

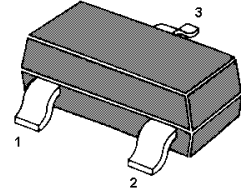
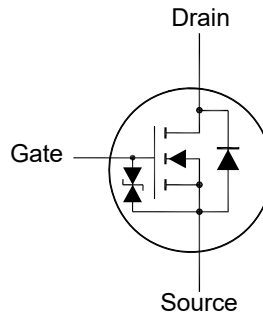
MKA03N095LZK

N-Channel Enhancement Mode MOSFET

Features

- Advanced trench cell design
- Built-in G-S Protection Diode
- Typical ESD Protection HBM Class 2

| Classification | Voltage Range(V) |
|----------------|------------------|
| 0A | < 125 |
| 0B | 125 to < 250 |
| 1A | 250 to < 500 |
| 1B | 500 to < 1000 |
| 1C | 1000 to < 2000 |
| 2 | 2000 to < 4000 |
| 3A | 4000 to < 8000 |
| 3B | ≥ 8000 |



1. Gate 2. Source 3. Drain
SOT-23 Plastic Package

Applications

- Portable appliances
- Power management

Absolute Maximum Ratings(at $T_a = 25^\circ\text{C}$ unless otherwise specified)

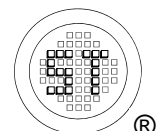
| Parameter | Symbol | Value | Unit |
|--|----------------|-------------------------------|------------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current | I_D | 3.6 | A |
| Pulsed Drain Current ¹⁾ | I_{DM} | 18 | A |
| Total Power Dissipation ²⁾ | P_{tot} | 1.4 1 | W |
| | | $t \leq 10$ s Steady State | |
| Operating Junction and Storage Temperature Range | T_j, T_{stg} | - 55 to + 150 | $^\circ\text{C}$ |

Thermal Characteristics

| Parameter | Symbol | Max. | Unit |
|---|-----------------|-------------------------------|--------------------|
| Thermal Resistance from Junction to Ambient ²⁾ | $R_{\theta JA}$ | 89 125 | $^\circ\text{C/W}$ |
| | | $t \leq 10$ s Steady State | |

¹⁾ Pulse Test: Pulse Width $\leq 100 \mu\text{s}$, Duty Cycle $\leq 2\%$, Repetitive rating, pulse width limited by junction temperature $T_{J(\text{MAX})}=150^\circ\text{C}$.

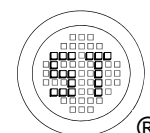
²⁾ Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.



MKA03N095LZK

Characteristics at $T_a = 25^\circ\text{C}$ unless otherwise specified

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|--|---------------|------|------------|----------|---------------|
| STATIC PARAMETERS | | | | | |
| Drain-Source Breakdown Voltage at $I_D = 250 \mu\text{A}$ | $V_{(BR)DSS}$ | 30 | - | - | V |
| Zero Gate Voltage Drain Current at $V_{DS} = 24 \text{ V}$ | I_{DSS} | - | - | 1 | μA |
| Gate-Source Leakage at $V_{GS} = \pm 16 \text{ V}$ | I_{GSS} | - | - | ± 10 | μA |
| Gate-Source Threshold Voltage at $V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$ | $V_{GS(th)}$ | 1 | - | 2.2 | V |
| Drain-Source On-State Resistance at $V_{GS} = 10 \text{ V}$, $I_D = 3.2 \text{ A}$ at $V_{GS} = 4.5 \text{ V}$, $I_D = 2.6 \text{ A}$ | $R_{DS(ON)}$ | - | - | 65 95 | m Ω |
| DYNAMIC PARAMETERS | | | | | |
| Forward Transconductance at $V_{DS} = 5 \text{ V}$, $I_D = 3 \text{ A}$ | g_{fs} | - | 6.3 | - | S |
| Gate Resistance at $V_{DS} = 0 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$ | R_g | - | 4.4 | - | Ω |
| Input Capacitance at $V_{DS} = 15 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$ | C_{iss} | - | 313 | - | pF |
| Output Capacitance at $V_{DS} = 15 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$ | C_{oss} | - | 42 | - | pF |
| Reverse Transfer Capacitance at $V_{DS} = 15 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$ | C_{rss} | - | 22 | - | pF |
| Total Gate Charge at $V_{DS} = 15 \text{ V}$, $I_D = 3 \text{ A}$, $V_{GS} = 10 \text{ V}$ at $V_{DS} = 15 \text{ V}$, $I_D = 3 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ | Q_g | - | 6.7 3.2 | - | nC |
| Gate to Source Charge at $V_{DS} = 15 \text{ V}$, $I_D = 3 \text{ A}$, $V_{GS} = 10 \text{ V}$ | Q_{gs} | - | 1.1 | - | nC |
| Gate to Drain Charge at $V_{DS} = 15 \text{ V}$, $I_D = 3 \text{ A}$, $V_{GS} = 10 \text{ V}$ | Q_{gd} | - | 1.1 | - | nC |
| Turn-On Delay Time at $V_{DS} = 15 \text{ V}$, $I_D = 3 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_G = 3.9 \Omega$ | $t_{d(on)}$ | - | 6 | - | ns |
| Turn-On Rise Time at $V_{DS} = 15 \text{ V}$, $I_D = 3 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_G = 3.9 \Omega$ | t_r | - | 13 | - | ns |
| Turn-Off Delay Time at $V_{DS} = 15 \text{ V}$, $I_D = 3 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_G = 3.9 \Omega$ | $t_{d(off)}$ | - | 8 | - | ns |
| Turn-Off Fall Time at $V_{DS} = 15 \text{ V}$, $I_D = 3 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_G = 3.9 \Omega$ | t_f | - | 3 | - | ns |
| Body-Diode PARAMETERS | | | | | |
| Drain-Source Diode Forward Voltage at $I_S = 3 \text{ A}$ | V_{SD} | - | - | 1.2 | V |
| Body-Diode Continuous Current | I_S | - | - | 3.6 | A |
| Body Diode Reverse Recovery Time at $I_S = 3 \text{ A}$, $di/dt = 100 \text{ A} / \mu\text{s}$ | t_{rr} | - | 5.4 | - | nS |
| Body Diode Reverse Recovery Charge at $I_S = 3 \text{ A}$, $di/dt = 100 \text{ A} / \mu\text{s}$ | Q_{rr} | - | 1.8 | - | nC |



Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

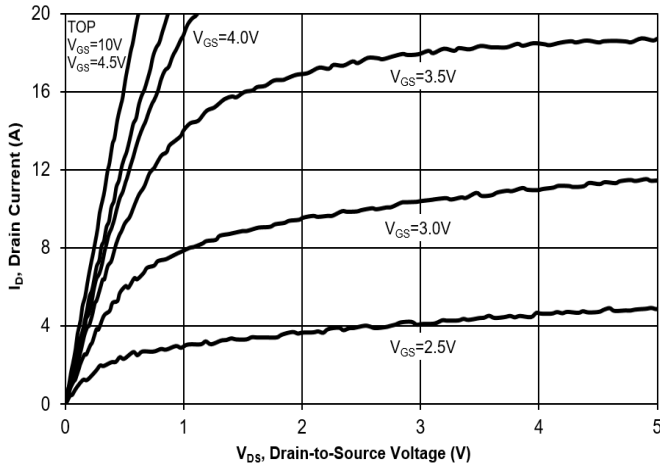


Fig. 2 Typical Transfer Characteristics

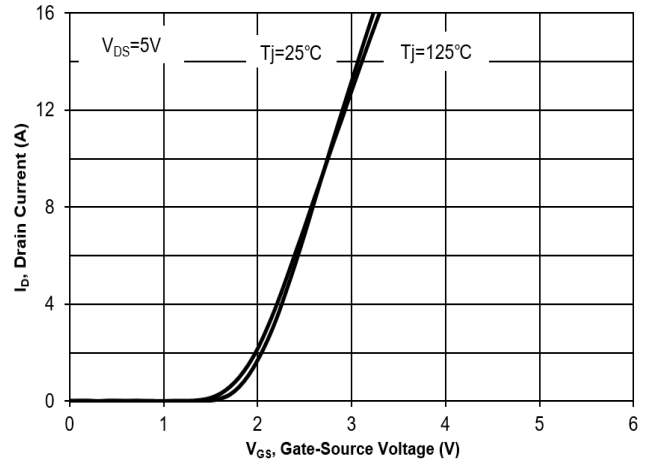


Fig. 3 on-Resistance vs. Drain Current

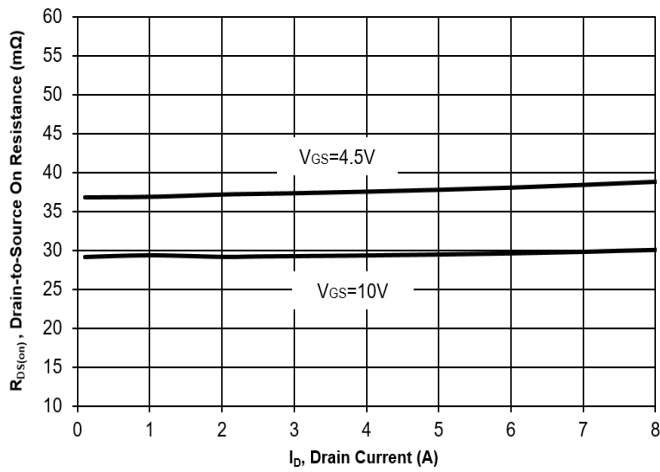


Fig. 4 on-Resistance vs. Gate-Source Voltage

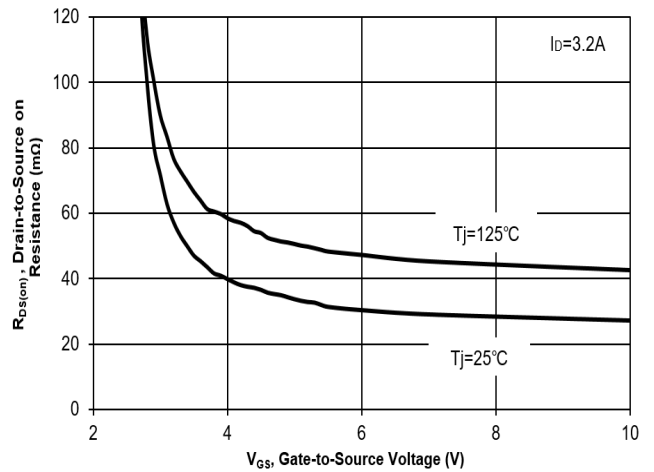


Fig. 5 on-Resistance vs. Tj

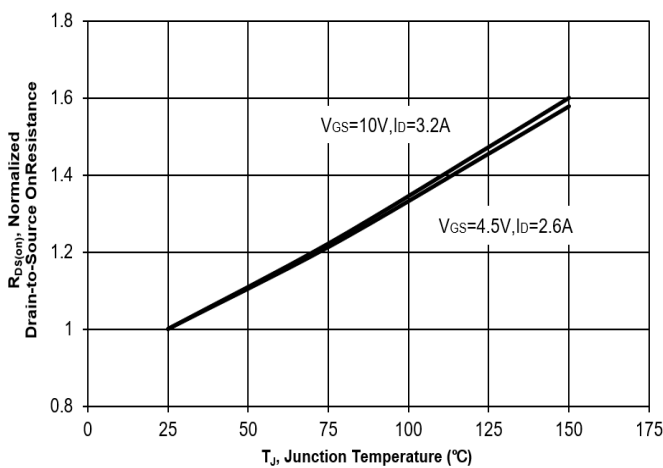
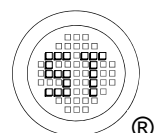
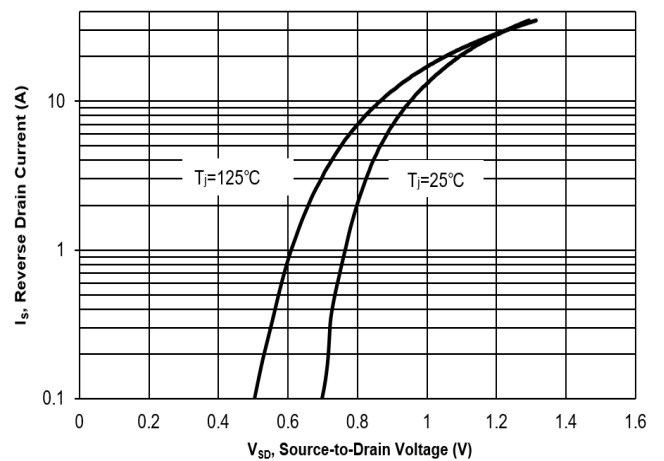


Fig. 6 Body Diodes Forward Characteristics



Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

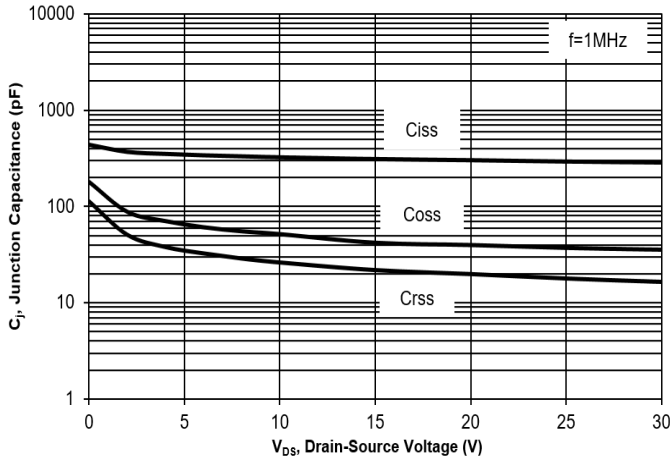


Fig. 8 Drain-Source Leakage Current vs. Tj

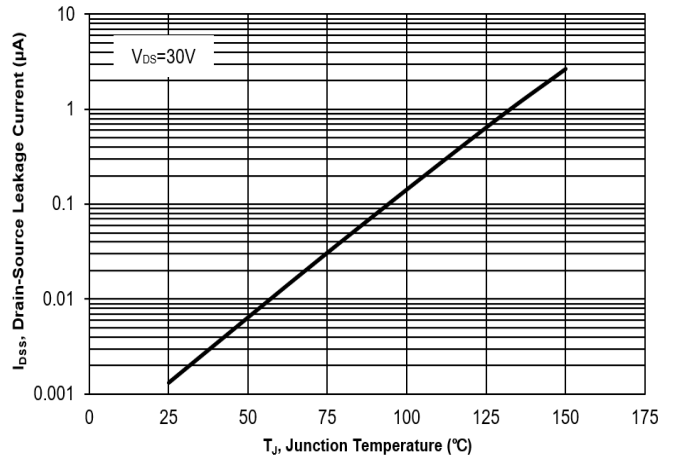


Fig. 9 V(BR)DSS vs. Junction Temperature

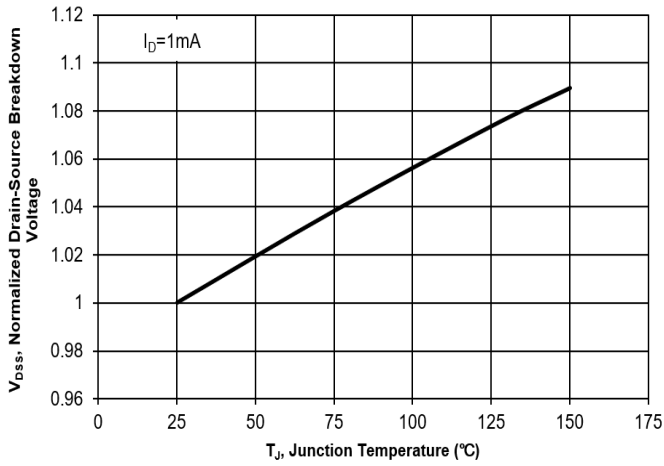


Fig. 10 Gate Threshold Variation vs. Tj

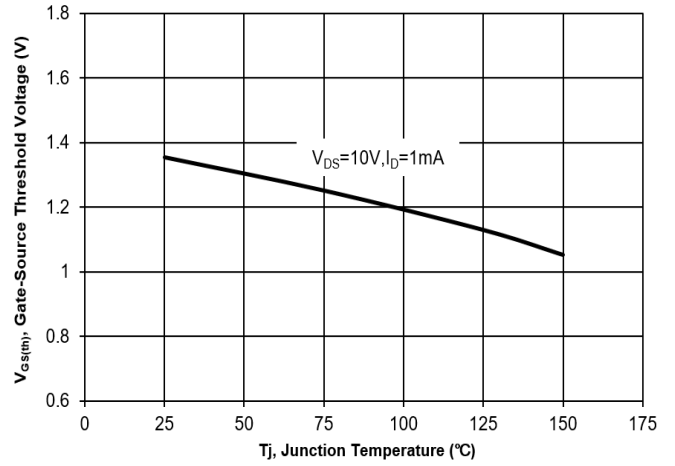
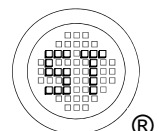
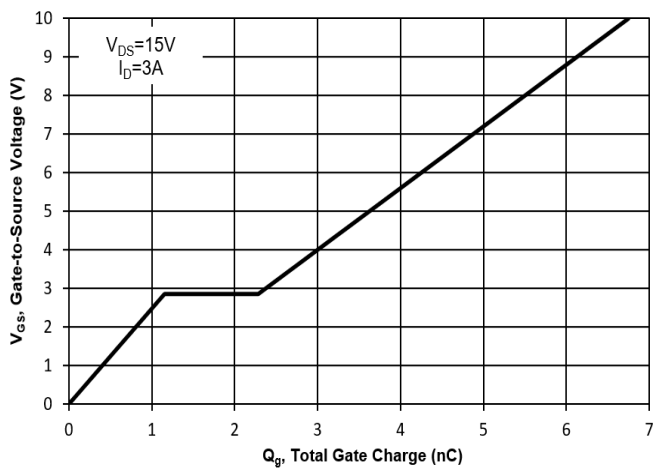


Fig. 11 Gate Charge



Test Circuits

Fig.1-1 Switching times test circuit

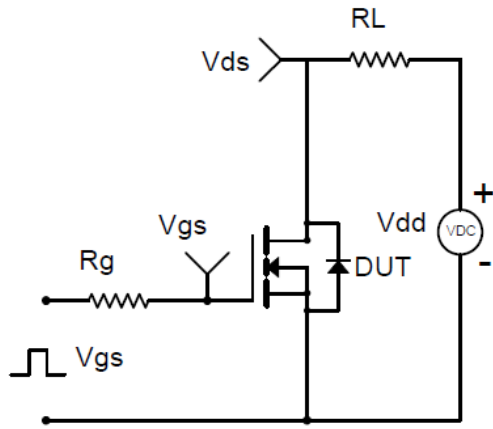


Fig.1-2 Switching Waveform

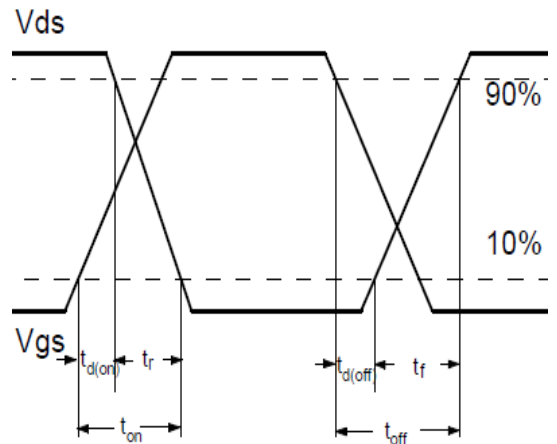


Fig.2-1 Gate charge test circuit

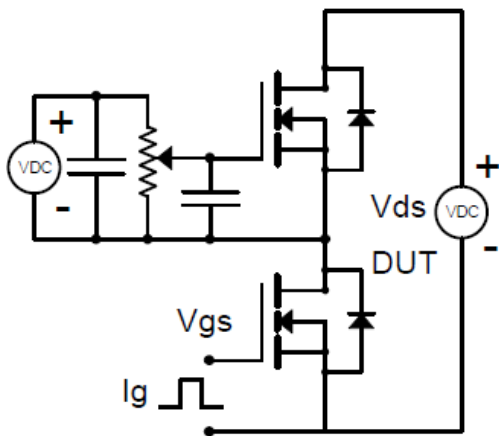
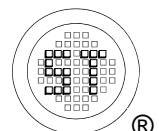
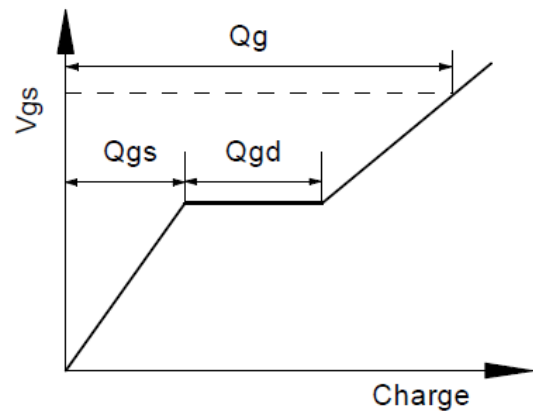


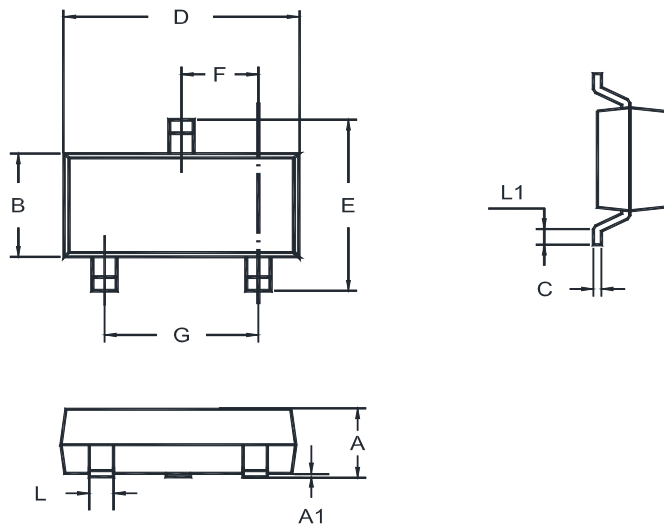
Fig.2-2 Gate charge waveform



MKA03N095LZK

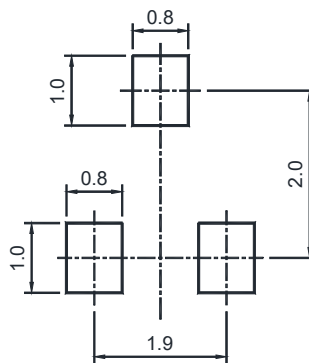
Package Outline (Dimensions in mm)

SOT-23



| Unit | A | A1 | B | C | D | E | F | G | L | L1 |
|------|------|-------|------|------|------|-----|------|------|------|-----|
| mm | 1.20 | 0.100 | 1.40 | 0.19 | 3.04 | 2.6 | 1.02 | 2.04 | 0.51 | 0.2 |
| | 0.89 | 0.013 | 1.20 | 0.08 | 2.80 | 2.2 | 0.89 | 1.78 | 0.37 | MIN |

Recommended Soldering Footprint

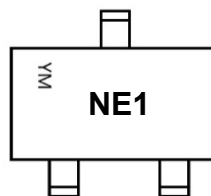


Packing information

| Package | Tape Width (mm) | Pitch | | Reel Size | | Per Reel Packing Quantity |
|---------|-----------------|---------|---------------|-----------|------|---------------------------|
| | | mm | inch | mm | inch | |
| SOT-23 | 8 | 4 ± 0.1 | 0.157 ± 0.004 | 178 | 7 | 3,000 |

Marking information

- " NE1 " = Part No.
 - " YM " = Date Code Marking
 - " Y " = Year
 - " M " = Month
- Font type: Arial



Disclaimer: Our company reserve the right to make modifications, enhancements, improvements, corrections or other changes to improve product design, functions and reliability, anytime without notice. Semtech Electronics Limited makes no warranties, representations or warranties regarding the suitability of its products for any particular purpose, and does not accept any liability arising from the application or use of any product or circuit such as: Apply to medical, military, aircraft, space or life support equipment and expressly waive any and all liability, including but not limited to special, consequential or collateral damage.

