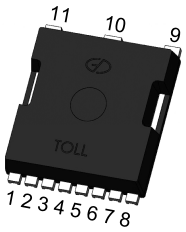
# N-Channel 100V (D-S) Power MOSFET

## Features

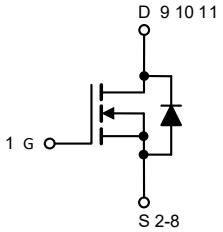
- 100% Avalanche Tested
- Extremely Low Losses with Low FOM Rdson*Qg
- Halogen Free, Pb-Free
- RoHS Compliant




TOLL

## Applications

- DC/DC
- Synchronous Rectification in SMPS
- Hard Switching and High Speed Circuit




## Absolute Maximum Ratings ($T_J$=25°C unless otherwise noted)

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain Source Voltage | | $V_{DS}$ | 100 | V |
| Gate Source Voltage | | $V_{GS}$ | ±20 | V |
| Drain Current, Continuous $V_{GS}$=10V | $T_C$=25°C | $I_D$ | 166 | A |
| | $T_C$=100°C | | 105 | |
| Drain Current, Pulsed *(Note 1)* | | $I_{DM}$ | 664 | A |
| Single Avalanche Energy *(Note 2)* | | $E_{AS}$ | 473 | mJ |
| Power Dissipation | $T_C$=25°C | $P_D$ | 156 | W |
| | $T_C$=100°C | | 63 | |
| Operating Junction/ Storage Temperature Range | | $T_J$/ $T_{STG}$ | -55 to +150 | °C |

*Note 1: Single Pulse; $t_p \leq 1us$.*
*Note 2: $V_{DD}$ = 50V, $V_{GS}$ = 10V, L = 0.5mH, $R_G$ = 25Ω, starting $T_J$ = 25 °C.*

## Thermal Characteristics

| Parameter | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance Junction to Case | $R_{thJC}$ | 0.8 | °C/W |
| Thermal Resistance Junction to Ambient *(Note 3)* | $R_{thJA}$ | 62.5 | °C/W |

*Note 3: Device mounted on 1 square inch FR4 PCB board, with 2oz single-sided copper, in a 25°C still air environment.*

## Electrical Characteristics ($T_J$ =25°C unless otherwise noted)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=250μA | 100 | -- | -- | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=100V, $V_{GS}$=0V | -- | -- | 1 | uA |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}$=$V_{GS}$, $I_{DS}$=250uA | 2.5 | 2.9 | 3.3 | V |
| Gate Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V, $V_{DS}$=0V | -- | -- | ±100 | nA |
| Drain-Source On-state Resistance *(Note 4)* | $R_{DS(on)}$ | $V_{GS}$=10V, $I_D$=20A | -- | 2.6 | 3 | mΩ |
| Total Gate Charge | $Q_g$ | $V_{GS(off)}$=0V, $V_{GS(on)}$=10V, $V_{DD}$=50V, $I_D$=20A | -- | 62 | -- | nC |
| Gate Source Charge | $Q_{gs}$ | | -- | 15 | -- | |
| Gate Drain Charge | $Q_{gd}$ | | -- | 18 | -- | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{GS}$=10V, $V_{DD}$=50V, $R_L$=0.75Ω, $R_G$=3Ω | -- | 22 | -- | ns |
| Turn-on Rise Time | $t_r$ | | -- | 96 | -- | |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 46 | -- | |
| Turn-off Fall Time | $t_f$ | | -- | 17 | -- | |
| Gate Resistance | $R_g$ | $V_{GS}$=0V, f=1MHz, open drain | -- | 2.3 | -- | Ω |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=100V, f=1MHz | -- | 4415 | -- | pF |
| Output Capacitance | $C_{oss}$ | | -- | 655 | -- | |
| Reverse Transfer Capacitance | $C_{rss}$ | | -- | 10 | -- | |

## Reverse Diode Characteristics ($T_J$ =25°C unless otherwise noted)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Forward Current, Continuous | $I_{SD}$ | $T_C$=25°C | -- | -- | 72 | A |
| Diode Forward Voltage *(Note 4)* | $V_{SD}$ | $I_F$=20A, $V_{GS}$=0V | -- | -- | 1.2 | V |
| Reverse Recovery Time | $T_{rr}$ | $V_R$ =50V, $I_F$ =20A, di/dt = 100 A/μs | -- | 62 | -- | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | -- | 69 | -- | nC |

*Note 4: Pulse test; pulse width ≤ 380μs, duty cycle ≤ 1%.*

## Typical Characteristics Curves ($T_J$ = 25℃ unless otherwise noted)

Fig. 1 - Output Characteristics

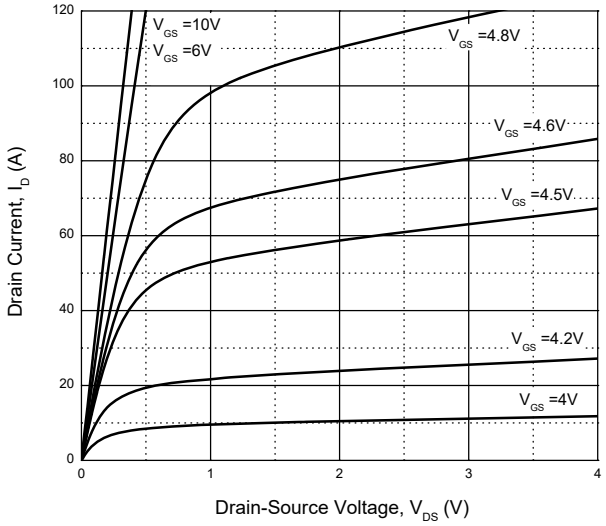



Fig. 2 - Transfer Characteristics

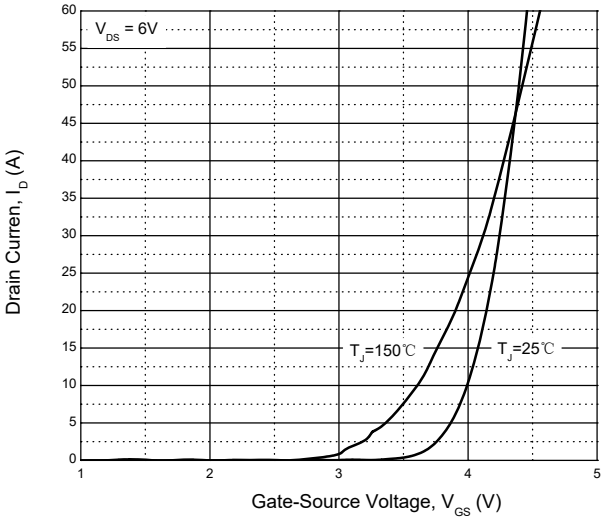



Fig. 3 - Drain-Source On-Resistance

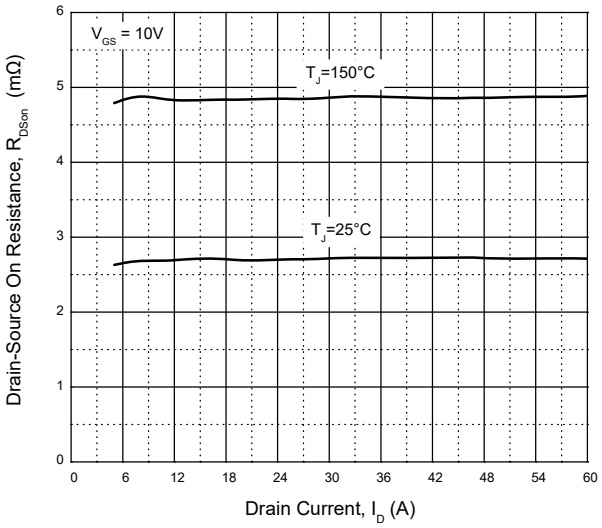



Fig. 4 - Normalized On-Resistance

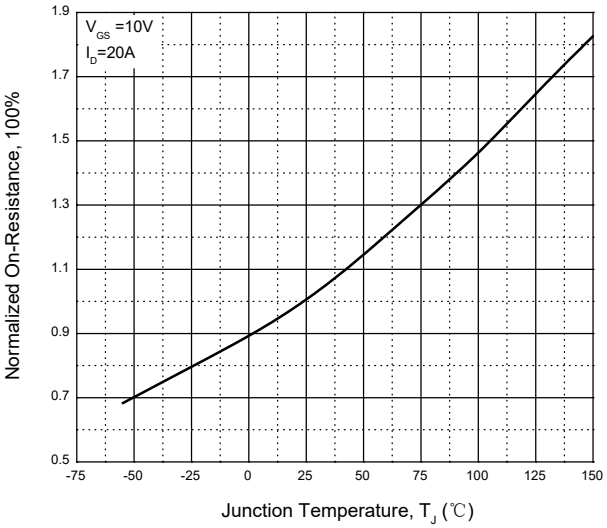



Fig. 5 - Drain-Source On-Resistance

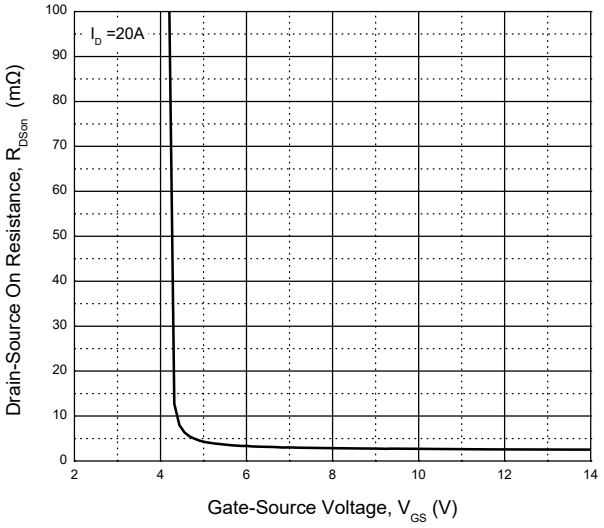
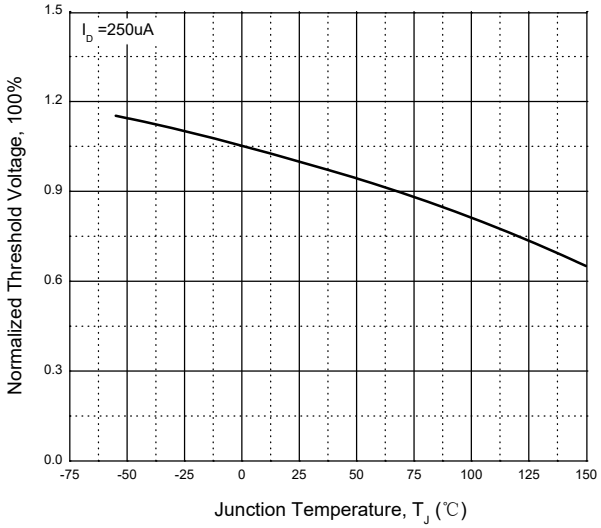



Fig. 6 - Normalized Threshold Voltage



## Typical Characteristics Curves ($T_J$ = 25℃ unless otherwise noted)

Fig. 7 - Capacitance

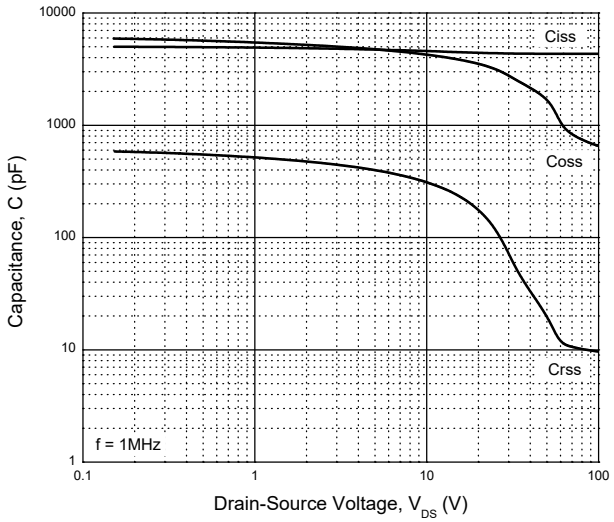



Fig. 8 - Gate Charge

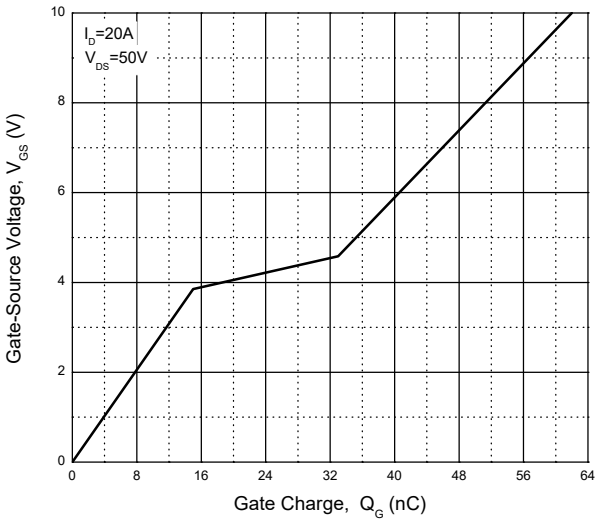



Fig. 9 - Forward Characteristic

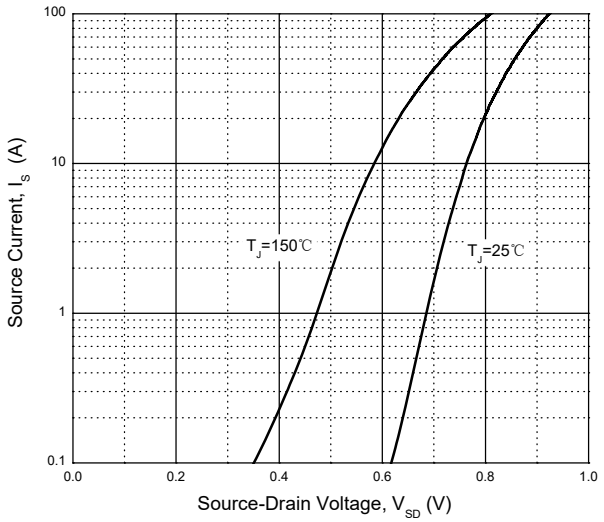



Fig. 10 - Safe Operating Area

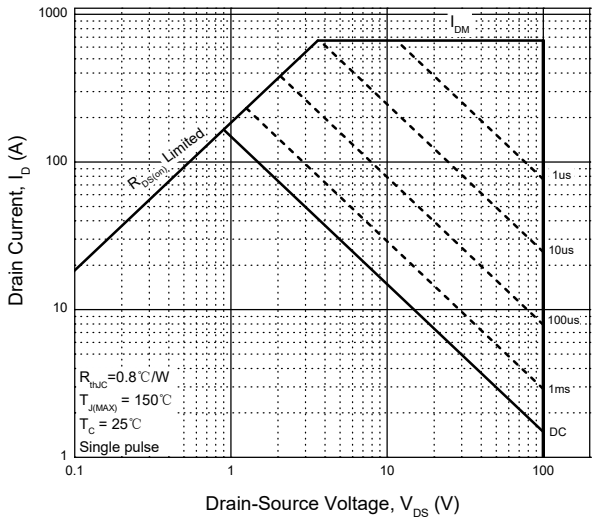
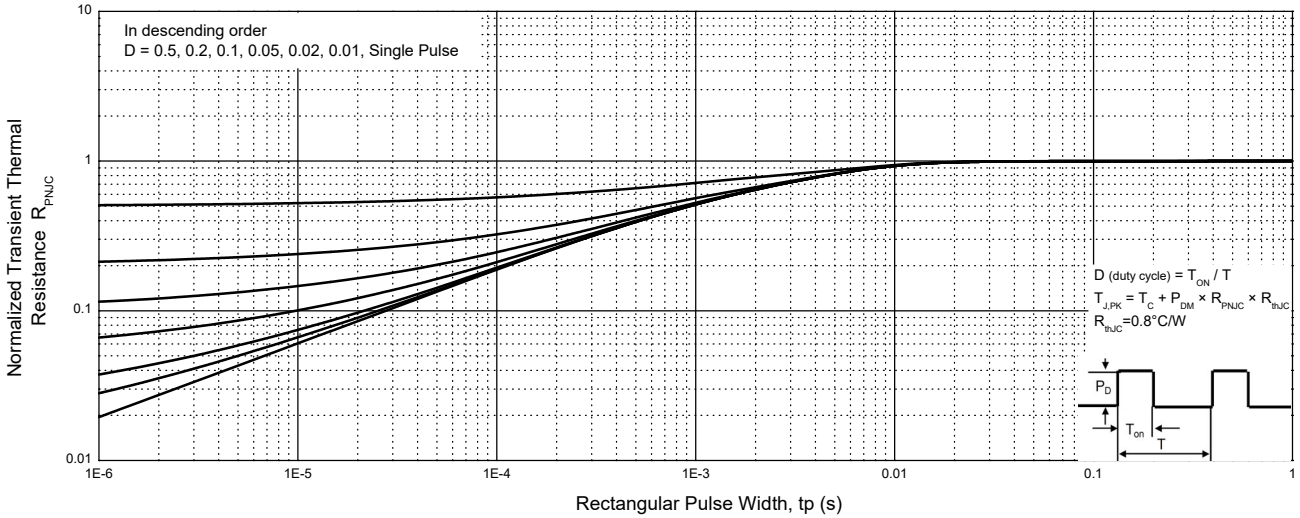



Fig.11 - Normalized Thermal Impedance, Junction-Case



## Typical Characteristics Curves (TJ = 25°C unless otherwise noted)

Fig. 12 - Power Derating

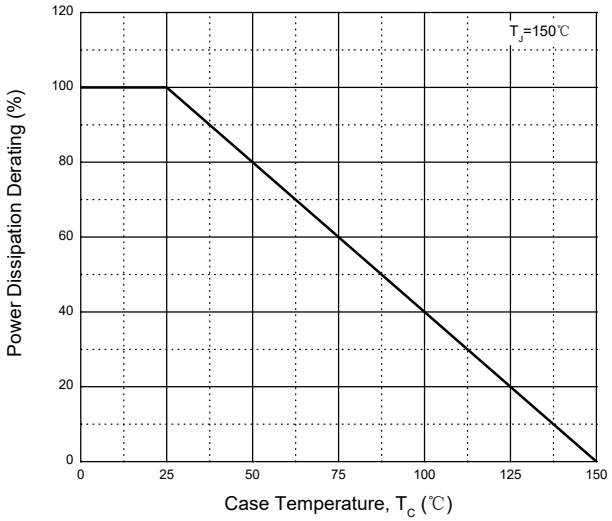
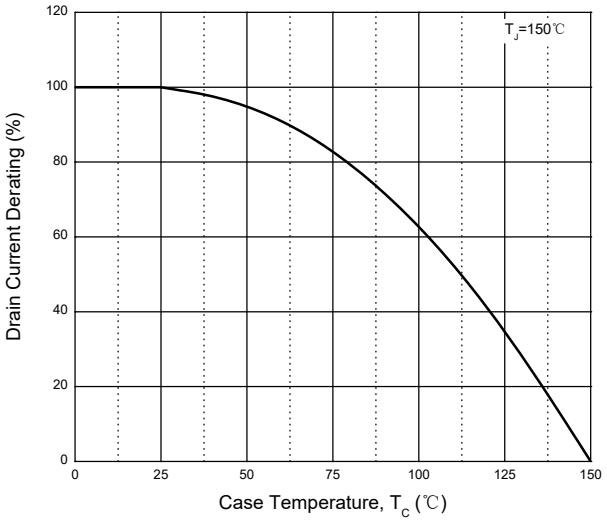
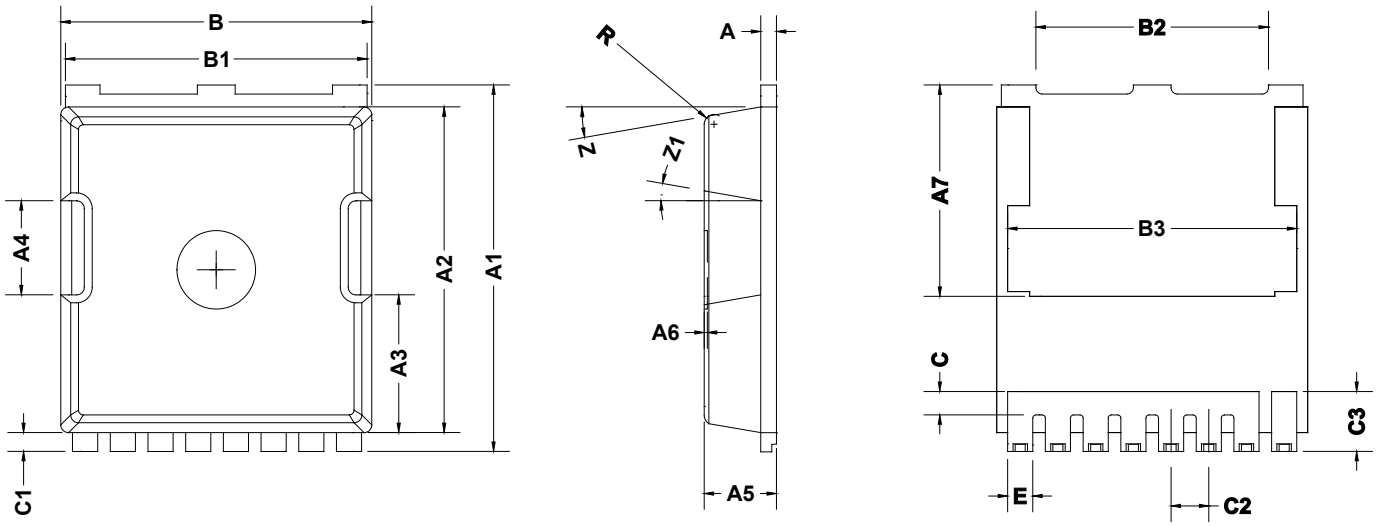



Fig. 13 - Drain Current Derating



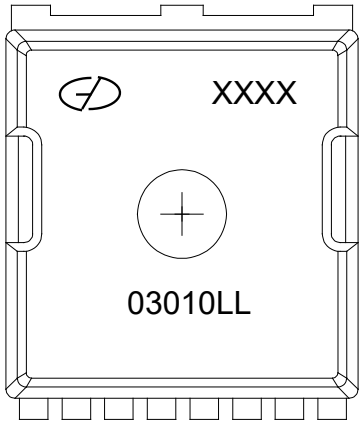
## Package Outline Dimensions (Unit: millimeters)

# TOLL




| TOLL | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Min. | Nom. | Max. | | Min. | Nom. | Max. |
| A | 0.400 | 0.500 | 0.600 | B2 | 7.300 | 7.400 | 7.500 |
| A1 | 11.58 | 11.68 | 11.78 | B3 | 9.100 | 9.200 | 9.300 |
| A2 | 10.33 | 10.38 | 10.43 | C | 0.650 | 0.750 | 0.850 |
| A3 | 4.290 | 4.390 | 4.490 | C1 | 0.500 | 0.600 | 0.700 |
| A4 | 2.900 | 3.000 | 3.100 | C2 | 1.100 | 1.200 | 1.300 |
| A5 | 2.250 | 2.300 | 2.350 | C3 | 1.810 | 1.910 | 2.010 |
| A6 | - | 0.100 | 0.200 | E | 0.700 | 0.800 | 0.900 |
| A7 | 6.640 | 6.740 | 6.840 | R | - | - | 0.3 |
| B | 9.850 | 9.900 | 9.950 | Z | - | - | 10° |
| B1 | 9.500 | 9.600 | 9.700 | Z1 | - | 10° | - |

## Marking Outline




Part Name: GMN03010LL

1. Logo Mark:
2. P/N Mark: 03010LL
3. Date Code: XXXX

## Revision History

| Version | Date | Major Changes |
|---|---|---|
| Rev.A | 2025.11.25 | Official Release |
| | | |
| | | |

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