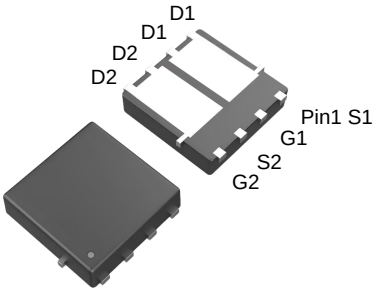
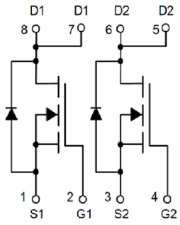
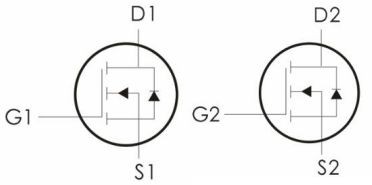
## Description：

This Dual 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) $V_{DS}$=20V,$I_D$=40A,$R_{DS(ON)}$<5.5mΩ @$V_{GS}$=4.5V（Typ：4.8mΩ）
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 |
|---|---|---|---|
| ZB5R5DNAG-K | B5R5DNA-K | DFN3*3-8D | 5000 pcs/Reel |

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

| Symbol | Parameter | Ratings | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 20 | V |
| $V_{GS}$ | Gate-Source Voltage | ±12 | V |
| $I_D$ | Continuous Drain Current-$T_C$=25℃[1] | 40 | A |
| | Continuous Drain Current-$T_C$=100℃[1] | 28 | |
| $I_{DM}$ | Drain Current – Pulsed [2] | 160 | A |
| $P_D$ | Power Dissipation -$T_A$=25℃ | 23 | W |
| $E_{AS}$ | Single pulse avalanche energy[3] | 49 | mJ |
| $T_J$, $T_{STG}$ | Operating and Storage Junction Temperature Range | -55 to +150 | ℃ |

## Thermal Characteristics：

| Symbol | Parameter | Max | Units |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance,Junction to Case | 5.5 | ℃/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 | 20 | --- | --- | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{GS}$=0V, $V_{DS}$=40V | --- | --- | 1 | μA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±12V, $V_{DS}$=0A | --- | --- | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate-Source Threshold Voltage | $V_{GS}$=$V_{DS}$, $I_D$=250μA | 0.5 | 0.7 | 1 | V |
| $R_{DS(ON)}$ | Drain-Source On Resistance[4] | $V_{GS}$=4.5V,$I_D$=10A | --- | 4.8 | 5.5 | mΩ |
| | | $V_{GS}$=2.5V,$I_D$=5A | --- | 6.4 | 7.5 | |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=10V, $V_{GS}$=0V, f=500KHz | --- | 1862 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 267 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 253 | --- | |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=16V , $V_{GS}$=4.5V , $R_G$=1.5Ω ,$I_D$=32A | --- | 13 | --- | ns |
| $t_r$ | Rise Time | | --- | 48 | --- | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | --- | 57.7 | --- | ns |
| $t_f$ | Fall Time | | --- | 89 | --- | ns |
| $Q_g$ | Total Gate Charge | $V_{DS}$=16V , $V_{GS}$=4.5V , $I_D$=32A | --- | 25 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 4 | --- | nC |
| $Q_{gd}$ | Gate-Drain “Miller” Charge | | --- | 12 | --- | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| $I_S$ | Continuous Drain Curren | $V_D$=$V_G$=0V | --- | --- | 36.3 | A |
| $I_{SM}$ | Pulsed Drain Current | | --- | --- | 145.4 | A |
| $V_{SD}$ | Source-Drain Diode Forward Voltage | $V_{GS}$=0V , $I_F$=20A | --- | 0.86 | 1.1 | V |
| Trr | Reverse Recovery Time | $I_F$=32A,$T_J$=25℃ dI/dt=39A/us | --- | 43 | --- | ns |
| Qrr | Reverse Recovery C45rge | | --- | 0.03 | --- | 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=10V,$V_G$=4.5V,L=0.5mH
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

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

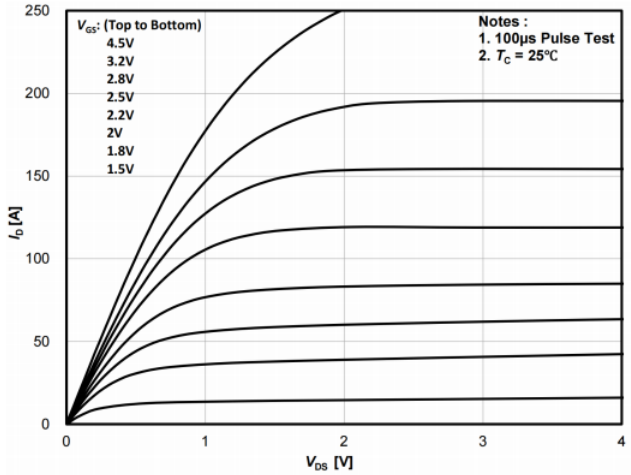



Figure 1. **On-Region Characteristics**

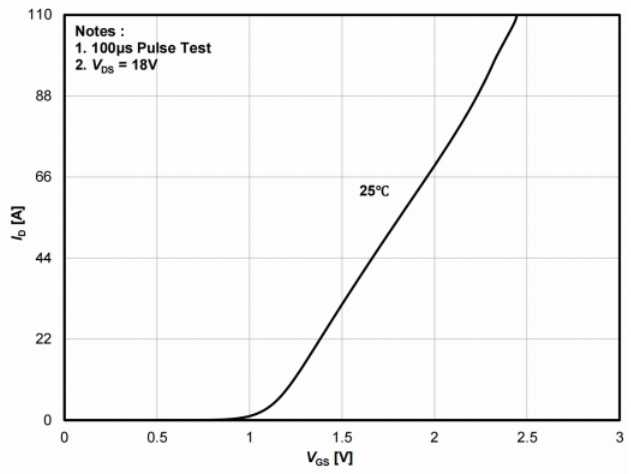



Figure 2. **Transfer Characteristics**

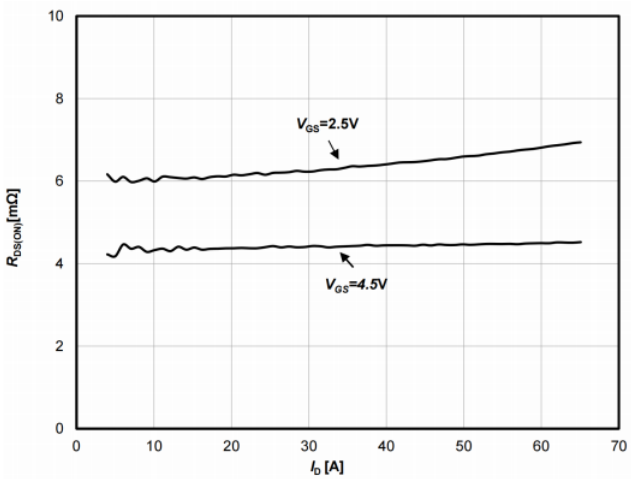



Figure 3. **On Resistance vs. Drain Current**

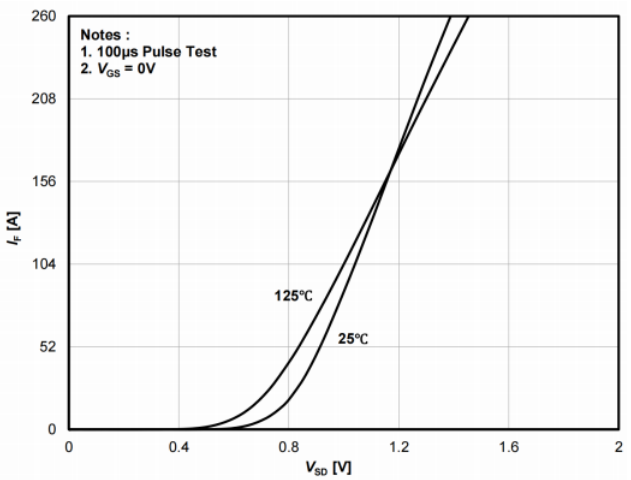



Figure 4. **Diode Forward Voltage vs. Current**

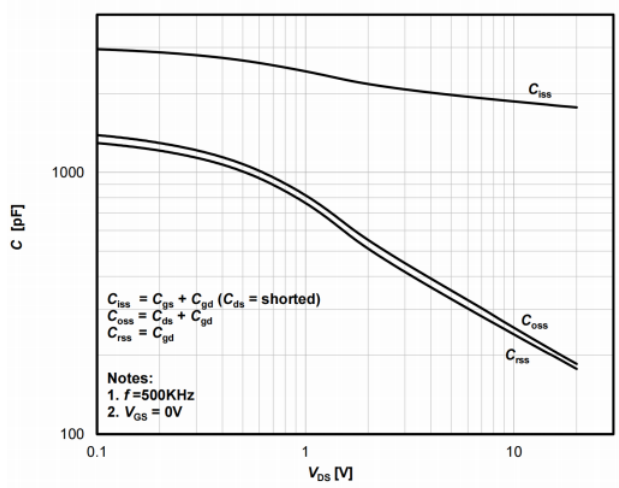



Figure 5. **Capacitance Characteristics**

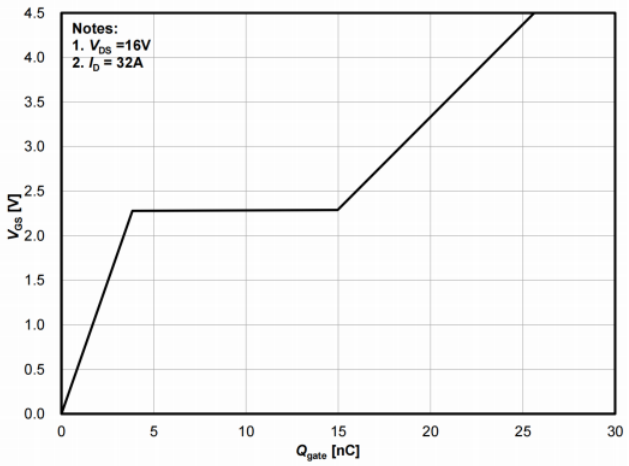



Figure 6. **Gate Charge Characteristics**

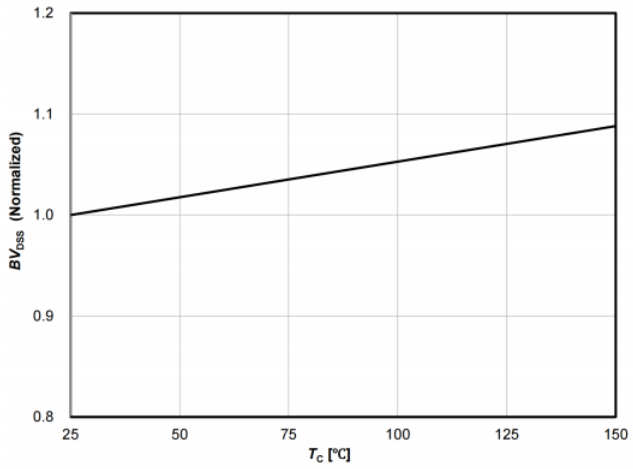



Figure 7. **Normalized $BV_{DSS}$ vs. Temperature**

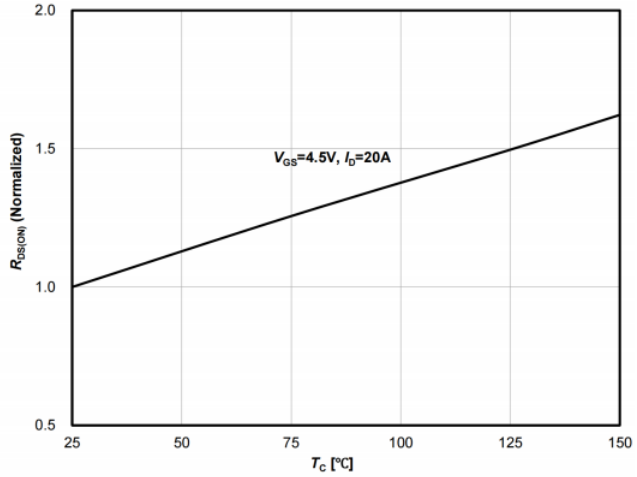



Figure 8. **Normalized On-Resistance Variation vs. Temperature**

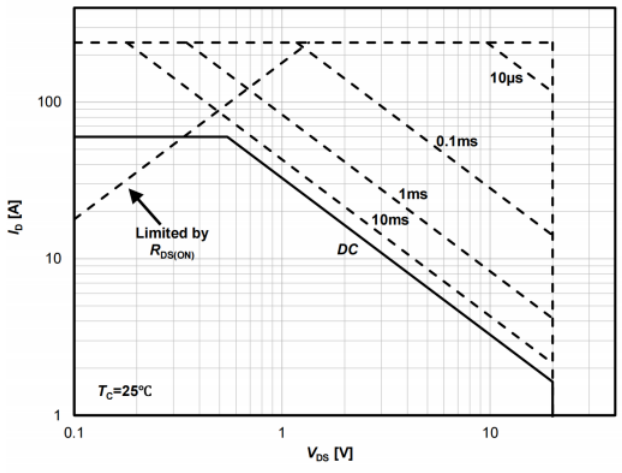



Figure 9. **Safe Operating Area** [3)]

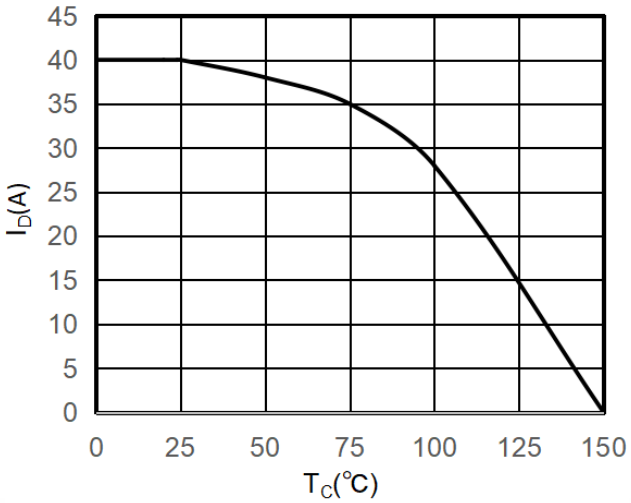



Figure 10. **Drain Current vs. Temperature**

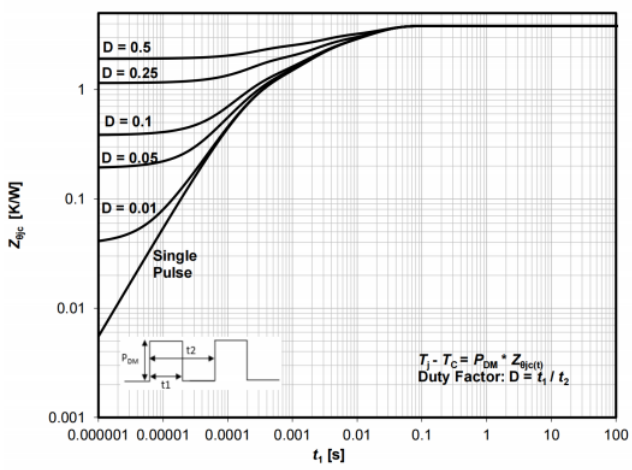
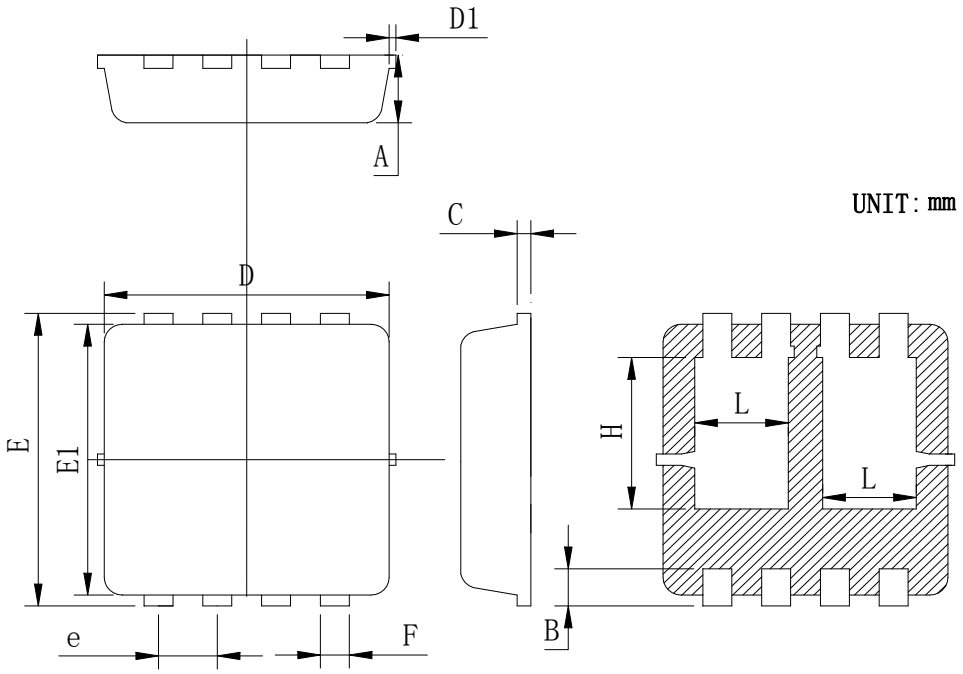



Figure 11. **Transient Thermal Impedance**

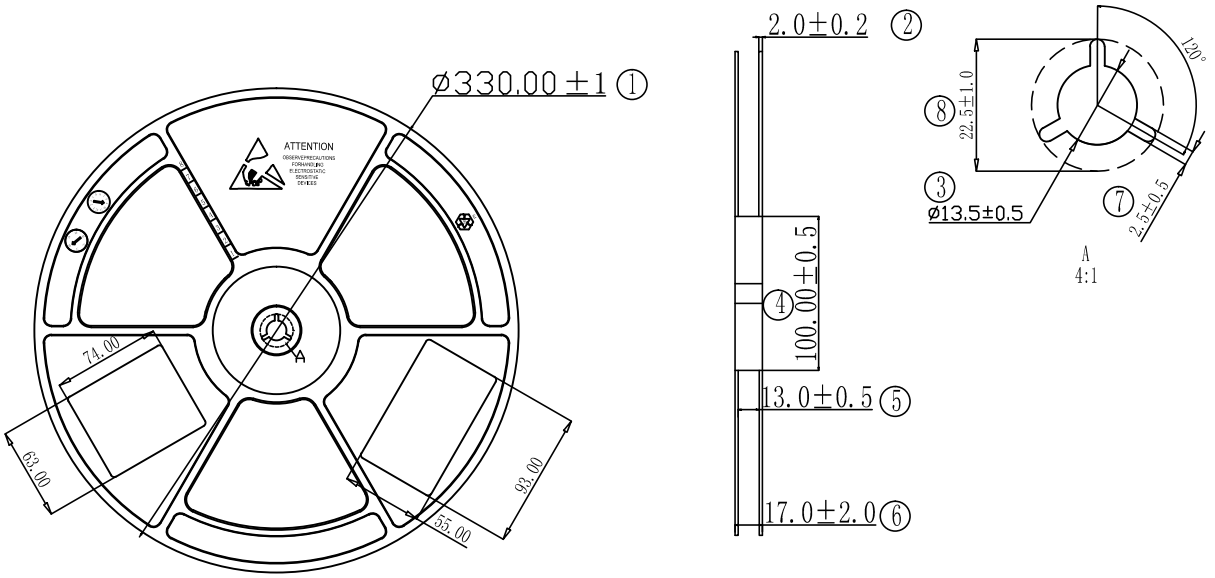
## DFN3X3-8D Package Outline Data



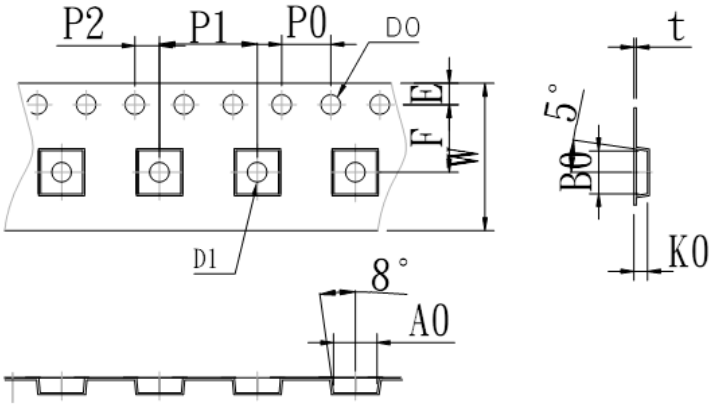

| Symbol | Min | Typ | Max |
|---|---|---|---|
| A | 0.725 | 0.775 | 0.825 |
| B | 0.28 | 0.38 | 0.48 |
| C | 0.13 | 0.15 | 0.20 |
| D | 3.05 | 3.15 | 3.25 |
| D1 | | | 0.10 |
| E | 3.25 | 3.35 | 3.45 |
| E1 | 3.0 | 3.1 | 3.2 |
| e | 0.60 | 0.65 | 0.70 |
| F | 0.27 | 0.32 | 0.37 |
| H | 1.63 | 1.73 | 1.83 |
| L | 0.93 | 1.03 | 1.13 |

## 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：

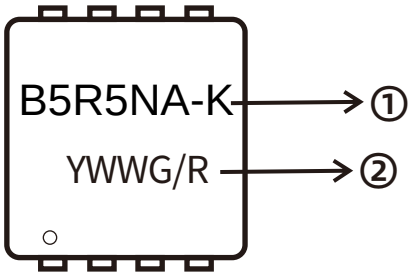
① . Part NO.

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) |
|---|---|---|
| 1.1 | 2026-04-22 | Release of final version |

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