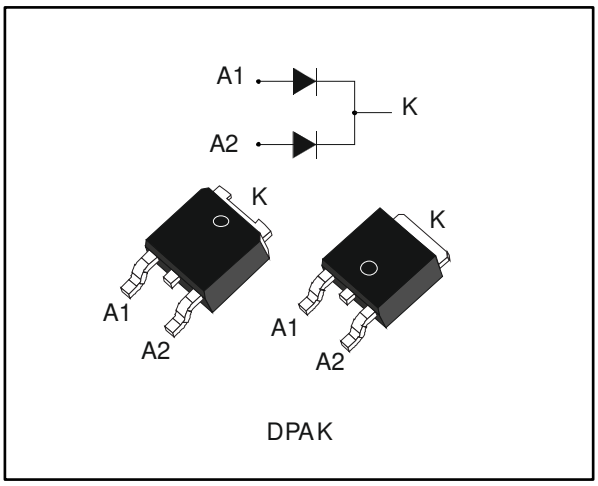
STPS20LCD80CB

High voltage power Schottky rectifier

Datasheet - production data



DPAK

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

This is information on a product in full production.

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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	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	Per diode	T_C = 145 °C	10	A
		Per device	T_C = 140 °C	20	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		125	A
P_{ARM} (1)	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C		230	W
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature (2)			+ 175	°C

Notes:

(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.

Table 3: Thermal parameter

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

When the diodes 1 and 2 are used simultaneously:

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

Table 4: Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-	3.2	15	µA
		T_j = 125 °C		-	2.8	8	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 10 A	-	0.815	0.880	V
		T_j = 125 °C		-	0.660	0.710	
		T_j = 25 °C	I_F = 20 A	-	1.030	1.160	
		T_j = 125 °C		-	0.765	0.865	

Notes:

(1)Pulse test: t_p = 5 ms, δ < 2%

(2)Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses, use the following equation:

$P = 0.555 \times I_{F(AV)} + 0.0155\ I_F^2{}_{(RMS)}$

1.1 Characteristics (curves)

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

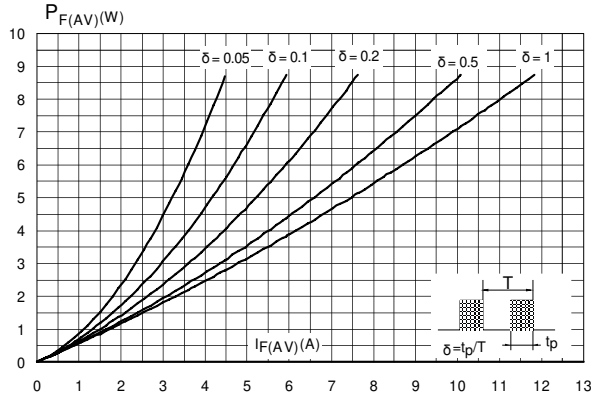


Figure 2: Average forward current versus ambient temperature (δ = 0.5, per diode)

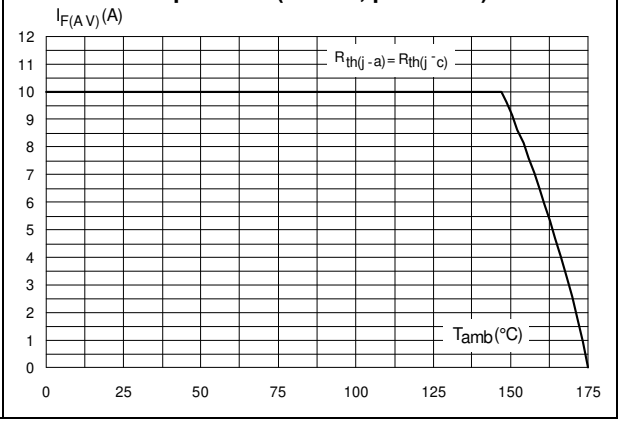


Figure 3: Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

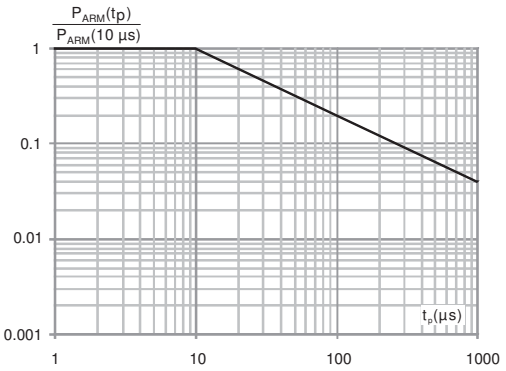


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration

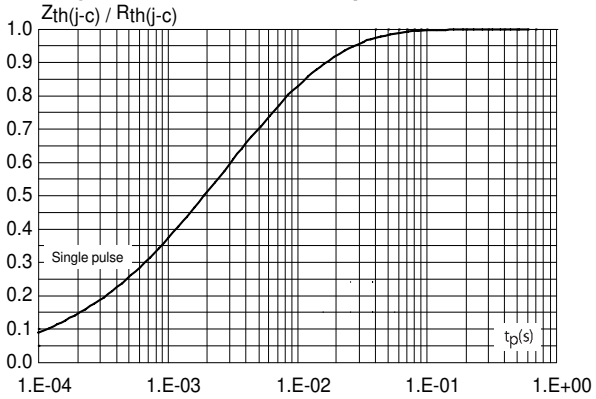


Figure 5: Reverse leakage current versus reverse voltage applied (typical values, per diode)

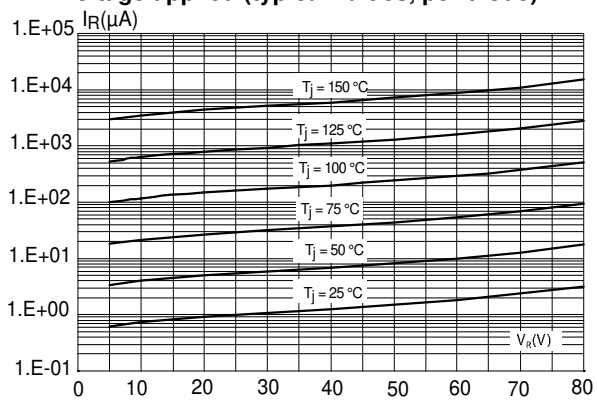


Figure 6: Junction capacitance versus reverse voltage applied (typical values, per diode)

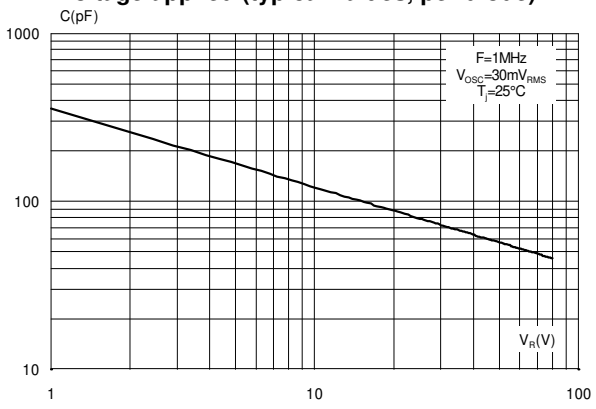


Figure 7: Thermal resistance junction to ambient versus copper surface under tab

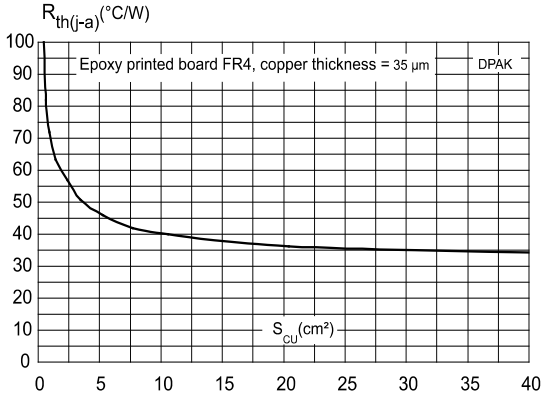
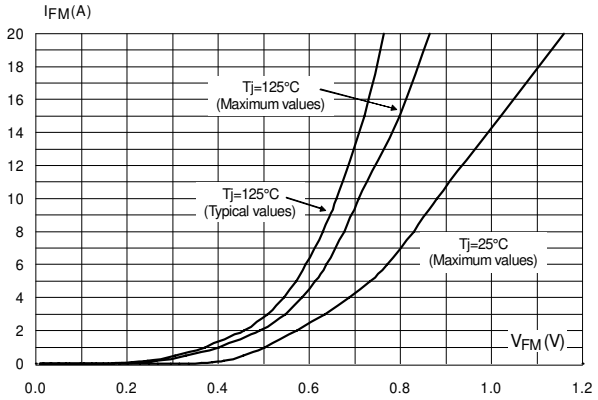


Figure 8: Forward voltage drop versus forward current (per diode)



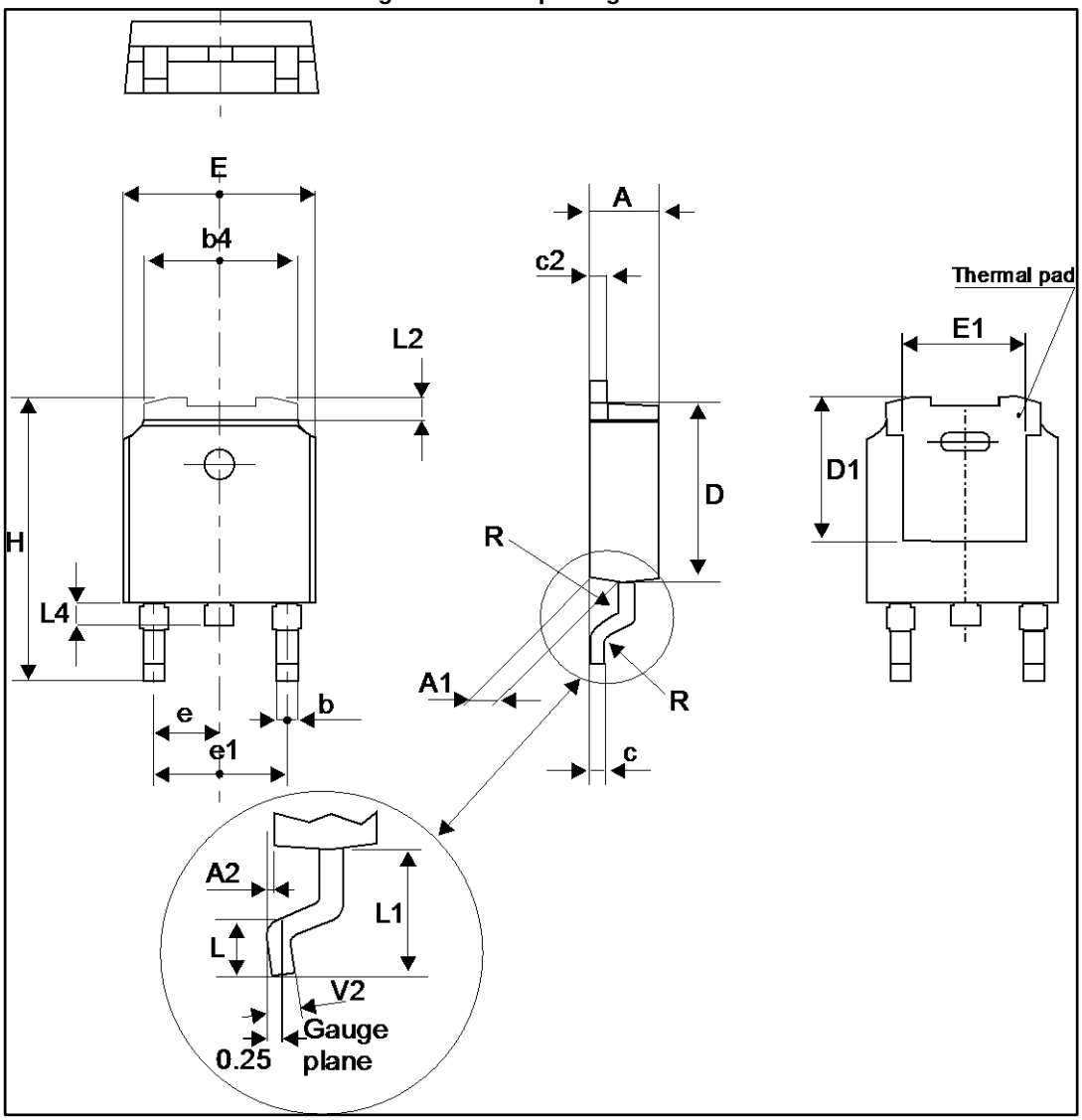
2 Package information

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

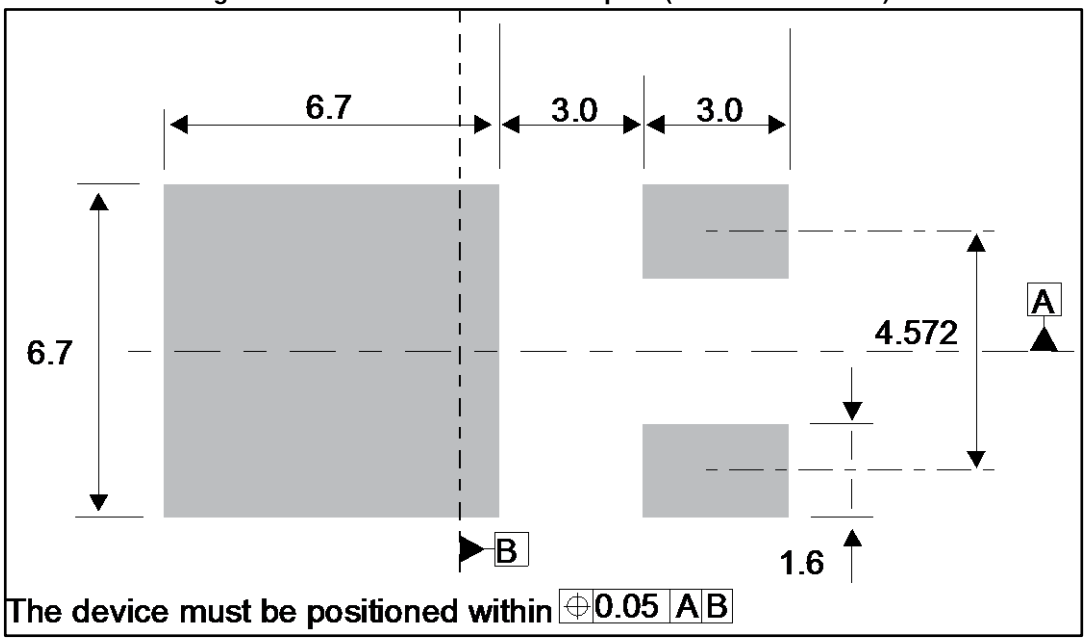


This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5: DPAK package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	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
c	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
E	6.35	6.73	0.250	0.265
E1	4.32	5.50	0.170	0.216
e	2.286 typ.		0.090 typ.	
e1	4.40	4.70	0.173	0.185
H	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)



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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