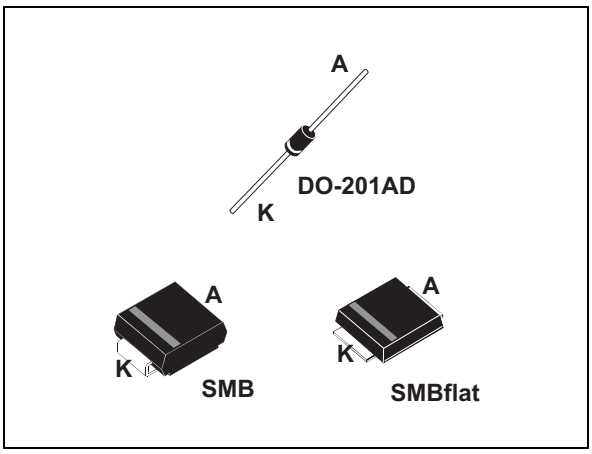
STPS3150

Power Schottky rectifier

Datasheet - production data



Features

- Negligible switching losses
- Low forward voltage drop for higher efficiency and extended battery life
- Low thermal resistance
- ECOPACK®2 compliant component

Description

150 V Power Schottky rectifier are suited for switch mode power supplies on up to 24 V rails and high frequency converters.

Packaged in Axial, SMB, and low-profile SMB, this device is intended for use in consumer and computer applications like TV, STB, PC and DVD where low drop forward voltage is required to reduce power dissipation.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	3 A
V_{RRM}	150 V
T_j (max)	175 °C
V_F (typ)	0.63 V

1 Characteristics

Table 2. Absolute Ratings (limiting values at 25 °C unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			150	V
$I_{F(AV)}$	Average forward current, δ = 0.5 square wave	SMB	T_L = 130 °C	3	A
		DO-201AD	T_L = 140 °C		
		SMB flat	T_L = 150 °C		
I_{FSM}	Surge non repetitive forward current	SMB	t_p = 10 ms sinusoidal	80	A
		DO-201AD		100	
		SMB flat		80	
P_{ARM}(1)	Repetitive peak avalanche power		T_j = 125 °C, t_p = 10 µs	210	W
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Operating junction temperature(2)			175	°C

1. For pulse time duration deratings, please refer to *Figure 3*. More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the STMicroelectronics Application notes AN1768, “Admissible avalanche power of Schottky diodes” and AN2025, “Converter improvement using Schottky rectifier avalanche specification”.
2. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ 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 lead		SMB flat	10	°C/W
			SMB	20	
		Lead length = 10 mm	DO-201AD	15	

Table 4. Static electrical characteristics

Symbol	Parameter	Tests conditions		Min.	Typ	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$		0.4	2.0	µA
		T_j = 125 °C			0.6	2.0	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 3 A		0.78	0.82	V
		T_j = 125 °C			0.63	0.67	
		T_j = 25 °C	I_F = 6 A		0.85	0.89	
		T_j = 125 °C			0.70	0.75	

1. t_p = 5 ms, δ < 2%
2. t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.59 \times I_{F(AV)} + 0.027\ I_F{}^2{}_{(RMS)}$

Figure 1. Average forward power dissipation versus average forward current

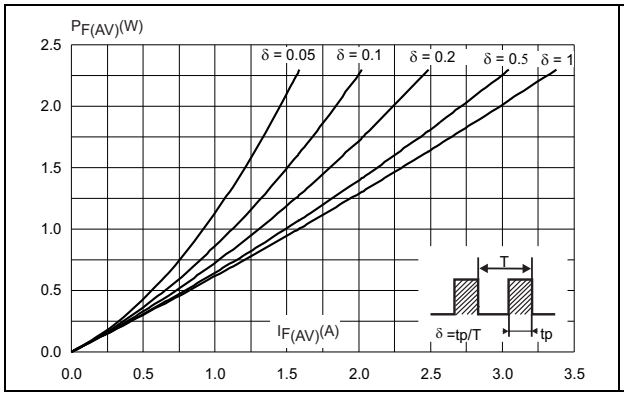


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

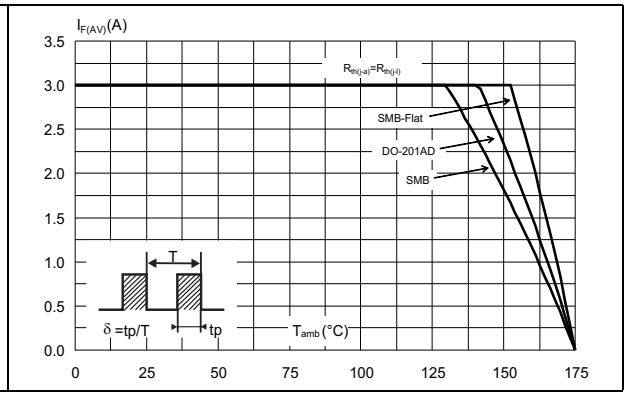


Figure 3. Normalized avalanche power derating versus pulse duration

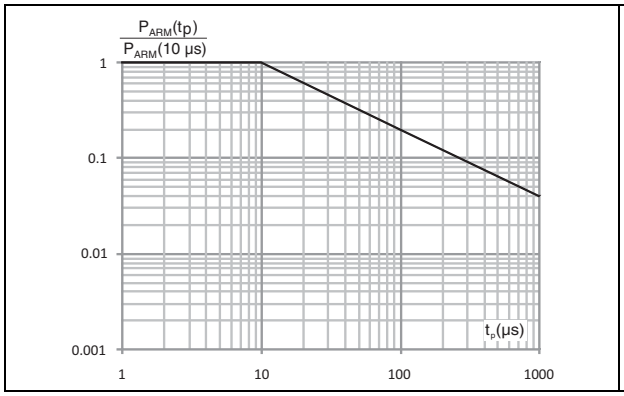


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration (DO-201AD)

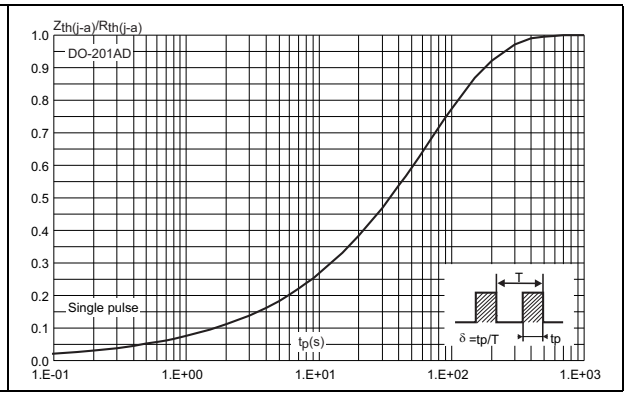


Figure 5. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)

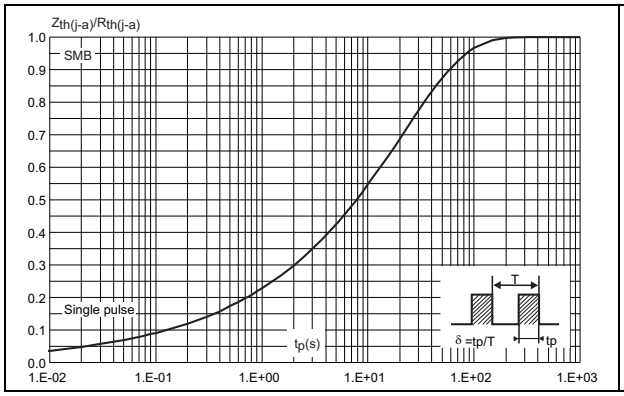


Figure 6. Relative variation of thermal impedance junction to lead versus pulse duration (SMBflat)

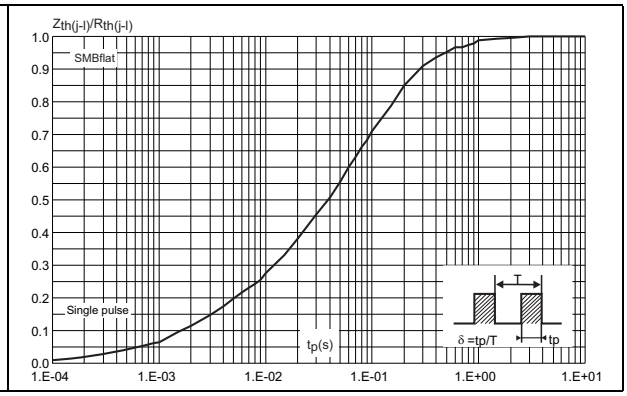


Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

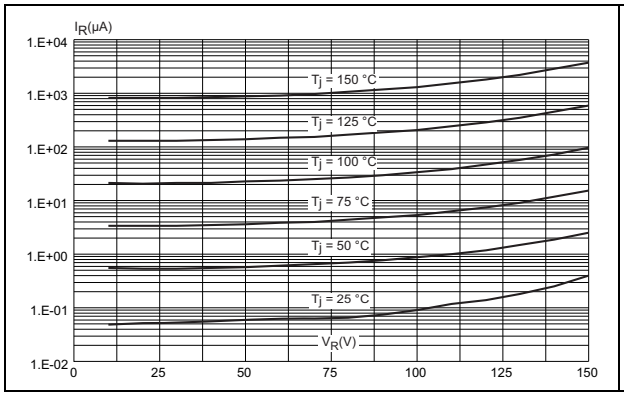


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

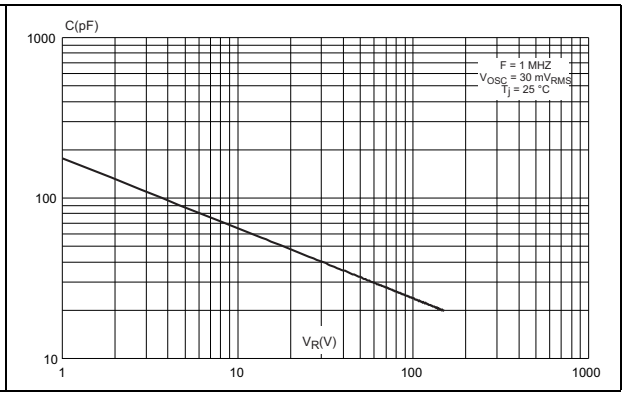


Figure 9. Forward voltage drop versus forward current

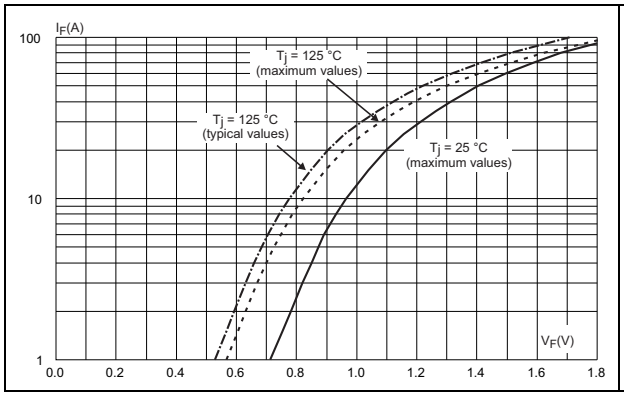


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (typical values)

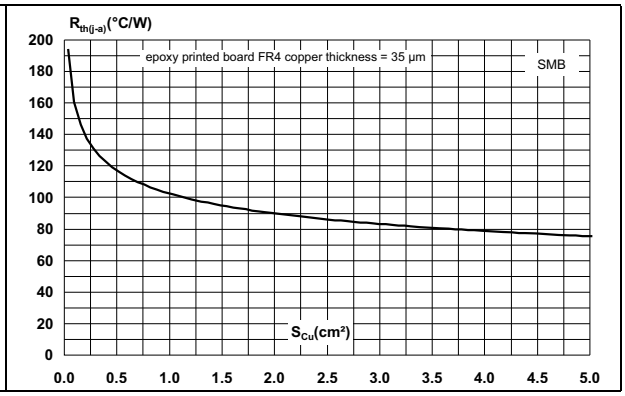


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (typical values)

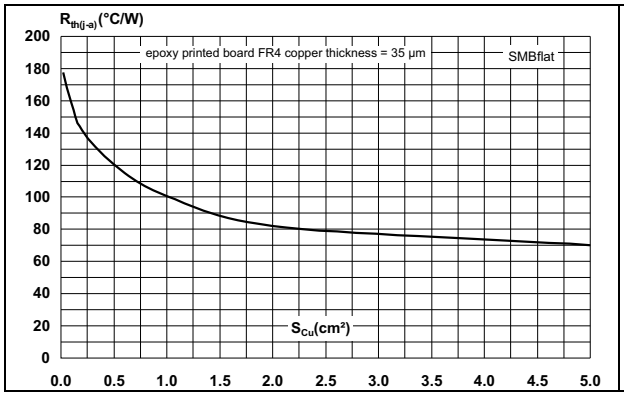
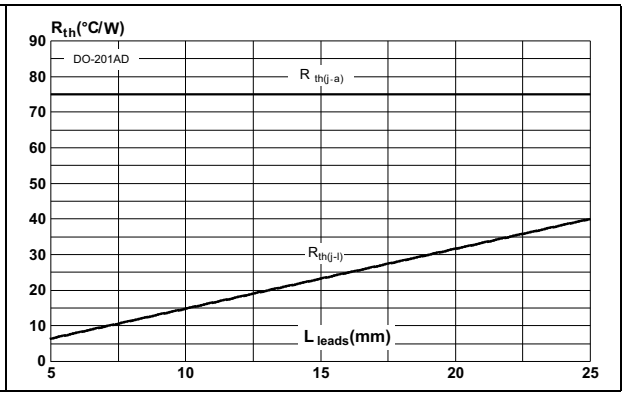


Figure 12. Thermal resistance versus lead length



2 Package information

- Epoxy meets UL94, V0
- Lead-free package

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 13. SMB dimensions (definitions)

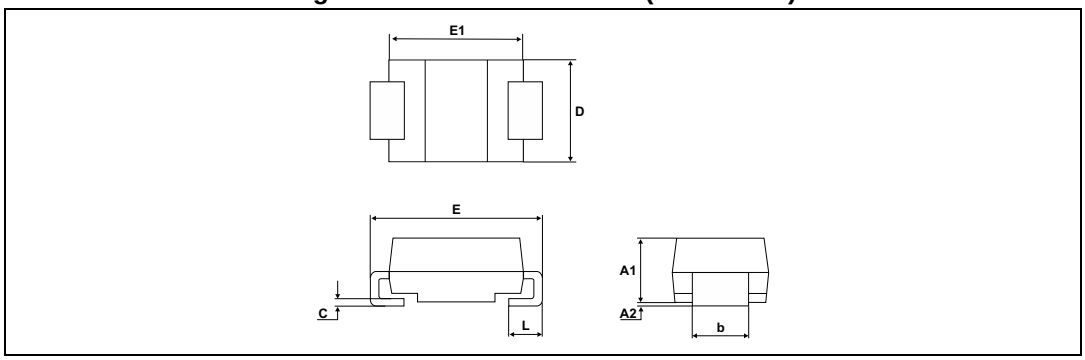


Table 5. SMB dimensions (values)

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
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
D	3.30	3.95	0.130	0.156
L	0.75	1.50	0.030	0.059

Figure 14. SMB footprint (dimensions in mm)

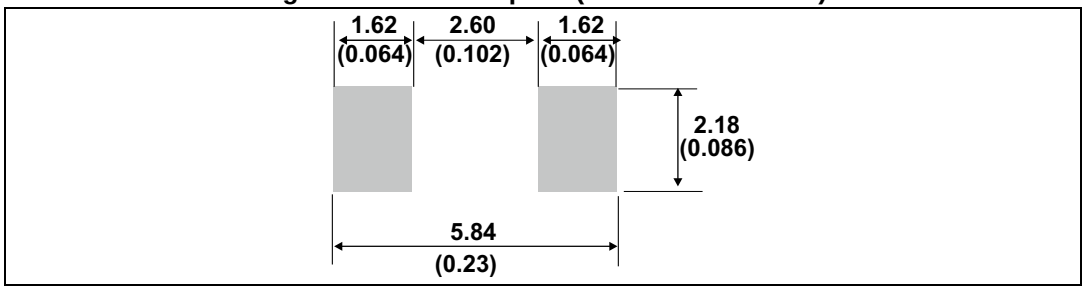


Figure 15. SMBflat dimensions (definitions)

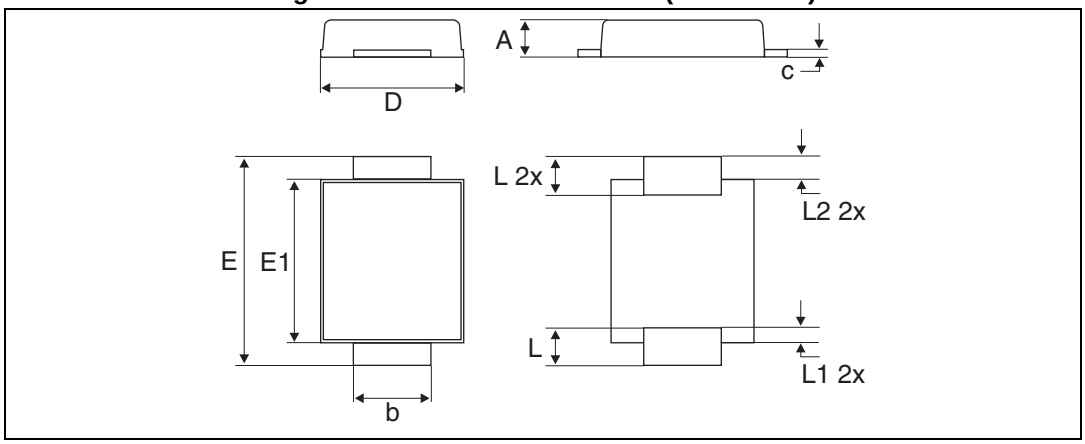


Table 6. SMBflat dimensions (values)

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
b(1)	1.95		2.20	0.077		0.087
c(1)	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	

1. Applies to plated leads

Figure 16. SMB Flat footprint

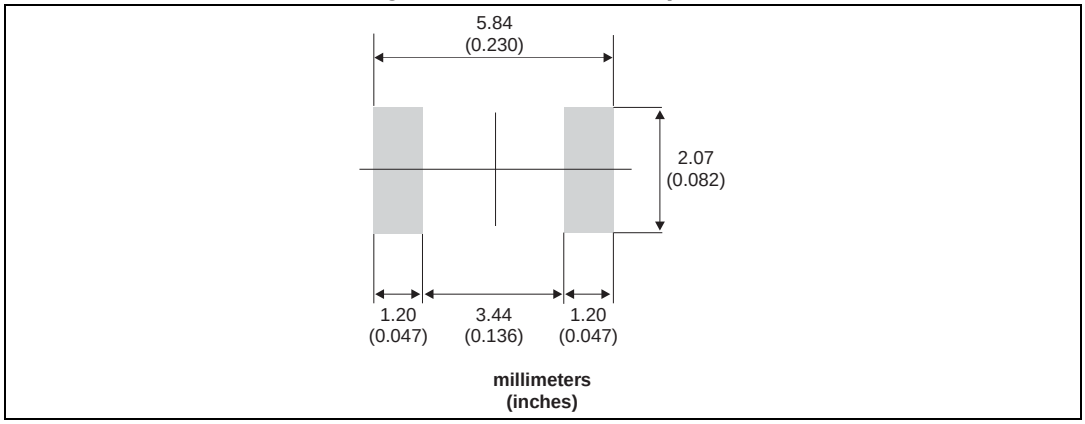


Figure 17. DO-201AD dimensions (definitions)

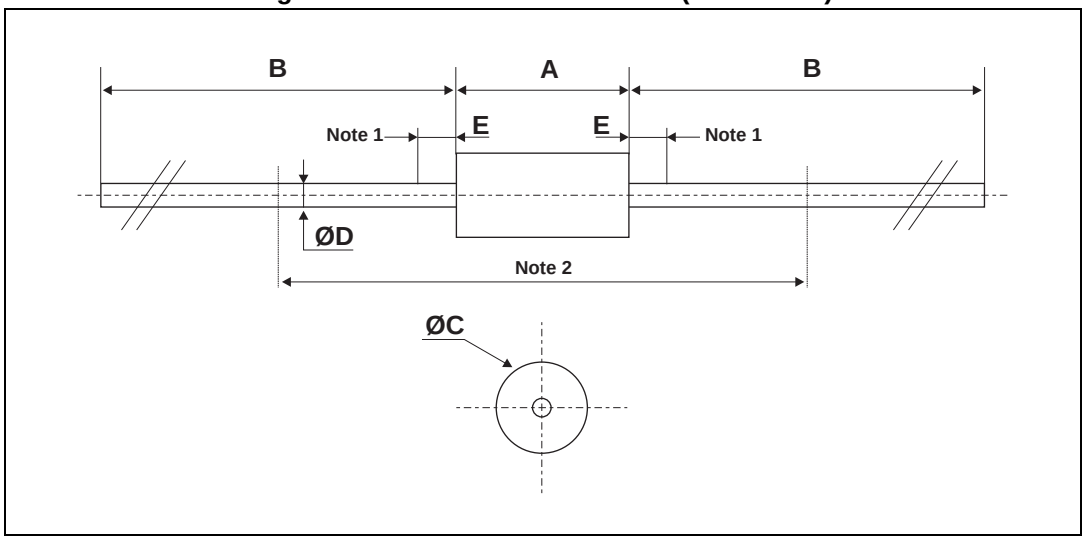


Table 7. DO-201AD dimensions (values)

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)		1.30		0.051
E		1.25		0.049
Note 2(2)	15		0.59	

1. The lead diameter D is not controlled over zone E
2. The minimum length, which must stay straight between the right angles after bending, is 15 mm (0.59”)

3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS3150U	G315	SMB	107 mg	2500	Tape and reel
STPS3150UF	FG315	SMB flat	50 mg	5000	Tape and reel
STPS3150	STPS3150	DO-201AD	1.12 g	600	Ammopack
STPS3150RL	STPS3150	DO-201AD	1.12 g	1900	Tape and reel

4 Revision history

Table 9. Document revision history

Date	Revision	Changes
May-2003	2A	Last update.
31-May-2006	3	Reformatted to current standard. Added ECOPACK statement. Updated SMB footprint in Figure 12. Changed nF to pF in Figure 8.
08-Feb-2007	4	Added SMB flat and SMB flat e package.
20-Jul-2011	5	Updated *Table 2.*
11-Aug-2016	6	Updated *Table 2* and all curves.

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