STPS40L15C

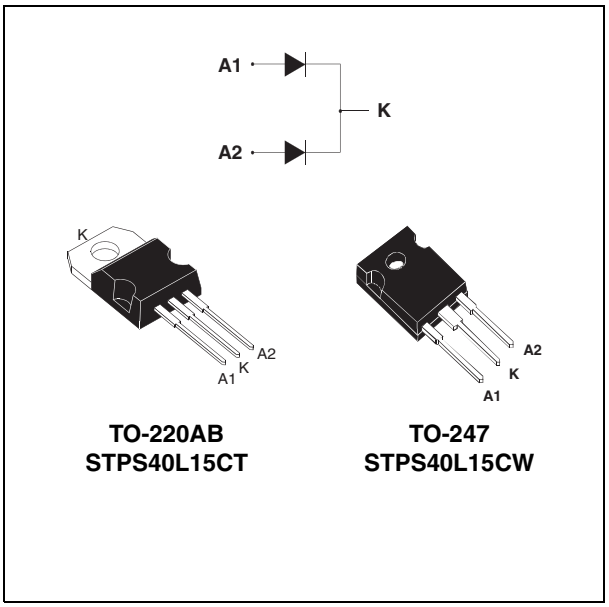
Low drop OR-ing power Schottky diode

Features

- Very low forward voltage drop for less power dissipation and reduced heatsink size
- Reverse voltage suited to OR-ing of 3 V, 5 V and 12 V rails
- Avalanche capability specified

Description

Dual center tap schottky rectifier packaged in TO-220AB and TO-247, this device is especially intended for use as OR-ing diode in fault tolerant power supply equipments.



TO-220AB
STPS40L15CT

TO-247
STPS40L15CW

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2x20 A
V_{RRM}	15 V
$T_{j\ (max)}$	125 °C
$V_{F\ (max)}$	0.33 V

1 Characteristics

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			15	V
$I_{F(RMS)}$	Forward current rms			30	A
$I_{F(AV)}$	Average forward current	T_{case} = 140 °C δ = 1	Total	40	A
			Per diode	20	
I_{FSM}	Surge non repetitive forward current	t_p = 10 m, Sinusoidal		310	A
I_{RRM}	Peak repetitive reverse current	t_p = 2 µs, F= 1 kHz		2	A
I_{RSM}	Non repetitive peak reverse current	t_p = 100 µs		3	A
P_{ARM}	Repetitive peak avalanche power	t_p = 1µs, T_j = 25 °C		13140	W
T_{stg}	Storage temperature range			-65 to + 150	°C
T_j	Maximum operating junction temperature (1)			125	°C
dV/dt	Critical rate of rise of reverse voltage			10000	V/µs

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistances

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

Table 4. Static electrical characteristics (Per diode)

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			6	mA
		T_j = 100 °C			200	500	
V_F(1)	Forward voltage drop	T_j = 25 °C	I_F = 19 A			0.41	V
		T_j = 25 °C	I_F = 40 A			0.52	
		T_j = 125 °C	I_F = 19 A		0.28	0.33	
		T_j = 125 °C	I_F = 40 A		0.42	0.50	

1. Pulse test : t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation :
$P = 0.18 \times I_{F(AV)} + 0.008\ I_F{}^2{}_{(RMS)}$

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

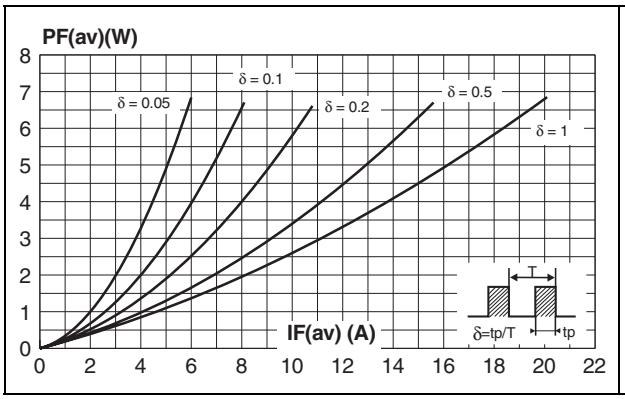


Figure 2. Average forward current versus ambient temperature (δ = 1, per diode)

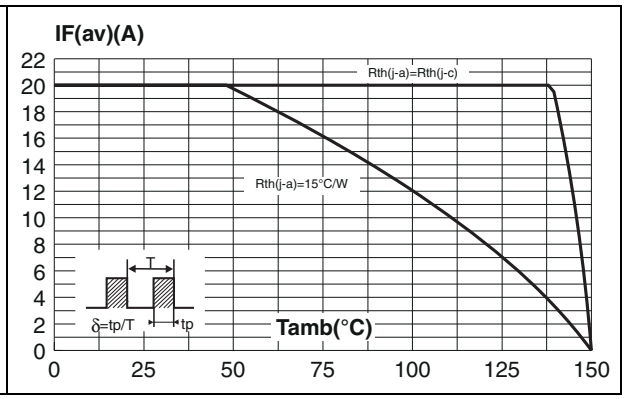


Figure 3. Normalized avalanche power derating versus pulse duration

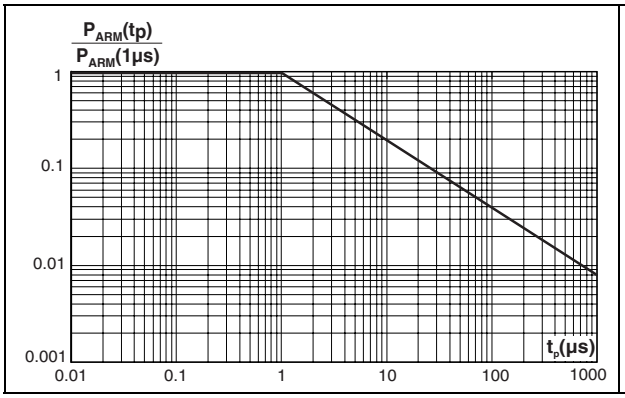


Figure 4. Normalized avalanche power derating versus junction temperature

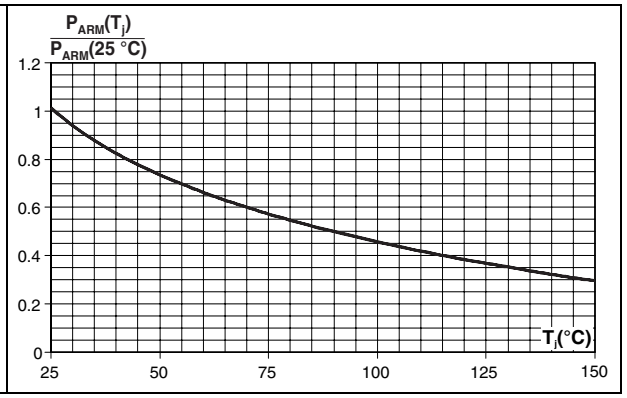


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values per diode)

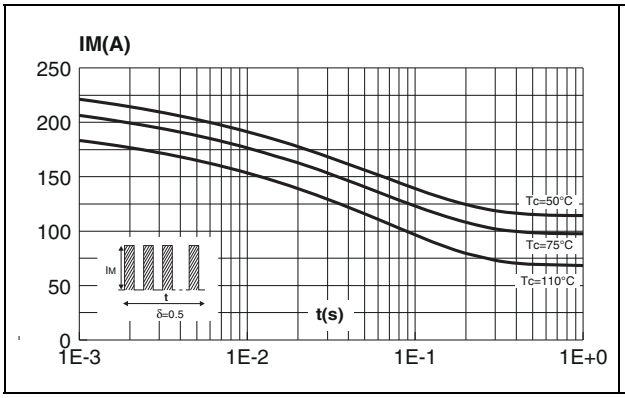


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration (per diode)

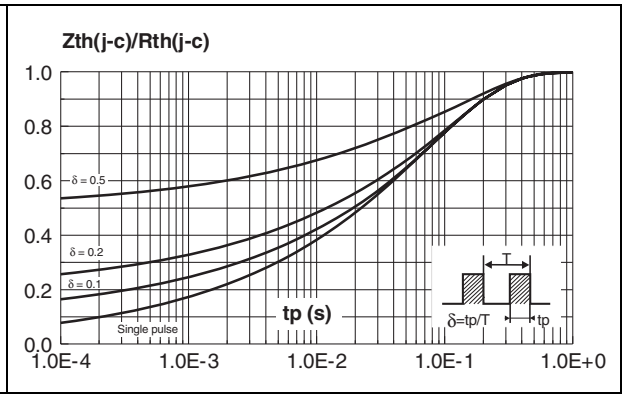


Figure 7. Reverse leakage current versus reverse voltage applied (typical values per diode)

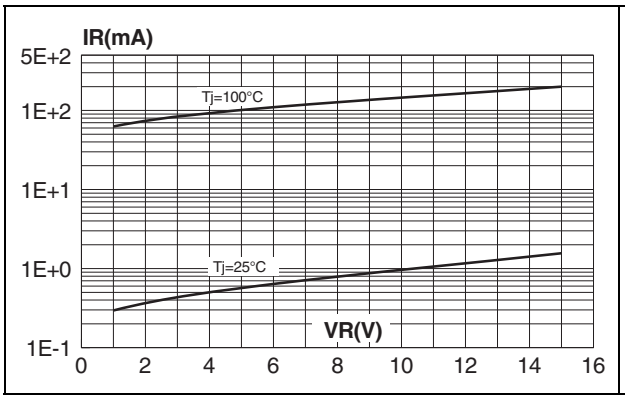


Figure 8. Junction capacitance versus reverse voltage applied (typical values per diode)

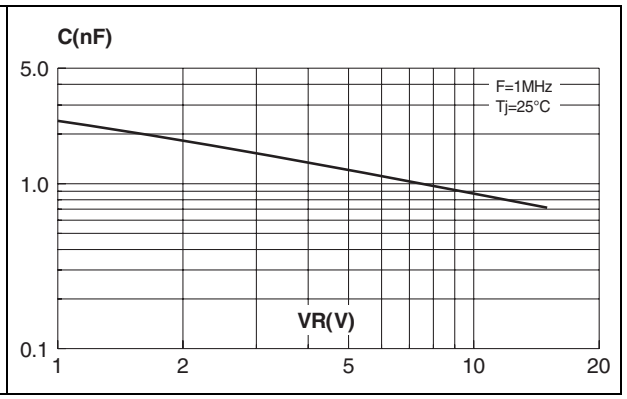


Figure 9. Forward voltage drop versus forward current (typical values per diode)

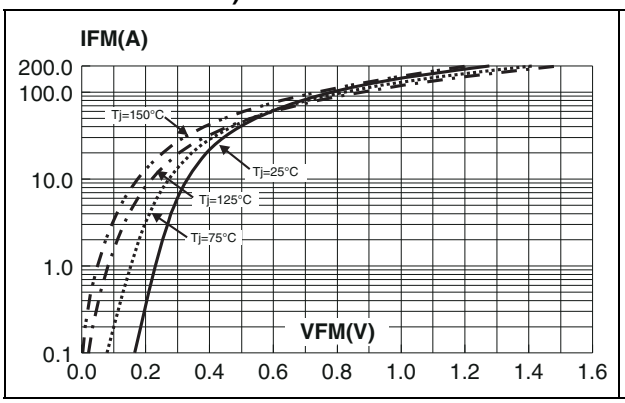
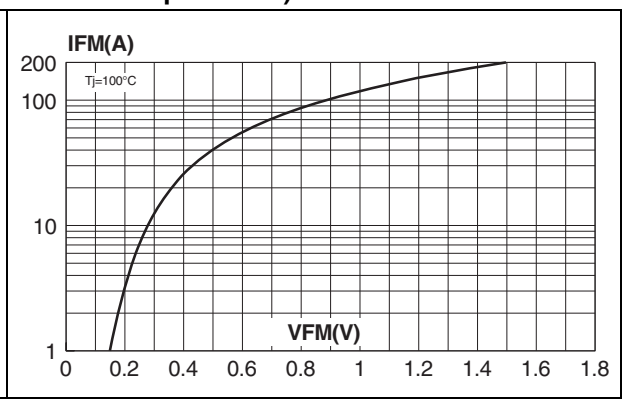


Figure 10. Forward voltage drop versus forward current (typical maximum per diode)

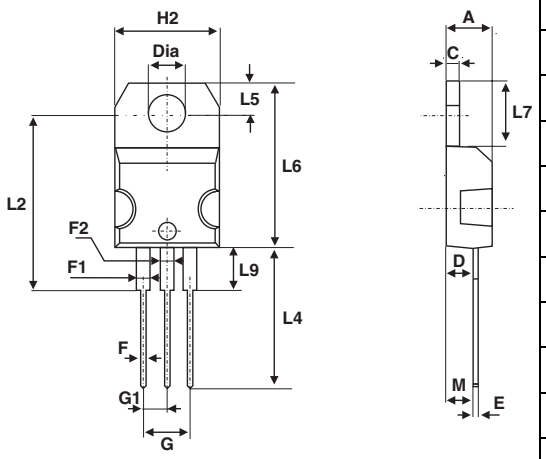


2 Package information

- Epoxy meets UL94,V0
- Cooling method: by conduction (C)
- Recommended torque values for: TO-220AB 0.4 to 0.6 N·m
- Recommended torque values for: TO-247 0.9 to 1.2 N·m

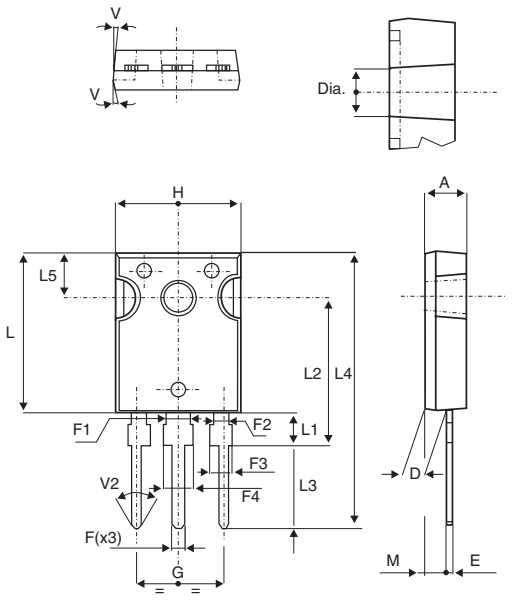
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 5. TO-220AB dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.106
D	2.40	2.72	0.094	0.009
E	0.49	0.70	0.019	0.037
F	0.61	0.88	0.024	0.067
F1	1.14	1.70	0.044	0.024
F2	1.14	1.70	0.044	0.054
G	4.95	5.15	0.194	0.368
G1	2.40	2.70	0.094	0.409
H2	10	10.40	0.393	0.208
L2	16.4 typ		0.645 typ	
L4	13	14	0.511	0.055
L5	2.65	2.95	0.104	0.069
L6	15.25	15.75	0.600	0.126
L7	6.20	6.60	0.244	
L9	3.50	3.93	0.137	
M	2.6 typ.		0.102 typ.	
Diam.	3.75	3.85	0.147	0.151

Table 6. TO-247 dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.031
E	0.40		0.80	0.015	0.009	
F	1.00		1.40	0.039		0.055
F1		3.00			0.118	
F2		2.00			0.078	
F3	2.00		2.40	0.078		0.094
F4	3.00		3.40	0.118		0.133
G		10.90			0.429	
H	15.45		15.75	0.608		0.620
L	19.85		20.15	0.781		0.793
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
L3	14.20		14.80	0.559		0.582
L4		34.60			1.362	
L5		5.50			0.216	
M	2.00		3.00	0.078		0.118
V		5°			5°	
V2		60°			60°	
Dia	3.55		3.65	0.139		0.143

3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS40L15CW	STPS40L15CW	TO-247	4.4 g	30	Tube
STPS40L15CT	STPS40L15CT	TO-220AB	2.2 g	50	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
July-2003	5A	Previous edition.
18-Jul-2011	6	Added cathode indicator K to illustration for TO-220AB.