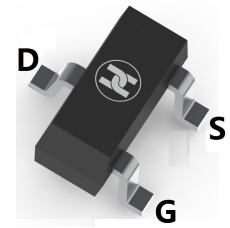
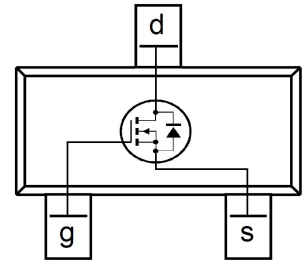


**MOSFET (N-CHANNEL)**
**FEATURES**

- Fast switching
- Ultra Low On-Resistance
- Surface Mount device


**SOT-23**

**MECHANICAL DATA**

- Case: SOT-23
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Weight: 0.008 grams (approximate)

**Marking:** IRON

**MAXIMUM RATINGS (T<sub>A</sub> = 25°C unless otherwise noted)**

| Parameter                                   | Symbol           | Value     | Unit |
|---|------------------|-----------|------|
| Drain-source voltage                        | V <sub>DS</sub>  | 20        | V    |
| Gate-source voltage                         | V <sub>GS</sub>  | ±12       | V    |
| Continuous drain current                    | I <sub>D</sub>   | 4.2       | A    |
| Pulsed drain current (Note 1)               | I <sub>DM</sub>  | 33        | A    |
| Power dissipation                           | P <sub>D</sub>   | 1.25      | W    |
| Thermal resistance from Junction to ambient | R <sub>θJA</sub> | 100       | °C/W |
| Junction temperature                        | T <sub>J</sub>   | 150       | °C   |
| Storage temperature                         | T <sub>STG</sub> | -55 ~+150 | °C   |

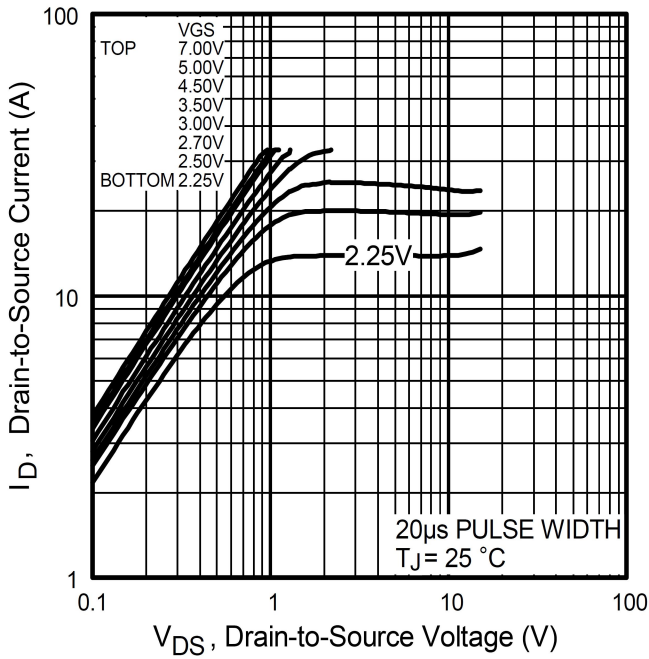
**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise specified)**

| Parameter                           | Symbol               | Min | Typ | Max  | Unit | Conditions   |
|-------------------------------------|----------------------|-----|-----|------|------|--|
| Drain-Source breakdown voltage      | V <sub>(BR)DSS</sub> | 20  |     |      | V    | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA   |
| Zero gate voltage drain current     | I <sub>DSS</sub>     |     |     | 1    | μA   | V <sub>DS</sub> =16V, V <sub>GS</sub> =0V  |
| Gate-body leakage current           | I <sub>GSS</sub>     |     |     | ±100 | nA   | V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V   |
| Gate-threshold voltage (note 1)     | V <sub>GS(th)</sub>  | 0.6 |     | 1.2  | V    | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                               |
| Drain-source on-resistance (note 1) | R <sub>DS(ON)</sub>  |     | 35  | 45   | mΩ   | V <sub>GS</sub> =4.5V, I <sub>D</sub> =4.2A  |
|                                     |                      |     | 50  | 80   | mΩ   | V <sub>GS</sub> =2.5V, I <sub>D</sub> =3.6A  |
| Forward transconductance (note 1)   | g <sub>FS</sub>      | 5.8 |     |      | S    | V <sub>DS</sub> =10V, I <sub>D</sub> =4.0A   |
| Diode forward voltage (note 1)      | V <sub>SD</sub>      |     |     | 1.2  | V    | I <sub>S</sub> =1.3A, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                        |
| Diode forward current               | I <sub>S</sub>       |     |     | 1.3  | A    |  |
| Input capacitance                   | C <sub>iss</sub>     |     | 740 |      | pF   | V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz                                      |
| Output capacitance                  | C <sub>oss</sub>     |     | 90  |      | pF   |  |
| Reverse transfer capacitance        | C <sub>rss</sub>     |     | 66  |      | pF   |  |
| Turn-on delay time                  | t <sub>d(on)</sub>   |     | 7.5 |      | nS   | V <sub>DD</sub> =10V, I <sub>D</sub> =1A,<br>R <sub>GEN</sub> =6Ω, R <sub>L</sub> =10Ω |
| Turn-on rise time                   | t <sub>r</sub>       |     | 10  |      | nS   |  |
| Turn-off delay time                 | t <sub>d(off)</sub>  |     | 54  |      | nS   |  |
| Turn-off fall time                  | t <sub>f</sub>       |     | 26  |      | nS   |  |
| Total gate charge                   | Q <sub>g</sub>       |     | 8   | 12   | nC   | V <sub>DS</sub> =10V, V <sub>GS</sub> =5V, I <sub>D</sub> =4A                          |
| Gate-source charge                  | Q <sub>gs</sub>      |     | 1.8 | 2.7  | nC   |  |
| Gate-drain charge                   | Q <sub>gd</sub>      |     | 1.7 | 2.6  | nC   |  |

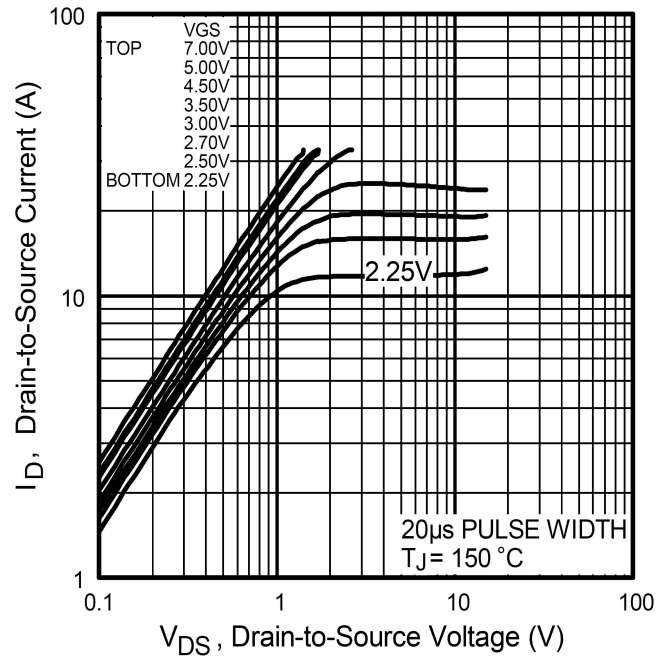
Note:1. Pulse test ; Pulse width ≤300μs, Duty cycle ≤ 2% .

MOSFET (N-CHANNEL)

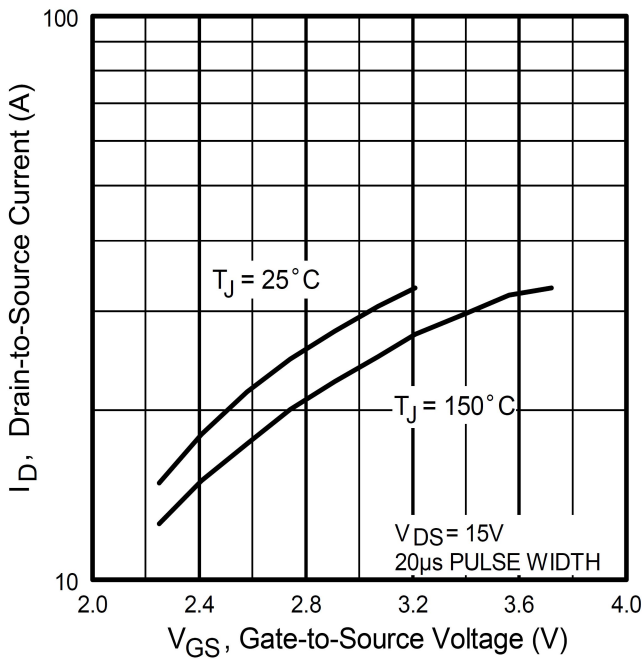
**Typical Characteristics**



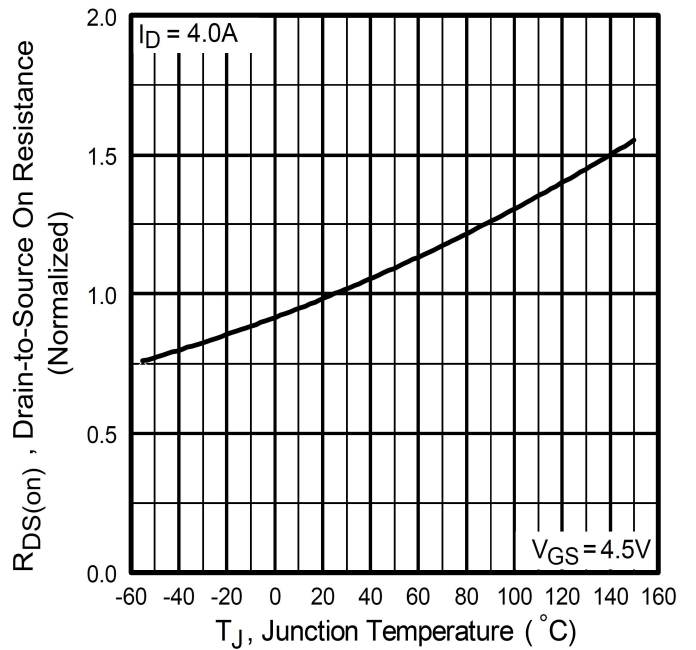
**Fig 1.** Typical Output Characteristics



**Fig 2.** Typical Output Characteristics

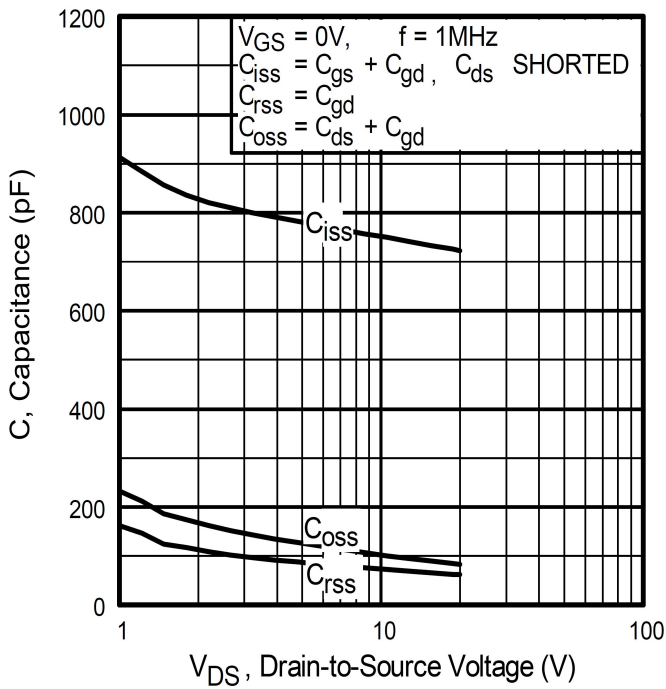


**Fig 3.** Typical Transfer Characteristics

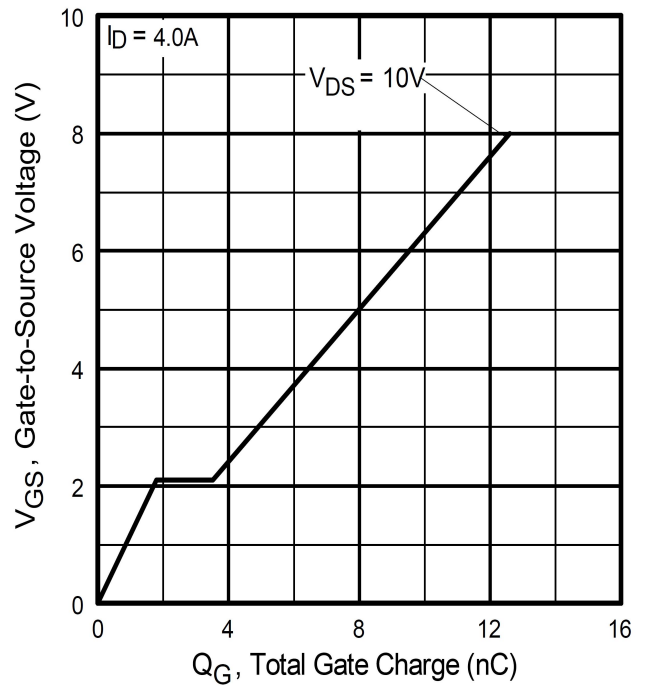


**Fig 4.** Normalized On-Resistance Vs. Temperature

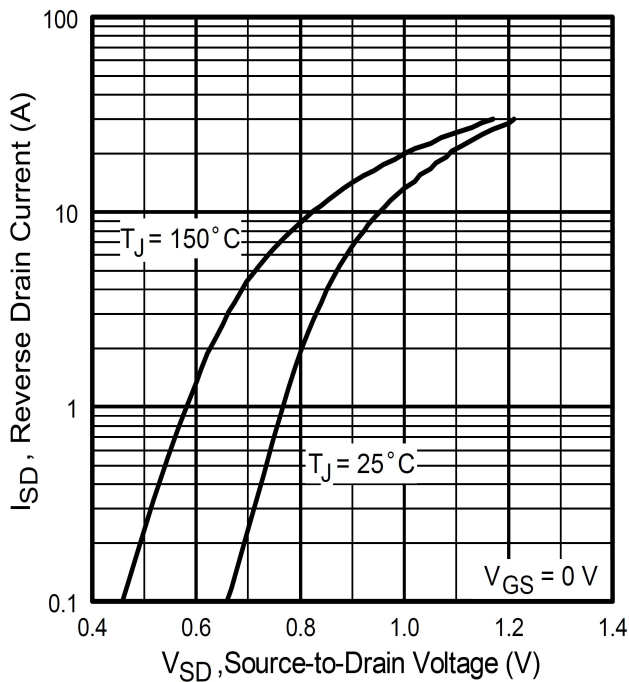
**MOSFET (N-CHANNEL)**



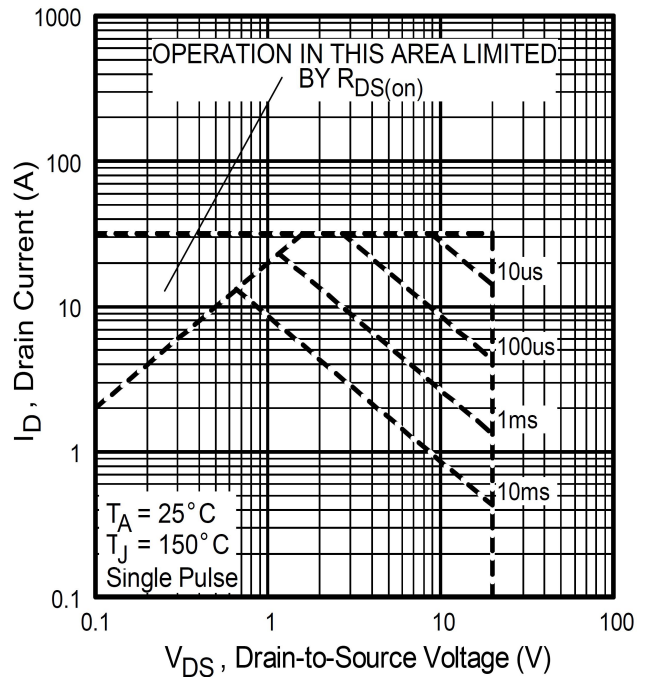
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage

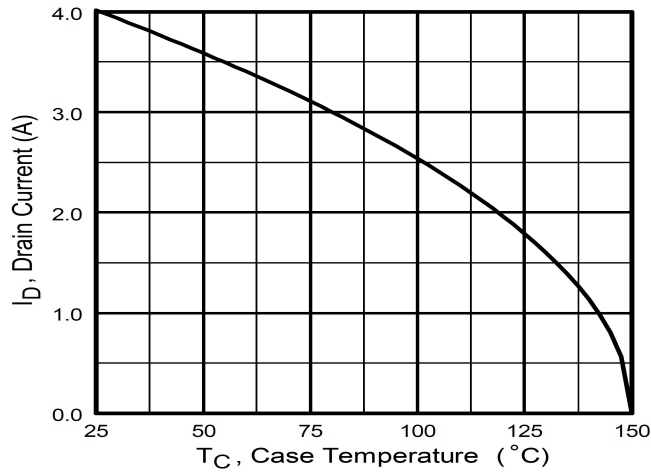


**Fig 7.** Typical Source-Drain Diode Forward Voltage

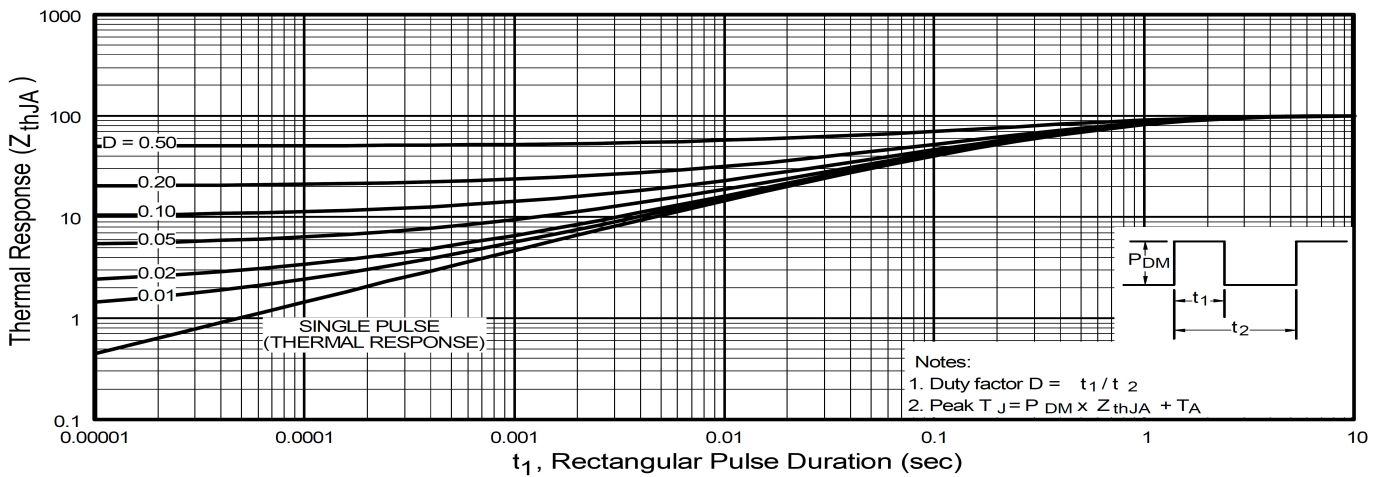


**Fig 8.** Maximum Safe Operating Area

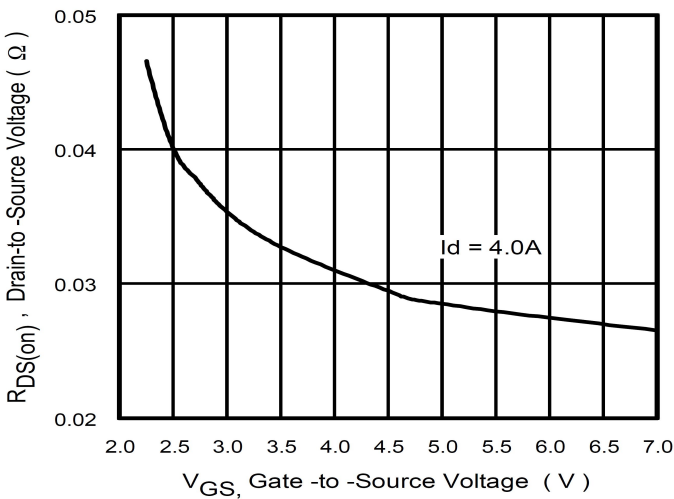
MOSFET (N-CHANNEL)



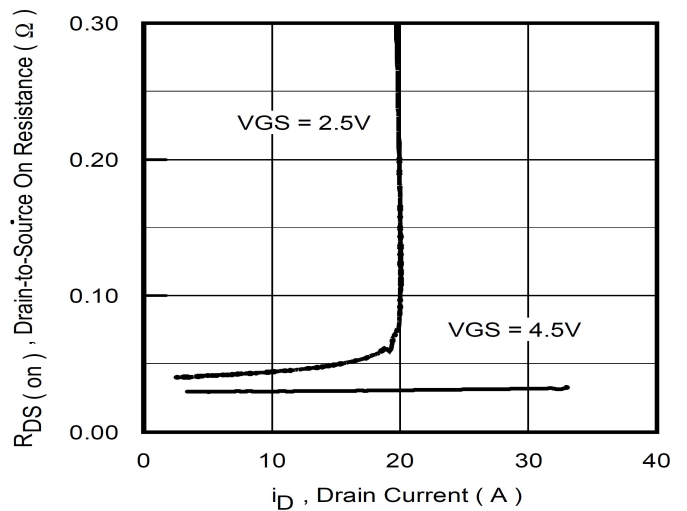
**Fig 9.** Maximum Drain Current Vs. Case Temperature



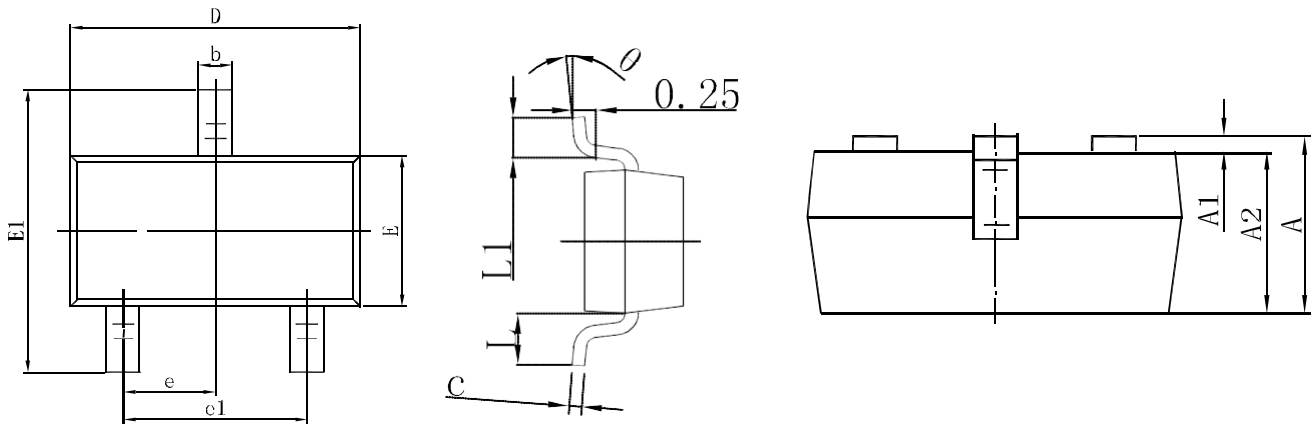
**Fig 10.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



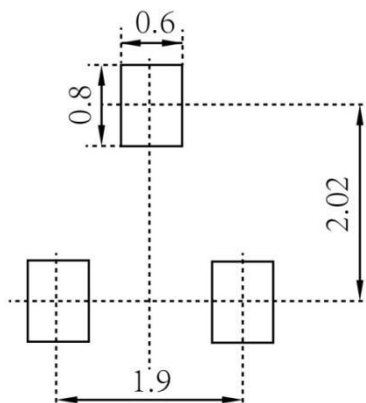
**Fig 11.** On-Resistance Vs. Gate Voltage



**Fig 12.** On-Resistance Vs. Drain Current

**MOSFET (N-CHANNEL)**
**SOT-23 Package Outline Dimensions**


| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.900                     | 1.150 | 0.035                | 0.045 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.050 | 0.035                | 0.041 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.080                     | 0.150 | 0.003                | 0.006 |
| D      | 2.800                     | 3.000 | 0.110                | 0.118 |
| E      | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1     | 2.250                     | 2.550 | 0.089                | 0.100 |
| e      | 0.950 TYP                 |       | 0.037 TYP            |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.550 REF                 |       | 0.022 REF            |       |
| L1     | 0.300                     | 0.500 | 0.012                | 0.020 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

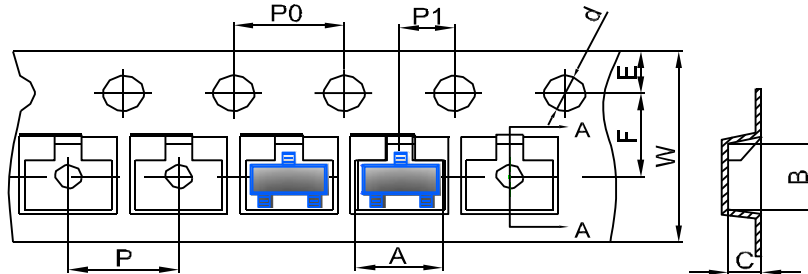
**SOT-23 Suggested Pad Layout**

**Note:**

1. Controlling dimension: in millimeters
2. General tolerance:  $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only

MOSFET (N-CHANNEL)

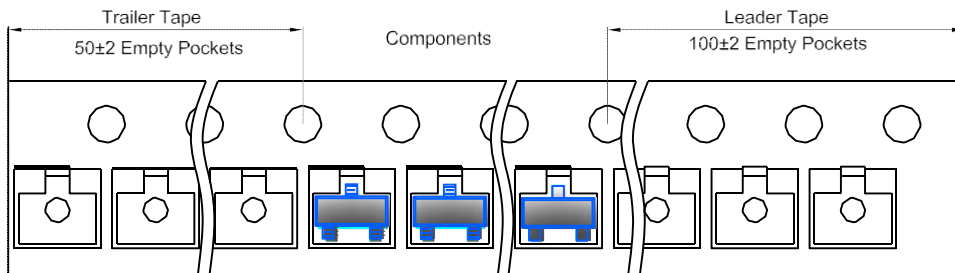
SOT-23 Tape and Reel

SOT-23 Embossed Carrier Tape

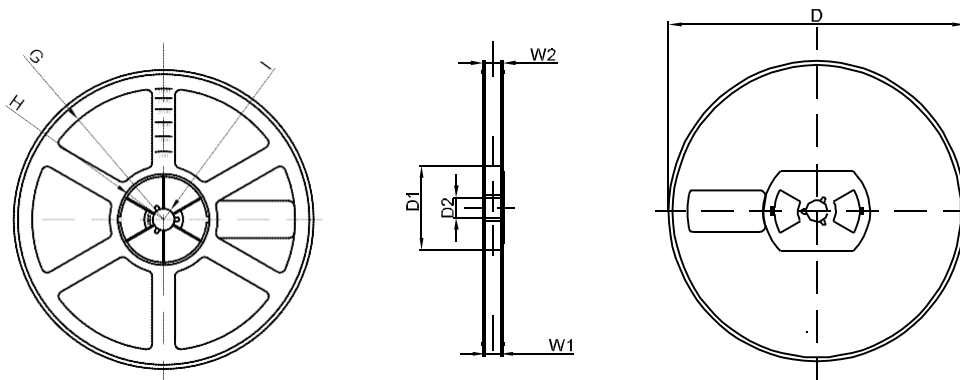


| DIMENSIONS ARE IN MILLIMETER |      |      |      |       |      |      |      |      |      |      |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|
| TYPE                         | A    | B    | C    | d     | E    | F    | P0   | P    | P1   | W    |
| SOT-23                       | 3.15 | 2.77 | 1.22 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |
| TOLERANCE                    | ±0.1 | ±0.1 | ±0.1 | ±0.1  | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |

SOT-23 Tape Leader and Trailer



SOT-23 Reel



| DIMENSIONS ARE IN MILLIMETER |      |       |       |     |        |       |      |       |
|------------------------------|------|-------|-------|-----|--------|-------|------|-------|
| REEL OPTION                  | D    | D1    | D2    | G   | H      | I     | W1   | W2    |
| 7" DIA                       | Ø178 | 54.40 | 13.00 | R78 | R25.60 | R6.50 | 9.50 | 12.30 |
| TOLERANCE                    | ±2   | ±1    | ±1    | ±1  | ±1     | ±1    | ±1   | ±1    |