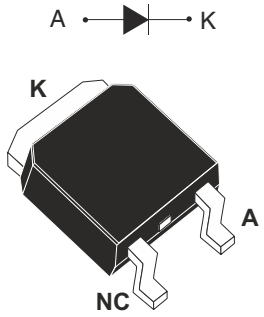
STPSC6H12

1200 V power Schottky silicon carbide diode

Datasheet - production data



DPAK HV 2L
STPSC6H12B-TR1

Features

- High frequency free-wheel / boost diode
- Robust high-voltage periphery
- Ultrafast high voltage switching independent of temperature

Description

ST's 1200 V high-performance rectifier is specifically designed to be used in photo-voltaic inverters or in applications where negligible switching losses are required.

The STPSC6H12 helps to increase the application efficiency yield by up to 2% thanks to its ability to work at high frequency whatever the temperature.

The central lead of the DPAK package is removed to meet the IEC60664 and UL 840 standards requirements for a higher voltage.

These characteristics make it the best-in-class 1200 V diode.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	6 A
V_{RRM}	1200 V
T_j (max)	175 °C
V_F (6 A, 25 °C) typ.	1.55 V
C_j (300 V) typ.	30 pF

1 Characteristics

Table 2. Absolute ratings (limiting values at 25 °C unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		1200	V
$I_{F(RMS)}$	Forward rms current		11	A
$I_{F(AV)}$	Average forward current	T_c = 125 °C, δ = 0.5	6	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal, T_a = 25 °C t_p = 10 ms sinusoidal, T_a = 150 °C t_p = 10 µs square, T_a = 25 °C	36 30 100	A
I_{FRM}	Repetitive peak forward current	δ = 0.1, T_c = 125 °C	28	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature range(1)		-40 to +175	°C

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

Table 3. Thermal resistance

Symbol	Parameter	Typ.	Max.	Unit
$R_{th(j-c)}$	Junction to case	1.3	1.9	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-	100	400	µA
		T_j = 150 °C		-	0.65	1.5	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 6 A	-	1.55	1.9	V
		T_j = 150 °C		-	2.05	2.6	

1. t_p = 10 ms, δ < 2%
2. t_p = 500 µs, δ < 2%

To evaluate the conduction losses use the following equation:

$P = 0.89 \times I_{F(AV)} + 0.285 \times I_F{}^2{}_{(RMS)}$

Table 5. Dynamic electrical characteristics

Symbol	Parameter	Test conditions	Typ.	Unit
Q_{cj}(1)	Total capacitive charge	V_R = 800 V	29	nC
C_j	Total capacitance	V_R = 0 V, T_c = 25 °C, F = 1 MHz	330	pF
		V_R = 300 V, T_c = 25 °C, F = 1 MHz	30	

1. Most accurate value for the capacitive charge: $Q_{cj} = \int_0^{V_{OUT}} c_j(v_R).dv_R$

Figure 1. Forward voltage drop versus forward current (typical values)

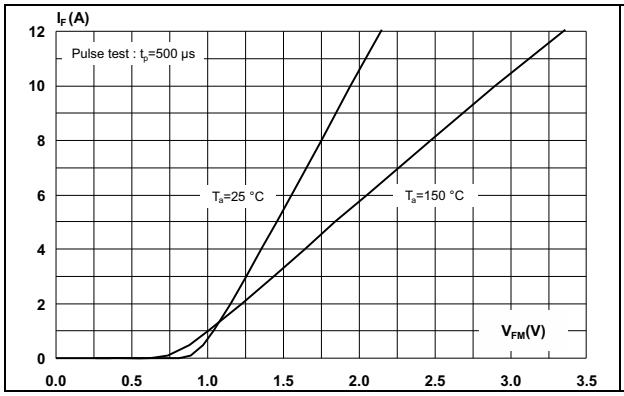


Figure 2. Reverse leakage current versus reverse voltage applied (typical values)

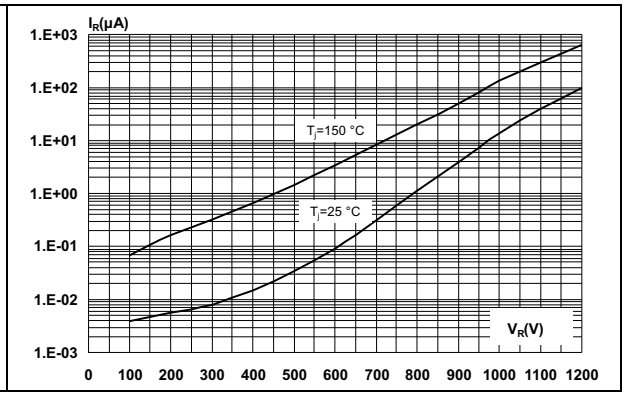


Figure 3. Peak forward current versus case temperature

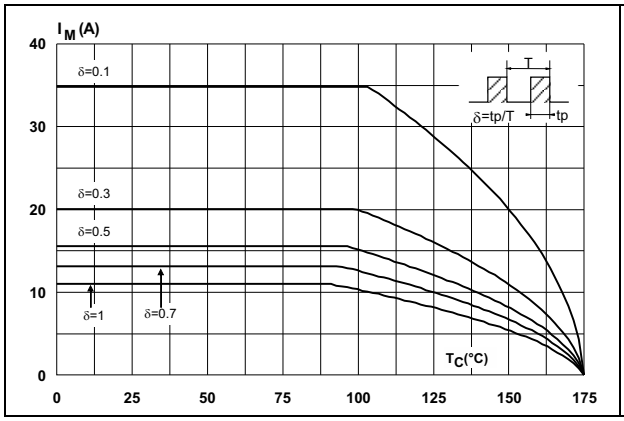


Figure 4. Junction capacitance versus reverse voltage applied (typical values)

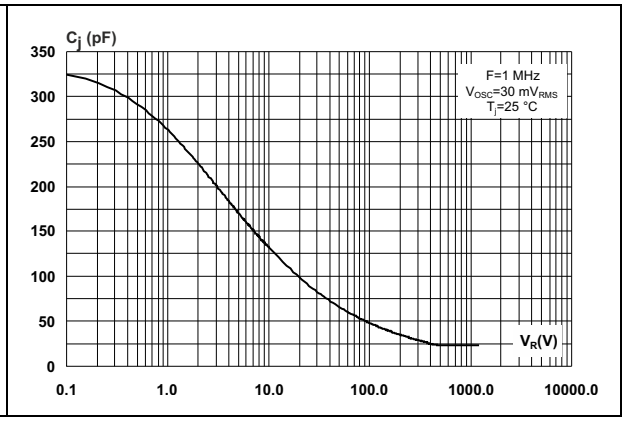


Figure 5. Relative variation of thermal impedance junction to case versus pulse duration

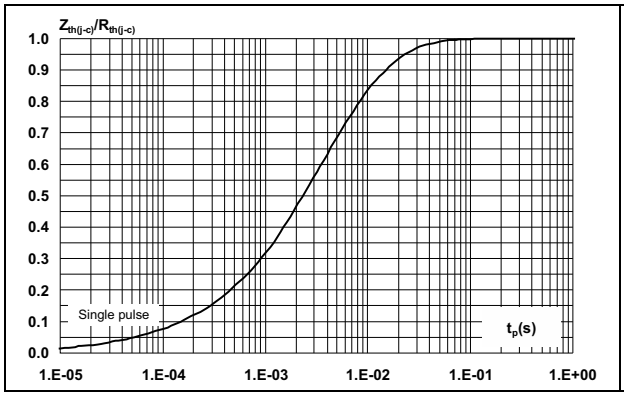


Figure 6. Non-repetitive peak surge forward current versus pulse duration (sinusoidal waveform)

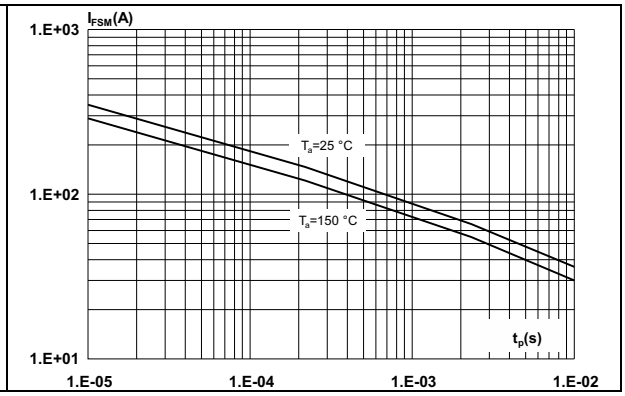
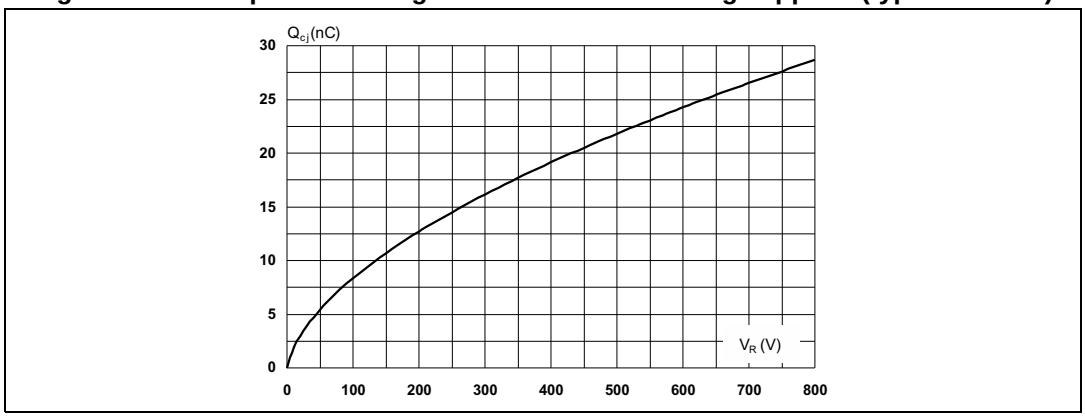


Figure 7. Total capacitive charges versus reverse voltage applied (typical values)



2 Package information

- Epoxy meets UL94, V0
- Lead-free package

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.

Figure 8. DPAK HV 2L dimension definitions

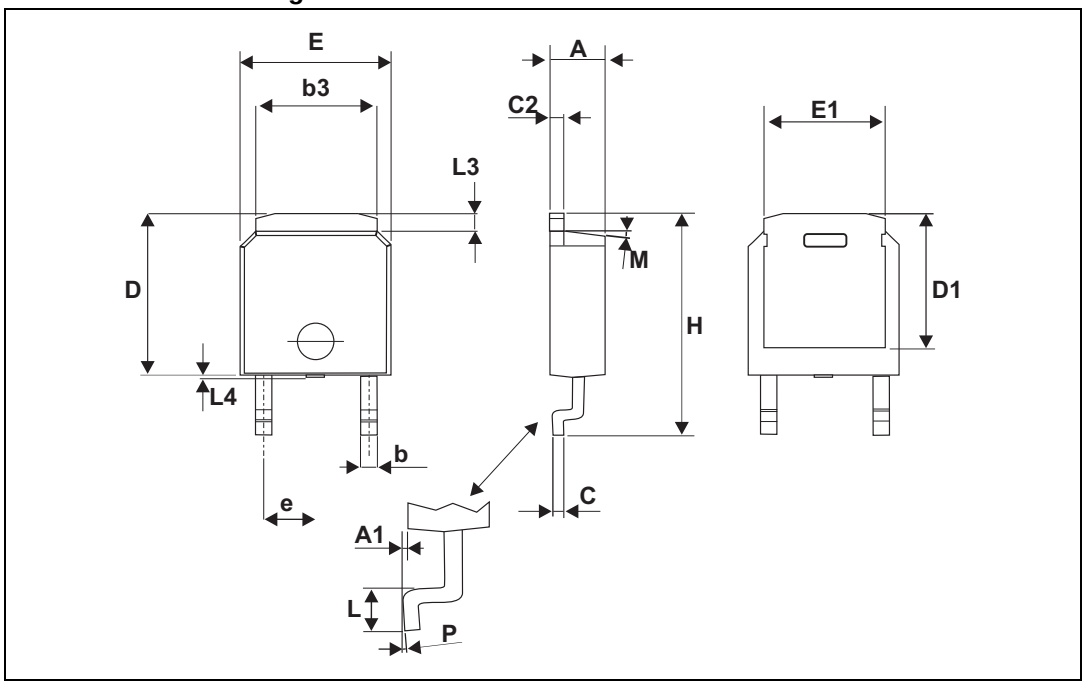
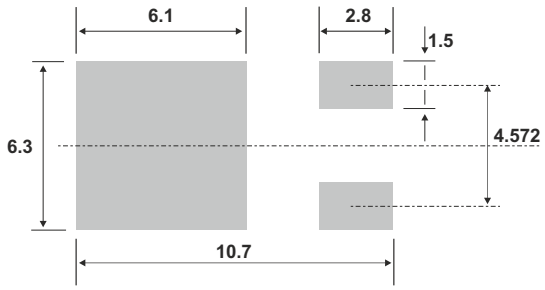


Table 6. DPAK HV 2L dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.16	2.29	2.40	0.085	0.090	0.094
A1	0.06	0.08	0.13	0.002	0.003	0.005
b	0.71	0.76	1.07	0.028	0.029	0.030
b3	5.004	5.10	5.21	0.197	0.201	0.205
c	0.46	0.51	0.56	0.018	0.020	0.025
c2	0.76	0.81	0.86	0.029	0.032	0.034
D	5.97	6.10	6.22	0.235	0.240	0.245
D1	5.84 REF			0.230 REF		
E	6.48	6.60	6.73	0.255	0.260	0.265
E1	4.95	5.08	5.21	0.195	0.200	0.205
e	2.29 REF			0.90 REF		
H	9.70	9.83	10.08	0.382	0.387	0.397
L	1.02	1.14	1.40	0.040	0.045	0.055
L3			1.14			0.045
L4(1)	0.000		0.15	0.000		0.006
M		7°			7°	
P			5°			5°

1. Maximum plastic protrusion

Figure 9. Footprint (dimensions in mm)



3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPSC6H12B-TR1	STPSC 6H12B	DPAK HV 2L	0.368g	2500	Tape and reel

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
02-Aug-2013	1	First issue.
05-Aug-2013	2	Corrected typographical error in *Table 7*.

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