



## Description

The 8205A-HXY uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

## General Features

$V_{DS} = 20V, I_D = 6A$

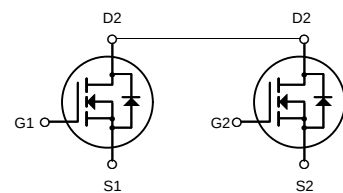
$R_{DS(ON)} < 25m\Omega @ V_{GS}=4.5V$

## Application

Battery protection  
Load switch  
Power management



SOT23-6L



Dual N-Channel MOSFET

## Package Marking and Ordering Information

| Product ID | Pack     | Marking       | Qty(PCS) |
|------------|----------|---------------|----------|
| 8205A-HXY  | SOT23-6L | 8205 XXX YYYY | 3000     |

## Absolute Maximum Ratings@ $T_J=25^\circ C$ (unless otherwise specified)

| Symbol                 | Parameter                                                 | Rating     | Units        |
|------------------------|-----------------------------------------------------------|------------|--------------|
| $V_{DS}$               | Drain-Source Voltage                                      | 20         | V            |
| $V_{GS}$               | Gate-Source Voltage                                       | $\pm 10$   | V            |
| $I_D @ T_A=25^\circ C$ | Drain Current, $V_{GS} @ 4.5V^3$                          | 6          | A            |
| $I_{DM}$               | Pulsed Drain Current <sup>1</sup>                         | 25         | A            |
| $P_D @ T_A=25^\circ C$ | Total Power Dissipation                                   | 1.25       | W            |
| $T_{STG}$              | Storage Temperature Range                                 | -55 to 150 | $^\circ C$   |
| $T_J$                  | Operating Junction Temperature Range                      | -55 to 150 | $^\circ C$   |
| $R_{thj-a}$            | Maximum Thermal Resistance, Junction-ambient <sup>3</sup> | 100        | $^\circ C/W$ |



**Electrical Characteristics ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)**

| Parameter                                     | Symbol              | Condition                                                                              | Min | Typ | Max  | Unit |
|-----------------------------------------------|---------------------|----------------------------------------------------------------------------------------|-----|-----|------|------|
| Off Characteristics                           |                     |                                                                                        |     |     |      |      |
| Drain-Source Breakdown Voltage                | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                             | 20  | 21  | -    | V    |
| Zero Gate Voltage Drain Current               | I <sub>DSS</sub>    | V <sub>DS</sub> =19.5V, V <sub>GS</sub> =0V                                            | -   | -   | 1    | μA   |
| Gate-Body Leakage Current                     | I <sub>GSS</sub>    | V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V                                             | -   | -   | ±100 | nA   |
| On Characteristics <sup>(Note 3)</sup>        |                     |                                                                                        |     |     |      |      |
| Gate Threshold Voltage                        | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                               | 0.5 | 0.7 | 1.2  | V    |
| Drain-Source On-State Resistance              | R <sub>DS(ON)</sub> | V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A                                              | -   | 22  | 25   | mΩ   |
|                                               |                     | V <sub>GS</sub> =2.5V, I <sub>D</sub> =3A                                              | -   | 26  | 31   | mΩ   |
| Forward Transconductance                      | g <sub>FS</sub>     | V <sub>DS</sub> =5V, I <sub>D</sub> =4A                                                | -   | 10  | -    | S    |
| Dynamic Characteristics <sup>(Note4)</sup>    |                     |                                                                                        |     |     |      |      |
| Input Capacitance                             | C <sub>iss</sub>    | V <sub>DS</sub> =8V, V <sub>GS</sub> =0V,<br>F=1.0MHz                                  | -   | 600 | -    | PF   |
| Output Capacitance                            | C <sub>oss</sub>    |                                                                                        | -   | 330 | -    | PF   |
| Reverse Transfer Capacitance                  | C <sub>rss</sub>    |                                                                                        | -   | 140 | -    | PF   |
| Switching Characteristics <sup>(Note 4)</sup> |                     |                                                                                        |     |     |      |      |
| Turn-on Delay Time                            | t <sub>d(on)</sub>  | V <sub>DD</sub> =10V, I <sub>D</sub> =1A<br>V <sub>GS</sub> =4V, R <sub>GEN</sub> =10Ω | -   | 18  | -    | nS   |
| Turn-on Rise Time                             | t <sub>r</sub>      |                                                                                        | -   | 5   | -    | nS   |
| Turn-Off Delay Time                           | t <sub>d(off)</sub> |                                                                                        | -   | 43  | -    | nS   |
| Turn-Off Fall Time                            | t <sub>f</sub>      |                                                                                        | -   | 20  | -    | nS   |
| Total Gate Charge                             | Q <sub>g</sub>      | V <sub>DS</sub> =10V, I <sub>D</sub> =4A,<br>V <sub>GS</sub> =4.5V                     | -   | 11  | -    | nC   |
| Gate-Source Charge                            | Q <sub>gs</sub>     |                                                                                        | -   | 2.3 | -    | nC   |
| Gate-Drain Charge                             | Q <sub>gd</sub>     |                                                                                        | -   | 2.5 | -    | nC   |
| Drain-Source Diode Characteristics            |                     |                                                                                        |     |     |      |      |
| Diode Forward Voltage <sup>(Note 3)</sup>     | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =2A                                                | -   | 0.8 | 1.2  | V    |
| Diode Forward Current <sup>(Note 2)</sup>     | I <sub>S</sub>      |                                                                                        | -   | -   | 2    | A    |

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production



## Typical Electrical and Thermal Characteristics

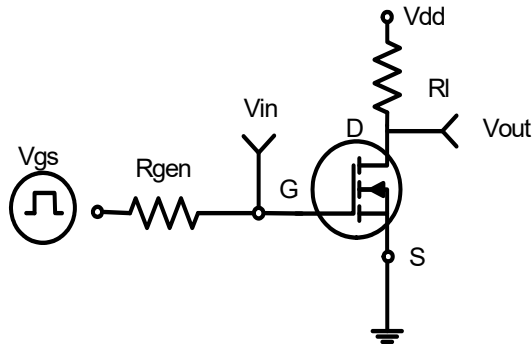


Figure 1: Switching Test Circuit

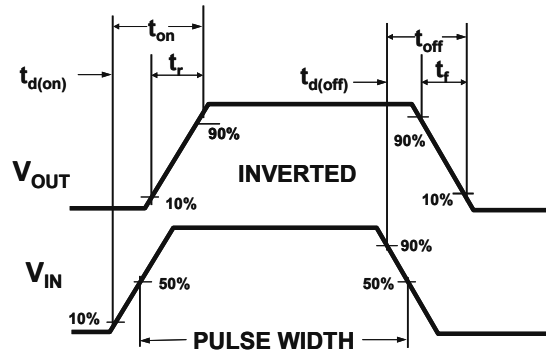


Figure 2: Switching Waveforms

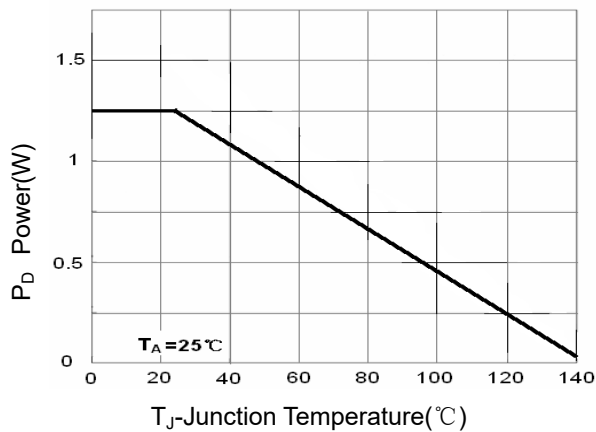


Figure 3 Power Dissipation

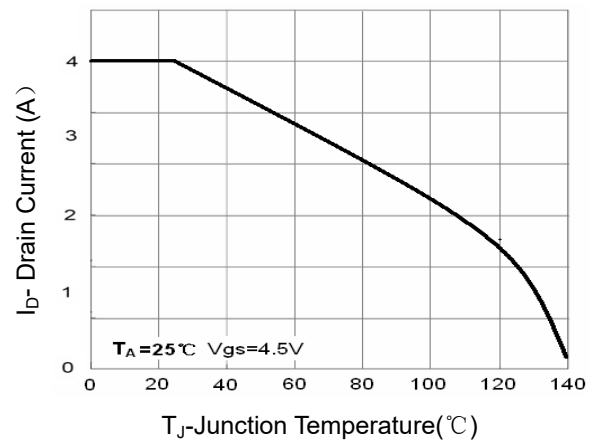


Figure 4 Drain Current

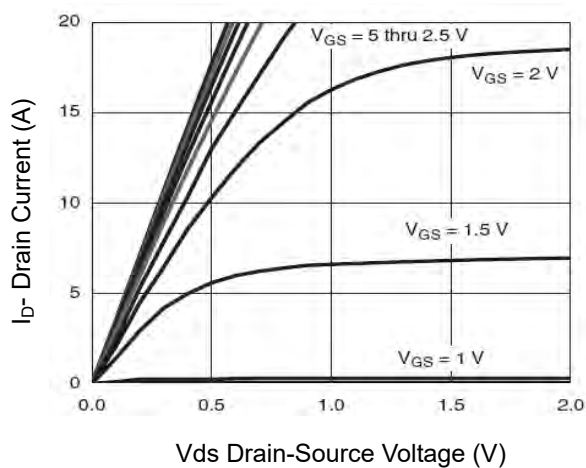


Figure 5 Output Characteristics

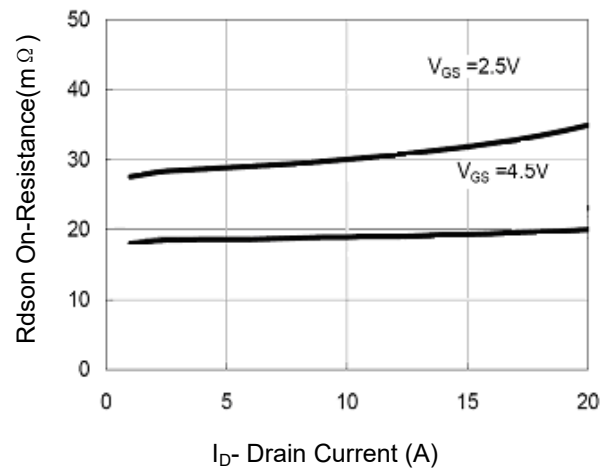


Figure 6 Drain-Source On-Resistance

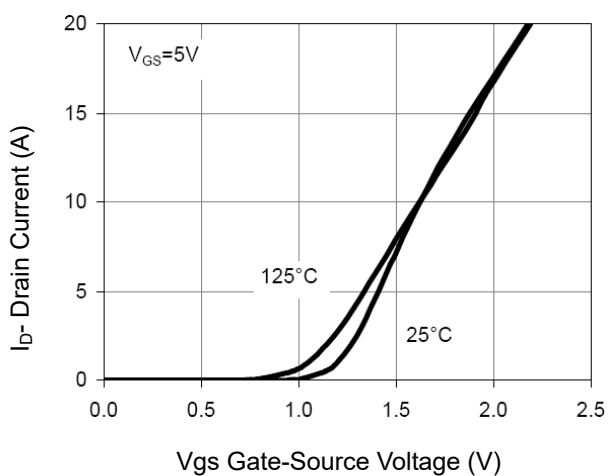


Figure 7 Transfer Characteristics

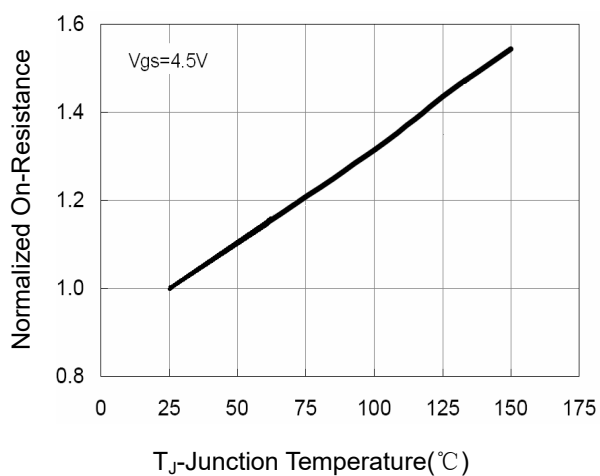


Figure 8 Drain-Source On-Resistance

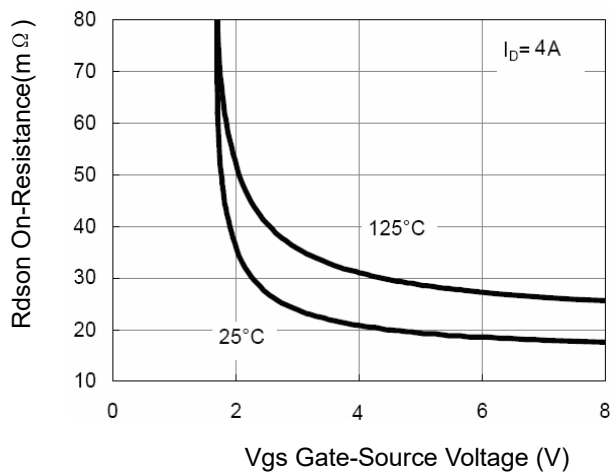


Figure 9 Rdson vs Vgs

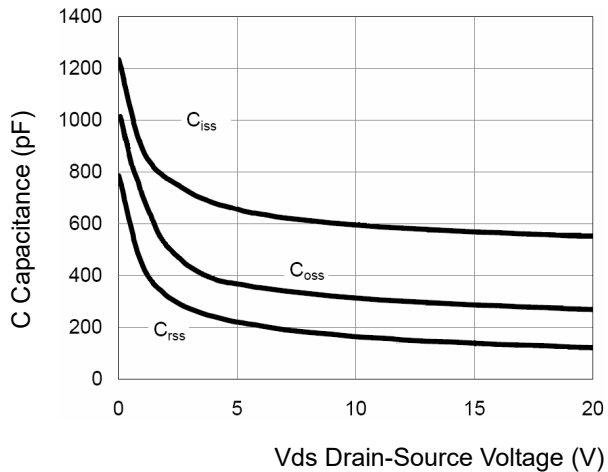


Figure 10 Capacitance vs Vds

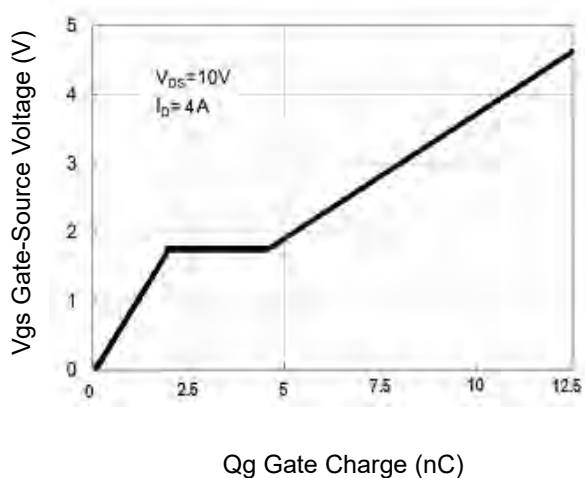


Figure 11 Gate Charge

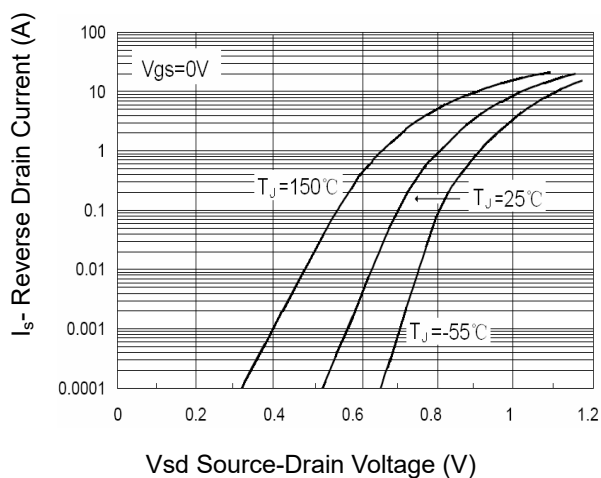


Figure 12 Source- Drain Diode Forward

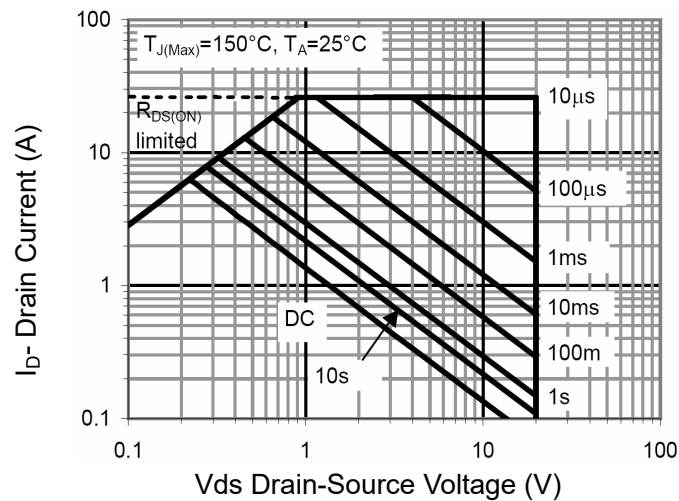


Figure 13 Safe Operation Area

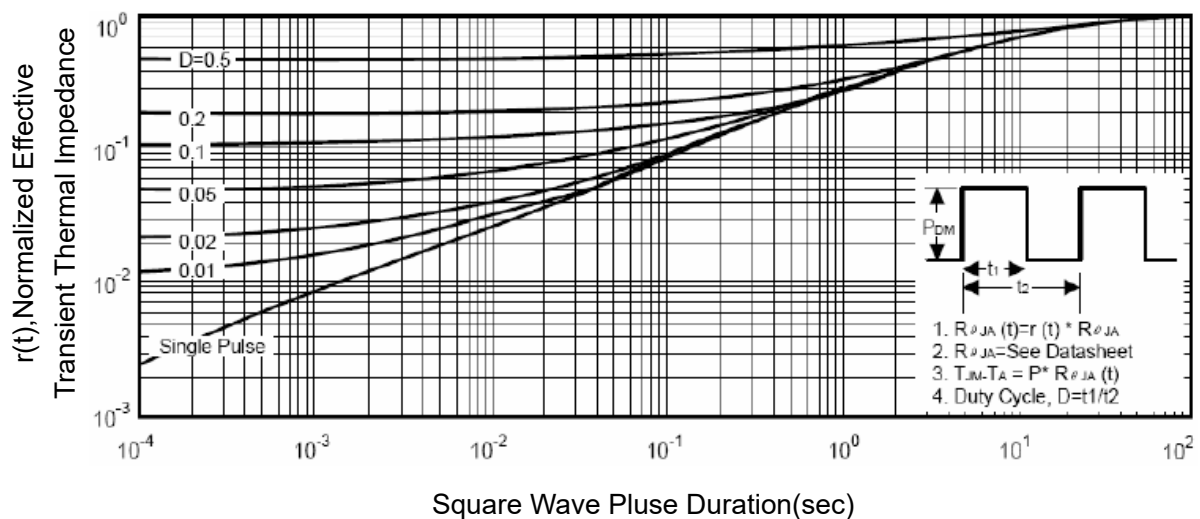
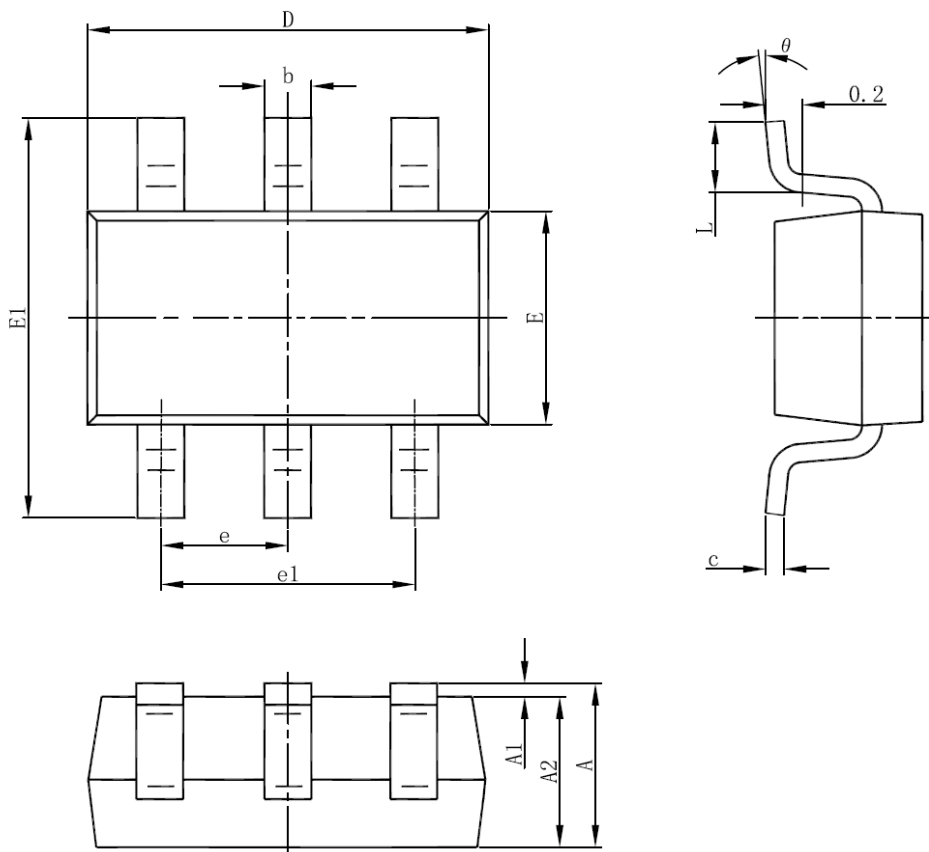


Figure 14 Normalized Maximum Transient Thermal Impedance



### SOT23-6L Package Information



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min                       | Max   | Min                  | Max   |
| A        | 1.050                     | 1.250 | 0.041                | 0.049 |
| A1       | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2       | 1.050                     | 1.150 | 0.041                | 0.045 |
| b        | 0.300                     | 0.500 | 0.012                | 0.020 |
| c        | 0.100                     | 0.200 | 0.004                | 0.008 |
| D        | 2.820                     | 3.020 | 0.111                | 0.119 |
| E        | 1.500                     | 1.700 | 0.059                | 0.067 |
| E1       | 2.650                     | 2.950 | 0.104                | 0.116 |
| e        | 0.950(BSC)                |       | 0.037(BSC)           |       |
| e1       | 1.800                     | 2.000 | 0.071                | 0.079 |
| L        | 0.300                     | 0.600 | 0.012                | 0.024 |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |



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