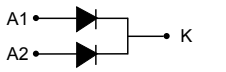
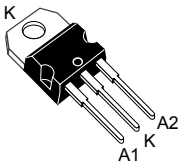
STPS20L60C

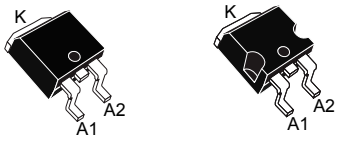
Datasheet

60 V, 2 x 10 A, low drop power Schottky rectifier





TO-220AB



D^2PAK

Features

- Low forward voltage drop
- Negligible switching losses
- Low thermal resistance
- Avalanche capability specified
- ECOPACK2 compliant component in TO-220AB, on demand for D^2PAK

Applications

- Set-top box
- Battery charger
- DC / DC converter
- Notebook adapter
- Switching diodes

Description

Dual center tab Schottky rectifier suited for SMPS and high frequency DC to DC converters.

Packaged in TO-220AB and D^2PAK, the STPS20L60C is intended for use in high frequency inverters.

Product status link
STPS20L60C

Product summary	
Symbol	**Value**
$I_{F(AV)}$	2 x 10 A
V_{RRM}	60 V
$T_{j(max.)}$	150 °C
$V_{F(typ.)}$	0.48 V

1 Characteristics

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			60	V
$I_{F(RMS)}$	Forward rms current			30	A
$I_{F(AV)}$	Average forward current	T_c = 135 °C, δ = 0.5 square wave	Per diode	10	A
			Per device	20	
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal	220	A
P_{ARM}	Repetitive peak avalanche power		t_p = 10 µs, T_j = 125 °C	430	W
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature(1)			150	°C
dV/dt	Critical rate of rise reverse voltage			10000	V/µs

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

Table 2. Thermal resistance parameters

Symbol	Parameter		Max. value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	1.6	°C/W
		Total	0.85	
$R_{th(c)}$	Coupling		0.1	

When the diodes 1 and 2 are used simultaneously :

ΔT_j(diode 1) = P(diode1) x $R_{th(j-c)}$(per diode) + P(diode 2) x $R_{th(c)}$

For more information, please refer to the following application note :

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		350	µA
		T_j = 125 °C		-	65	95	mA
V_F(1)	Forward voltage drop	T_j = 25 °C	I_F = 10 A	-		0.60	V
		T_j = 125 °C		-	0.48	0.56	
		T_j = 25 °C	I_F = 20 A	-		0.74	
		T_j = 125 °C		-	0.62	0.70	

1. *Pulse test: t_p = 380 µs, δ < 2%*

To evaluate the conduction losses, use the following equation:

$P = 0.42 \times I_{F(AV)} + 0.014 \times I_F{}^2{}_{(RMS)}$

For more information, please refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

1.1 Characteristics (curves)

Figure 1. Average forward current versus case temperature (δ = 0.5, per diode)

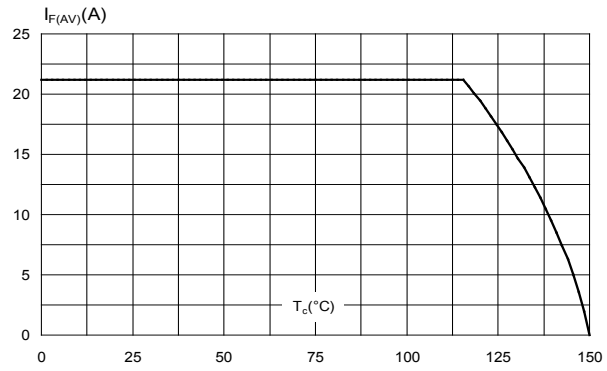


Figure 2. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

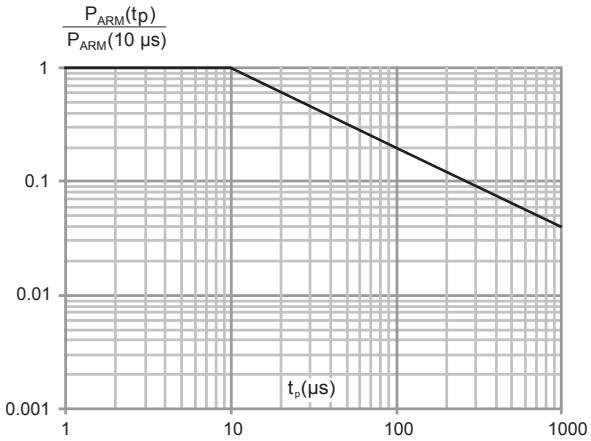


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

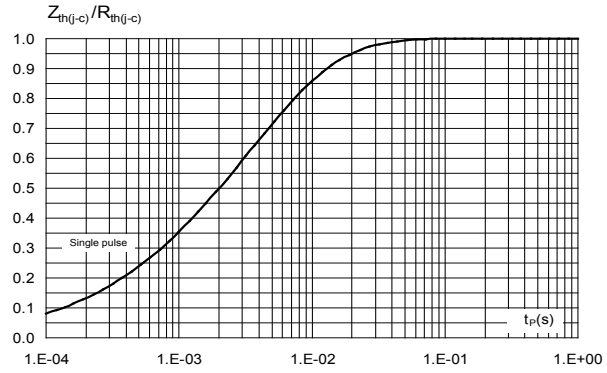


Figure 4. Reverse leakage current versus reverse voltage applied (typical values, per diode)

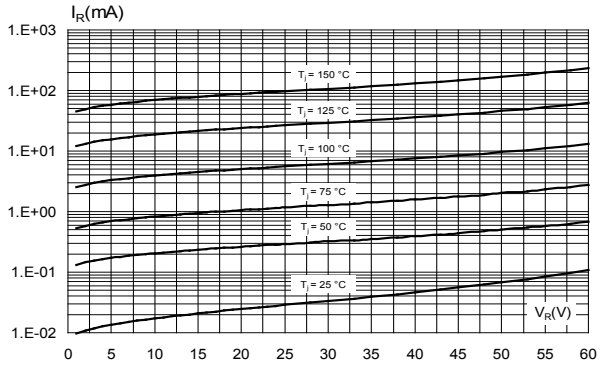


Figure 5. Junction capacitance versus reverse voltage applied (typical values, per diode)

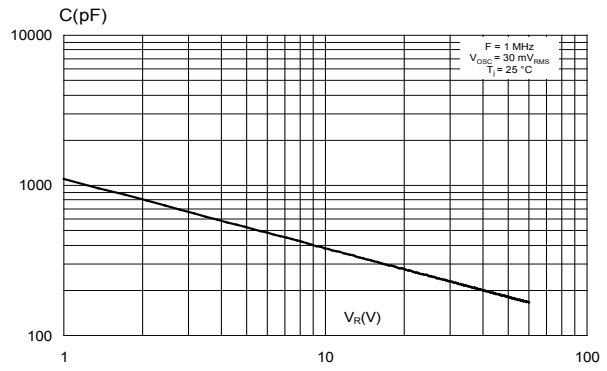


Figure 6. Forward voltage drop versus forward current (typical values, per diode)

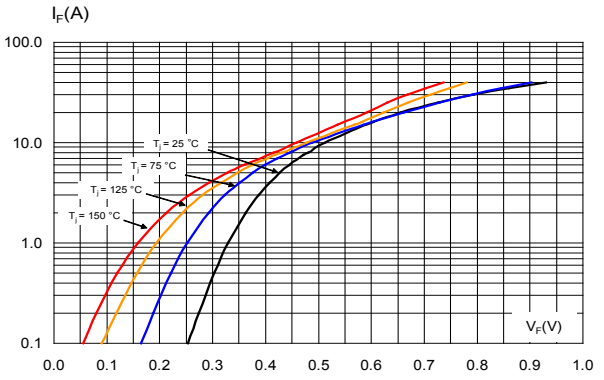
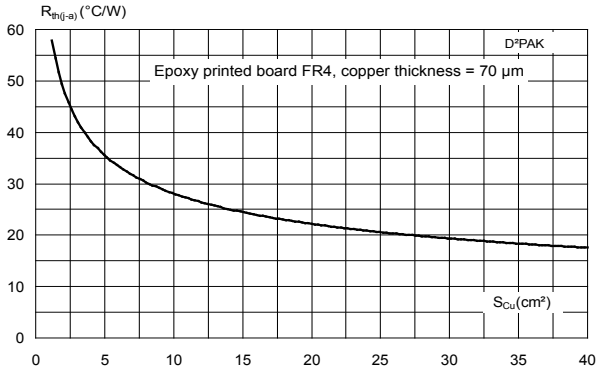


Figure 7. Thermal resistance junction to ambient versus copper surface under tab (typical values)



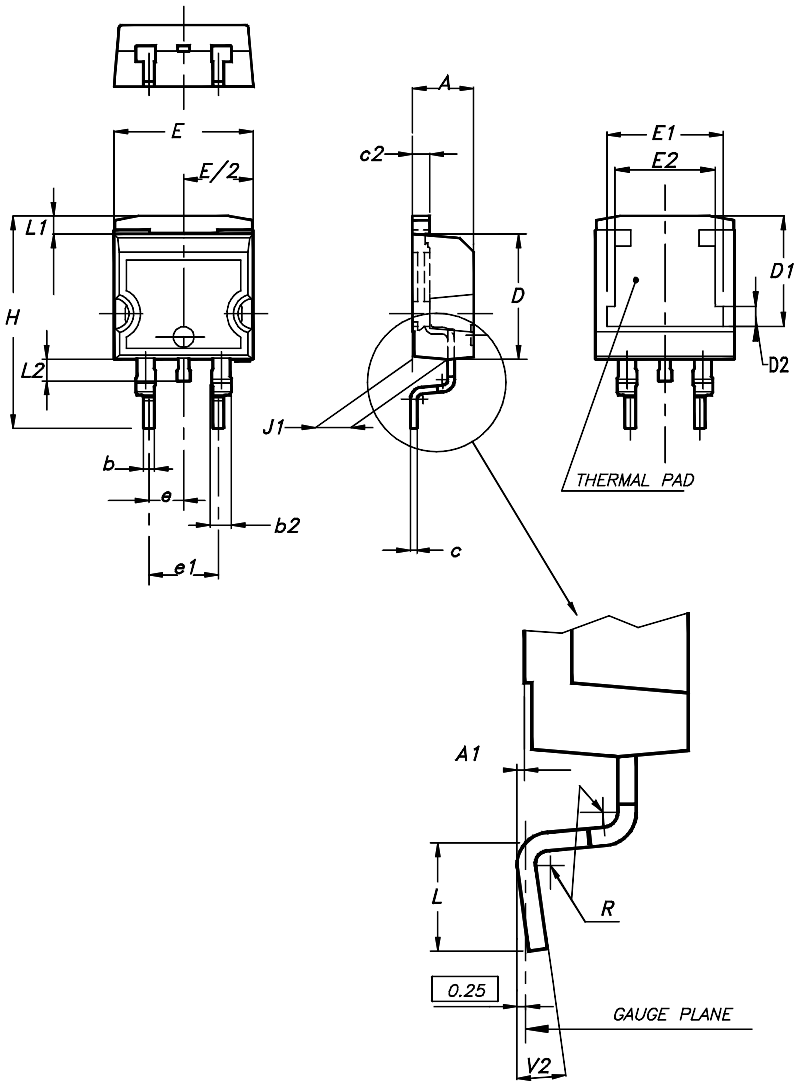
2 Package information

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.

2.1 D²PAK package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

Figure 8. D²PAK package outline

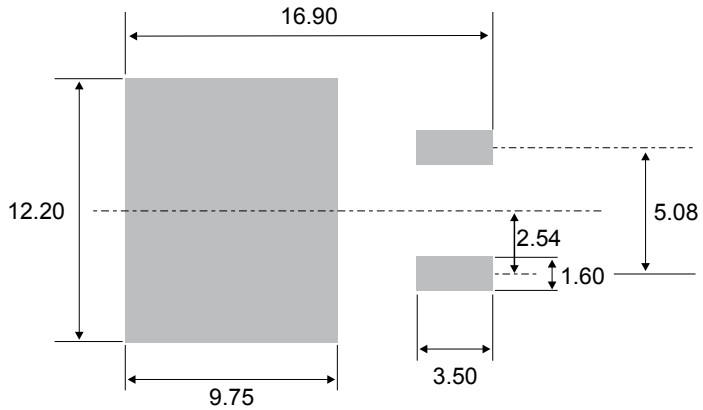


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 4. **D²PAK package mechanical data**

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A	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
c	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
E	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
e	2.54 typ.		0.100	
e1	4.88	5.28	0.190	0.205
H	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.		0.015	
V2	0°	8°	0°	8°

Figure 9. **D²PAK recommended footprint (dimensions in mm)**



2.2 TO-220AB package information

- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.70 N·m

Figure 10. TO-220AB package outline

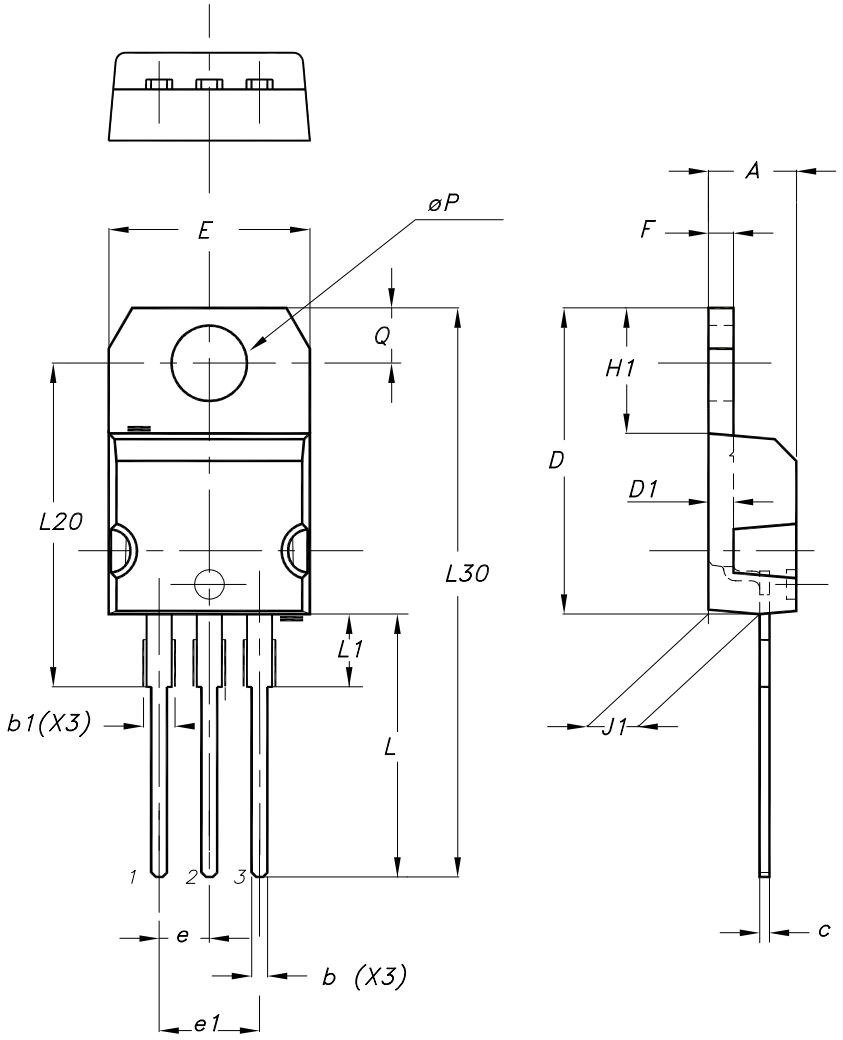


Table 5. **TO-220AB package mechanical data**

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	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	1.55	0.045	0.061
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

3 Ordering Information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS20L60CT	STPS20L60CT	TO-220AB	1.95 g	1000	Tape and reel
STPS20L60CG-TR	STPS20L60CG	D^2PAK	1.48 g	50	Tube

Revision history

Table 7. **Document revision history**

Date	Version	Changes
Jul-2003	3C	Previous release
02-Aug-2013	4	Added TO-220AB narrow leads package.
02-Dec-2020	5	Removed I²PAK package information. Updated D²PAK package information. Added Application section. Minor text change.

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