

Description

Dual center tap Schottky rectifiers suited for switched mode power supplies and high frequency DC to DC converters.

Packaged in TO-220AB, TO-220AB narrow leads, I²PAK and D²PAK, this device is intended for use in high frequency inverters.

Table 1. Device summary

$I_{F(AV)}$	2 x 10 A
V_{RRM}	60 V
$T_j(max)$	150 °C
$V_F(max)$	0.56 V

Features

- Low forward voltage drop
- Negligible switching losses
- Low thermal resistance
- Avalanche capability specified

1 Characteristics

Table 2. Absolute ratings (limiting values, per diode)

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	$T_C = 140\text{ °C}$ $\delta = 0.5$	Per diode Per device	10 20	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ ms}$	Sinusoidal	220	A
I_{RRM}	Repetitive peak reverse current	$t_p = 2\text{ }\mu\text{s}$ square	$F = 1\text{ kHz}$	1	A
P_{ARM}	Repetitive peak avalanche power	$t_p = 1\text{ }\mu\text{s}$	$T_j = 25\text{ °C}$	5800	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. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ thermal runaway condition for a diode on its own heatsink

Table 3. Thermal resistances

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

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j(\text{diode } 1) = P(\text{diode } 1) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode } 2) \times R_{th(c)}$$

Table 4. Static electrical characteristics (per diode)

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$			350	μA
		$T_j = 125\text{ °C}$			65	95	mA
$V_F^{(1)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 10\text{ A}$			0.6	V
		$T_j = 125\text{ °C}$	$I_F = 10\text{ A}$		0.48	0.56	
		$T_j = 25\text{ °C}$	$I_F = 20\text{ A}$			0.74	
		$T_j = 125\text{ °C}$	$I_F = 20\text{ A}$		0.62	0.7	

1. Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

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

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

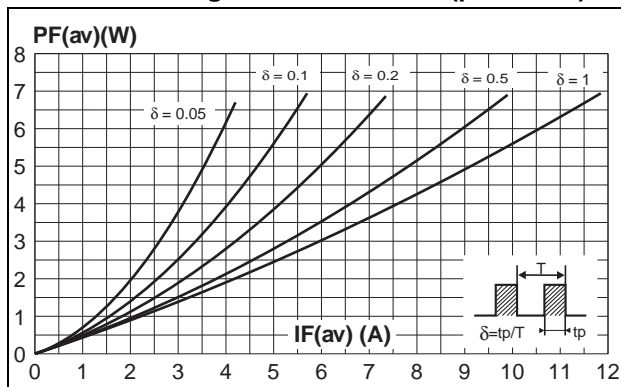
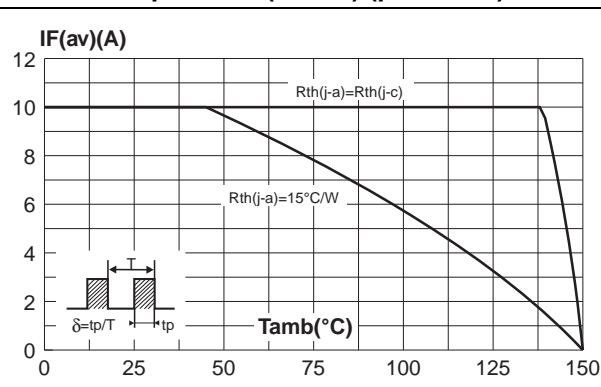
Figure 2. Average current versus ambient temperature ($\delta = 0.5$) (per diode)

Figure 3. Normalized avalanche power derating versus pulse duration

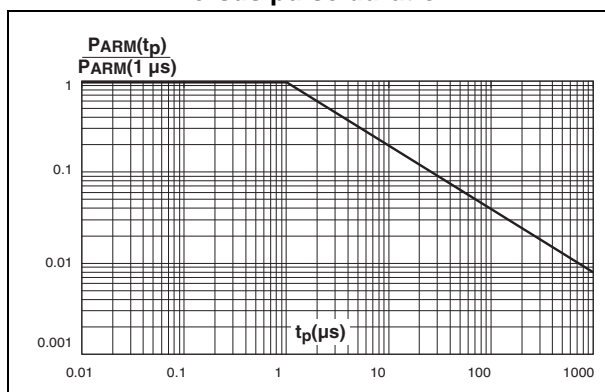


Figure 4. Normalized avalanche power derating versus junction temperature

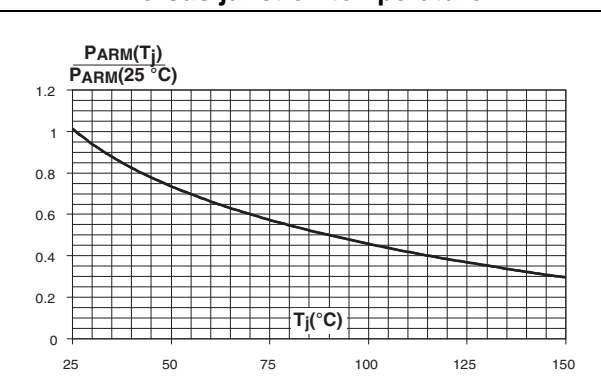


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

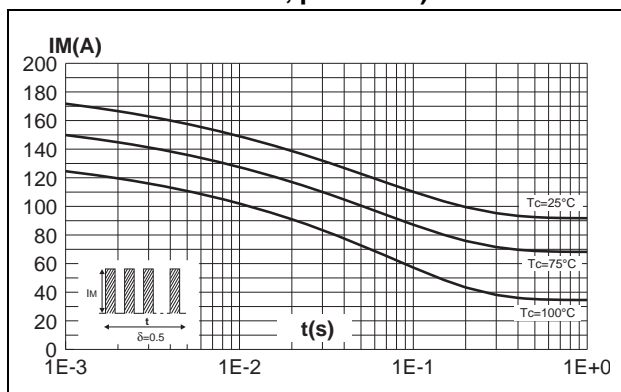


Figure 6. Relative variation of thermal transient impedance junction to case versus pulse duration

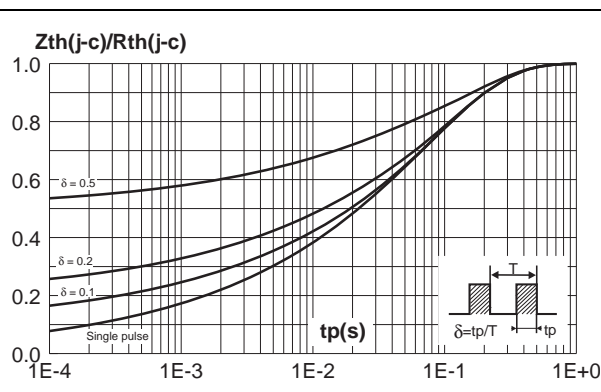


Figure 7. Reverse leakage current versus reverse voltage applied (typical values, per diode)

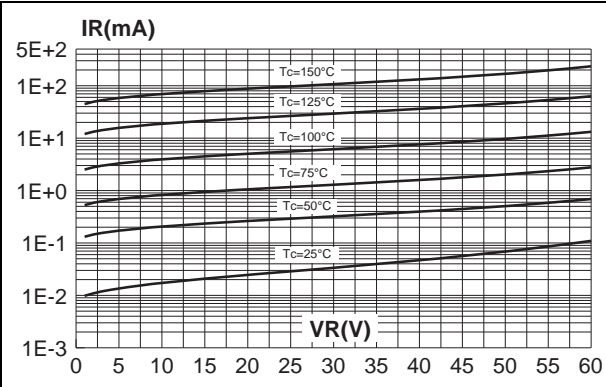


Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)

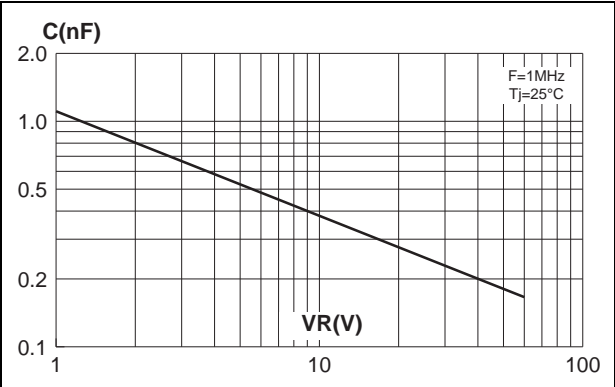
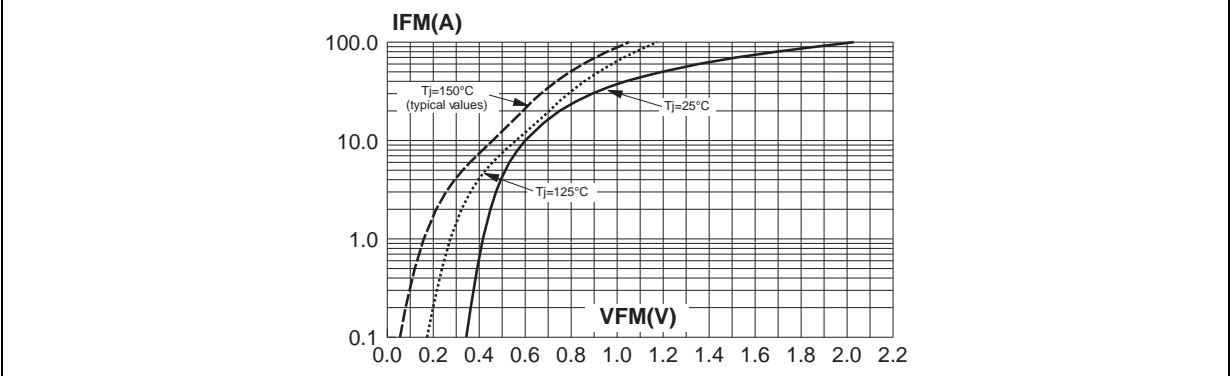


Figure 9. Forward voltage drop versus forward current (maximum values, per diode)



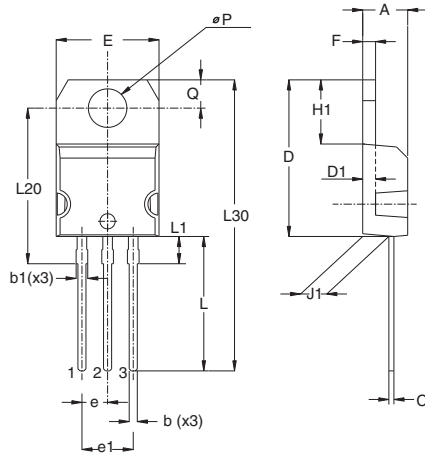
2 Package information

- Epoxy meets UL94, V0
- Cooling method: conduction
- Recommended torque value: 0.4 to 0.6 N·m

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.

Table 5. TO-220AB narrow leads dimensions

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.17		0.18
b	0.61		0.88	0.024		0.034
b1	0.95		1.20	0.037		0.047
c	0.48		0.70	0.019		0.027
D	15.25		15.75	0.60		0.62
D1	1.27			0.05		
E	10.00		10.40	0.39		0.41
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.19		0.20
F	1.23		1.32	0.048		0.052
H1	6.20		6.60	0.24		0.26
J1	2.40		2.72	0.095		0.107
L	13.00		14.00	0.51		0.55
L1	2.60		2.90	0.102		0.114
L20	15.40			0.61		
L30	28.90			1.14		
ØP	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116



Devices in I²PAK with nickel-plated back frame must NOT be mounted by frame soldering like SMDs. Such devices are intended to be through-hole mounted ONLY and in no circumstances shall ST be held liable for any lack of performance or damage arising out of soldering of nickel-plated back frames.

Table 6. I²PAK dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	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
c	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
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.195	0.203
E	10	10.40	0.394	0.409
L	13	14	0.512	0.551
L1	3.50	3.93	0.138	0.155
L2	1.27	1.40	0.050	0.055

Table 7. D²PAK dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	0.208
L	15.00	15.85	0.590	0.624
L2	1.27	1.40	0.050	0.055
L3	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

Figure 10. Footprint (dimensions in mm)

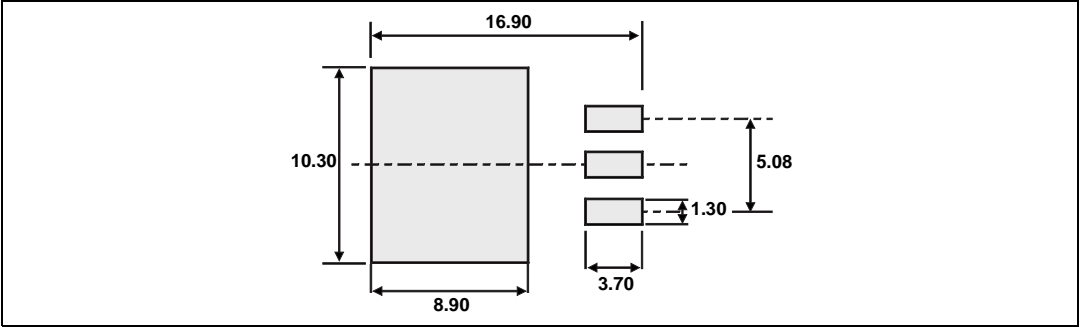
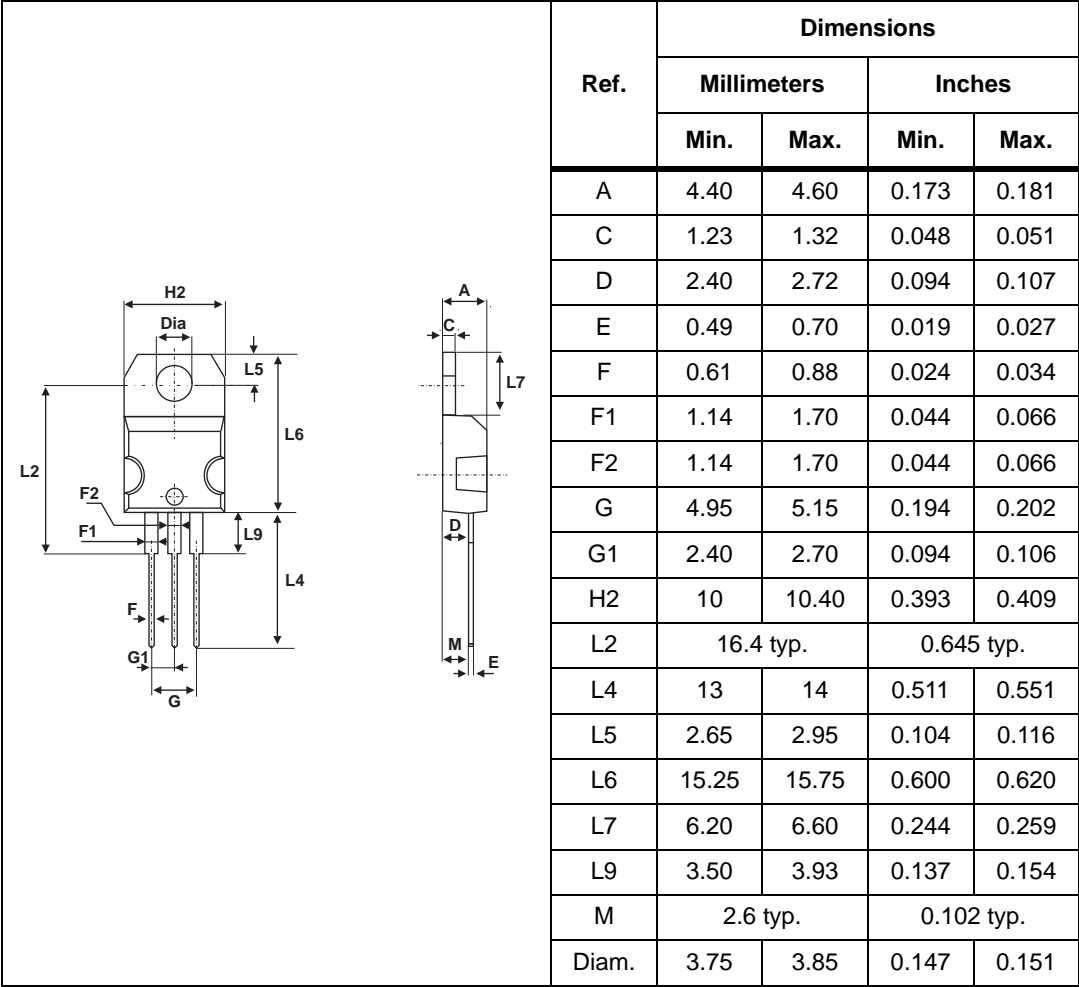


Figure 11. TO-220AB dimensions



3 Ordering information

Table 8. Ordering information

Type	Marking	Package	Weight	Base qty	Delivery mode
STPS20L60CT	STPS20L60CT	TO-220AB	2.2 g	50	Tube
STPS20L60CT	STPS20L60CT	TO-220AB	2.2 g	1000	Bulk
STPS20L60CG	STPS20L60CG	D ² PAK	1.48 g	50	Tube
STPS20L60CG-TR	STPS20L60CG	D ² PAK	1.48 g	1000	Tape and reel
STPS20L60CR	STPS20L60CR	I ² PAK	1.49 g	50	Tube
STPS20L60CTN	STPS20L60CTN	TO-220AB narrow leads	1.9 g	50	Tube

4 Revision history

Table 9. Document revision history

Date	Revision	Changes
Jul-2003	3C	Previous release
02-Aug-2013	4	Added TO-220AB narrow leads package.

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