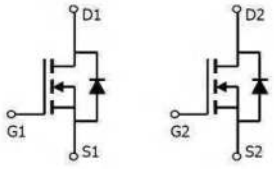
RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

# RMD12N30ED3

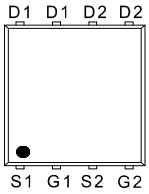
N-CHANNEL POWER MOSFET

## Features

- 30V,12A
  $R_{DS(ON)}$ <25mΩ @$V_{GS}$=10V TYP:17mΩ
  $R_{DS(ON)}$ <26mΩ @$V_{GS}$=4.5V TYP:19mΩ
- Advanced Trench Technology
- Lead free product is acquired
- ESD＞2KV



Schematic diagram



pin assignment

## Applications

- Interfacing Switching
- Load Switch
- PWM applications
- Halogen-free

## Package Marking and Ordering Information

| Device Marking | Device | Device Package | Packaging Code | Reel Size | Quantity(PCS) |
|---|---|---|---|---|---|
| D12N30 | RMD12N30ED3 | DFN3 X3 | -W | 13inch | 5000 |

## ABSOLUTE MAXIMUM RATINGS ($T_a$=25℃ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | $V_{GS}$ | ±12 | V |
| Continuous Drain Current (Tc=25℃) | $I_D$ | 12 | A |
| Continuous Drain Current (Tc=100℃) | $I_D$ | 7.5 | A |
| Pulsed Drain Current (1) | $I_{DM}$ | 48 | A |
| Drain Power Dissipation | $P_D$ | 19.2 | W |
| Single Pulsed Avalanche Energy (2) | $E_{AS}$ | 25 | mJ |
| Thermal Resistance from Junction to Ambient (3) | $R_{\theta JA}$ | 45 | ℃/W |
| Thermal Resistance from Junction to Case | $R_{\theta JC}$ | 6.5 | ℃/W |
| Junction Temperature | $T_J$ | -55~ +150 | ℃ |
| Storage Temperature | $T_{STG}$ | -55~ +150 | ℃ |

**Notes:**

2025-11/59
REV:O

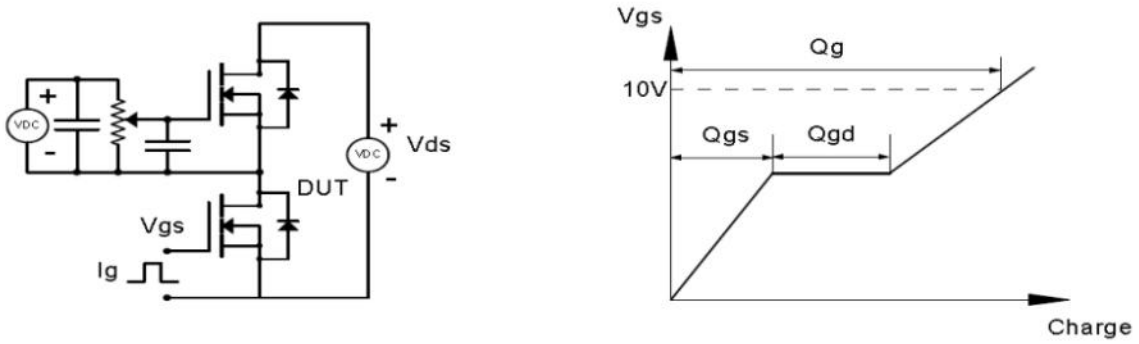
1) Repetitive Rating: pulse width limited by maximum junction temperature
2) EAS condition : $T_J$=25℃, $V_{DD}$ 15V, $V_G$=10V, L=0.5mH, $R_g$=25Ω, $I_{AS}$ 10A
3) The value of RθJA Mounted on FR4 Board（25.4mm*25.4mm*t1.6mm）With 2oz Copper TA=25℃

## MOSFET ELECTRICAL CHARACTERISTICS($T_J$=25℃ unless otherwise noted)

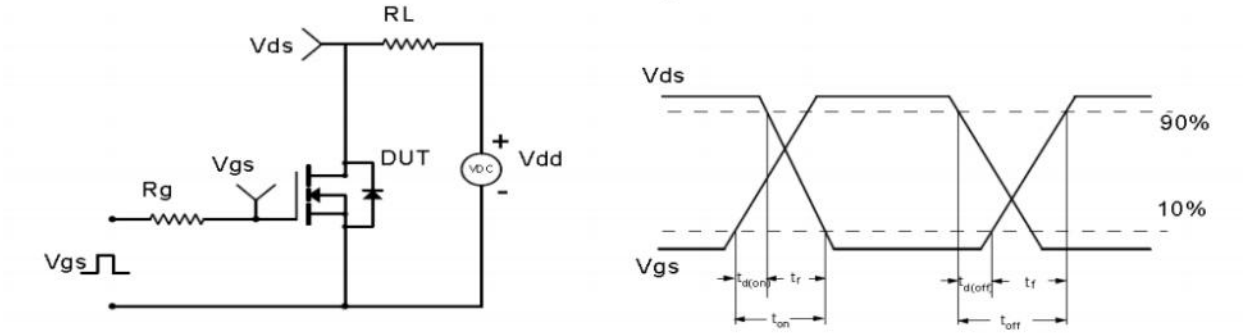
| Parameter | Symbol | Test Condition | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ =250μA | 30 | 33 | - | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$ =30V, $V_{GS}$ = 0V | - | - | 1 | uA |
| Gate-body leakage current | $I_{GSS}$ | $V_{GS}$ =±12V, $V_{DS}$ = 0V | - | - | ±100 | nA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =250μA | 0.4 | 1.0 | 1.5 | V |
| Drain-source on-resistance | $R_{DS(on)}$ | $V_{GS}$ =10V, $I_D$ =3A | - | 17 | 25 | mΩ |
| | | $V_{GS}$ =4.5V, $I_D$ =2A | - | 19 | 26 | mΩ |
| Forward transconductance | $R_g$ | $V_{GS}$= 0V, $V_{DS}$= 0V, f=1.0MHz | - | 1.9 | - | Ω |
| **Dynamic characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ =15V, VGS=0V, f=1MHz | - | 700 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 66 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 52 | - | |
| **Switching characteristics** | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=10V, $I_D$=3A, $R_G$ 3.0Ω, $V_{GS}$ 10V | - | 12 | - | nS |
| Turn-on rise time | $t_r$ | | - | 52 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 17 | - | |
| Turn-off fall time | $t_f$ | | - | 10 | - | |
| Total Gate Charge | Qg | $V_{DS}$=20V, $I_D$=2A, $V_{GS}$ 10V | - | 18 | - | nC |
| Gate-Source Charge | Qgs | | - | 1.46 | - | |
| Gate-Drain Charge | Qgd | | - | 2.06 | - | |
| **Source-Drain Diode characteristics** | | | | | | |
| Diode Forward voltage | $V_{SD}$ | $T_J$=25℃, $V_{GS}$ =0V, $I_S$=2A | - | 0.8 | 1.1 | V |
| Diode Forward current | $I_S$ | $T_C$=25℃ | - | - | 12 | A |
| Body Diode Reverse Recovery Time | Trr | $T_J$=25℃, VD =20V, di/dt=100A/us,IF=3A | - | 8.5 | - | nS |
| Body Diode Reverse Recovery Charge | Qrr | | - | 2.2 | - | nC |

## Test Circuit & Waveform

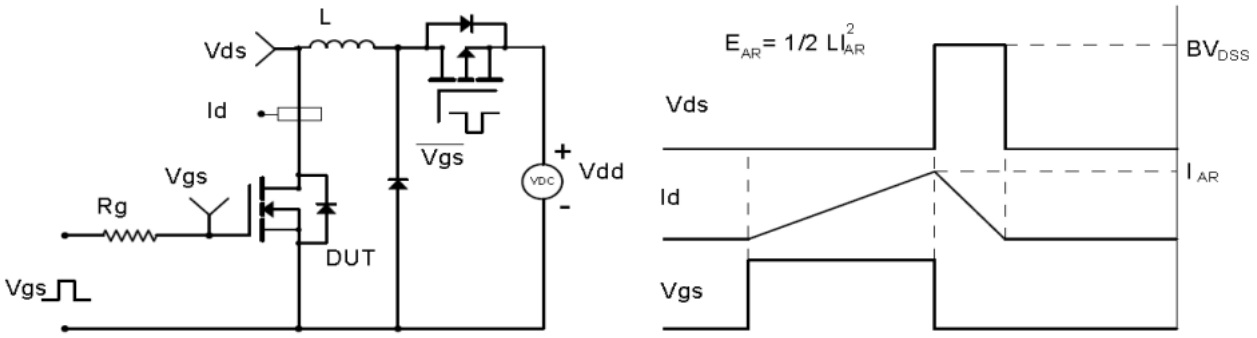
Gate Charge Test Circuit & Waveform



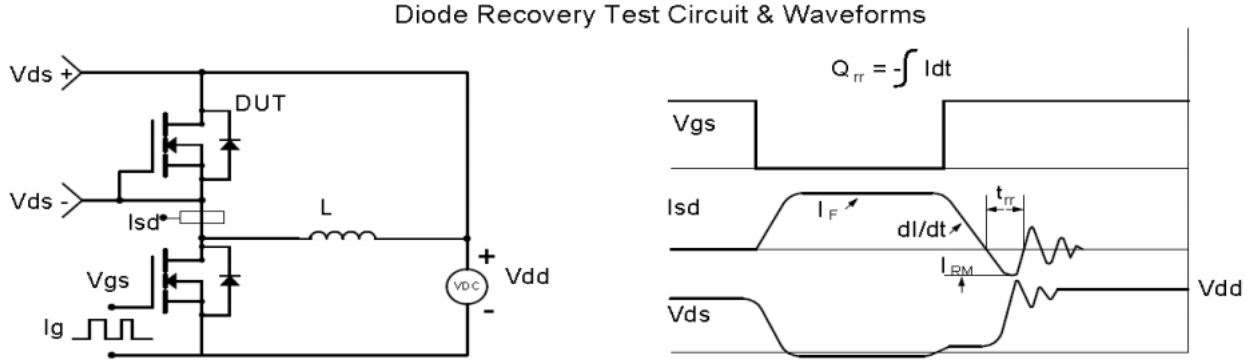

Resistive Switching Test Circuit & Waveforms




Unclamped Inductive Switching (UIS) Test Circuit & Waveforms




Diode Recovery Test Circuit & Waveforms



## RATING AND CHARACTERISTICS CURVES (RMD12N30ED3)

**Figure 1. Output Characteristics**

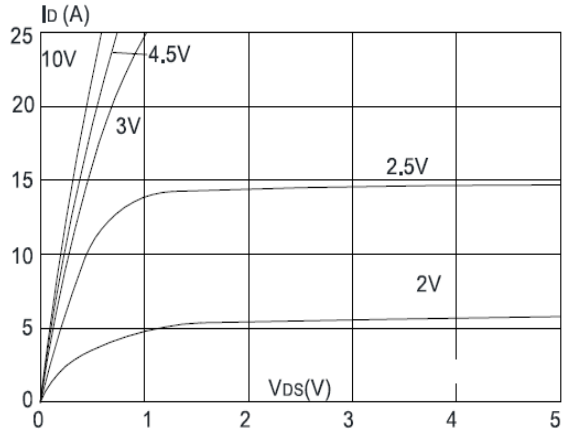



**Figure 2. Transfer Characteristics**

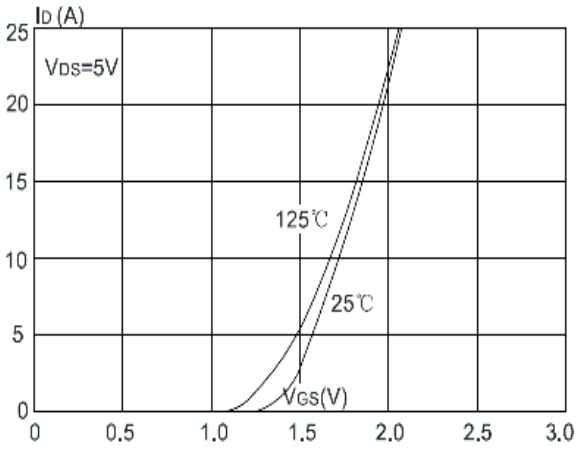



**Figure 3. Source Drain Forward Characteristics**

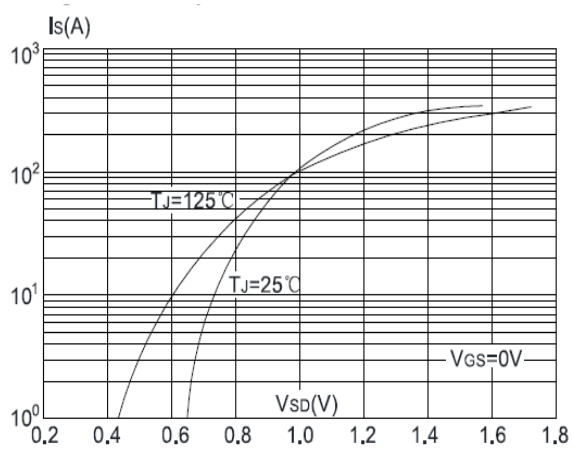



**Figure 4. Gate-Charge Characteristics**

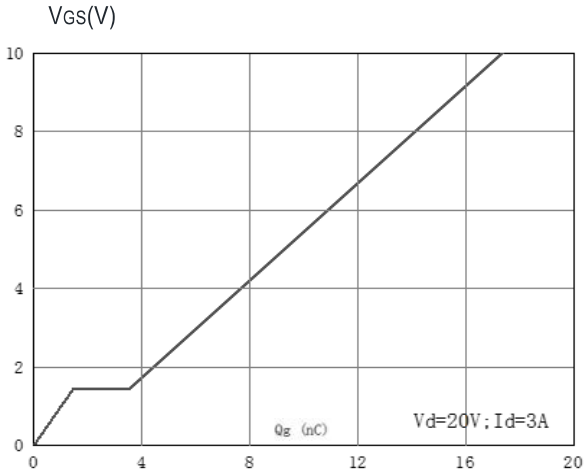



**Figure 5. On-Resistance vs. Drain Current and Gate Voltage**

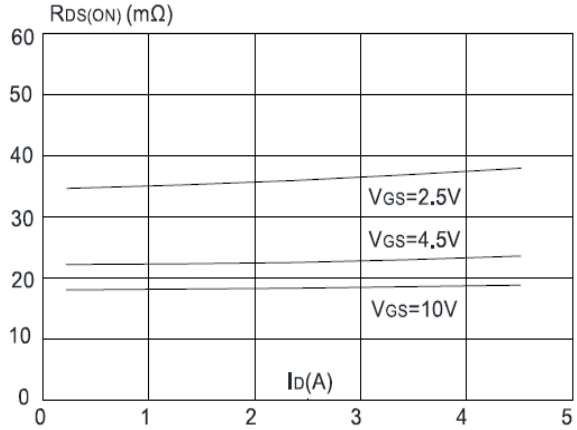
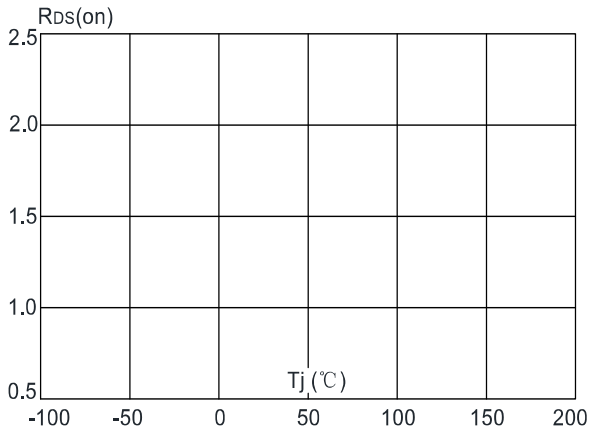



**Figure 6. Normilized $R_{DS(ON)}$ vs Junction Temperature**



# RATING AND CHARACTERISTICS CURVES (RMD12N30ED3)

**Figure 7: $V_{th}$ vs Junction Temperature**

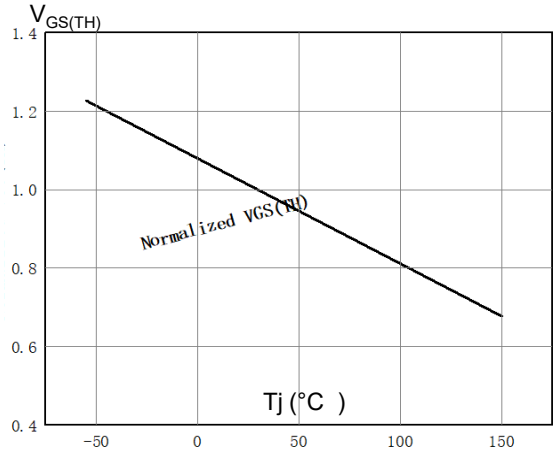



**Figure 8.BVDSS vs. Junction Temperature**

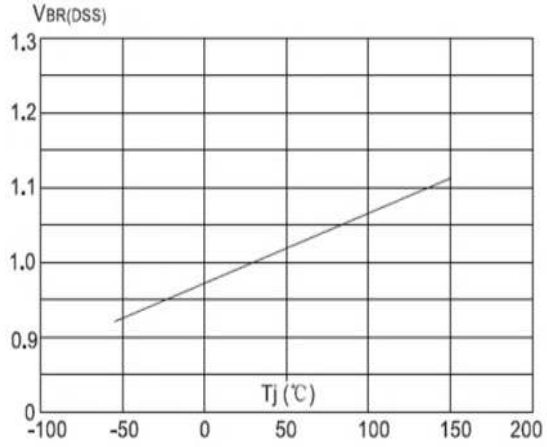



**Figure 9. Capacitance**

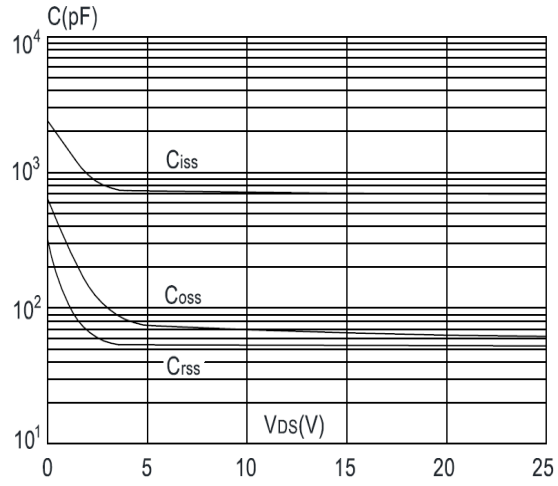



**Figure 10. On-Resistance vs. Gate-Source Voltage**

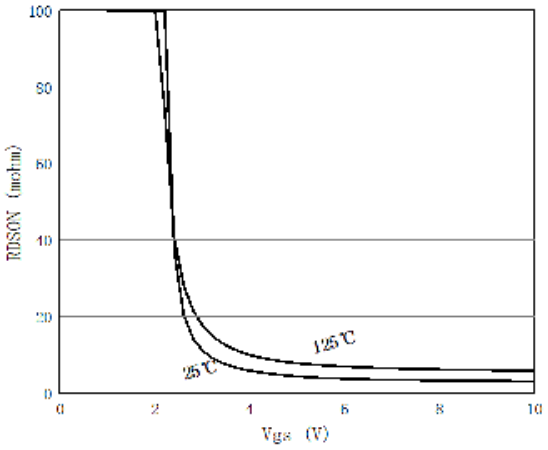



**Figure 11. Current De-rating**

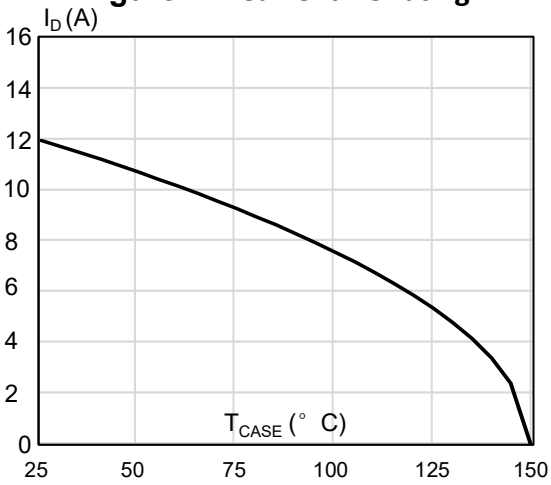
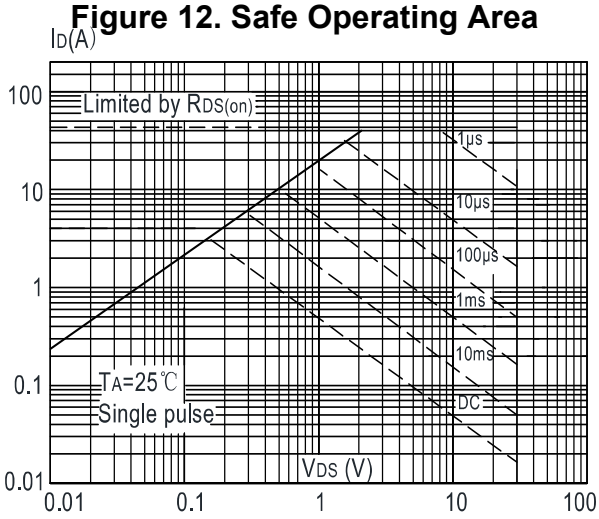
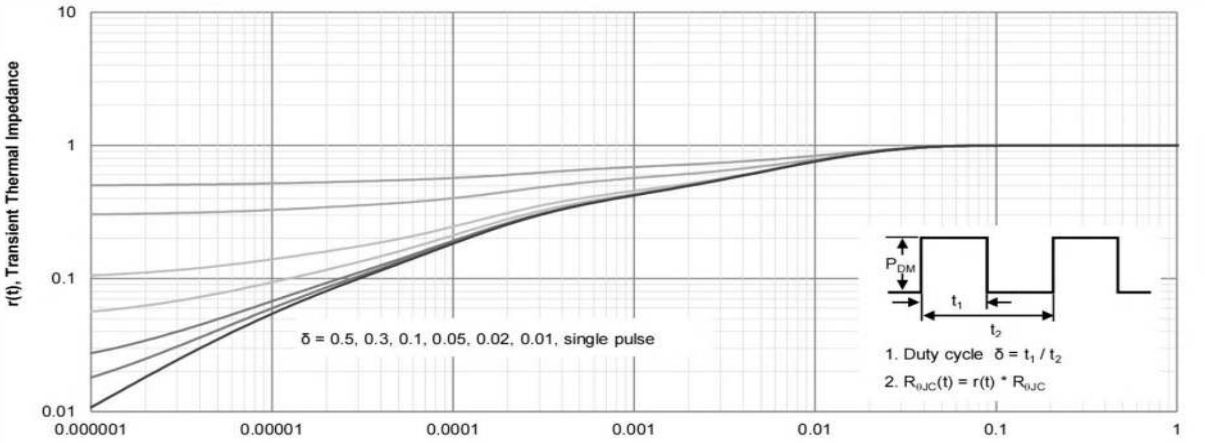



**Figure 12. Safe Operating Area**



## RATING AND CHARACTERISTICS CURVES (RMD12N30ED3)

**Figure 13. Normalized Maximum Transient Thermal Impedance**

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**Marking on the body**

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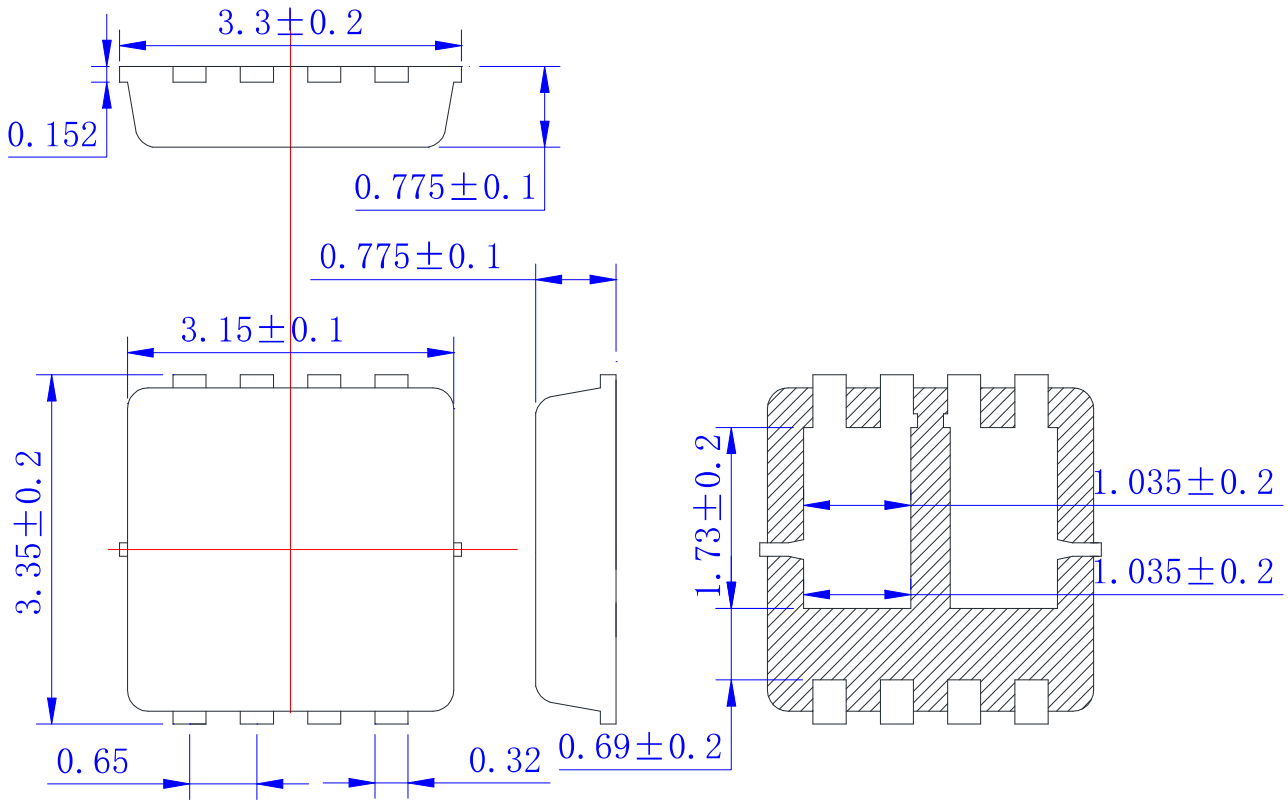
Year – Code
(Y:24-----2024
25-----2025.....)

Week – code
(WW:01~52)

**D 1 2 N 3 0** ← Part No.

## PACKAGE OUTLINE DIMENSIONS



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