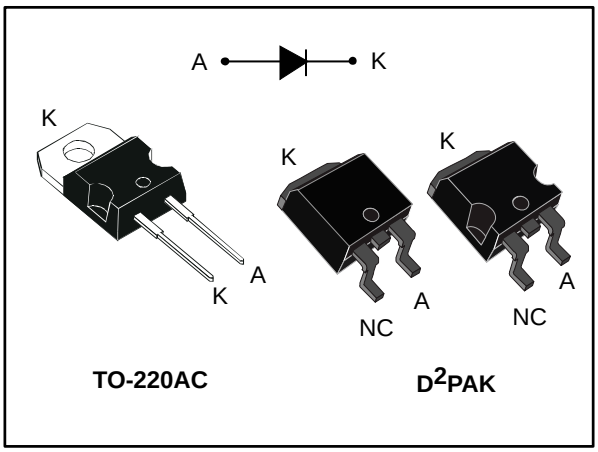
STTH803

High frequency secondary rectifier

Datasheet - production data



Features

- Combines highest recovery and reverse voltage performance
- Ultra-fast, soft and noise-free recovery
- ECOPACK®2 compliant component for D²PAK on demand

Description

Single fast recovery epitaxial diode suited for switch mode power supply and high frequency DC/DC converters. Packaged in TO-220AC or D²PAK this device is especially intended for secondary rectification.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	8 A
V_{RRM}	300 V
T_j (max)	175 °C
V_F (typ)	0.85 V
t_{rr} (max)	25 ns

This is information on a product in full production.

1 Characteristics

Table 2: Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		300	V
$I_{F(RMS)}$	Forward rms current		20	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	T_C = 150 °C	8	A
I_{FSM}	Surge non repetitive forward current	tp = 10 ms sinusoidal	100	A
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j	Maximum operating junction temperature		+ 175	°C

Table 3: Thermal parameter

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	2.5	°C/W

Table 4: Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	V_R = 300 V	-		20	µA
		T_j = 125 °C		-	20	200	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 8 A	-		1.25	V
		T_j = 125 °C		-	0.85	1	

Notes:

(1)Pulse test: t_p = 5 ms, δ < 2%

(2)Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:

$P = 0.75 \times I_{F(AV)} + 0.031\ I_F{}^2{}_{(RMS)}$

Table 5: Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 0.5 A, I_{rr} = 0.25 A, I_R = 1 A	-		25	ns
			I_F = 1 A, dI_F/dt = -50 A/µs, V_R = 30 V	-		35	
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 8 A, dI_F/dt = -100 A/µs, V_{FR} = 1.1 x V_{Fmax}	-		200	ns
V_{FP}	Forward recovery voltage	T_j = 25 °C		-		3.5	V
S_{factor}	Softness factor	T_j = 125 °C	I_F = 8 A, V_{CC} = 200 V dI_F/dt = 200 A/µs	-	0.3		
I_{RM}	Reverse recovery current	T_j = 125 °C		-		8	A

1.1 Characteristics (curves)

Figure 1: Conduction losses versus average current

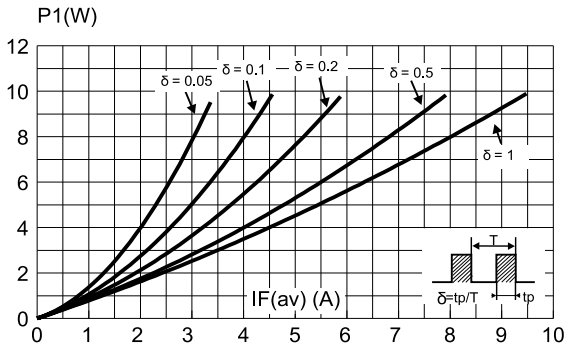


Figure 2: Forward voltage drop versus forward current (maximum values)

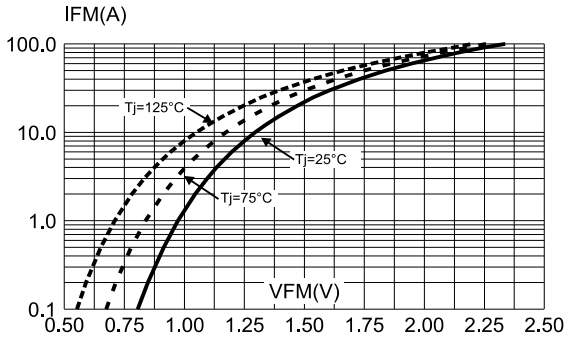


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

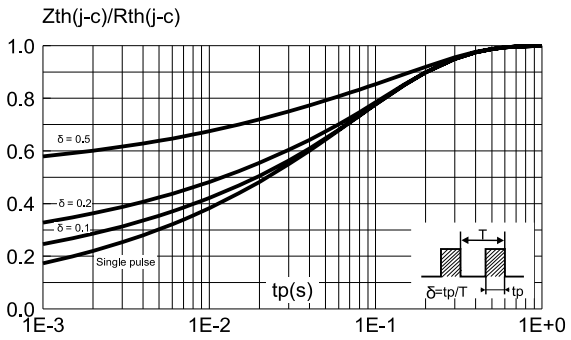


Figure 4: Peak reverse recovery current versus dIF/dt (typical values)

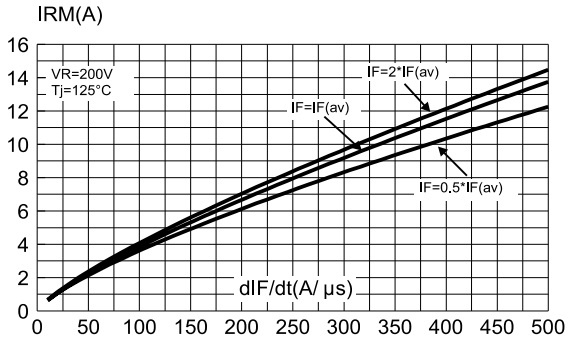


Figure 5: Reverse recovery time versus dIF/dt (typical values)

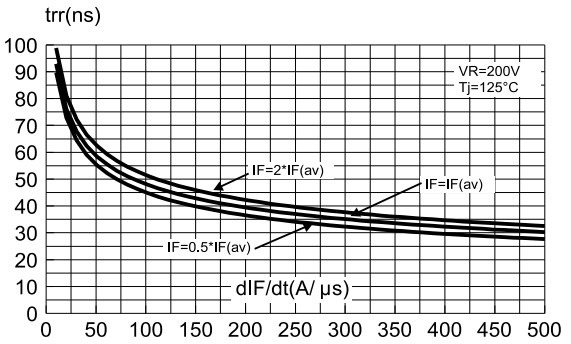


Figure 6: Softness factor versus dIF/dt (typical values)

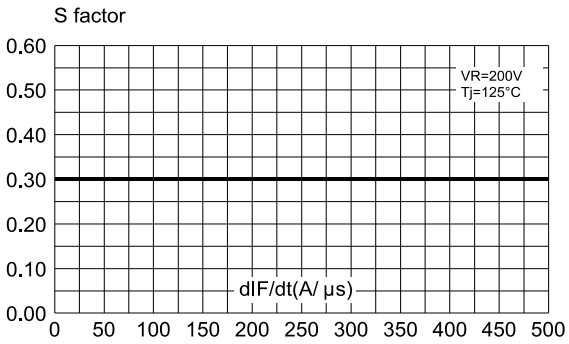


Figure 7: Relative variation of dynamic parameters versus junction temperature (reference: Tj= 125 °C)

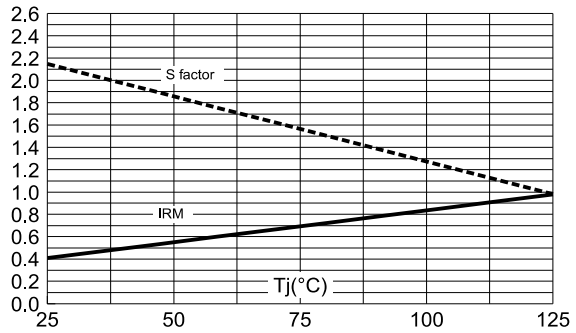


Figure 8: Transient peak forward voltage versus dIF/dt (typical values)

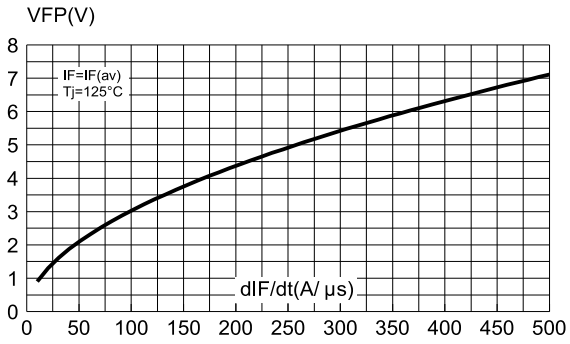
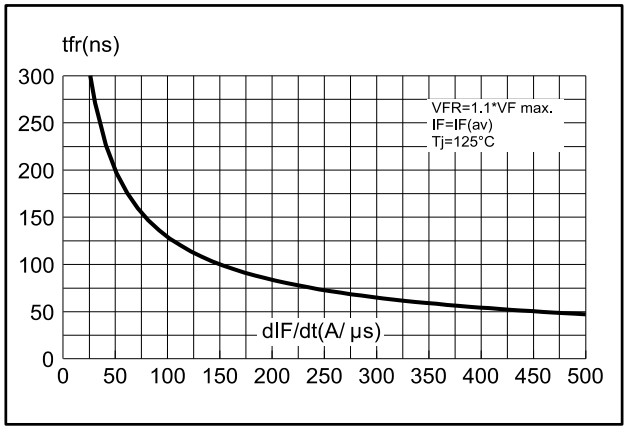


Figure 9: Forward recovery time versus dIF/dt (typical values)



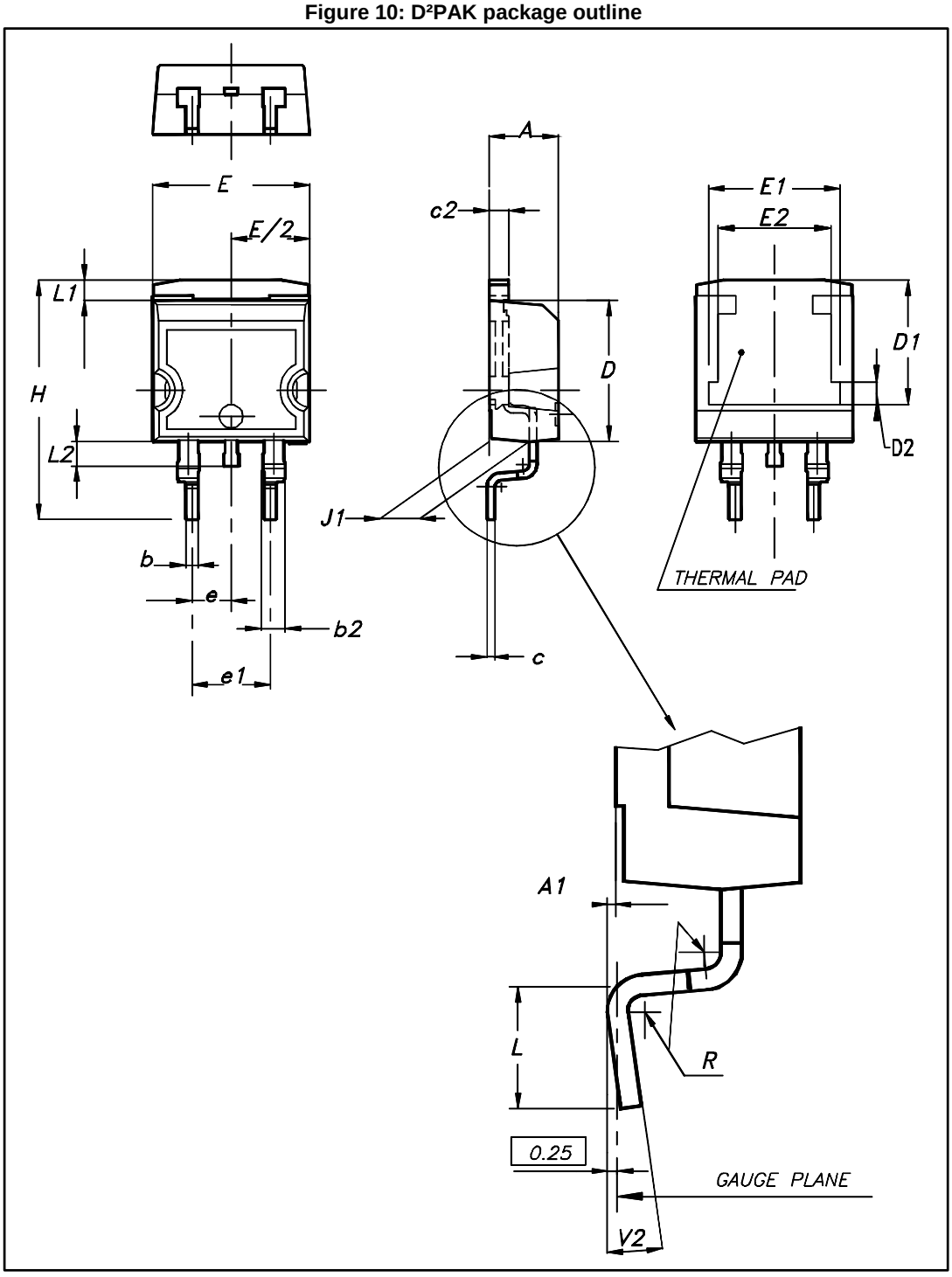
2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: ***www.st.com***. ECOPACK® is an ST trademark.

- Cooling method: by conduction (C)
- Recommended torque value (TO-220AC): 0.55 N.m.
- Maximum torque value (TO-220AC): 0.70 N.m.
- Epoxy meets UL 94,V0

2.1 D²PAK package information

Figure 10: D²PAK package outline

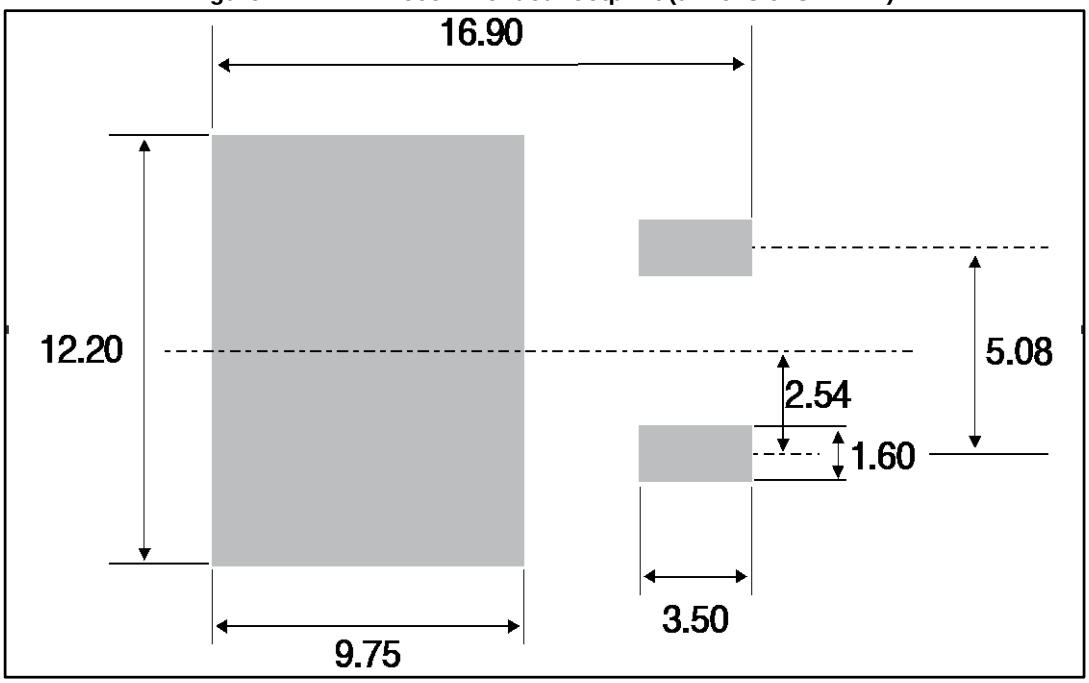


This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 6: D²PAK package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.36	4.60	0.172	0.181
A1	0.00	0.25	0.000	0.010
b	0.70	0.93	0.028	0.037
b2	1.14	1.70	0.045	0.067
c	0.38	0.69	0.015	0.027
c2	1.19	1.36	0.047	0.053
D	8.60	9.35	0.339	0.368
D1	6.90	8.00	0.272	0.311
D2	1.10	1.50	0.043	0.060
E	10.00	10.55	0.394	0.415
E1	8.10	8.90	0.319	0.346
E2	6.85	7.25	0.266	0.282
e	2.54 typ.		0.100	
e1	4.88	5.28	0.190	0.205
H	15.00	15.85	0.591	0.624
J1	2.49	2.90	0.097	0.112
L	1.90	2.79	0.075	0.110
L1	1.27	1.65	0.049	0.065
L2	1.30	1.78	0.050	0.070
R	0.4 typ.		0.015	
V2	0°	8°	-	-

Figure 11: D²PAK recommended footprint (dimensions in mm)



2.2 TO-220AC package information

Figure 12: TO-220AC package outline

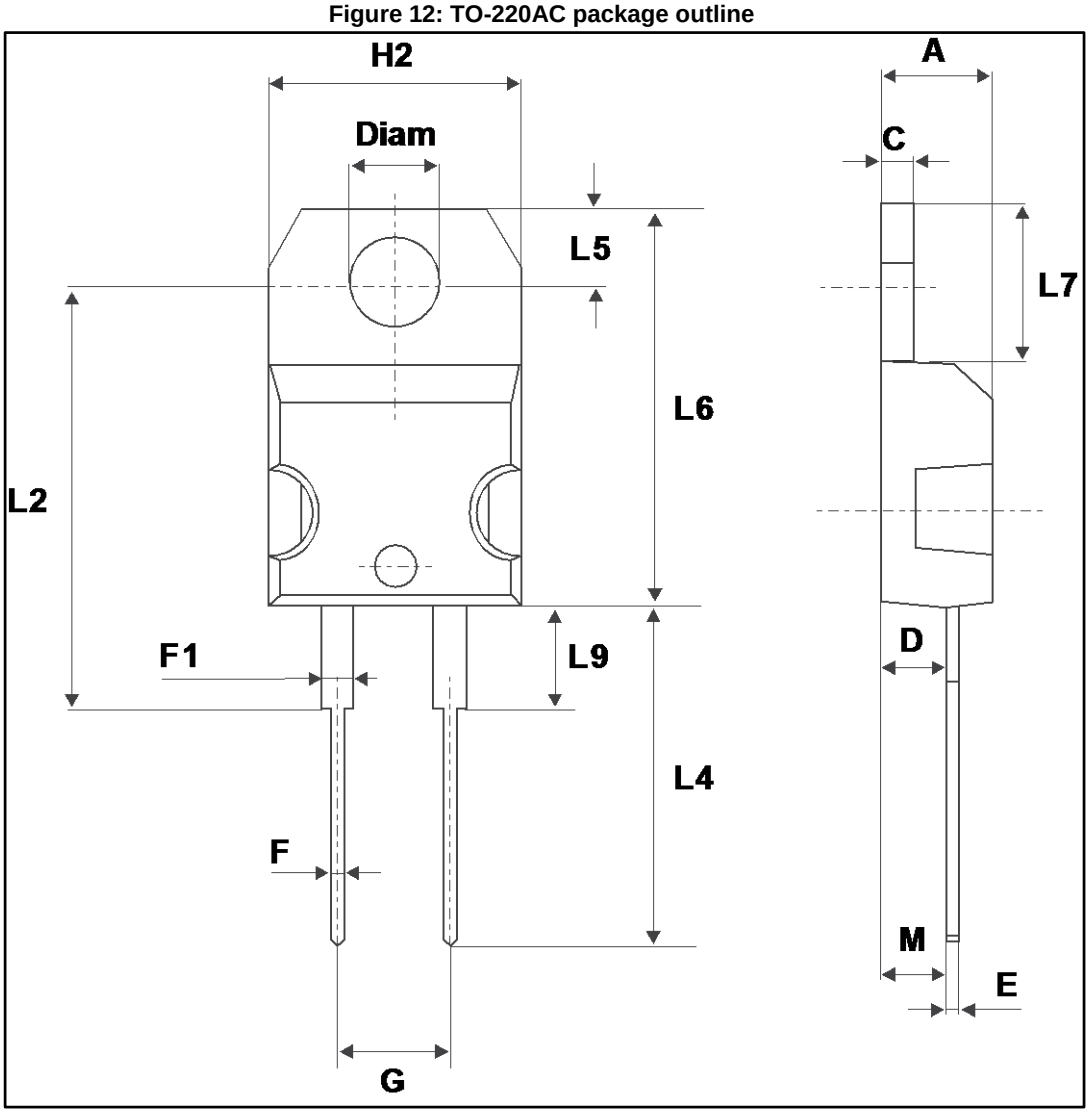


Table 7: TO-220AC package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
H2	10.00	10.40	0.393	0.409
L2	16.40 typ.		0.645 typ.	
L4	13.00	14.00	0.511	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.20	6.60	0.244	0.259
L9	3.50	3.93	0.137	0.154
M	2.6 typ.		0.102 typ.	
Diam	3.75	3.85	0.147	0.151

3 Ordering information

Table 8: Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH803D	STTH803D	TO-220AC	1.86g	50	Tube
STTH803G-TR	STTH803G	D^2PAK	1.38g	1000	Tape and reel

4 Revision history

Table 9: Document revision history

Date	Revision	Changes
26-Jun-2012	9	
22-Apr-2015	10	Updated features, *Table 1: "Device summary"* in cover page. Minor text changes in *Section 1: "Characteristics"*. Updated *Section 2: "Package information"*.

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