STPS2150

Power Schottky rectifier

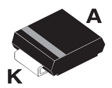
Features

- Negligible switching losses
- Low forward voltage drop for higher efficiency and extented battery life
- Low thermal resistance
- Surface mount miniature package
- Avalanche capability specified

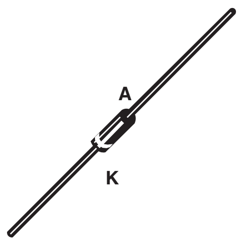
Description

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

Packaged in SMA, SMA low profile, and axial, 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.

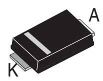


SMA
(JEDEC DO-214AC)
STPS2150A



DO-15

STPS2150



SMAflat
(JEDEC DO-221AC)
STPS2150AF

Table 1. Device summary

$I_{F(AV)}$	2 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	SMA, SMAflat	T_L = 145 °C δ = 0.5	2	A
		DO-15	T_L = 130 °C δ = 0.5		
I_{FSM}	Surge non repetitive forward current	SMA, SMAflat	t_p = 10 ms sinusoidal	75	A
		DO-15		150	
P_{ARM}	Repetitive peak avalanche power		tp = 1 µs Tj = 25 °C	2400	W
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum 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		SMA, SMAflat	20	°C/W
		Lead length = 10 mm	DO-15	30	

Table 4. Static electrical characteristics

Symbol	Parameter	Tests conditions		Min.	Typ	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$		0.5	1.5	µA
		T_j = 125 °C			0.5	1.5	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 2 A		0.78	0.82	V
		T_j = 125 °C			0.62	0.67	
		T_j = 25 °C	I_F = 4 A		0.86	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: $P = 0.59 \times I_{F(AV)} + 0.04\, I_F{}^2{}_{(RMS)}$

Figure 1. Average forward power dissipation versus average forward current

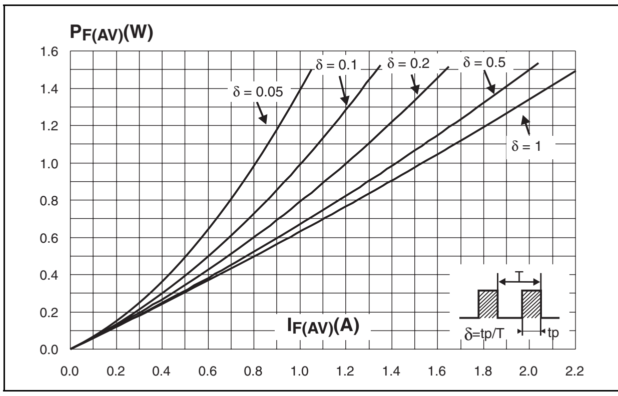


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

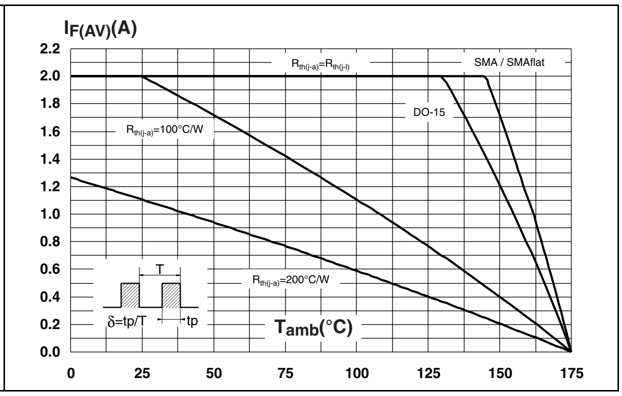


Figure 3. Normalized avalanche power derating versus pulse duration

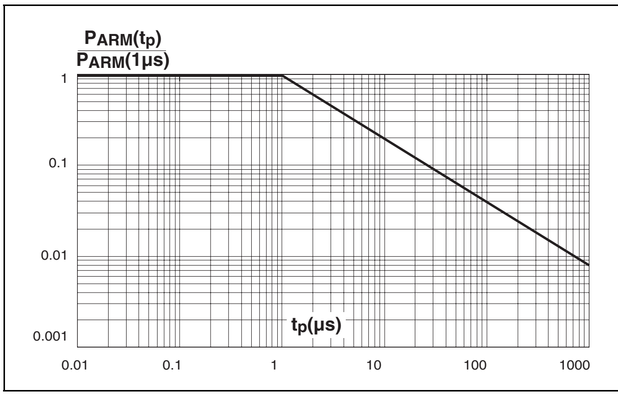


Figure 4. Normalized avalanche power derating versus junction temperature

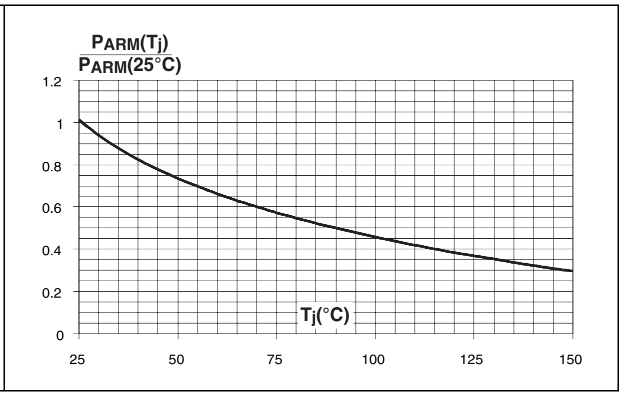


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, DO-15)

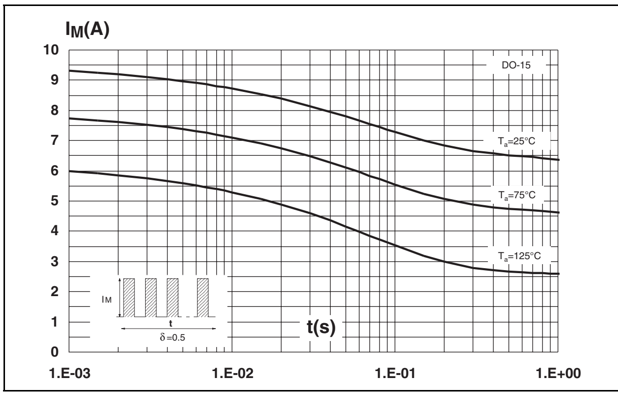


Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values, SMA)

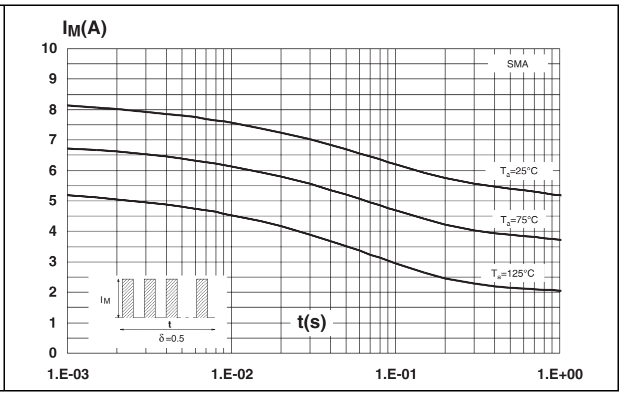


Figure 7. Non repetitive surge peak forward current versus overload duration (maximum values, SMAflat)

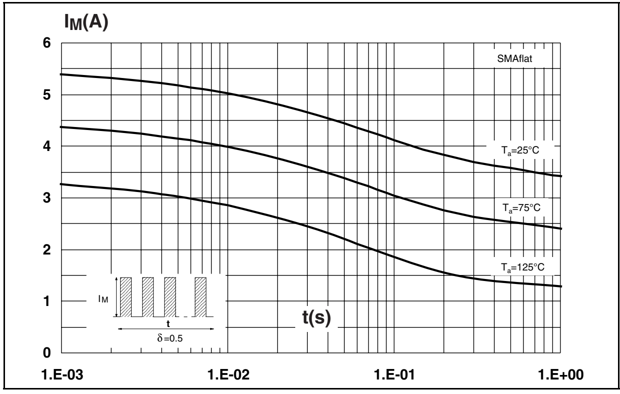


Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration (DO-15)

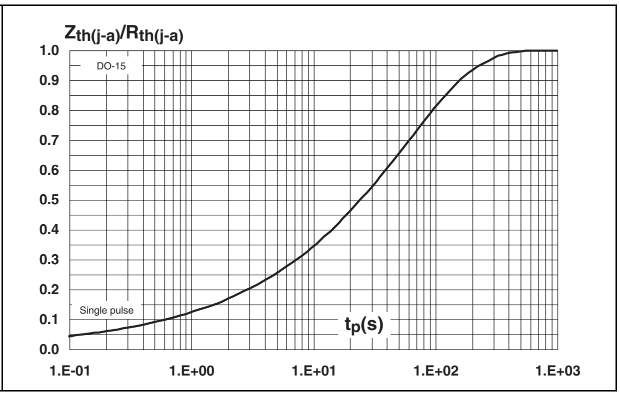


Figure 9. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)

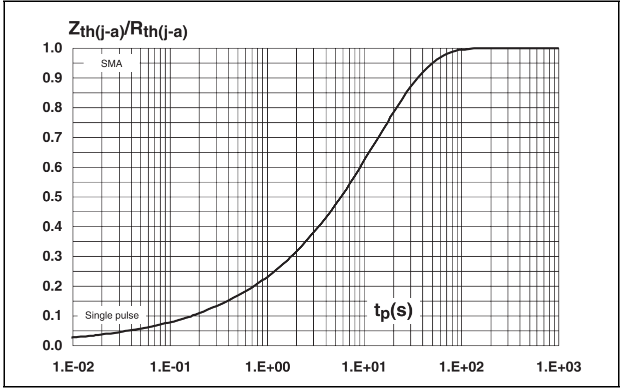


Figure 10. Relative variation of thermal impedance junction to ambient versus pulse duration (SMAflat)

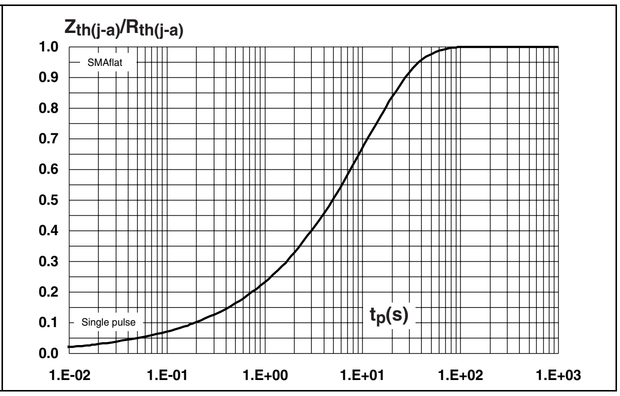


Figure 11. Reverse leakage current versus reverse voltage applied (typical values)

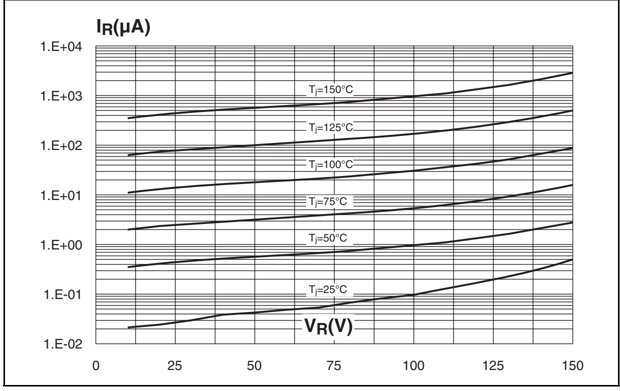


Figure 12. Junction capacitance versus reverse voltage applied (typical values)

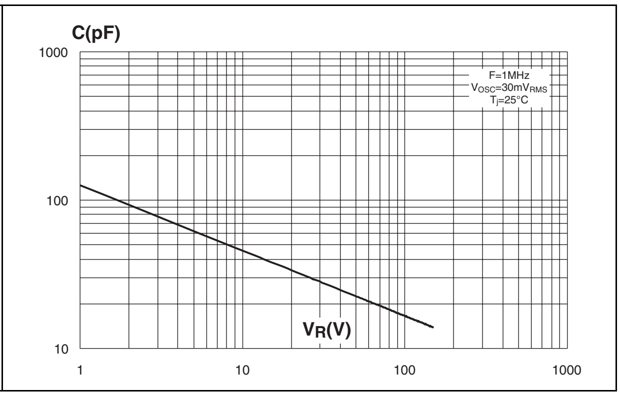


Figure 13. Forward voltage drop versus forward current (maximum values, low level)

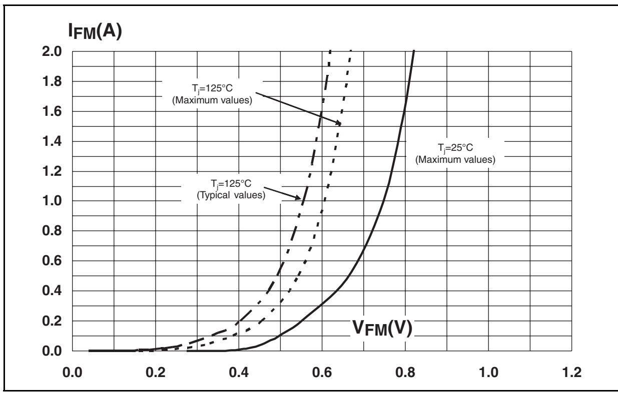


Figure 14. Forward voltage drop versus forward current (maximum values, high level)

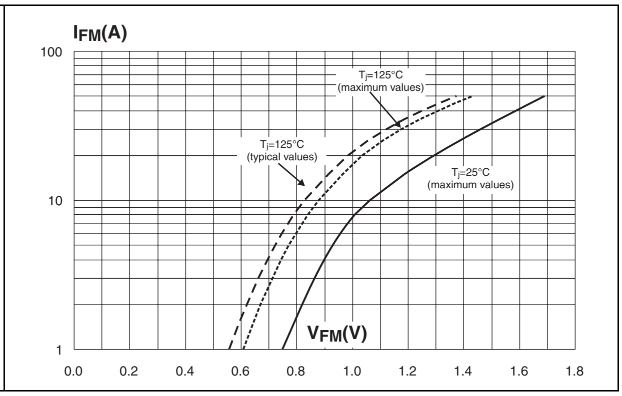


Figure 15. Thermal resistance junction to ambient versus copper surface under each lead - epoxy printed circuit board FR4, copper thickness = 35 µm (SMA)

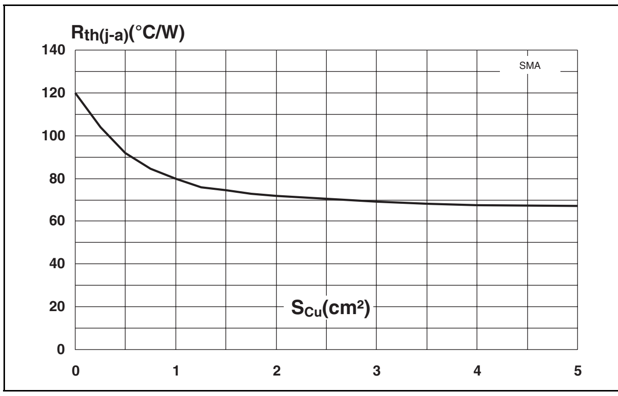


Figure 16. Thermal resistance junction to ambient versus copper surface under each lead - epoxy printed circuit board FR4, copper thickness = 35 µm (SMAflat)

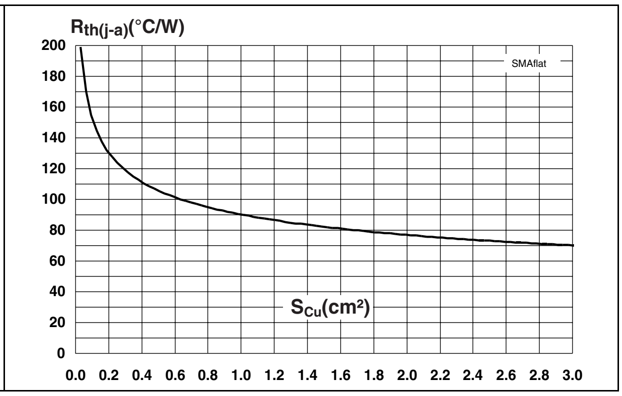
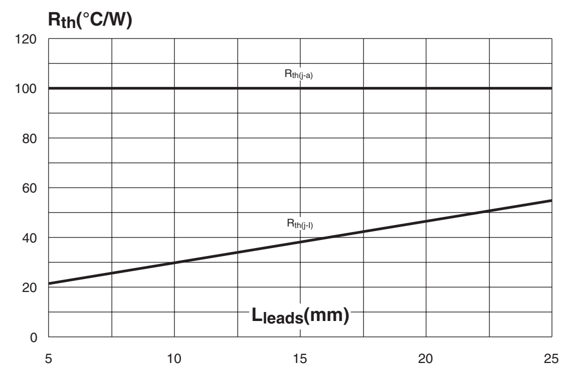


Figure 17. Thermal resistance versus lead length (DO-15)

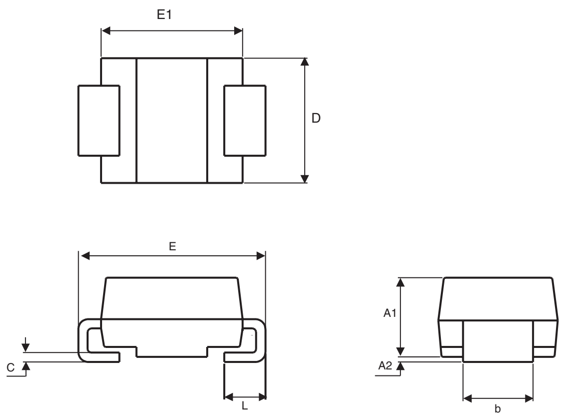


2 Package information

- Epoxy meets UL94, V0.

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at *www.st.com*.

Table 5. SMA package dimensions



REF.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.094
A2	0.05	0.20	0.002	0.008
b	1.25	1.65	0.049	0.065
c	0.15	0.40	0.006	0.016
D	2.25	2.90	0.089	0.114
E	4.80	5.35	0.189	0.211
E1	3.95	4.60	0.156	0.181
L	0.75	1.50	0.030	0.059

Figure 18. SMA footprint dimensions in millimeters (inches)

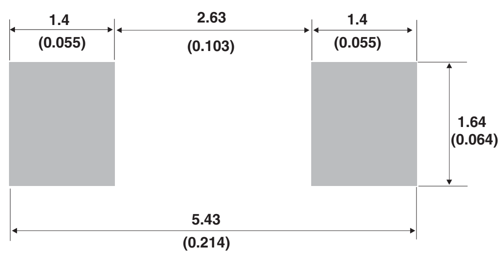


Figure 19. Marking information

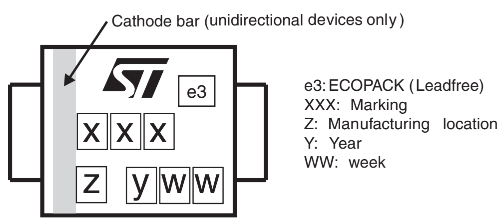
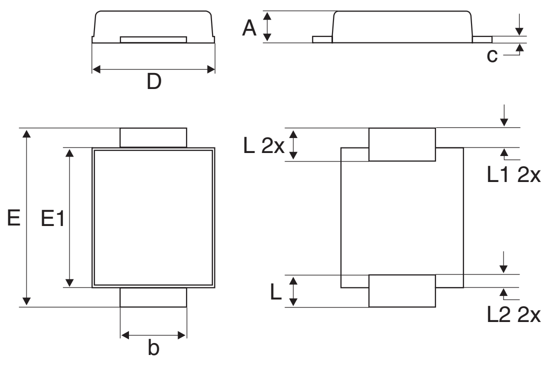


Table 6. SMAflat dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
b	1.25		1.65	0.049		0.065
c	0.15		0.40	0.006		0.016
D	2.25		2.95	0.088		0.116
E	4.80		5.60	0.189		0.220
E1	3.95		4.60	0.156		0.181
L	0.75		1.50	0.030		0.059
L1		0.50			0.019	
L2		0.50			0.019	

Figure 20. SMAflat footprint dimensions optimized for SMAflat(1)

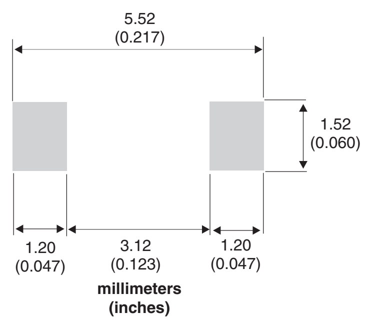
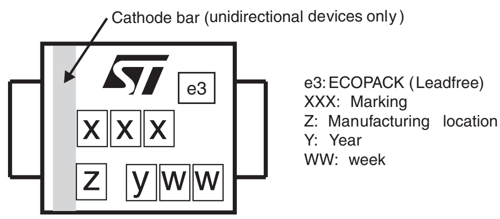
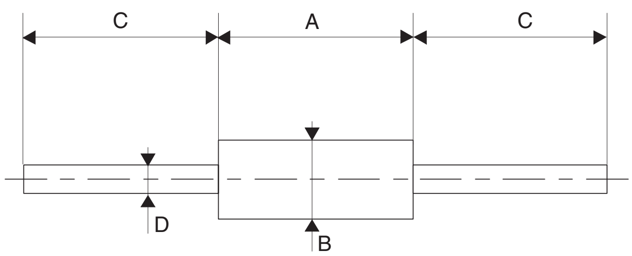


Figure 21. Marking information



1. SMA footprint may also be used.

Table 7. DO-15 package 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

3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS2150A	2150	SMA	0.068 g	5000	Tape and reel
STPS2150	STPS2150	DO-15	0.4 g	2000	Ammopack
STPS2150RL	STPS2150	DO-15	0.4 g	5000	Tape and reel
STPS2150AF	F2150	SMAflat	0.035 g	1000	Tape and reel

4 Revision history

Table 9. Document revision history

Date	Revision	Description of changes
Jul-2003	3A	Last update.
Aug-2004	4	SMA package dimensions update. Reference A1 max. changed from 2.70mm (0.106) to 2.03mm (0.080).
31-May-2006	5	Reformatted to current standard. Added ECOPACK statement. Updated SMA footprint in Figure 15. Changed nF to pF in Figure 10.
18-Sep-2008	6	Reformatted to current standard. Added SMAflat package. Removed IF(RMS) from *Table 2*.