

Power Schottky rectifier

Features

- Negligible switching losses
- Low forward voltage drop
- Avalanche capability specified

Description

Axial and surface mount power Schottky rectifier suited for switch mode power supplies and high frequency dc to dc converters. Packaged in DO-201AD, DO-15, SMB and SMBflat, this device is intended for use in low voltage, high frequency inverters and small battery chargers and for applications where there are space constraints, for example telecom battery charger.

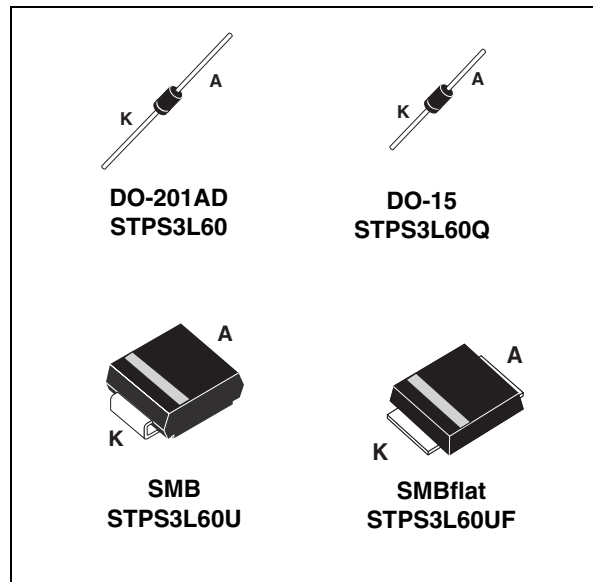


Table 1. Device summary

$I_{F(AV)}$	3 A
V_{RRM}	60 V
$T_j(max)$	150 °C
$V_F(max)$	0.61 V

1 Characteristics

Table 2. Absolute ratings⁽¹⁾

Symbol	Parameter		Value	Unit
V _{RRM}	Repetitive peak reverse voltage		60	V
I _{F(RMS)}	RMS forward current		10	A
I _{F(AV)}	Average forward current	T _L = 105 °C δ = 0.5 (DO-201AD, SMB)	3	A
		T _L = 72 °C δ = 0.5 (DO-15)		
		T _L = 127 °C δ = 0.5 (SMBflat)		
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms Sinusoidal	100	A
P _{ARM}	Repetitive peak avalanche power	t _p = 1 μs T _j = 25 °C	2000	W
T _{stg}	Storage temperature range		-65 to + 150	°C
T _j	Maximum operating junction temperature ⁽²⁾		150	°C
dV/dt	Critical rate of rise reverse voltage		10000	V/μs

1. limiting values, per diode

2. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance

Symbol	Parameter		Value	Unit
R _{th (j-l)}	Junction to leads	SMBflat	10	°C/W
		SMB	20	
	Lead length = 10 mm	DO-201AD	20	
		DO-15	35	

Table 4. Static electrical characteristics

Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-	-	150	μA
		$T_j = 100\text{ °C}$		-	4	15	mA
		$T_j = 125\text{ °C}$		-	14	30	
$V_F^{(1)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 3\text{ A}$	-	-	0.62	V
		$T_j = 100\text{ °C}$		-	0.53	0.61	
		$T_j = 125\text{ °C}$		-	0.51	0.59	
		$T_j = 25\text{ °C}$	$I_F = 6\text{ A}$	-	-	0.79	
		$T_j = 100\text{ °C}$		-	0.62	0.71	
		$T_j = 125\text{ °C}$		-	0.6	0.69	

1. Pulse test : $t_p = 380\ \mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation :

$$P = 0.44 \times I_{F(AV)} + 0.05 \times I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$) (DO-201AD, SMB)

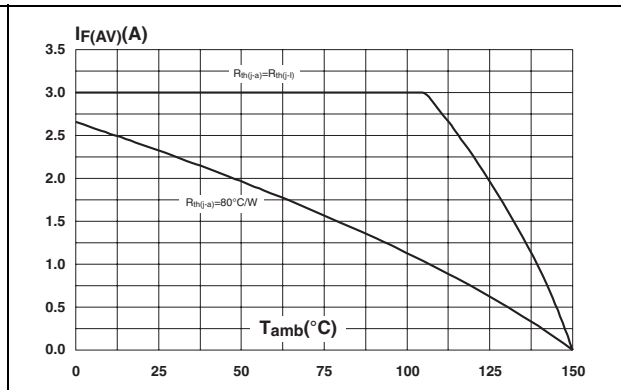
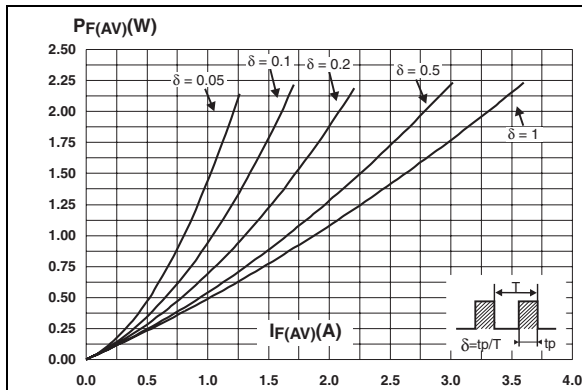


Figure 3. Average forward current versus ambient temperature ($\delta = 0.5$) (DO-15)

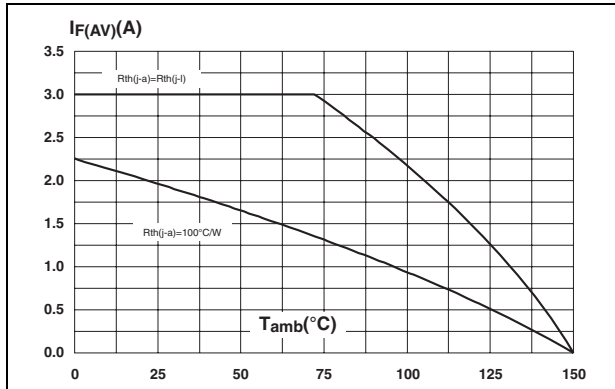


Figure 4. Average forward current versus ambient temperature ($\delta = 0.5$) (SMBflat)

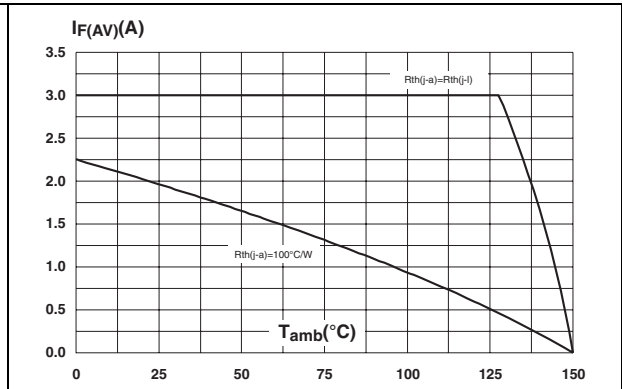


Figure 5. Normalized avalanche power derating versus pulse duration

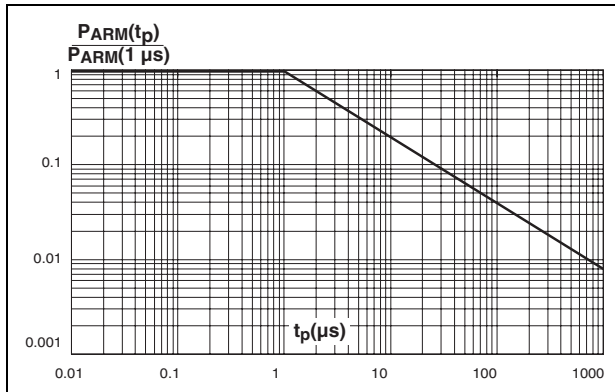


Figure 6. Normalized avalanche power derating versus junction temperature

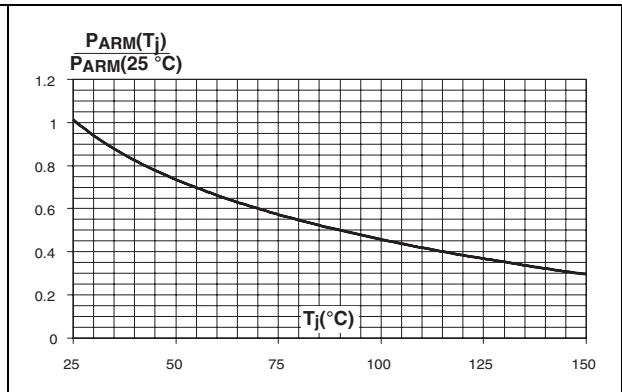


Figure 7. Non repetitive surge peak forward current versus overload duration (maximum values) (DO-201AD)

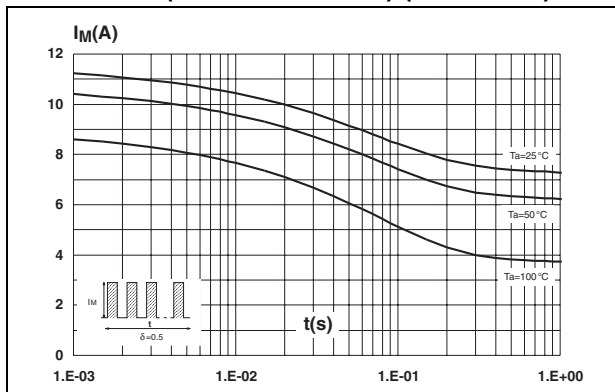


Figure 8. Non repetitive surge peak forward current versus overload duration (maximum values) (DO-15)

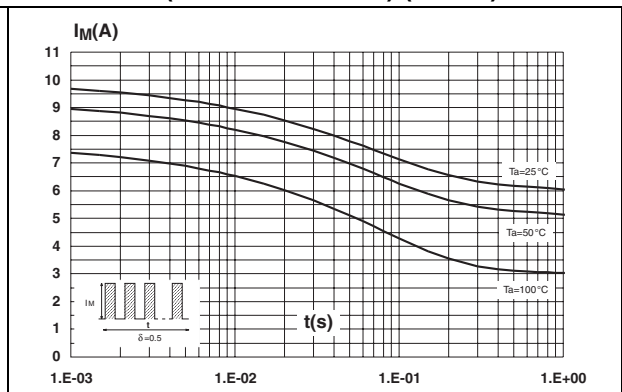


Figure 9. Non repetitive surge peak forward current versus overload duration (maximum values) (SMB)

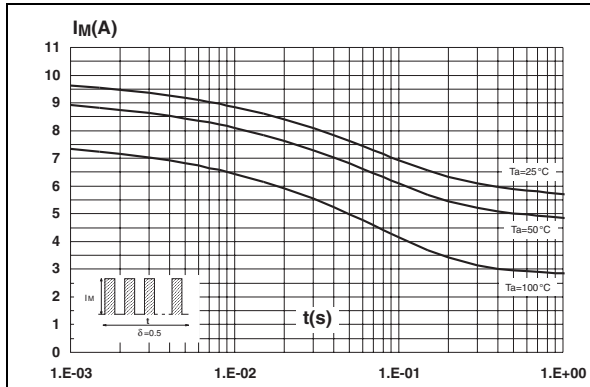


Figure 10. Non repetitive surge peak forward current versus overload duration (maximum values) (SMBflat)

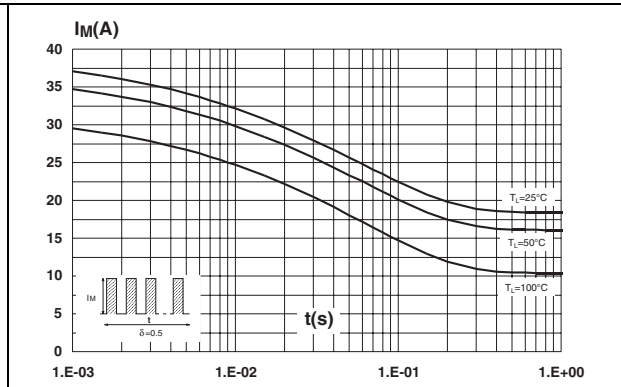


Figure 11. Relative variation of thermal impedance junction to ambient versus pulse duration (DO-201AD)

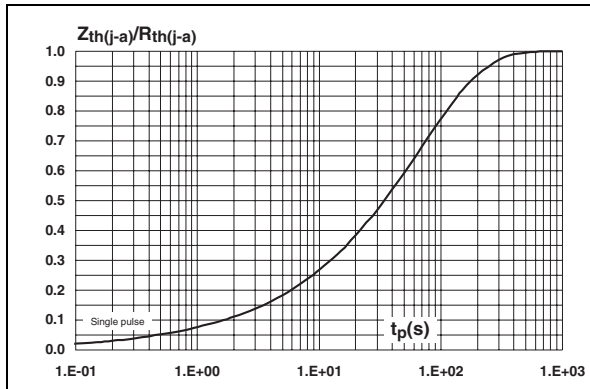


Figure 12. Relative variation of thermal impedance junction to ambient versus pulse duration (DO-15)

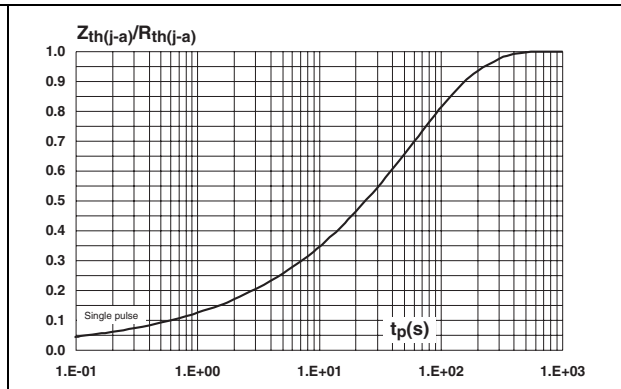


Figure 13. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)

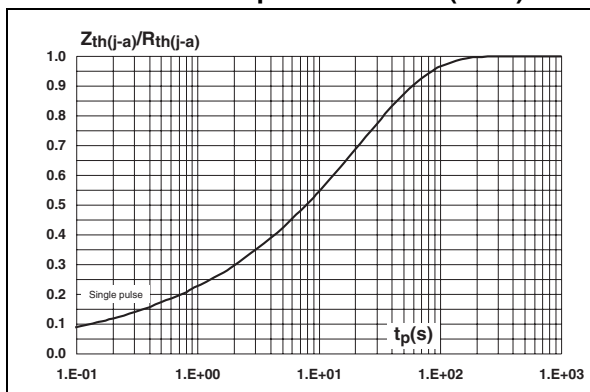


Figure 14. Relative variation of thermal impedance junction to lead versus pulse duration (SMBflat)

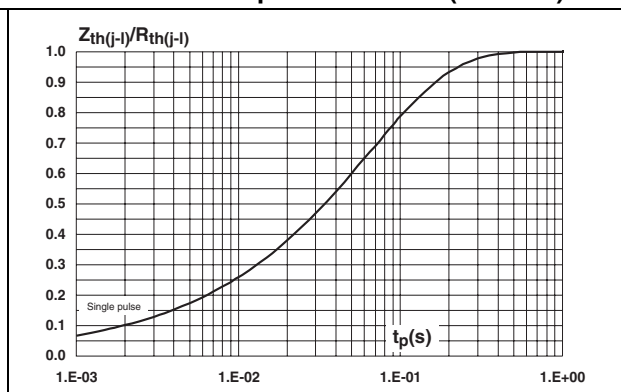


Figure 15. Reverse leakage current versus reverse voltage applied (typical values)

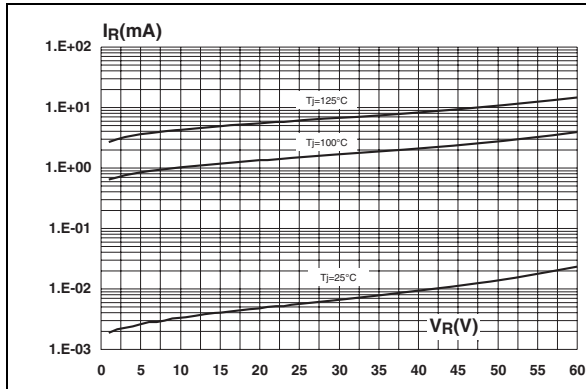


Figure 16. Junction capacitance versus reverse voltage applied (typical values)

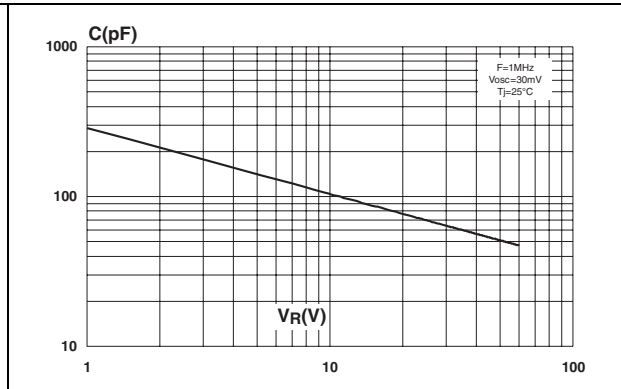


Figure 17. Forward voltage drop versus forward current (high level)

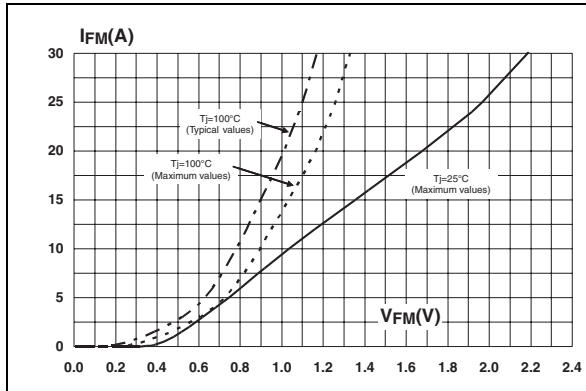


Figure 18. Forward voltage drop versus forward current (low level)

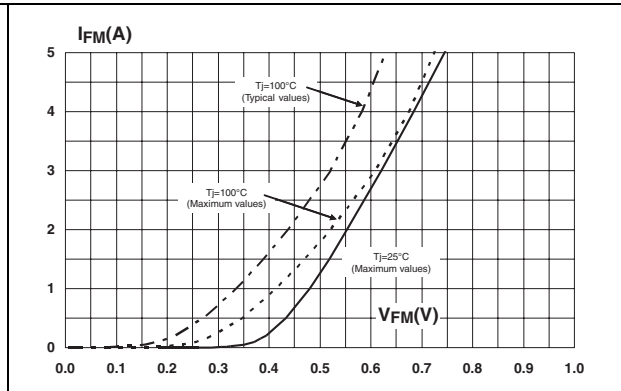


Figure 19. Thermal resistance junction to ambient versus copper surface under each lead (SMB)

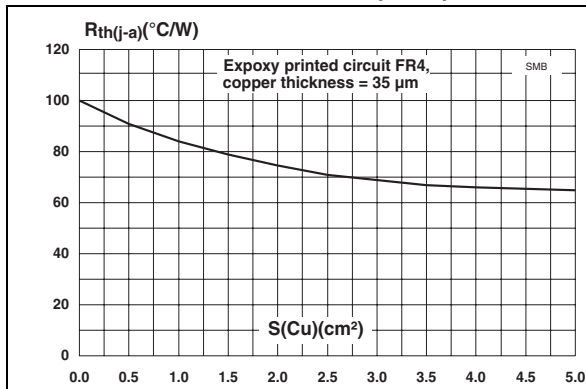
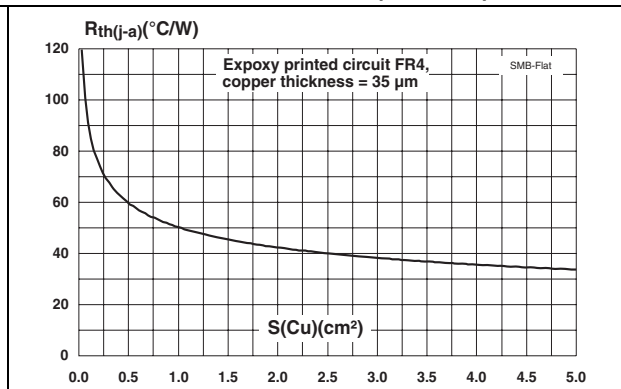


Figure 20. Thermal resistance junction to ambient versus copper surface under each lead (SMBflat)



2 Package information

- Epoxy meets UL94,V0

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.

Figure 21. DO-15 plastic dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	6.05	6.75	0.238	0.266
B	2.95	3.53	0.116	0.139
C	26	31	1.024	1.220
D	0.71	0.88	0.028	0.035

Figure 22. DO-201AD plastic dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A		9.50		0.374
B	25.40		1.000	
∅C		5.30		0.209
∅D		1.30		0.051
E		1.25		0.049

Notes:

1. The lead diameter $\varnothing D$ is not controlled over zone E
2. The minimum axial length within which the device may be placed with its leads bent at right angles is 0.59”(15 mm)

Table 5. SMB dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.40	0.006	0.016
D	3.30	3.95	0.130	0.156
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
L	0.75	1.50	0.030	0.059

Figure 23. SMB footprint, dimensions in mm (inches)

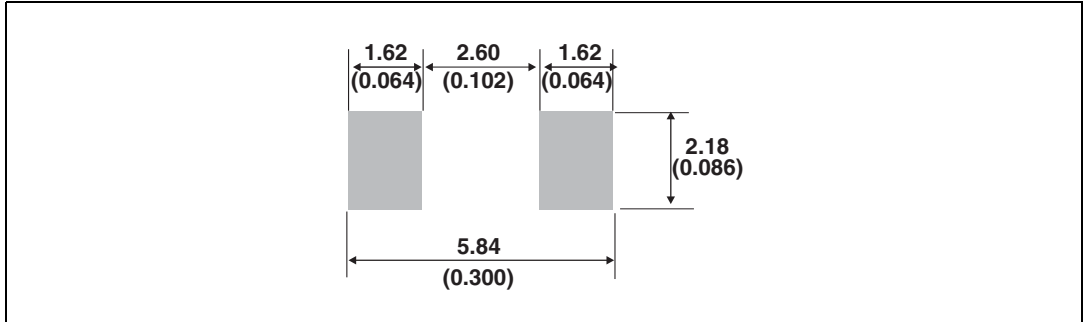
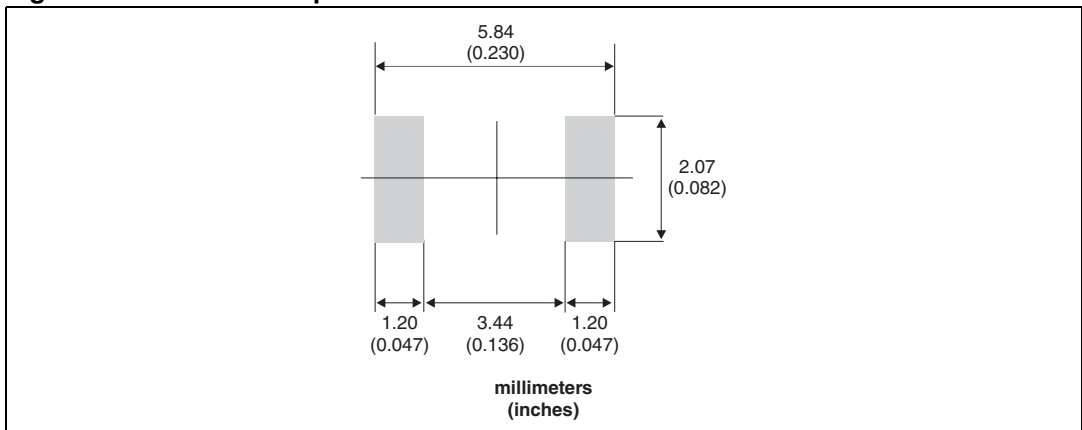


Table 6. SMBflat dimensions

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
b	1.95		2.20	0.077		0.087
c	0.15		0.40	0.006		0.016
D	3.30		3.95	0.130		0.156
E	5.10		5.60	0.200		0.220
E1	4.05		4.60	0.189		0.181
L	0.75		1.50	0.029		0.059
L1		0.40			0.016	
L2		0.60			0.024	

Figure 24. SMBflat footprint dimensions^(a)



a. SMB footprint may also be used.

3 Ordering information

Table 7. Ordering information

Order codes	Marking	Package	Weight	Base qty	Delivery mode
STPS3L60	STPS3L60	DO-201AD	1.12 g	600	Ammopack
STPS3L60RL	STPS3L60	DO-201AD	1.12 g	1900	Tape and reel
STPS3L60Q	STPS3L60	DO-15	0.4 g	1000	Ammopack
STPS3L60QRL	STPS3L60	DO-15	0.4 g	6000	Tape and reel
STPS3L60U	G36	SMB	0.107 g	2500	Tape and reel
STPS3L60UF	FG36	SMBflat	0.136 g	5000	Tape and reel

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
July-2003	5A	Previous issue
12-Jun-2009	6	Reformatted to current standards. Added SMBflat package. Added ECOPACK statement. Added cathode band graphics.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2009 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com