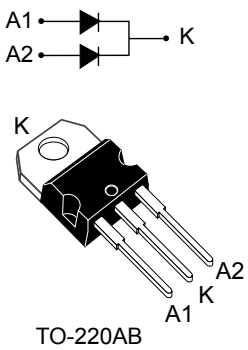
STPS60150C

Datasheet

150 V power Schottky rectifier



TO-220AB

Features

- High junction temperature capability
- Low leakage current
- High voltage capabilities
- Low thermal resistance
- High frequency operation
- Avalanche specification
- ECOPACK®2 compliant

Applications

- Switching diode
- SMPS
- DC/DC converter
- Telecom power

Description

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

Packaged in TO-220AB, the STPS60150C combines high current rating and low volume to enhance both reliability and power density of the application.

Product status	
STPS60150C	
Product summary	
$I_{F(AV)}$	2 x 30 A
V_{RRM}	150 V
$T_{j(max.)}$	175 °C
$V_{F(typ.)}$	0.72 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			150	V
$I_{F(RMS)}$	Forward rms current			60	A
$I_{F(AV)}$	Average forward current, δ = 0.5, square wave	T_C = 145 °C	Per diode	30	A
		T_C = 135 °C	Per device	60	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		270	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C		1245	W
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature(1)			+175	°C

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		Value Max.	Unit
$R_{th(j-c)}$	Junction to case	Per diode	1.0	°C/W
		Total	0.7	
$R_{th(c)}$	Coupling		0.4	°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 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-	3	15	µA
		T_j = 125 °C		-	3	10	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 30 A	-		0.94	V
		T_j = 125 °C		-	0.72	0.76	
		T_j = 25 °C	I_F = 60 A	-	0.97	1.05	
		T_j = 125 °C		-	0.86	0.92	

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:

$P = 0.6 \times I_{F(AV)} + 0.0053 \times I_F{}^2{}_{(RMS)}$

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 power dissipation versus average forward current (per diode)

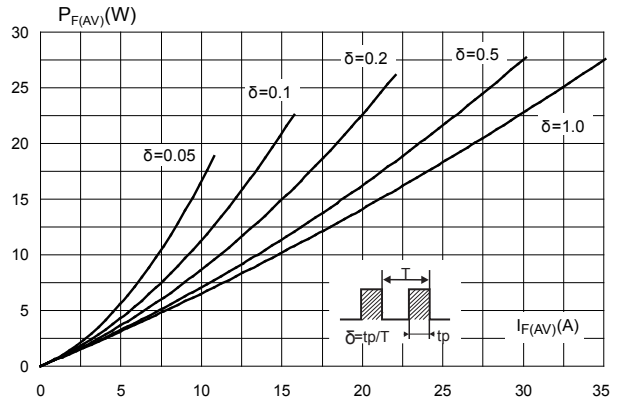


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

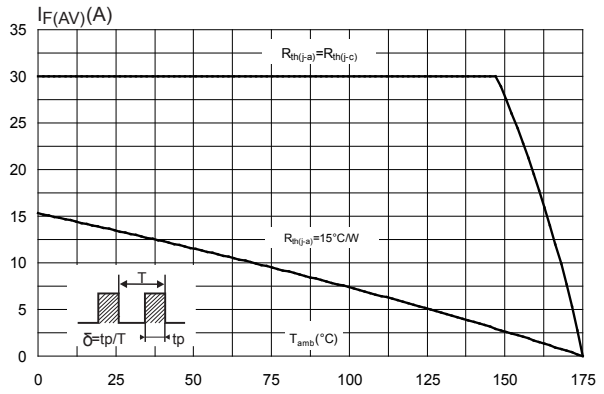


Figure 3. Normalized avalanche power derating versus pulse duration (T_j= 125 °C)

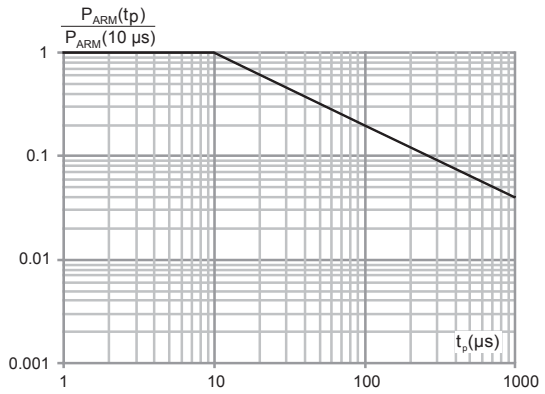


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

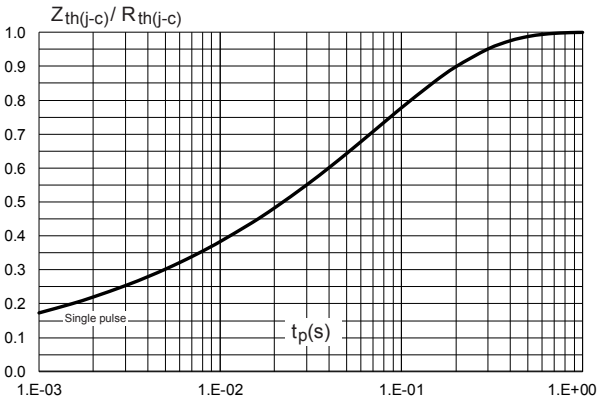


Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)

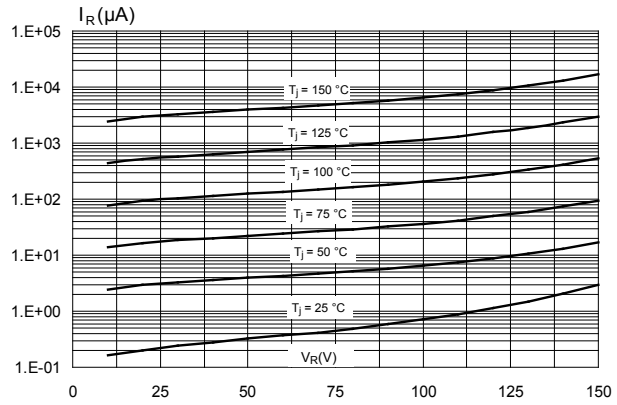


Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)

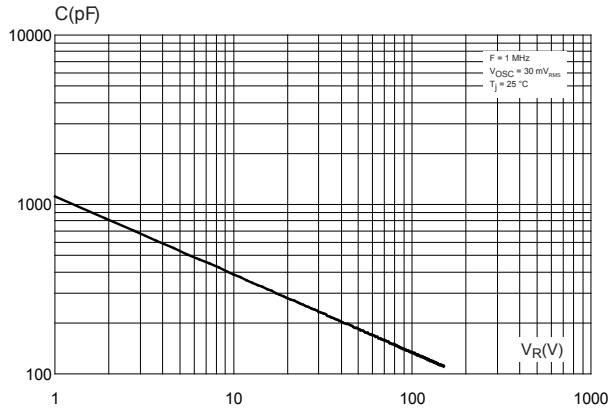
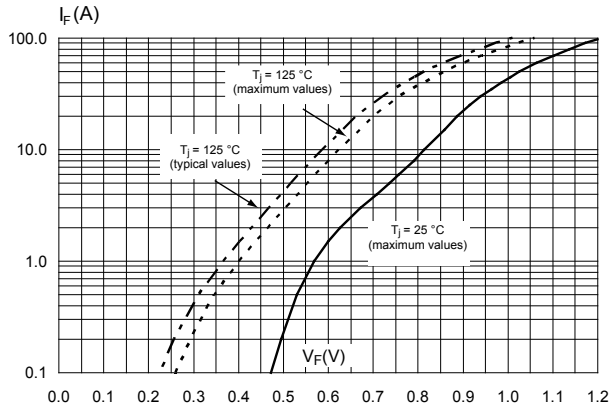


Figure 7. Forward voltage drop versus forward current (per diode)



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.

2.1 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 8. TO-220AB package outline

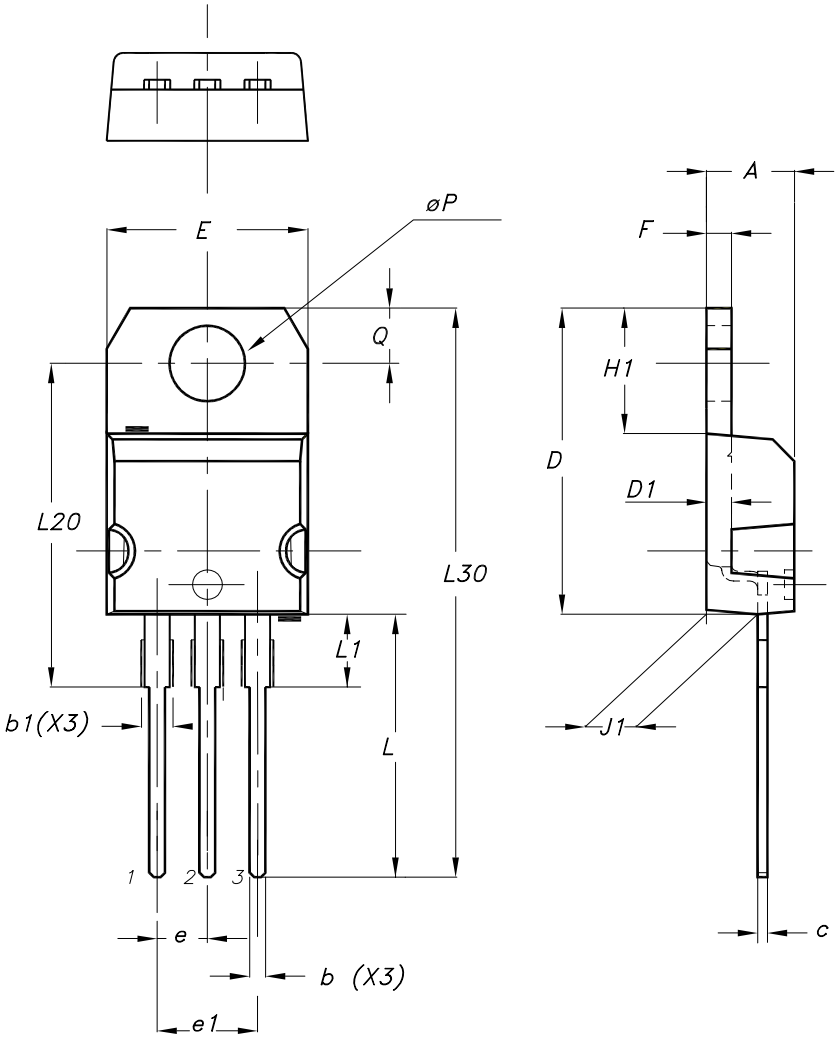


Table 4. TO-220AB package mechanical data

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	1.55	0.045	0.061

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
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 5. **Order code**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS60150CT	STPS60150CT	TO-220AB	1.95 g	50	Tube

Revision history

Table 6. **Document revision history**

Date	Revision	Changes
19-Oct-2004	1	First issue.
01-Jun-2018	2	Updated PARM value and removed "Normalized avalanche power derating" curves.