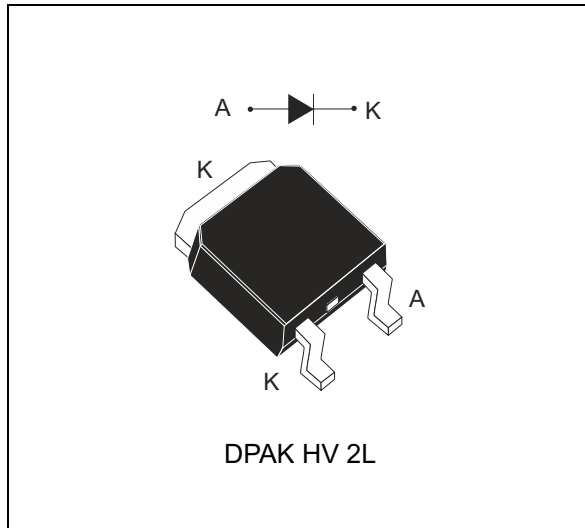


## 1200 V power Schottky silicon carbide diode

Datasheet - production data



### 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.

### Features

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

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	$T_C = 125\text{ °C}, \delta = 0.5$	6	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}, T_a = 25\text{ °C}$	36	A
		$t_p = 10\text{ ms sinusoidal}, T_a = 150\text{ °C}$	30	
		$t_p = 10\text{ }\mu\text{s square}, T_a = 25\text{ °C}$	100	
$I_{FRM}$	Repetitive peak forward current	$\delta = 0.1, T_C = 125\text{ °C}$	28	A
$T_{stg}$	Storage temperature range		-65 to +175	°C
$T_j$	Operating junction temperature range <sup>(1)</sup>		-40 to +175	°C

1.  $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  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	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-	100	400	$\mu\text{A}$
		$T_j = 150\text{ °C}$		-	0.65	1.5	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 6\text{ A}$	-	1.55	1.9	V
		$T_j = 150\text{ °C}$		-	2.05	2.6	

1.  $t_p = 10\text{ ms}, \delta < 2\%$

2.  $t_p = 500\text{ }\mu\text{s}, \delta < 2\%$

To evaluate the conduction losses use the following equation:

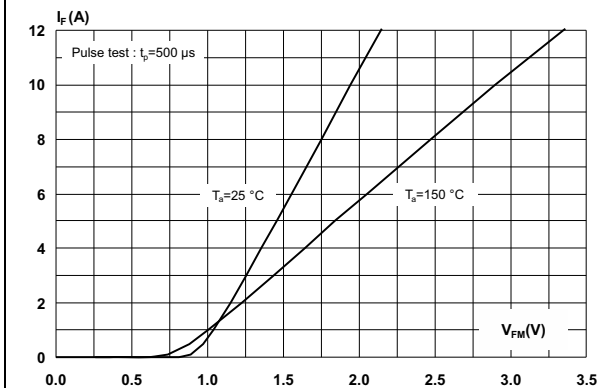
$$P = 0.89 \times I_{F(AV)} + 0.285 \times I_{F(RMS)}^2$$

**Table 5. Dynamic electrical characteristics**

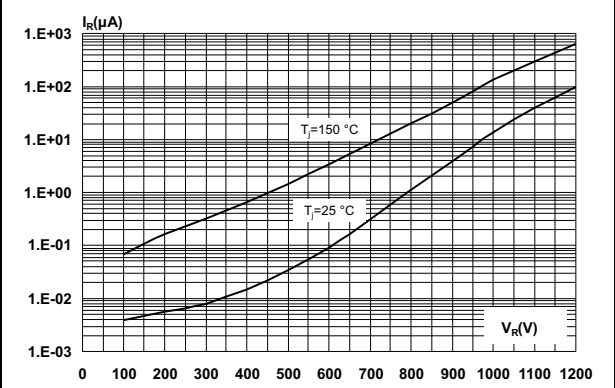
Symbol	Parameter	Test conditions	Typ.	Unit
$Q_{cj}^{(1)}$	Total capacitive charge	$V_R = 800\text{ V}$	29	nC
$C_j$	Total capacitance	$V_R = 0\text{ V}, T_C = 25\text{ °C}, F = 1\text{ MHz}$	330	pF
		$V_R = 300\text{ V}, T_C = 25\text{ °C}, F = 1\text{ MHz}$	30	

1. Most accurate value for the capacitive charge:  $Q_{cj} = \int_0^{V_{OUT}} C_j(V_R).dV_R$

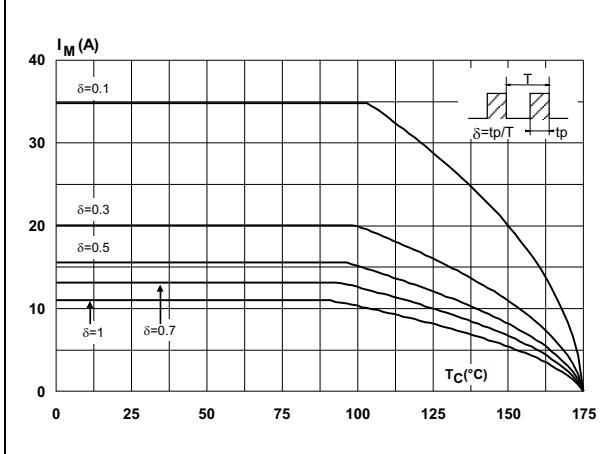
**Figure 1. Forward voltage drop versus forward current (typical values)**



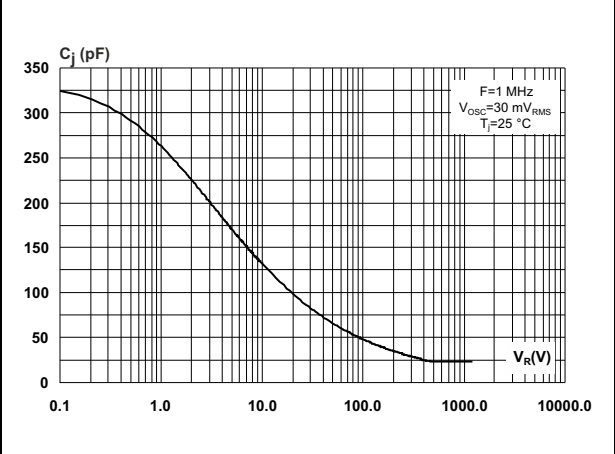
**Figure 2. Reverse leakage current versus reverse voltage applied (typical values)**



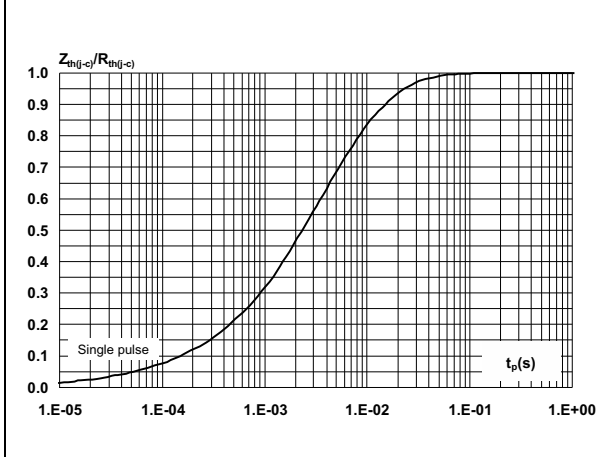
**Figure 3. Peak forward current versus case temperature**



**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)**

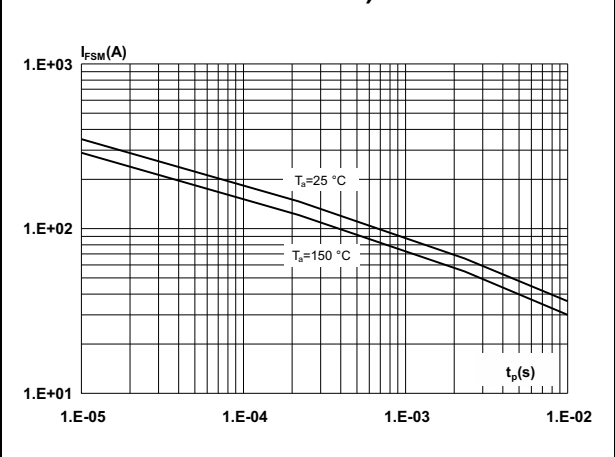
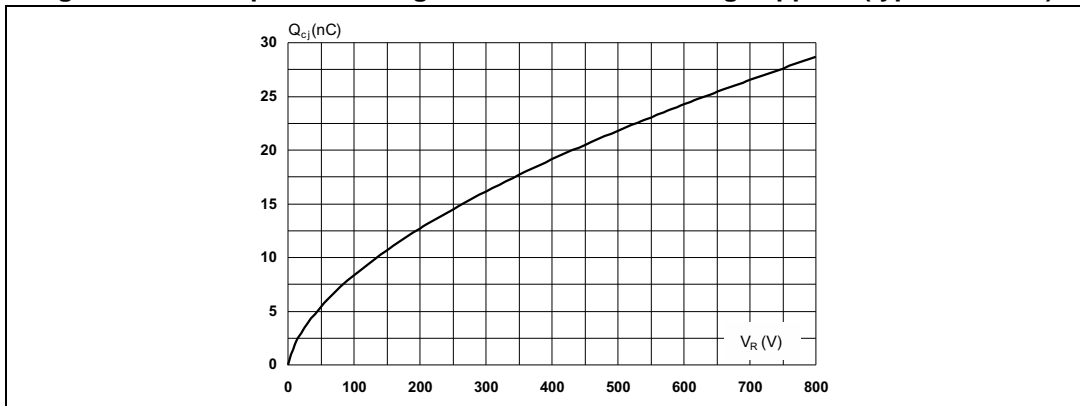


Figure 7. Total capacitive charges versus reverse voltage applied (typical values)



## 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<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

### 2.1 DPAK HV 2L package information

Figure 8. DPAK HV 2L package outline

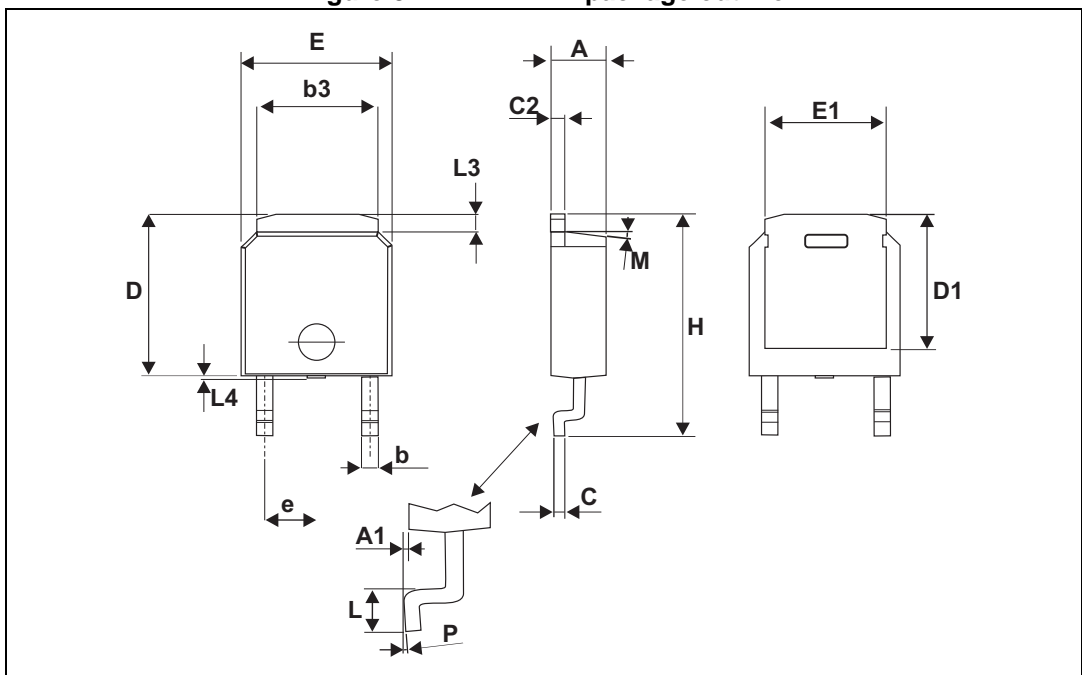
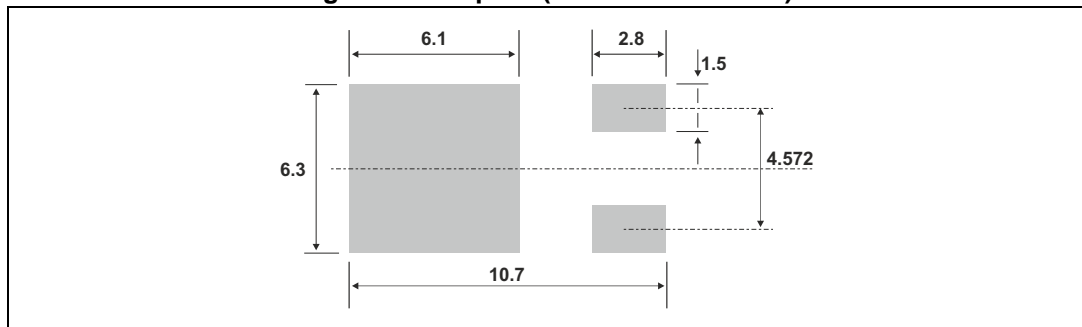


Table 6. DPAK HV 2L package mechanical data

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 <sup>(1)</sup>	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 6H12	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 <a href="#">Table 7</a> .
13-Mar-2015	3	Updated marking information in <a href="#">Table 7: Ordering information</a> .
06-May-2015	4	Updated cover page. Format updated to current standard.

**IMPORTANT NOTICE – PLEASE READ CAREFULLY**

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2015 STMicroelectronics – All rights reserved