STPS40170C

HIGH VOLTAGE POWER SCHOTTKY RECTIFIER

Table 1: Main Product Characteristics

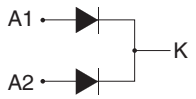
$I_{F(AV)}$	2 x 20 A
V_{RRM}	170 V
T_j	175 °C
V_F(max)	0.75 V

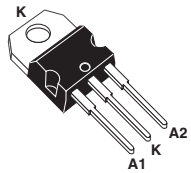
FEATURES AND BENEFITS

- High junction temperature capability
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Low thermal resistance
- High frequency operation
- Avalanche specification

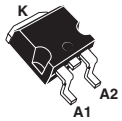
DESCRIPTION

Dual center tab Schottky rectifier suited for High Frequency Switched Mode Power Supplies. Packaged in TO-220AB, D2PAK and TO-247, these devices are intended for use to enhance the reliability of the application.

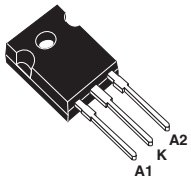




TO-220AB
STPS40170CT



D^{2}PAK
STPS40170CG



TO-247
STPS40170CW

Table 2: Order Codes

Part Numbers	Marking
STPS40170CT	STPS40170CT
STPS40170CG	STPS40170CG
STPS40170CG-TR	STPS40170CG
STPS40170CW	STPS40170CW

Table 3: Absolute Ratings (limiting values, per diode)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			170	V
$I_{F(RMS)}$	RMS forward current			60	A
$I_{F(AV)}$	Average forward current	T_c = 150 °C δ = 0.5	Per diode Per device	20 40	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		250	A
P_{ARM}	Repetitive peak avalanche power	t_p = 1 µs T_j = 25 °C		14100	W
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature *			175	°C
dV/dt	Critical rate of rise of reverse voltage			10000	V/µs

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

Table 4: Thermal Parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode Total	1.2 0.85	°C/W
$R_{th(c)}$		Coupling	0.5	

When the diodes 1 and 2 are used simultaneously:

Δ Tj(diode 1) = P(diode 1) x $R_{th(j-c)}$(Per diode) + P(diode 2) x $R_{th(c)}$

Table 5: Static Electrical Characteristics (per diode)

Symbol	Parameter	Tests conditions		Min.	Typ	Max.	Unit
I_R *	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			30	µA
		T_j = 125 °C			7	30	mA
V_F **	Forward voltage drop	T_j = 25 °C	I_F = 20A			0.92	V
		T_j = 125 °C			0.69	0.75	
		T_j = 25 °C	I_F = 40A			1.00	
		T_j = 125 °C			0.79	0.86	

Pulse test: * tp = 5 ms, δ < 2%

** tp = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation: P = 0.64 x $I_{F(AV)}$ + 0.055 I_F^2(RMS)

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

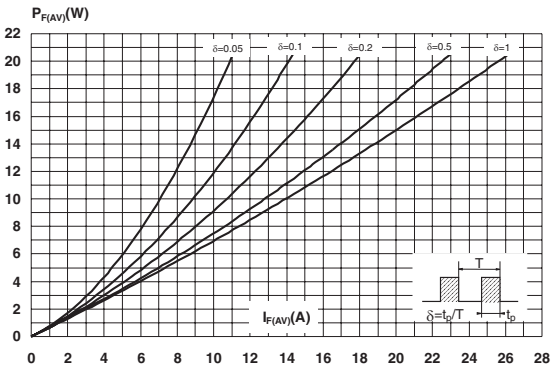


Figure 2: Average forward current versus ambient temperature (δ = 0.5, per diode)

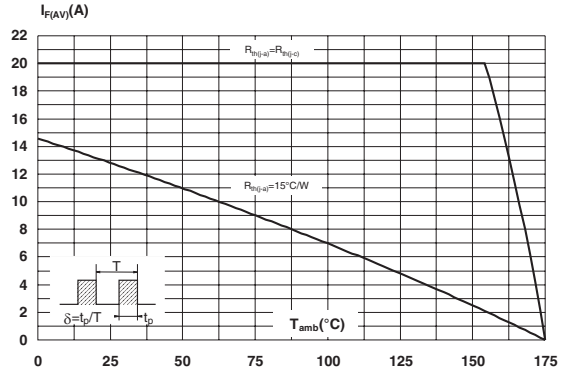


Figure 3: Normalized avalanche power derating versus pulse duration

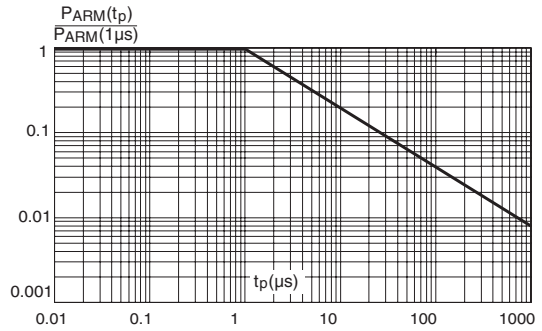


Figure 4: Normalized avalanche power derating versus junction temperature

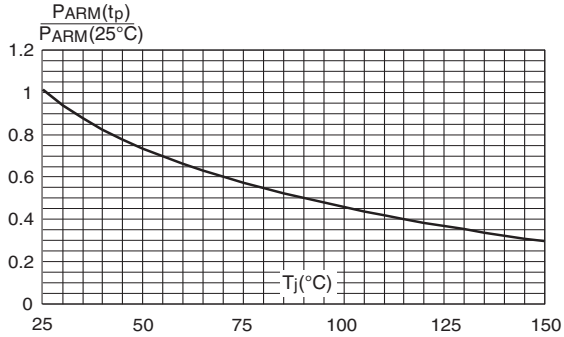


Figure 5: Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

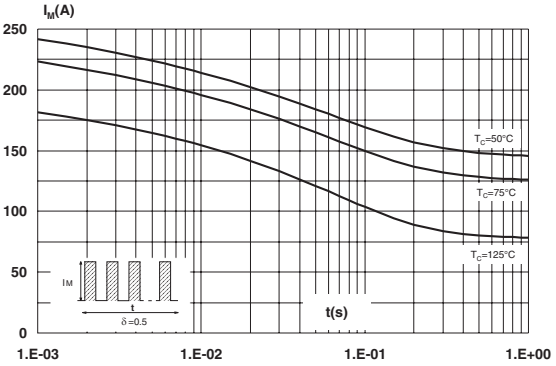


Figure 6: Relative variation of thermal impedance junction to case versus pulse duration

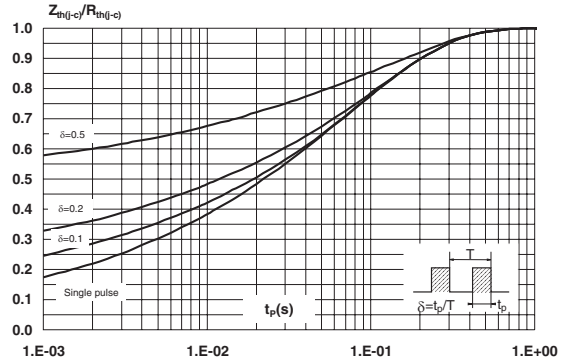
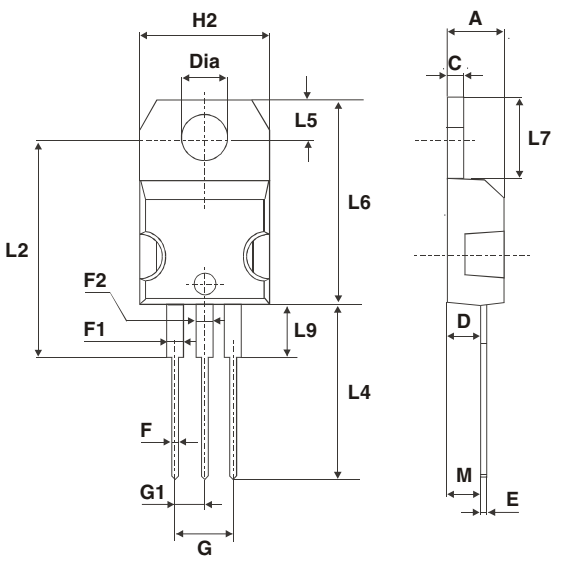


Figure 15: TO-220AB Package Mechanical Data



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
F2	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
G1	2.40	2.70	0.094	0.106
H2	10	10.40	0.393	0.409
L2	16.4 typ.		0.645 typ.	
L4	13	14	0.511	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.20	6.60	0.244	0.259
L9	3.50	3.93	0.137	0.154
M	2.6 typ.		0.102 typ.	
Diam.	3.75	3.85	0.147	0.151

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

Table 6: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS40170CT	STPS40170CT	TO-220AB	2.20 g	50	Tube
STPS40170CG	STPS40170CG	D^2PAK	1.48 g	50	Tube
STPS40170CG-TR	STPS40170CG			1000	Tape & reel
STPS40170CW	STPS40170CW	TO-247	4.4 g	30	Tube

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- TO-220 - Recommended torque value: 0.55 Nm, Maximum torque value: 0.7 Nm.
- TO-247 - Recommended torque value: 0.8 Nm, Maximum torque value: 1.0 Nm.