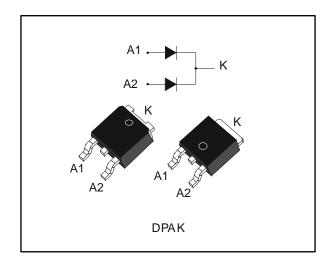


STPS20LCD80CB

High voltage power Schottky rectifier

Datasheet - production data



Features

- High junction temperature capability
- Good trade-off between leakage current and forward voltage drop
- Low leakage current
- Avalanche capability specified
- ECOPACK[®]2 compliant component for DPAK on demand

Description

This dual diode Schottky rectifier is suited for high frequency switched mode power supplies.

Packaged in DPAK, this device is intended to be used in high density converters, providing these applications with a good efficiency at both low and high load.

Table 1: Device summary

Symbol	Value
I _{F(AV)}	2 x 10 A
V _{RRM}	80 V
T _j (max)	175 °C
V _F (typ)	0.66 V

Characteristics STPS20LCD80CB

1 Characteristics

Table 2: Absolute ratings (limiting values, per diode, at T_{amb} 25 °C, unless otherwise stated)

Symbol	Parameter	Value	Unit			
V_{RRM}	Repetitive peak reverse voltage			80	V	
I _{F(RMS)}	Forward rms current			20	Α	
	Average forward current $\delta = 0.5$,	Per diode	T _C = 145 °C	10	Α	
I _{F(AV)}	square wave	Per device	T _C = 140 °C	20		
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms s	inusoidal	125	Α	
P _{ARM} ⁽¹⁾	Repetitive peak avalanche power $t_p = 10 \mu s$, $T_j = 125 ^{\circ}C$			230	W	
T _{stg}	Storage temperature range			-65 to + 175	°C	
Tj	Maximum operating junction temperature (2)			+ 175	°C	

Notes:

Table 3: Thermal parameter

Symbol	Parameter		Value	Unit	
D	Junction to case	Per diode	3.20	°C/W	
R _{th(j-c)}	Junction to case	Total	1.95	C/VV	
R _{th(c)}	Coupling		0.70	°C/W	

When the diodes 1 and 2 are used simultaneously:

 $\Delta T_{j \; (diode1)} = P_{(diode1)} \; x \; R_{th(j\text{-}c)} \; \text{(per diode)} \; + \; P_{(diode2)} \; x \; R_{th(c)}$

⁽¹⁾For pulse time duration derating, please refer to *Figure 3: "Normalized avalanche power derating versus pulse duration (Tj = 125 °C)". More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the application notes AN1768 and AN2025.*

 $^{^{(2)}(}dP_{tot}/dT_j) < (1/R_{th(j-a)}) \ condition \ to \ avoid \ thermal \ runaway \ for \ a \ diode \ on \ its \ own \ heatsink.$

STPS20LCD80CB Characteristics

Table 4: Static electrical characteristics (per diode)

	The state of the s							
	Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
	I _R ⁽¹⁾ F	Reverse leakage current	T _j = 25 °C	V _R = V _{RRM}	ı	3.2	15	μΑ
			T _j = 125 °C		1	2.8	8	mA
T _j = 25 °C	I _F = 10 A	-	0.815	0.880				
	V _F ⁽²⁾	Forward voltage drop	T _j = 125 °C	IF = 10 A	ı	0.660	0.710	V
			T _j = 25 °C	I _F = 20 A	ı	1.030	1.160	
			T _j = 125 °C		ı	0.765	0.865	

Notes:

 $^{(1)}\text{Pulse}$ test: t_p = 5 ms, δ < 2%

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

To evaluate the conduction losses, use the following equation:

 $P = 0.555 \text{ x } I_{F(AV)} + 0.0155 I_{F^2(RMS)}$

Characteristics STPS20LCD80CB

11 12 13

1.1 Characteristics (curves)

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

P_{F(AV)(W)}

10

9

8

7

temperature (δ = 0.5, per diode) $I_{F(A \ V)}(A)$ 12 $R_{th(j-a)} = R_{th(j-c)} -$ 11 10 9 8 7 6 5 3 2 Tamb (°C) 0 0

Figure 2: Average forward current versus ambient

Figure 3: Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

7

9 10

5

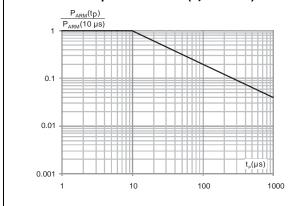


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration

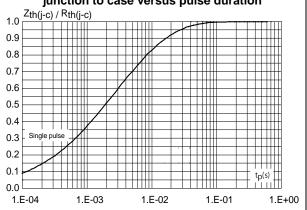


Figure 5: Reverse leakage current versus reverse voltage applied (typical values, per diode)

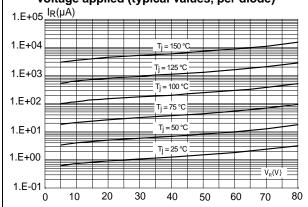
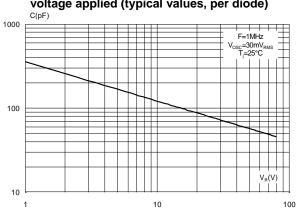


Figure 6: Junction capacitance versus reverse voltage applied (typical values, per diode)



STPS20LCD80CB Characteristics

Figure 7: Thermal resistance junction to ambient versus copper surface under tab

Rth(j-a)(°C/W)

100

90

Epoxy printed board FR4, copper thickness = 35 µm

DPAK

70

60

40

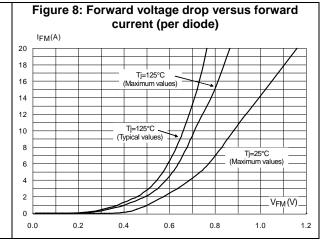
30

20

10

0

S_{CU}(cm²)



2 Package information

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.

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

2.1 DPAK package information

Figure 9: DPAK package outline **b4** c2, Thermal pad **E1** L2 D1 D R Gauge 0.25 plane

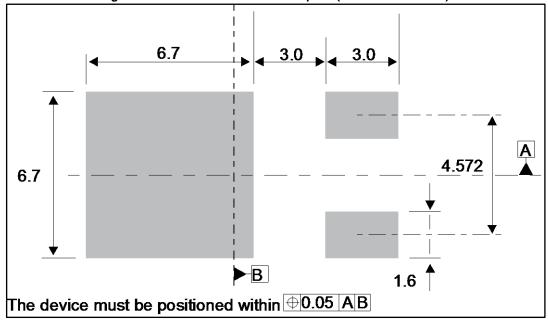


This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5: DPAK package mechanical data

	Dimensions				
Ref.	Milli	meters	Incl	hes	
	Min.	Max.	Min.	Max.	
А	2.18	2.40	0.085	0.094	
A1	0.90	1.10	0.035	0.043	
A2	0.03	0.23	0.001	0.009	
b	0.64	0.90	0.025	0.035	
b4	4.95	5.46	0.194	0.215	
С	0.46	0.61	0.018	0.024	
c2	0.46	0.60	0.018	0.023	
D	5.97	6.22	0.235	0.244	
D1	4.95	5.60	0.194	0.220	
Е	6.35	6.73	0.250	0.265	
E1	4.32	5.50	0.170	0.216	
е	2.2	2.286 typ. 0.090 typ.		typ.	
e1	4.40	4.70	0.173	0.185	
Н	9.35	10.40	0.368	0.409	
L	1.0	1.78	0.039	0.070	
L2		1.27		0.050	
L4	0.60	1.02	0.023	0.040	
V2	-8°	+8°	-8°	+8°	

Figure 10: DPAK recommended footprint (dimensions in mm)



Ordering information STPS20LCD80CB

3 Ordering information

Table 6: Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS20LCD80CB-TR	S20LC D80C	DPAK	0.32 g	2500	Tape and reel

4 Revision history

Table 7: Document revision history

Date	Revision	Changes
07-Jan-2015	1	First full version, consolidating the previous internal release of march 2013. Updated the DPAK package information.
27-Sep-2017	2	Updated description in cover page. Minor text changes.

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