

## General Description

The MY2305 is the high cell density trench P-CH MOSFET, which provide excellent  $R_{DS(ON)}$  and efficiency for most of the small power switching and load switch applications.

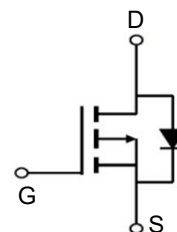
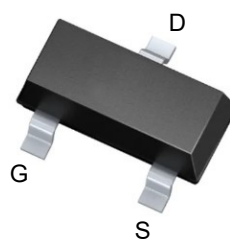


## Features

|                                     |      |           |
|-------------------------------------|------|-----------|
| $V_{DSS}$                           | -20  | V         |
| $I_D$                               | -4.2 | A         |
| $R_{DS(ON)}$ (at $V_{GS} = -4.5V$ ) | 35   | $m\Omega$ |
| $R_{DS(ON)}$ (at $V_{GS} = -2.5V$ ) | 39   | $m\Omega$ |

## Application

- Green Device Available
- Super Low Gate Charge
- Excellent  $CdV/dt$  effect decline



## Package Marking and Ordering Information

| Product ID | Pack   | Marking | Qty(PCS) |
|------------|--------|---------|----------|
| MY2305     | SOT-23 | 2305    | 3000     |

## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Symbol                         | Parameter                                    | Rating     | Units            |
|--------------------------------|----------------------------------------------|------------|------------------|
| $V_{DS}$                       | Drain-Source Voltage                         | -20        | V                |
| $V_{GS}$                       | Gate-Source Voltage                          | $\pm 12$   | V                |
| $I_D @ T_A = 25^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ -4.5V^1$ | -4.2       | A                |
| $I_D @ T_A = 70^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ -4.5V^1$ | -3.0       | A                |
| $I_{DM}$                       | Pulsed Drain Current <sup>2</sup>            | -16        | A                |
| $P_D @ T_A = 25^\circ\text{C}$ | Total Power Dissipation <sup>3</sup>         | 1.31       | W                |
| $P_D @ T_A = 70^\circ\text{C}$ | Total Power Dissipation <sup>3</sup>         | 0.84       | W                |
| $T_{STG}$                      | Storage Temperature Range                    | -55 to 150 | $^\circ\text{C}$ |
| $T_J$                          | Operating Junction Temperature Range         | -55 to 150 | $^\circ\text{C}$ |

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

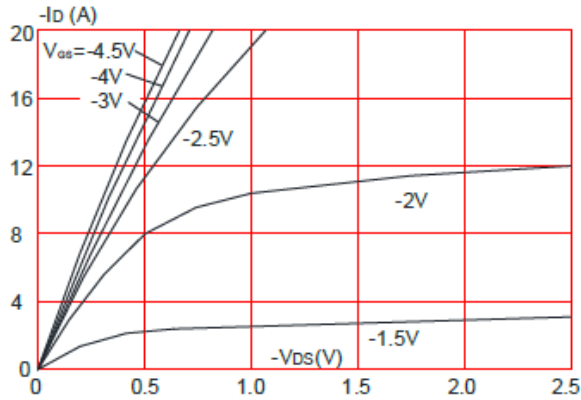
| Symbol                                                 | Parameter                                                | Test Condition                                                                                   | Min. | Typ. | Max. | Units |
|--------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------|------|------|------|-------|
| Off Characteristic                                     |                                                          |                                                                                                  |      |      |      |       |
| V <sub>(BR)DSS</sub>                                   | Drain-Source Breakdown Voltage                           | V <sub>GS</sub> =0V, I <sub>D</sub> = -250μA                                                     | -20  | -    | -    | V     |
| I <sub>DSS</sub>                                       | Zero Gate Voltage Drain Current                          | V <sub>DS</sub> = -20V, V <sub>GS</sub> =0V,                                                     | -    | -    | -1   | μA    |
| I <sub>GSS</sub>                                       | Gate to Body Leakage Current                             | V <sub>DS</sub> =0V, V <sub>GS</sub> = ±12V                                                      | -    | -    | ±100 | nA    |
| On Characteristics                                     |                                                          |                                                                                                  |      |      |      |       |
| V <sub>GS(th)</sub>                                    | Gate Threshold Voltage                                   | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> = -250μA                                       | -0.4 | -0.7 | -1.0 | V     |
| R <sub>DS(on)</sub>                                    | Static Drain-Source on-Resistance<br>note2               | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4.1A                                                  | -    | 35   | 42   | mΩ    |
|                                                        |                                                          | V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -3A                                                    | -    | 39   | 53   |       |
| Dynamic Characteristics                                |                                                          |                                                                                                  |      |      |      |       |
| C <sub>iss</sub>                                       | Input Capacitance                                        | V <sub>DS</sub> = -10V, V <sub>GS</sub> =0V,<br>f=1.0MHz                                         | -    | 830  | -    | pF    |
| C <sub>oss</sub>                                       | Output Capacitance                                       |                                                                                                  | -    | 132  | -    | pF    |
| C <sub>rss</sub>                                       | Reverse Transfer Capacitance                             |                                                                                                  | -    | 85   | -    | pF    |
| Q <sub>g</sub>                                         | Total Gate Charge                                        | V <sub>DS</sub> = -10V, I <sub>D</sub> = -2A,<br>V <sub>GS</sub> = -4.5V                         | -    | 8.8  | -    | nC    |
| Q <sub>gs</sub>                                        | Gate-Source Charge                                       |                                                                                                  | -    | 1.4  | -    | nC    |
| Q <sub>gd</sub>                                        | Gate-Drain("Miller") Charge                              |                                                                                                  | -    | 1.9  | -    | nC    |
| Switching Characteristics                              |                                                          |                                                                                                  |      |      |      |       |
| t <sub>d(on)</sub>                                     | Turn-on Delay Time                                       | V <sub>DD</sub> = -10V, I <sub>D</sub> = -3.3A,<br>R <sub>G</sub> = 1Ω, V <sub>GEN</sub> = -4.5V | -    | 10   | -    | ns    |
| t <sub>r</sub>                                         | Turn-on Rise Time                                        |                                                                                                  | -    | 32   | -    | ns    |
| t <sub>d(off)</sub>                                    | Turn-off Delay Time                                      |                                                                                                  | -    | 50   | -    | ns    |
| t <sub>f</sub>                                         | Turn-off Fall Time                                       |                                                                                                  | -    | 51   | -    | ns    |
| Drain-Source Diode Characteristics and Maximum Ratings |                                                          |                                                                                                  |      |      |      |       |
| I <sub>S</sub>                                         | Maximum Continuous Drain to Source Diode Forward Current |                                                                                                  | -    | -    | -5.0 | A     |
| I <sub>SM</sub>                                        | Maximum Pulsed Drain to Source Diode Forward Current     |                                                                                                  | -    | -    | -16  | A     |
| V <sub>SD</sub>                                        | Drain to Source Diode Forward Voltage                    | V <sub>GS</sub> =0V, I <sub>S</sub> = -4.1A                                                      | -    | -    | -1.2 | V     |

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

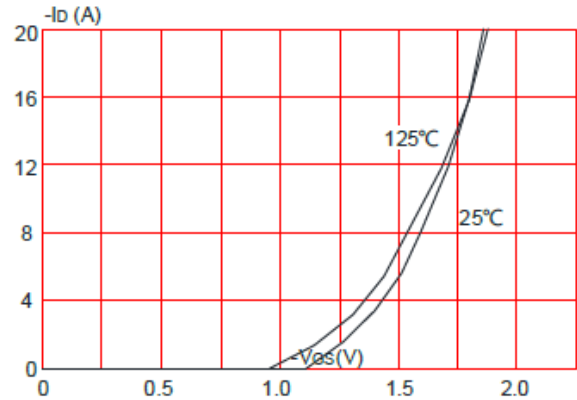
2. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$

**Switching Time Test Circuit and Waveforms**

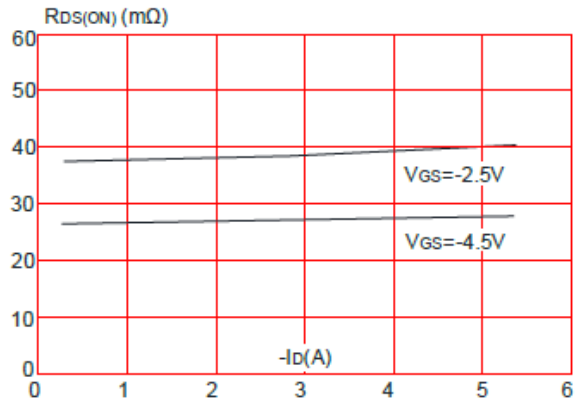
**Figure1: Output Characteristics**



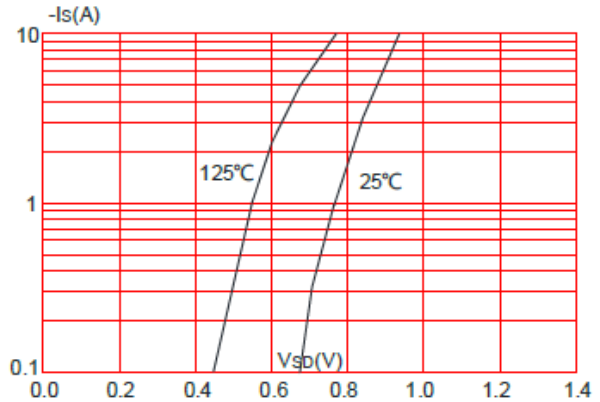
**Figure 2: Typical Transfer Characteristics**



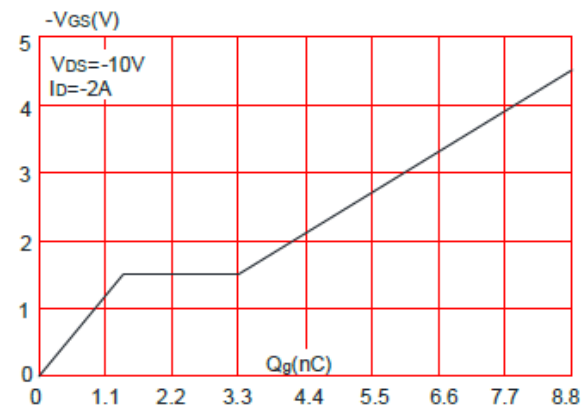
**Figure 3: On-resistance vs. Drain Current**



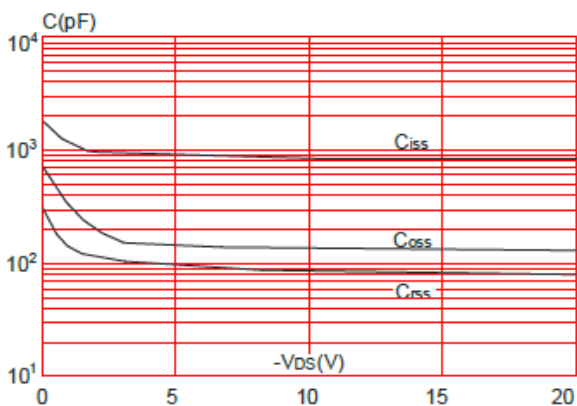
**Figure 4: Body Diode Characteristics**



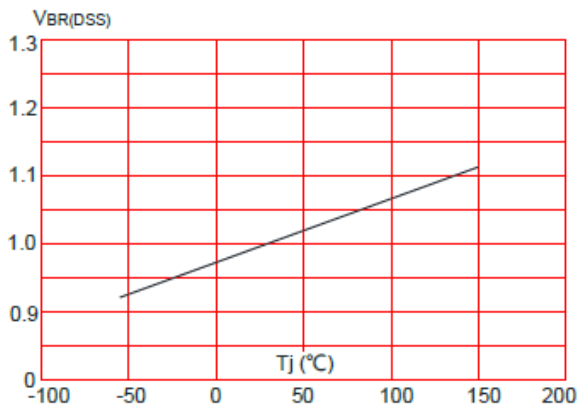
**Figure 5: Gate Charge Characteristics**



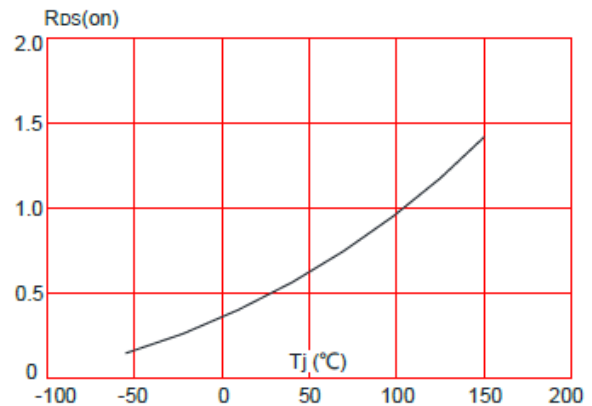
**Figure 6: Capacitance Characteristics**



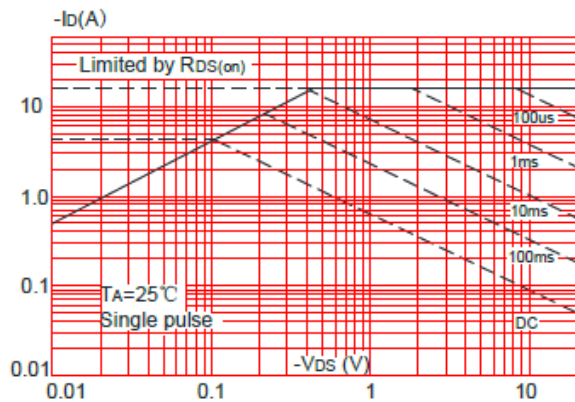
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



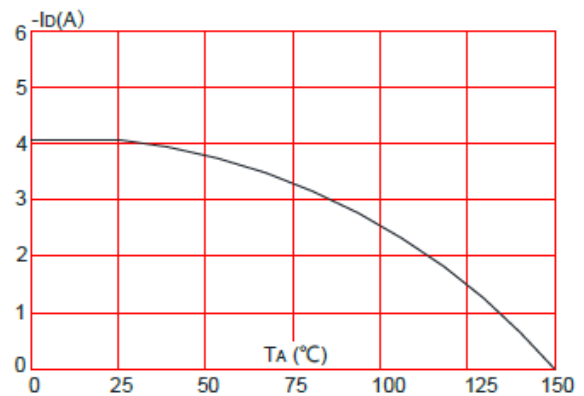
**Figure 8:** Normalized on Resistance vs. Junction Temperature



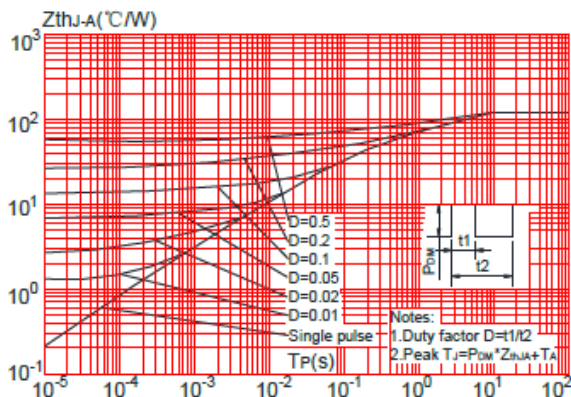
**Figure 9:** Maximum Safe Operating Area



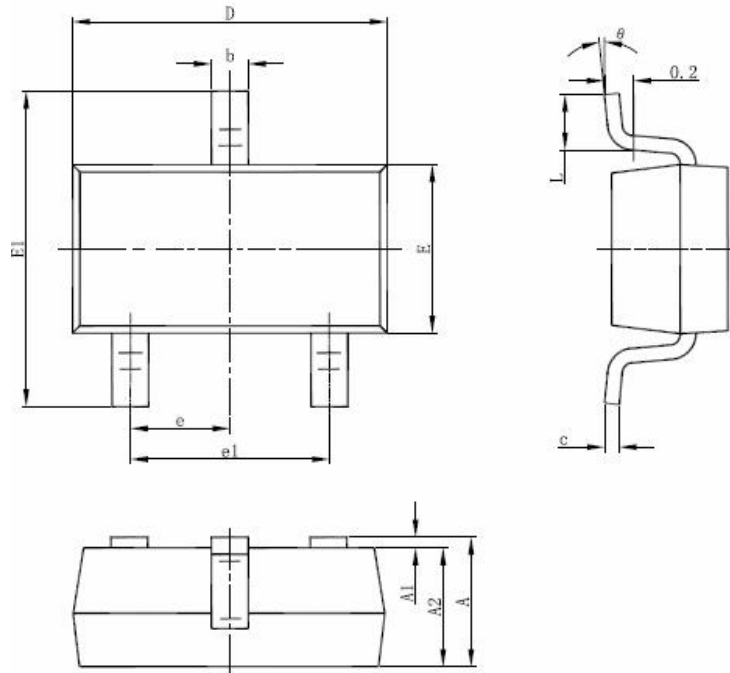
**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature



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



**Package Mechanical Data-SOT-23**



| 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 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |