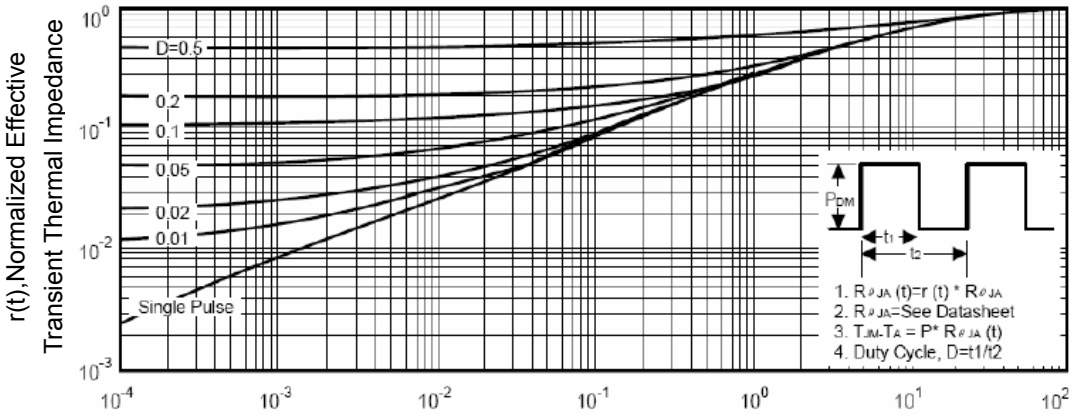
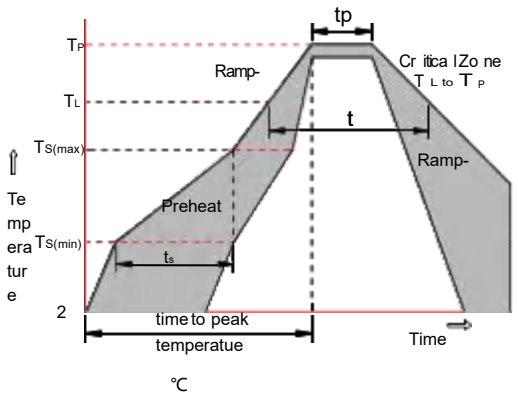



**Figure 14 Normalized Maximum Transient Thermal Impedance**

## Soldering parameters

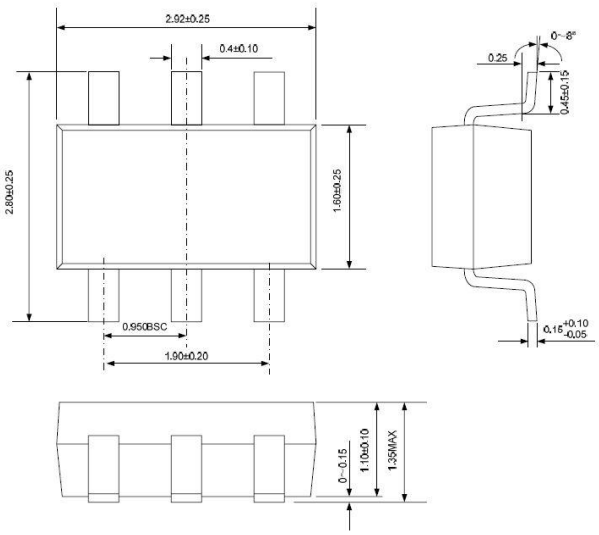
| Reflow Condition | | Pb-Free assembly (see as bellow) |
|---|---|---|
| Pre Heat | -Temperature Min ($T_{s(min)}$) | +150℃ |
| | -Temperature Max($T_{s(max)}$) | +200℃ |
| | -Time (Min to Max) (ts) | 60-180 secs. |
| Average ramp up rate (Liquid us Temp ($T_L$) to peak) | | 3℃/sec. Max |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate | | 3℃/sec. Max |
| Reflow | -Temperature($T_L$)(Liquid us) | +217℃ |
| | -Temperature($t_L$) | 60-150 secs. |
| Peak Temp ($T_p$) | | +260(+0/-5)℃ |
| Time within 5℃ of actual Peak Temp ($t_p$) | | 30 secs. Max |
| Ramp-down Rate | | 6℃/sec. Max |
| Time 25℃ to Peak Temp ($T_P$) | | 8 min. Max |
| Do not exceed | | +260℃ |

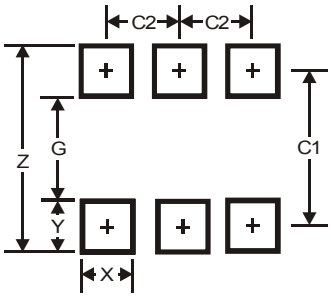
**FIG5:** Reflow condition




## Package Dimensions & Suggested Pad Layout

**SOT23-6L**



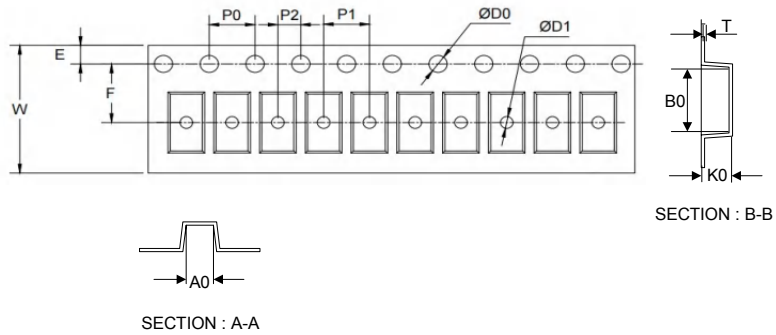




| Dimensions | Value (in mm) |
|---|---|
| Z | 3.50 |
| G | 1.30 |
| X | 0.65 |
| Y | 1.10 |
| C1 | 2.40 |
| C2 | 0.95 |

Dimensions in millimeters

## Tape & rell specification

Tape

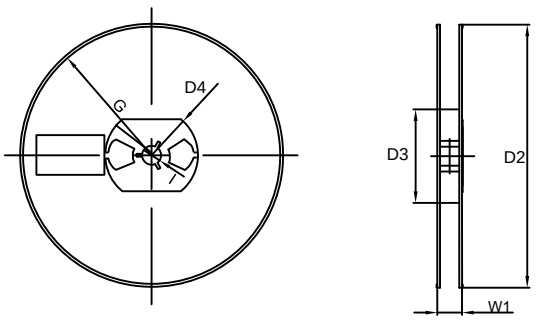



SECTION : A-A

SECTION : B-B

| Symbol | Dimension (mm) |
|---|---|
| P0 | 4.00±0.20 |
| P1 | 4.00±0.20 |
| P2 | 2.00±0.20 |
| D0 | 1.55±0.20 |
| D1 | 1.20±0.20 |
| E | 1.55±0.20 |
| F | 3.60±0.20 |
| W | 8.00±0.20 |
| A0 | 3.80±0.20 |
| B0 | 3.50±0.20 |
| K0 | 1.55±0.20 |
| T | 0.25±0.15 |

7” Reel




| | |
|---|---|
| D2 | 178.0±5.0 |
| D3 | 55Min. |
| D4 | R24.0±3.0 |
| G | R82.0±3.0 |
| I | 13.0±2.0 |
| W1 | 11.0±3.0 |

Quantity: 3000PCS

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