

## 1000V 2A 6.3Ω N-ch Power MOSFET

### Description

WMOS™ D1 is Wayon's 1<sup>st</sup> generation VDMOS family that is dramatic reduction in on-resistance and ultra-low gate charge for applications requiring high power density and high efficiency. And it is very robust and RoHS compliant.

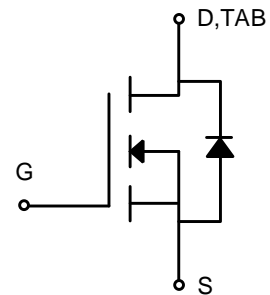
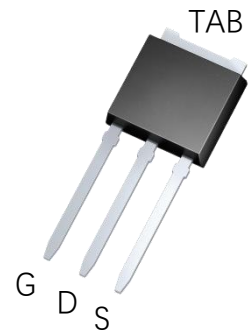
### Features

- $V_{DS}=1050V@T_{jmax}$
- $Typ.R_{DS(on)}=6.3\Omega@V_{GS}=10V$
- 100% avalanche tested
- Pb-free, Halogen free

### Applications

- SMPS
- Charger
- DC-DC


**TO-252**

**TO-251-L9.4**


### Absolute Maximum Ratings ( $T_C=25^\circ C$ )

| Parameter                        | Symbol       | WMO2N100D1 | WMAA2N100D1 | Unit |
|----------------------------------|--------------|------------|-------------|------|
| Drain-source voltage             | $V_{DS}$     | 1000       |             | V    |
| Gate-source voltage              | $V_{GS}$     | $\pm 30$   |             | V    |
| Continuous drain current         | $I_D$        | 2          |             | A    |
| Pulsed drain current             | $I_{DM}$     | 8          |             | A    |
| Avalanche energy, single pulse   | $E_{AS}$     | 80         |             | mJ   |
| Power dissipation                | $P_D$        | 60         |             | W    |
| Derate above 25°C                |              | 0.48       |             | W/°C |
| Operating junction temperature   | $T_j$        | -55~150    |             | °C   |
| Storage temperature              | $T_{stg}$    | -55~150    |             | °C   |
| Continuous diode forward current | $I_S$        | 2          |             | A    |
| Diode pulse current              | $I_{Spulse}$ | 8          |             | A    |

### Thermal Characteristic

|  |                 |      |      |
|--|-----------------|------|------|
| Thermal resistance,junction-to-case    | $R_{\theta JC}$ | 2.08 | °C/W |
| Thermal resistance,junction-to-ambient | $R_{\theta JA}$ | 75   | °C/W |

## Electrical Characteristics of MOSFET

|                                     |              |                               |                   | Min. | Typ. | Max. |          |
|-------------------------------------|--------------|-------------------------------|-------------------|------|------|------|----------|
| Drain-source break down voltage     | $BV_{DSS}$   | $I_D=250\mu A, V_{GS}=0V$     | $T_C=25^\circ C$  | 1000 | -    | -    | V        |
| Gate threshold voltage              | $V_{GS(th)}$ | $I_D=250\mu A, V_{DS}=V_{GS}$ | $T_J=25^\circ C$  | 3    | 3.7  | 4.5  | V        |
| Drain-source leakage current        | $I_{DSS}$    | $V_{DS}=1000V, V_{GS}=0V$     | $T_J=25^\circ C$  | -    | -    | 1    | $\mu A$  |
|                                     |              | $V_{DS}=800V, V_{GS}=0V$      | $T_J=125^\circ C$ | -    | -    | 250  | $\mu A$  |
| Gate-source leakage current,forward | $I_{GSSF}$   | $V_{DS}=0V, V_{GS}=30V$       | $T_J=25^\circ C$  | -    | -    | 100  | nA       |
| Gate-source leakage current,reverse | $I_{GSSR}$   | $V_{DS}=0V, V_{GS}=-30V$      | $T_J=25^\circ C$  | -    | -    | -100 | nA       |
| Drain-source on-state resistance    | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=1A$          | $T_J=25^\circ C$  | -    | 6.3  | 8.5  | $\Omega$ |
| Transconductance                    | $G_{fs}$     | $V_{DS}=20V$                  | $T_J=25^\circ C$  | -    | 2.5  | -    | S        |

## Dynamic Characteristics of MOSFET ( $T_C=25^\circ C$ )

|                              |           |                                 |  | Min. | Typ. | Max. |    |
|------------------------------|-----------|---------------------------------|--|------|------|------|----|
| Input capacitance            | $C_{iss}$ | $f=1MHz, V_{DS}=25V, V_{GS}=0V$ |  | -    | 700  | -    | pF |
| Output capacitance           | $C_{oss}$ |                                 |  | -    | 70   | -    | pF |
| Reverse transfer capacitance | $C_{rss}$ |                                 |  | -    | 7    | -    | pF |
| Gate to source charge        | $Q_{gs}$  | $V_{DD}=500V$                   |  | -    | 4.3  | -    | nC |
| Gate to drain charge         | $Q_{gd}$  | $I_D=2A$                        |  | -    | 7.6  | -    | nC |
| Total gate charge            | $Q_g$     | $V_{GS}=0$ to 10V               |  | -    | 18   | -    | nC |

## Switching Characteristics of MOSFET ( $T_C=25^\circ C$ )

|                     |             |   |  | Min. | Typ. | Max. |    |
|---------------------|-------------|---|--|------|------|------|----|
| Turn-on delay time  | $t_{d on}$  | $V_{DS}=500V, I_D=2A,$<br>$R_G=12\Omega, V_{GS}=0$ to 10V |  | -    | 12   | -    | ns |
| Rise time           | $t_r$       |   |  | -    | 20   | -    | ns |
| Turn-off delay time | $t_{d off}$ |   |  | -    | 61   | -    | ns |
| Fall time           | $t_f$       |   |  | -    | 41   | -    | ns |

## Characteristics of Body Diode ( $T_C=25^\circ C$ )

|                          |          |  |  | Min. | Typ. | Max. |         |
|--------------------------|----------|--|--|------|------|------|---------|
| Forward voltage          | $V_{SD}$ | $I_{SD}=2A, V_{GS}=0V$                                   |  | -    | -    | 1.5  | V       |
| Reverse recovery time    | $t_{rr}$ | $V_{DS}=500V, I_S=2A, V_{GS}=10V$<br>$-di/dt=100A/\mu s$ |  | -    | 400  | -    | ns      |
| Reverse recovery current | $I_{rr}$ |  |  | -    | 8    | -    | A       |
| Recovery charge          | $Q_{rr}$ |  |  | -    | 1.6  | -    | $\mu C$ |

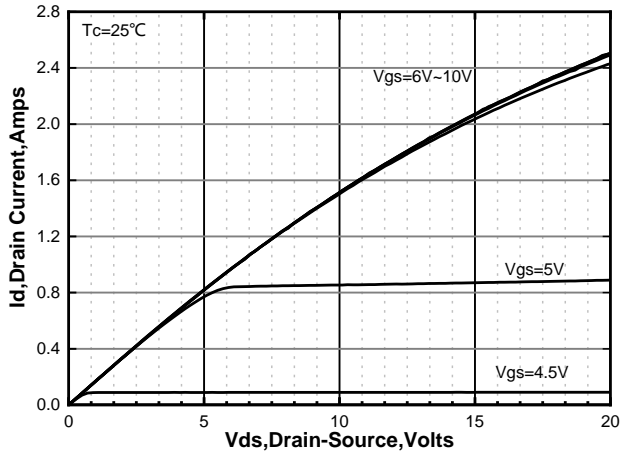


Figure 1. On-Region Characteristics

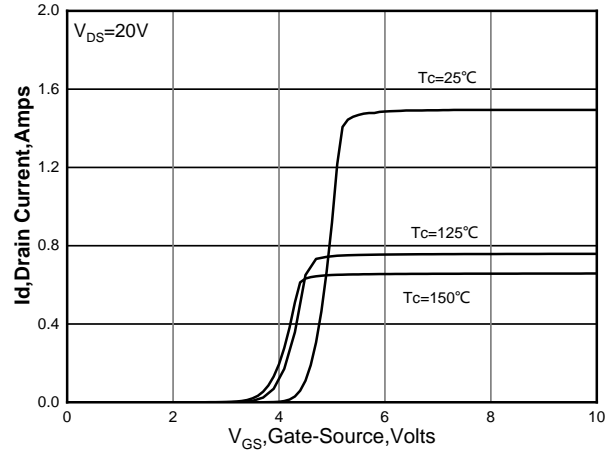


Figure 2. Transfer Characteristics

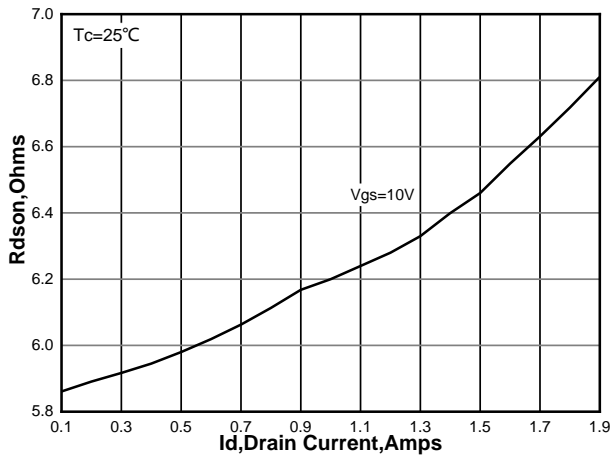


Figure 3. Static Drain-Source On Resistance

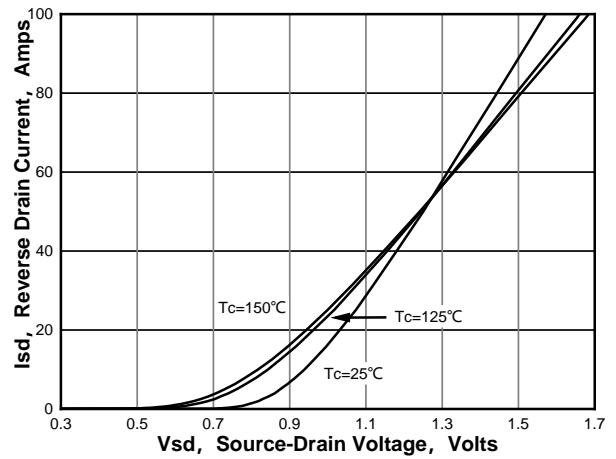


Figure 4. Typical Body Diode Transfer Characteristics

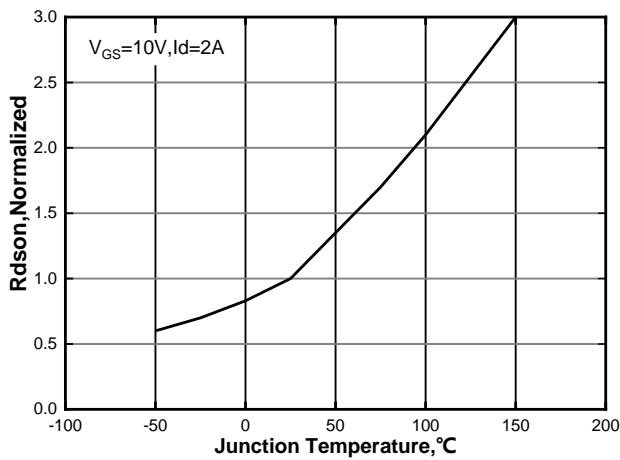


Figure 5. Normalized  $R_{DS(on)}$  vs. Temperature

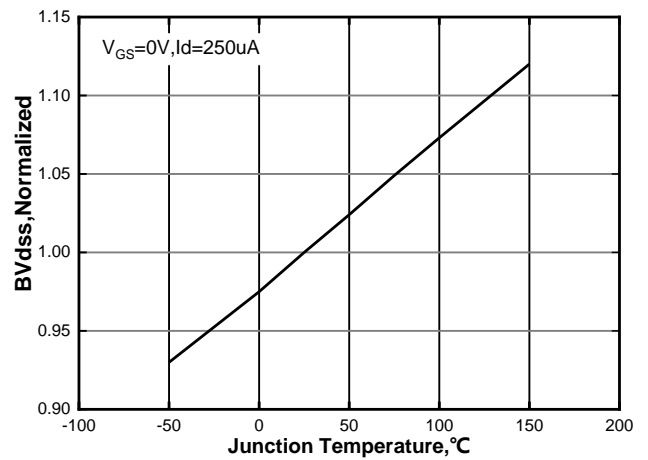


Figure 6. Normalized  $BV_{DSS}$  vs. Temperature

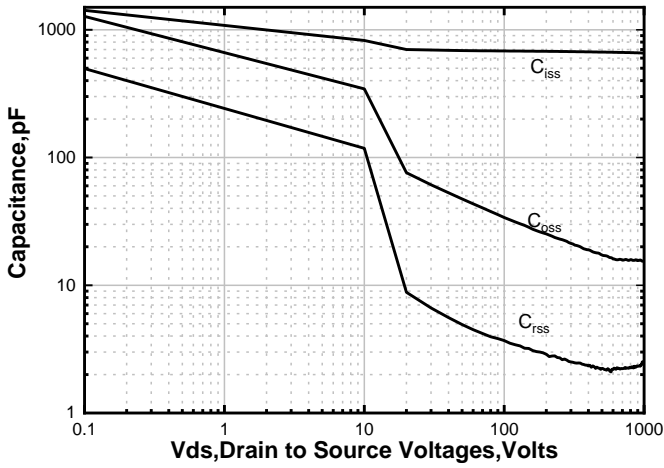


Figure 7. Capacitance Characteristics

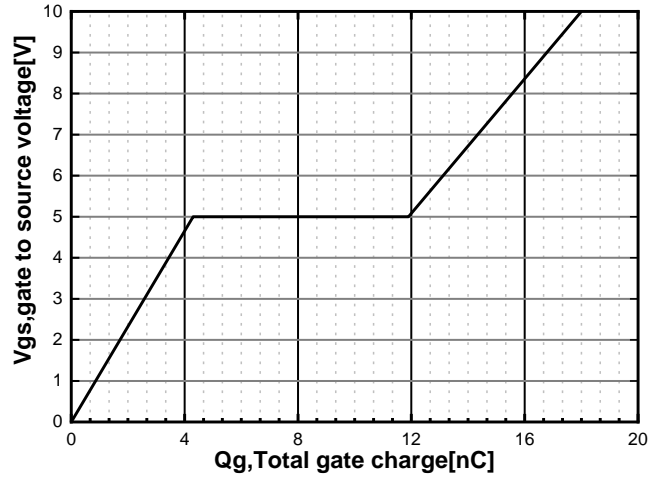


Figure 8. Gate Charge Characteristics

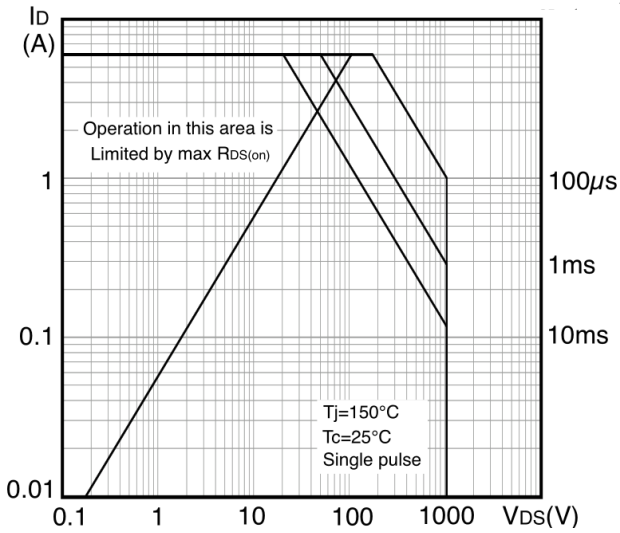


Figure 9. Maximum Safe Operating Area (TO-252, TO-251)

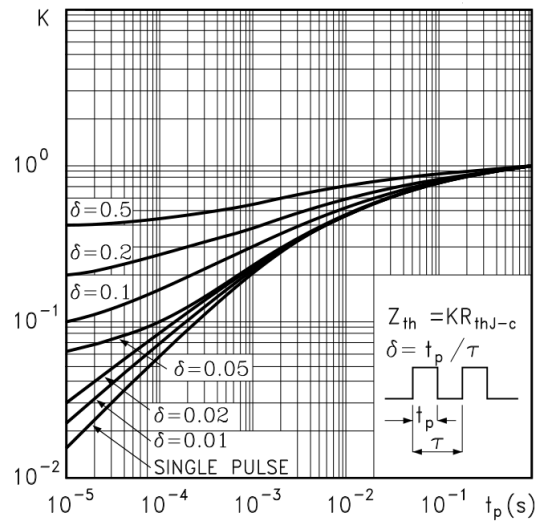
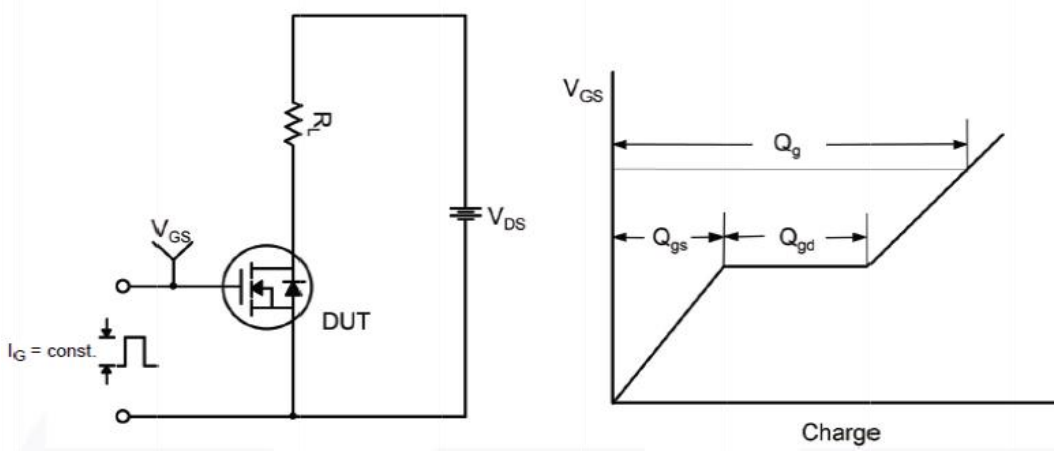
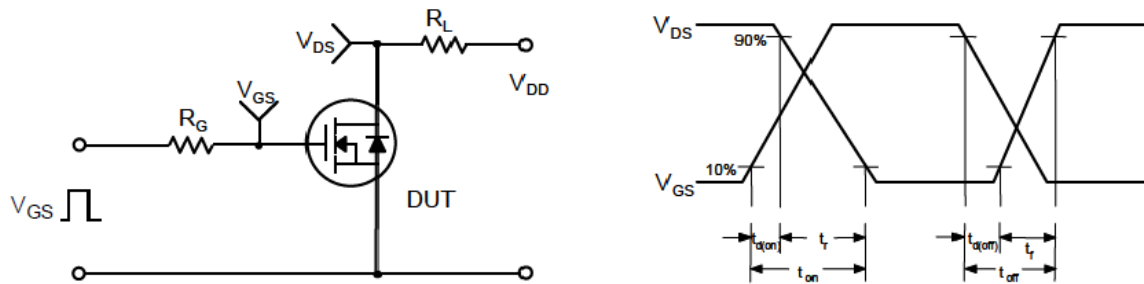


Figure 10. Transient Thermal Response Curve (TO-252, TO-251)

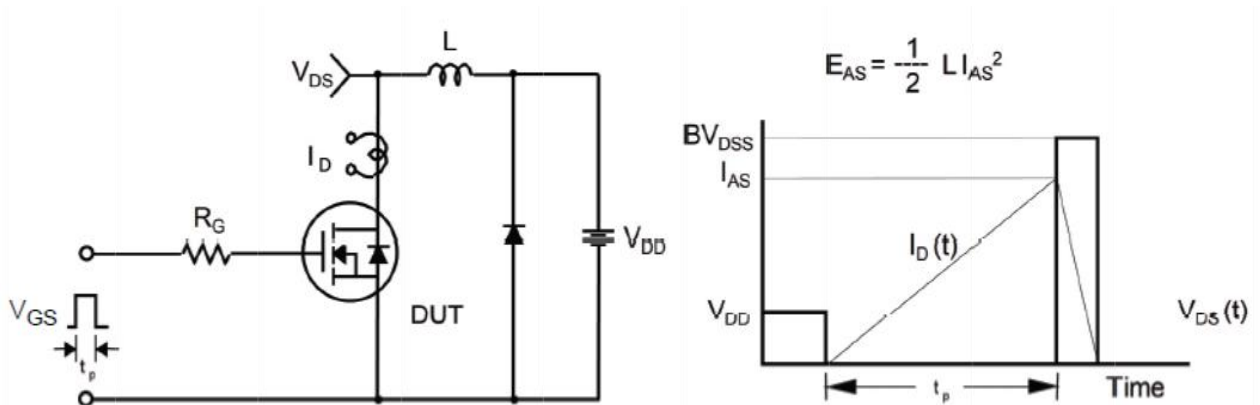
Gate Charge Test Circuit & Waveform



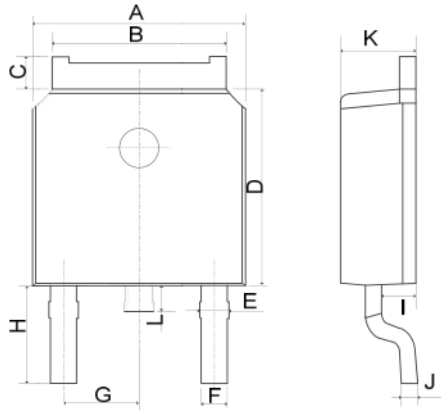
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



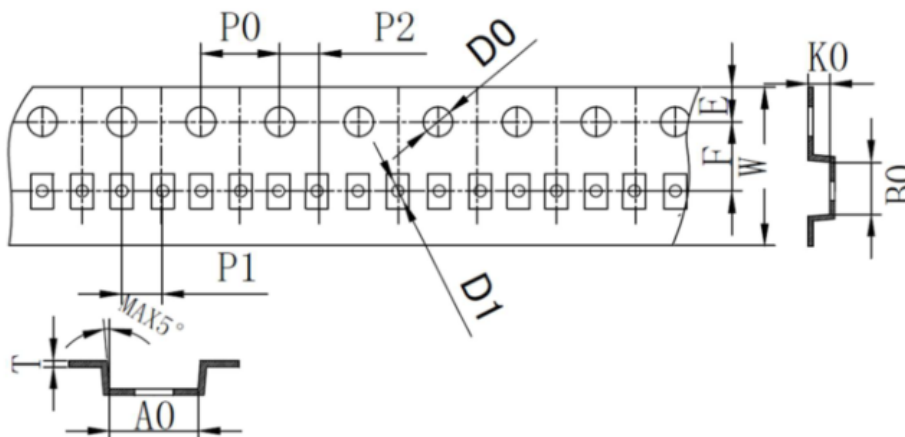
## Mechanical Dimensions for TO-252



## COMMON DIMENSIONS

| SYMBOL | MM      |      |
|--------|---------|------|
|        | MIN     | MAX  |
| A      | 6.40    | 6.80 |
| B      | 5.13    | 5.50 |
| C      | 0.88    | 1.28 |
| D      | 5.90    | 6.22 |
| E      | 0.68    | 1.10 |
| F      | 0.68    | 0.91 |
| G      | 2.29REF |      |
| H      | 2.90REF |      |
| I      | 0.85    | 1.17 |
| J      | 0.51REF |      |
| K      | 2.10    | 2.50 |
| L      | 0.40    | 1.00 |

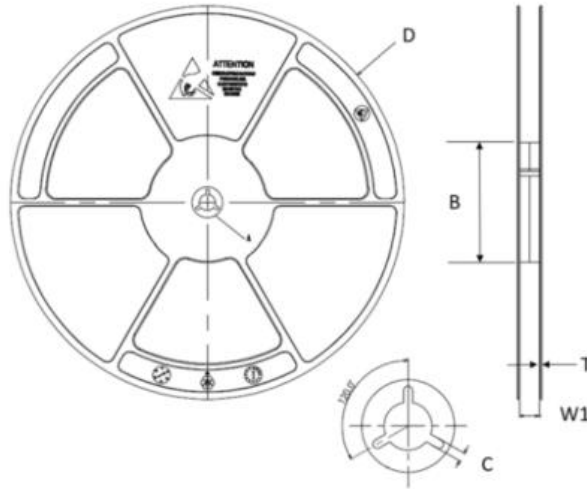
## Packaging mechanical data(Tape for TO-252)



单位: mm

|           |            |             |           |           |           |
|-----------|------------|-------------|-----------|-----------|-----------|
| A0        | B0         | K0          | D0        | D1        | P0        |
| 6.80~7.00 | 10.4~10.85 | 2.55~2.95   | 1.45~1.65 | 1.40~1.60 | 3.90~4.10 |
| P1        | P2         | W           | T         | E         | F         |
| 7.90~8.10 | 1.90~2.10  | 15.70~16.30 | 0.25~0.35 | 1.65~1.85 | 7.40~7.60 |

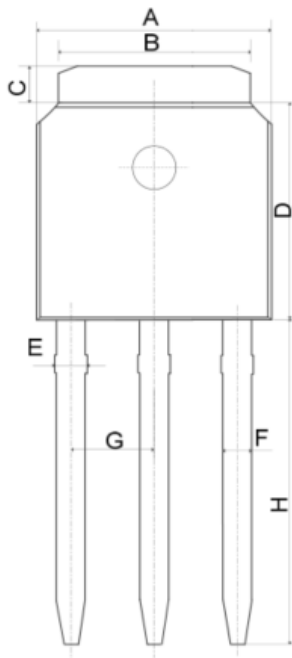
## Packaging mechanical data(Reel for TO-252)



单位: mm

| D<br>(卷盘直径) | W1<br>(卷盘宽度) | T<br>(厚度) | B<br>(内圈直径) | C<br>卡槽宽度 |
|-------------|--------------|-----------|-------------|-----------|
| 328~332     | 16.4~18.4    | 1.5~3.1   | 98~102      | 1.8~3.6   |

## Mechanical Dimensions for TO-251



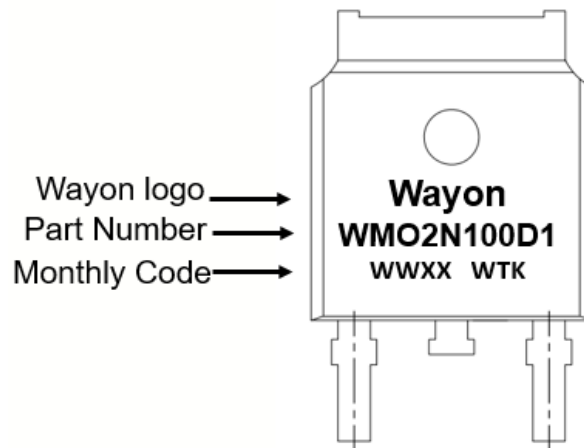
## COMMON DIMENSIONS

| SYMBOL | MM      |      |
|--------|---------|------|
|        | MIN     | MAX  |
| A      | 6.40    | 6.80 |
| B      | 5.13    | 5.46 |
| C      | 0.88    | 1.28 |
| D      | 5.90    | 6.22 |
| E      | 0.68    | 1.10 |
| F      | 0.68    | 0.91 |
| G      | 2.29REF |      |
| H      | 9.00    | 9.65 |
| I      | 0.90    | 1.17 |
| J      | 0.40    | 0.61 |
| K      | 2.10    | 2.50 |

## Ordering Information

| Part        | Package     | Marking     | Packing method |
|-------------|-------------|-------------|----------------|
| WMO2N100D1  | TO-252      | WMO2N100D1  | Tape and reel  |
| WMAA2N100D1 | TO-251-L9.4 | WMAA2N100D1 | Tube           |

## Marking Information



## Contact Information

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