



**THE DATASHEET OF  
BYV30W-600PT2Q**



## 1. General description

Ultrafast power diode in a 2-lead TO247-2L plastic package.

## 2. Features and benefits

- Fast switching
- Very low on-state loss
- Low leakage current
- Low thermal resistance

## 3. Applications

- Active PFC in air conditioner
- S.M.P.S Power Factor Correction (PFC)
- Half-bridge / full-bridge switched-mode power supplies

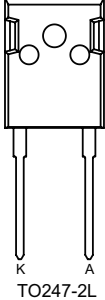
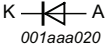
## 4. Quick reference data

Table 1. Quick reference data

| Symbol                         | Parameter                           | Conditions                                                                                                                         | Values |      |      | Unit |
|--------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|--------|------|------|------|
| <b>Absolute maximum rating</b> |                                     |                                                                                                                                    |        |      |      |      |
| $V_{RRM}$                      | repetitive peak reverse voltage     |                                                                                                                                    | 600    |      |      | V    |
| $I_{F(AV)}$                    | average forward current             | $\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 129$ °C; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> | 30     |      |      | A    |
| $I_{FRM}$                      | repetitive peak forward current     | $\delta = 0.5$ ; $t_p = 25$ $\mu$ s; $T_{mb} \leq 129$ °C; square-wave pulse                                                       | 60     |      |      | A    |
| $I_{FSM}$                      | non-repetitive peak forward current | $t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; <a href="#">Fig. 4</a>                                                      | 290    |      |      | A    |
|                                |                                     | $t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse                                                                             | 330    |      |      | A    |
| Symbol                         | Parameter                           | Conditions                                                                                                                         | Min    | Typ  | Max  | Unit |
| <b>Static characteristics</b>  |                                     |                                                                                                                                    |        |      |      |      |
| $V_F$                          | forward voltage                     | $I_F = 30$ A; $T_j = 25$ °C; <a href="#">Fig. 6</a>                                                                                | -      | 1.18 | 1.55 | V    |
|                                |                                     | $I_F = 30$ A; $T_j = 150$ °C; <a href="#">Fig. 6</a>                                                                               | -      | 0.98 | -    | V    |
| <b>Dynamic characteristics</b> |                                     |                                                                                                                                    |        |      |      |      |
| $t_{rr}$                       | reverse recovery time               | $I_F = 1$ A; $V_R = 30$ V; $dI_F/dt = 50$ A/ $\mu$ s; $T_j = 25$ °C; <a href="#">Fig. 7</a>                                        | -      | 42   | 75   | ns   |
|                                |                                     | $I_F = 30$ A; $V_R = 400$ V; $dI_F/dt = 200$ A/ $\mu$ s; $T_j = 25$ °C; <a href="#">Fig. 7</a>                                     | -      | 65   | -    | ns   |
|                                |                                     | $I_F = 30$ A; $V_R = 400$ V; $dI_F/dt = 200$ A/ $\mu$ s; $T_j = 125$ °C; <a href="#">Fig. 7</a>                                    | -      | 101  | -    | ns   |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description                        | Simplified outline                                                                | Graphic symbol                                                                      |
|-----|--------|------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | K      | cathode                            |  |  |
| 2   | A      | anode                              |                                                                                   |                                                                                     |
| mb  | mb     | mounting base; connected to cathod |                                                                                   |                                                                                     |

## 6. Ordering information

Table 3. Ordering information

| Type number   | Package name | Orderable part number | Packing method | Small packing quantity | Package version | Package issue date |
|---------------|--------------|-----------------------|----------------|------------------------|-----------------|--------------------|
| BYV30W-600PT2 | TO247-2L     | BYV30W-600PT2Q        | Tube           | 30                     | TO247L-2L       | 10-Nov-2020        |

## 7. Marking

Table 4. Marking codes

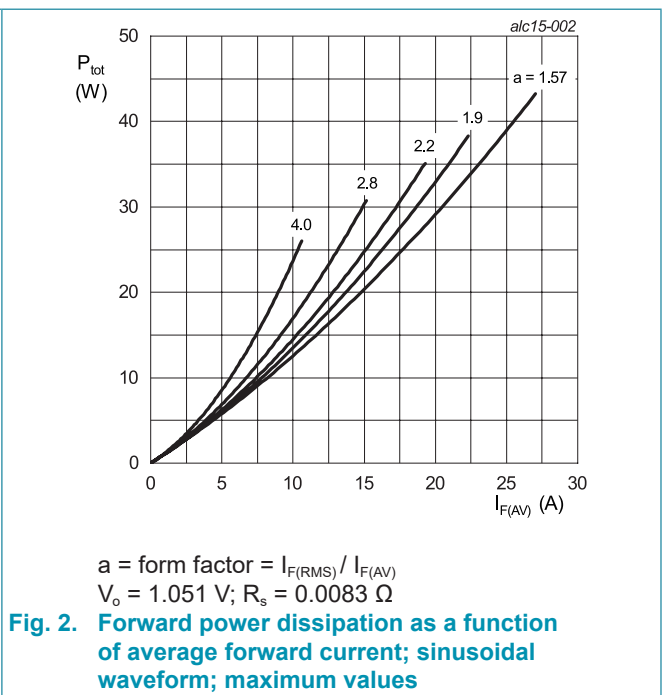
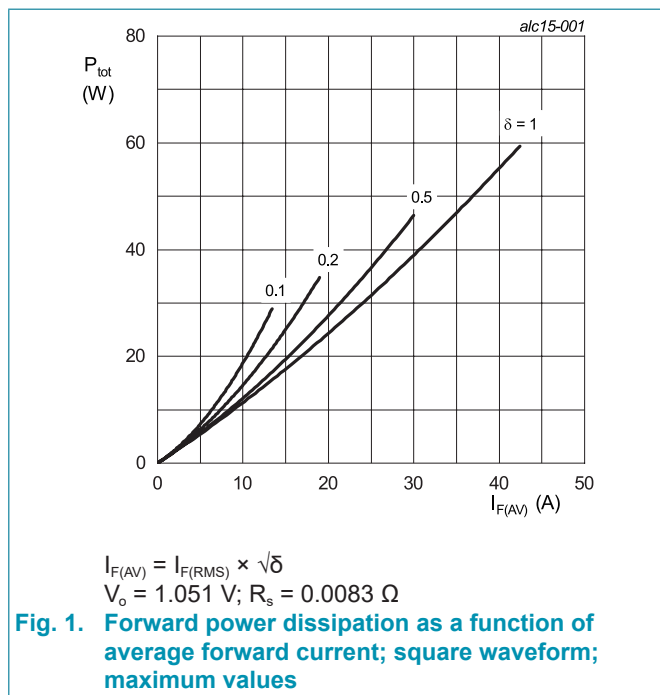
| Type number   | Marking codes    |
|---------------|------------------|
| BYV30W-600PT2 | BYV30W<br>600PT2 |

## 8. Limiting values

**Table 5. Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol      | Parameter                           | Conditions                                                                                                                                                | Values     | Unit             |
|-------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------|
| $V_{RRM}$   | repetitive peak reverse voltage     |                                                                                                                                                           | 600        | V                |
| $V_{RWM}$   | crest working reverse voltage       |                                                                                                                                                           | 600        | V                |
| $V_R$       | reverse voltage                     | DC                                                                                                                                                        | 600        | V                |
| $I_{F(AV)}$ | average forward current             | $\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 129\text{ }^\circ\text{C}$ ;<br><a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> | 30         | A                |
| $I_{FRM}$   | repetitive peak forward current     | $\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 129\text{ }^\circ\text{C}$ ;<br>square-wave pulse                                           | 60         | A                |
| $I_{FSM}$   | non-repetitive peak forward current | $t_p = 10\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; sine-wave pulse;<br><a href="#">Fig. 4</a>                                       | 290        | A                |
|             |                                     | $t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; sine-wave pulse                                                                 | 330        | A                |
| $T_{stg}$   | storage temperature                 |                                                                                                                                                           | -55 to 175 | $^\circ\text{C}$ |
| $T_j$       | junction temperature                |                                                                                                                                                           | 175        | $^\circ\text{C}$ |



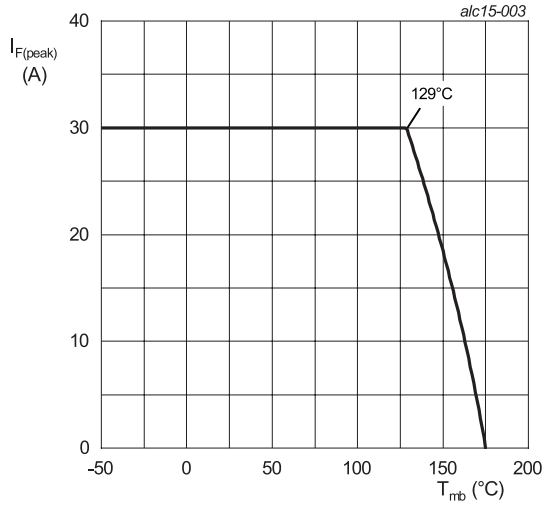


Fig. 3. Forward current as a function of mounting base temperature; maximum values

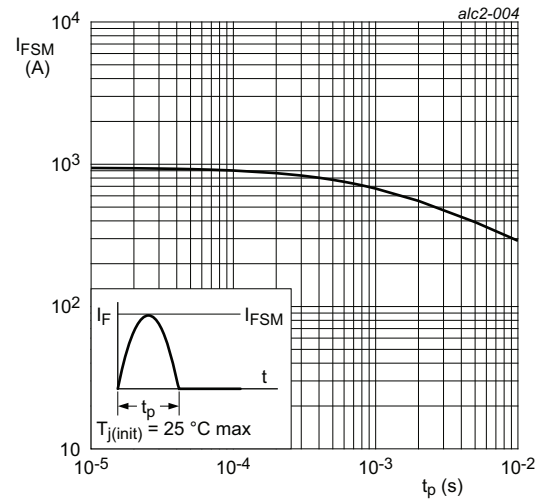


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

### 9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol         | Parameter                                            | Conditions             | Min | Typ | Max | Unit |
|----------------|------------------------------------------------------|------------------------|-----|-----|-----|------|
| $R_{th(j-mb)}$ | thermal resistance from junction to mounting base    | <a href="#">Fig. 5</a> | -   | -   | 1   | K/W  |
| $R_{th(j-a)}$  | thermal resistance from junction to ambient free air | in free air            | -   | 45  | -   | K/W  |

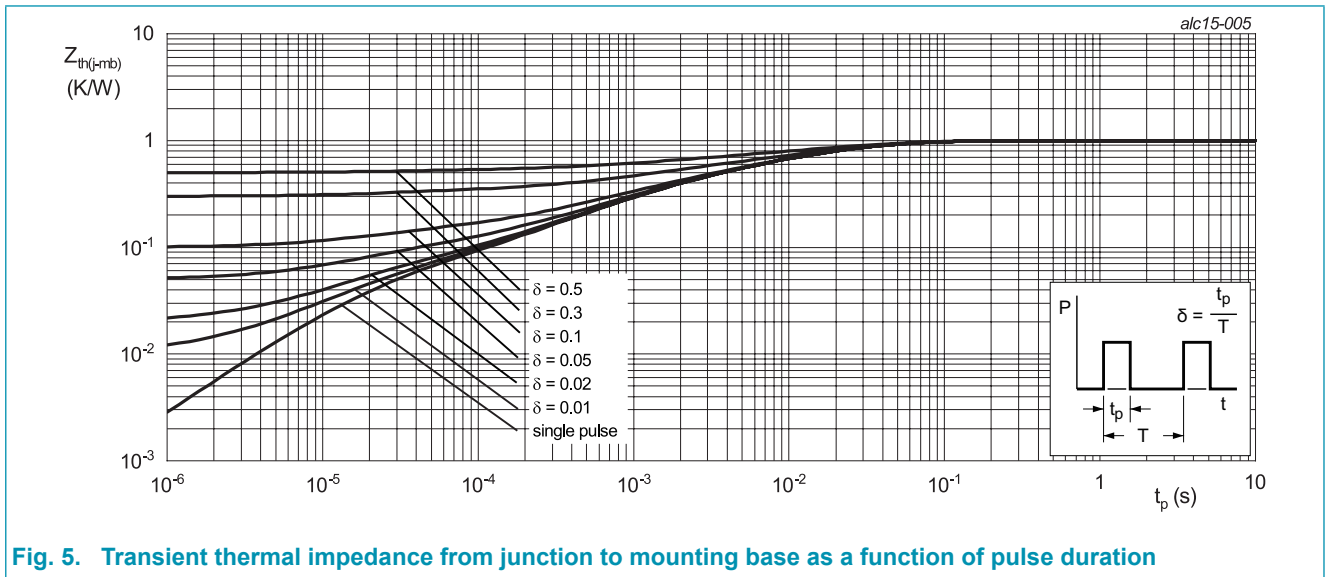
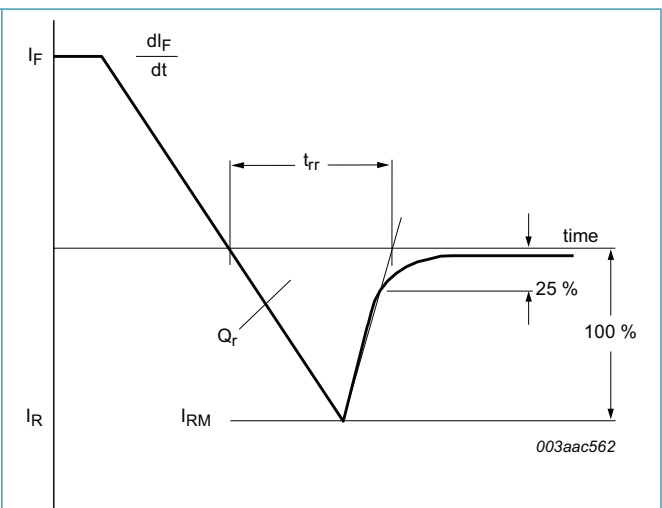
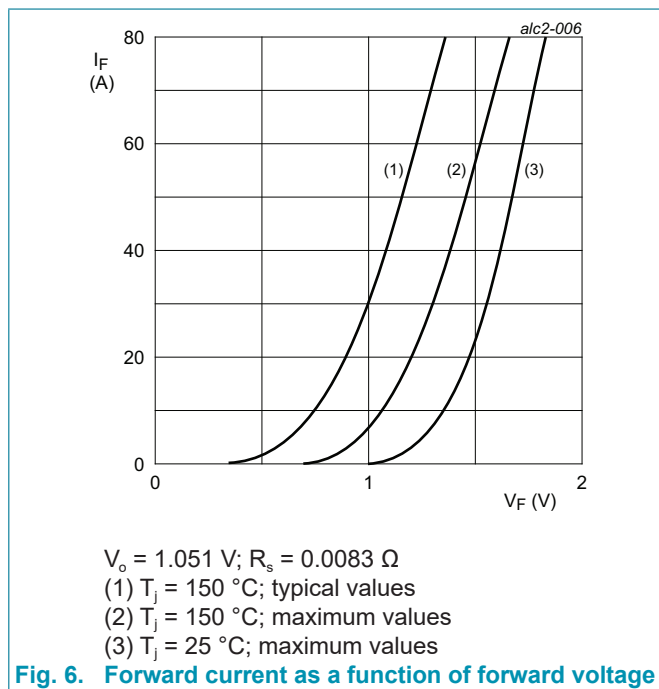


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

### 10. Characteristics

Table 7. Characteristics

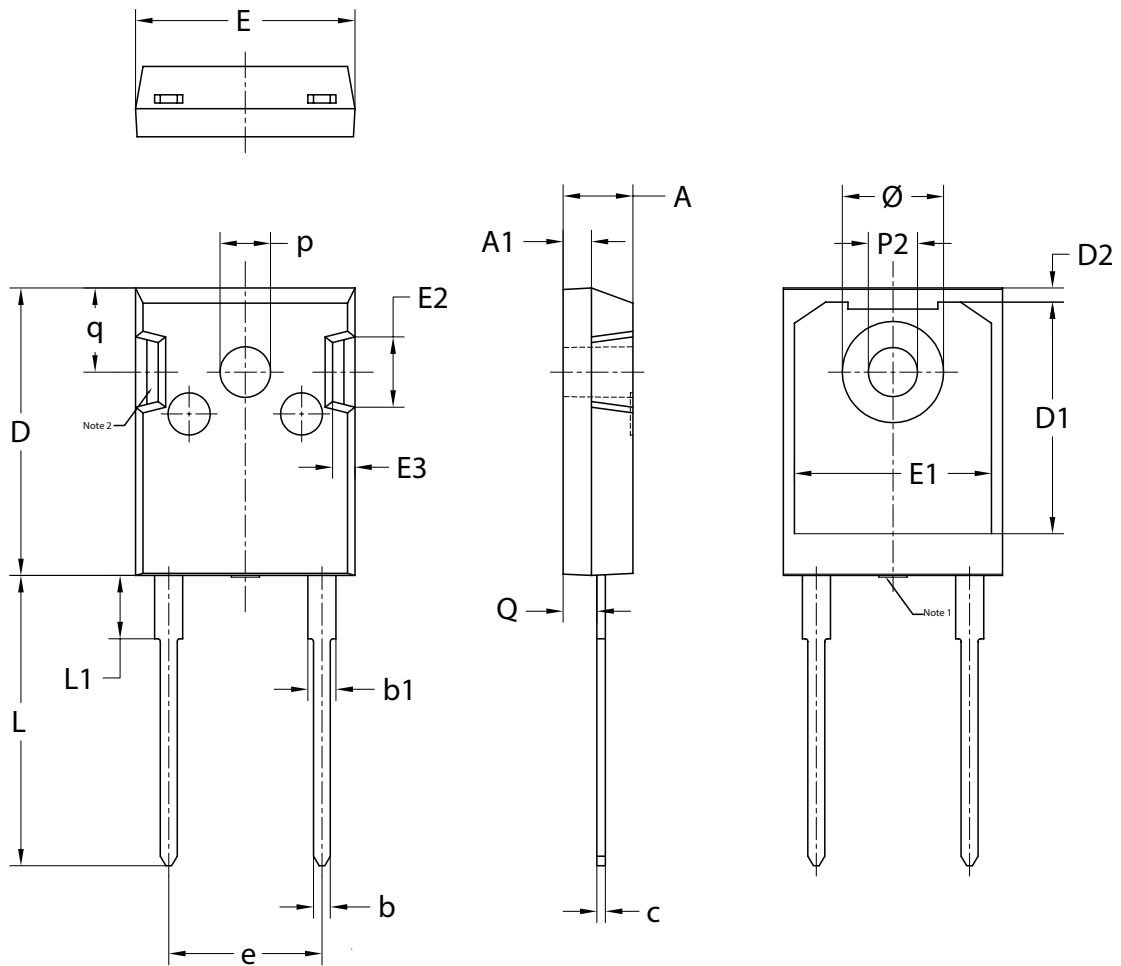
| Symbol                         | Parameter                     | Conditions                                                                                                      | Min | Typ  | Max  | Unit          |
|--------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------|-----|------|------|---------------|
| <b>Static characteristics</b>  |                               |                                                                                                                 |     |      |      |               |
| $V_F$                          | forward current               | $I_F = 30\text{ A}; T_j = 25\text{ °C}; \text{Fig. 6}$                                                          | -   | 1.18 | 1.55 | V             |
|                                |                               | $I_F = 30\text{ A}; T_j = 150\text{ °C}; \text{Fig. 6}$                                                         | -   | 0.98 | -    | V             |
| $I_R$                          | reverse current               | $V_R = 600\text{ V}; T_j = 25\text{ °C}$                                                                        | -   | 2    | 10   | $\mu\text{A}$ |
|                                |                               | $V_R = 600\text{ V}; T_j = 125\text{ °C}$                                                                       | -   | -    | 500  | $\mu\text{A}$ |
| <b>Dynamic characteristics</b> |                               |                                                                                                                 |     |      |      |               |
| $Q_r$                          | reverse charge                | $I_F = 30\text{ A}; V_R = 400\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$  | -   | 272  | -    | nC            |
|                                |                               | $I_F = 30\text{ A}; V_R = 400\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$ | -   | 775  | -    | nC            |
| $t_{rr}$                       | reverse recovery time         | $I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 50\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$     | -   | 42   | 75   | ns            |
|                                |                               | $I_F = 30\text{ A}; V_R = 400\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$  | -   | 65   | -    | ns            |
|                                |                               | $I_F = 30\text{ A}; V_R = 400\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$ | -   | 101  | -    | ns            |
| $I_{RM}$                       | peak reverse recovery current | $I_F = 30\text{ A}; V_R = 400\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$  | -   | 8.4  | -    | A             |
|                                |                               | $I_F = 30\text{ A}; V_R = 400\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$ | -   | 15.2 | -    | A             |



### 11. Package outline

Plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 2 leads TO-247

TO247-2L



| UNIT | A    | A <sub>1</sub> | b    | b <sub>1</sub> | c    | D     | D <sub>1</sub><br>⊕ | D <sub>2</sub> | E     | E <sub>1</sub> | E <sub>2</sub> | E <sub>3</sub> | e     | L     | L <sub>1</sub> | P <sub>2</sub> | p    | Q    | q    | Ø    |
|------|------|----------------|------|----------------|------|-------|---------------------|----------------|-------|----------------|----------------|----------------|-------|-------|----------------|----------------|------|------|------|------|
| mm   | 5.20 | 2.10           | 1.40 | 2.20           | 0.70 | 20.60 | 16.20               | 1.20           | 15.75 | 14.22          | 5.20           | 1.80           | 10.90 | 20.72 | 4.75           | 3.60           | 3.70 | 2.60 | 6.18 | 7.30 |
|      | 4.70 | 1.90           | 1.00 | 1.80           | 0.50 | 20.30 | 16.87               | 0.80           | 15.45 | 13.82          | 4.80           | 1.40           | BSC   | 20.22 | 4.25           | 3.40           | 3.50 | 2.20 | 5.78 | 7.10 |

Note:

1. Mold resin protrusion max 0.127mm.
2. Metal exposed with Sn plating.

## 12. Legal information

### Data sheet status

| Document status [1][2]         | Product status [3] | Definition                                                                            |
|--------------------------------|--------------------|---------------------------------------------------------------------------------------|
| Objective [short] data sheet   | Development        | This document contains data from the objective specification for product development. |
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