

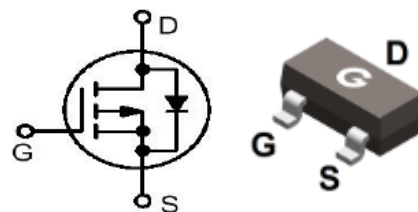
## Features

- Advanced trench technology
- Low gate charge
- Fast switching speed

HF

## Mechanical Data

- Case: SOT-23
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



SOT-23

## Ordering Information

| Part Number | Package | Shipping Quantity      | Marking Code |
|-------------|---------|------------------------|--------------|
| BL6202      | SOT-23  | 3000 pcs / Tape & Reel | D1           |

## Maximum Ratings (@ T<sub>A</sub> = 25°C unless otherwise specified)

| Parameter                                                            | Symbol           | Value      | Unit |
|----------------------------------------------------------------------|------------------|------------|------|
| Drain-to-Source Voltage                                              | V <sub>DSS</sub> | -60        | V    |
| Gate-to-Source Voltage                                               | V <sub>GSS</sub> | ±20        | V    |
| Continuous Drain Current (T <sub>C</sub> = 25°C)                     | I <sub>D</sub>   | -2.7       | A    |
| Continuous Drain Current (T <sub>A</sub> = 25°C) *1                  |                  | -1.9       | A    |
| Continuous Drain Current (T <sub>A</sub> = 70°C) *1                  |                  | -1.5       | A    |
| Pulsed Drain Current (t <sub>p</sub> = 10μs, T <sub>A</sub> = 25°C)  | I <sub>DM</sub>  | -19        | A    |
| Pulsed Drain Current (t <sub>p</sub> = 300μs, T <sub>A</sub> = 25°C) |                  | -7.6       | A    |
| Single Pulse Avalanche Energy *4                                     | E <sub>AS</sub>  | 14         | mJ   |
| Power Dissipation (T <sub>C</sub> = 25°C)                            | P <sub>D</sub>   | 2          | W    |
| Power Dissipation (T <sub>A</sub> = 25°C) *1                         |                  | 1          | W    |
| Power Dissipation (T <sub>A</sub> = 25°C) *2                         |                  | 0.35       | W    |
| Operating Junction Temperature Range                                 | T <sub>J</sub>   | -55 ~ +150 | °C   |
| Storage Temperature Range                                            | T <sub>STG</sub> | -55 ~ +150 | °C   |

## Thermal Characteristics

| Parameter                             | Symbol           | Min. | Typ. | Max. | Unit |
|---------------------------------------|------------------|------|------|------|------|
| Thermal Resistance Junction-to-Case   | R <sub>θJC</sub> | -    | -    | 62   | °C/W |
| Thermal Resistance Junction-to-Air *1 | R <sub>θJA</sub> | -    | 105  | 125  | °C/W |
| Thermal Resistance Junction-to-Air *2 |                  | -    | 200  | 357  | °C/W |

### Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

| Symbol                             | Parameter                       | Test Condition                                                                                    | Min.            | Typ. | Max. | Unit |
|------------------------------------|---------------------------------|---------------------------------------------------------------------------------------------------|-----------------|------|------|------|
| Static Characteristics             |                                 |                                                                                                   |                 |      |      |      |
| V <sub>DSS</sub>                   | Drain-Source Breakdown Voltage  | V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA                                                     | -60             | -    | -    | V    |
| I <sub>DSS</sub>                   | Zero Gate Voltage Drain Current | V <sub>DS</sub> = -48V, V <sub>GS</sub> = 0V                                                      | -               | -    | -1   | μA   |
| I <sub>GSS</sub>                   | Gate-Body Leakage Current       | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                                      | -               | -    | ±100 | nA   |
| On Characteristics                 |                                 |                                                                                                   |                 |      |      |      |
| R <sub>DS(ON)</sub>                | Drain-Source On-resistance *3   | V <sub>GS</sub> = -10V, I <sub>D</sub> = -1.5A                                                    | -               | 115  | 150  | mΩ   |
|                                    |                                 | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -1A                                                     | -               | 155  | 200  | mΩ   |
| V <sub>GS(th)</sub>                | Gate Threshold Voltage          | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                       | -1              | -1.7 | -3   | V    |
| R <sub>G</sub>                     | Gate Resistance                 | V <sub>GS</sub> = 0V, f = 1MHz                                                                    | -               | 8.4  | -    | Ω    |
| Dynamic Characteristics            |                                 |                                                                                                   |                 |      |      |      |
| C <sub>ISS</sub>                   | Input Capacitance               | V <sub>GS</sub> = 0V<br>V <sub>DS</sub> = -15V<br>f = 1.0MHz                                      | -               | 425  | -    | pF   |
| C <sub>OSS</sub>                   | Output Capacitance              |                                                                                                   | -               | 48   | -    |      |
| C <sub>RSS</sub>                   | Reverse Transfer Capacitance    |                                                                                                   | -               | 38   | -    |      |
| Switching Characteristics          |                                 |                                                                                                   |                 |      |      |      |
| t <sub>d(ON)</sub>                 | Turn-on Delay Time *5           | V <sub>DD</sub> = -15V<br>V <sub>GS</sub> = -10V<br>R <sub>G</sub> = 3.3Ω<br>I <sub>D</sub> = -1A | -               | 17.4 | -    | ns   |
| t <sub>r</sub>                     | Turn-on Rise Time *5            |                                                                                                   | -               | 5.4  | -    |      |
| t <sub>d(OFF)</sub>                | Turn-Off Delay Time *5          |                                                                                                   | -               | 37.2 | -    |      |
| t <sub>f</sub>                     | Turn-Off Fall Time *5           |                                                                                                   | -               | 2.4  | -    |      |
| Q <sub>G</sub>                     | Total Gate-Charge               | V <sub>DD</sub> = -20V<br>V <sub>GS</sub> = -10V<br>I <sub>D</sub> = -1.5A                        | -               | 12   | -    | nC   |
| Q <sub>GS</sub>                    | Gate to Source Charge           |                                                                                                   | -               | 2.1  | -    |      |
| Q <sub>GD</sub>                    | Gate to Drain (Miller) Charge   |                                                                                                   | -               | 2.1  | -    |      |
| Source-Drain Diode Characteristics |                                 |                                                                                                   |                 |      |      |      |
| V <sub>SD</sub>                    | Diode Forward Voltage *3        | I <sub>SD</sub> = -1A, V <sub>GS</sub> = 0V                                                       | -               | -0.8 | -1.4 | V    |
| t <sub>rr</sub>                    | Reverse Recovery Time           | I <sub>SD</sub> = -4A, V <sub>GS</sub> = 0V                                                       | -               | 26   | -    | ns   |
| Q <sub>rr</sub>                    | Reverse Recovery Charge         |                                                                                                   | di/dt = 100A/μs | -    | 22   | -    |

Notes:

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper
- The data tested by surface mounted on a minimum recommended FR-4 board
- The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$
- The  $E_{AS}$  data shows Max. rating. The test condition is  $V_{DD} = -30\text{V}, V_{GS} = -10\text{V}, L = 0.5\text{mH}$
- Guaranteed by design, not subject to production

Ratings and Characteristics Curves (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)

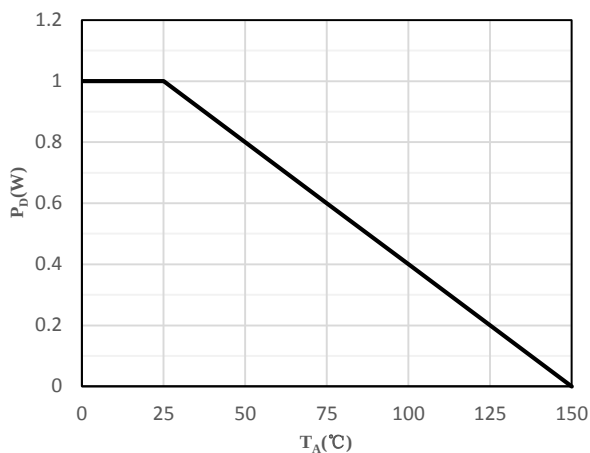


Fig 1 Power Dissipation

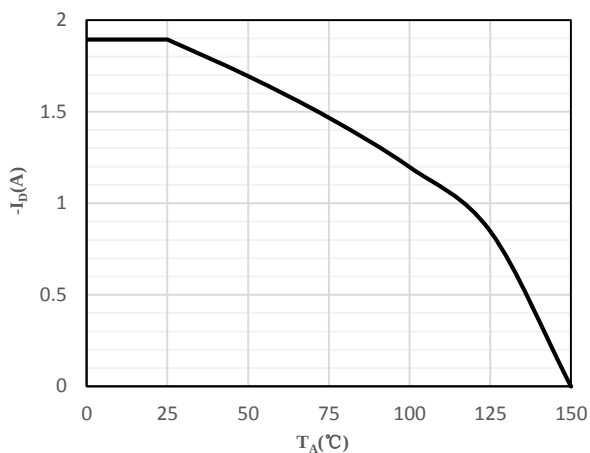


Fig 2 Drain Current

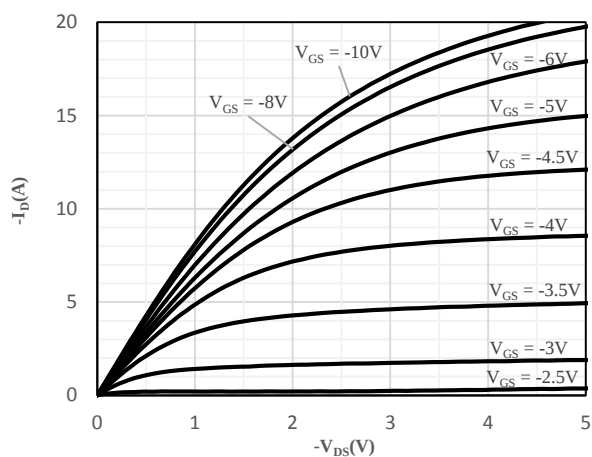


Fig 3 Typical Output Characteristics

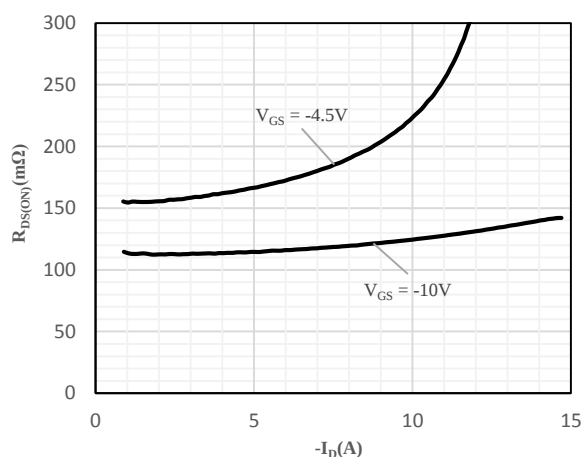


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

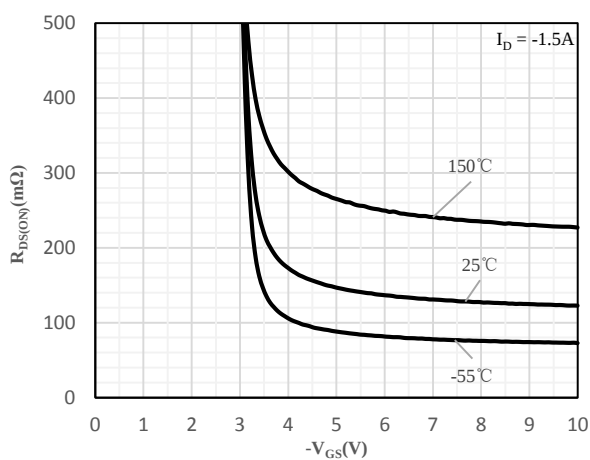


Fig 5 On-Resistance vs. Gate-Source Voltage

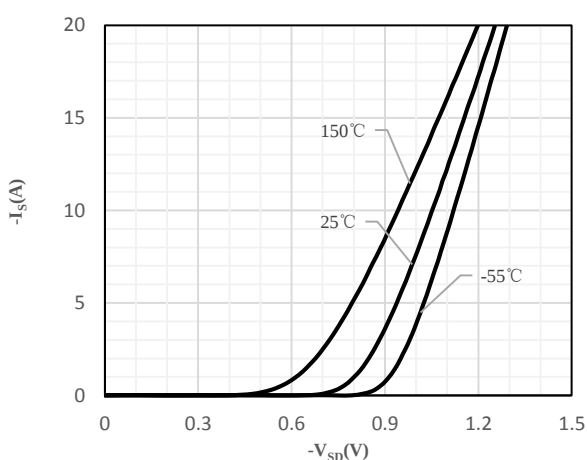


Fig 6 Body-Diode Characteristics

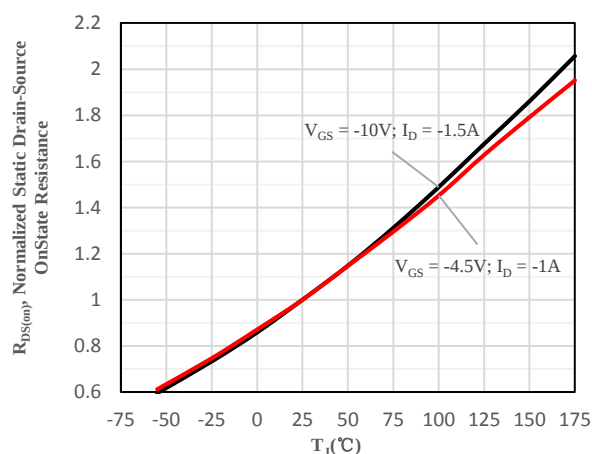


Fig 7 Normalized On-Resistance vs. Junction Temperature

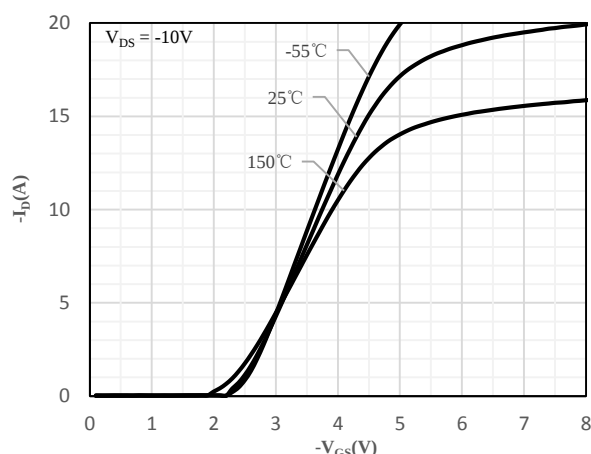


Fig 8 Transfer Characteristics

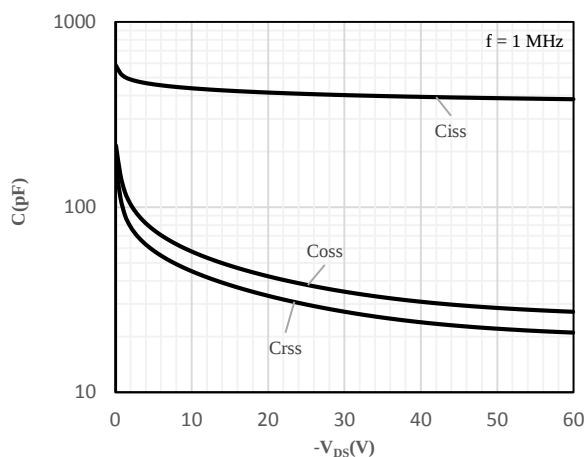


Fig 9 Capacitance Characteristics

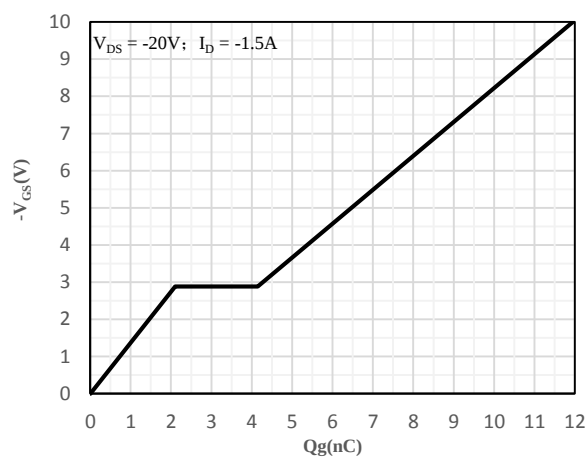


Fig 10 Gate-Charge Characteristics

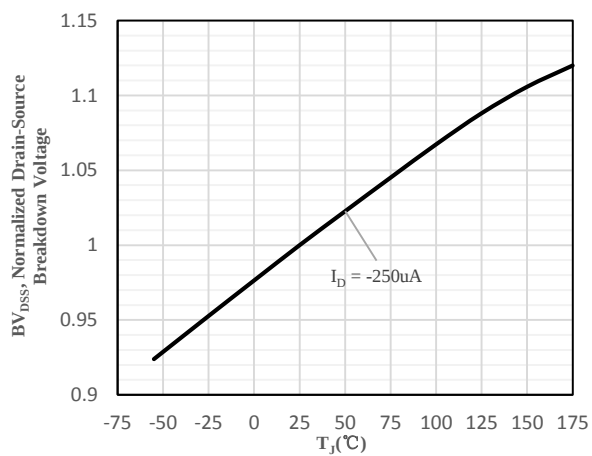


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

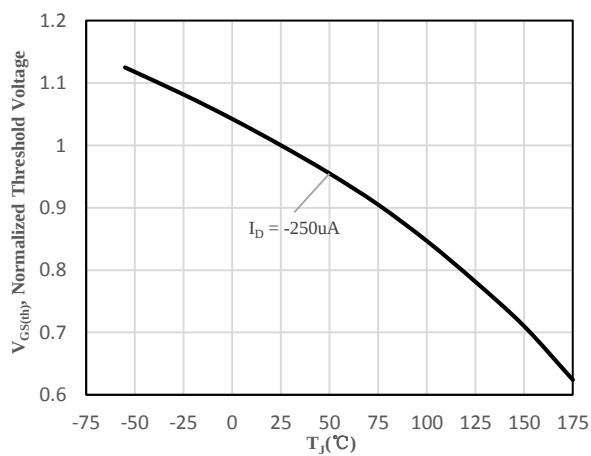


Fig 12 Normalized  $V_{GS(th)}$  vs. Junction Temperature

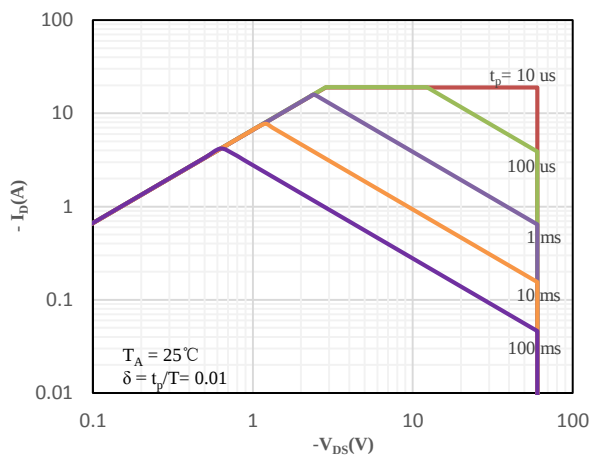


Fig 13 Safe Operation Area

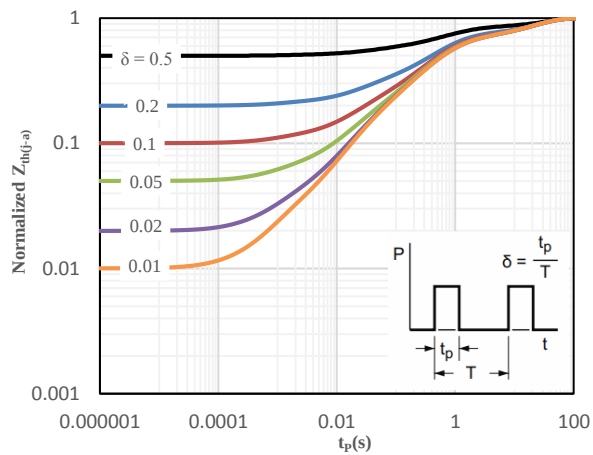
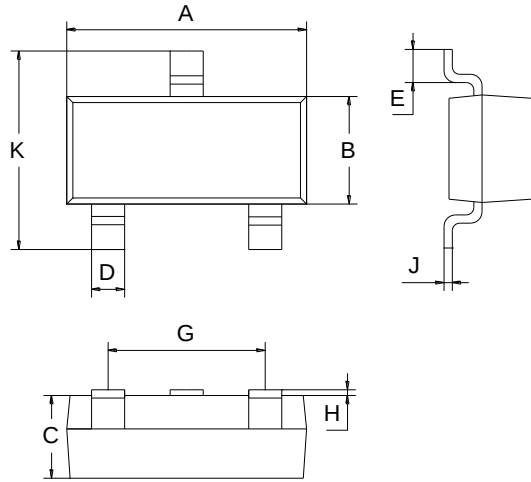


Fig 14 Normalized Maximum transient thermal impedance

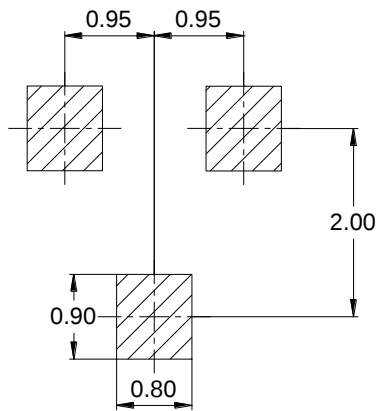
## Package Outline Dimensions (Unit: mm)



| SOT-23    |      |      |
|-----------|------|------|
| Dimension | Min. | Max. |
| A         | 2.70 | 3.10 |
| B         | 1.10 | 1.50 |
| C         | 0.90 | 1.10 |
| D         | 0.30 | 0.50 |
| E         | 0.35 | 0.48 |
| G         | 1.80 | 2.00 |
| H         | 0.02 | 0.10 |
| J         | 0.05 | 0.15 |
| K         | 2.20 | 2.60 |

## Mounting Pad Layout (Unit: mm)

### SOT-23



## IMPORTANT NOTICE

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