

| | | | |
|----------------|------------------------------------|------|--------|
| Product | Alkaline battery, 1.5 volts | Page | 1 of 5 |
| Size | LR6, Mignon, AA | | |

1. Type designation:

IEC LR6
JIS: AM3
ANSI : AA



2. Chemical system:

Electrolyte-zinc-manganese dioxide (mercury & cadmium free)

3. Dimension:

Ø 13.5-14.5
Height: 49.2-50.5

4. Norminal voltage:

1.5 Volts

5. Norminal weight:

The weight of each battery is approximately 24.0 g.

6. Heavy Metal content (%):

| Mercury content | Cadmium | Lead |
|-----------------|---------|---------|
| ≤ 1ppm | ≤ 10ppm | ≤ 40ppm |

7. Appearance and terminal:

Battery shall be clean and have no dirt, no leakage, and no deformation which may affect their performance and actual use and shall have clearly visible markings.

8. Battery capacity: (Test environment : 20°C±2,60%±15%R.H)

(Load resistance:**43ohms**, Daily period:**24h/d**, Cut off voltage:**0.9V** ; According to as the above the same discharge condition, the capacity of each battery is approximately:**2600mAh**)

9. Storage characteristics:

After 12 months storage at 20°C, 90% capacitance of fresh cells.

After 24 months storage at 20°C, 85% capacitance of fresh cells.

| | | | |
|----------------|------------------------------------|------|--------|
| Product | Alkaline battery, 1.5 volts | Page | 2 of 5 |
| Size | LR6, Mignon, AA | | |

10. Electrical characteristics:

(Test environment: 20°C±2, 60%±15%R.H)(Load resistance: **3.9ohms**, Measure time: **0.3S**)

(All samples shall be normalized for a minimum of 8 hours at the above environment prior to measurement)

| | OCV (V) | CCV (V) | SCC (A) |
|-------------------------|---------|---------|---------|
| Initial | ≥ 1.59 | ≥ 1.45 | ≥ 10 |
| After 12 months storage | ≥ 1.57 | ≥ 1.43 | ≥ 8 |

Remark: OCV: Open Circuit Voltage; CCV: Close Circuit Voltage; SCC: Short Circuit Current

11. Discharge test (service life) (Test environment: 20°C±2, 45%--75%R.H)

| LOAD Resistance | 10Ω | 24Ω | 3.9Ω | 10Ω | 43Ω | 1000mA |
|-------------------------|---------|---------|------------|---------------|-------|--------------------|
| Daily Period | 24h/d | pulse | 1h/day | 1h/day | 1h/d | 10s/min, 1h/d |
| Cut off Voltage | 0.9V | 1.0V | 0.8V | 0.9V | 0.9V | 0.9V |
| Initial | ≥ 19.0h | ≥ 43h | ≥ 7.0h | ≥ 19.0h | ≥ 90h | ≥ 350times |
| After 12 months storage | ≥ 18.0h | ≥ 40h | ≥ 6.5h | ≥ 18.0h | ≥ 85h | ≥ 320times |
| Application | / | control | Motor, toy | Tape recorder | radio | Camera flash light |

Remark: The initial discharge test shall commence within 30 days of manufacture.

The discharge time is the minimum average duration (MAD).

Test quantity: n=9pcs (for per discharge test)

12. Discharge curve:

- ① 10ohms 24h/d to 0.9V continuous discharge curve (Appendix 1)
- ② 10ohms 1h/d to 0.9V discharge curve (Appendix 1)
- ③ 3.9ohms 1h/d to 0.8V discharge curve (Appendix 1)
- ④ 24ohms 15s/min, 8h/d to 1.0V discharge curve (Appendix 2)
- ⑤ 43ohms 4h/d to 0.9V discharge curve (Appendix 2)
- ⑥ 1000mA, 10s/min, 1h/d to 0.9V discharge curve (Appendix 2)

13. Leakage-proof structure:

- ① The top seal is made of imported special nylon from DUPONT, has a much stable vent pressure.
- ② The sealing location of the battery is provided with double beading scores to make the structure tighter.
- ③ Using imported special sealing glue, with more reliable leakage-proof performance.

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14. Safety test (Test environment: 20°C±2,60%±15%R.H)

| Test item | Test method | Test pcs | Requirements |
|---|--|----------|----------------------------|
| Over-discharge leakage test | 10ohms (24h/d) 48hours | 9pcs | No leakage |
| | 3.9ohms (4min/h,8h/d) to 0.6V | 9pcs | No leakage |
| | 1000mA (10s/min, 1h/d) to 0.6V | 9pcs | No leakage |
| | 10ohms (1h/d) to 0.6V | 9pcs | No leakage |
| | 43ohms (4h/d) to 0.6V | 9pcs | No leakage |
| | 24ohms (15s/mn, 8h/d) to 0.6V | 9pcs | No leakage |
| High temperature test | 60±2°C,RH:90±5%, after 20 days storage, the cells shall be stored in an ambient temperature of 20±2°C,RH:60±5%, for 4-24hours. | 40 | No leakage |
| One piece of battery Short circuit test | The terminal of an un-discharged battery is connected by wire. The circuit is completely for 24hours or until the case temperature has return to environment. | 10 | No leakage No explosion |
| Reversible charge | 4 pieces of battery are in series connected and one of them is under incorrect polarity for 24 hours or until the case temperature has return to environment.. | 40 | No explosion |
| Over discharge | One battery discharge 43ohms to 0.6V, then in series connect with 3 pieces of new battery with 20ohm 24h | 36 | No explosion |
| Four pieces of battery in series Short circuit test | The terminal of four pieces of battery is connected by wire. The circuit is completely for 24hours or until the case temperature has return to environment. | 40 | No explosion |
| Free fall test | The battery free drops from one-meter height for 6 times, then store for 1h | 10 | No explosion |
| Impact under high and low temperature | Un-discharged battery store in test box under 70±2°C for 24h,then change to -20°C for 24h, repeat the above condition for 10 cycles. | 20 | No explosion |
| Storage after partial discharge | 50% discharged battery stored under 45±5°C for 30days | 9 | No leakage No explosion |

15. Expiry period:

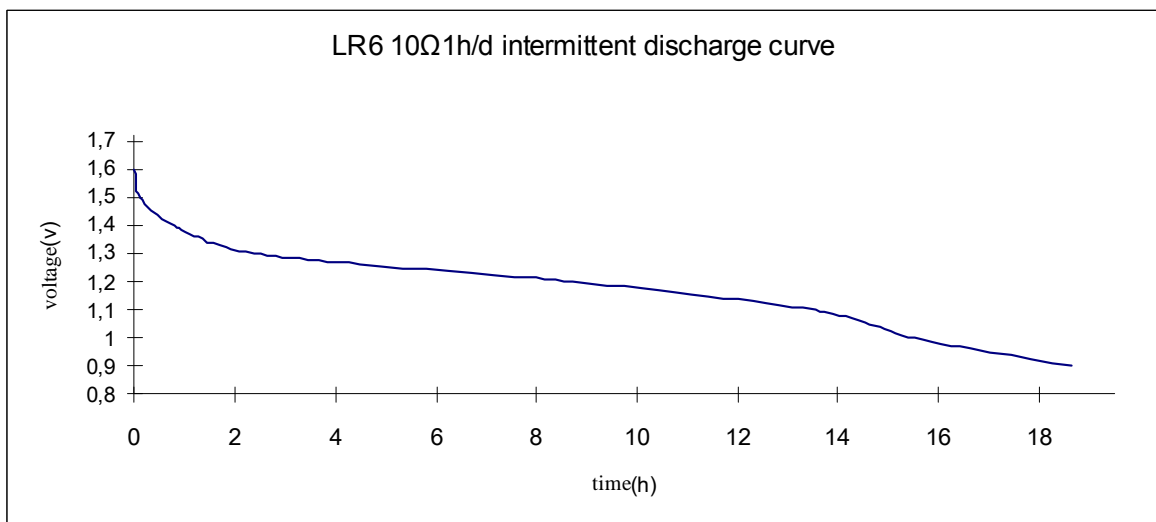
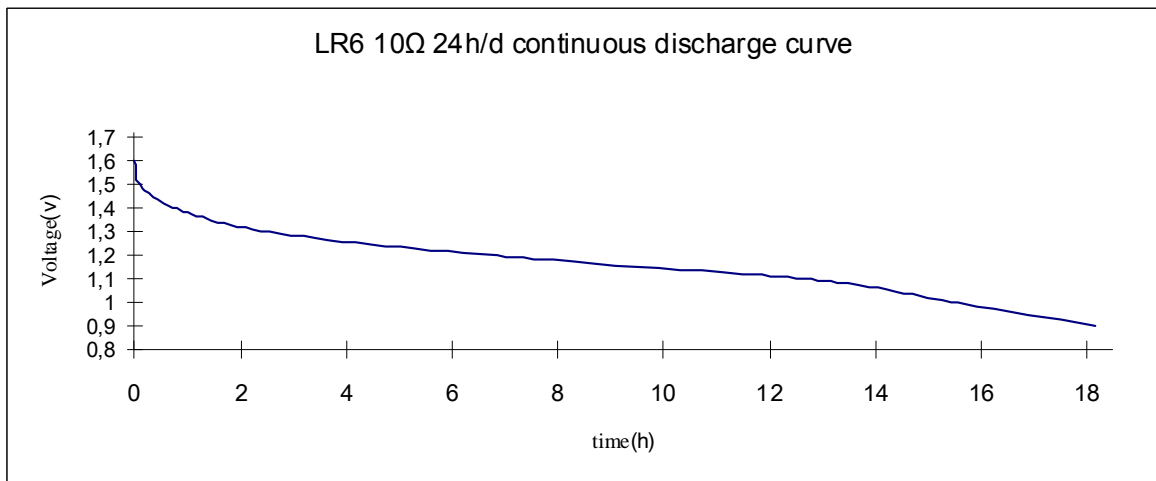
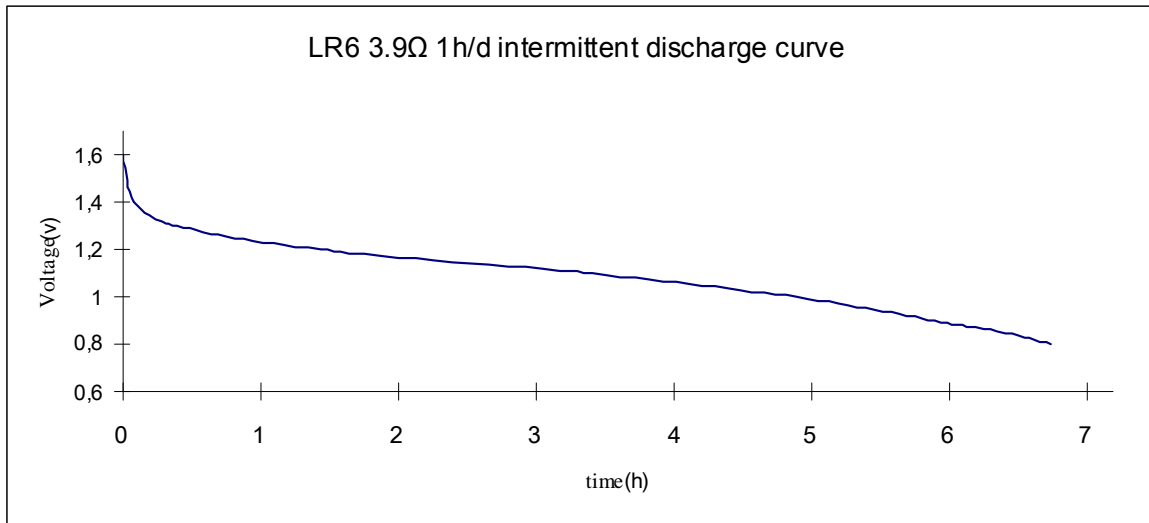
7 years

16. Expiry period marking:

Expiry date marked on the bottom plate of finished battery . For example: 2015-08 means the Expiry date is August 2015.

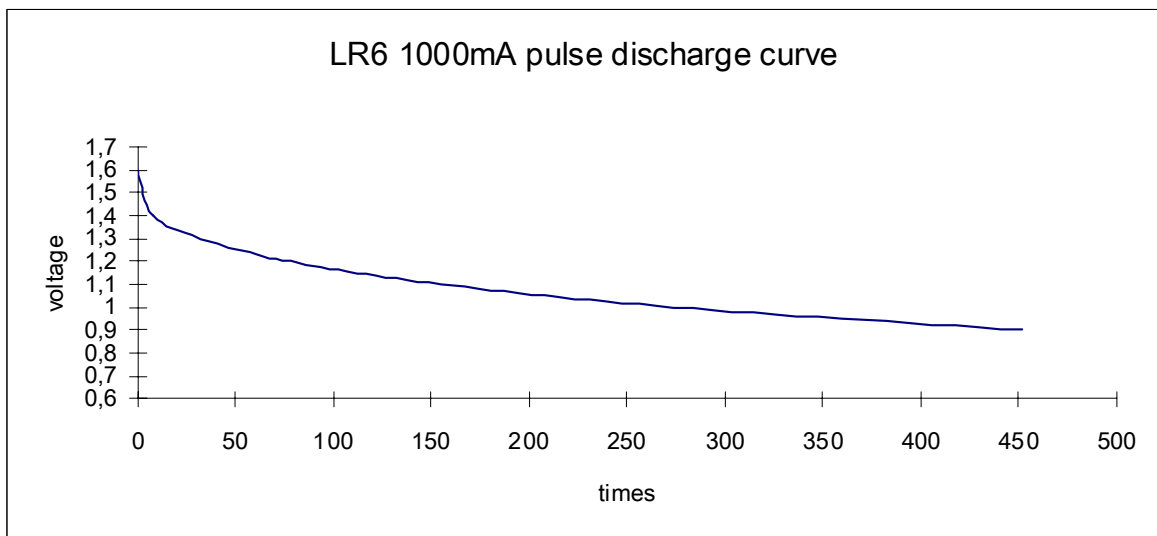
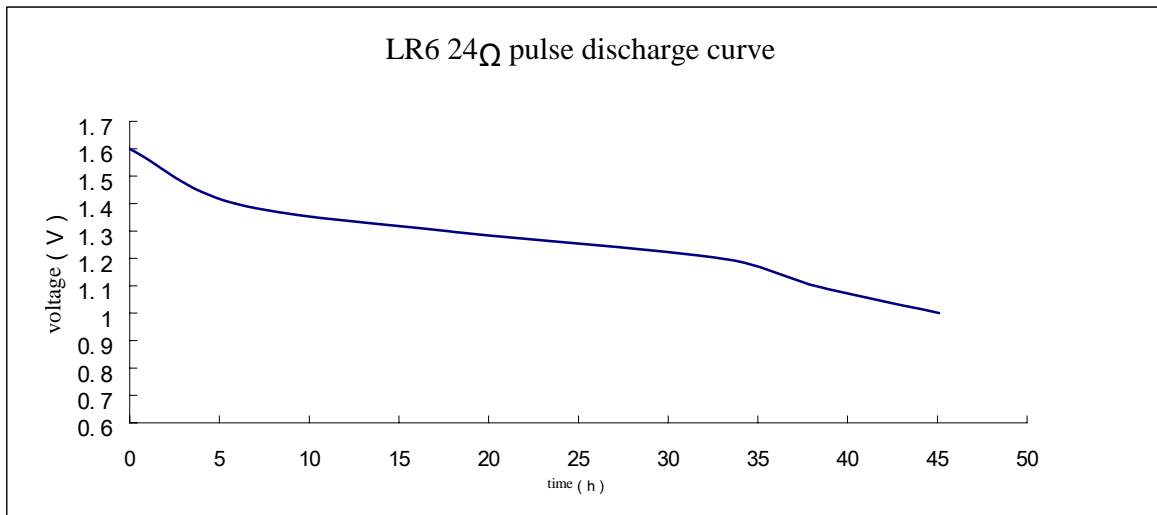
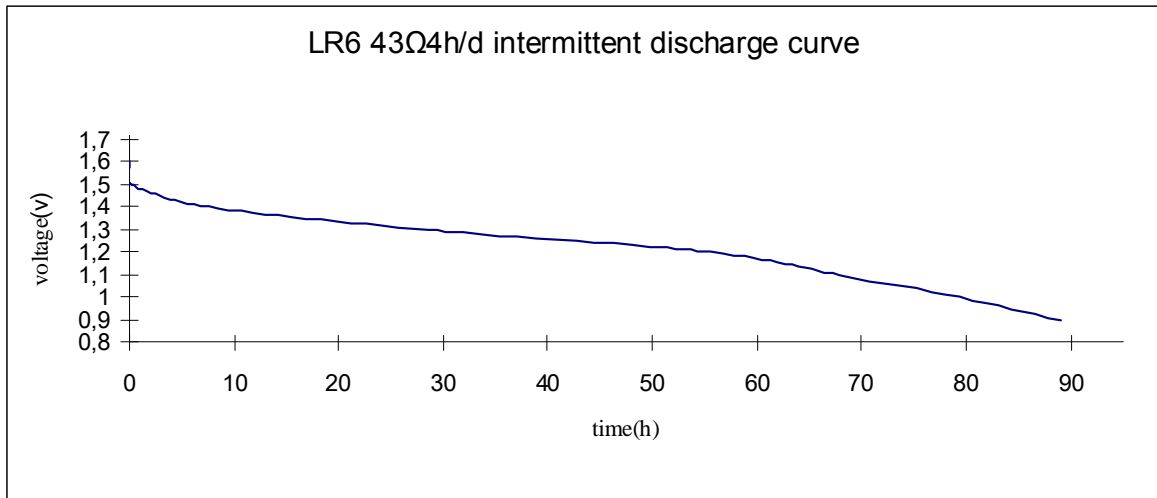
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| Product | Alkaline battery, 1.5 volts | Page | 4 of 5 |
| Size | LR6, Mignon, AA | | |

Appendix 1



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| Product | Alkaline battery, 1.5 volts | Page | 5 of 5 |
| Size | LR6, Mignon, AA | | |

Appendix 2



| | | | |
|----------------|------------------------------------|------|--------|
| Product | Alkaline battery, 1.5 volts | Page | 1 of 5 |
| Size | LR03, Micro, AAA | | |

1. Type designation:

IEC LR03

JIS: AM-4

ANSI:AAA



2. Chemical system:

Electrolyte-zinc-manganese dioxide (mercury & cadmium free)

3. Dimension:

Ø 9.5-10.5, Height: 43.3-44.5

4. Norminal voltage:

1.5 volts

5. Norminal weight:

The weight of each battery is approximately 11.8 g.

6. Heavy Metal content (%):

| Mercury content | Cadmium | Lead |
|-----------------|---------|---------|
| ≤ 1ppm | ≤ 10ppm | ≤ 40ppm |

7. Appearance and terminal:

Battery shall be clean and have no dirt, no leakage, and no deformation which may affect their performance and actual use and shall have clearly visible markings.

8. Battery capacity: (Test environment : 20°C±2,60%±15%R.H)

(Load resistance:**75ohms**, Daily period:**24h/d**, Cut off voltage:**0.9V** ; According to as the above the same discharge condition, the capacity of each battery is approximately:**1150mAh**)

9. Storage characteristics:

After 12 months storage at 20°C, 90% capacitance of fresh cells.

After 24 months storage at 20°C, 85% capacitance of fresh cells.

| | | | |
|----------------|------------------------------------|------|--------|
| Product | Alkaline battery, 1.5 volts | Page | 2 of 5 |
| Size | LR03, Micro, AAA | | |

10. Electrical characteristics:

(Test environment: 20°C±2, 60%±15%R.H) (Load resistance: **3.9ohms**, Measure time: **0.3S**)

(All samples shall be normalized for a minimum of 8 hours at the above environment prior to measurement)

| | OCV (V) | CCV (V) | SCC (A) |
|-------------------------|---------|---------|---------|
| Initial | ≥ 1.59 | ≥ 1.45 | ≥ 8 |
| After 12 months storage | ≥ 1.57 | ≥ 1.42 | ≥ 6 |

Remark: OCV: Open Circuit Voltage; CCV: Close Circuit Voltage; SCC: Short Circuit Current

11. Discharge test (service life) (Test environment: 20°C±2, 45%--75%R.H)

| LOAD Resistance | 20Ω | 24Ω | 5.1Ω | 10Ω | 75Ω | 600mA |
|-------------------------|---------|---------------|----------------|---------------|--------|--------------------|
| Daily Period | 24h/d | 15s/min, 8h/d | 4min/h, 8h/day | 1hrs/day | 4hrs/d | 10s/min, 1h/d |
| Cut off Voltage | 0.9V | 1.0V | 0.9V | 0.9V | 0.9V | 0.9V |
| Initial | ≥ 18.0h | ≥ 19.0h | ≥ 225min | ≥ 480min | ≥ 70h | ≥ 280times |
| After 12 months storage | ≥ 17.2h | ≥ 18.0h | ≥ 210min | ≥ 450min | ≥ 65h | ≥ 250times |
| Application | / | control | torch | Tape recorder | radio | Camera flash light |

Remark: The initial discharge test shall commence within 30 days of manufacture.

The discharge time is the minimum average duration (MAD).

Test quantity: n=9pcs (for per discharge test)

12. Discharge curve:

- ① 20ohms 24h/d to 0.9V continuous discharge curve (Appendix 1)
- ② 5.1ohms 4min/h, 8h/d to 0.9V discharge curve (Appendix 1)
- ③ 600mA 10s/min, 1h/d to 0.9V pulse discharge curve (Appendix 1)
- ④ 24ohms 15s/min, 8h/d to 1.0V pulse discharge curve (Appendix 2)
- ⑤ 10ohms 1h/d to 0.9V intermittent discharge curve (Appendix 2)
- ⑥ 75ohms, 4h/d to 0.9V intermittent discharge curve (Appendix 2)

13. Leakage-proof structure:

- ① The top seal is made of imported special nylon from DUPONT, has a much stable vent pressure.
- ② The sealing location of the battery is provided with double beading scores to make the structure tighter.
- ③ Using imported special sealing glue, with more reliable leakage-proof performance.

| | | | |
|----------------|------------------------------------|-------------|---------------|
| Product | Alkaline battery, 1.5 volts | Page | 3 of 5 |
| Size | LR03, Micro, AAA | | |

14. Safety test (Test environment: 20°C±2,60%±15%R.H)

| Test item | Test method | Test pcs | Requirements |
|---|--|----------|----------------------------|
| Over-discharge leakage test | 20ohms (24h/d) 48hours | 9pcs | No leakage |
| | 5.1ohms (4min/h,8h/d) to 0.6V | 9pcs | No leakage |
| | 600mA (10s/min, 1h/d) to 0.6V | 9pcs | No leakage |
| | 10ohms (1h/d) to 0.6V | 9pcs | No leakage |
| | 75ohms (4h/d) to 0.6V | 9pcs | No leakage |
| | 24ohms (15s/mn, 8h/d) to 0.6V | 9pcs | No leakage |
| High temperature test | 60±2°C,RH:90±5%, after 20 days storage, the cells shall be stored in an ambient temperature of 20±2°C,RH:60±5%, for 4-24hours. | 40 | No leakage |
| One piece of battery Short circuit test | The terminal of an un-discharged battery is connected by wire. The circuit is completely for 24hours or until the case temperature has return to environment. | 10 | No leakage No explosion |
| Reversible charge | 4 pieces of battery are in series connected and one of them is under incorrect polarity for 24 hours or until the case temperature has return to environment.. | 40 | No explosion |
| Over discharge | One battery discharge 75ohms to 0.6V, then in series connect with 3 pieces of new battery with 20ohm 24h | 36 | No explosion |
| Four pieces of battery in series Short circuit test | The terminal of four pieces of battery is connected by wire. The circuit is completely for 24hours or until the case temperature has return to environment. | 40 | No explosion |
| Free fall test | The battery free drops from one-meter height for 6 times, then store for 1h | 10 | No explosion |
| Impact under high and low temperature | Un-discharged battery store in test box under 70±2°C for 24h,then change to -20°C for 24h, repeat the above condition for 10 cycles. | 20 | No explosion |
| Storage after partial discharge | 50% discharged battery stored under 45±5°C for 30days | 9 | No leakage No explosion |

15. Expiry period:

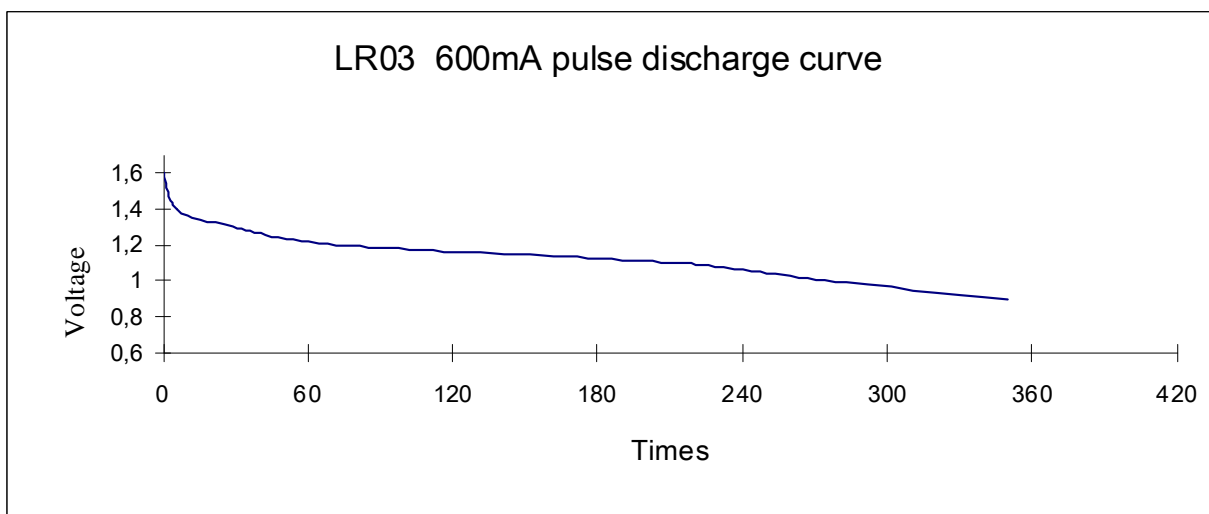
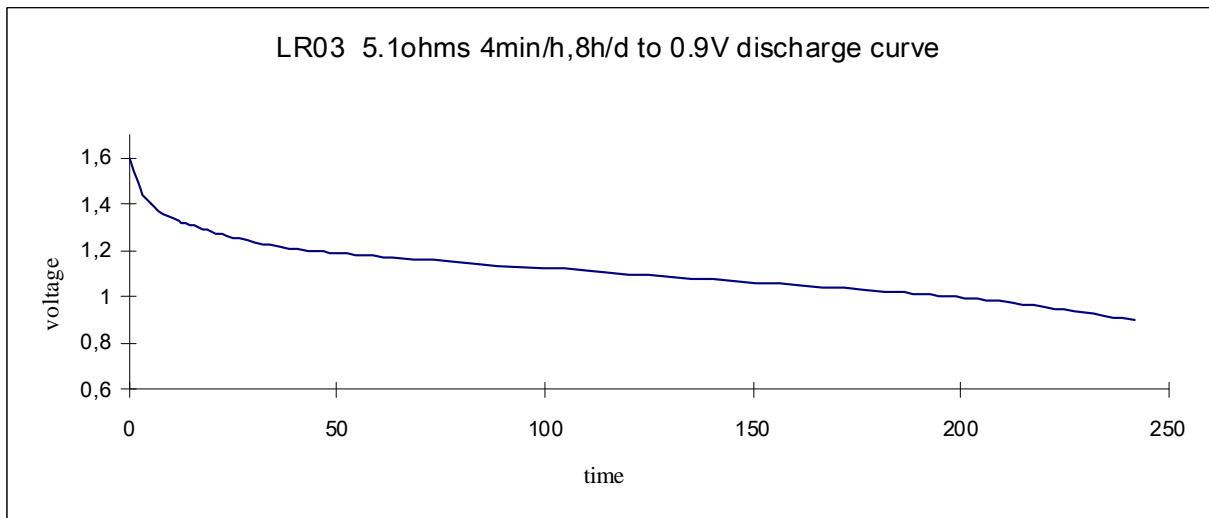
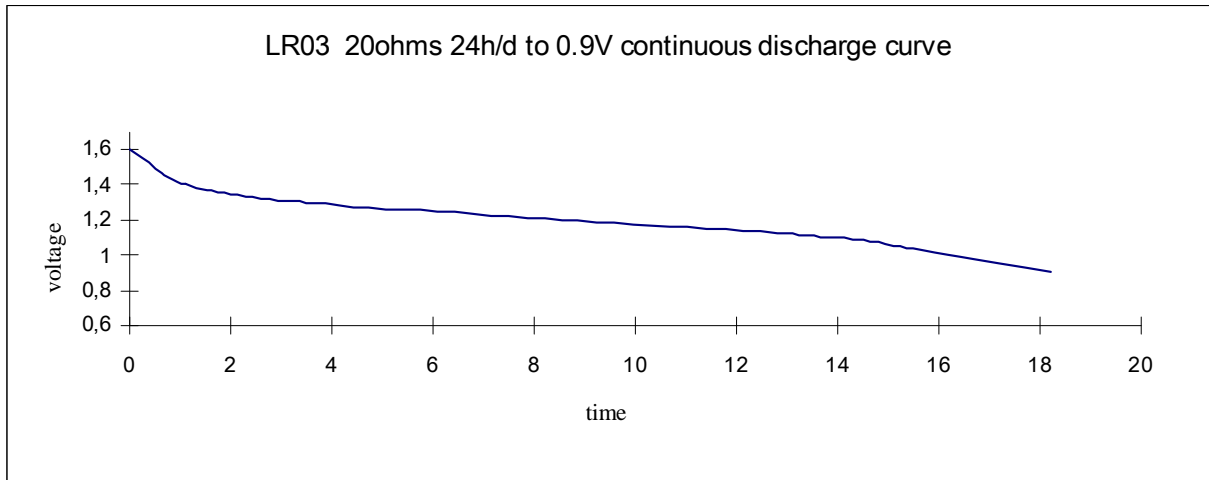
7 years

16. Expiry period marking:

Expiry date marked on the bottom plate of finished battery . For example: 2015-08 means the Expiry date is August 2015.

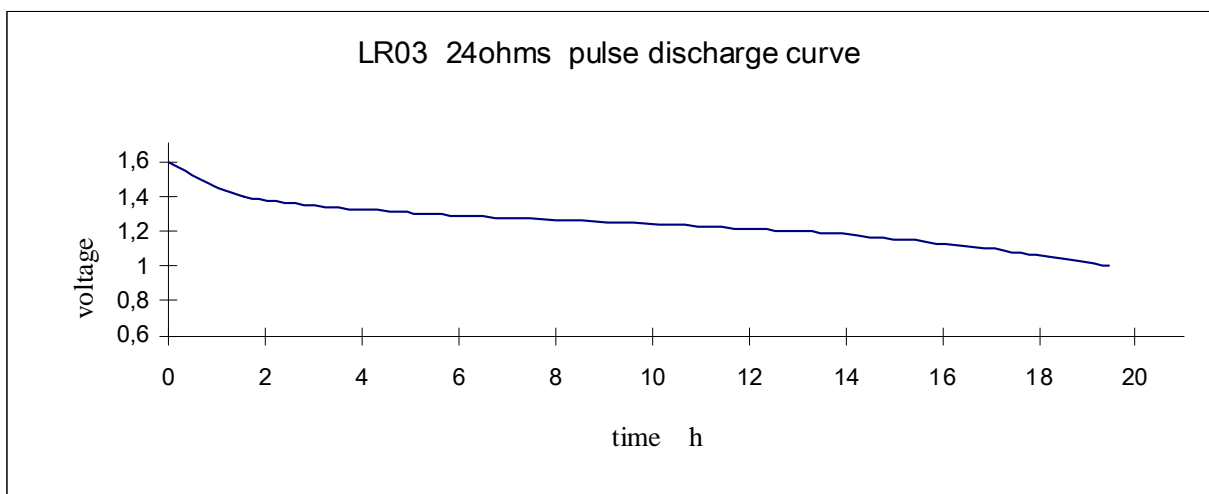
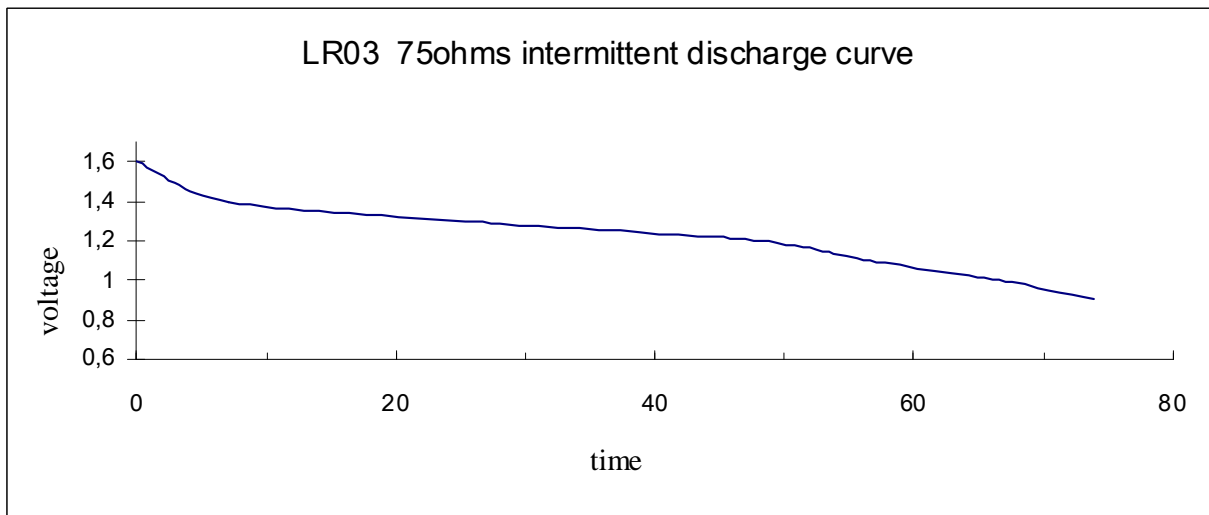
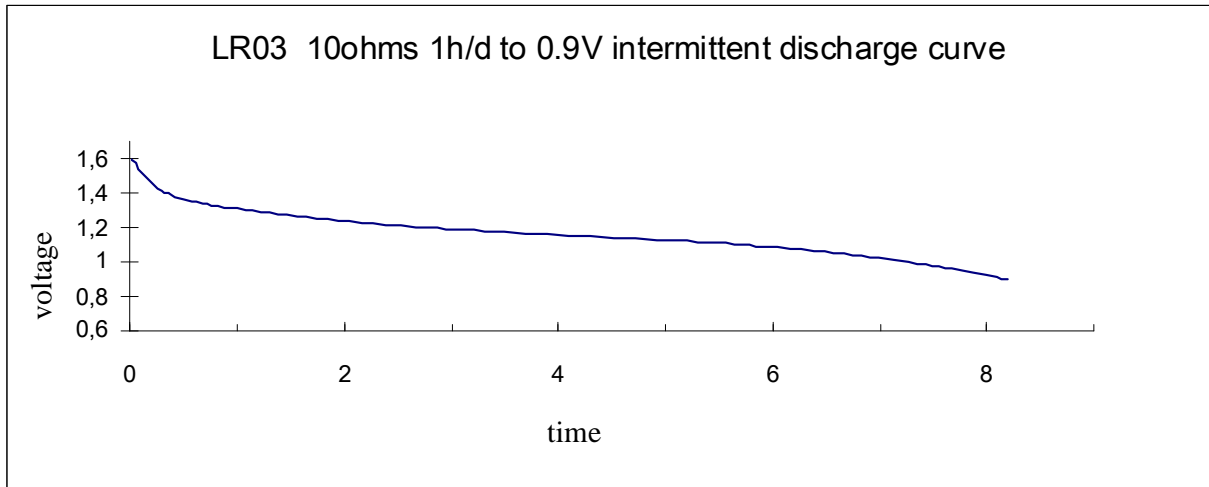
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| Product | Alkaline battery, 1.5 volts | Page | 4 of 5 |
| Size | LR03, Micro, AAA | | |

Appendix 1



| | | | |
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| Product | Alkaline battery, 1.5 volts | Page | 5 of 5 |
| Size | LR03, Micro, AAA | | |

Appendix 2



| | | | |
|----------------|----------------------------------|------|--------|
| Product | Alkaline battery, 9 volts | Page | 1 of 4 |
| Size | 6LR61, 9 V Block | | |

1. Type designation:

IEC 6LR61
JIS: 6LR61

2. Chemical system:

Electrolyte-zinc-manganese dioxide (mercury & cadmium free).

3. Dimension:

Ø 24.5-26.5mm, 15.5-17.5mm, Height 46.5-48.5mm

4. Nominal voltage:

9.0 volts

5. Nominal weight:

The weight of each battery is approximately: ≤45.0g

6. Heavy Metal content (%):

| Mercury content | Cadmium | Lead |
|-----------------|---------|--------|
| ≤1ppm | ≤10ppm | ≤40ppm |



7. Appearance and terminal:

Battery shall be clean and have no dirt, no leakage, and no deformation which may affect their performance and actual use and shall have clearly visible markings.

8. Battery capacity: (Test environment : 20°C±2,60%±15%R.H)

(Load resistance:**620 ohms**, Daily period:**24h/d**, Cut off voltage:**4.8V** ; According to as the above the same discharge condition, the capacity of each battery is approximately:**550mAh**)

9. Storage characteristics:

After 12 months storage at 20°C, 90% capacitance of fresh cells.
After 24 months storage at 20°C, 85% capacitance of fresh cells.

| | | | |
|----------------|----------------------------------|------|--------|
| Product | Alkaline battery, 9 volts | Page | 2 of 4 |
| Size | 6LR61, 9 V Block | | |

10. Electrical characteristics:

(Test environment: 20°C ± 2, 60% ± 15% R.H.) (Load resistance: **180 ohms**, Measure time: **0.3S**)
 (All samples shall be normalized for a minimum of 8 hours at the above environment prior to measurement)

| | OCV (V) | CCV (V) | SCC (A) |
|-------------------------|---------|---------|---------|
| Initial | ≥9.5 | ≥9.3 | ≥4 |
| After 12 months storage | ≥9.4 | ≥9.2 | ≥3 |

Remark: OCV: Open Circuit Voltage; CCV: Close Circuit Voltage; SCC: Short Circuit Current

11. Discharge test (service life) (Test environment: 20 ± 2, 45%--75% R.H)

| Load | 180Ω | 270Ω | 620Ω |
|-------------------------|-------|-------|--------|
| Discharge mode | 24h/d | 1h/d | 2h/day |
| End voltage | 5.4V | 5.4V | 5.4V |
| Initial | 11.5h | 16.8h | 38.5h |
| After 12 months storage | 10.5h | 15.2h | 35h |

Remark: The initial discharge test shall commence within 30 days of manufacture.
 The discharge time is the minimum average duration (MAD).
 Test quantity: n=9pcs (for per discharge test)

12. Discharge curve:

- (1) 180 ohms 24h/d to 5.4V continuous discharge curve (Appendix 1)
- (2) 270 ohms 1h/d to 5.4V intermittent discharge curve (Appendix 1)
- (3) 620ohms, 2h/d to 5.4V intermittent discharge curve (Appendix 1)

| | | | |
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| Product | Alkaline battery, 9 volts | Page | 3 of 4 |
| Size | 6LR61, 9 V Block | | |

13. Safety test (Test environment: 20 ±2,60%±15%R.H)

| Test item | Test method | Test pcs | Requirements |
|---|---|----------|----------------------------|
| Over-discharge leakage test | 180 ohms (24h/d) 48hours | 9pcs | No leakage |
| | 270 ohms (1h/d) to 3.6V | 9pcs | No leakage |
| | 620 ohms (2h/d) to 3.6V | 9pcs | No leakage |
| High temperature test | 60±2□,RH:90±5%, after 20 days storage, the cells shall be stored in an ambient temperature of 20±2□,RH:60±5%, for 4-24hours. | 40 | No leakage |
| One piece of battery Short circuit test | The terminal of an un-discharged battery is connected by wire. The circuit is completely for 24hours or until the case temperature has return to environment. | 10 | No leakage No explosion |
| Over discharge | One battery discharge 180 ohms to 3.6V, then in series connect with 3 pieces of new battery with 620ohm 24h | 36 | No explosion |
| Free fall test | The battery free drops from one-meter height for 6 times, then store for 1h | 10 | No explosion |
| Impact under high and low temperature | Un-discharged battery store in test box under 70±2□ for 24h,then change to -20□ for 24h, repeat the above condition for 10 cycles. | 20 | No explosion |
| Storage after partial discharge | 50% discharged battery stored under 45±5□ for 30days | 9 | No leakage No explosion |

14. Expiry period:

7 years

15. Expiry period marking

Expiry date marked on the bottom plate of finished battery . For example: 2015-08 means the expiry date is August 2015.

| | | | |
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| Product | Alkaline battery, 9 volts | Page | 4 of 4 |
| Size | 6LR61, 9 V Block | | |

Appendix 1

