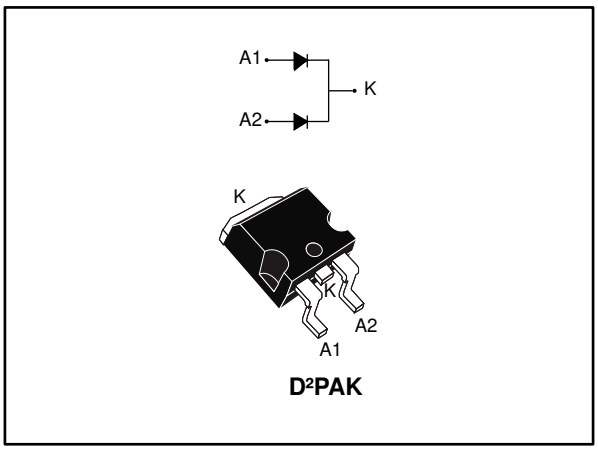
STTH1602C-Y

Automotive high efficiency ultrafast diode

Datasheet - production data



D²PAK

Features

- AEC-Q101 qualified
- Low losses
- Low forward and reverse recovery time
- Low leakage current
- High junction temperature
- V_{RRM} guaranteed from -40 to +175 °C
- PPAP capable

Description

Dual center tap rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in D²PAK, this device is especially intended for use in low voltage, high frequency inverters, freewheeling and polarity protection applications for automotive applications.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	2 x 8 A
V_{RRM}	200 V
T_j (max.)	175 °C
V_F (typ.)	0.78 V
t_{rr} (typ.)	21 ns

This is information on a product in full production.

www.st.com

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 (T_j = -40 to +175 °C)			200	V
$I_{F(RMS)}$	Forward rms current			26	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	T_C = 150 °C	Per diode	8	A
		T_C = 140 °C	Per device	16	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		100	A
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature range			-40 to +175	°C

Table 3: Thermal parameter

Symbol	Parameter		Max. value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	2.7	°C/W
		Per device	1.6	
$R_{th(c)}$	Coupling		0.5	°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		-	4	60	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 8 A	-		1.10	V
		T_j = 150 °C		-	0.78	0.90	
		T_j = 25 °C	I_F = 16 A	-		1.25	
		T_j = 150 °C		-		1.05	

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:

$P = 0.75 \times I_{F(AV)} + 0.01875 \times I_{F^2(RMS)}$

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 = 1 A, V_R = 30 V, dI_F/dt = 100 A/µs	-	21	26	ns
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 8 A, V_R = 160 V, dI_F/dt = 200 A/µs	-	8	10	A

1.1 Characteristics (curves)

Figure 1: Average forward power dissipation versus average forward current (square waveform)

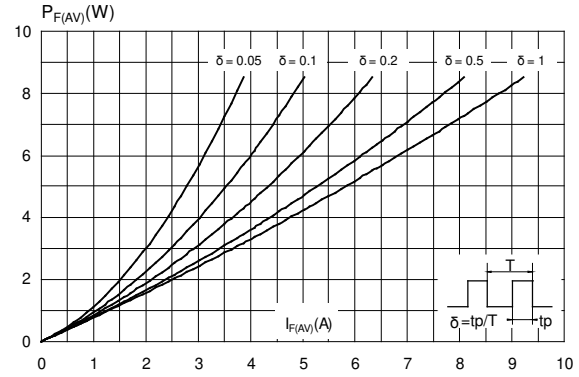


Figure 2: Forward voltage drop versus forward current (typical values)

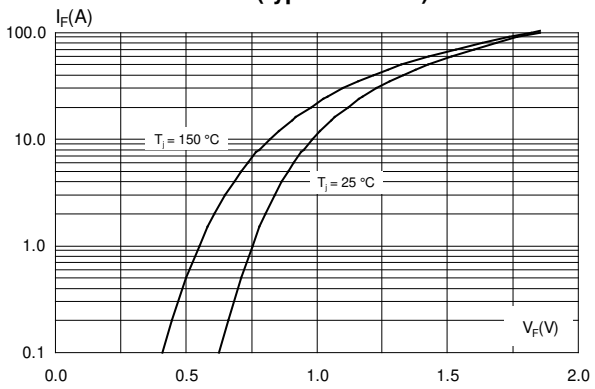


Figure 3: Forward voltage drop versus forward current (maximum values)

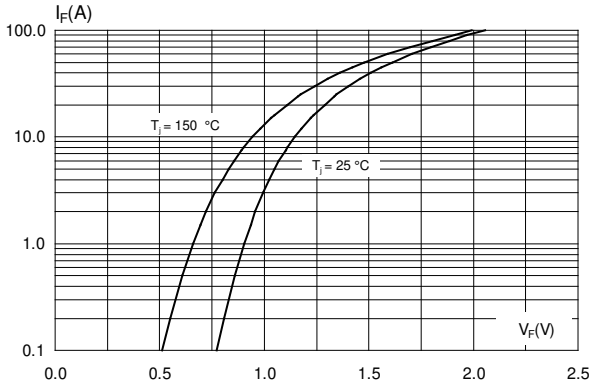


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration

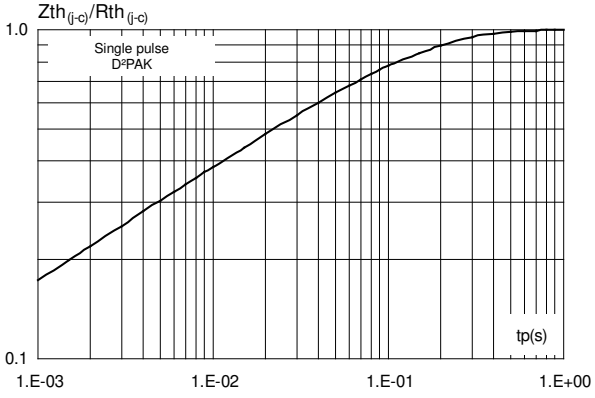


Figure 5: Junction capacitance versus reverse voltage applied (typical values, per diode)

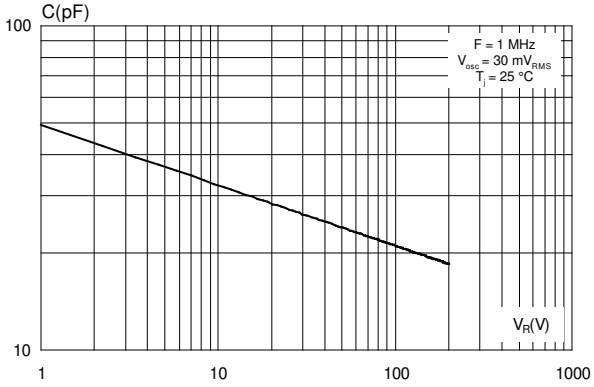


Figure 6: Reverse recovery charges versus dI_F/dt (typical values, per diode)

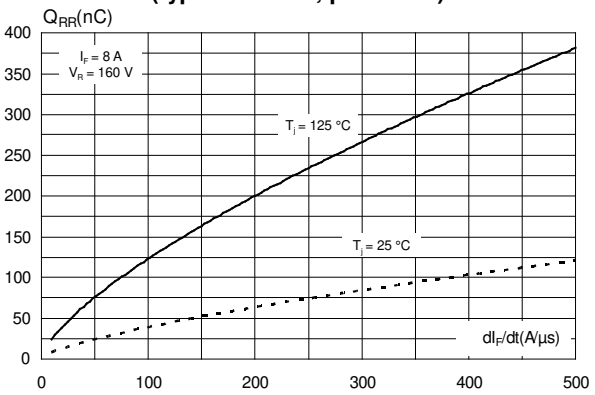


Figure 7: Reverse recovery time versus dI_F/dt (typical values, per diode)

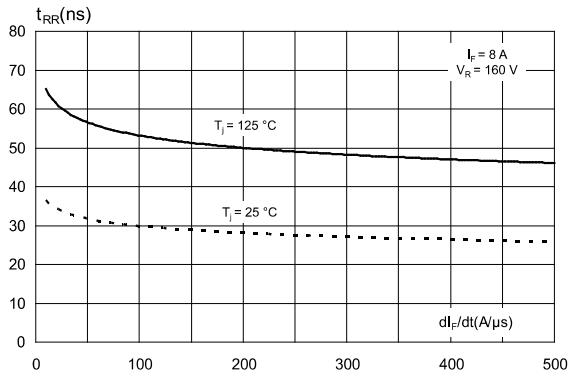


Figure 8: Peak reverse recovery current versus dI_F/dt (typical values, per diode)

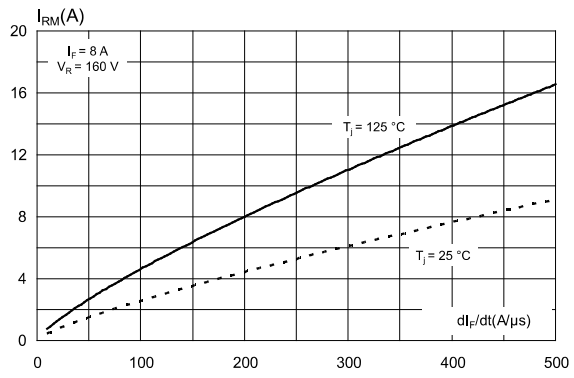


Figure 9: Softness factor versus dI_F/dt (typical values, per diode)

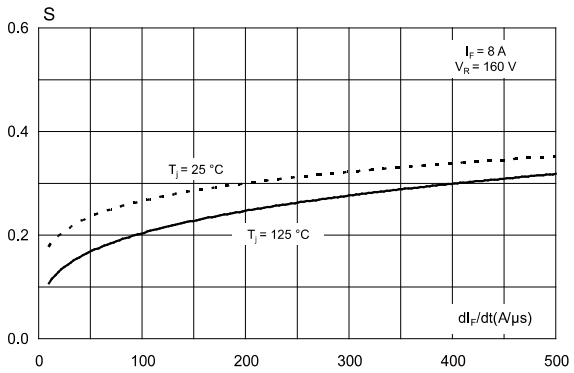


Figure 10: Dynamic parameters versus junction temperature

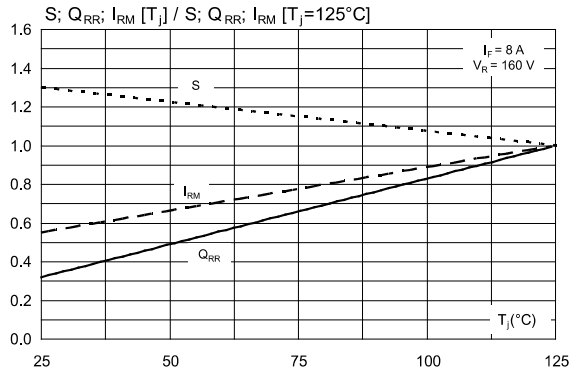
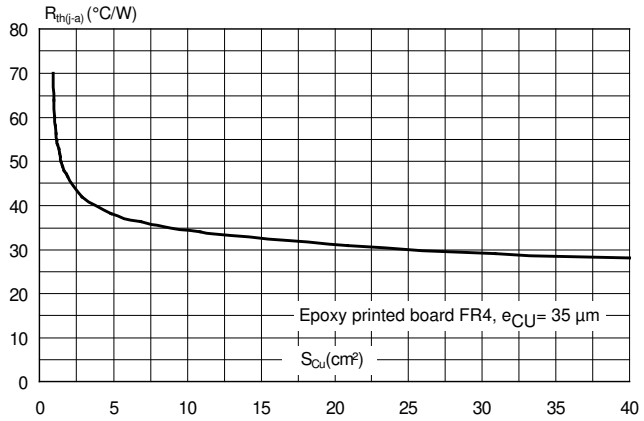


Figure 11: Thermal resistance junction to ambient versus copper surface under tab



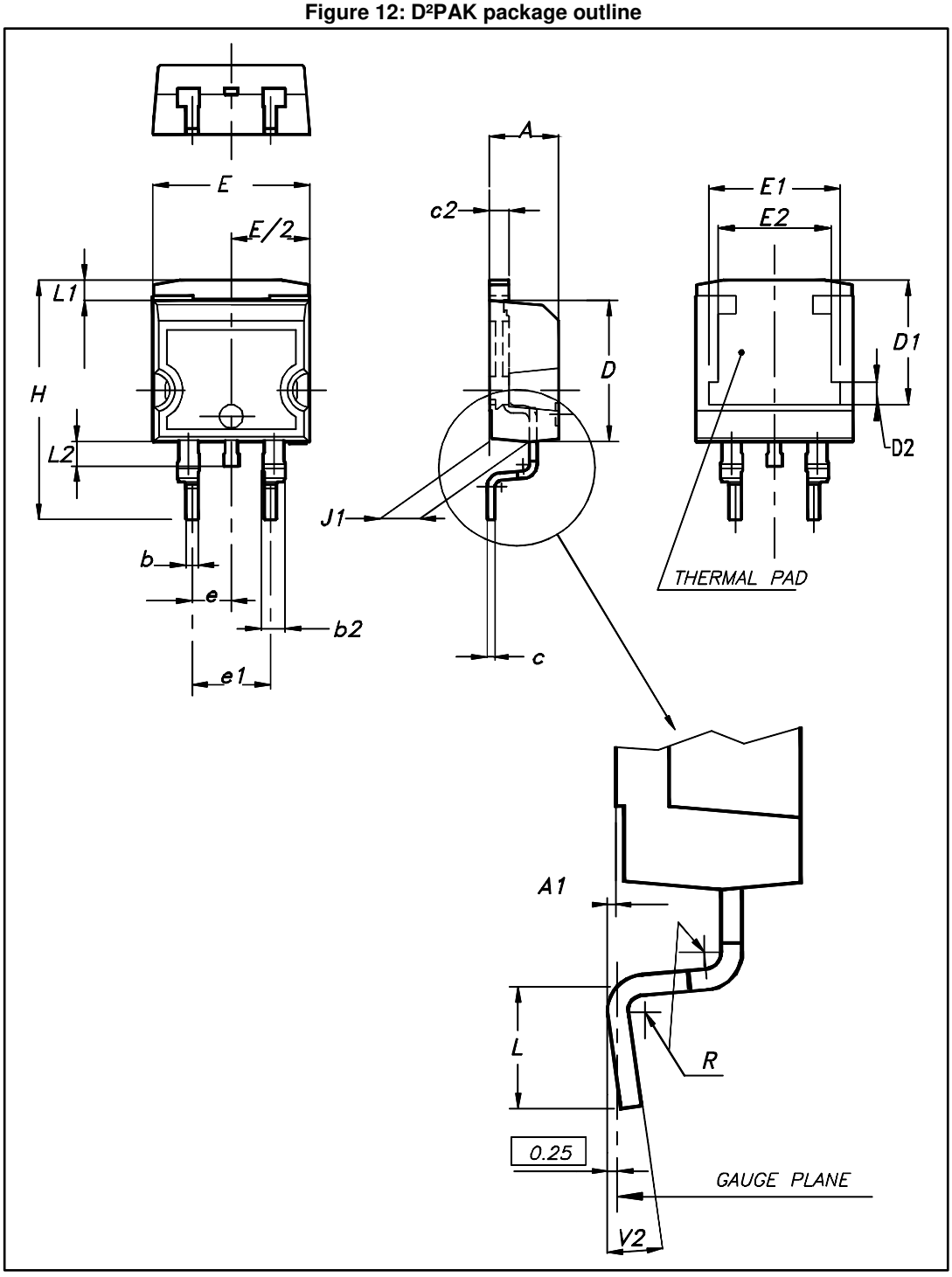
2 Package information

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

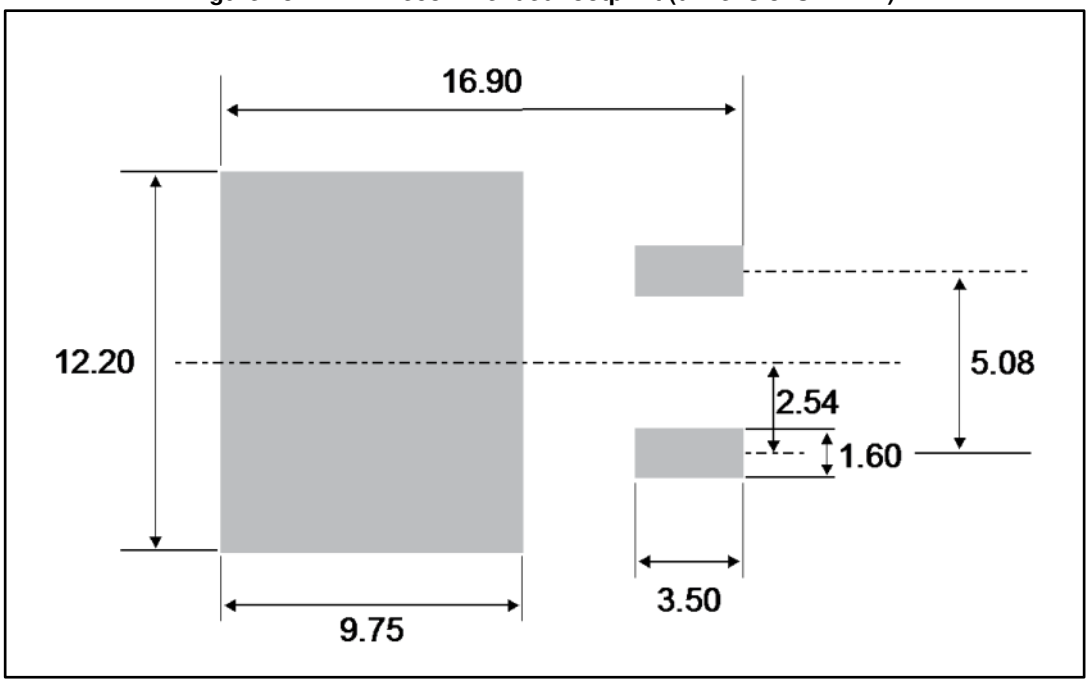


This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

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
STTH1602CGY-TR	STTH1602CGY	D^2PAK	1.48 g	1000	Tape and reel

4 Revision history

Table 8: Document revision history

Date	Revision	Changes
04-Dec-2017	1	Initial release.

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