

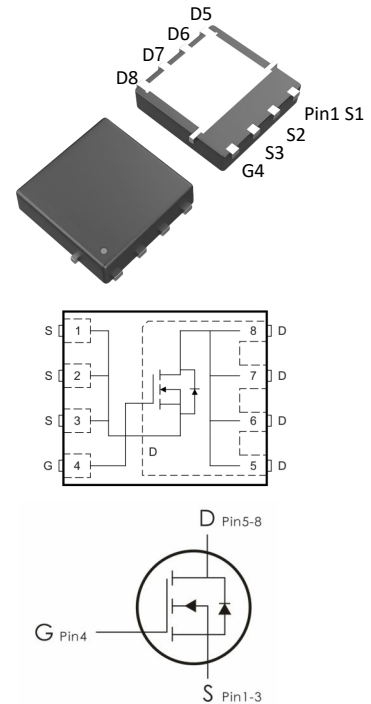
## Description:

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)  $V_{DS}=20V, I_D=50A, R_{DS(on)} < 6m\Omega @ V_{GS}=4.5V$  (Typ:  $4.5m\Omega$ )
- 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       |
|-----------|---------|----------|---------------|
| ZB006NG-B | B006N-B | DFN3*3-8 | 5000 pcs/Reel |

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

| Symbol         | Parameter                                                      | Ratings  | Units            |
|----------------|----------------------------------------------------------------|----------|------------------|
| $V_{DS}$       | Drain-Source Voltage                                           | 20       | V                |
| $V_{GS}$       | Gate-Source Voltage                                            | $\pm 12$ | V                |
| $I_D$          | Continuous Drain Current <sup>1</sup>                          | 50       | A                |
|                | Continuous Drain Current- $T_c=100^\circ\text{C}$ <sup>1</sup> | 35       |                  |
| $I_{DM}$       | Pulsed Drain Current <sup>2</sup>                              | 200      |                  |
| $P_D$          | Power Dissipation                                              | 28       | W                |
| $E_{AS}$       | Single pulse avalanche energy <sup>3</sup>                     | 56       | mJ               |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range               | -55-+150 | $^\circ\text{C}$ |

## Thermal Characteristics:

| Symbol          | Parameter                            | Max | Units                     |
|-----------------|--------------------------------------|-----|---------------------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 4.5 | $^\circ\text{C}/\text{W}$ |

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

| Symbol                             | Parameter                               | Conditions                                                                               | Min | Typ  | Max   | Units |
|------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------|-----|------|-------|-------|
| Off Characteristics                |                                         |                                                                                          |     |      |       |       |
| BV <sub>DSS</sub>                  | Drain-Sourctce Breakdown Voltage        | V <sub>GS</sub> =0V, I <sub>D</sub> =250 μ A                                             | 20  | ---  | ---   | V     |
| I <sub>DSS</sub>                   | Zero Gate Voltage Drain Current         | V <sub>GS</sub> =0V, V <sub>DS</sub> =20V                                                | --- | ---  | 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 | 0.7  | 1     | V     |
| R <sub>DS(on)</sub>                | Drain-Source On Resistance <sup>4</sup> | V <sub>GS</sub> =4.5V, I <sub>D</sub> =25A                                               | --- | 4.5  | 6     | m Ω   |
|                                    |                                         | V <sub>GS</sub> =2.5V, I <sub>D</sub> =15A                                               | --- | 6    | 8     |       |
| Dynamic Characteristics            |                                         |                                                                                          |     |      |       |       |
| C <sub>iss</sub>                   | Input Capacitance                       | V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz                                        | --- | 1600 | ---   | pF    |
| C <sub>oss</sub>                   | Output Capacitance                      |                                                                                          | --- | 242  | --    |       |
| C <sub>rss</sub>                   | Reverse Transfer Capacitance            |                                                                                          | --- | 221  | ---   |       |
| Switching Characteristics          |                                         |                                                                                          |     |      |       |       |
| t <sub>d(on)</sub>                 | Turn-On Delay Time                      | V <sub>DS</sub> =10V, I <sub>D</sub> =20A,<br>R <sub>G</sub> =3 Ω ,V <sub>GS</sub> =4.5V | --- | 12   | ---   | ns    |
| t <sub>r</sub>                     | Rise Time                               |                                                                                          | --- | 34   | ---   | ns    |
| t <sub>d(off)</sub>                | Turn-Off Delay Time                     |                                                                                          | --- | 50   | ---   | ns    |
| t <sub>f</sub>                     | Fall Time                               |                                                                                          | --- | 99   | ---   | ns    |
| Q <sub>g</sub>                     | Total Gate Charge                       | V <sub>GS</sub> =4.5V, V <sub>DS</sub> =10V,<br>I <sub>D</sub> =20A                      | --- | 25   | ---   | nC    |
| Q <sub>gs</sub>                    | Gate-Source Charge                      |                                                                                          | --- | 5    | ---   | nC    |
| Q <sub>gd</sub>                    | Gate-Drain “Miller” Charge              |                                                                                          | --- | 8    | ---   | nC    |
| Drain-Source Diode Characteristics |                                         |                                                                                          |     |      |       |       |
| V <sub>SD</sub>                    | Diode Forward Voltage                   | V <sub>GS</sub> =0V, I <sub>SD</sub> =25A                                                | --- | ---  | 1.2   | V     |
| I <sub>S</sub>                     | Continuous Drain Current                | V <sub>D</sub> =V <sub>G</sub> =0V                                                       | --- | ---  | 41.6  | A     |
| I <sub>SM</sub>                    | Pulsed Drain Current                    |                                                                                          | --- | ---  | 83.3  | A     |
| T <sub>rr</sub>                    | Reverse Recovery Time                   | I <sub>F</sub> =20A, T <sub>J</sub> =25 °C                                               | --- | 11   | ---   | ns    |
| Q <sub>rr</sub>                    | Reverse Recovery Charge                 | dl/dt=100A/us                                                                            | --- | 2.5  | ---   | nC    |

## 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. EAS condition :  $T_J=25^{\circ}C, V_{DD}=10V, V_G=4.5V, L=0.5mH$
4. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 0.5\%$

## Typical Characteristics: ( $T_c=25^{\circ}C$ unless otherwise noted)

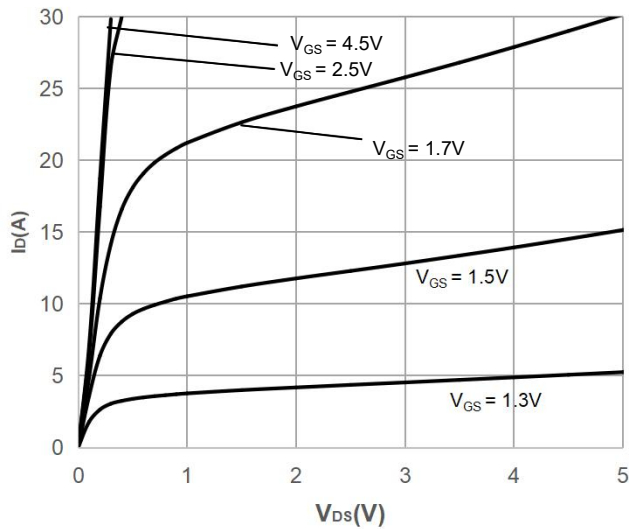


Figure 1: Output Characteristics

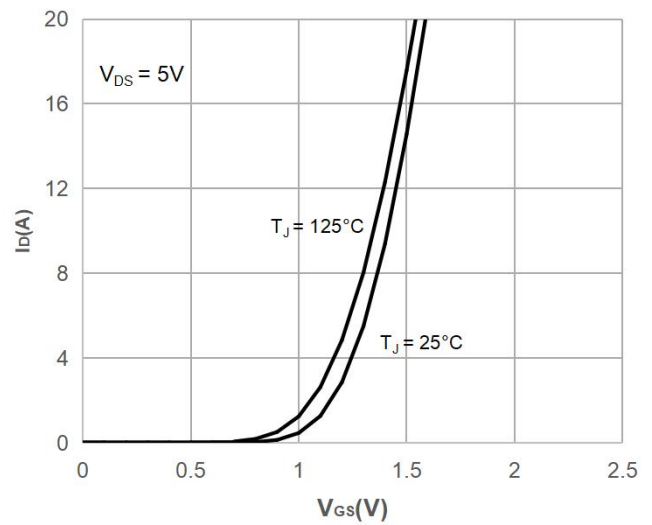


Figure 2: Typical Transfer Characteristics

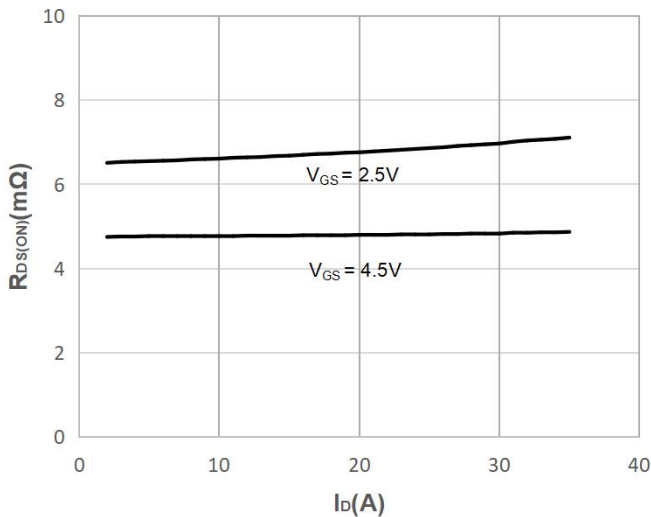


Figure 3: On-resistance vs. Drain Current

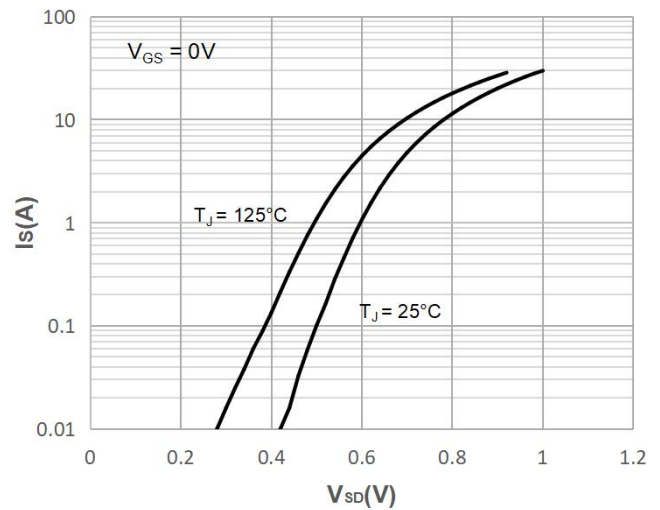


Figure 4: Body Diode Characteristics

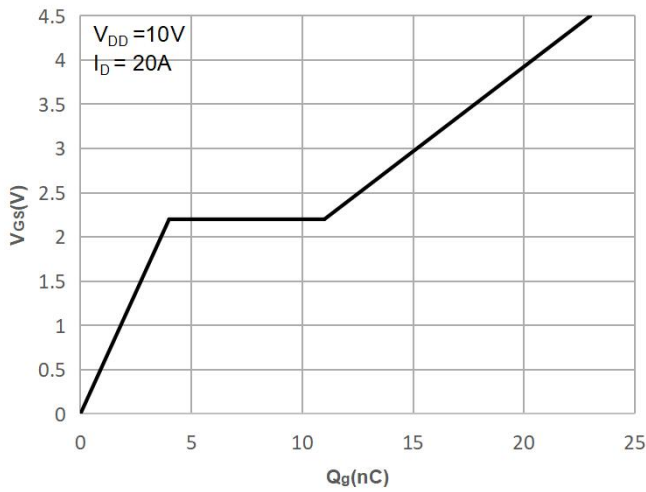


Figure 5: Gate Charge Characteristics

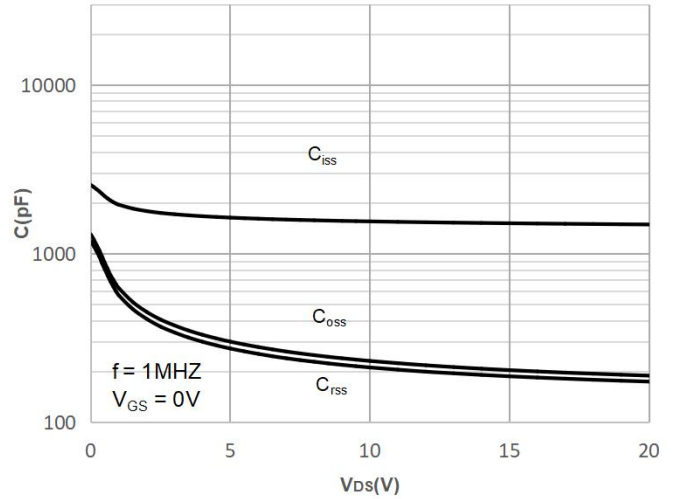


Figure 6: Capacitance Characteristics

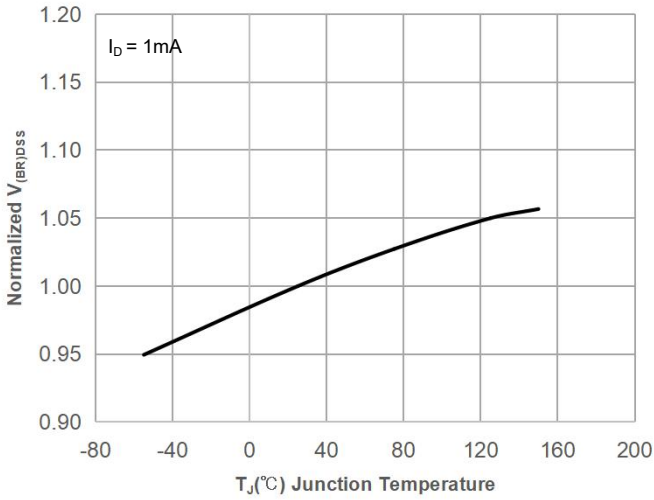


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

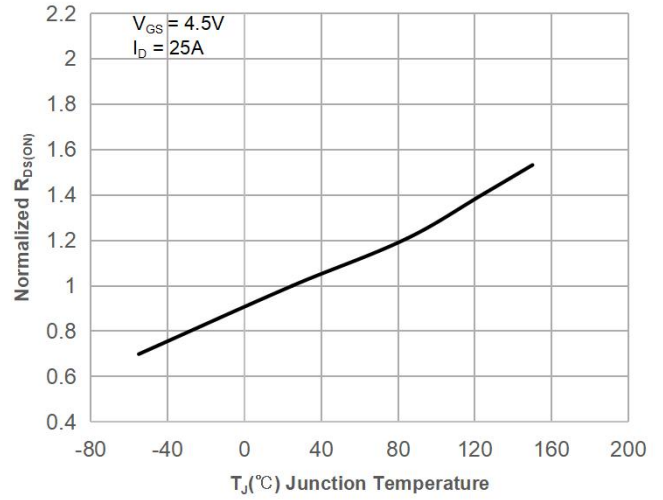


Figure 8: Normalized on Resistance vs. Junction Temperature

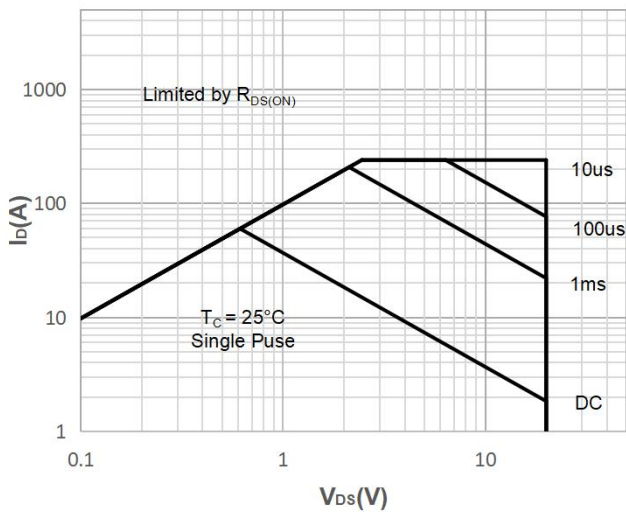


Figure 9: Maximum Safe Operating Area

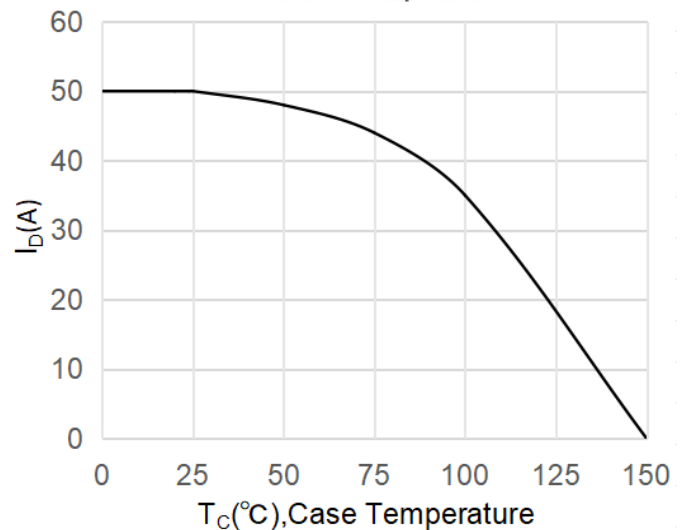
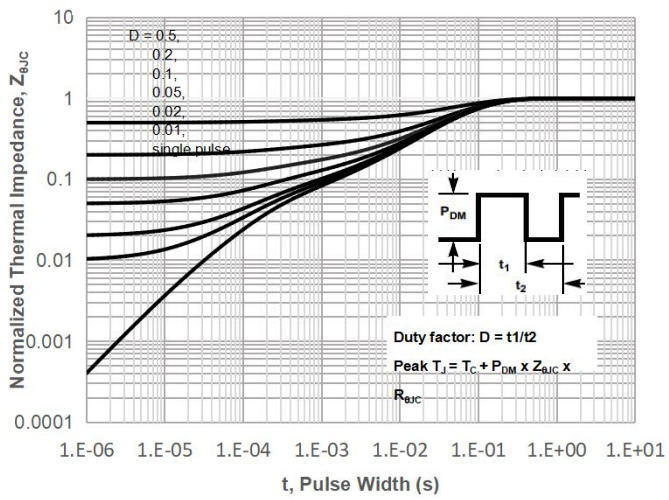
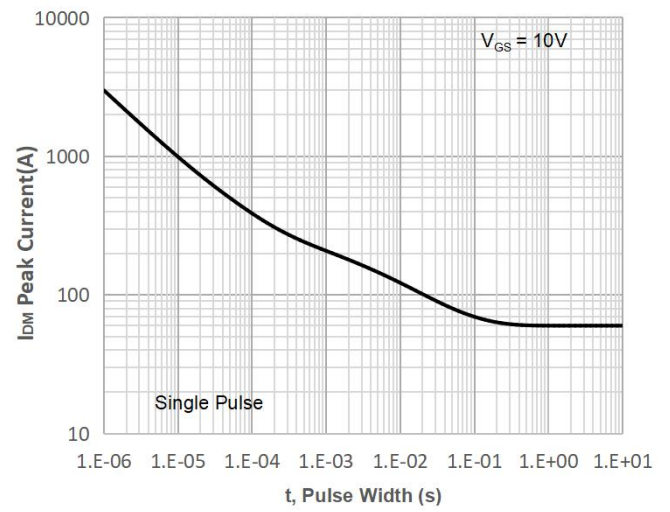


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

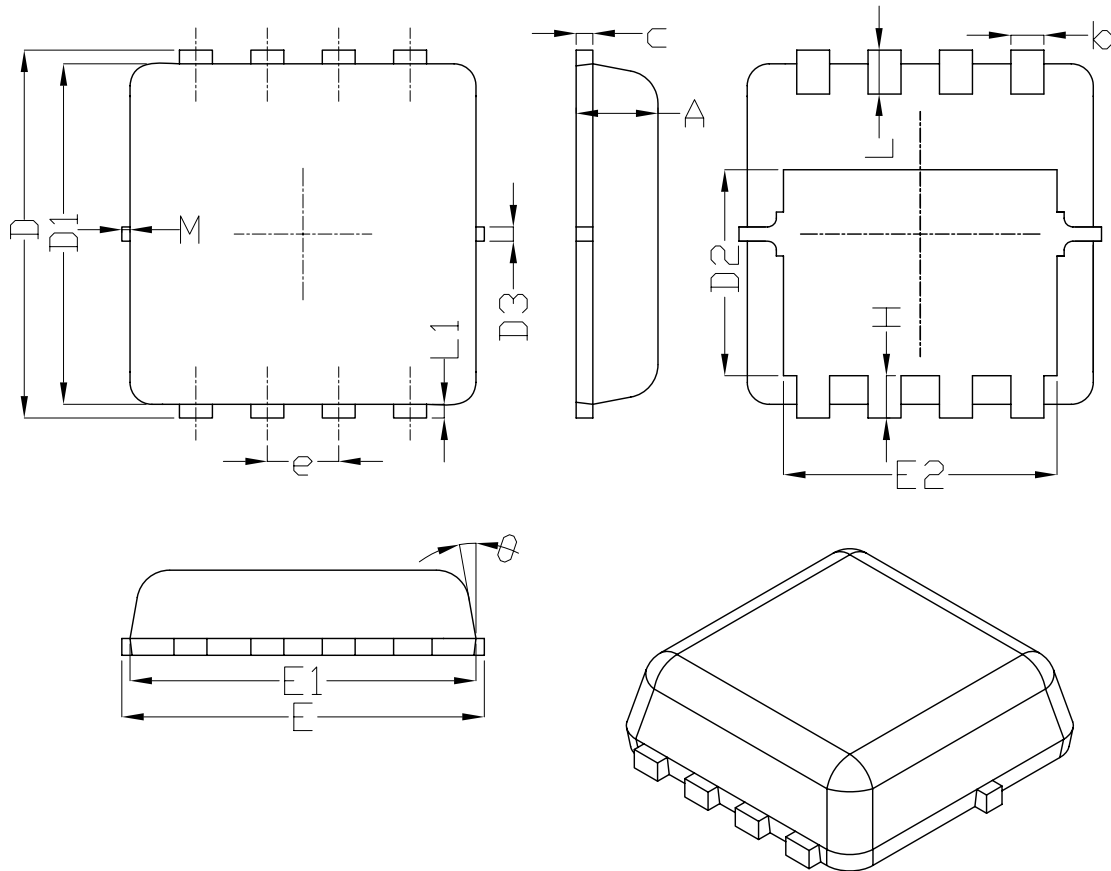


**Figure 11: Normalized Maximum Transient Thermal Impedance**

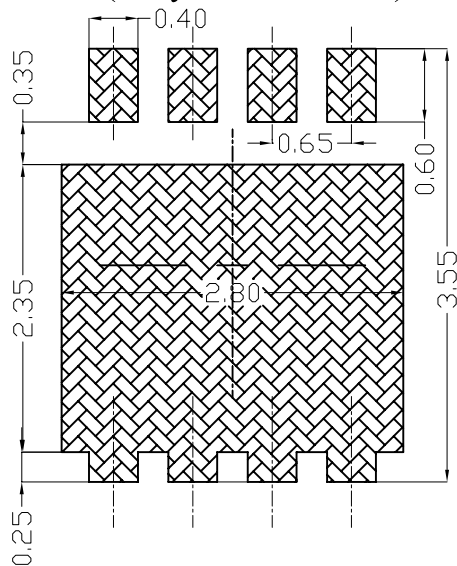


**Figure 12: Peak Current Capacity**

## DFN3X3-8Package Outline Data



**Land Pattern  
(Only for Reference)**



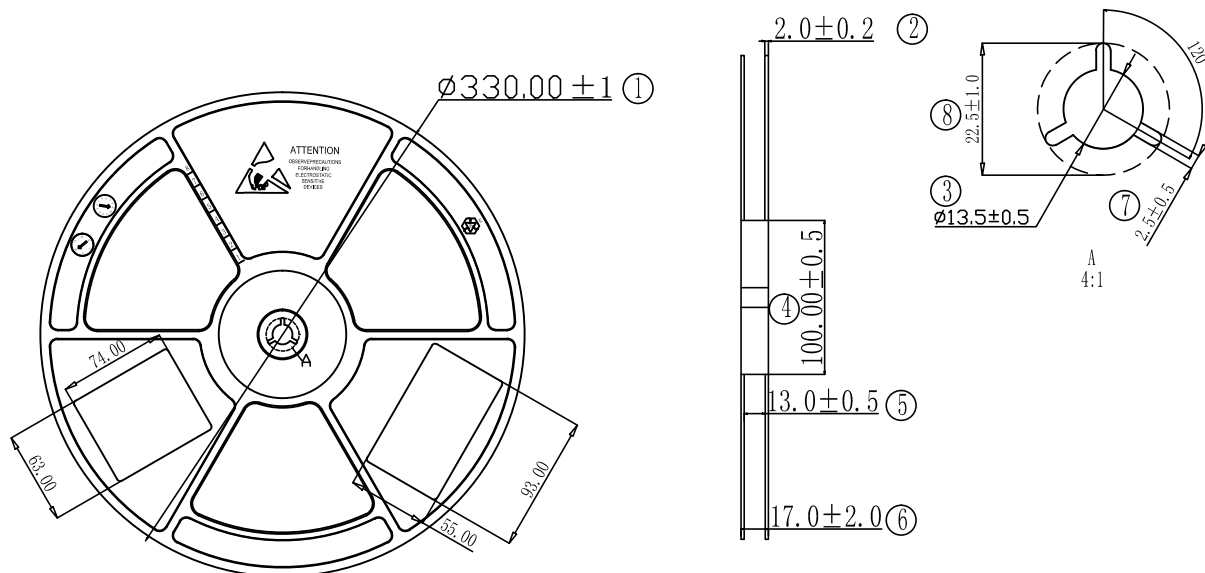
UNIT: mm

| SYMBOL | DIMENSIONAL REQMTS |      |      |
|--------|--------------------|------|------|
|        | MIN                | NOM  | MAX  |
| A      | 0.70               | 0.75 | 0.80 |
| b      | 0.25               | 0.30 | 0.35 |
| c      | 0.10               | 0.15 | 0.25 |
| D      | 3.25               | 3.35 | 3.45 |
| D1     | 3.00               | 3.10 | 3.20 |
| D2     | 1.78               | 1.88 | 1.98 |
| D3     | ---                | 0.13 | ---  |
| E      | 3.20               | 3.30 | 3.40 |
| E1     | 3.00               | 3.15 | 3.20 |
| E2     | 2.39               | 2.49 | 2.59 |
| e      | 0.65BSC            |      |      |
| H      | 0.30               | 0.39 | 0.50 |
| L      | 0.30               | 0.40 | 0.50 |
| L1     | ---                | 0.13 | ---  |
| θ      | ---                | 10°  | 12°  |
| M      | *                  | *    | 0.15 |

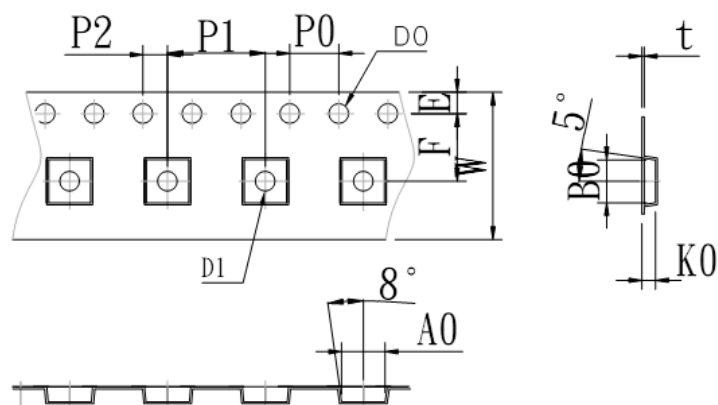
\* Not specified

## Tape & Reel Information

Dimensions in mm



|        |            |           |           |           |           |           |           |           |
|--------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Symbol | A0         | B0        | K0        | D0        | D1        | P0        | P1        | 10*P0     |
| Spec   | 3.55±0.10  | 3.45±0.10 | 1.13±0.10 | 1.55±0.10 | 1.55±0.10 | 4.00±0.10 | 8.00±0.10 | 40.0±0.10 |
| Symbol | W          | E         | F         | P2        | t         |           |           |           |
| Spec   | 12.00±0.10 | 1.75±0.10 | 5.50±0.10 | 2.00±0.10 | 0.20±0.05 |           |           |           |



Pulling direction →

## Marking Information:

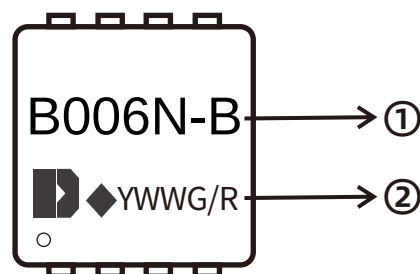
①. Part NO.

②. Date Code(YWWG / R)

Y : Year Code , last digit of the year

WW : Week Code(01-53)

G/R : G(Green) /R(Lead Free)



## Previous Version

| Version | Date       | Subjects (major changes since last revision) |
|---------|------------|----------------------------------------------|
| 1.0     | 2026-02-10 | Release of final version                     |

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