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STMicroelectronics
STPS80170CW

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Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of STPS80170CW - DIODE ARRAY SCHOTTKY 170V TO247
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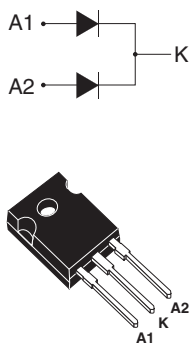
STPS80170C

HIGH VOLTAGE POWER SCHOTTKY RECTIFIER

Table 1: Main Product Characteristics

$I_{F(AV)}$	2 x 40 A
V_{RRM}	170 V
T_j	175 °C
V_F(max)	0.74 V



TO-247
STPS80170CW

FEATURES AND BENEFITS

- High junction temperature capability
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Low thermal resistance
- High frequency operation
- Avalanche specification

DESCRIPTION

Dual center tab Schottky rectifier suited for High Frequency Switched Mode Power Supplies. Packaged in TO-247, this device is intended for use to enhance the reliability of the application.

Table 2: Order Code

Part Number	Marking
STPS80170CW	STPS80170CW

Table 3: Absolute Ratings (limiting values, per diode)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			170	V
$I_{F(RMS)}$	RMS forward current			80	A
$I_{F(AV)}$	Average forward current	T_c = 150 °C δ = 0.5	Per diode Per device	40 80	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		500	A
P_{ARM}	Repetitive peak avalanche power	t_p = 1 µs T_j = 25 °C		38200	W
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature *			175	°C
dV/dt	Critical rate of rise of reverse voltage			10000	V/µs

* : $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ thermal runaway condition for a diode on its own heatsink

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Table 4: Thermal Parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode Total	0.7 0.5	°C/W
$R_{th(c)}$		Coupling	0.3	

When the diodes 1 and 2 are used simultaneously:
Δ Tj(diode 1) = P(diode 1) x $R_{th(j-c)}$(Per diode) + P(diode 2) x $R_{th(c)}$

Table 5: Static Electrical Characteristics (per diode)

Symbol	Parameter	Tests conditions		Min.	Typ	Max.	Unit
I_R *	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			80	µA
		T_j = 125 °C			20	80	mA
V_F **	Forward voltage drop	T_j = 25 °C	I_F = 40 A		0.80	0.84	V
		T_j = 125 °C			0.68	0.74	
		T_j = 25 °C	I_F = 80 A		0.90	0.96	
		T_j = 125 °C			0.80	0.86	

Pulse test: * tp = 5 ms, δ < 2%
** tp = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation: P = 0.62 x $I_{F(AV)}$ + 0.003 $I_F^2{}_{(RMS)}$

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Figure 1: Average forward power dissipation versus average forward current (per diode)

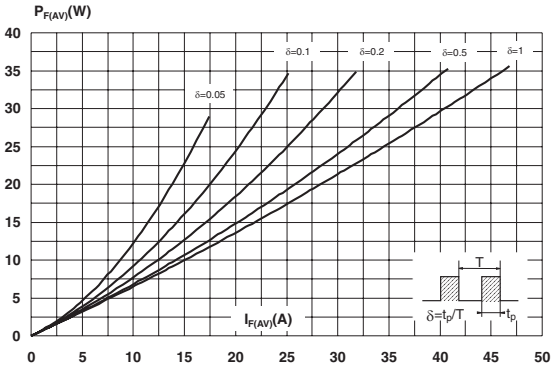

Figure 2: Average forward current versus ambient temperature (δ = 0.5, per diode)

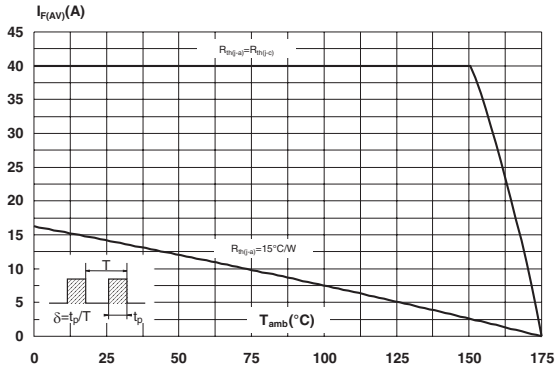

Figure 3: Normalized avalanche power derating versus pulse duration

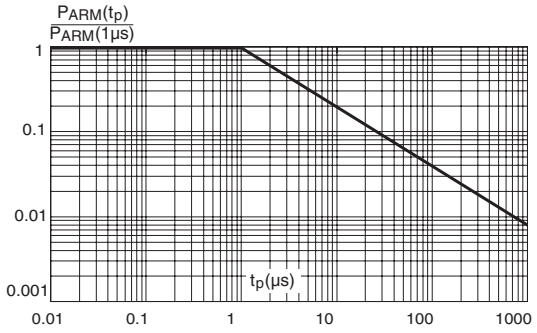

Figure 4: Normalized avalanche power derating versus junction temperature

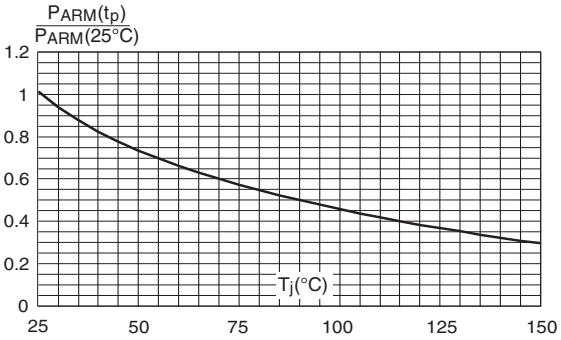

Figure 5: Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

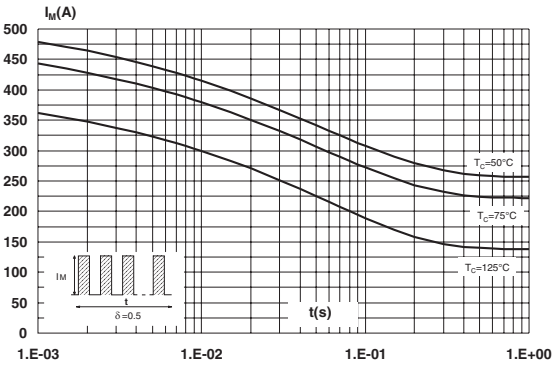

Figure 6: Relative variation of thermal impedance junction to case versus pulse duration

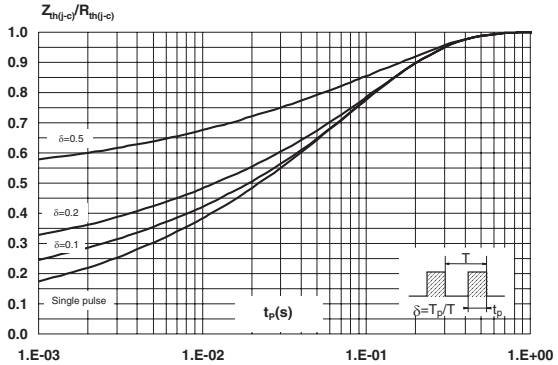

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Figure 7: Reverse leakage current versus reverse voltage applied (typical values, per diode)

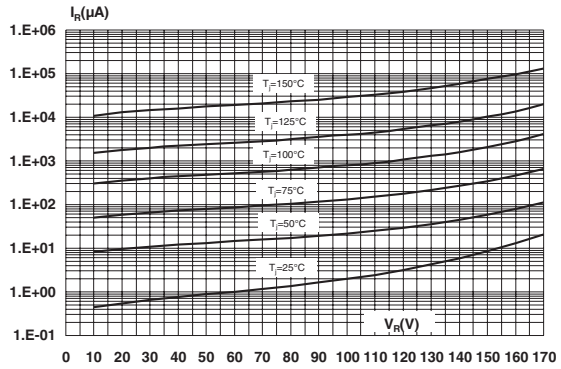

Figure 8: Junction capacitance versus reverse voltage applied (typical values, per diode)

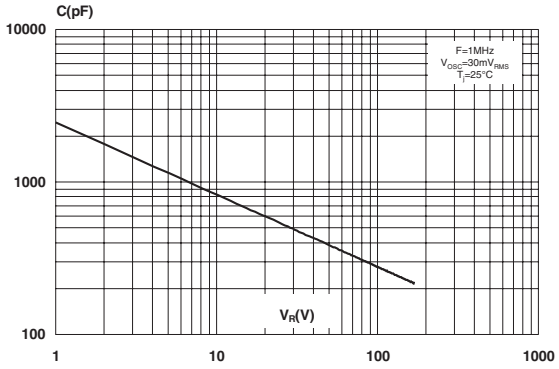

Figure 9: Forward voltage drop versus forward current (per diode, low level)

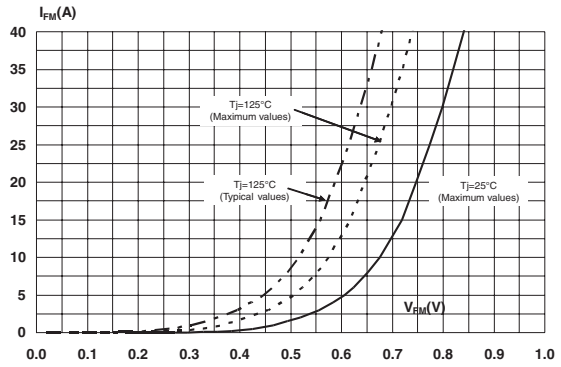

Figure 10: Forward voltage drop versus forward current (per diode, high level)

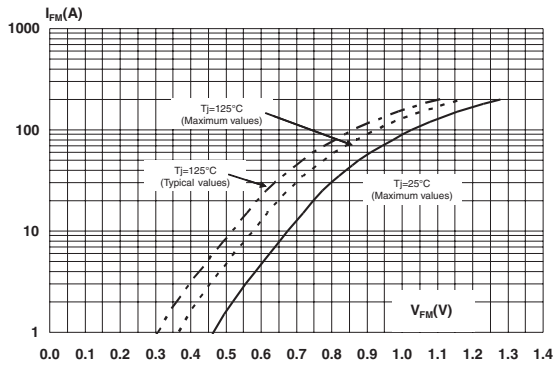

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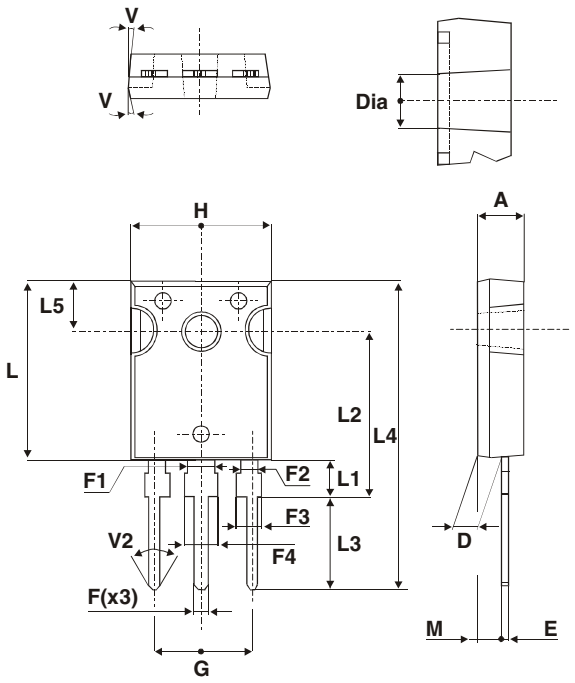
Figure 11: TO-247 Package Mechanical Data



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.102
E	0.40		0.80	0.015		0.031
F	1.00		1.40	0.039		0.055
F1		3.00			0.118	
F2		2.00			0.078	
F3	2.00		2.40	0.078		0.094
F4	3.00		3.40	0.118		0.133
G		10.90			0.429	
H	15.45		15.75	0.608		0.620
L	19.85		20.15	0.781		0.793
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
L3	14.20		14.80	0.559		0.582
L4		34.60			1.362	
L5		5.50			0.216	
M	2.00		3.00	0.078		0.118
V		5°			5°	
V2		60°			60°	
Dia.	3.55		3.65	0.139		0.143

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 6: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS80170CW	STPS80170CW	TO-247	4.4 g	30	Tube

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 Nm.
- Maximum torque value: 1.0 Nm.

Table 7: Revision History

Date	Revision	Description of Changes
16-Sep-2005	1	First issue.

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