Power Schottky rectifier

Technical Literature

CUSTOM ATTRIBUTES

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Rev 5.1		Properties Changes
07/01/2014 AUTOMATIC REVALIDATION DATE WORKFLOW STARTED		

DOCUMENT APPROVAL

LABEL	USER FUNCTION	DATE
Donohoo Sean Michael	Document Controller	17-Apr-2015

STPS3150

Power Schottky rectifier

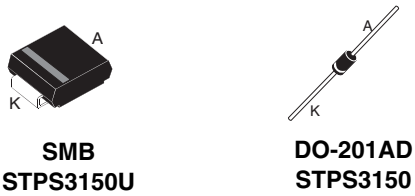
Features

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

Description

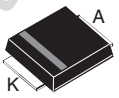
150 V Power Schottky rectifier are suited for switch mode power supplies on up to 24 V rails and high frequency converters.

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.



SMB
STPS3150U

DO-201AD
STPS3150



SMB flat
STPS3150UF

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	3 A
V_{RRM}	150 V
T_j (max)	175 °C
V_F (max)	0.67 V

1 Characteristics

Table 2. Absolute Ratings (limiting values)

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

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ 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:
$P = 0.59 \times I_{F(AV)} + 0.023\ I_F{}^2{}_{(RMS)}$

Figure 1. Average forward power dissipation versus average forward current

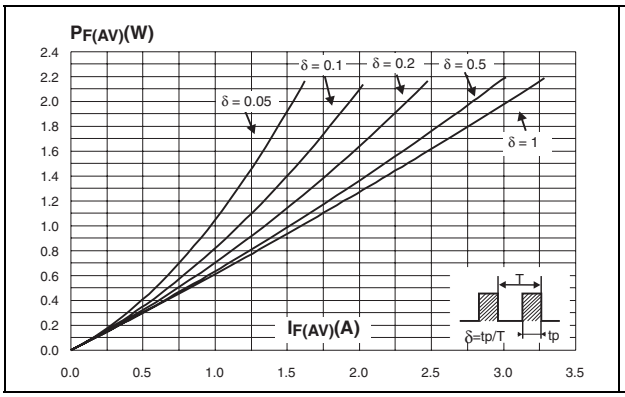


Figure 2. Average forward current versus ambient temperature (δ = 0.5) (DO-201AD / SMB)

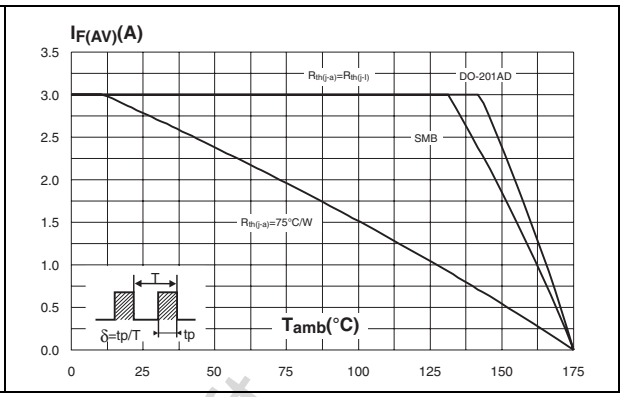


Figure 3. Average forward current versus ambient temperature (δ = 0.5) (SMB flat)

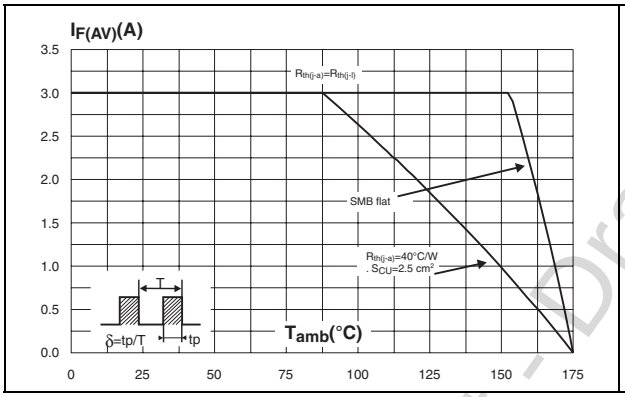


Figure 4. Non repetitive surge peak forward current versus overload duration (maximum values)

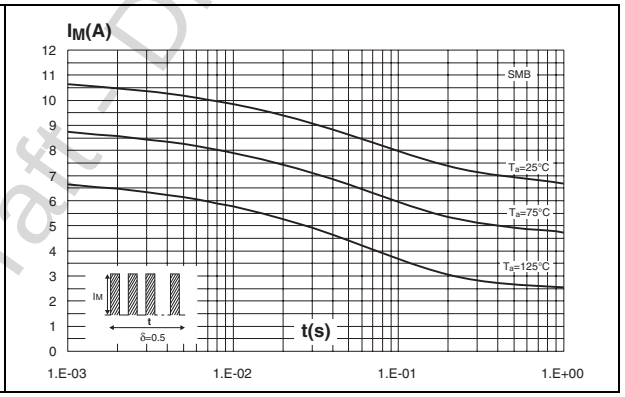


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)

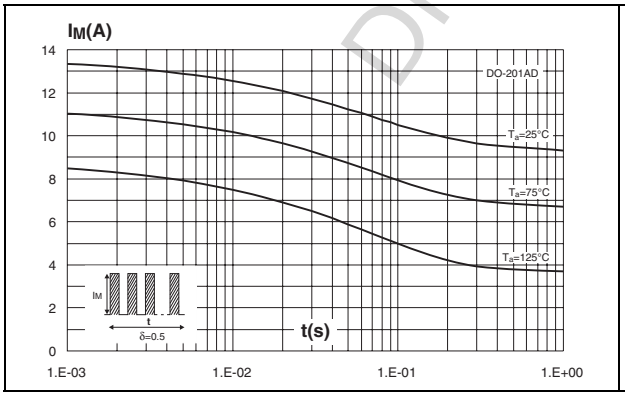


Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values)

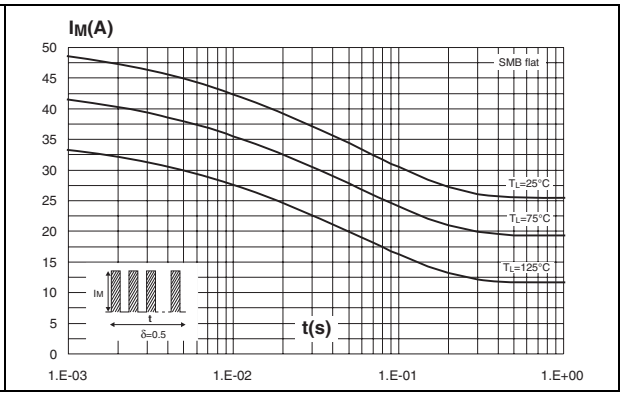


Figure 7. Normalized avalanche power derating versus pulse duration

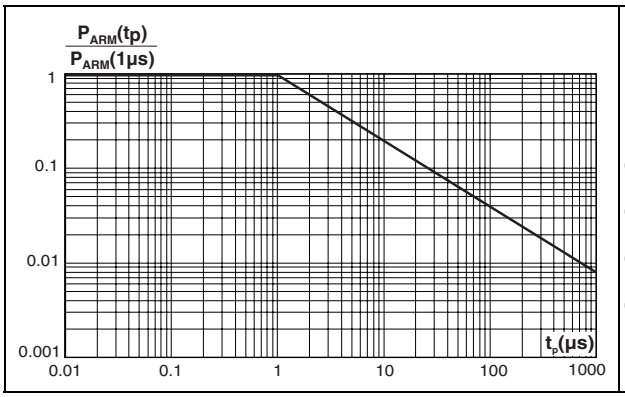


Figure 8. Normalized avalanche power derating versus junction temperature

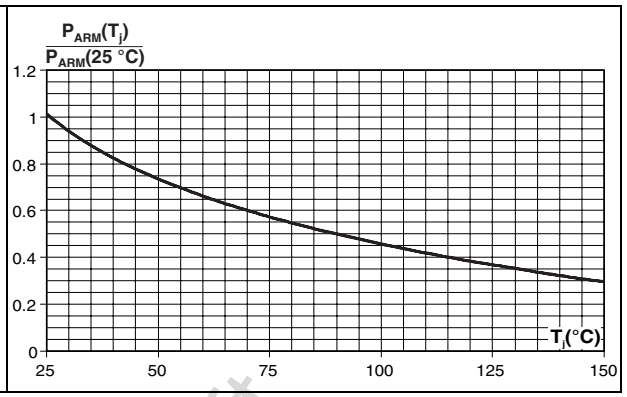


Figure 9. Relative variation of thermal impedance junction to ambient versus pulse duration

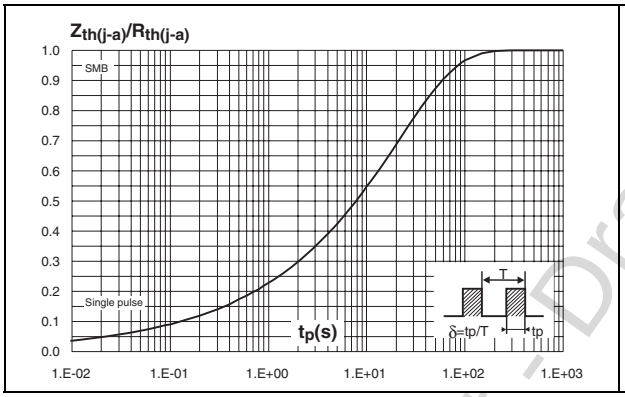


Figure 10. Relative variation of thermal impedance junction to ambient versus pulse duration

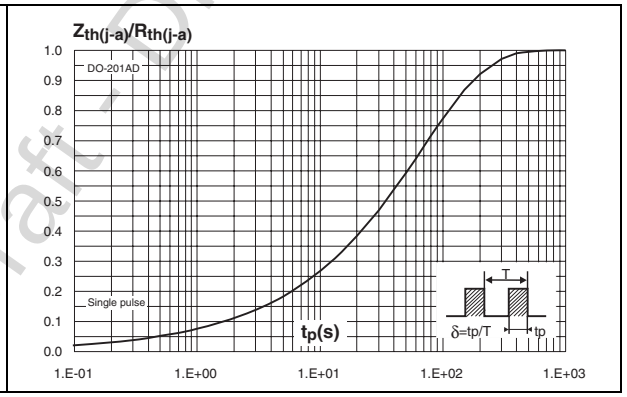


Figure 11. Relative variation of thermal impedance junction to lead versus pulse duration

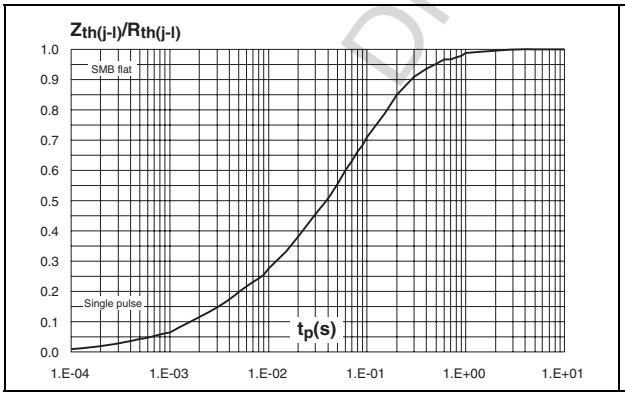


Figure 12. Reverse leakage current versus reverse voltage applied (typical values)

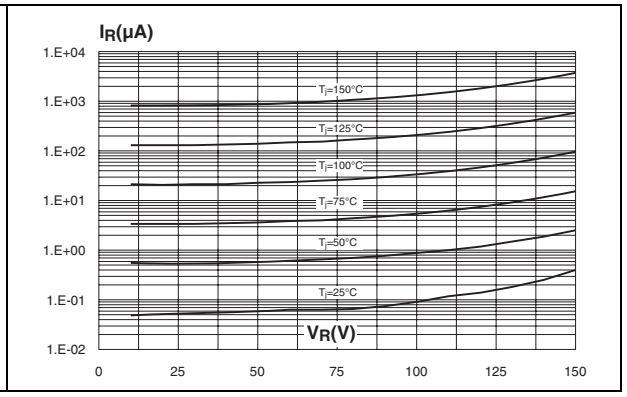


Figure 13. Junction capacitance versus reverse voltage applied (typical values)

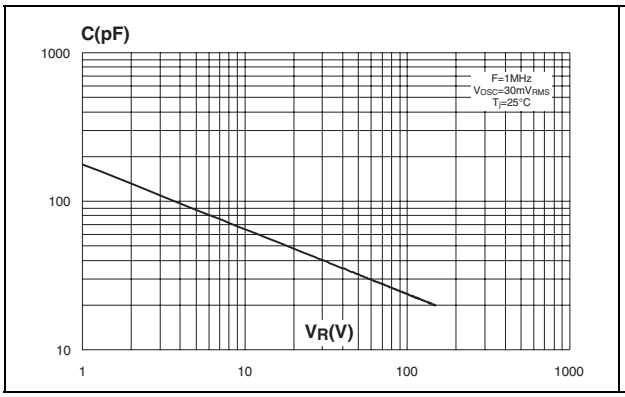


Figure 14. Forward voltage drop versus forward current

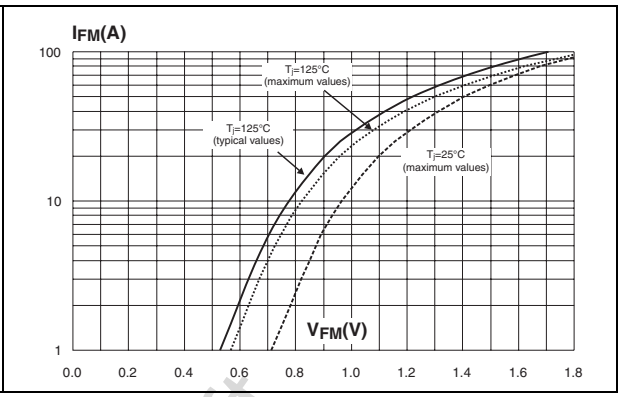


Figure 15. Thermal resistance junction to ambient versus copper surface under each lead

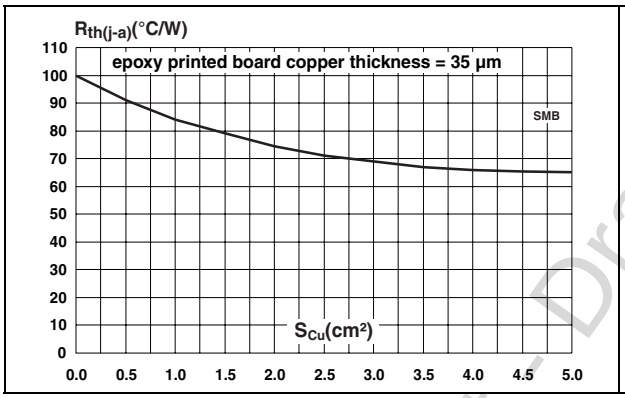


Figure 16. Thermal resistance junction to ambient versus copper surface under each lead

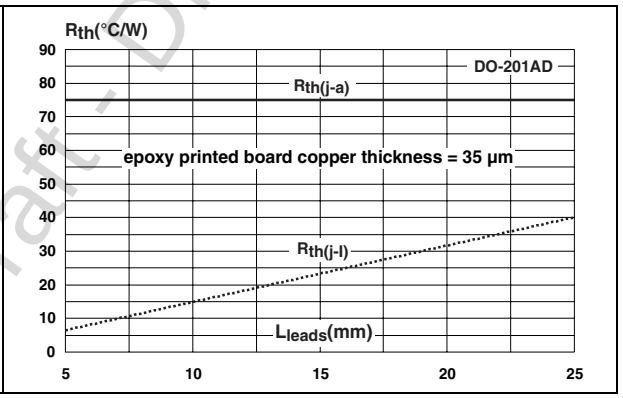
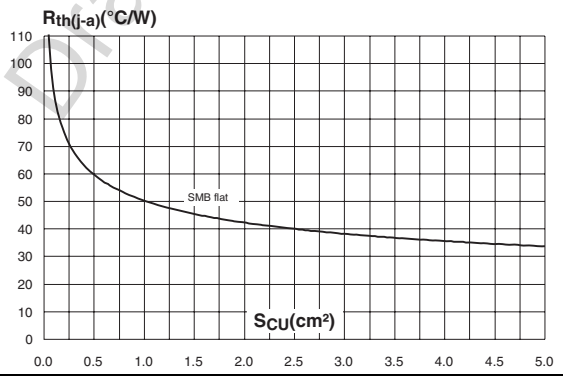


Figure 17. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board copper thickness = 35 µm)

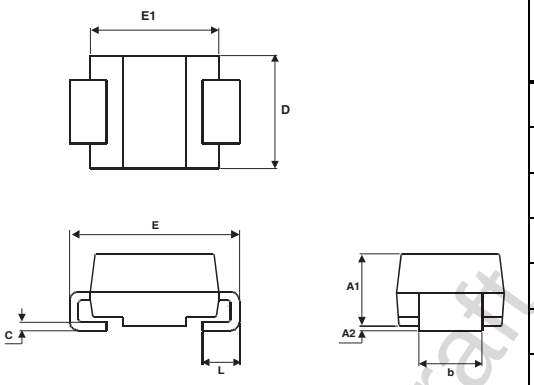


2 Package information

- 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.

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
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 18. SMB footprint (dimensions in mm)

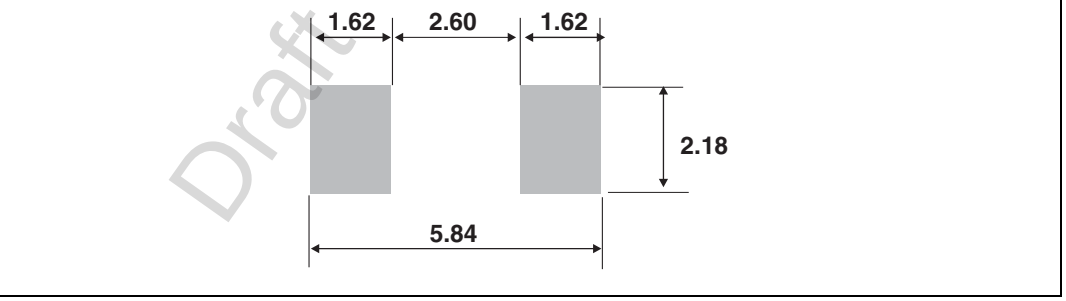
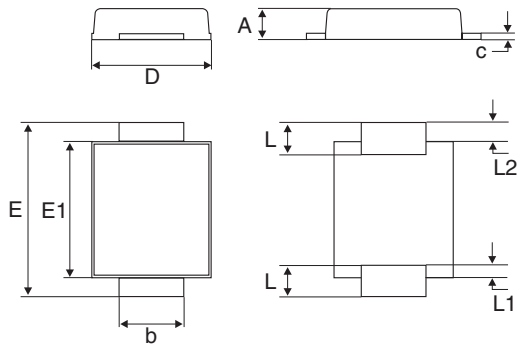


Table 6. SMB Flat dimensions



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 19. SMB Flat footprint (dimensions in mm)

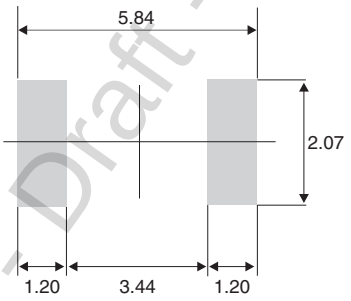
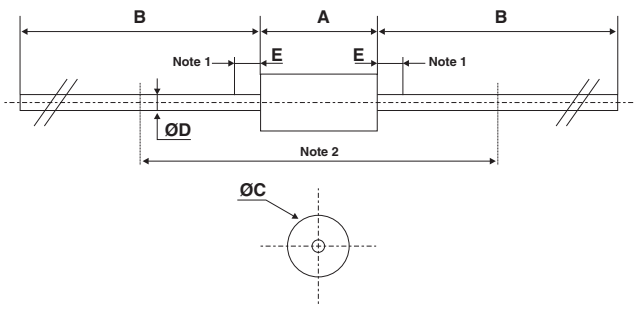


Table 7. DO-201AD dimensions



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)		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	0.107 g	2500	Tape and reel
STPS3150UF	FG315	SMB flat	0.50 g	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.*

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