

## Description:

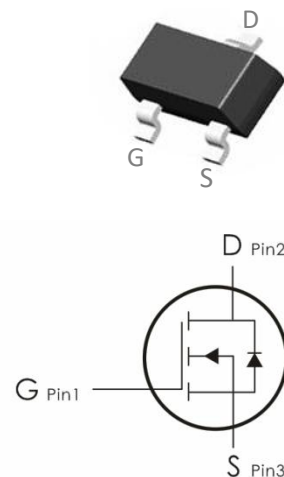
This N-Channel MOSFET uses advanced trench technology and

design to provide excellent  $R_{DS(on)}$  with low gate charge.

It can be used in a wide variety of applications.

## Features:

- 1)  $V_{DS}=30V, I_D=4A, R_{DS(ON)} < 50m\Omega @ V_{GS}=10V$  (Typ:  $39m\Omega$ )
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low  $R_{DS(ON)}$ .
- 5) Excellent package for good heat dissipation.
- 6) MSL3



## Package Marking and Ordering Information:

| Part NO. | Marking | Package | Packing       |
|----------|---------|---------|---------------|
| DO3402A  | 3402A   | SOT-23  | 3000 pcs/Reel |

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

| Symbol         | Parameter                                                     | Ratings  | Units            |
|----------------|---------------------------------------------------------------|----------|------------------|
| $V_{DS}$       | Drain-Source Voltage                                          | 30       | V                |
| $V_{GS}$       | Gate-Source Voltage                                           | $\pm 12$ | V                |
| $I_D$          | Continuous Drain Current <sup>1</sup>                         | 4        | A                |
|                | Continuous Drain Current $T_A=100^\circ\text{C}$ <sup>1</sup> | 2.8      |                  |
| $I_{DM}$       | Pulsed Drain Current <sup>2</sup>                             | 16       |                  |
| $P_D$          | Power Dissipation                                             | 1.2      | W                |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range              | -55-+150 | $^\circ\text{C}$ |

## Thermal Characteristics:

| Symbol          | Parameter                               | Max | Units                     |
|-----------------|-----------------------------------------|-----|---------------------------|
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 103 | $^\circ\text{C}/\text{W}$ |

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

| Symbol                             | Parameter                               | Conditions                                                                                | Min | Typ  | Max   | Units |
|------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------------|-----|------|-------|-------|
| Off Characteristics                |                                         |                                                                                           |     |      |       |       |
| BV <sub>DSS</sub>                  | Drain-Source Breakdown Voltage          | V <sub>GS</sub> =0V, I <sub>D</sub> =250 μ A                                              | 30  | ---  | ---   | V     |
| I <sub>DSS</sub>                   | Zero Gate Voltage Drain Current         | V <sub>GS</sub> =0V, V <sub>DS</sub> =30V                                                 | --- | ---  | 1     | μ A   |
| I <sub>GSS</sub>                   | Gate-Source Leakage Current             | V <sub>GS</sub> =± 12V, V <sub>DS</sub> =0A                                               | --- | ---  | ± 100 | nA    |
| On Characteristics                 |                                         |                                                                                           |     |      |       |       |
| V <sub>GS(th)</sub>                | Gate-Source Threshold Voltage           | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250 μ A                                | 0.4 | 0.82 | 1     | V     |
| R <sub>DS(ON)</sub>                | Drain-Source On Resistance <sup>3</sup> | V <sub>GS</sub> =10V, I <sub>D</sub> =4A                                                  | --- | 39   | 50    | m Ω   |
|                                    |                                         | V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A                                                 | --- | 41   | 55    | m Ω   |
|                                    |                                         | V <sub>GS</sub> =2.5V, I <sub>D</sub> =2A                                                 | --- | 49   | 65    | m Ω   |
| Dynamic Characteristics            |                                         |                                                                                           |     |      |       |       |
| C <sub>iss</sub>                   | Input Capacitance                       | V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz                                         | --- | 235  | ---   | pF    |
| C <sub>oss</sub>                   | Output Capacitance                      |                                                                                           | --- | 37   | --    |       |
| C <sub>rss</sub>                   | Reverse Transfer Capacitance            |                                                                                           | --- | 30   | ---   |       |
| Switching Characteristics          |                                         |                                                                                           |     |      |       |       |
| t <sub>d(on)</sub>                 | Turn-On Delay Time                      | V <sub>DS</sub> =15V, I <sub>D</sub> =2A,<br>R <sub>ENG</sub> =3 Ω ,V <sub>GS</sub> =4.5V | --- | 4.2  | ---   | ns    |
| t <sub>r</sub>                     | Rise Time                               |                                                                                           | --- | 13.6 | ---   | ns    |
| t <sub>d(off)</sub>                | Turn-Off Delay Time                     |                                                                                           | --- | 43   | ---   | ns    |
| t <sub>f</sub>                     | Fall Time                               |                                                                                           | --- | 17.8 | ---   | ns    |
| Q <sub>g</sub>                     | Total Gate Charge                       | V <sub>GS</sub> =4.5V, V <sub>DS</sub> =15V,<br>I <sub>D</sub> =2A                        | --- | 4.7  | ---   | nc    |
| Q <sub>gs</sub>                    | Gate-Source Charge                      |                                                                                           | --- | 1.05 | ---   | nc    |
| Q <sub>gd</sub>                    | Gate-Drain “Miller” Charge              |                                                                                           | --- | 1.05 | ---   | nc    |
| Drain-Source Diode Characteristics |                                         |                                                                                           |     |      |       |       |
| V <sub>SD</sub>                    | Diode Forward Voltage                   | V <sub>GS</sub> =0V, I <sub>SD</sub> =4A                                                  | --- | ---  | 1.2   | V     |
| T <sub>rr</sub>                    | Reverse Recovery Time                   | I <sub>F</sub> =2A,                                                                       | --- | 6    | ---   | ns    |
| Q <sub>rr</sub>                    | Reverse Recovery Charge                 | dI/dt=100A/us                                                                             | --- | 1    | ---   | nc    |
| I <sub>S</sub>                     | Continuous Drain Curren                 | V <sub>D</sub> =V <sub>G</sub> =0V                                                        | --- | ---  | 4     | A     |
| I <sub>SM</sub>                    | Pulsed Drain Current                    | V <sub>D</sub> =V <sub>G</sub> =0V                                                        | --- | ---  | 16    | A     |

## Notes:

1. Computed continuous current assumes the condition of  $T_{j,Max}$  while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 0.5\%$ .

## Typical Characteristics: ( $T_A = 25^\circ C$ unless oth

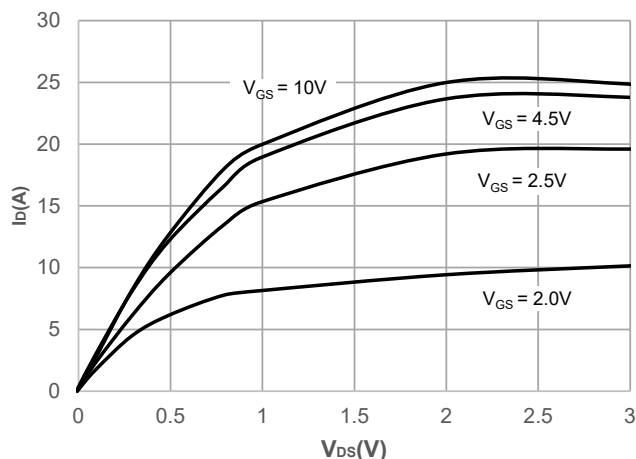


Figure 1: Output Characteristics

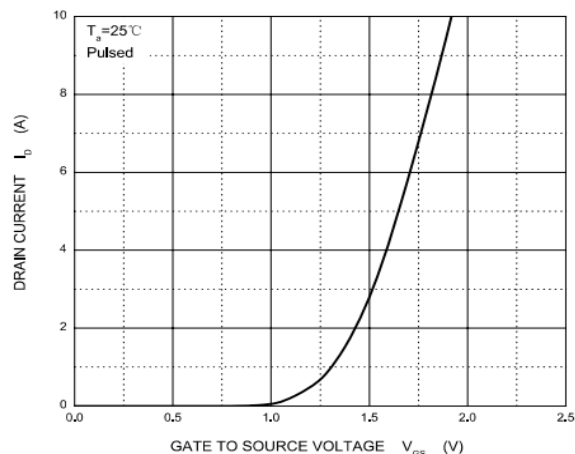


Figure 2: Typical Transfer Characteristics

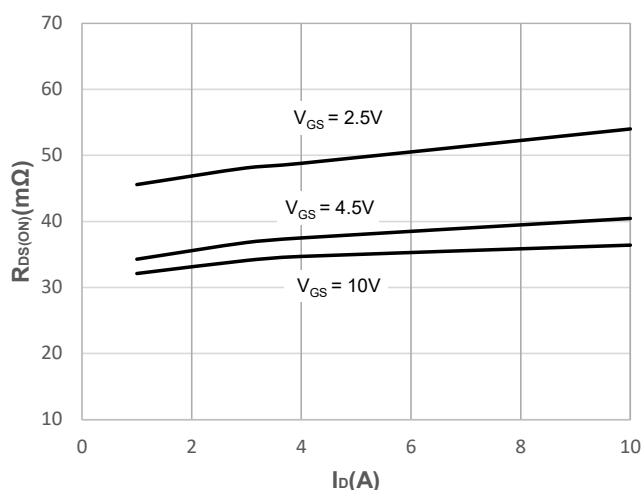


Figure 3: On-resistance vs. Drain Current

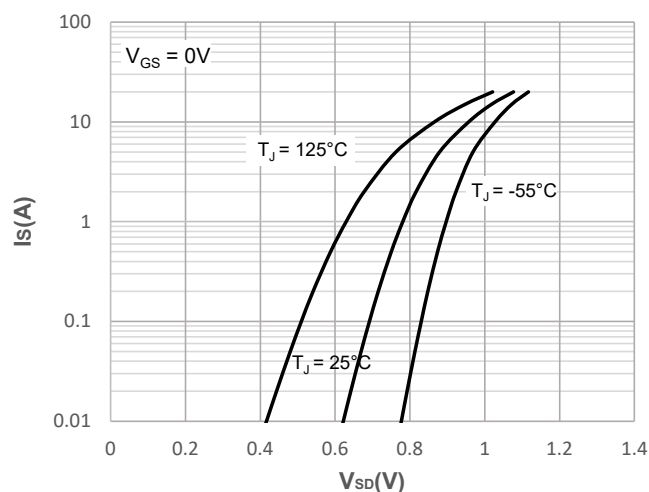


Figure 4: Body Diode Characteristics

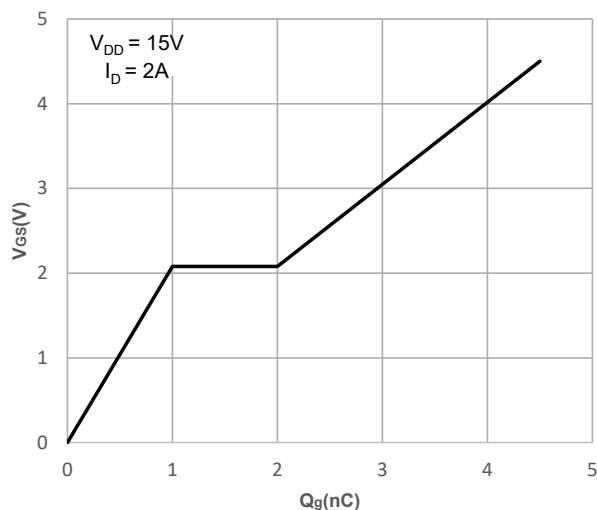


Figure 5: Gate Charge Characteristics

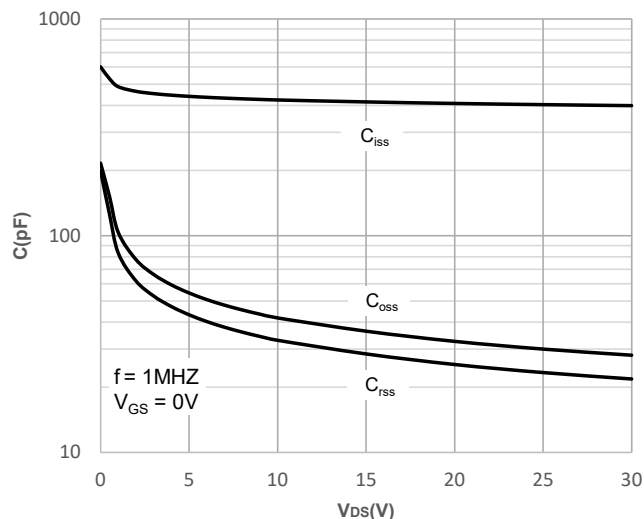


Figure 6: Capacitance Characteristics

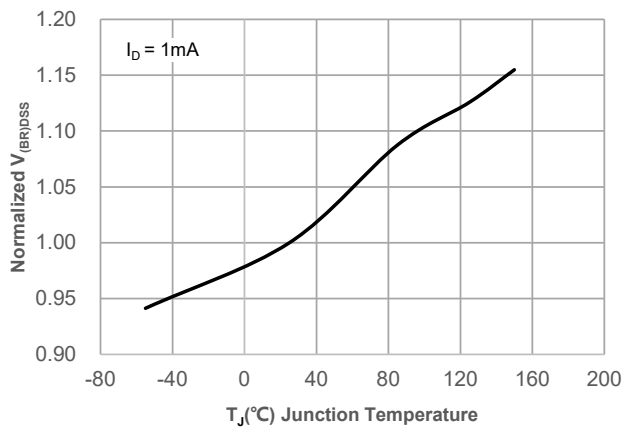


**Figure 7: Normalized Breakdown voltage vs. Junction Temperature**

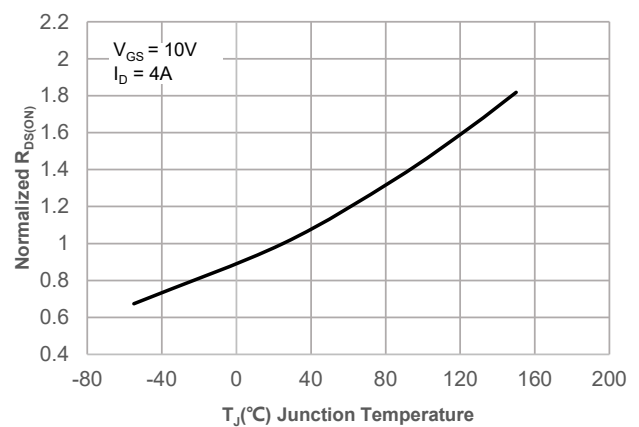


**Figure 8: Normalized on Resistance vs. Junction Temperature**

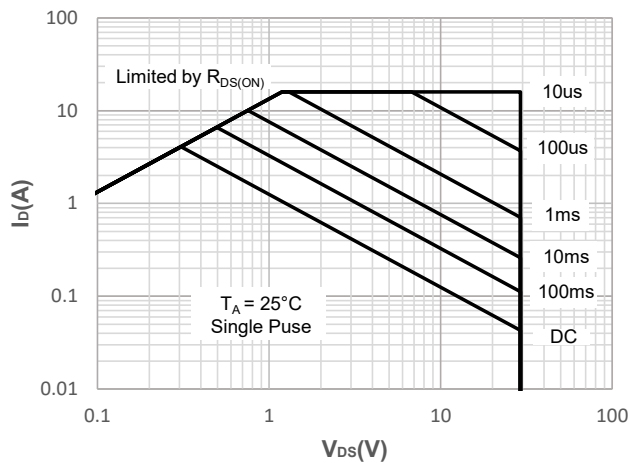


**Figure 9: Maximum Safe Operating Area**

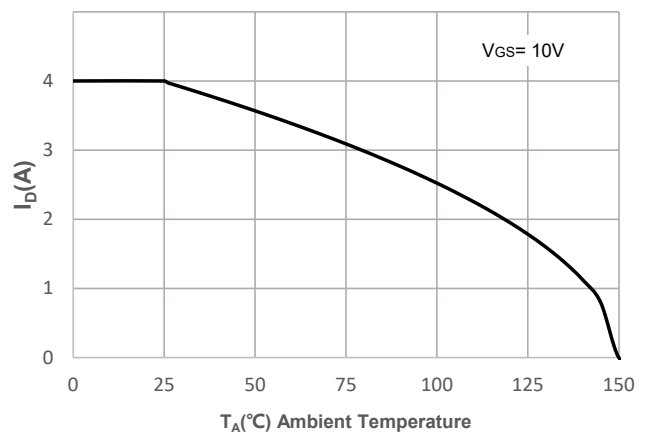


**Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature**

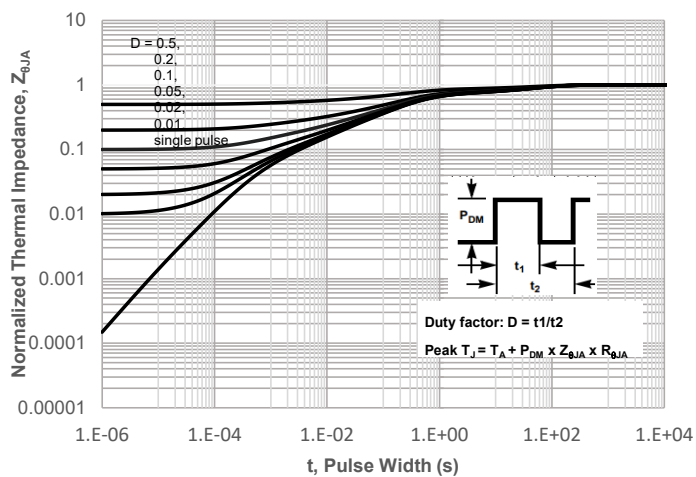


**Figure 11: Normalized Maximum Transient Thermal Impedance**

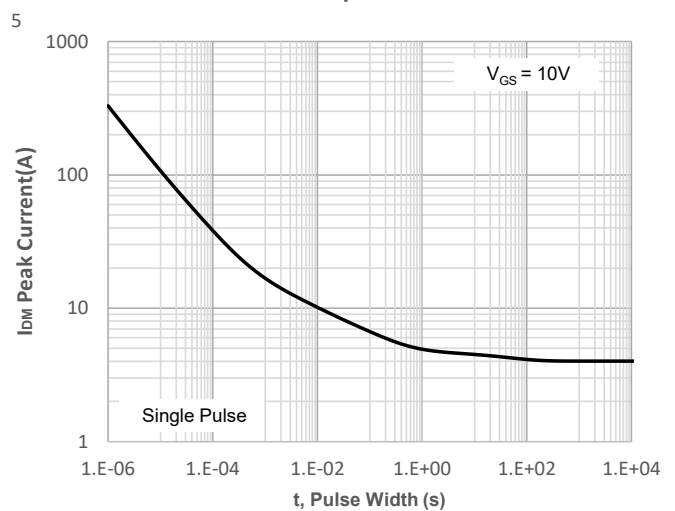
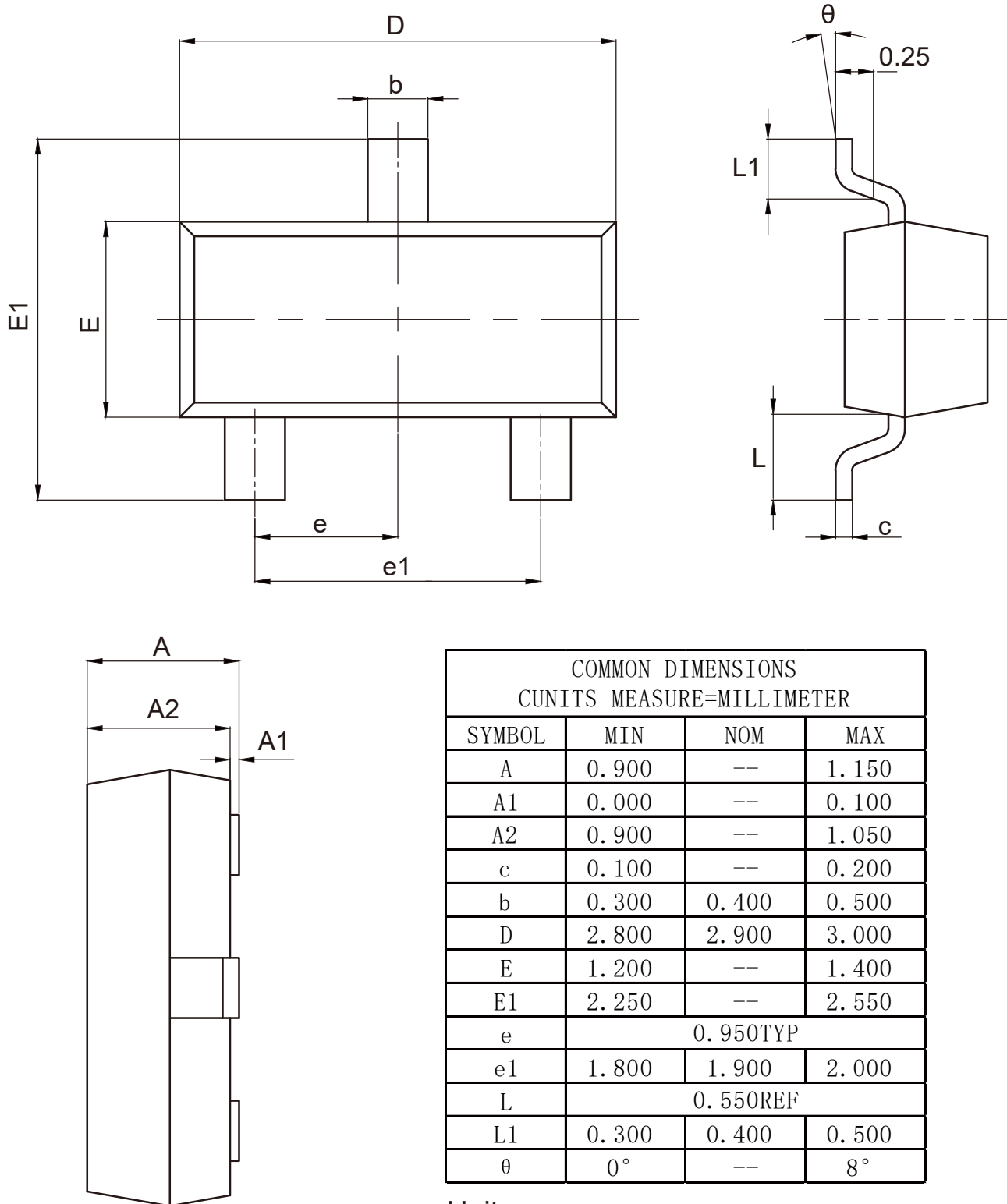


**Figure 12: Peak Current Capacity**

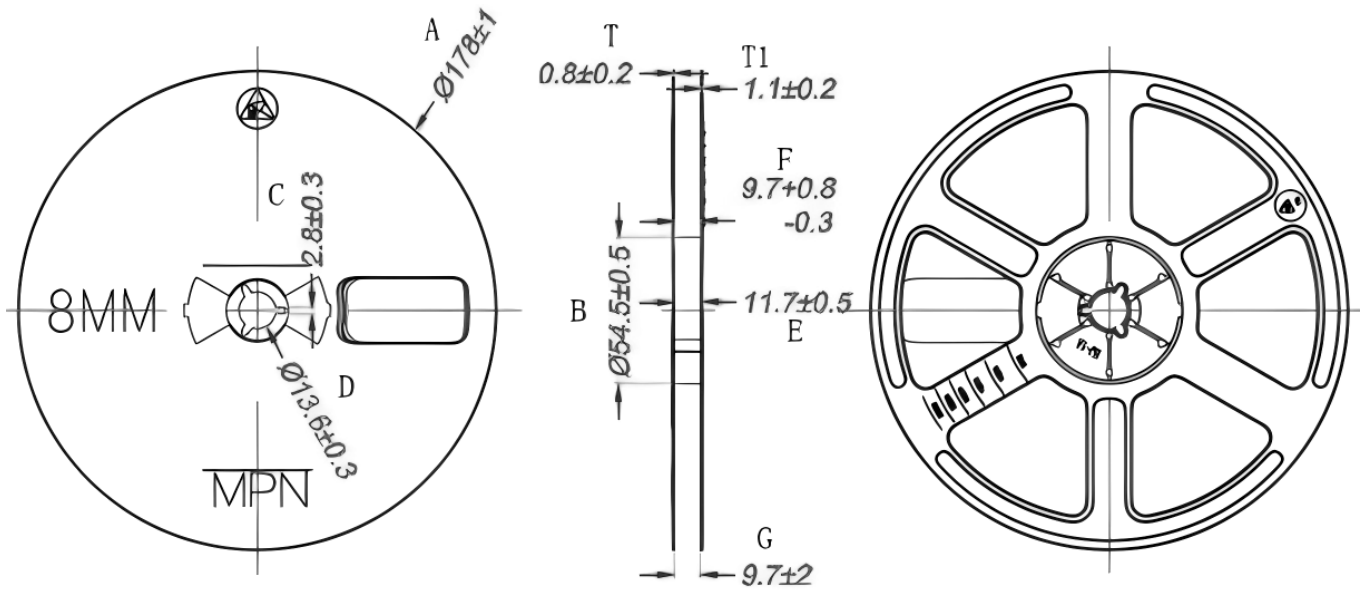
## SOT-23 Package Outline Data



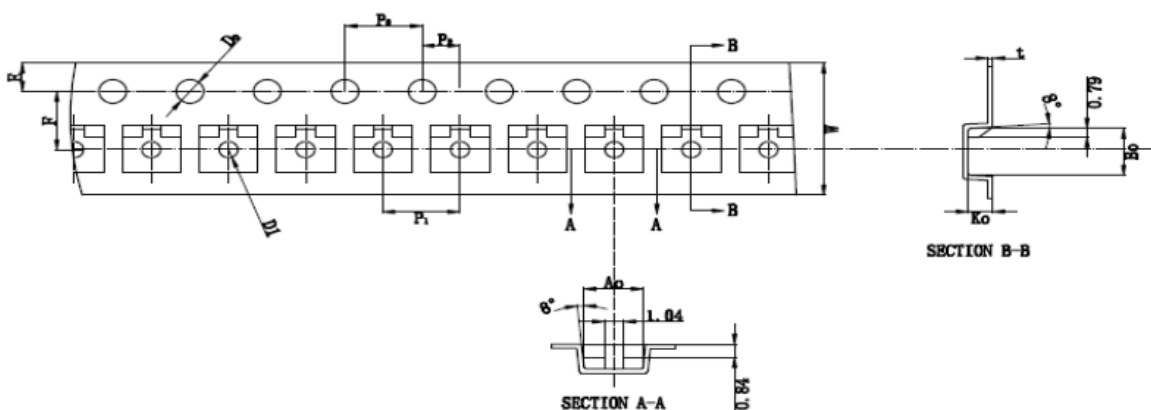
Unit:mm

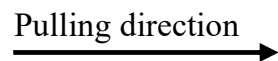
## Tape & Reel Information

Dimensions in mm

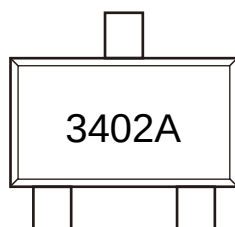


| PKG TYPE  | W         | P         | E         | F          | D         | D1        | Po        | Po10      | P2         | A0        | B0        | K0        | T          |
|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|------------|
| SOT-23    | 8.00      | 4.00      | 1.75      | 3.50       | 1.55      | 1.00      | 4.00      | 40.00     | 2.00       | 3.17      | 2.77      | 1.28      | 0.20       |
| Tolerance | +0.3/-0.1 | $\pm 0.1$ | $\pm 0.1$ | $\pm 0.05$ | $\pm 0.1$ | $\pm 0.1$ | $\pm 0.1$ | $\pm 0.2$ | $\pm 0.05$ | $\pm 0.1$ | $\pm 0.1$ | $\pm 0.1$ | $\pm 0.03$ |



Pulling direction 

## Marking Information:



## Previous Version

| Version | Date       | Subjects (major changes since last revision) |
|---------|------------|----------------------------------------------|
| 2.2     | 2026-05-09 | Release of final version                     |

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