

# BYT28 series

Dual rectifier diodes ultrafast

Rev. 04 — 22 November 2004

Product data sheet

## 1. Product profile

### 1.1 General description

Dual, common cathode, ultrafast, epitaxial rectifier diodes in the SOT78 (TO-220AB) leaded package.

### 1.2 Features

- Low forward voltage drop
- Soft recovery characteristics
- Low thermal resistance.
- Fast switching
- High thermal cycling performance

### 1.3 Applications

- Output rectifiers in high frequency switched-mode power supplies.

### 1.4 Quick reference data

- $V_R \leq 300$  V (BYT28-300)
- $V_R \leq 500$  V (BYT28-500)
- $V_F \leq 1.05$  V.
- $I_{O(AV)} \leq 10$  A
- $t_{rr} \leq 60$  ns

## 2. Pinning information

Table 1: Pinning

Pin	Description	Simplified outline	Symbol
1	anode 1	<p>SOT78</p>	<p>sym084</p>
2	cathode		
3	anode 2		
mb	mounting base; connected to cathode		

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### 3. Ordering information

Table 2: Ordering information

Type number	Package		Version
	Name	Description	
BYT28-300	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78
BYT28-500			

### 4. Limiting values

Table 3: Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage				
	BYT28-300		-	300	V
	BYT28-500		-	500	V
$V_R$	continuous reverse voltage				
	BYT28-300	$T_{mb} \leq 147\text{ °C}$	-	300	V
	BYT28-500	$T_{mb} \leq 147\text{ °C}$	-	500	V
$I_{O(AV)}$	average rectified output current	both diodes conducting; square wave; $\delta = 0.5$ ; $T_{mb} \leq 115\text{ °C}$	[1] -	10	A
$I_{FSM}$	non-repetitive peak forward current per diode				
		$t = 10\text{ ms}$	-	50	A
		$t = 8.3\text{ ms}$ sinusoidal; with reapplied $V_{RRM(max)}$	-	55	A
$T_{stg}$	storage temperature		-40	+150	°C
$T_j$	junction temperature		-	150	°C

[1] Neglecting switching and reverse current losses.

### 5. Thermal characteristics

Table 4: Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	per diode; see <a href="#">Figure 1</a>	-	-	4.5	K/W
		both diodes conducting	-	-	3	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	60	-	K/W

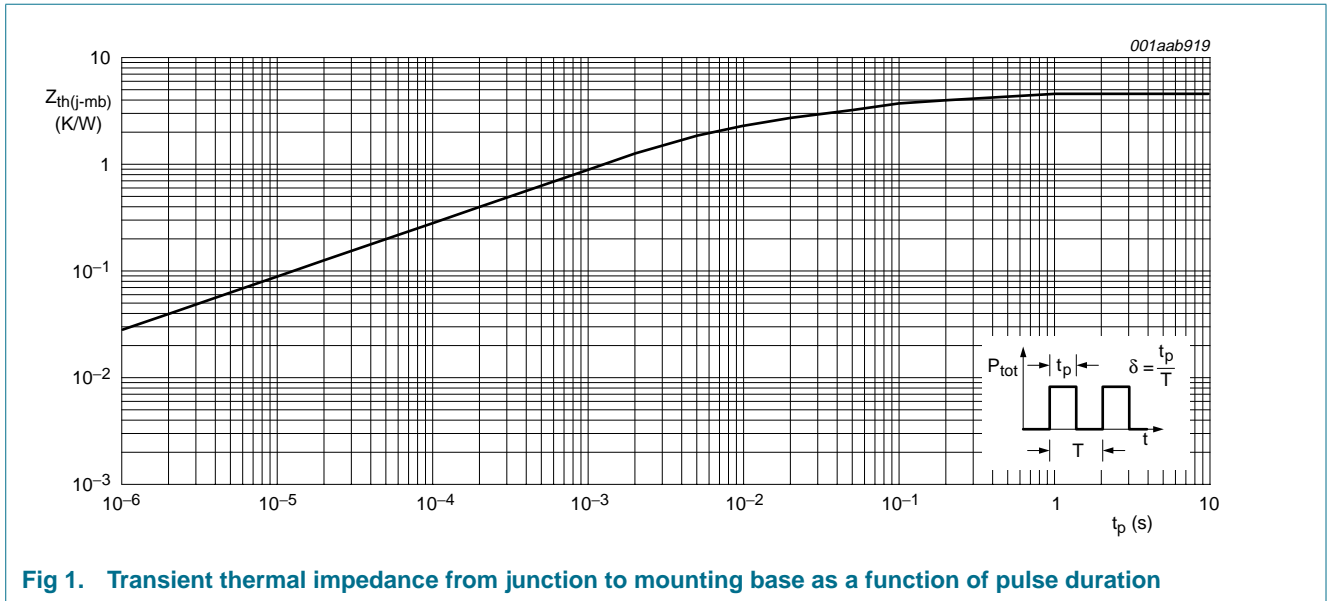


Fig 1. Transient thermal impedance from junction to mounting base as a function of pulse duration

## 6. Characteristics

Table 5: Characteristics

$T_j = 25\text{ }^\circ\text{C}$ ; unless otherwise stated.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Characteristics are per diode</b>						
$V_F$	forward voltage	$I_F = 5\text{ A}$ ; $T_j = 150\text{ }^\circ\text{C}$	-	0.95	1.05	V
		$I_F = 10\text{ A}$	-	1.3	1.4	V
$I_R$	reverse current	$V_R = V_{RRM}$	-	2	10	$\mu\text{A}$
		$V_R = V_{RRM}$ ; $T_j = 100\text{ }^\circ\text{C}$	-	10	200	$\mu\text{A}$
$Q_S$	reverse recovery charge	$I_F = 2\text{ A}$ ; $V_R \geq 30\text{ V}$ ; $-dI_F/dt = 20\text{ A}/\mu\text{s}$ ; see <a href="#">Figure 9</a>	-	50	60	nC
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}$ ; $V_R \geq 30\text{ V}$ ; $-dI_F/dt = 100\text{ A}/\mu\text{s}$ ; see <a href="#">Figure 6</a>	-	50	60	ns
$I_{RRM}$	repetitive peak reverse current	$I_F = 5\text{ A}$ ; $V_R \geq 30\text{ V}$ ; $-dI_F/dt = 50\text{ A}/\mu\text{s}$ ; $T_j = 100\text{ }^\circ\text{C}$ ; see <a href="#">Figure 7</a>	-	2	3	A
$V_{fr}$	forward recovery voltage	$I_F = 1\text{ A}$ ; $dI_F/dt = 10\text{ A}/\mu\text{s}$	-	2.5	-	V

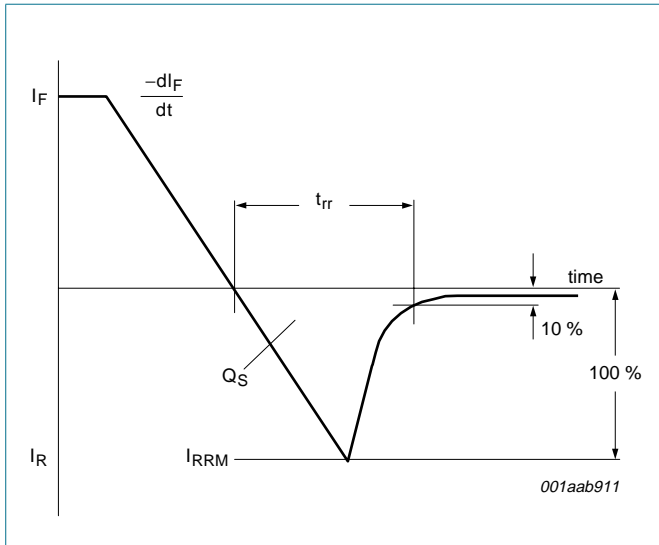


Fig 2. Reverse recovery definitions

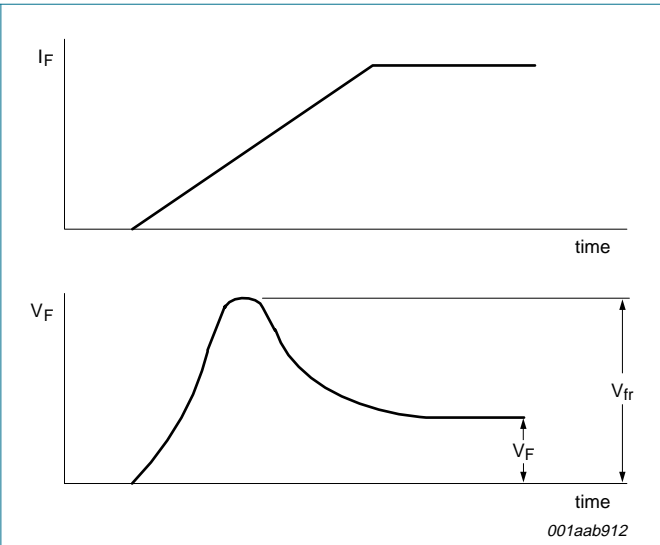
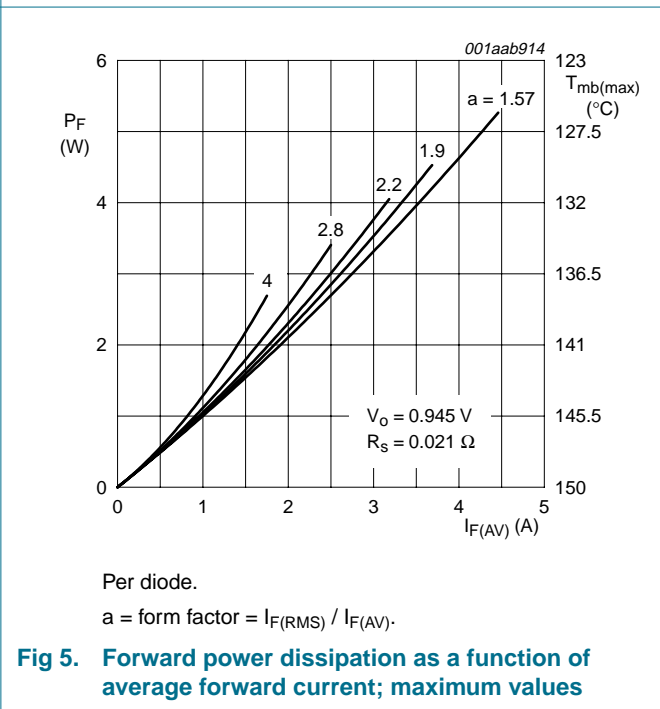
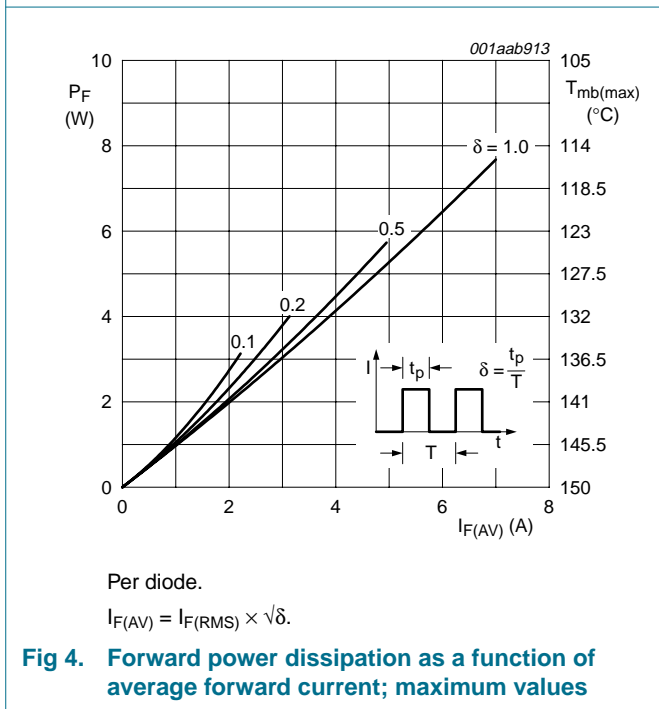
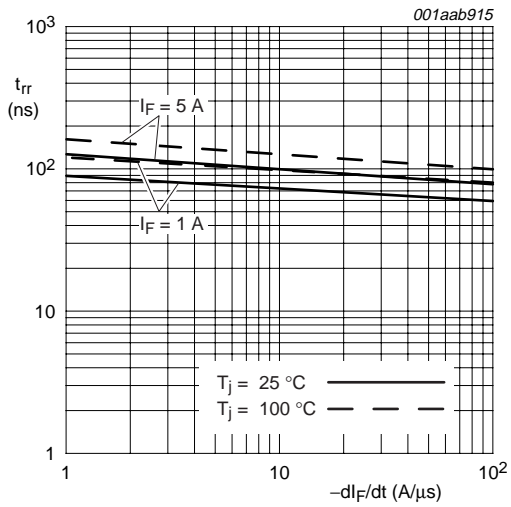


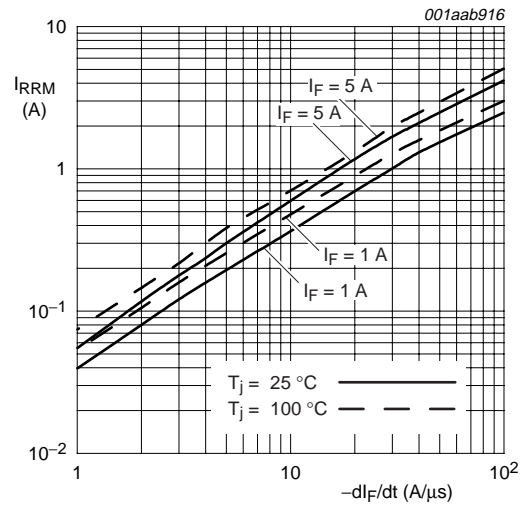
Fig 3. Forward recovery definitions





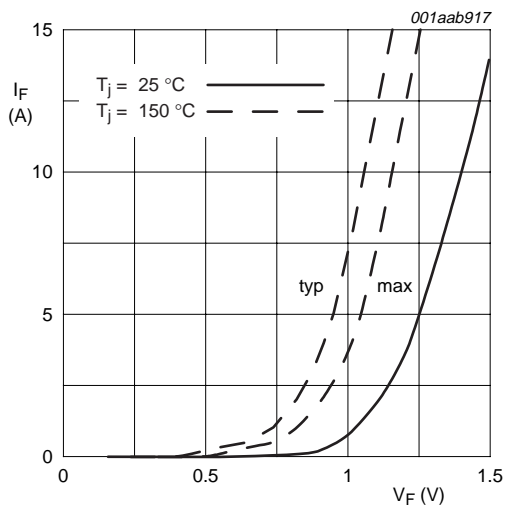
Per diode.

**Fig 6. Reverse recovery time as a function of time differential forward current; maximum values**

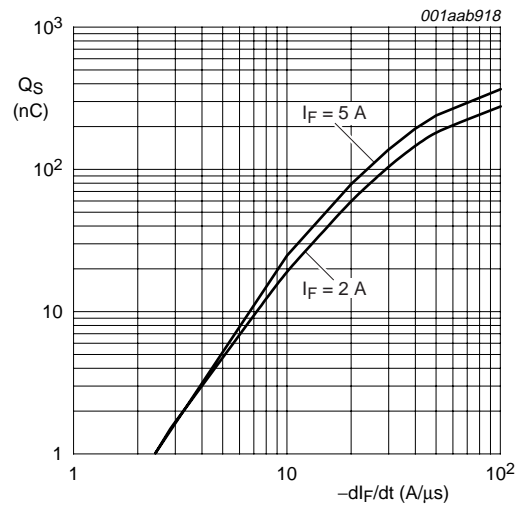


Per diode.

**Fig 7. Repetitive peak reverse current as a function of time differential forward current; maximum values**



**Fig 8. Forward current as a function of forward voltage**



Per diode.

Tj = 25 °C.

**Fig 9. Reverse recovery charge as a function of time differential forward current; maximum values**

## 7. Package information

Epoxy meets UL94 V0 at 1/8 inch.

8. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB

SOT78

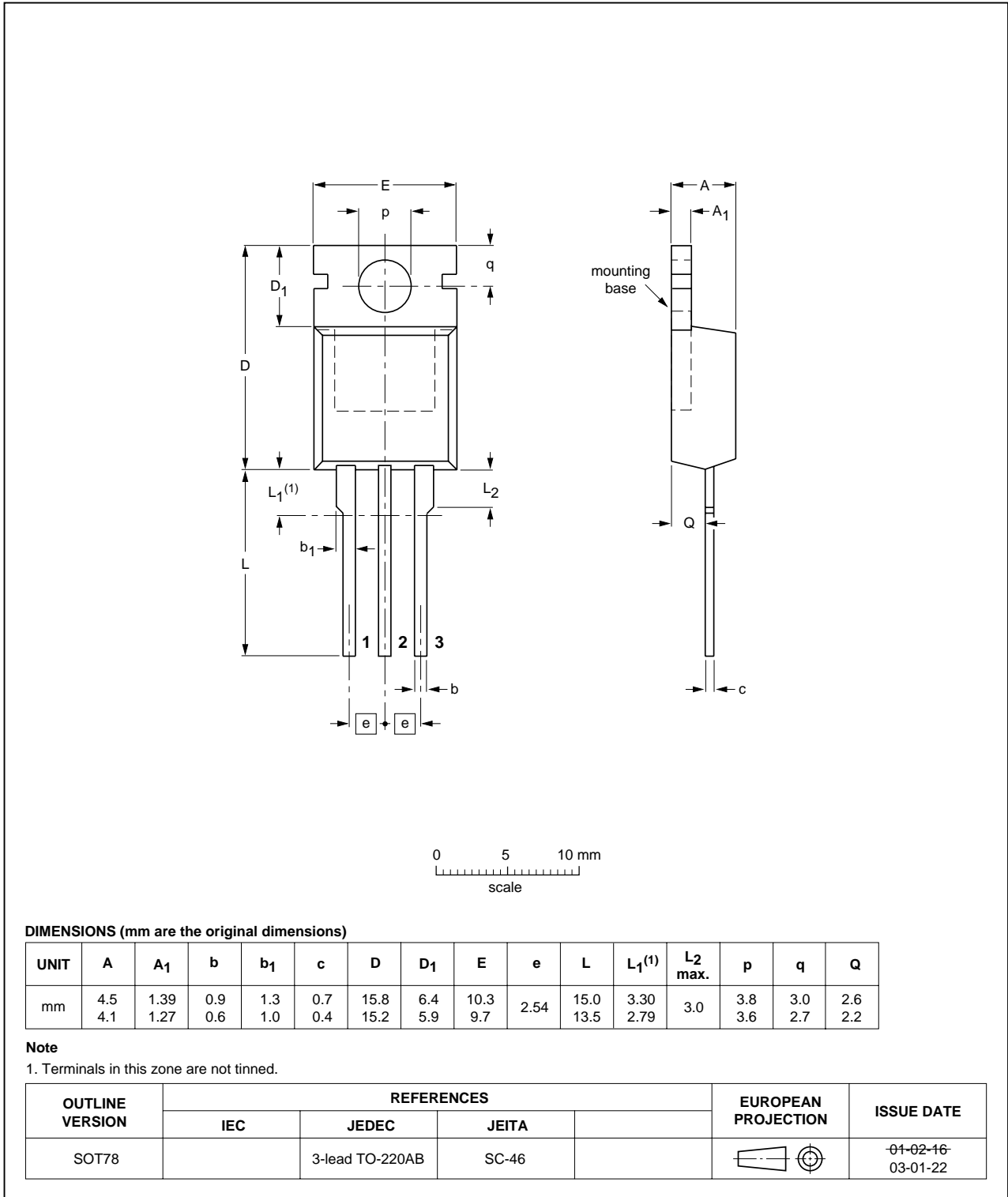


Fig 10. Package outline SOT78 (SC-46)



## 9. Revision history

Table 6: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BYT28_SER_4	20041122	Product data sheet	-	9397 750 14088	BYT28_SERIES_3
Modifications:	<ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors.</li><li>• Type number BYT28-400 removed</li><li>• <a href="#">Table 1</a>: correction so the table corresponds to the device.</li></ul>				
BYT28_SERIES_3	19981001	Product specification	-	-	BYT28_SERIES_2
BYT28_SERIES_2	19980901	Product specification	-	-	BYT28_SERIES_1
BYT28_SERIES_1	19960201	Product specification	-	-	-

## 10. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2]</sup> <sup>[3]</sup>	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

## 11. Definitions

**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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