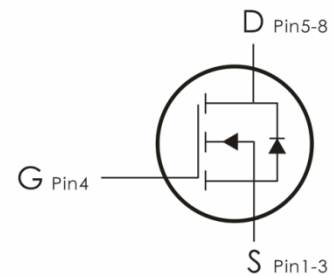
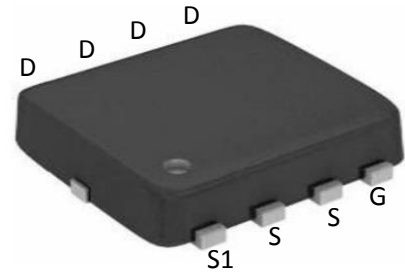


## Description:

This N-Channel MOSFET uses advanced trench technology to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

## Features:

- 1)  $V_{DS}=40V, I_D=70A, R_{DS(ON)}=5.5m\Omega @V_{GS}=10V$
- 2) Improved  $dv/dt$  capability
- 3) Fast switching
- 4) 100% EAS Guaranteed
- 5) Green Device Available.



## Package Marking and Ordering Information:

| Part NO. | Marking | Package  | Packing       |
|----------|---------|----------|---------------|
| DOZ70N04 | 70N04   | DFN3*3-8 | 5000 pcs/Reel |

## Absolute Maximum Ratings: ( $T_C=25^\circ C$ unless otherwise noted)

| Symbol         | Parameter                                                | Ratings     | Units      |
|----------------|----------------------------------------------------------|-------------|------------|
| $V_{DS}$       | Drain-Source Voltage                                     | 40          | V          |
| $V_{GS}$       | Gate-Source Voltage                                      | $\pm 20$    | V          |
| $I_D$          | Continuous Drain Current-Continuous ( $T_C=25^\circ C$ ) | 70          | A          |
|                | Continuous Drain Current- $T_C=100^\circ C$              | 44.3        |            |
| $I_{DM}$       | Drain Current – Pulsed <sup>1</sup>                      | 280         | A          |
| $P_D$          | Power Dissipation ( $T_C=25^\circ C$ )                   | 52          | W          |
| $E_{AS}$       | Single pulse avalanche energy <sup>2</sup>               | 100         | mJ         |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range         | -55 to +150 | $^\circ C$ |

## Thermal Characteristics:

| Symbol          | Parameter                               | Max | Units        |
|-----------------|-----------------------------------------|-----|--------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case    | 2.4 | $^\circ C/W$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 62  |              |

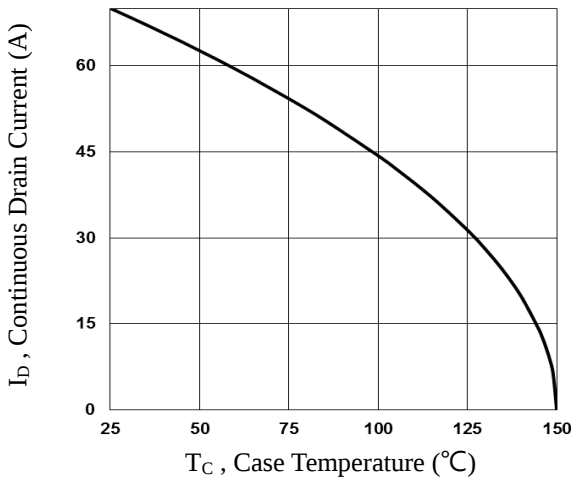
**Electrical Characteristics:** ( $T_c=25^{\circ}\text{C}$  unless otherwise noted)

| 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                                             | 40  | ---  | ---   | V     |
| I <sub>DSS</sub>                   | Drain-Source Leakage Current                    | V <sub>GS</sub> =0V, V <sub>DS</sub> =40V, T <sub>J</sub> =25℃                           | --- | ---  | 1     | μ A   |
|                                    |                                                 | V <sub>GS</sub> =0V, V <sub>DS</sub> =32V, T <sub>J</sub> =125℃                          | --- | ---  | 10    | μ A   |
| I <sub>GSS</sub>                   | Gate-Source Leakage Current                     | V <sub>GS</sub> =± 20V, 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                               | 1   | 1.6  | 2.5   | V     |
| R <sub>DS(ON)</sub>                | Drain-Source On Resistance <sup>3</sup>         | V <sub>GS</sub> =10V, I <sub>D</sub> =20A                                                | --- | 4.2  | 5.5   | m Ω   |
|                                    |                                                 | V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A                                               | --- | 5.3  | 7     |       |
| G <sub>FS</sub>                    | Forward Transconductance                        | V <sub>DS</sub> =10V, I <sub>D</sub> =10A                                                | --- | 16   | ---   | S     |
| Dynamic Characteristics            |                                                 |                                                                                          |     |      |       |       |
| C <sub>iss</sub>                   | Input Capacitance                               | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz                                        | --- | 2410 | 3600  | pF    |
| C <sub>oss</sub>                   | Output Capacitance                              |                                                                                          | --- | 233  | 400   |       |
| C <sub>rss</sub>                   | Reverse Transfer Capacitance                    |                                                                                          | --- | 152  | 230   |       |
| Switching Characteristics          |                                                 |                                                                                          |     |      |       |       |
| t <sub>d(on)</sub>                 | Turn-On Delay Time <sup>3,4</sup>               | V <sub>DD</sub> =20V , V <sub>GS</sub> =10V ,<br>R <sub>G</sub> =3.3, I <sub>D</sub> =1A | --- | 14.2 | 28    | ns    |
| t <sub>r</sub>                     | Rise Time <sup>3,4</sup>                        |                                                                                          | --- | 18.3 | 36    | ns    |
| t <sub>d(off)</sub>                | Turn-Off Delay Time <sup>3,4</sup>              |                                                                                          | --- | 38.8 | 76    | ns    |
| t <sub>f</sub>                     | Fall Time <sup>3,4</sup>                        |                                                                                          | --- | 13.9 | 28    | ns    |
| Q <sub>g</sub>                     | Total Gate Charge <sup>3,4</sup>                | V <sub>DS</sub> =32V , V <sub>GS</sub> =4.5V ,<br>I <sub>D</sub> =10A                    | --- | 25   | 50    | nC    |
| Q <sub>gs</sub>                    | Gate-Source Charge <sup>3,4</sup>               |                                                                                          | --- | 6.4  | 13    | nC    |
| Q <sub>gd</sub>                    | Gate-Drain “Miller” Charge <sup>3,4</sup>       |                                                                                          | --- | 12.1 | 24    | nC    |
| Drain-Source Diode Characteristics |                                                 |                                                                                          |     |      |       |       |
| V <sub>SD</sub>                    | Source-Drain Diode Forward Voltage <sup>2</sup> | V <sub>GS</sub> =0V , I <sub>S</sub> =1A , T <sub>J</sub> =25℃                           | --- | ---  | 1     | V     |
| IS                                 | Reverse Recovery Time                           | V <sub>G</sub> =V <sub>D</sub> =0V                                                       | --- | ---  | 70    | A     |
| ISM                                | Reverse Recovery Charge                         | Force Current                                                                            | --- | ---  | 35    | A     |

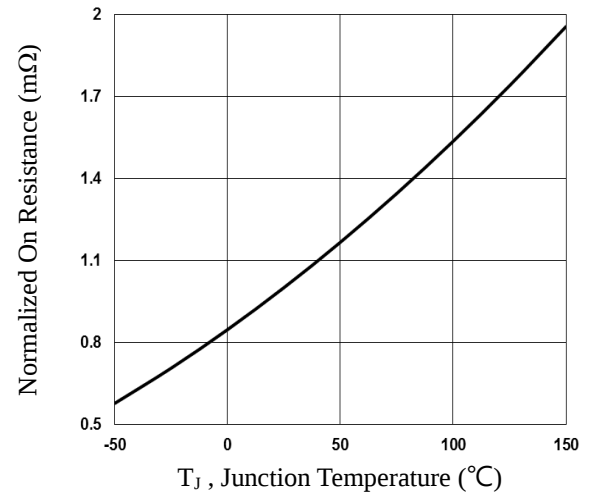
## Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

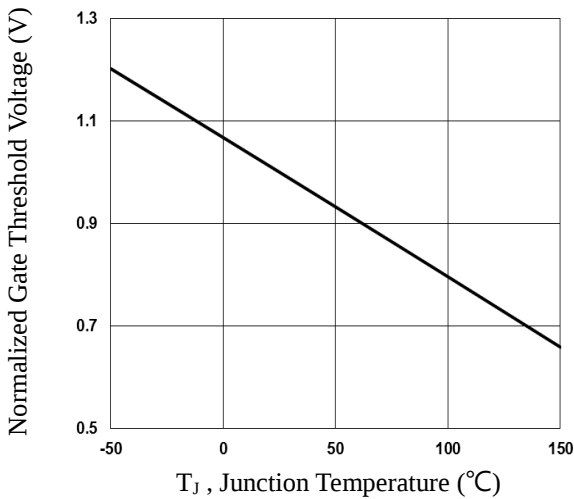
## Typical Characteristics: ( $T_C=25^\circ\text{C}$ unless otherwise noted)



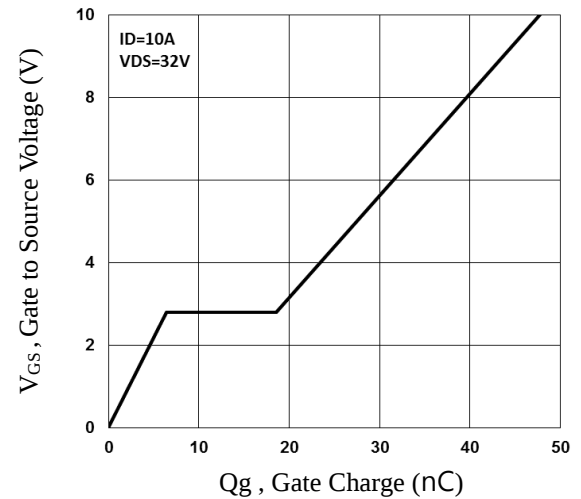
**Fig.1 Continuous Drain Current vs.  $T_C$**



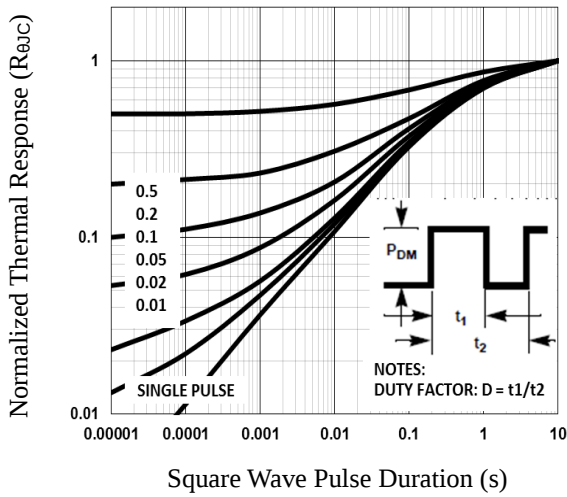
**Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$**



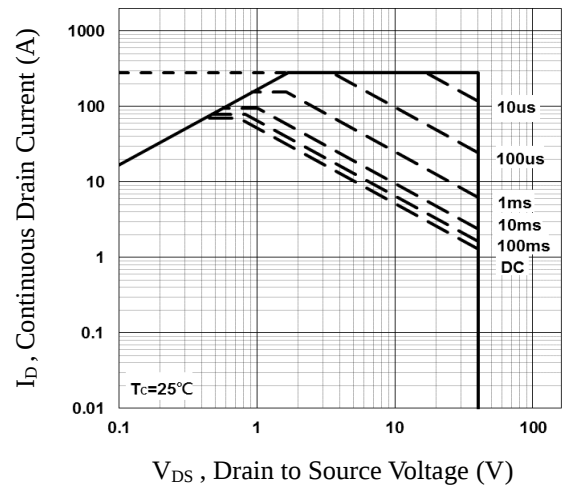
**Fig.3 Normalized  $V_{th}$  vs.  $T_J$**



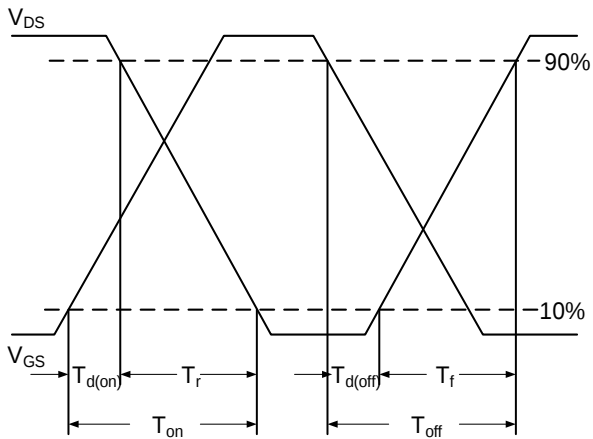
**Fig.4 Gate Charge Waveform**



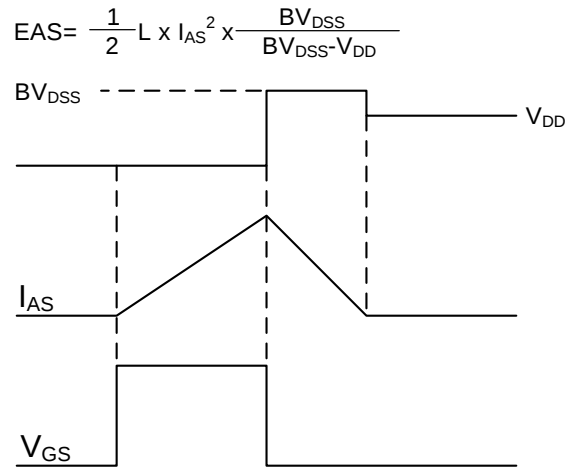
**Fig.5 Normalized Transient Impedance**



**Fig.6 Maximum Safe Operation Area**

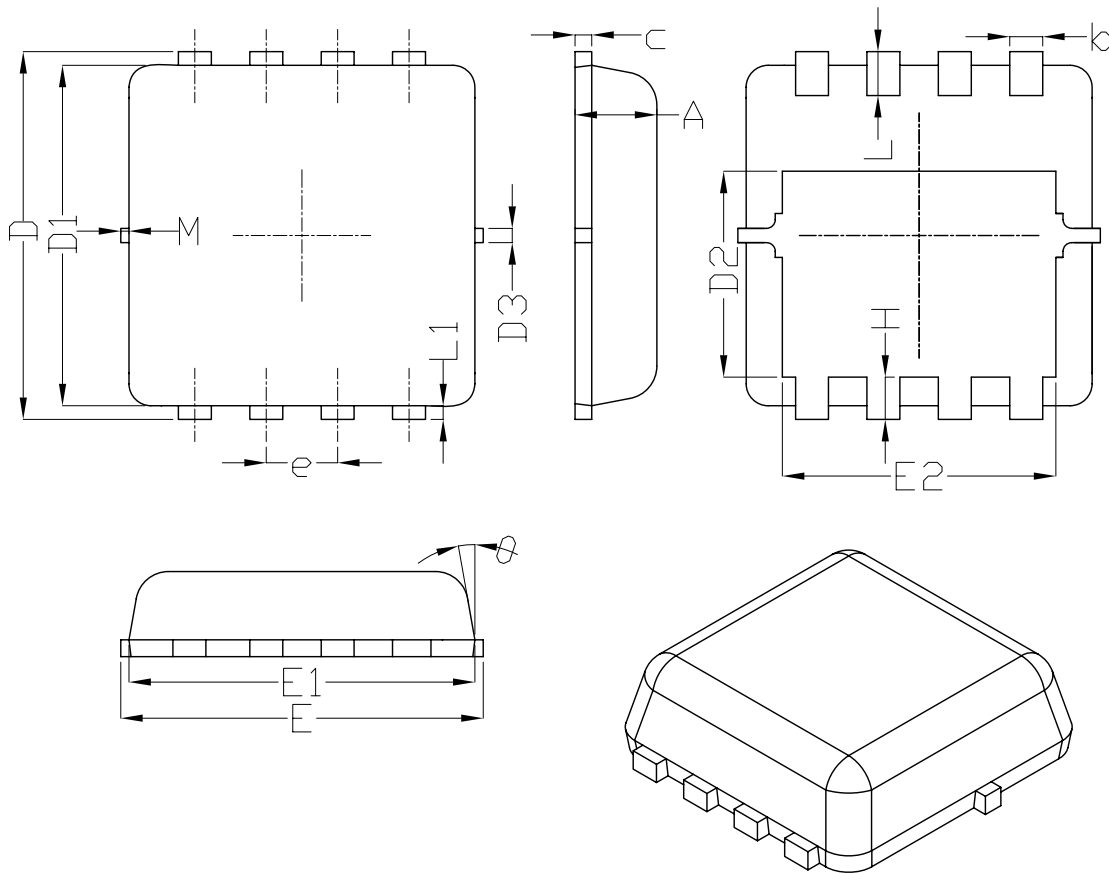


**Fig.7 Switching Time Waveform**

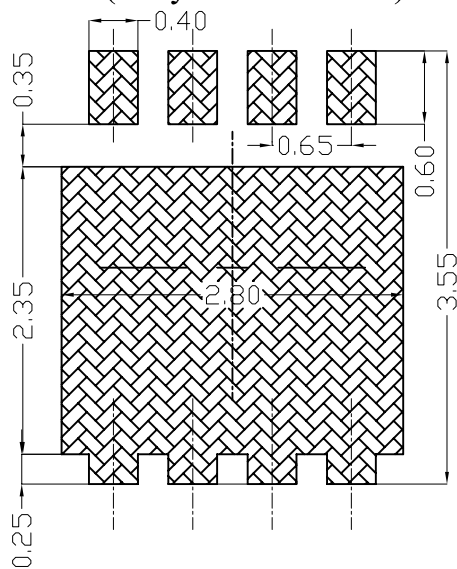


**Fig.8 EAS Waveform**

## DFN3X3-8Package Outline Data



**Land Pattern**  
(Only for Reference)



UNIT: mm

| SYMBOL | DIMENSIONAL REOMTS |      |      |
|--------|--------------------|------|------|
|        | 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

## Marking Information:

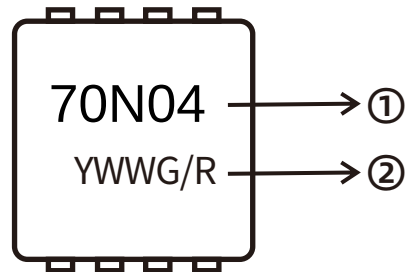
①. Part NO.

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     | 2024-05-11 | Release of final version                     |

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