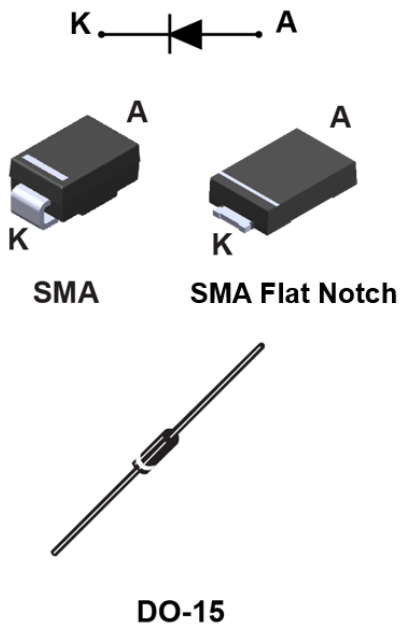


## 150 V, 2 A power Schottky rectifier



### Features

- Negligible switching losses
- Low forward voltage drop for higher efficiency and extended battery life
- Low thermal resistance
- Surface mount miniature package
- Avalanche capability specified
- [ECOPACK2](#) compliant

### Applications

- Switching diode
- SMPS
- DC/DC converter
- Telecom power

### Description

This 150 V power Schottky rectifier is ideal for switch mode power supplies on up to 24 V rails and high frequency converters.

Packaged in SMA, SMA Flat Notch and axial, the [STPS2150](#) is optimized for use in consumer and computer applications where low drop forward voltage is required to reduce power dissipation.

#### Product status link

[STPS2150](#)

#### Product status link

Symbol	Values
$I_{F(AV)}$	2 A
$V_{RRM}$	150 V
$T_j(max.)$	175 °C
$V_F(typ.)$	0.62 V

# 1 Characteristics

**Table 1. Absolute ratings (limiting values, at 25 °C, unless otherwise specified)**

Symbol	Parameter		Value	Unit	
$V_{RRM}$	Repetitive peak reverse voltage		150	V	
$I_{F(RMS)}$	Forward rms current		30	A	
$I_{F(AV)}$	Average forward current $\delta = 0.5$ , square wave	SMA	$T_L = 145\text{ °C}$	2	A
		SMA Flat Notch	$T_L = 145\text{ °C}$		
		DO-15	$T_L = 130\text{ °C}$		
$I_{FSM}$	Surge non repetitive forward current	SMA	$t_p = 10\text{ ms sinusoidal}$	75	A
		SMA Flat Notch		70	
		DO-15		150	
$P_{ARM}$	Repetitive peak avalanche power	$t_p = 10\text{ }\mu\text{s}, T_j = 125\text{ °C}$	170	W	
$T_{stg}$	Storage temperature range		-65 to + 175	°C	
$T_j$	Maximum operating junction temperature <sup>(1)</sup>		+ 175	°C	

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

**Table 2. Thermal resistance parameter**

Symbol	Parameter		Value	Unit	
$R_{th(j-L)}$	Junction to lead		SMA	20	°C/W
			SMA Flat Notch	20	
	Junction to lead	Lead length = 10 mm	DO-15	30	

For more information, please refer to the following application note :

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

**Table 3. Static electrical characteristics**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-	0.5	1.5	$\mu\text{A}$
		$T_j = 125\text{ °C}$		-	0.5	1.5	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 2\text{ A}$	-	0.78	0.82	V
		$T_j = 125\text{ °C}$		-	0.62	0.67	
		$T_j = 25\text{ °C}$	$I_F = 4\text{ A}$	-	0.86	0.89	
		$T_j = 125\text{ °C}$		-	0.70	0.75	

1. Pulse test:  $t_p = 5\text{ ms}, \delta < 2\%$

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

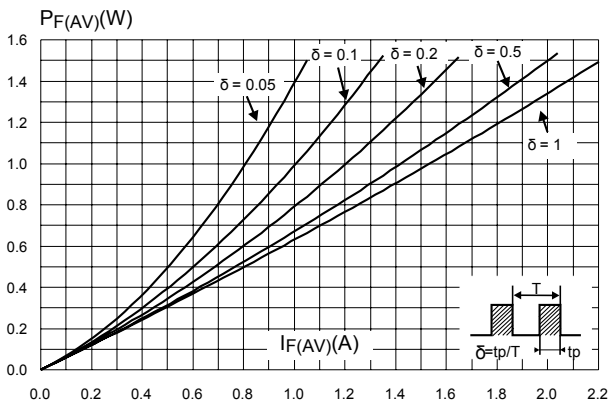
To evaluate the conduction losses use the following equation:  $P = 0.59 \times I_{F(AV)} + 0.04 I_{F(RMS)}^2$

For more information, please refer to the following application notes related to the power losses :

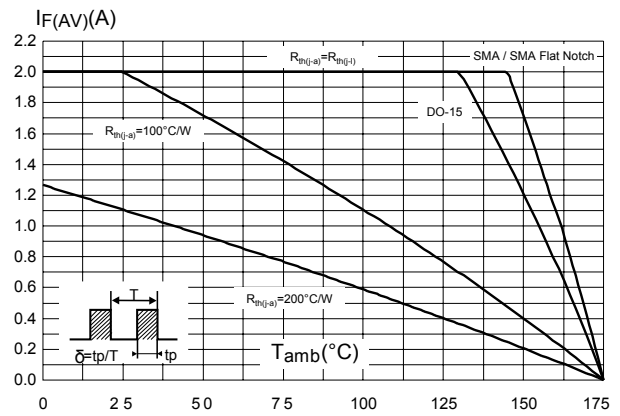
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

## 1.1 Characteristics (curves)

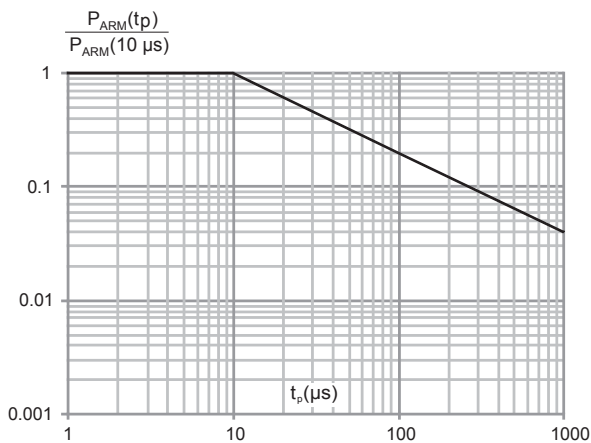
**Figure 1. Average forward power dissipation versus average forward current**



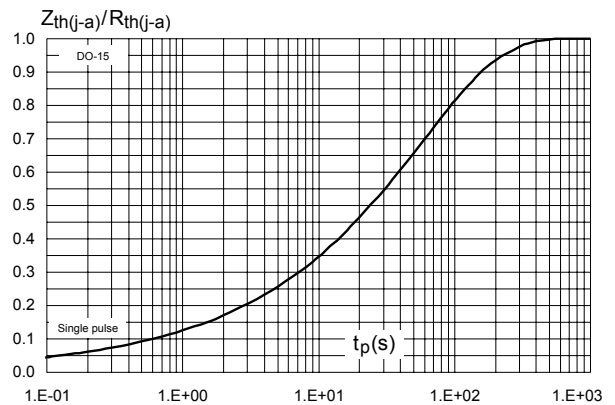
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



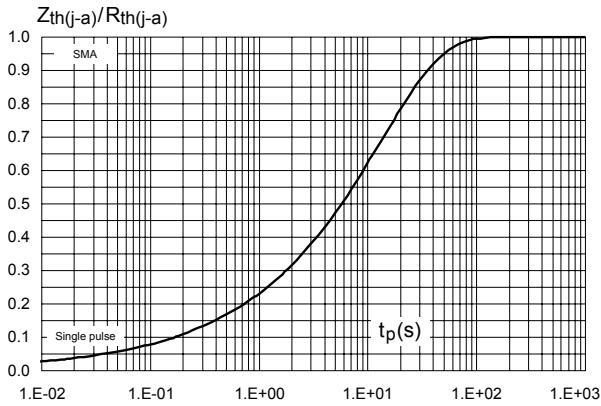
**Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125^\circ\text{C}$ )**



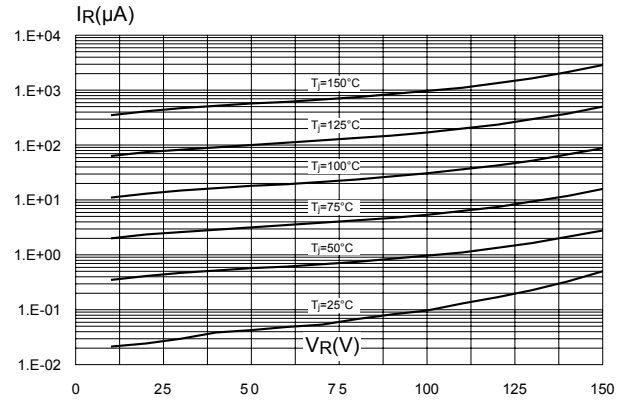
**Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration (DO-15)**



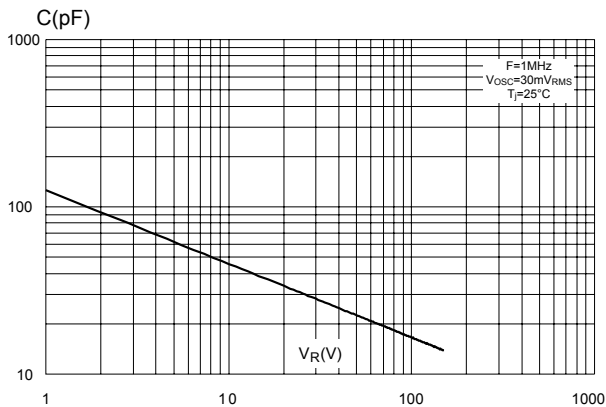
**Figure 5. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)**



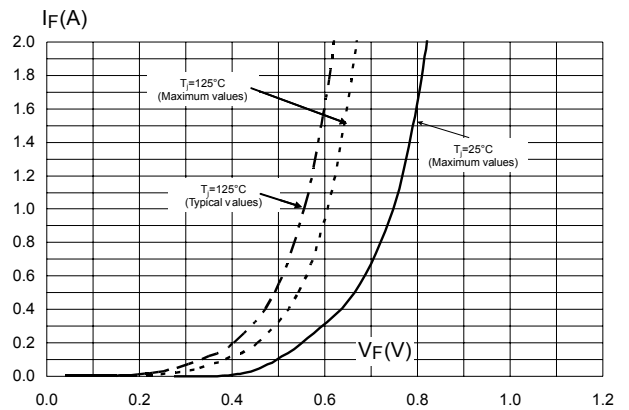
**Figure 6. Reverse leakage current versus reverse voltage applied (typical values)**



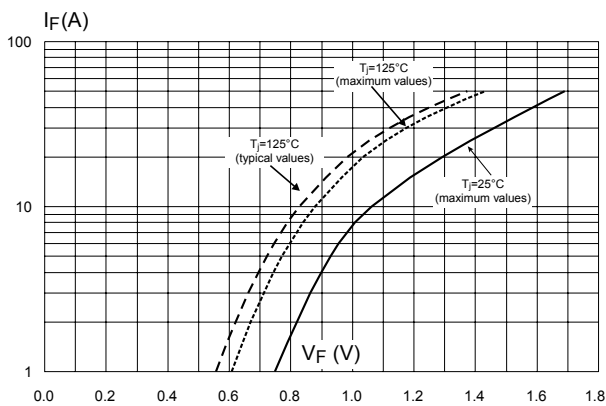
**Figure 7. Junction capacitance versus reverse voltage applied (typical values)**



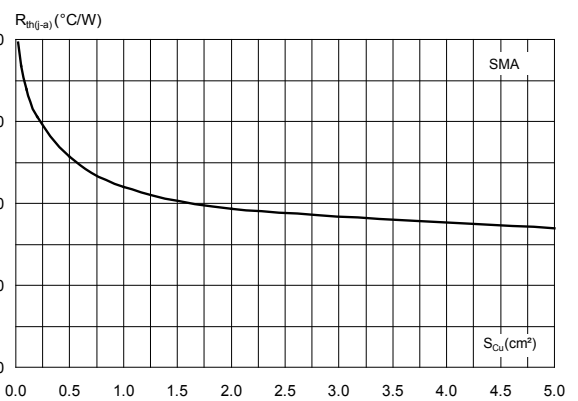
**Figure 8. Forward voltage drop versus forward current (low level)**



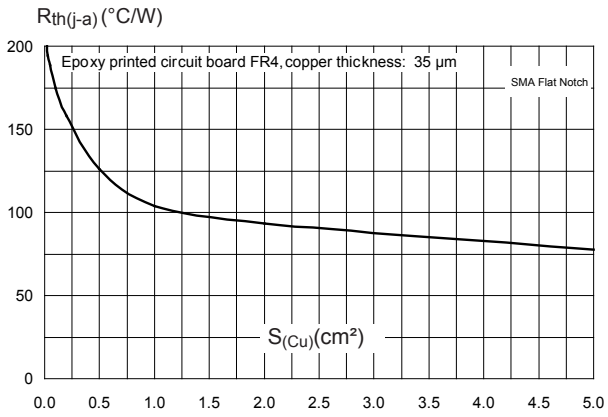
**Figure 9. Forward voltage drop versus forward current (high level)**



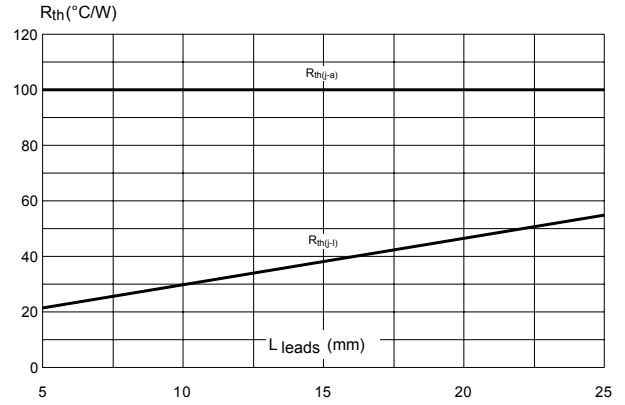
**Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (SMA)**



**Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (SMA Flat Notch)**



**Figure 12. Thermal resistance versus lead length (DO-15)**



## 2 Package information

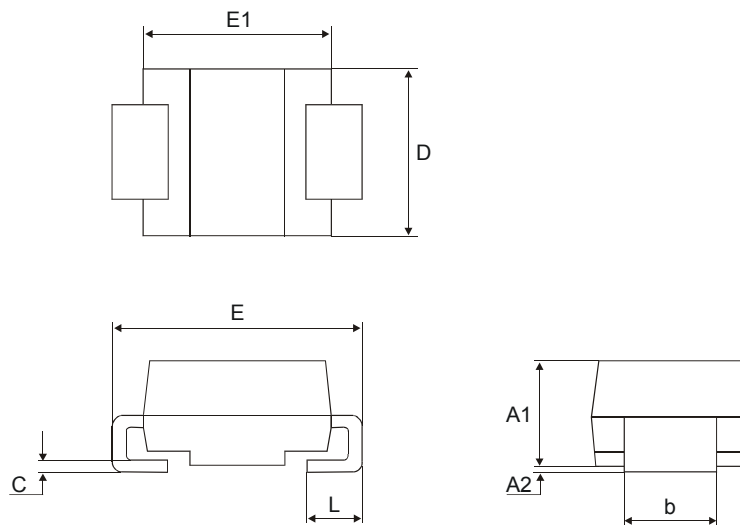
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In order to meet environmental requirements, ST offers these devices in different grades of **ECOPACK** packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com).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

## 2.1 SMA package information

- Epoxy meets UL 94, V0
- Cooling method : by conduction (C)

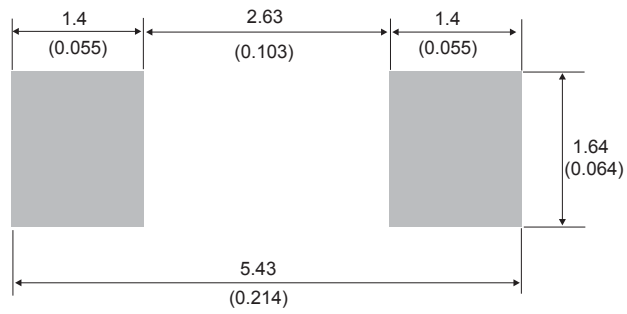
**Figure 13. SMA package outline**



**Table 4. SMA package mechanical data**

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A1	1.90	-	2.45	0.075	-	0.097
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 14. SMA recommended footprint in mm (inches)**

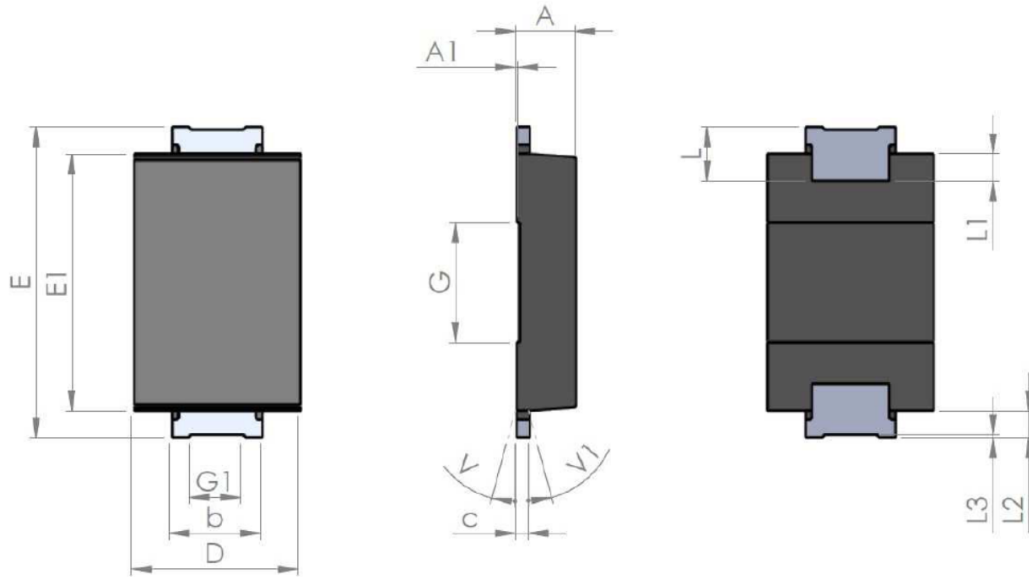




## 2.2 SMA Flat Notch package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Band indicates cathode

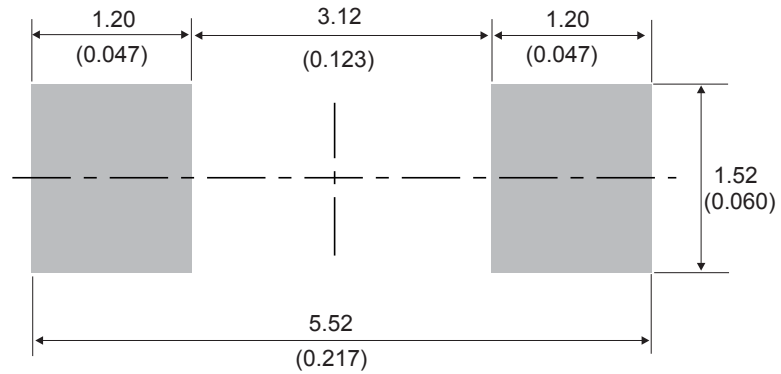
**Figure 15. SMA Flat Notch package outline**



**Table 5. SMA Flat Notch package mechanical data**

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A1	0.90		1.10	0.035		0.044
A1		0.05			0.002	
b	1.25		1.65	0.049		0.065
C	0.15		0.40	0.005		0.016
D	2.25		2.90	0.088		0.115
E	5.00		5.35	0.196		0.211
E1	3.95		4.60	0.155		0.182
G		2.00			0.079	
G1		0.85			0.033	
L	0.75		1.20	0.029		
L1		0.45			0.018	
L2		0.45			0.018	
L3		0.05			0.002	
V			8°			8°
V1			8°			8°

Figure 16. SMA Flat Notch recommended footprint in mm (inches)



### 2.3 DO-15 package information

- Epoxy meets UL 94, V0

Figure 17. DO-15 package outline

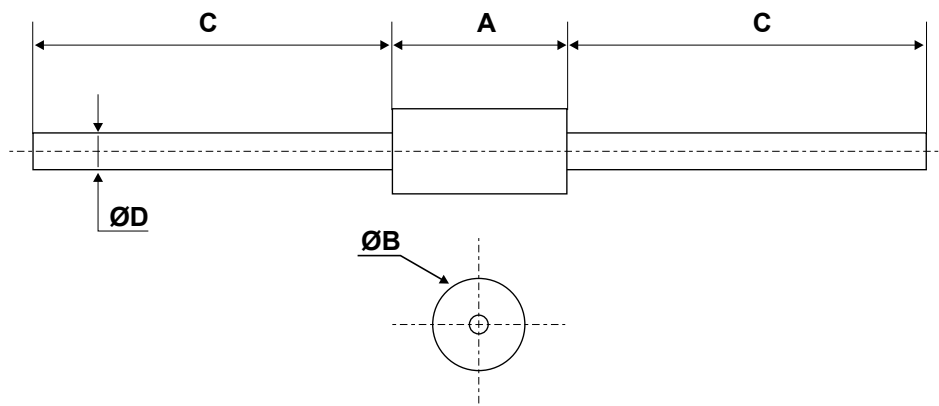


Table 6. DO-15 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.05	-	6.75	0.238	-	0.266
B	2.95	-	3.53	0.116	-	0.139
C	26.00	-	31.00	1.024	-	1.220
D	0.71	-	0.88	0.028	-	0.0035

### 3 Ordering information

**Table 7. Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS2150AFN	A2150	SMA Flat Notch	0.039 g	10 000	Tape and reel
STPS2150A	2150	SMA	0.068 g	5000	Ammopack
STPS2150	STPS2150	DO-15	0.4 g	2000	Tape and reel

## Revision history

**Table 8. Document revision history**

Date	Revision	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 $I_{F(RMS)}$ from Table 2.
04-Jul-2018	7	Removed SMAFlat package information. Updated <a href="#">Table 1</a> and <a href="#">Figure 3</a> .
25-Sep-2019	8	Added <a href="#">Section 2.2 SMA Flat Notch package information</a> .

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