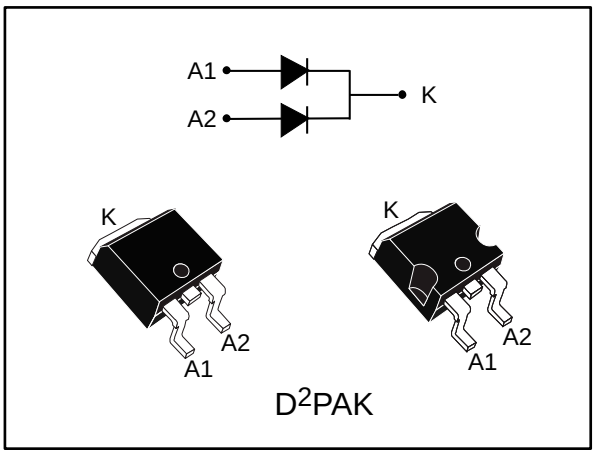
STTH1302

High efficiency ultrafast diode

Datasheet - production data



D²PAK

Features

- Suited for SMPS
- Low losses
- Low forward and reverse recovery time
- High surge current capability
- High junction temperature
- ECOPACK®2 compliant component for D²PAK on demand

Description

Dual center tap rectifier suited for switch mode power supplies and high frequency DC to DC converters.
This device is especially intended for use in low voltage, high frequency inverters, freewheeling and polarity protection applications.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	2 x 6.5 A
V_{RRM}	200 V
T_j (max)	175 °C
V_F (typ)	0.81 V
t_{rr} (typ)	16 ns

This is information on a product in full production.

1 Characteristics

Table 2: Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			200	V
$I_{F(RMS)}$	Forward rms current			20	A
$I_{F(peak)}$	Average forward current δ = 0.5, square wave	T_C = 155 °C	Per diode	6.5	A
		T_C = 145 °C	Per device	13	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		70	A
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature			175	°C

Table 3: Thermal parameter

Symbol	Parameter		Max. value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	3	°C/W
		Total	1.9	
$R_{th(c)}$	Coupling		0.8	°C/W

When the diodes 1 and 2 are used simultaneously:

$\Delta T_{j(diode1)} = P_{(diode1)} \times R_{th(j-c)\ (per\ diode)} + P_{(diode2)} \times R_{th(c)}$

Table 4: Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		6	µA
		T_j = 125 °C		-	3	60	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 6.5 A	-		1.10	V
		T_j = 125 °C		-	0.81	0.95	
		T_j = 25 °C	I_F = 13 A	-		1.25	
		T_j = 125 °C		-	0.95	1.10	

Notes:

(1)Pulse test: t_p = 5 ms, δ < 2%

(2)Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses, use the following equation:

$P = 0.80 \times I_{F(AV)} + 0.023 \times I_{F}{}^{2}{}_{(RMS)}$

Table 5: Dynamic electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 0.5 A, I_{rr} = 0.25 A, I_R = 1 A	-	16	25	ns
t_{fr}	Forward recovery time		I_F = 6.5 A, dI_F/dt = 100 A/µs , V_{FR} = 1.1 x V_{Fmax},	-	70		ns
V_{FP}	Forward recovery voltage		I_F = 6.5 A, dI_F/dt = 100 A/µs	-	2.2		V

1.1 Characteristics (curves)

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

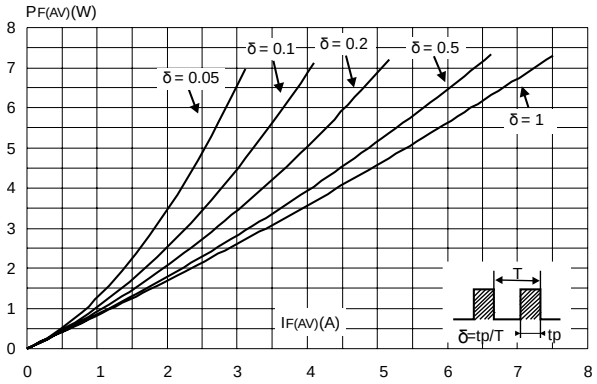


Figure 2: Peak current versus duty cycle (per diode)

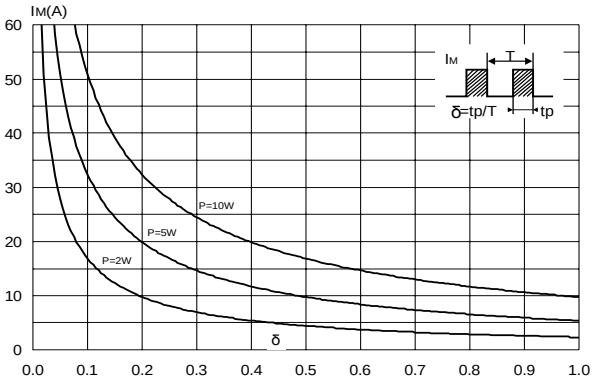


Figure 3: Forward voltage drop versus forward current (per diode)

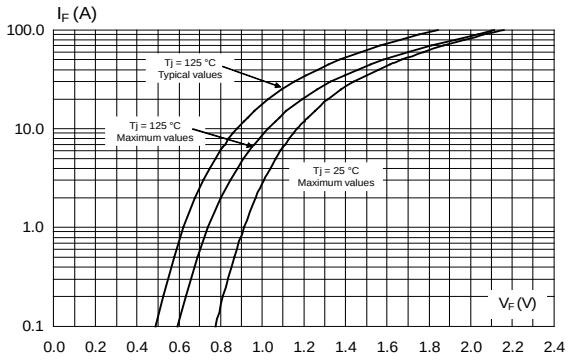


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration

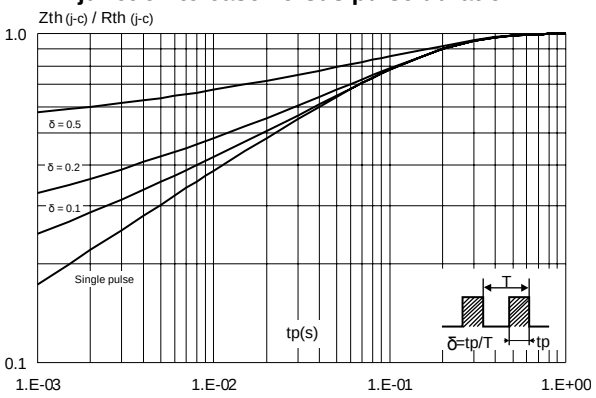


Figure 5: Average forward current versus ambient temperature (δ = 0.5, per diode)

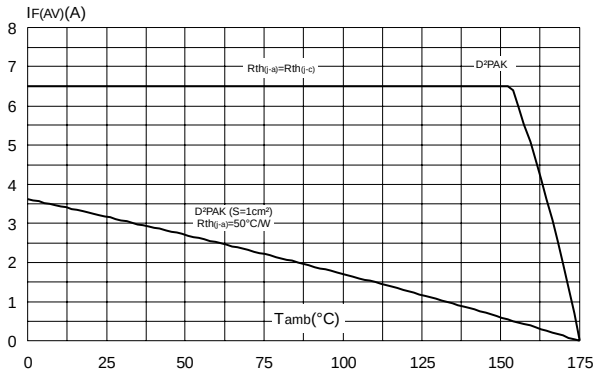


Figure 6: Junction capacitance versus reverse voltage applied (typical values, per diode)

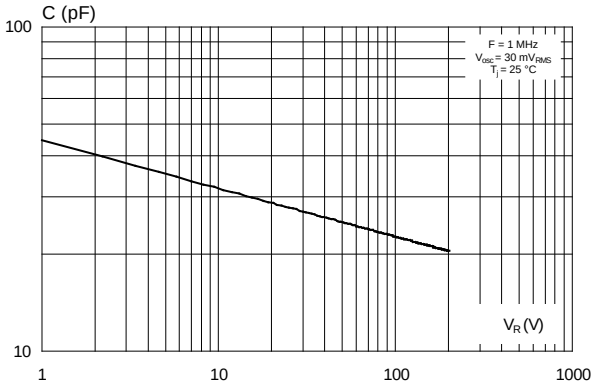


Figure 7: Reverse recovery charges versus dI_F/dt (typical values, per diode)

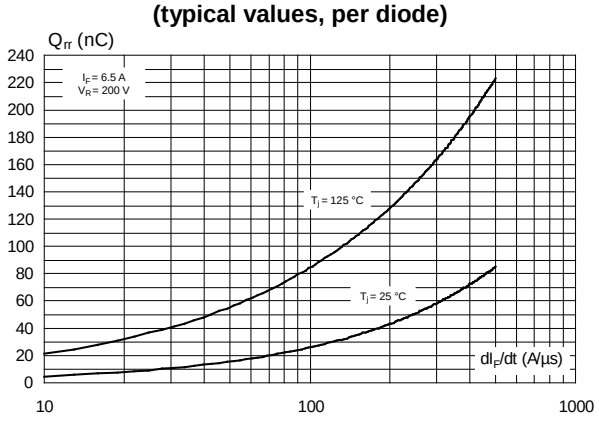


Figure 8: Reverse recovery time versus dI_F/dt (typical values, per diode)

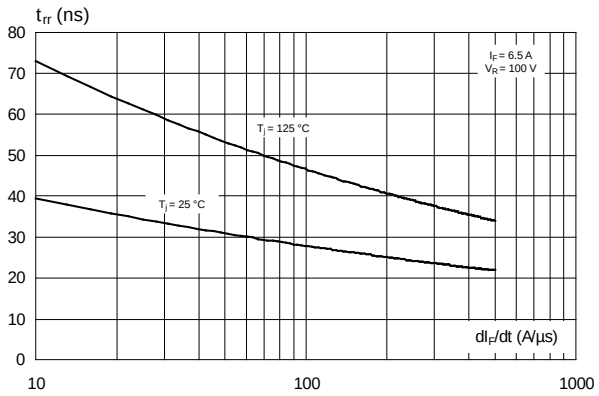


Figure 9: Peak reverse recovery current versus dI_F/dt (typical values, per diode)

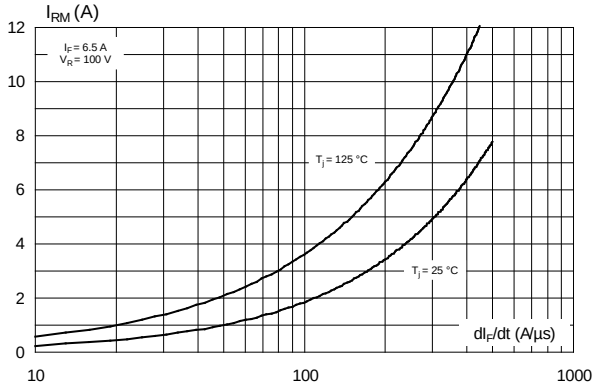


Figure 10: Relative variation of dynamic parameters versus junction temperature

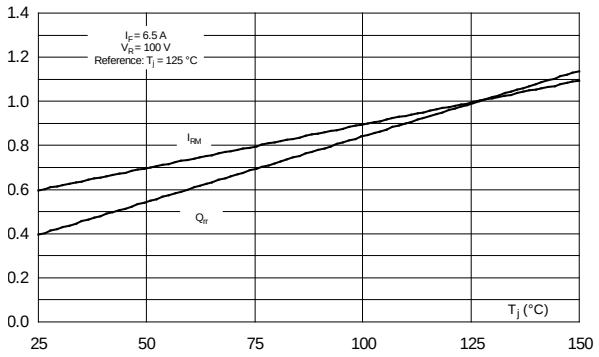
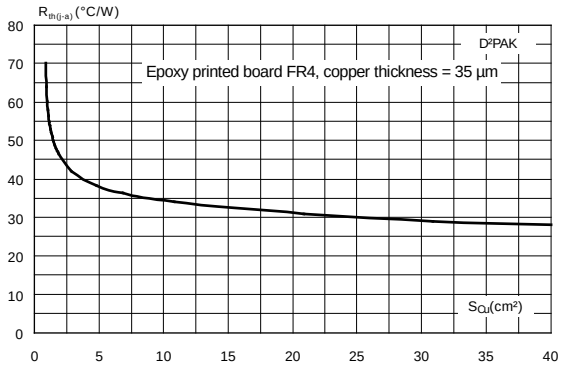


Figure 11: Thermal resistance junction to ambient versus copper surface under tab



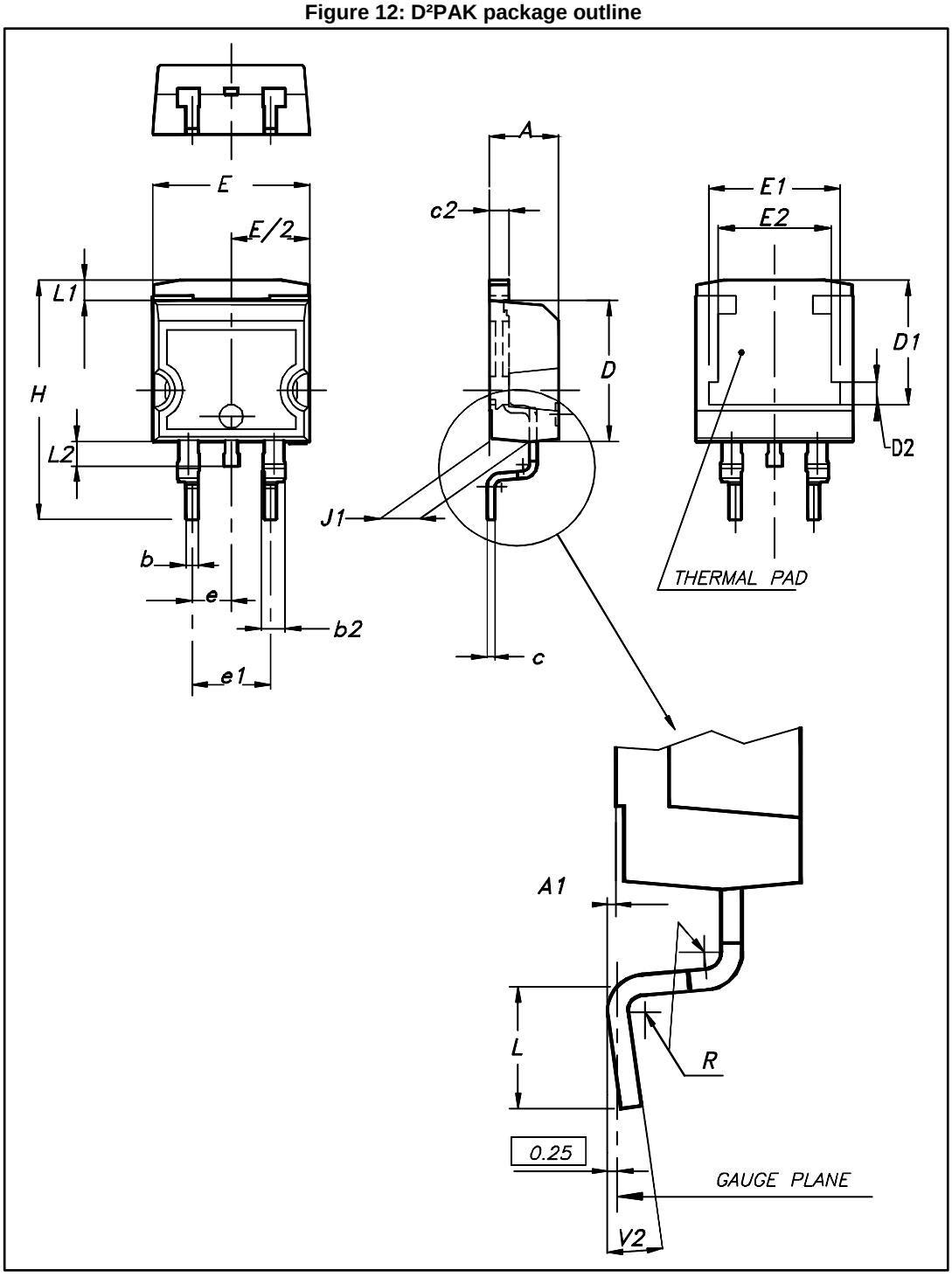
2 Package information

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.

- Cooling method: by conduction (C)
- Epoxy meets UL94,V0

2.1 D²PAK package information

Figure 12: D²PAK package outline

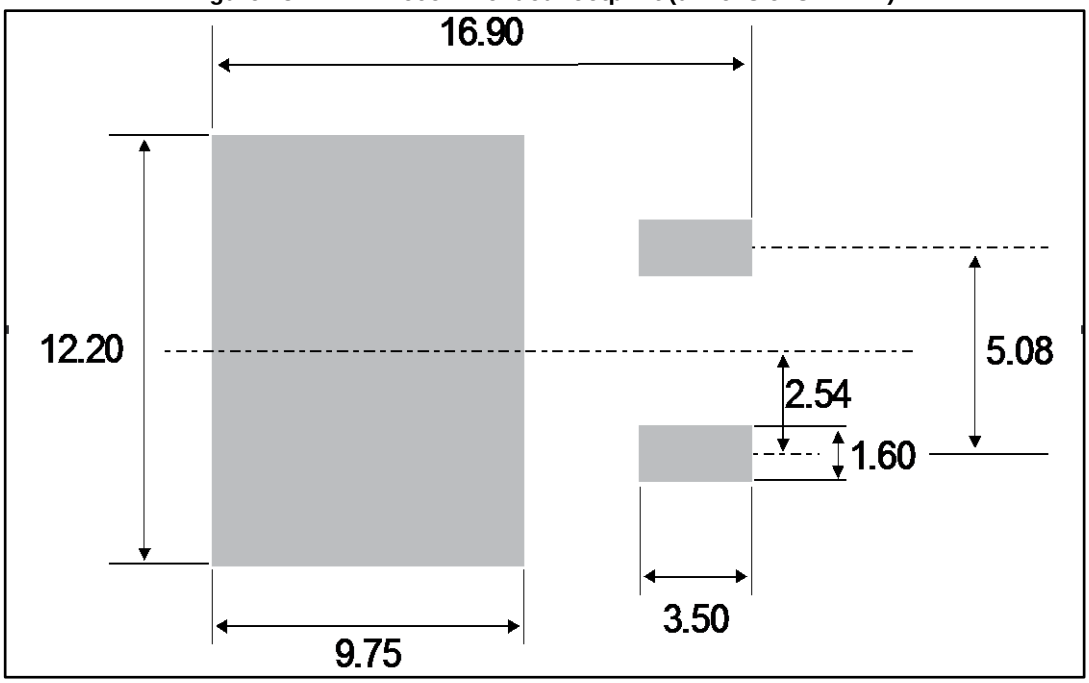


This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 6: D²PAK package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.36	4.60	0.172	0.181
A1	0.00	0.25	0.000	0.010
b	0.70	0.93	0.028	0.037
b2	1.14	1.70	0.045	0.067
c	0.38	0.69	0.015	0.027
c2	1.19	1.36	0.047	0.053
D	8.60	9.35	0.339	0.368
D1	6.90	8.00	0.272	0.311
D2	1.10	1.50	0.043	0.060
E	10.00	10.55	0.394	0.415
E1	8.10	8.90	0.319	0.346
E2	6.85	7.25	0.266	0.282
e	2.54 typ.		0.100	
e1	4.88	5.28	0.190	0.205
H	15.00	15.85	0.591	0.624
J1	2.49	2.90	0.097	0.112
L	1.90	2.79	0.075	0.110
L1	1.27	1.65	0.049	0.065
L2	1.30	1.78	0.050	0.070
R	0.4 typ.		0.015	
V2	0°	8°	0°	8°

Figure 13: D²PAK recommended footprint (dimensions in mm)



3 Ordering information

Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH1302CG-TR	STTH1302CG	D^2PAK	1.38 g	1000	Tape and reel

4 Revision history

Table 8: Document revision history

Date	Revision	Changes
27-Jun-2012	3	Initial version, previously mentioned as revision 2A.
21-Aug-2017	4	Updated features, package silhouette and *Table 1: "Device summary"* in cover page. Updated *Section 1: "Characteristics"*, *Section 1.1: "Characteristics (curves)"*, *Section 2: "Package information"* and *Table 7: "Ordering information"*.

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