



BAS16TH

High-speed switching diode

7 December 2018

Product data sheet

1. General description

High-speed switching diode, encapsulated in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- High switching speed: $t_{rr} \leq 4$ ns
- Low leakage current
- Repetitive peak reverse voltage $V_{RRM} \leq 100$ V
- Low capacitance
- Small SMD plastic package
- High-temperature applications up to 175 °C
- AEC-Q101 qualified

3. Applications

- High-speed switching
- General-purpose switching

4. Quick reference data

Table 1. Quick reference data

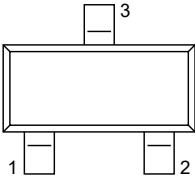
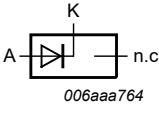
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage	$T_j = 25$ °C		-	-	100	V
I_F	forward current		[1]	-	-	215	mA
V_R	reverse voltage			-	-	100	V
V_F	forward voltage	$I_F = 150$ mA	[2]	-	-	1.25	V
I_R	reverse current	$V_R = 80$ V; $T_j = 25$ °C		-	-	0.5	µA
t_{rr}	reverse recovery time	$I_F = 10$ mA; $I_R = 10$ mA; $R_L = 100$ Ω; $I_{R(meas)} = 1$ mA; $T_{amb} = 25$ °C		-	-	4	ns

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-side copper, tin-plated and standard footprint.

[2] Pulsed test: $t_p \leq 300$ µs; $\delta \leq 0.02$

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode	 TO-236AB (SOT23)	 006aaa764
2	n.c.	not connected		
3	K	cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS16TH	TO-236AB	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
BAS16TH	SP%

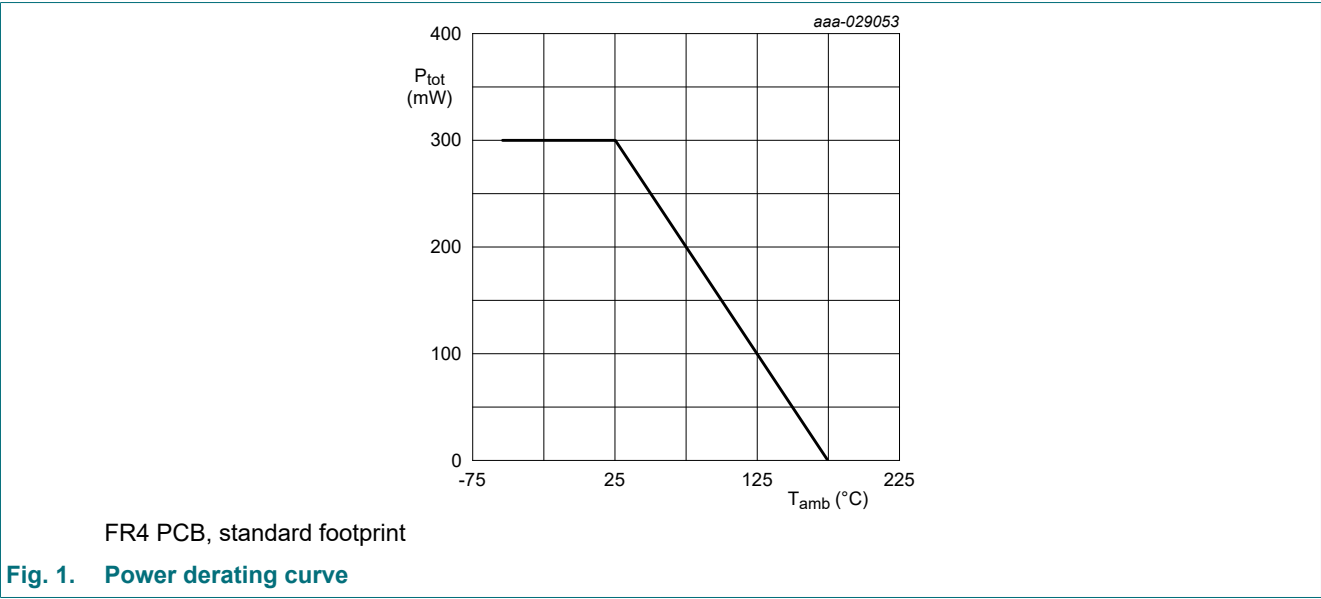
[1] % = placeholder for manufacturing site code

8. Limiting values

Table 5. Limiting values
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage	$T_j = 25\text{ }^{\circ}\text{C}$		-	100	V
V_R	reverse voltage			-	100	V
I_F	forward current		[1]	-	215	mA
I_{FSM}	non-repetitive peak forward current	$t_p = 1\text{ }\mu\text{s}; T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}; \text{square wave}$		-	4	A
		$t_p = 1\text{ ms}; T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}; \text{square wave}$		-	1	A
		$t_p = 1\text{ s}; T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}; \text{square wave}$		-	0.5	A
I_{FRM}	repetitive peak forward current	$t_p \leq 0.5\text{ ms}; \delta = 0.25$		-	500	mA
P_{tot}	total power dissipation	$T_{\text{amb}} \leq 25\text{ }^{\circ}\text{C}$	[1]	-	300	mW
T_j	junction temperature			-	175	$^{\circ}\text{C}$
T_{amb}	ambient temperature			-55	175	$^{\circ}\text{C}$
T_{stg}	storage temperature			-65	175	$^{\circ}\text{C}$

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-side copper, tin-plated and standard footprint.



9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	500	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[2]	-	-	330	K/W

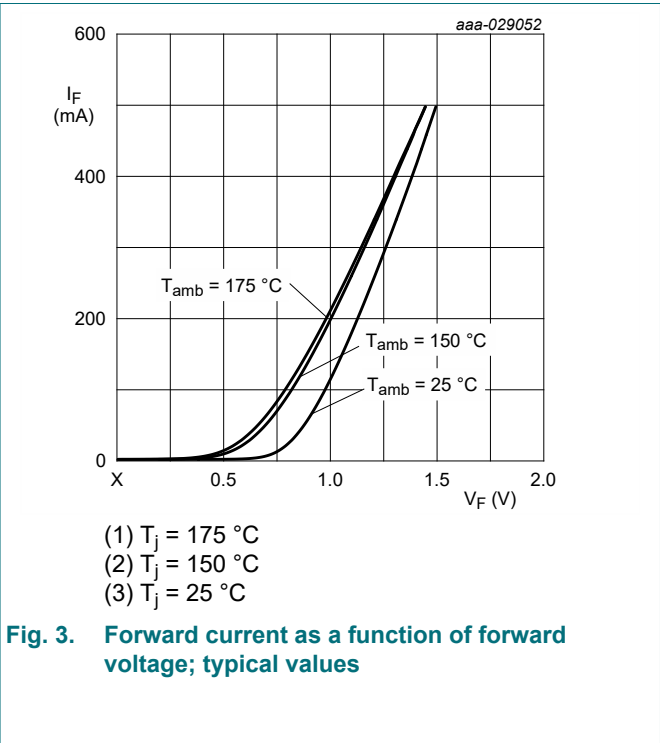
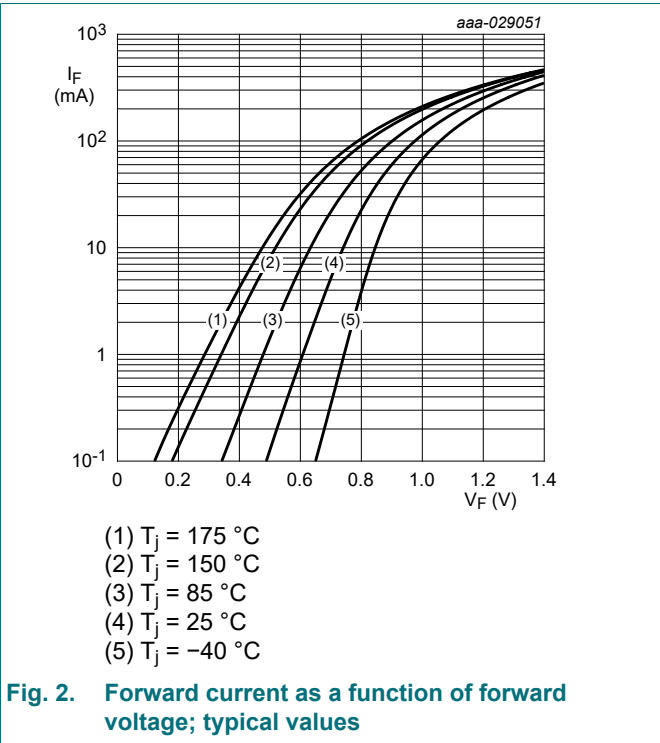
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-side copper, tin-plated and standard footprint.
[2] Soldering point of cathode tab.

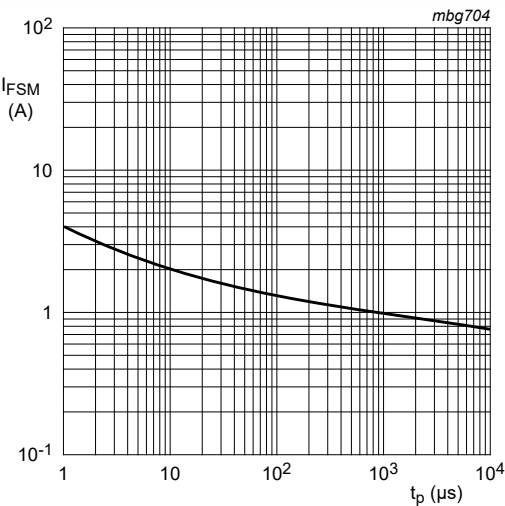
10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _F	forward voltage	I _F = 1 mA	[1]	-	-	715	mV
		I _F = 10 mA	[1]	-	-	855	mV
		I _F = 50 mA	[1]	-	-	1	V
		I _F = 150 mA	[1]	-	-	1.25	V
I _R	reverse current	V _R = 25 V; T _j = 25 °C		-	-	30	nA
		V _R = 80 V; T _j = 25 °C		-	-	0.5	μA
		V _R = 25 V; T _j = 150 °C		-	-	30	μA
		V _R = 80 V; T _j = 150 °C		-	-	50	μA
C _d	diode capacitance	V _R = 0 V; f = 1 MHz; T _j = 25 °C		-	-	1.5	pF
t _{rr}	reverse recovery time	I _F = 10 mA; I _R = 10 mA; R _L = 100 Ω; I _{R(meas)} = 1 mA; T _{amb} = 25 °C		-	-	4	ns
V _{FRM}	peak forward recovery voltage	I _F = 10 mA; t _r = 20 ns		-	-	1.75	V

[1] Pulsed test: t_p ≤ 300 μs; δ ≤ 0.02





Based on square wave currents.
 $T_{j(init)} = 25\text{ }^{\circ}\text{C}$

Fig. 4. Non-repetitive peak forward current as a function of pulse duration; typical values

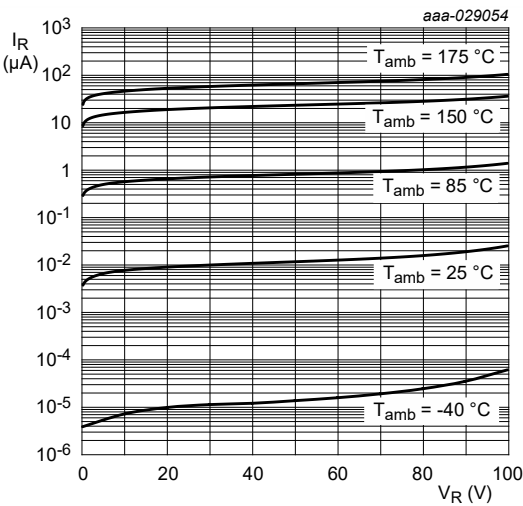
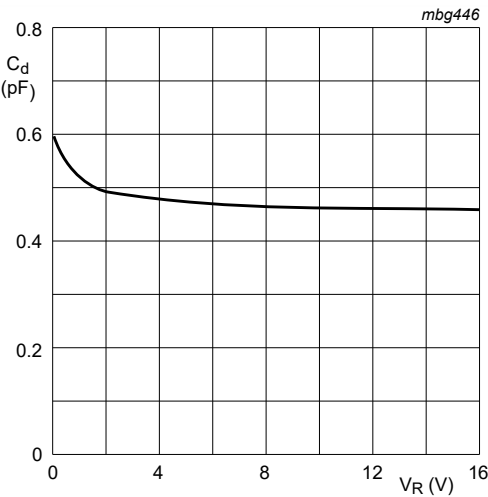


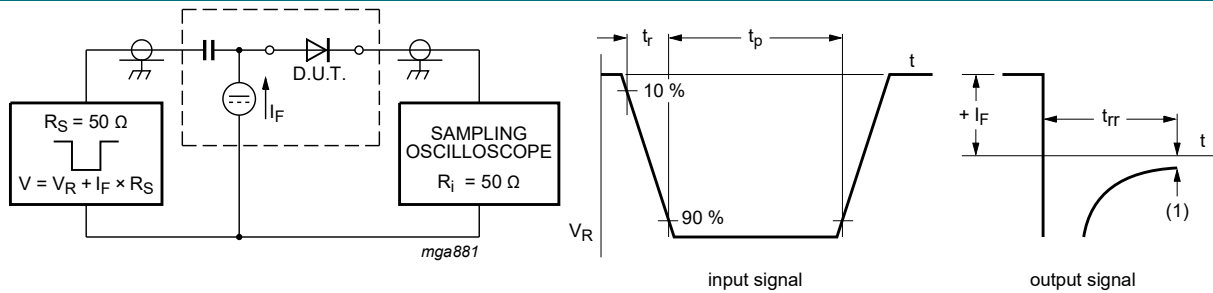
Fig. 5. Reverse current as a function of reverse voltage; typical values



$f = 1\text{ MHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$

Fig. 6. Diode capacitance as a function of reverse voltage; typical values

11. Test information

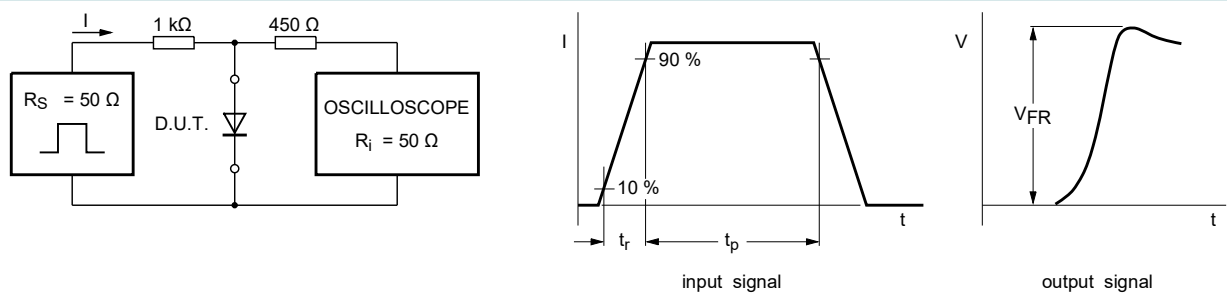


(1) $I_R = 1 \text{ mA}$

Input signal: reverse pulse rise time $t_r = 0.6 \text{ ns}$; reverse voltage pulse duration $t_p = 100 \text{ ns}$; duty cycle $\delta = 0.05$

Oscilloscope: rise time $t_r = 0.35 \text{ ns}$

Fig. 7. Reverse recovery time test circuit and waveforms



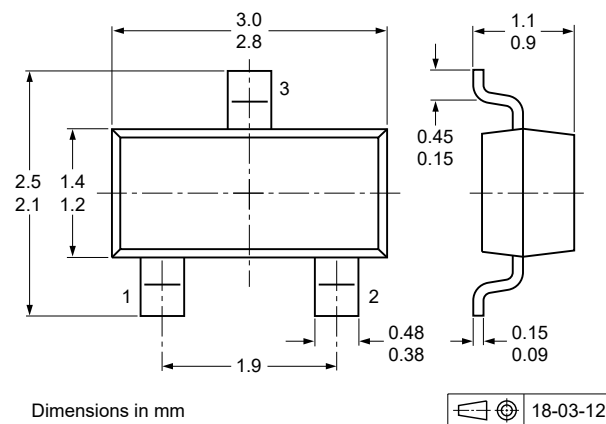
Input signal: forward pulse rise time $t_r = 20 \text{ ns}$; forward current pulse duration $t_p \geq 100 \text{ ns}$; duty cycle $\delta \leq 0.005$

Fig. 8. Forward recovery voltage test circuit and waveforms

Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

12. Package outline



13. Soldering

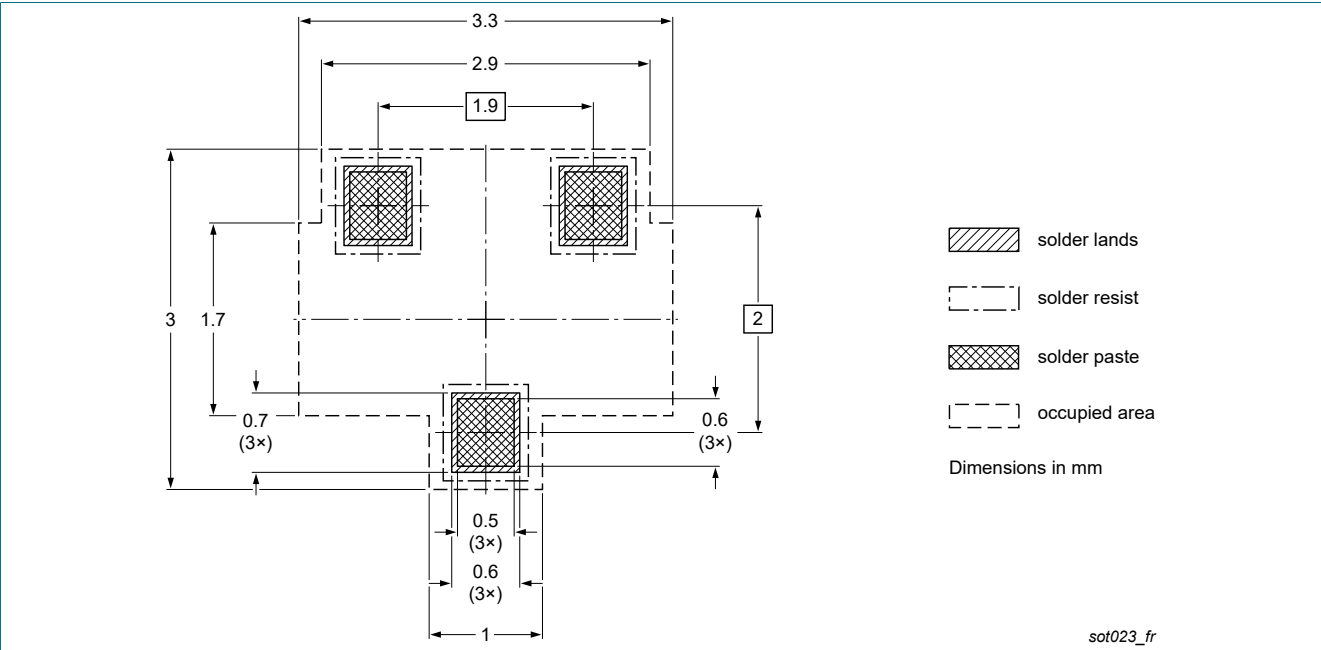


Fig. 10. Reflow soldering footprint for TO-236AB (SOT23)

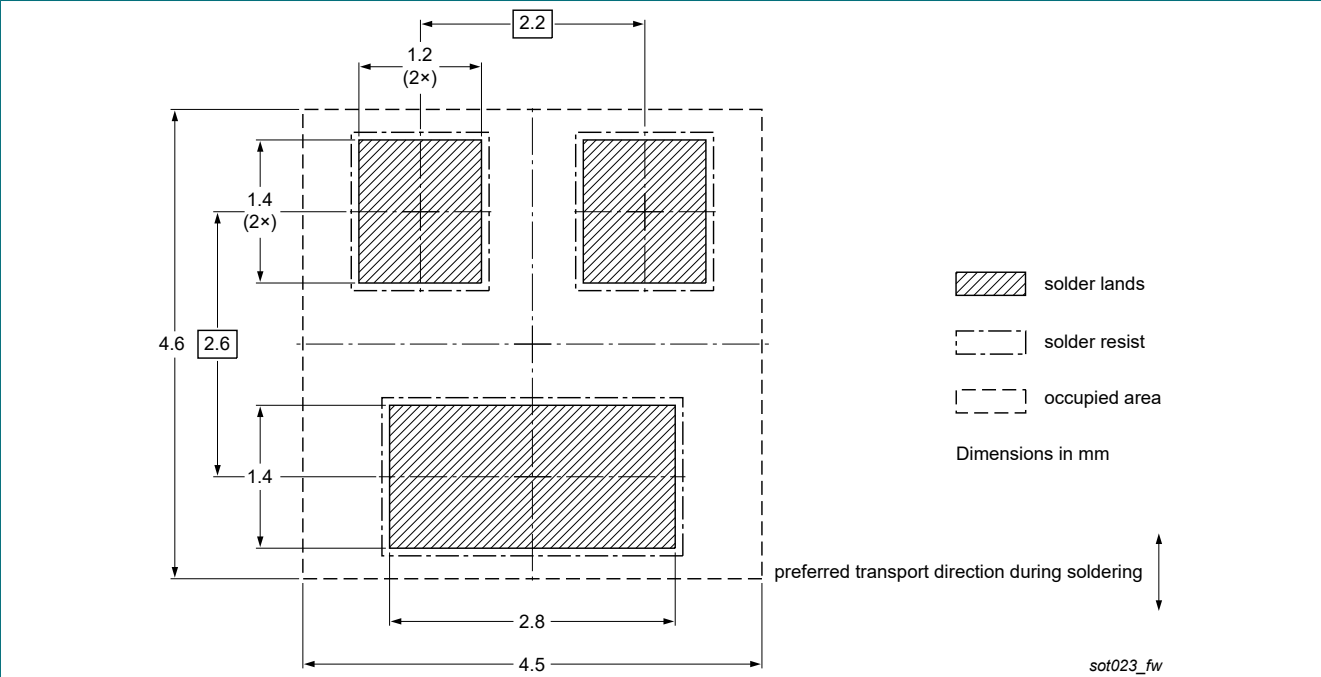


Fig. 11. Wave soldering footprint for TO-236AB (SOT23)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS16TH v.1	20181207	Product data sheet	-	-

15. 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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Contents

1. General description..... 1

2. Features and benefits..... 1

3. Applications..... 1

4. Quick reference data..... 1

5. Pinning information.....2

6. Ordering information.....2

7. Marking.....2

8. Limiting values..... 3

9. Thermal characteristics..... 3

10. Characteristics..... 4

11. Test information..... 6

12. Package outline..... 6

13. Soldering..... 7

14. Revision history.....8

15. Legal information.....9

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