

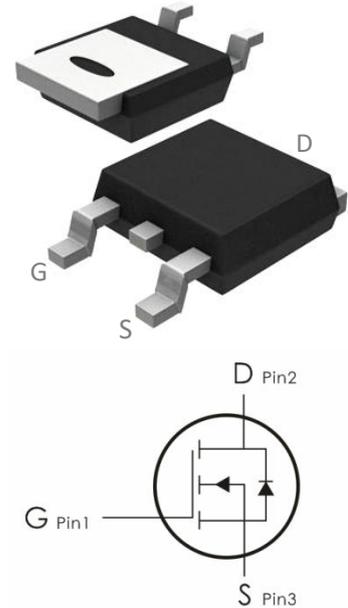
Description:

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) $V_{DS}=30V, I_D=90A, R_{DS(ON)}<4.5m\ \Omega @V_{GS}=10V$ (Typ: $3.6m\ \Omega$)
- 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 |
|-----------|---------|---------|---------------|
| DC4R5NG-E | C4R5N-E | TO- 252 | 2500 pcs/Reel |

Absolute Maximum Ratings: ($T_C=25^\circ\text{C}$ 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 | 90 | A |
| | Continuous Drain Current- $T_C=100^\circ\text{C}$ ¹ | 63 | |
| I_{DM} | Pulsed Drain Current ² | 360 | |
| P_D | Power Dissipation | 62.5 | W |
| E_{AS} | Single pulse avalanche energy ³ | 100 | 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 | 2 | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 62.5 | $^\circ\text{C}/\text{W}$ |

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---------------------------|------|-----------|------------------|
| Off Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\ \mu\text{A}$ | 30 | --- | --- | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{GS}=0V, V_{DS}=30V$ | --- | --- | 1 | μA |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0A$ | --- | --- | ± 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(th)}$ | Gate-Source Threshold Voltage | $V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$ | 1 | 1.55 | 2.5 | V |
| $R_{DS(on)}$ | Drain-Source On Resistance ⁴ | $V_{GS}=10V, I_D=20A$ | --- | 3.6 | 4.5 | $\text{m}\Omega$ |
| | | $V_{GS}=4.5V, I_D=10A$ | --- | 7 | 9 | $\text{m}\Omega$ |
| Dynamic Characteristics | | | | | | |
| C_{iss} | Input Capacitance | $V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$ | --- | 2098 | --- | pF |
| C_{oss} | Output Capacitance | | --- | 206 | -- | |
| C_{rss} | Reverse Transfer Capacitance | | --- | 186 | --- | |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DS}=24V, I_D=40A,$ $R_{ENG}=3\ \Omega, V_{GS}=10V$ | --- | 10 | --- | ns |
| t_r | Rise Time | | --- | 5 | --- | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | --- | 36 | --- | ns |
| t_f | Fall Time | | --- | 12 | --- | ns |
| Q_g | Total Gate Charge | | $V_{GS}=10V, V_{DS}=24V,$ | --- | 42 | --- |
| Q_{gs} | Gate-Source Charge | $I_D=90A$ | --- | 10 | --- | nC |
| Q_{gd} | Gate-Drain "Miller" Charge | | --- | 16 | --- | nC |
| Drain-Source Diode Characteristics | | | | | | |
| V_{SD} | Diode Forward Voltage | $V_{GS}=0V, I_{SD}=20A$ | --- | 0.85 | --- | V |
| I_S | Continuous Drain Current | $V_D=V_G=0V$ | --- | --- | 90 | A |
| I_{SM} | Pulsed Drain Current | | --- | --- | 360 | A |
| T_{rr} | Reverse Recovery Time | $I_F=60A,$ | --- | 19 | --- | ns |
| Q_{rr} | Reverse Recovery Charge | $dI/dt=100A/\mu\text{s}$ | --- | 13 | --- | 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 : $T_J=25^{\circ}C, V_{DD}=15V, V_G=10V, L=0.5mH$
4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

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

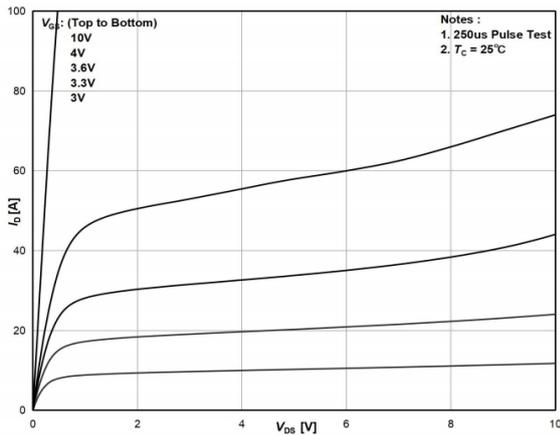


Figure 1. On-Region Characteristics

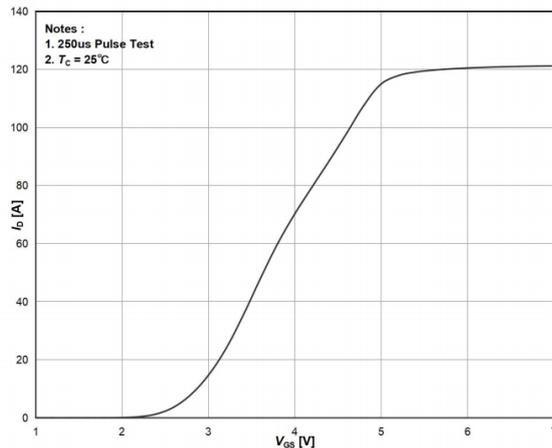


Figure 2. Transfer Characteristics

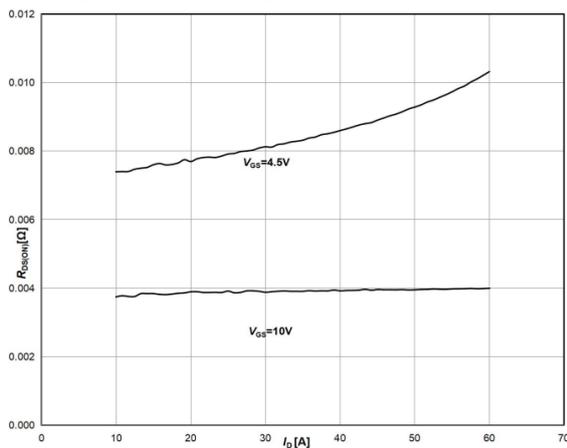


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

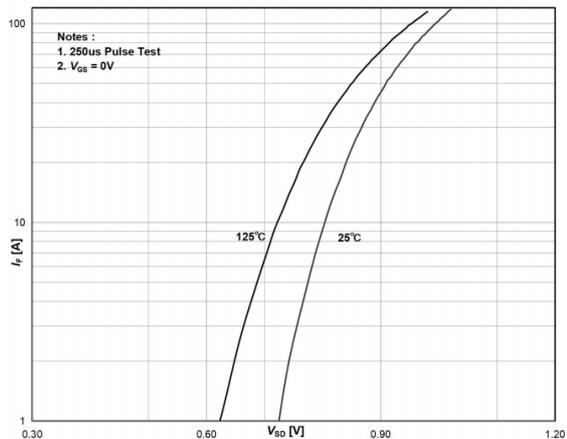


Figure 4. Body Diode Forward Voltage Variation with Current

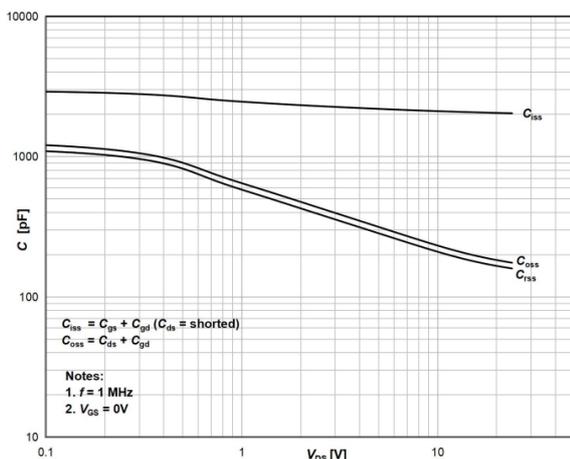


Figure 5. Capacitance Characteristics

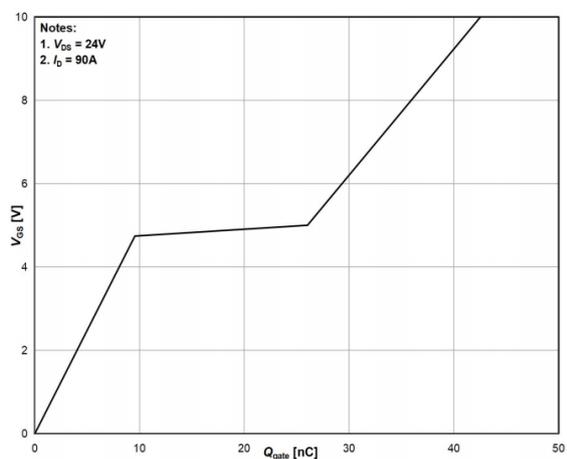


Figure 6. Gate Charge Characteristics

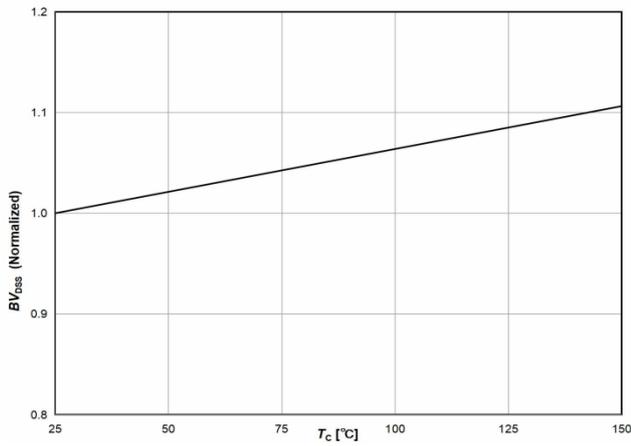


Figure 7. Breakdown Voltage Variation vs Temperature

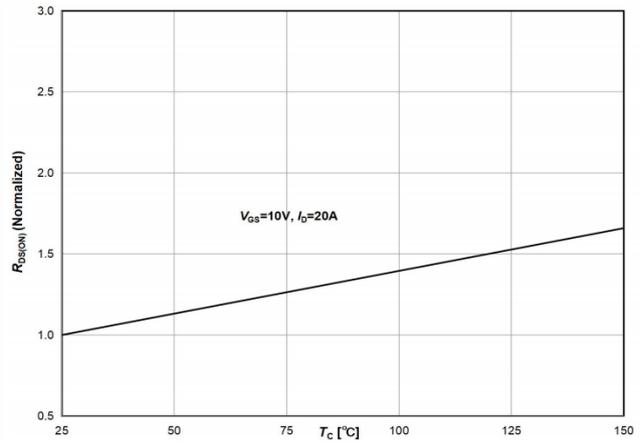


Figure 8. On-Resistance Variation vs Temperature

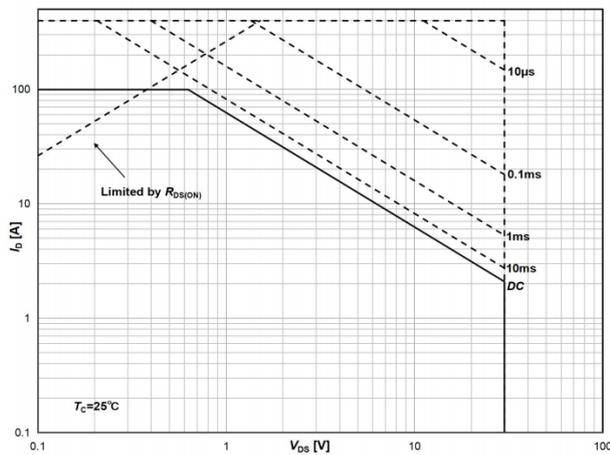


Figure 9. Maximum Safe Operating Area³⁾

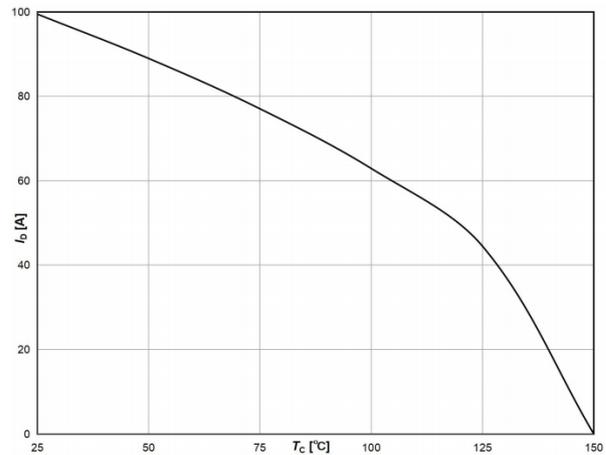


Figure 10. Maximum Drain Current vs Case Temperature

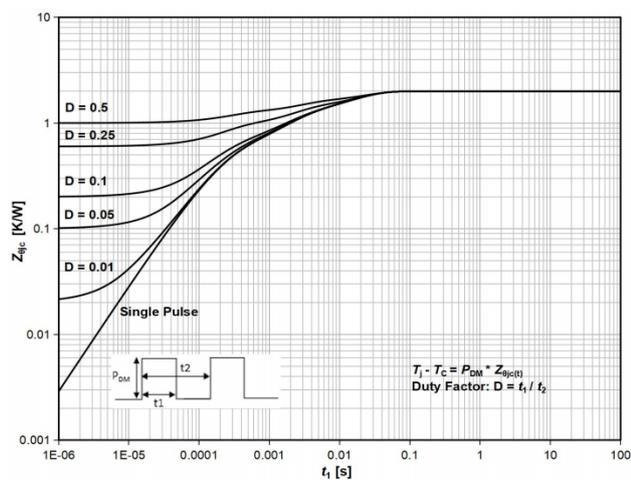
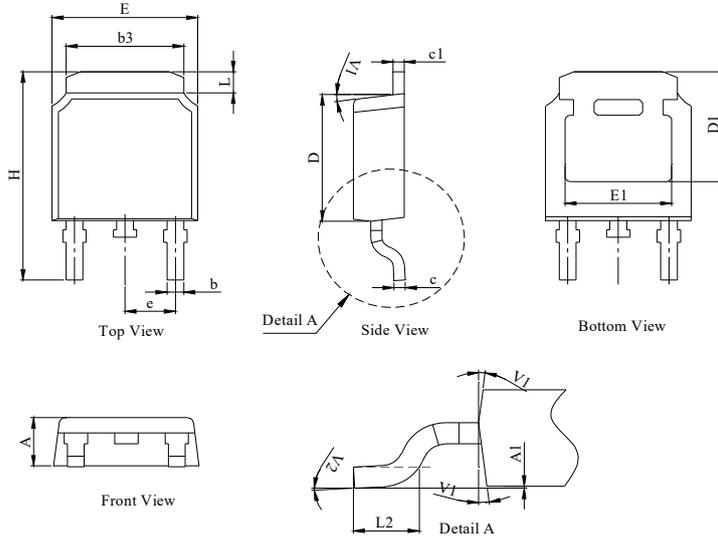


Figure 11. Transient Thermal Response Curve

TO-252 Package Information

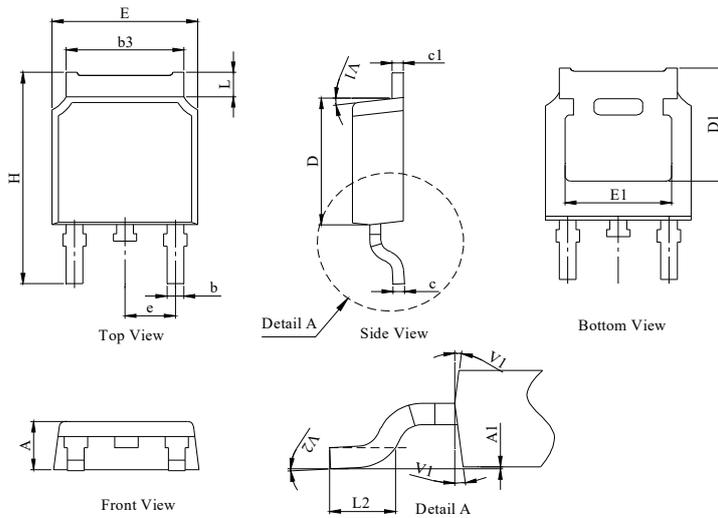
Package Outline Type-A

UNIT: mm



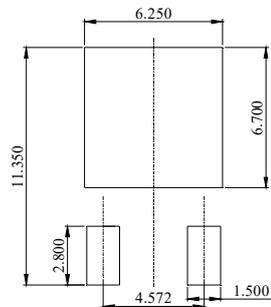
| DIM. | MILLIMETER | | |
|------|------------|-------|-------|
| | MIN. | NOM. | MAX. |
| A | 2.18 | 2.30 | 2.39 |
| A1 | 0 | -- | 0.13 |
| b | 0.64 | 0.76 | 0.89 |
| c | 0.40 | 0.50 | 0.61 |
| c1 | 0.46 | 0.50 | 0.58 |
| D | 5.97 | 6.10 | 6.23 |
| D1 | 5.05 | -- | -- |
| E | 6.35 | 6.60 | 6.73 |
| E1 | 4.32 | -- | -- |
| b3 | 5.21 | 5.38 | 5.55 |
| e | 2.29 BSC | | |
| H | 9.40 | 10.00 | 10.40 |
| L | 0.89 | -- | 1.27 |
| L2 | 1.40 | -- | 1.78 |
| V1 | 7° REF | | |
| V2 | 0° | -- | 6° |

Package Outline Type-B



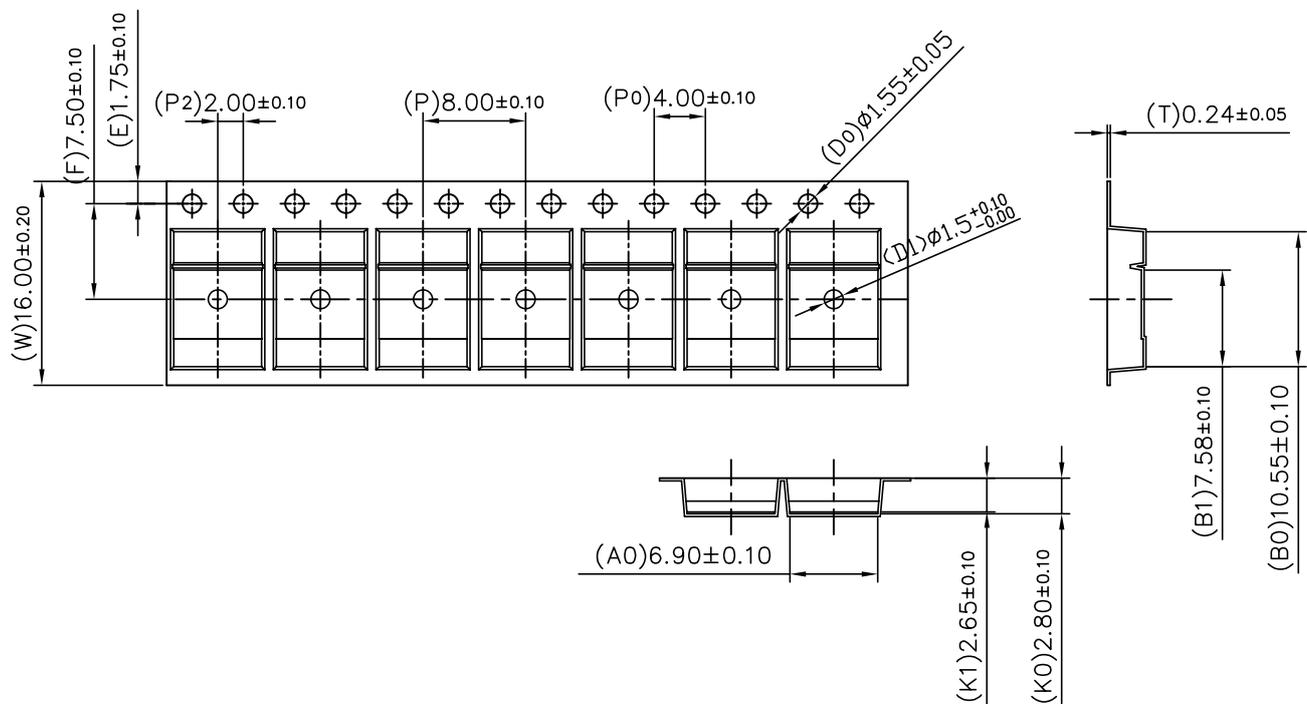
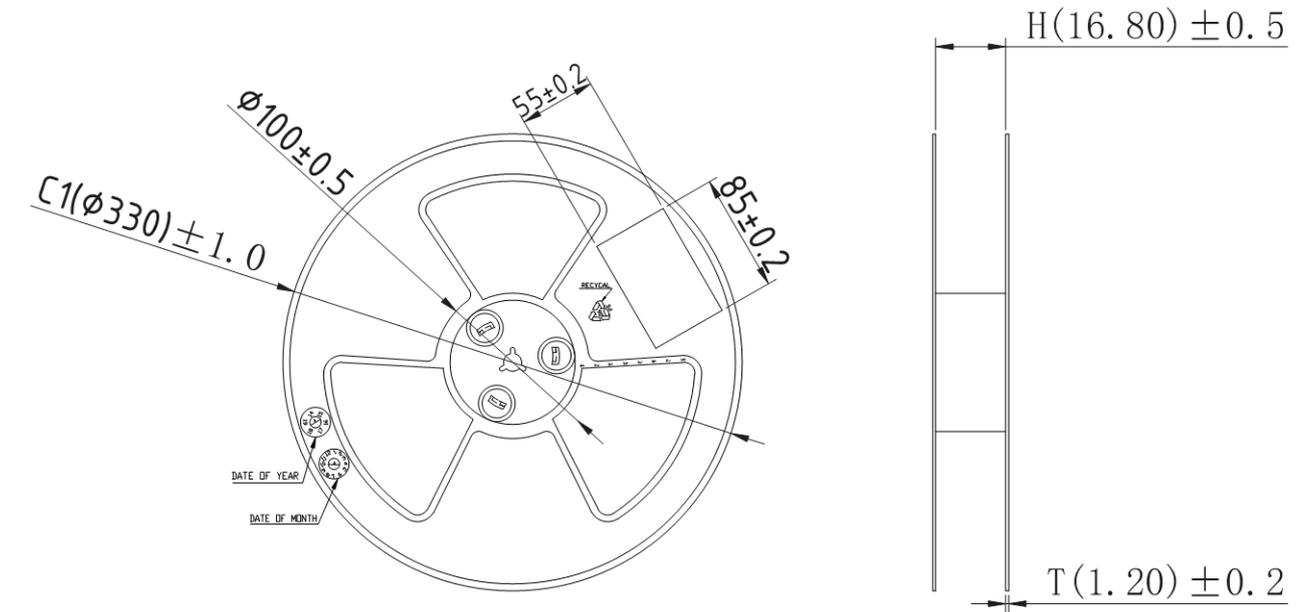
| DIM. | MILLIMETER | | |
|------|------------|-------|-------|
| | MIN. | NOM. | MAX. |
| A | 2.10 | 2.30 | 2.40 |
| A1 | 0 | -- | 0.13 |
| b | 0.66 | 0.76 | 0.86 |
| b3 | 5.21 | 5.38 | 5.55 |
| c | 0.40 | 0.50 | 0.60 |
| c1 | 0.44 | 0.50 | 0.58 |
| D | 5.90 | 6.10 | 6.30 |
| D1 | 5.30REF | | |
| E | 6.40 | 6.60 | 6.80 |
| E1 | 4.63 | - | - |
| e | 2.29 BSC | | |
| H | 9.50 | 10.00 | 10.70 |
| L | 1.09 | -- | 1.21 |
| L2 | 1.35 | -- | 1.65 |
| V1 | 7° REF | | |
| V2 | 0° | -- | 6° |

Recommended Soldering Footprint



Tape & Reel Information

Dimensions in mm



Pulling direction →

Marking Information:

①. Doingter LOGO

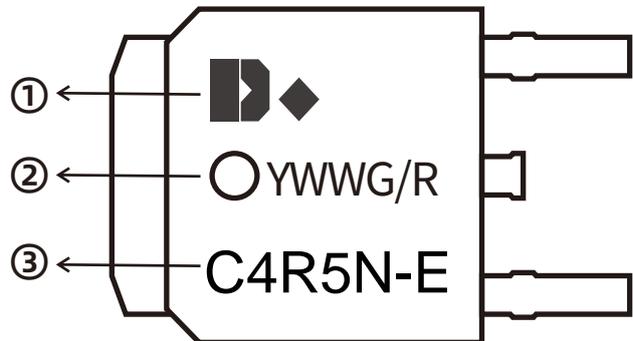
②. Date Code(YWWG / R)

Y : Year Code , last digit of the year

WW : Week Code(01-53)

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

③. Part NO.



Previous Version

| Version | Date | Subjects (major changes since last revision) |
|---------|------------|--|
| 1.0 | 2025-04-10 | Release of final version |

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