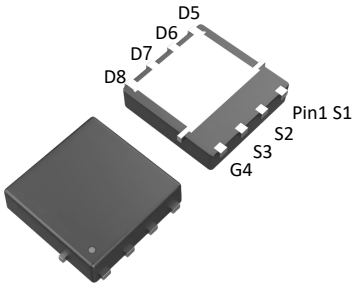
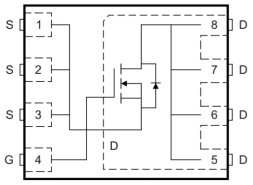
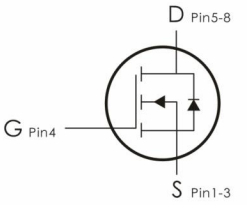
## Description：

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,$I_D$=50A,$R_{DS(ON)}$<5mΩ @$V_{GS}$=10V（Typ：4.2mΩ）
2) Low gate charge.
3) Green device available.
4) Advanced high cell denity 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 |
|---|---|---|---|
| ZC005NG-K | C005N-K | DFN3*3-8 | 5000 pcs/Reel |

## Absolute Maximum Ratings：($T_c$=25℃ unless otherwise noted)

| Symbol | Parameter | Ratings | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 30 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$ | Continuous Drain Current[1] | 50 | A |
| | Continuous Drain Current-$T_c$=100℃[1] | 35 | |
| $I_{DM}$ | Pulsed Drain Current[2] | 200 | |
| $P_D$ | Power Dissipation | 27.8 | W |
| $E_{AS}$ | Single pulse avalanche energy[3] | 81 | mJ |
| $T_J$, $T_{STG}$ | Operating and Storage Junction Temperature Range | -55-+150 | ℃ |

## Thermal Characteristics：

| Symbol | Parameter | Max | Units |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance,Junction to Case | 4.5 | ℃/W |
| $R_{\theta JA}$ | Thermal Resistance,Junction to Ambient | 62 | ℃/W |

## Electrical Characteristics: ($T_c$=25℃ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Sourtce Breakdown Voltage | $V_{GS}$=0V,$I_D$=250μA | 30 | --- | --- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{GS}$=0V, $V_{DS}$=30V | --- | --- | 1 | μA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0A | --- | --- | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate-Source Threshold Voltage | $V_{GS}$=$V_{DS}$, $I_D$=250μA | 1 | 1.4 | 2 | V |
| $R_{DS(ON)}$ | Drain-Source On Resistance[4] | $V_{GS}$=10V,$I_D$=20A | --- | 4.2 | 5 | mΩ |
| | | $V_{GS}$=4.5V,$I_D$=10A | --- | 7.5 | 11 | |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V, $V_{GS}$=0V, f=1MHz | --- | 1600 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 190 | -- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 176 | --- | |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DS}$=24V, $I_D$=48A, $R_G$=5Ω,$V_{GS}$=10V | --- | 10.5 | --- | ns |
| $t_r$ | Rise Time | | --- | 5 | --- | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | --- | 36.7 | --- | ns |
| $t_f$ | Fall Time | | --- | 17.8 | --- | ns |
| $Q_g$ | Total Gate Charge | $V_{GS}$=10V, $V_{DS}$=24V, $I_D$=48A | --- | 35 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 6 | --- | nC |
| $Q_{gd}$ | Gate-Drain “Miller” Charge | | --- | 11.5 | --- | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V, $I_{SD}$=20A | --- | --- | 1.1 | V |
| $I_S$ | Continuous Drain Curren | $V_D$=$V_G$=0V | --- | --- | 45.4 | A |
| $I_{SM}$ | Pulsed Drain Current | | --- | --- | 181.8 | A |
| Trr | Reverse Recovery Time | $I_F$=24A,$T_J$=25℃ dI/dt=100A/us | --- | 11 | --- | ns |
| Qrr | Reverse Recovery Charge | | --- | 0.02 | --- | μC |

## 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 : TJ=25℃,VDD=50V,$V_G$=10V,L=0.5mH
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

## Typical Characteristics： ($T_c$=25℃ unless otherwise noted)

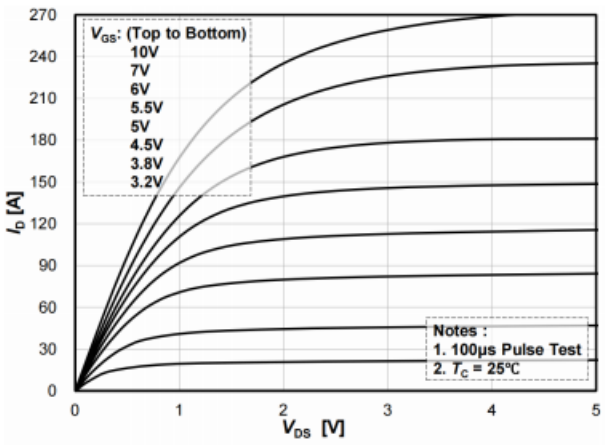



Figure 1. **On-Region Characteristics**

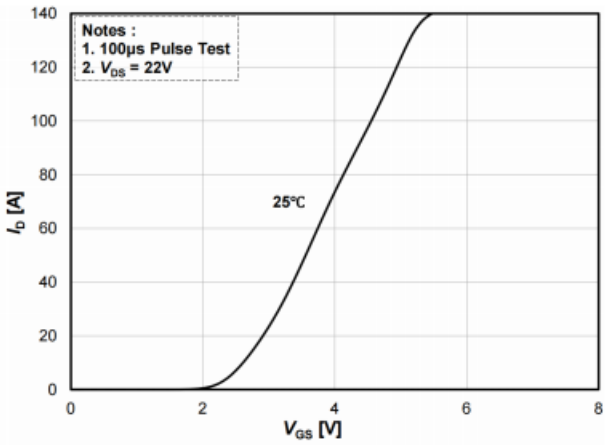



Figure 2. **Transfer Characteristics**

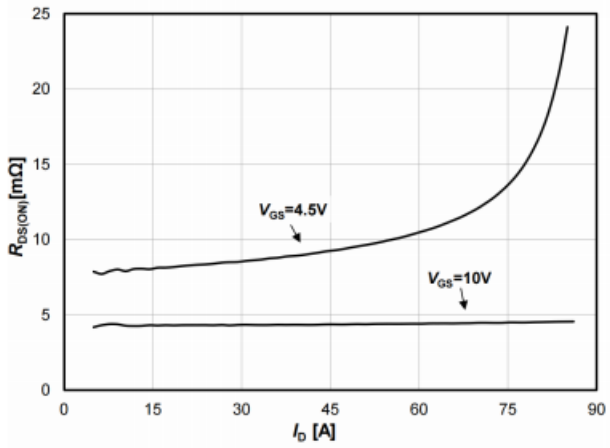



Figure 3. **On Resistance vs. Drain Current**

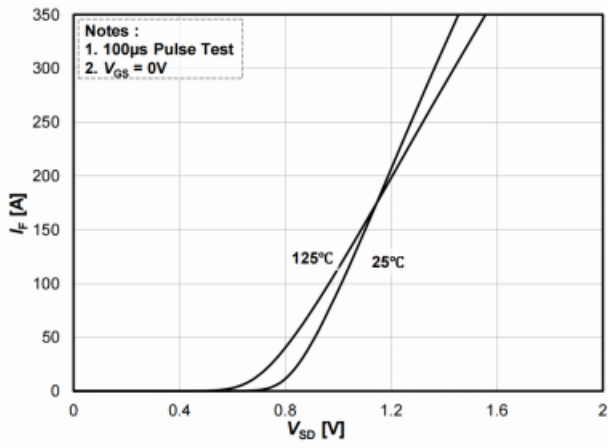



Figure 4. **Diode Forward Voltage vs. Current**

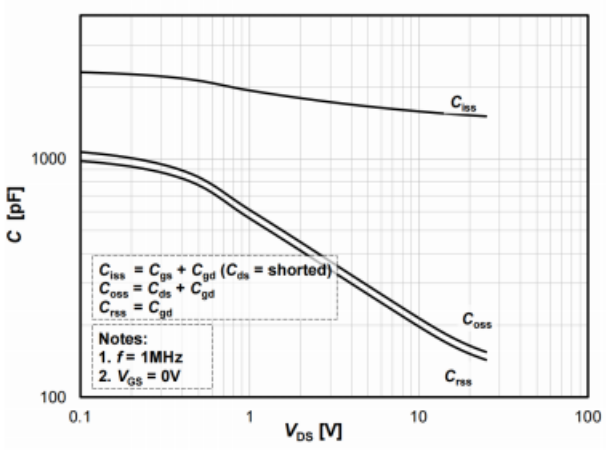



Figure 5. **Capacitance Characteristics**

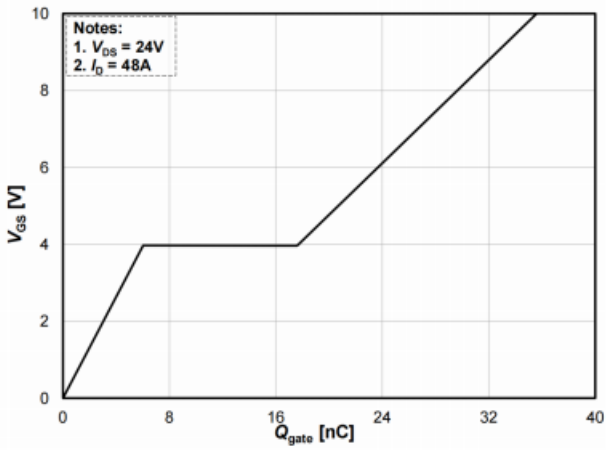



Figure 6. **Gate Charge Characteristics**

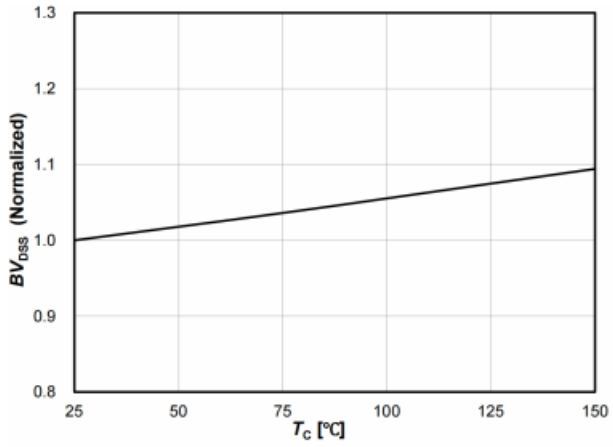



Figure 7. **Normalized $BV_{DSS}$ vs. Temperature**

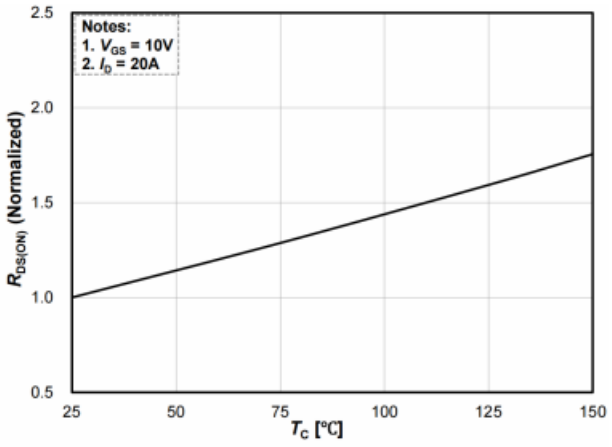



Figure 8. **Normalized On-Resistance Variation vs. Temperature**

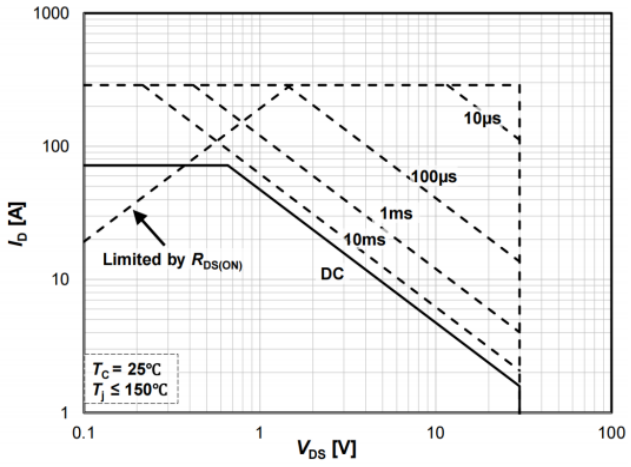



Figure 9. **Safe Operating Area** [3)]

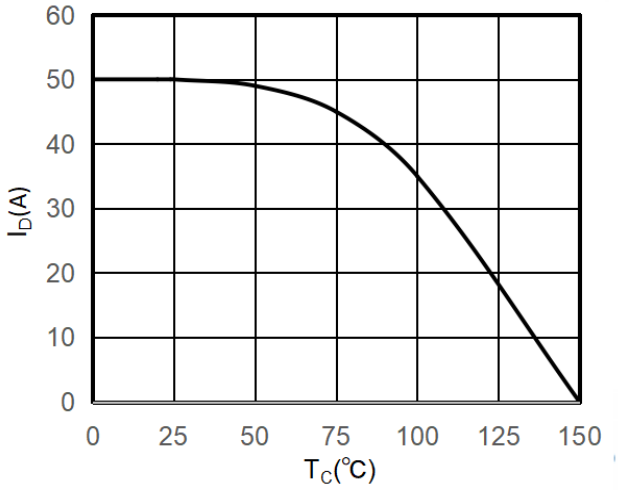



Figure 10. **Drain Current vs. Temperature**

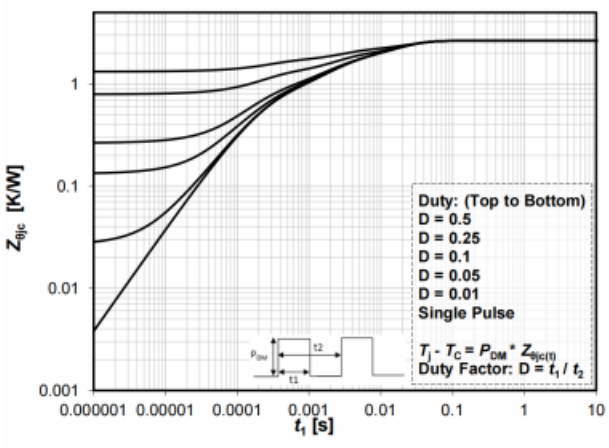
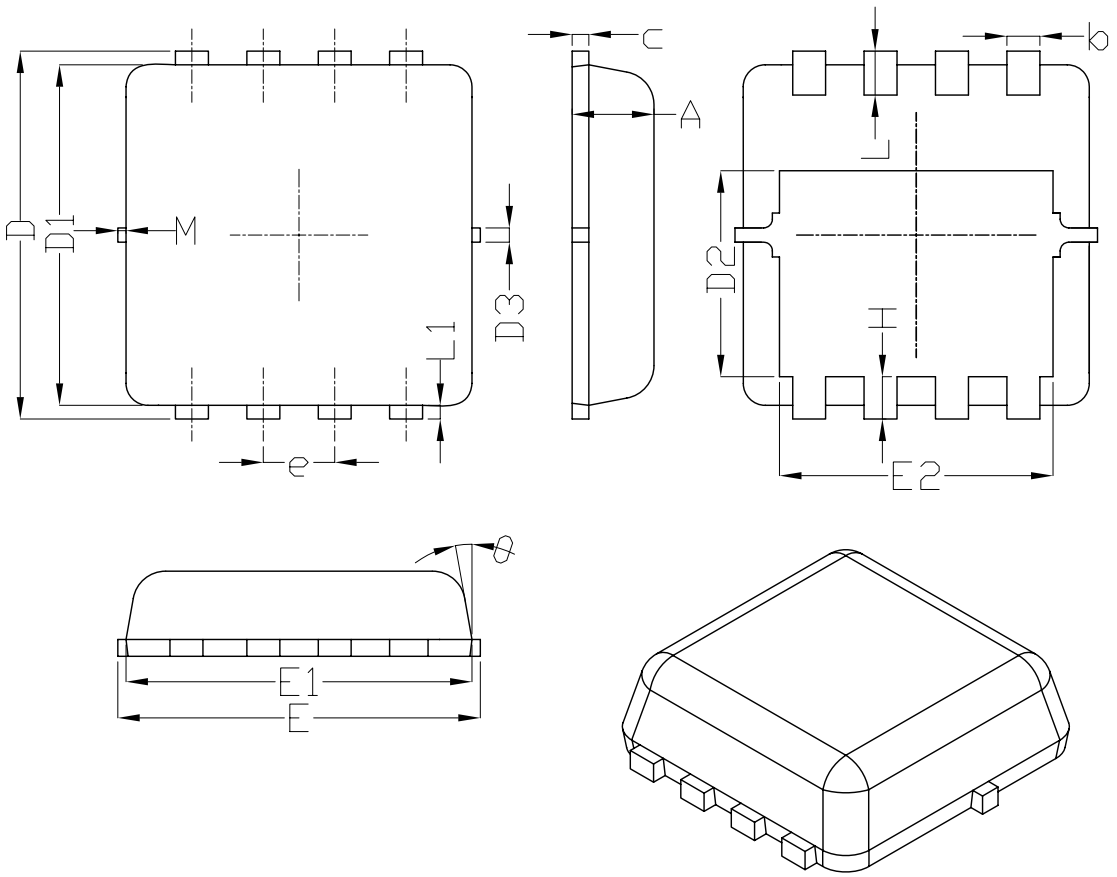
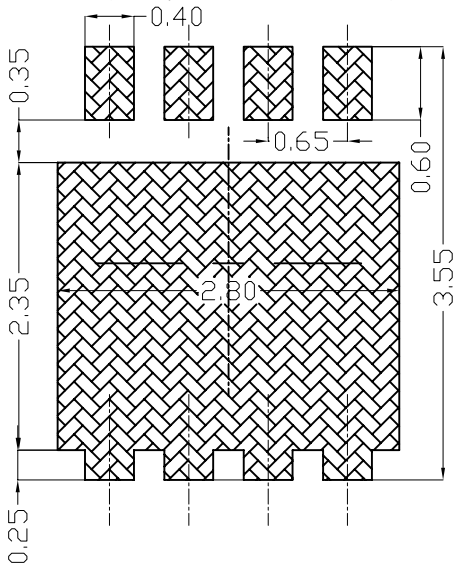



Figure 11. **Transient Thermal Impedance**

## DFN3X3-8 Package Outline Data




Land Pattern
(Only for Reference)

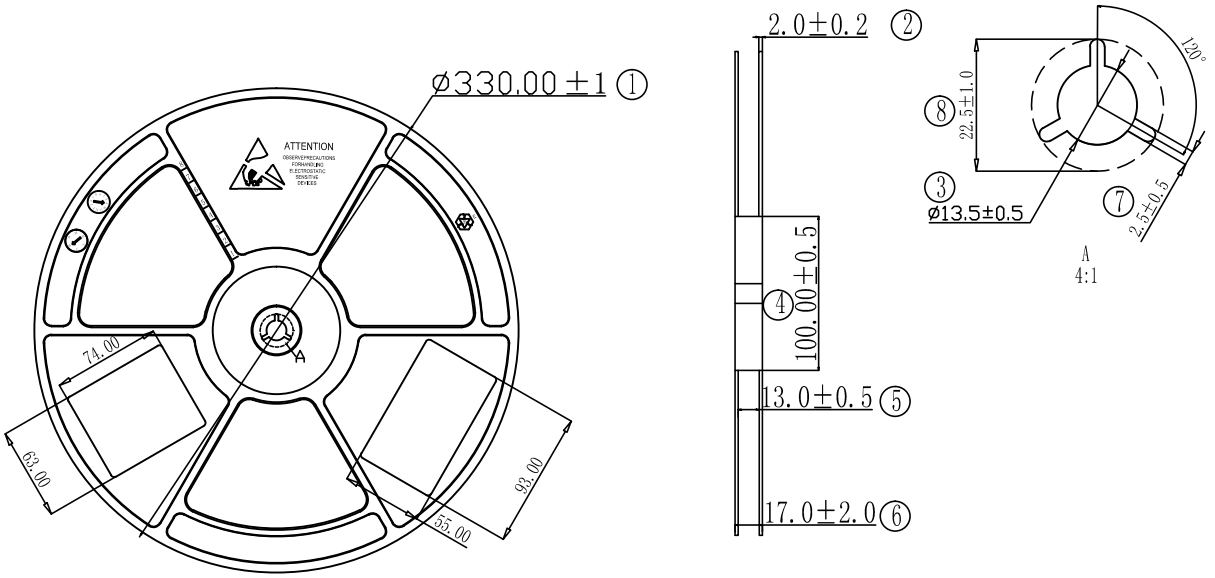



UNIT: mm

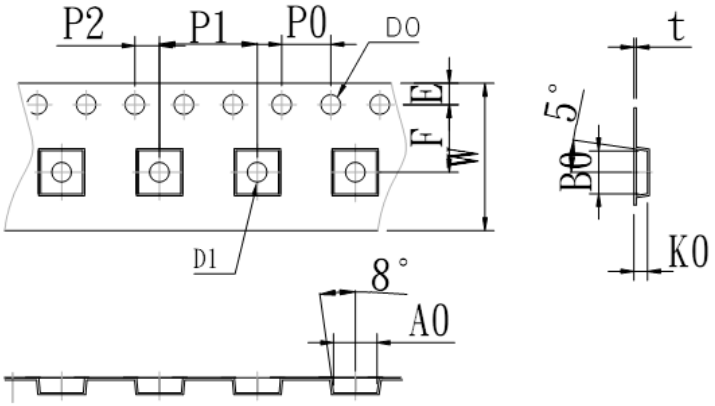
| SYMBOL | DIMENSIONAL REQMTS | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | 0.70 | 0.75 | 0.80 |
| b | 0.25 | 0.30 | 0.35 |
| c | 0.10 | 0.15 | 0.25 |
| D | 3.25 | 3.35 | 3.45 |
| D1 | 3.00 | 3.10 | 3.20 |
| D2 | 1.78 | 1.88 | 1.98 |
| D3 | --- | 0.13 | --- |
| E | 3.20 | 3.30 | 3.40 |
| E1 | 3.00 | 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：

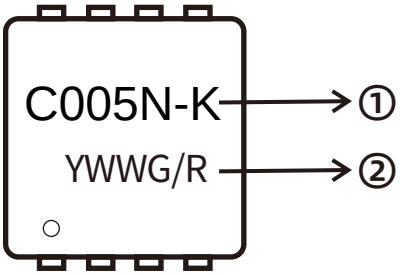
①. Part NO.

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) |
|---|---|---|
| 1.2 | 2026-04-07 | Release of final version |

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