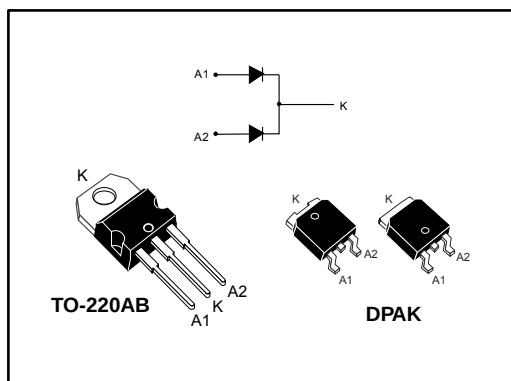


High voltage power Schottky rectifier

Datasheet - production data



Description

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

Packaged in DPAK and TO-220AB, this device is intended to be used in SMPS TV, 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}	200 V
V_F (typ.)	0.76 V
T_j (max.)	175 °C

Features

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

1 Characteristics

Table 2: Absolute ratings (limiting values per diode at $T_{amb} = 25\text{ °C}$ unless otherwise specified)

Symbol	Parameter			Value	Unit
V _{RRM}	Repetitive peak reverse voltage			200	V
I _{F(RMS)}	Forward rms current		DPAK /TO-220AB	20	A
I _{F(AV)}	Average forward current δ = 0.5, square wave (DPAK, TO-220AB)	T _c = 145 °C	Per diode	10	A
		T _c = 140 °C	Per device	20	
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms sinusoidal	DPAK	125	A
			TO-220AB	150	
T _{stg}	Storage temperature range			-65 to +175	°C
T _j	Maximum operating junction temperature ⁽¹⁾			175	°C

Notes:

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

Table 3: Thermal resistance parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	3	°C/W
		Total	1.8	
$R_{th(c)}$	Coupling		0.6	

When the two diodes 1 and 2 are used simultaneously:

$$\Delta T_j(\text{diode1}) = P(\text{diode1}) \times R_{th(j-c)}(\text{per diode}) + P(\text{diode2}) \times R_{th(c)}$$

Table 4: Static electrical characteristics, per diode

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-		5	μA
		$T_j = 125\text{ °C}$		-	0.7	2.5	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 10\text{ A}$	-		0.95	V
		$T_j = 125\text{ °C}$		-	0.76	0.81	
		$T_j = 25\text{ °C}$	$I_F = 20\text{ A}$	-		1.125	
		$T_j = 125\text{ °C}$		-	0.89	0.97	

Notes:

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

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

To evaluate the conduction losses use the following equation:

$$P = 0.65 \times I_{F(AV)} + 0.016 \times I_F^2(RMS)$$

1.1 Characteristics (curves)

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

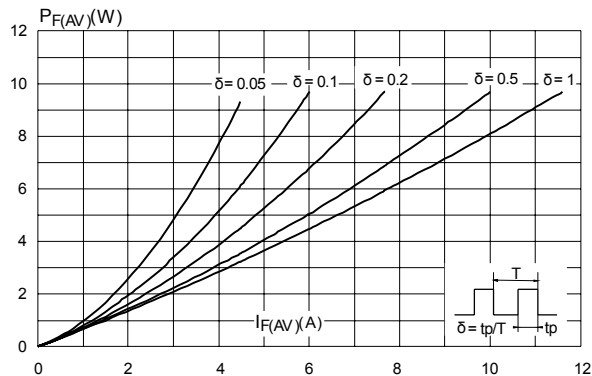


Figure 2: Relative variation of thermal impedance junction to case versus pulse duration

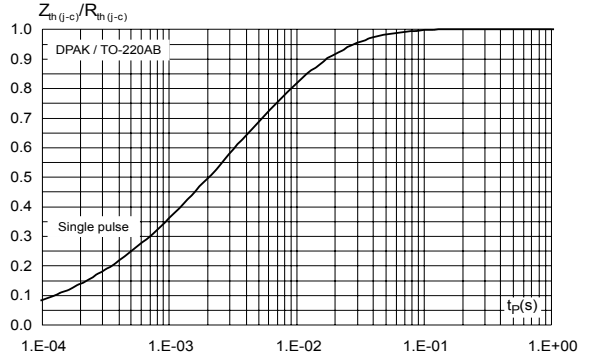


Figure 3: Reverse leakage current versus reverse voltage applied (typical values, per diode)

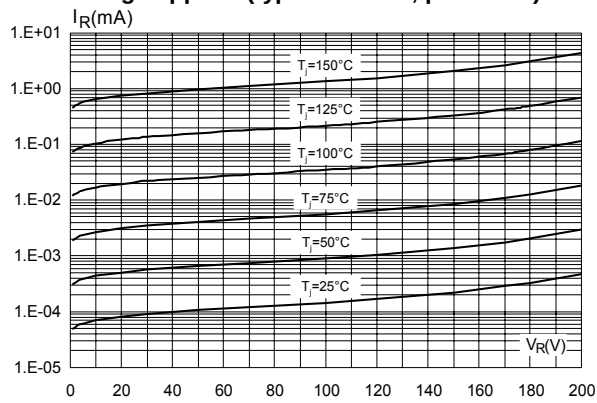


Figure 4: Junction capacitance versus reverse voltage applied (typical values, per diode)

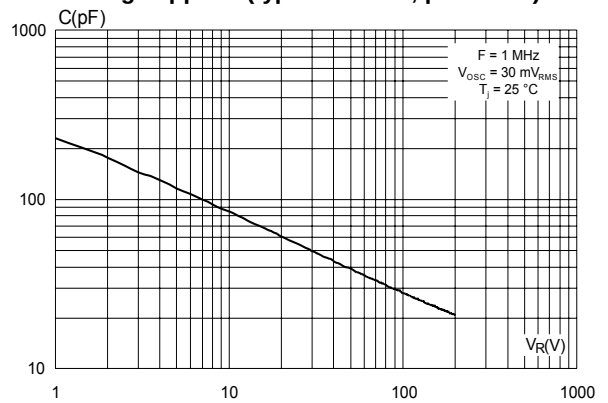


Figure 5: Forward voltage drop versus forward current (per diode)

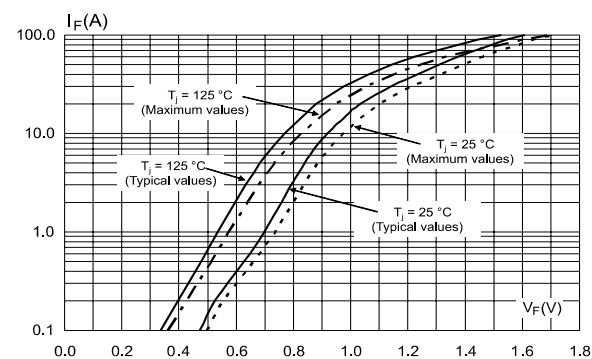
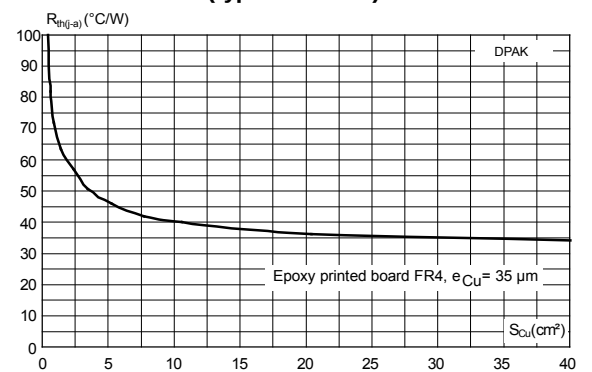


Figure 6: Thermal resistance junction to ambient versus copper surface under tab for DPAK (typical values)



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
- Recommended torque value: 0.55 N·m (for TO-220AB)
- Maximum torque value: 0.7 N·m (for TO-220AB)

2.1 TO-220AB package information

Figure 7: TO-220AB package outline

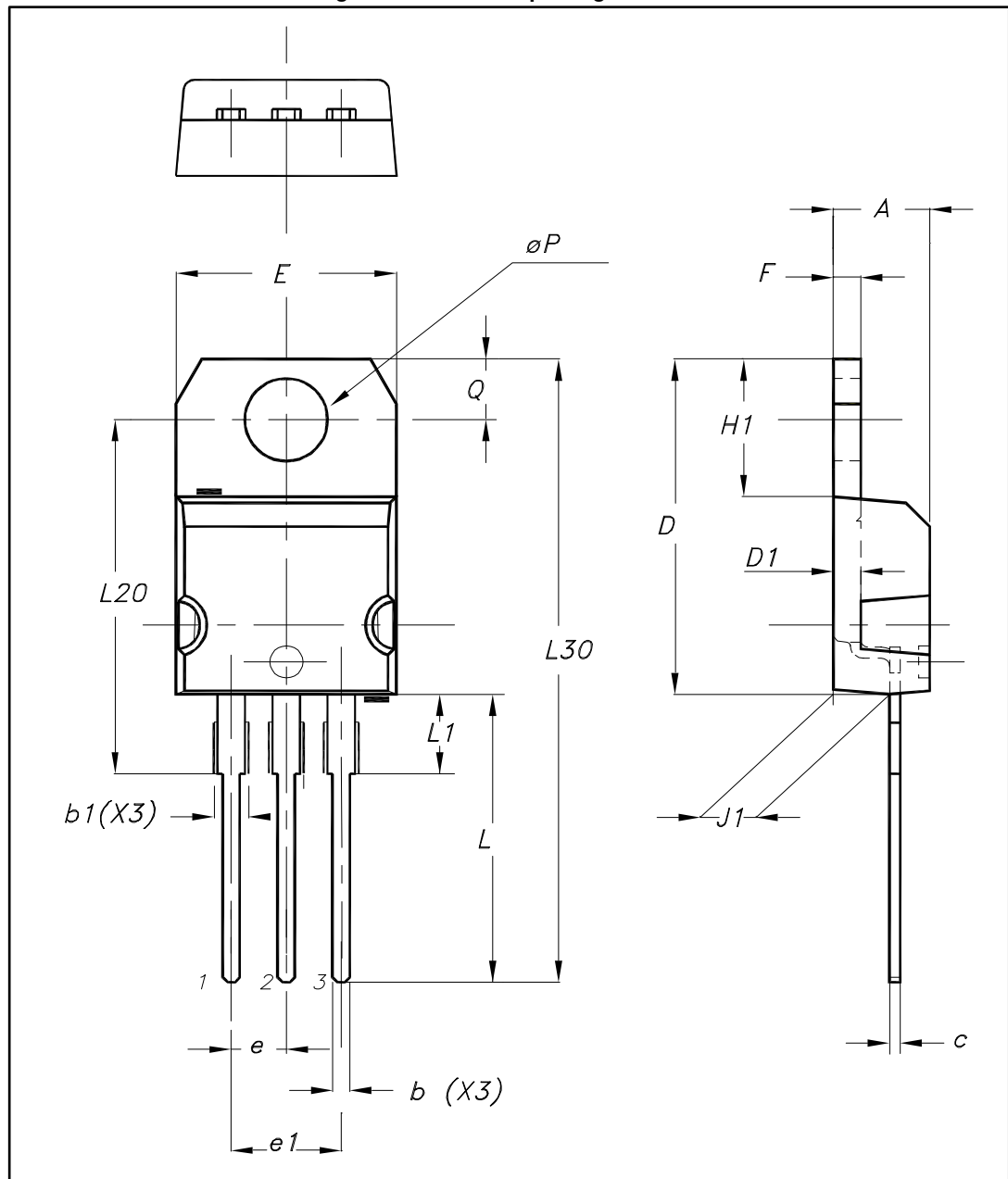
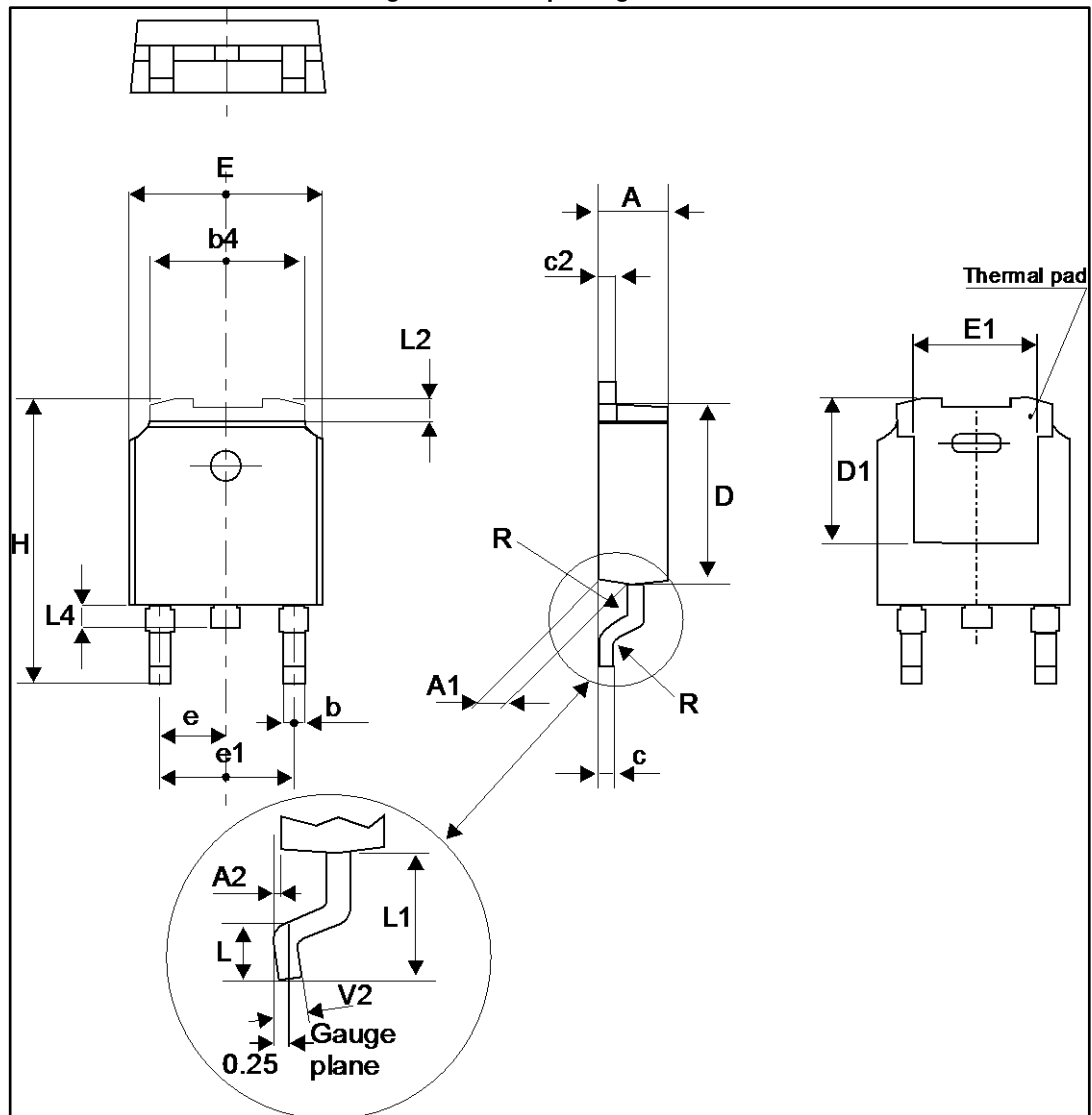


Table 5: TO-220AB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
b	0.61	0.88	0.240	0.035
b1	1.14	1.70	0.045	0.067
c	0.48	0.70	0.019	0.028
D	15.25	15.75	0.600	0.620
D1	1.27 typ.		0.050 typ.	
E	10.00	10.40	0.394	0.409
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.195	0.203
F	1.23	1.32	0.048	0.052
H1	6.20	6.60	0.244	0.260
J1	2.40	2.72	0.094	0.107
L	13.00	14.00	0.512	0.551
L1	3.50	3.93	0.138	0.155
L20	16.40 typ.		0.646 typ.	
L30	28.90 typ.		1.138 typ.	
θP	3.75	3.85	0.148	0.152
Q	2.65	2.95	0.104	0.116

2.2 DPAK package information

Figure 8: DPAK package outline

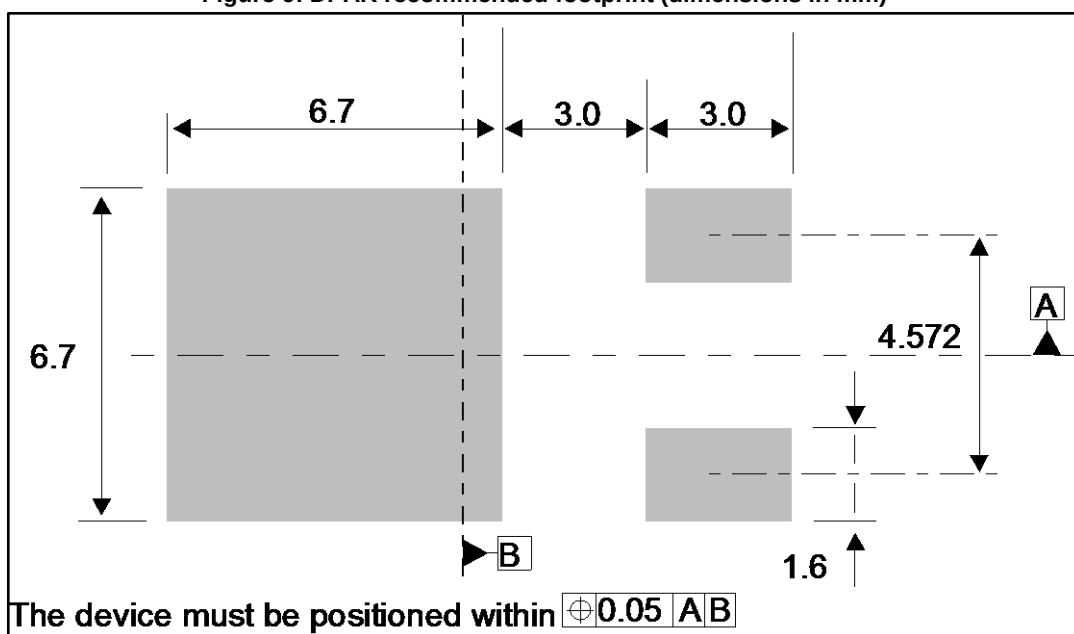


This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 6: 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 9: DPAK recommended footprint (dimensions in mm)



3 Ordering information

Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS20LCD200CBTR	S20LCD200C	DPAK	0.32 g	2500	Tape and reel
STPS20LCD200CT	STPS20LCD200C	TO-220AB	1.95 g	50	Tube

4 Revision history

Table 8: Document revision history

Date	Revision	Changes
09-Aug-2013	1	First issue
27-Sep-2013	2	Updated Figure 9 and Table 5.
18-Dec-2015	3	Updated DPAK package information and reformatted to current standard.
22-Sep-2017	4	Removed TO-220FPAB package.

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