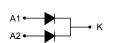
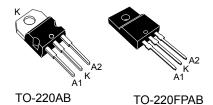




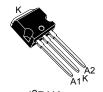
## 100 V power Schottky rectifier



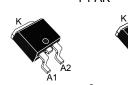


#### **Features**

- Negligible switching losses
- · High junction temperature capability
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Avalanche rated
- Insulated package: TO-220FPAB
  - Insulating voltage = 2000 V<sub>RMS</sub> sine
- ECOPACK®2 compliant component for D²PAK on demand



#### I<sup>2</sup>PAK



D<sup>2</sup>PAK

Product status link					
STPS20H100C					
Product summary					
I <sub>F(AV)</sub> 2 x 10 A					
V <sub>RRM</sub>	100 V				
T <sub>j</sub> (max)	175 °C				
<b>V<sub>F</sub> (typ)</b> 0.59 ∨					

#### **Description**

Dual center tap Schottky rectifier designed for high frequency miniature switch mode power supplies such as adaptors and on-board DC-DC converters.



#### 1 Characteristics

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

Symbol		Value	Unit				
V <sub>RRM</sub>	Repetitive peak reverse voltage	Repetitive peak reverse voltage					
I <sub>F(RMS)</sub>	Forward rms current				30	Α	
		TO-220AB, D <sup>2</sup> PAK, I <sup>2</sup> PAK	T <sub>=</sub> = 160 °C	Per diode	10		
	$I_{F(AV)}$ Average forward current $\delta$ = 0.5, square wave	TO-220AB, D-PAK, I-PAK	1C = 100 C	Per device	20		
IF(AV)		TO COOFDAD	T <sub>C</sub> = 145 °C	Per diode	10	Α	
		TO-220FPAB	T <sub>C</sub> = 125 °C	Per device	20		
I <sub>FSM</sub>	Surge non repetitive forward current	tp = 10 ms sinusoidal		250	Α		
P <sub>ARM</sub>	Repetitive peak avalanche power tp = 10 $\mu$ s, $T_j$ = 125 °C				775	W	
T <sub>stg</sub>	Storage temperature range					°C	
Tj	Maximum operating junction temperature (1)					°C	

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

Table 2. Thermal resistance parameter

Symbol		Value	Unit		
		TO-220AB, D <sup>2</sup> PAK, I <sup>2</sup> PAK	Per diode	1.6	
Para s	R <sub>th(j-c)</sub> Junction to case	TO-220FPAB	Per diode	4	°C/W
Txtn(J-c)		TO-220AB, D <sup>2</sup> PAK, I <sup>2</sup> PAK	Total	0.9	
		TO-220FPAB	Total	3.2	
P., .	Coupling	TO-220AB, D <sup>2</sup> PAK, I <sup>2</sup> PAK		0.15	°C/W
R <sub>th(c)</sub> C	Coupling	TO-220FPAB	-	2.5	C/VV

When the diodes 1 and 2 are used simultaneously :

 $\Delta$ Tj(diode 1) = P(diode1) x R<sub>th(j-c)</sub>(Per diode) + P(diode 2) x R<sub>th(c)</sub>

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Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test co	Test conditions		Тур.	Max.	Unit
I_ (1)	I <sub>R</sub> <sup>(1)</sup> Reverse leakage current	T <sub>j</sub> = 25 °C	\ \ -\\	-		4.5	μΑ
'R'		T <sub>j</sub> = 125 °C	$V_R = V_{RRM}$	-	2	6	mA
			I <sub>F</sub> = 8 A	-		0.71	
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 10 A	-		0.77	
			I <sub>F</sub> = 16 A	-		0.81	
V (2)	Faculty of the second		I <sub>F</sub> = 20 A	-		0.88	
$V_{F}^{(2)}$	Forward voltage drop		I <sub>F</sub> = 8 A	-	0.56	0.58	V
			I <sub>F</sub> = 10 A	-	0.59	0.64	
	T <sub>j</sub> = 125 °C	I <sub>F</sub> = 16 A	-	0.65	0.68		
			I <sub>F</sub> = 20 A	-	0.67	0.73	

<sup>1.</sup> Pulse test:  $t_p = 5$  ms,  $\delta < 2\%$ 

To evaluate the conduction losses use the following equation:

$$P = 0.55 \times I_{F(AV)} + 0.009 I_{F}^{2}_{(RMS)}$$

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<sup>2.</sup> Pulse test:  $t_p$  = 380  $\mu$ s,  $\delta$  < 2%



#### 1.2 Characteristics (curves)

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

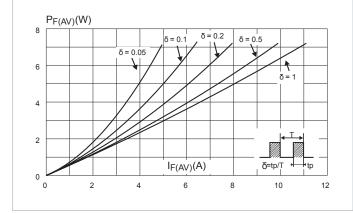


Figure 2. Average forward current versus ambient temperature ( $\delta$ = 0.5, per diode)

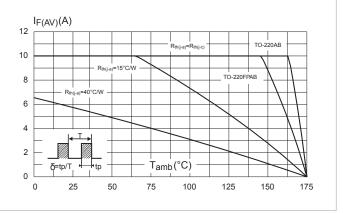


Figure 3. Normalized avalanche power derating versus pulse ( $T_j$ = 125 °C)

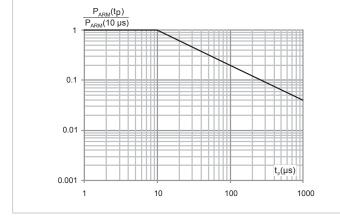


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration (per diode)

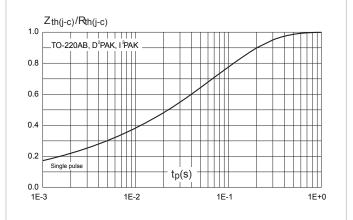


Figure 5. Relative variation of thermal impedance junction to case versus pulse duration (per diode)

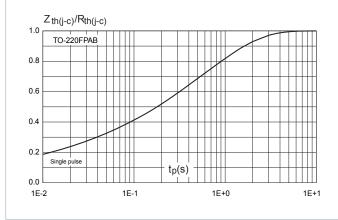
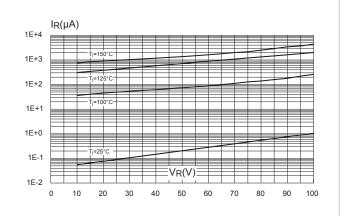


Figure 6. Reverse leakage current versus reverse voltage applied (typical values, per diode)



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Figure 7. Junction capacitance versus reverse voltage applied (typical values, per diode)

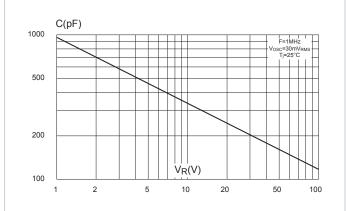


Figure 8. Forward voltage drop versus forward current (maximum values, per diode)

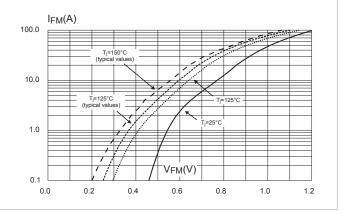
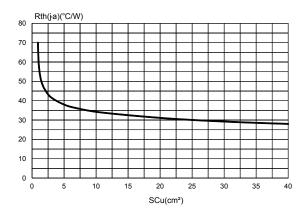


Figure 9. Thermal resistance junction to ambient versus copper surface under tab (epoxy printed board FR4,  $e_{Cu}$  = 35  $\mu$ m) (D<sup>2</sup>PAK)



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# 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.

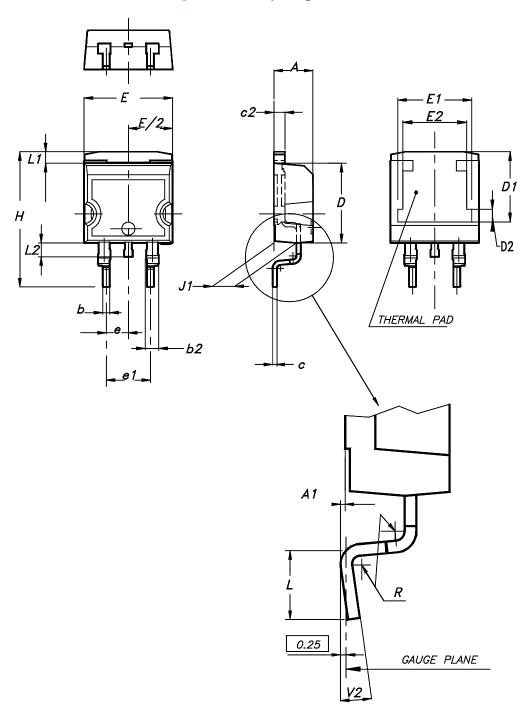
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## 2.1 D<sup>2</sup>PAK package information

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

Figure 10. D<sup>2</sup>PAK package outline



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Table 4. D<sup>2</sup>PAK package mechanical data

	Dimensions				
Ref.	Millim	neters	Inch	ies	
	Min.	Max.	Min.	Max.	
А	4.36	4.60	0.172	0.181	
A1	0.00	0.25	0.000	0.010	
b	0.70	0.93	0.028	0.037	
b2	1.14	1.70	0.045	0.067	
С	0.38	0.69	0.015	0.027	
c2	1.19	1.36	0.047	0.053	
D	8.60	9.35	0.339	0.368	
D1	6.90	8.00	0.272	0.311	
D2	1.10	1.50	0.043	0.060	
Е	10.00	10.55	0.394	0.415	
E1	8.10	8.90	0.319	0.346	
E2	6.85	7.25	0.266	0.282	
е	2.54	typ.	0.100		
e1	4.88	5.28	0.190	0.205	
Н	15.00	15.85	0.591	0.624	
J1	2.49	2.90	0.097	0.112	
L	1.90	2.79	0.075	0.110	
L1	1.27	1.65	0.049	0.065	
L2	1.30	1.78	0.050	0.070	
R	0.4	typ.	0.0	15	
V2	0°	8°	0°	8°	



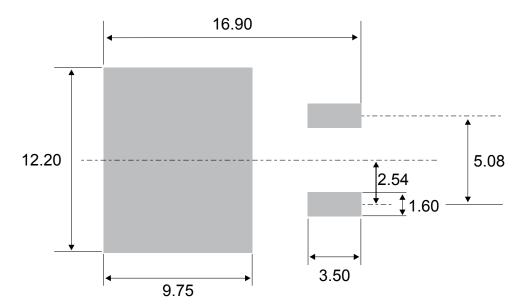


Figure 11. D<sup>2</sup>PAK Recommended footprint

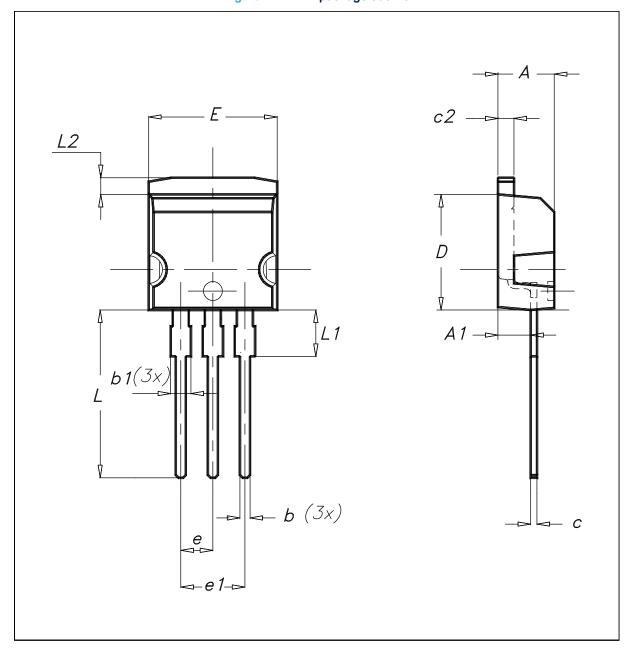
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## 2.2 I<sup>2</sup>PAK package information

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

Figure 12. I<sup>2</sup>PAK package outline



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Table 5. I<sup>2</sup>PAK package mechanical data

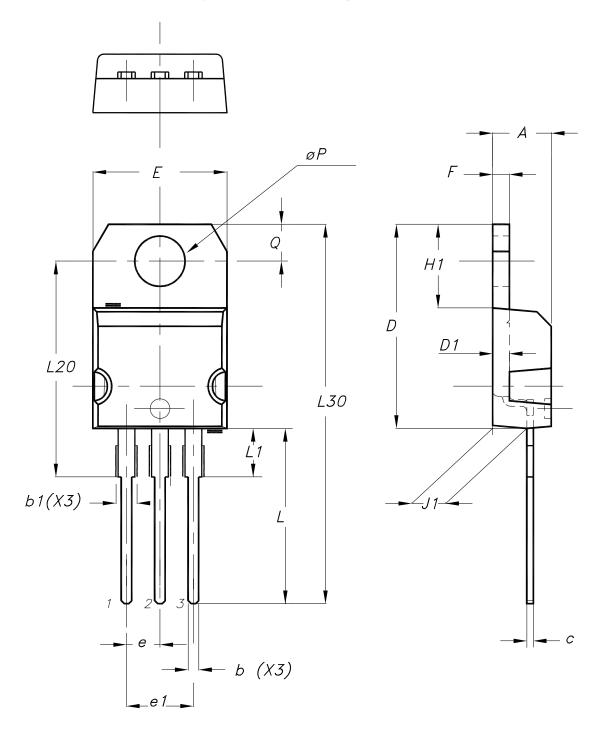
	Dimensions					
Ref.	Millim	eters	Incl	hes		
	Min.	Max.	Min.	Max.		
Α	4.40	4.60	0.173	0.181		
A1	2.40	2.72	0.094	0.107		
b	0.61	0.88	0.024	0.035		
b1	1.14	1.70	0.044	0.067		
С	0.49	0.70	0.019	0.028		
c2	1.23	1.32	0.048	0.052		
D	8.95	9.35	0.352	0.368		
е	2.40	2.70	0.094	0.106		
e1	4.95	5.15	0.195	0.203		
E	10.00	10.40	0.394	0.409		
L	13.00	14.00	0.512	0.551		
L1	3.50	3.93	0.138	0.155		
L2	1.27	1.40	0.050	0.055		



#### 2.3 TO-220AB package information

- Cooling method: by conduction (C)
- Epoxy meets UL 94,V0
- Recommended torque value: 0.55 N⋅m
- Maximum torque value: 0.7 N·m

Figure 13. TO-220AB package outline



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Table 6. TO-220AB package mechanical data

	Dimensions				
Ref.	Millimeters		Inc	hes	
	Min.	Max.	Min.	Max.	
Α	4.40	4.60	0.173	0.181	
b	0.61	0.88	0.240	0.035	
b1	1.14	1.55	0.045	0.061	
С	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	
е	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.		
θР	3.75	3.85	0.148	0.152	
Q	2.65	2.95	0.104	0.116	

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## 2.4 TO-220FPAB package information

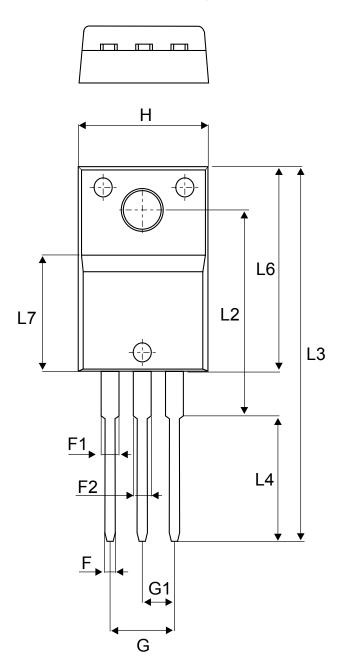
• Cooling method: by conduction (C)

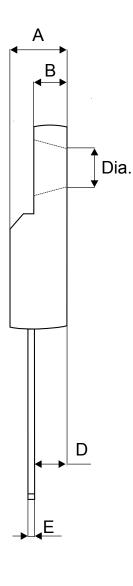
• Epoxy meets UL 94,V0

Recommended torque value: 0.55 N·m

• Maximum torque value: 0.7 N·m

Figure 14. TO-220FPAB package outline





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Table 7. TO-220FPAB package mechanical data

			Dimensions		
Ref.	Millimeters		Inches (for reference only)		
	Min.	Max.	Min.	Max.	
Α	4.40	4.60	0.1739	0.1818	
В	2.5	2.7	0.0988	0.1067	
D	2.50	2.75	0.0988	0.1087	
Е	0.45	0.70	0.0178	0.0277	
F	0.75	1.0	0.0296	0.0395	
F1	1.15	1.70	0.0455	0.0672	
F2	1.15	1.70	0.0455	0.0672	
G	4.95	5.20	0.1957	0.2055	
G1	2.40	2.70	0.0949	0.1067	
Н	10.00	10.40	0.3953	0.4111	
L2	16.00	typ.	0.632	4 typ.	
L3	28.60	30.60	1.1304	1.2095	
L4	9.80	10.6	0.3874	0.4190	
L5	2.90	3.60	0.1146	0.1423	
L6	15.90	16.40	0.6285	0.6482	
L7	9.00	9.30	0.3557	0.3676	
Dia	3.0	3.20	0.1186	0.1265	

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# **3** Ordering information

**Table 8. Ordering information** 

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS20H100CT	STPS20H100CT	TO-220AB	1.95 g	50	Tube
STPS20H100CFP	STPS20H100CFP	TO-220FPAB	1.90 g	50	Tube
STPS20H100CR	STPS20H100CR	I <sup>2</sup> PAK	1.50 g	50	Tube
STPS20H100CG	STPS20H100CG	D <sup>2</sup> PAK	1.38 g	50	Tube
STPS20H100CG-TR	STPS20H100CG	D <sup>2</sup> PAK	1.38 g	1000	Tape and reel



## **Revision history**

Table 9. Document revision history

Date	Revision	Changes
Jul-2003	4G	Previous release
21-Mar-2007	5	Removed ISOWATT package
10-Sep-2007	6	Reformatted cover page to current standards - no technical changes. Updated dimensions A1, b, b1, c, c2, L, and L1 in Table 8.
22-Sep-2011	7	Updated Table 8
21-May-2015	8	Updated features, and packages silhouette in cover page. Updated Section 1: "Characteristics" and Section 1.1: "Characteristics (curves)". Updated Section 2.2: "D²PAK package information".
16-Apr-2018	9	Updated Table 5. I <sup>2</sup> PAK package mechanical data.



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