

### Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | $I_D$ |
|---------------|-----------------|-------|
| -20V          | 39mΩ@-4.5V      | -5.4A |
|               | 49mΩ@-2.5V      |       |
|               | 63mΩ@-1.8V      |       |

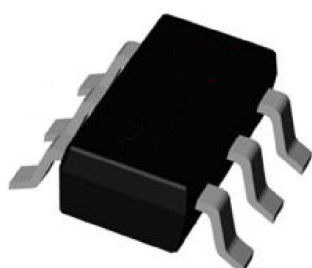
### Feature

- Advanced trench process technology
- High density cell design for ultra low on-resistance
- Low Gate Charge

### Application

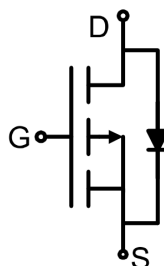
- Battery protection
- Power management
- Load switch

### Package

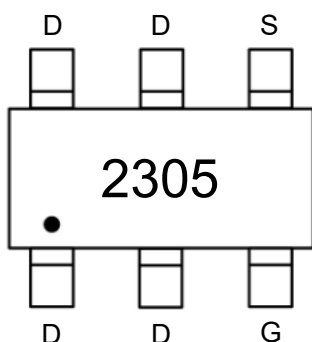


SOT-23-6L

### Circuit diagram



### Marking



### Absolute maximum ratings (Ta=25°C unless otherwise noted)

| Parameter                | Symbol    | Value      | Unit |
|--------------------------|-----------|------------|------|
| Drain-Source Voltage     | $V_{DS}$  | -20        | V    |
| Gate-Source Voltage      | $V_{GS}$  | $\pm 10$   | V    |
| Continuous Drain Current | $I_D$     | -5.4       | A    |
| Pulsed Drain Current     | $I_{DM}$  | -22        | A    |
| Power Dissipation        | $P_D$     | 1.2        | W    |
| Junction Temperature     | $T_J$     | 150        | °C   |
| Storage Temperature      | $T_{STG}$ | -55 ~ +150 | °C   |

### Electrical characteristics (Ta=25 °C, unless otherwise noted)

| Parameter                                | Symbol        | Test Condition                                                      | Min. | Typ.  | Max.      | Unit    |
|------------------------------------------|---------------|---------------------------------------------------------------------|------|-------|-----------|---------|
| Static Characteristics                   |               |                                                                     |      |       |           |         |
| Drain-source breakdown voltage           | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = -250\mu A$                                      | -20  |       |           | V       |
| Zero gate voltage drain current          | $I_{DSS}$     | $V_{DS} = -16V, V_{GS} = 0V$                                        |      |       | -1        | $\mu A$ |
| Gate-body leakage current                | $I_{GSS}$     | $V_{GS} = \pm 10V, V_{DS} = 0V$                                     |      |       | $\pm 100$ | nA      |
| Gate threshold voltage                   | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = -250\mu A$                                  | -0.4 | -0.62 | -1.0      | V       |
| Drain-source on-resistance <sup>1)</sup> | $R_{DS(on)}$  | $V_{GS} = -4.5V, I_D = -5.4A$                                       |      | 27    | 39        | mΩ      |
|                                          |               | $V_{GS} = -2.5V, I_D = -4.0A$                                       |      | 36    | 49        |         |
|                                          |               | $V_{GS} = -1.8V, I_D = -3.0A$                                       |      | 48    | 63        |         |
| Dynamic characteristics <sup>2)</sup>    |               |                                                                     |      |       |           |         |
| Input Capacitance                        | $C_{iss}$     | $V_{DS} = -10V, V_{GS} = 0V, f = 1MHz$                              |      | 1010  |           | pF      |
| Output Capacitance                       | $C_{oss}$     |                                                                     |      | 130   |           |         |
| Reverse Transfer Capacitance             | $C_{rss}$     |                                                                     |      | 109   |           |         |
| Total Gate Charge                        | $Q_g$         | $V_{DS} = -10V, V_{GS} = -4.5V, I_D = -4.0A$                        |      | 11    |           | nC      |
| Gate-Source Charge                       | $Q_{gs}$      |                                                                     |      | 2.17  |           |         |
| Gate-Drain Charge                        | $Q_{gd}$      |                                                                     |      | 2.54  |           |         |
| Turn-on delay time                       | $t_{d(on)}$   | $V_{DD} = -10V, V_{GS} = -4.5V, R_L = 2.5\Omega, R_{GEN} = 3\Omega$ |      | 8.4   |           | nS      |
| Turn-on rise time                        | $t_r$         |                                                                     |      | 36.2  |           |         |
| Turn-off delay time                      | $t_{d(off)}$  |                                                                     |      | 76.8  |           |         |
| Turn-off fall time                       | $t_f$         |                                                                     |      | 56.2  |           |         |
| Source-Drain Diode characteristics       |               |                                                                     |      |       |           |         |
| Diode Forward Current <sup>1)</sup>      | $I_S$         |                                                                     |      |       | -5.4      | A       |
| Diode Forward voltage                    | $V_{DS}$      | $V_{GS} = 0V, I_S = -5.4A$                                          |      |       | -1.2      | V       |

Notes:

- 1) Pulse Test: Pulse Width < 300μs, Duty Cycle ≤ 2%.
- 2) Guaranteed by design, not subject to production testing.

## Typical Characteristics

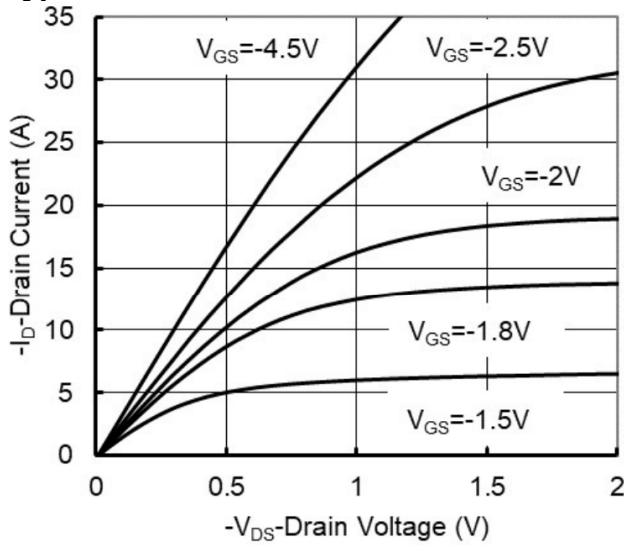


Figure1. Output Characteristics

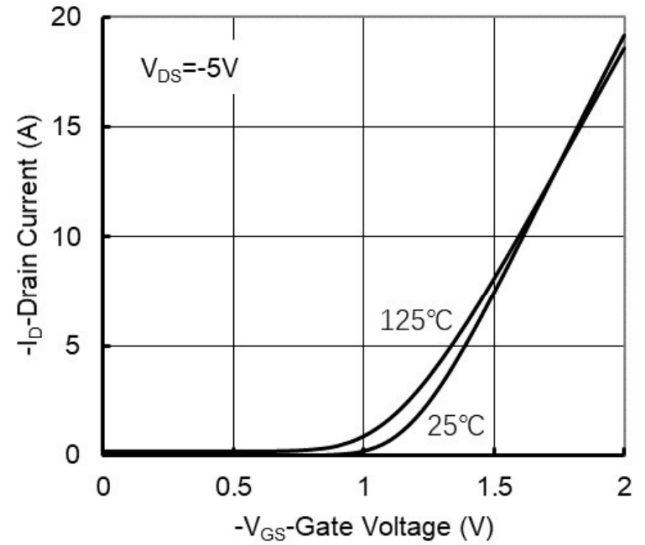


Figure2. Transfer Characteristics

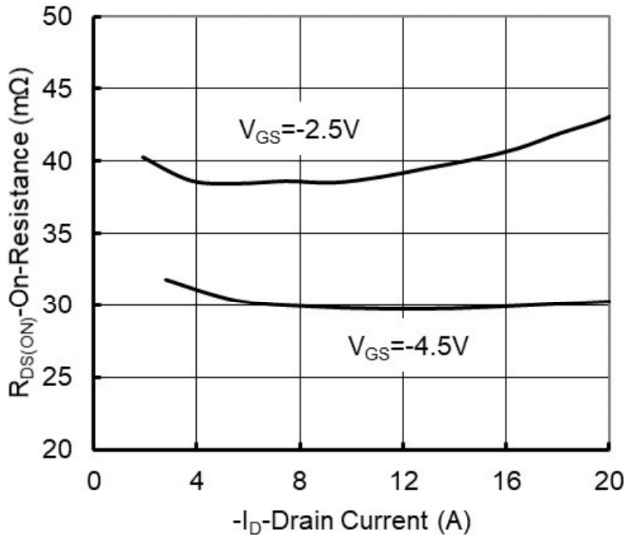


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

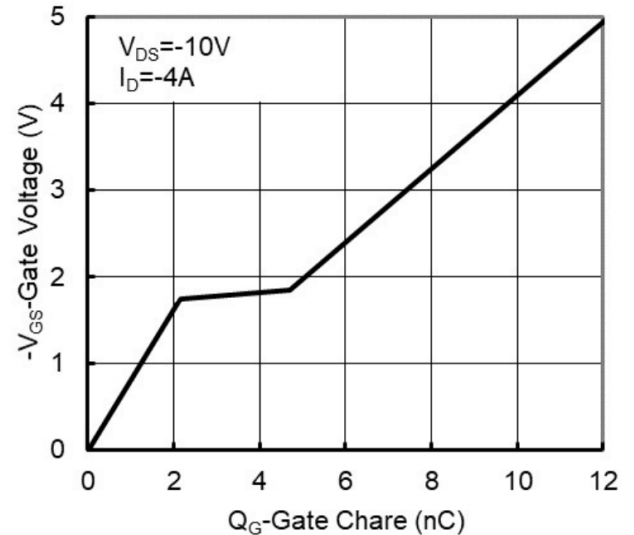


Figure 4: On-Resistance vs. Junction Temperature

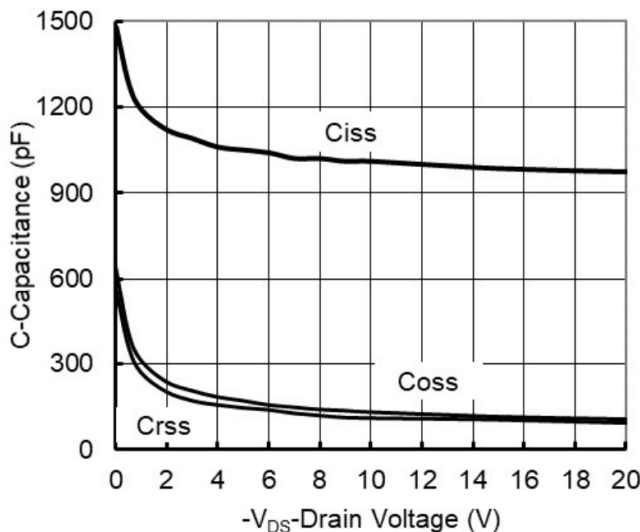


Figure5. Capacitance Characteristics

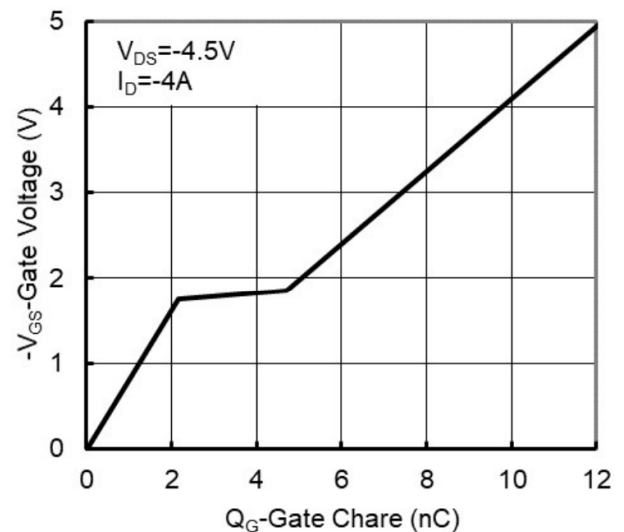


Figure6. Gate Charge

## Typical Characteristics

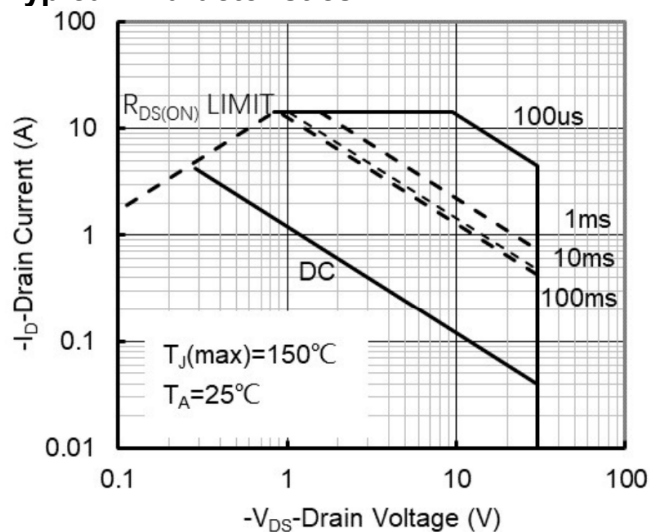


Figure7. Safe Operation Area

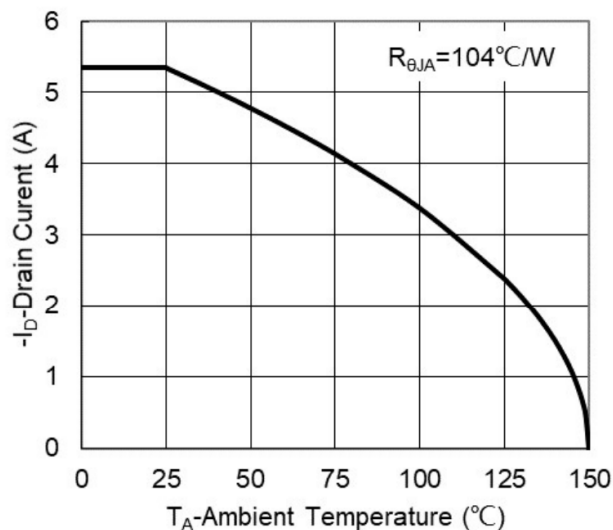


Figure8. Maximum Continuous Drain Current vs Ambient Temperature

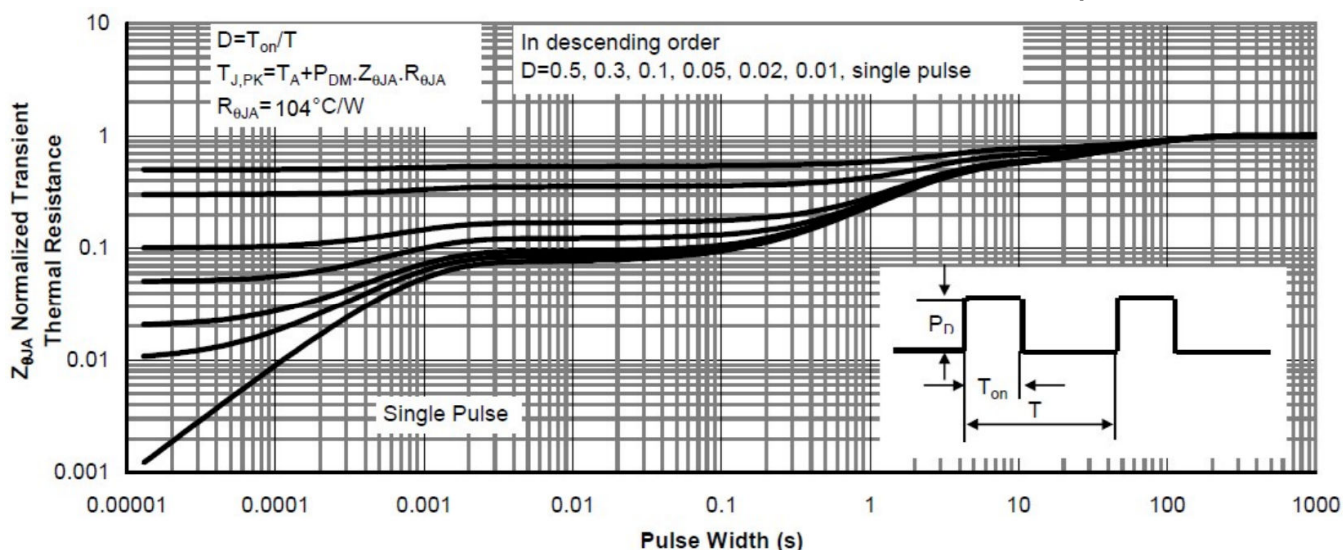
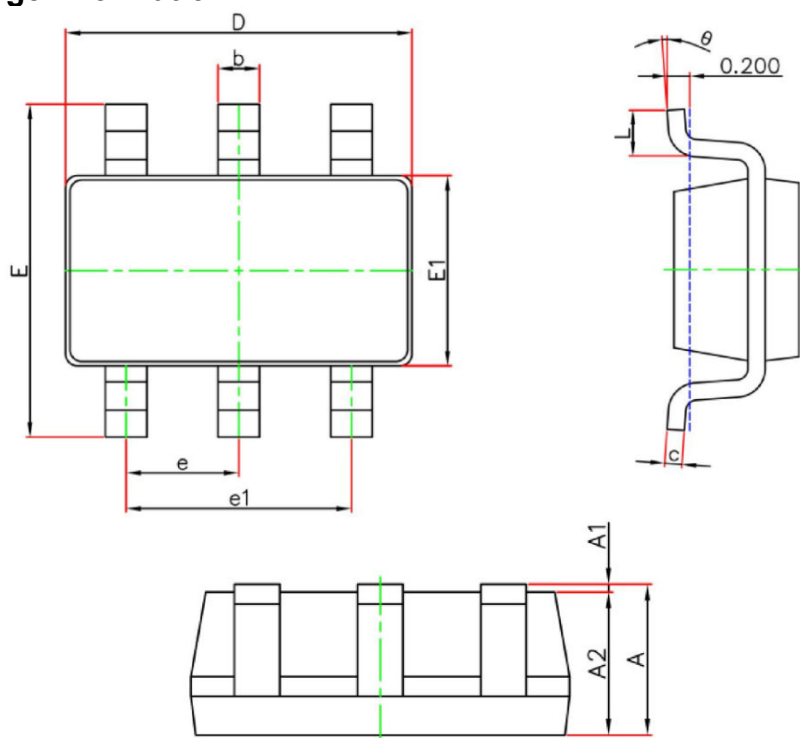


Figure9. Normalized Maximum Transient Thermal Impedance

## SOT-23-6L 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      | 2.650                     | 2.950 | 0.104                | 0.116 |
| E1     | 1.500                     | 1.700 | 0.059                | 0.067 |
| 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°    |