

1. General description

Dual ultrafast power diode in a SOT429 (3-lead TO-247) plastic package.

2. Features and benefits

- Very low on-state loss
- Fast switching
- Soft recovery characteristic minimizes power consuming oscillations
- High thermal cycling performance
- Low thermal resistance

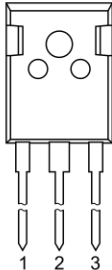
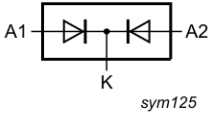
3. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _R	reverse voltage	DC		-	-	400	V
I _{F(AV)}	average forward current	δ = 0.5 ; T _{mb} ≤ 104 °C; square-wave pulse; per diode; Fig. 1 ; Fig. 2 ; Fig. 3		-	-	15	A
I _{FSM}	non-repetitive peak forward current	t _p = 10 ms; T _{j(init)} = 25 °C; sine-wave pulse; per diode; Fig. 4		-	-	170	A
		t _p = 8.3 ms; T _{j(init)} = 25 °C; sine-wave pulse; per diode		-	-	185	A
Static characteristics							
V _F	forward voltage	I _F = 15 A; T _j = 25 °C; Fig. 6		-	1.08	1.25	V
		I _F = 30 A; T _j = 25 °C; Fig. 6		-	1.15	1.36	V
		I _F = 15 A; T _j = 150 °C; Fig. 6		-	0.95	1.12	V
Dynamic characteristics							
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 100 A/μs; T _j = 25 °C; Fig. 7		-	35	60	ns

4. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1	 TO-247 (SOT429)	 sym125
2	K	cathode		
3	A2	anode 2		
mb	K	mounting base; cathode		

5. Ordering information

Table 3. Ordering information

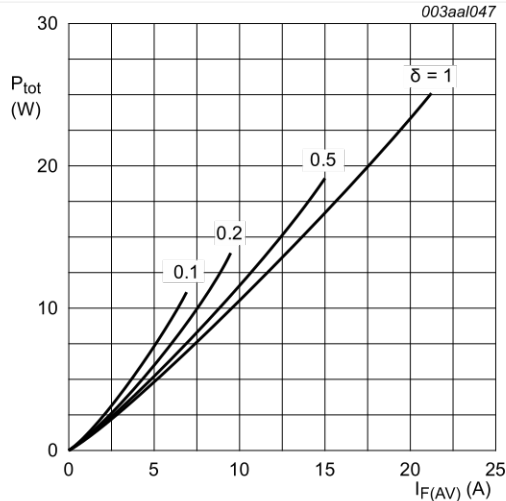
Type number	Package		
	Name	Description	Version
BYV74W-400	TO-247	plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 3 lead TO-247	SOT429

6. Limiting values

Table 4. Limiting values

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

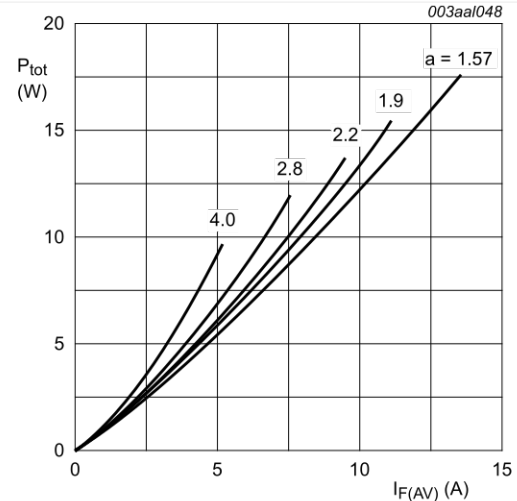
Symbol	Parameter	Conditions	Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	400	V
V_{RWM}	crest working reverse voltage		-	400	V
V_R	reverse voltage	DC; $T_{mb} \leq 136\text{ °C}$	-	400	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 104\text{ °C}$; square-wave pulse; per diode; Fig. 1; Fig. 2; Fig. 3	-	15	A
$I_{O(AV)}$	average output current	$\delta = 0.5$; $T_{mb} \leq 94\text{ °C}$; square-wave pulse; both diodes conducting	-	30	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; $T_{j(init)} = 25\text{ °C}$; sine-wave pulse; per diode; Fig. 4	-	170	A
		$t_p = 8.3\text{ ms}$; $T_{j(init)} = 25\text{ °C}$; sine-wave pulse; per diode	-	185	A
T_{stg}	storage temperature		-40	150	°C
T_j	junction temperature		-	150	°C



$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$

$$V_o = 0.959\text{ V}; R_s = 0.010\text{ }\Omega$$

Fig. 1. Forward power dissipation as a function of average forward current; square waveform; per diode; maximum values



$$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$$

$$V_o = 0.959\text{ V}; R_s = 0.010\text{ }\Omega$$

Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; per diode; maximum values

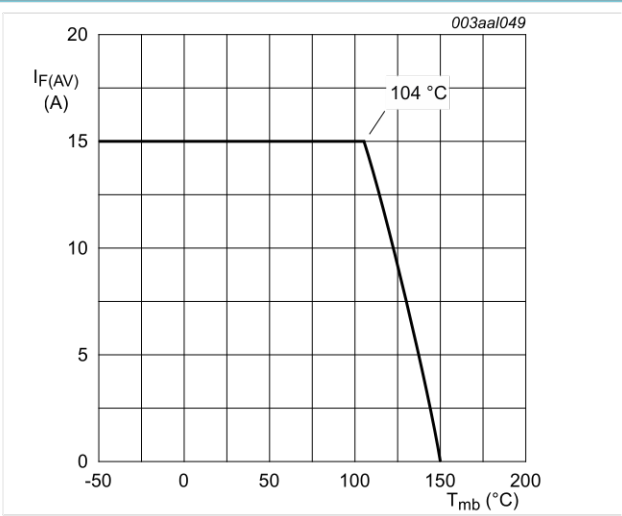


Fig. 3. Average forward current as a function of mounting base temperature; per diode; maximum values

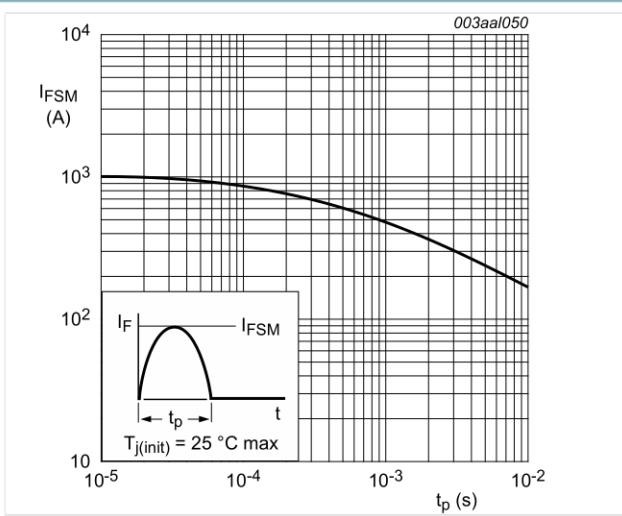


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; per diode; maximum values

7. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	with heatsink compound; per diode; Fig. 5	-	-	2.4	K/W
		with heatsink compound; both diodes conducting	-	-	1.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	45	-	K/W

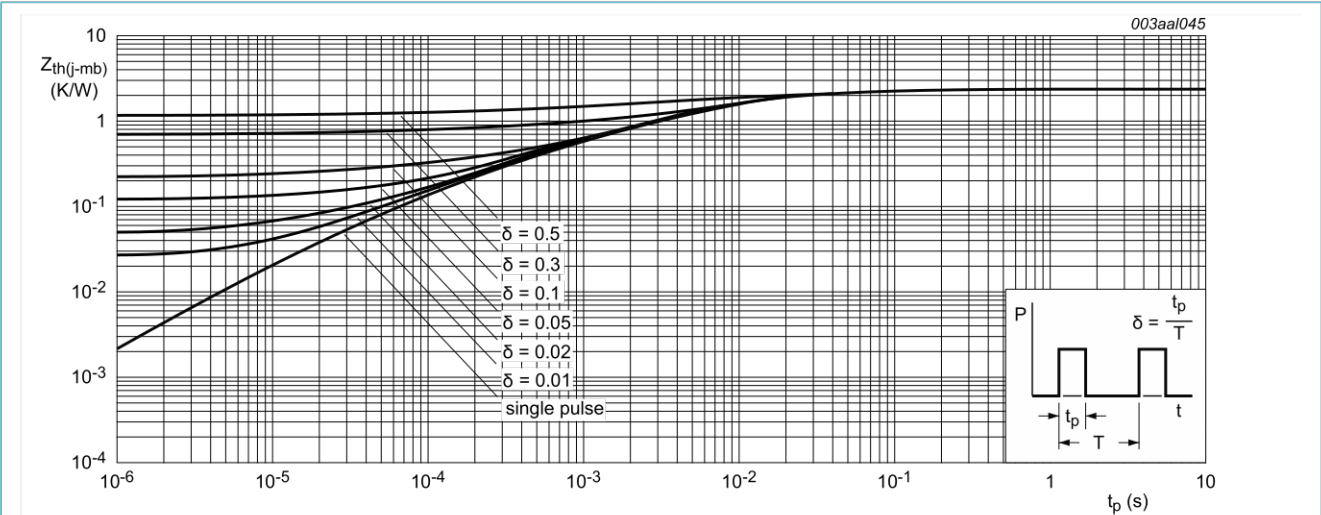
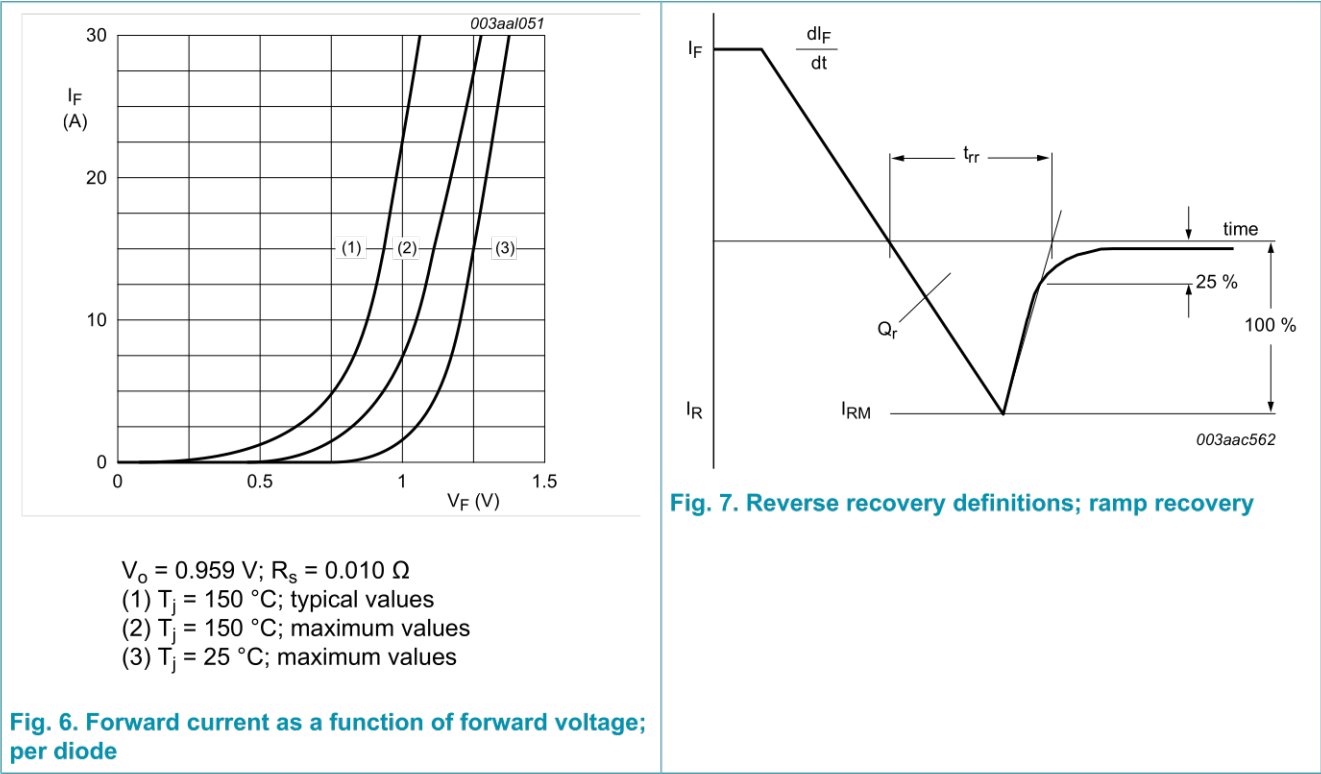


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse width; per diode; maximum values

8. Characteristics

Table 6. Characteristics
characteristics are per diode unless otherwise stated

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V _F	forward voltage	I _F = 15 A; T _j = 25 °C; Fig. 6		-	1.08	1.25	V
		I _F = 30 A; T _j = 25 °C; Fig. 6		-	1.15	1.36	V
		I _F = 15 A; T _j = 150 °C; Fig. 6		-	0.95	1.12	V
I _R	reverse current	V _R = 400 V; T _j = 25 °C		-	10	50	μA
		V _R = 400 V; T _j = 100 °C		-	0.3	0.8	mA
Dynamic characteristics							
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 100 A/μs; T _j = 25 °C; Fig. 7		-	35	60	ns
I _{RM}	peak reverse recovery current	I _F = 10 A; V _R = 30 V; dI _F /dt = 50 A/μs; T _j = 100 °C; Fig. 7		-	4.2	5.2	A
Q _r	recovered charge	I _F = 2 A; V _R = 30 V; dI _F /dt = 20 A/μs; T _j = 25 °C; Fig. 7		-	40	60	nC
V _{FR}	forward recovery voltage	I _F = 10 A; dI _F /dt = 10 A/μs; T _j = 25 °C; Fig. 8		-	2.5	-	V



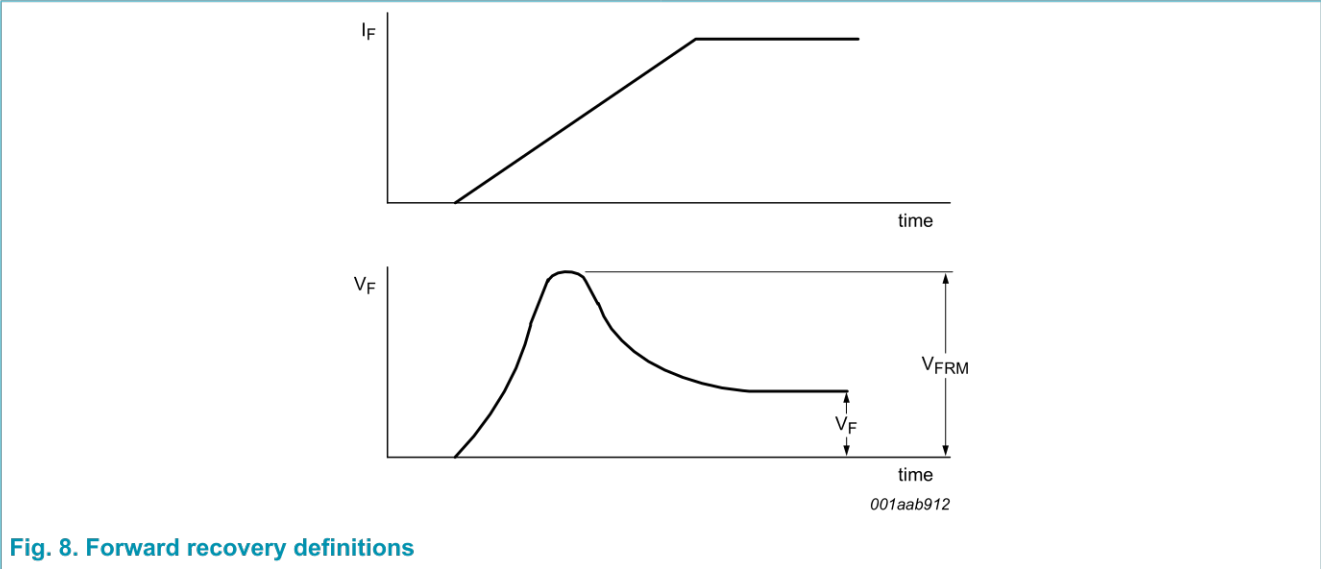


Fig. 8. Forward recovery definitions

9. Package outline

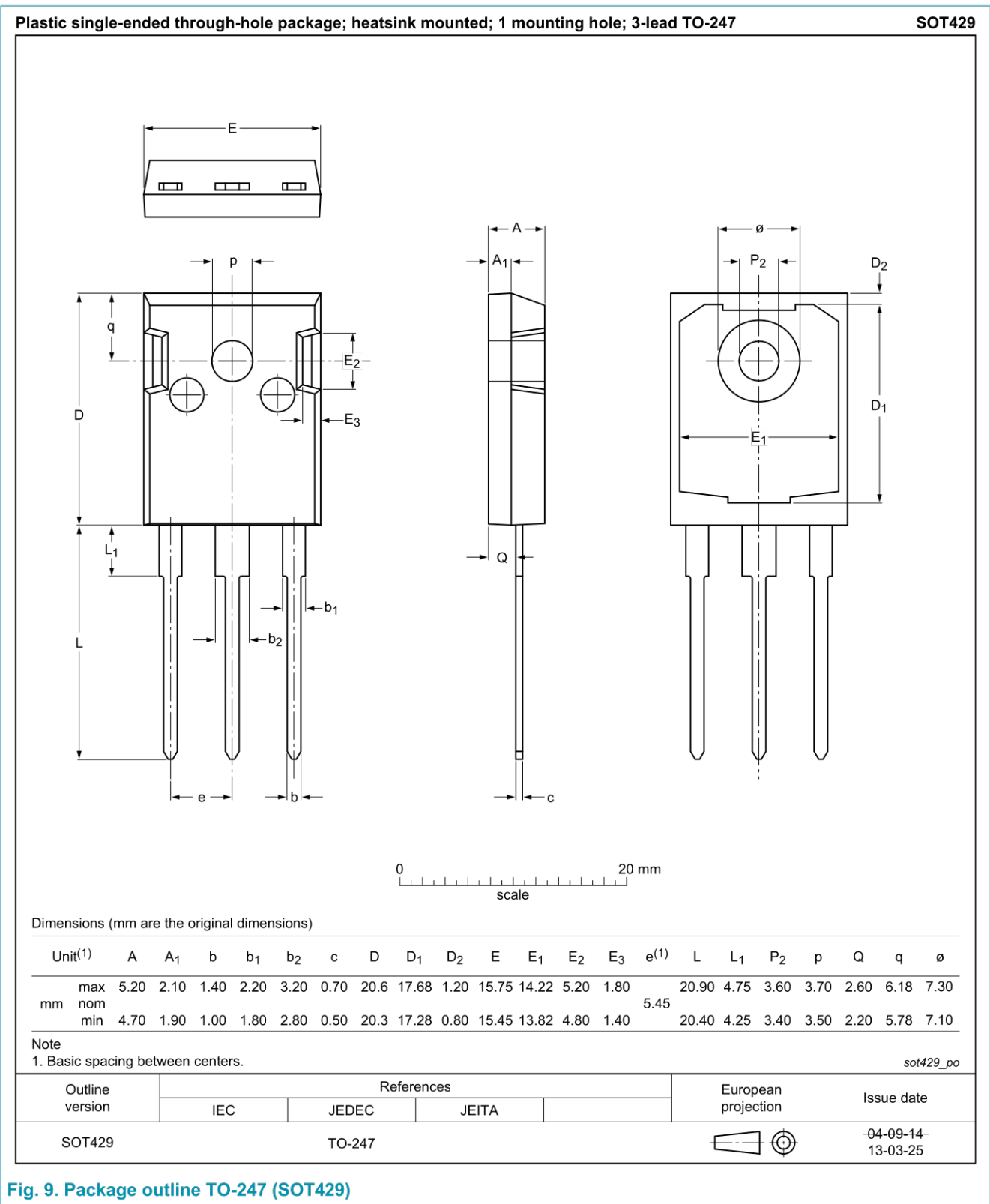


Fig. 9. Package outline TO-247 (SOT429)

10. 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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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