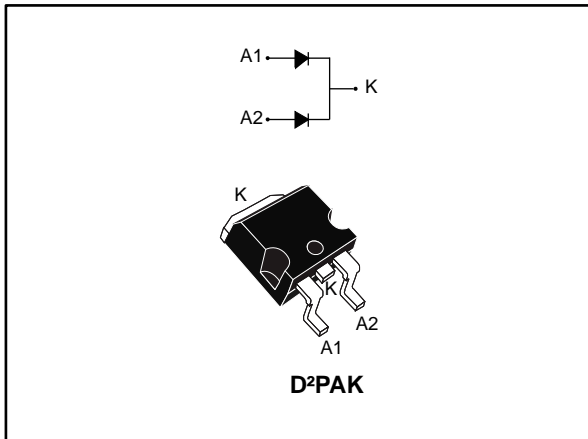


## Automotive high efficiency ultrafast diode

Datasheet - production data



### Description

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

Packaged in D<sup>2</sup>PAK, 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

### 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



# 1 Characteristics

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

Symbol	Parameter		Value	Unit	
V <sub>RRM</sub>	Repetitive peak reverse voltage (T <sub>j</sub> = -40 to +175 °C)		200	V	
I <sub>F(RMS)</sub>	Forward rms current		26	A	
I <sub>F(AV)</sub>	Average forward current $\delta = 0.5$ , square wave	T <sub>C</sub> = 150 °C	Per diode	8	A
		T <sub>C</sub> = 140 °C	Per device	16	
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms sinusoidal		100	A
T <sub>stg</sub>	Storage temperature range		-65 to +175	°C	
T <sub>j</sub>	Maximum operating junction temperature range		-40 to +175	°C	

**Table 3: Thermal parameter**

Symbol	Parameter		Max. value	Unit
R <sub>th(j-c)</sub>	Junction to case	Per diode	2.7	°C/W
		Per device	1.6	
R <sub>th(c)</sub>	Coupling		0.5	°C/W

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_{j(\text{diode}1)} = P_{(\text{diode}1)} \times R_{th(j-c)} (\text{per diode}) + P_{(\text{diode}2)} \times R_{th(c)}$$

**Table 4: Static electrical characteristics (per diode)**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>RRM</sub>	-		6	μA
		T <sub>j</sub> = 125 °C		-	4	60	
V <sub>F</sub> <sup>(2)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 8 A	-		1.10	V
		T <sub>j</sub> = 150 °C		-	0.78	0.90	
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 16 A	-		1.25	
		T <sub>j</sub> = 150 °C		-		1.05	

**Notes:**

<sup>(1)</sup>Pulse test: t<sub>p</sub> = 5 ms,  $\delta < 2\%$

<sup>(2)</sup>Pulse test: t<sub>p</sub> = 380 μs,  $\delta < 2\%$

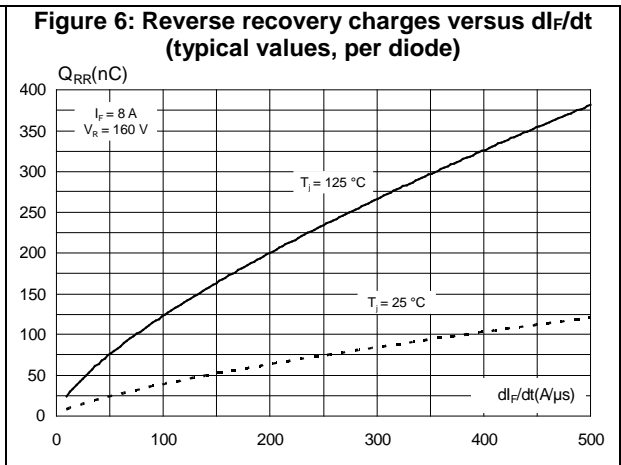
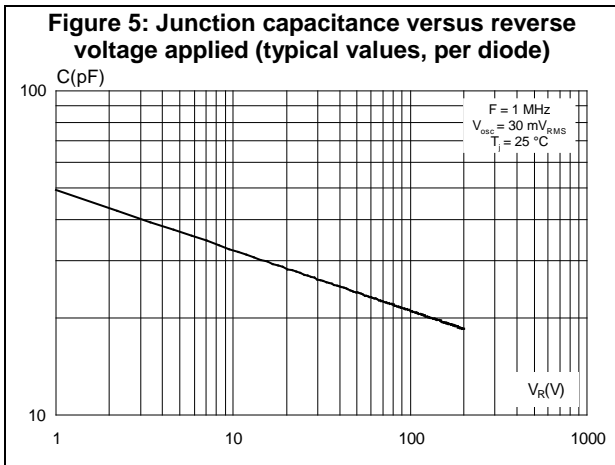
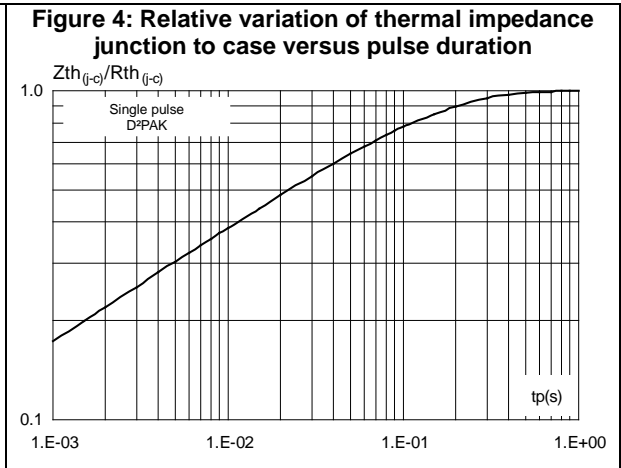
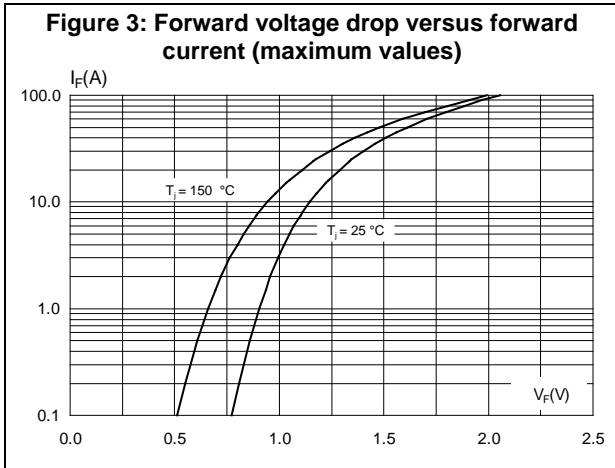
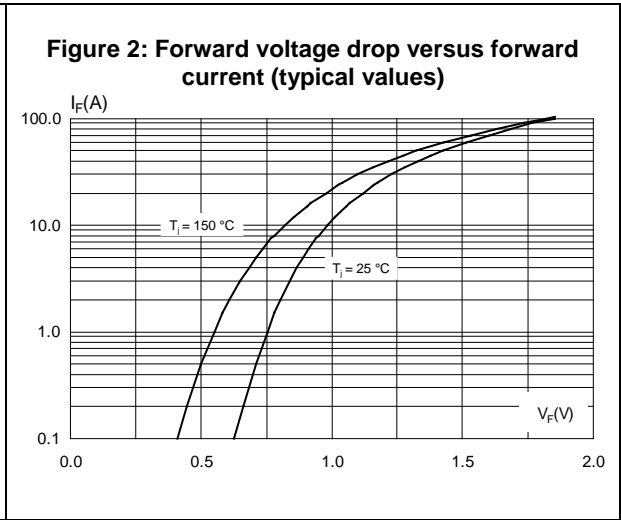
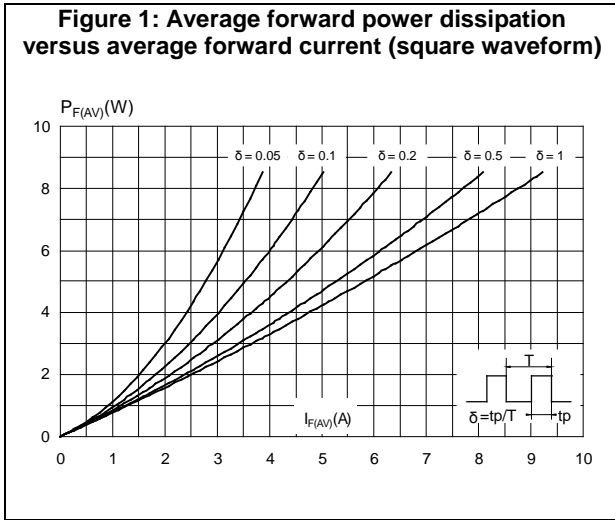
To evaluate the conduction losses, use the following equation:

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

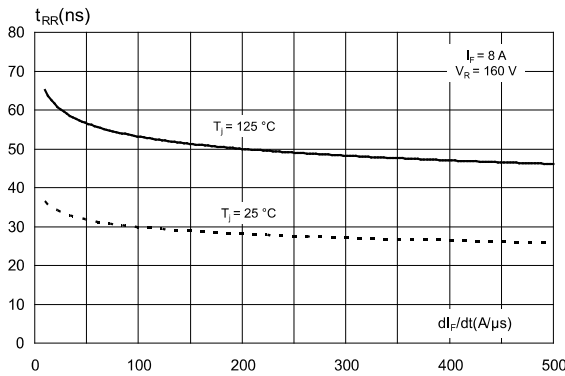
Table 5: Dynamic electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ °C}$	$I_F = 1\text{ A},$ $V_R = 30\text{ V},$ $di_F/dt = 100\text{ A}/\mu\text{s}$	-	21	26	ns
$I_{RM}$	Reverse recovery current	$T_j = 125\text{ °C}$	$I_F = 8\text{ A},$ $V_R = 160\text{ V},$ $di_F/dt = 200\text{ A}/\mu\text{s}$	-	8	10	A

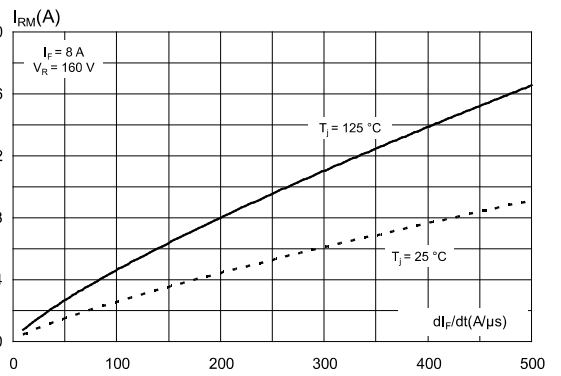
# 1.1 Characteristics (curves)



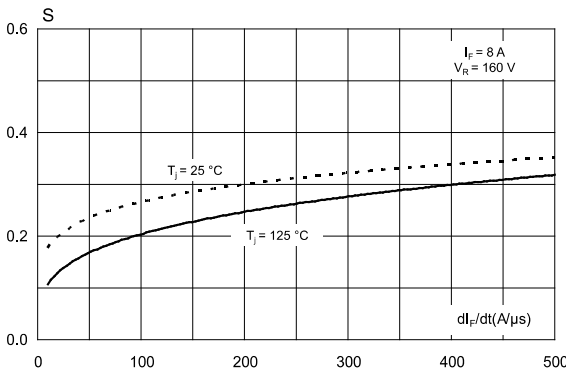
**Figure 7: Reverse recovery time versus  $di_F/dt$  (typical values, per diode)**



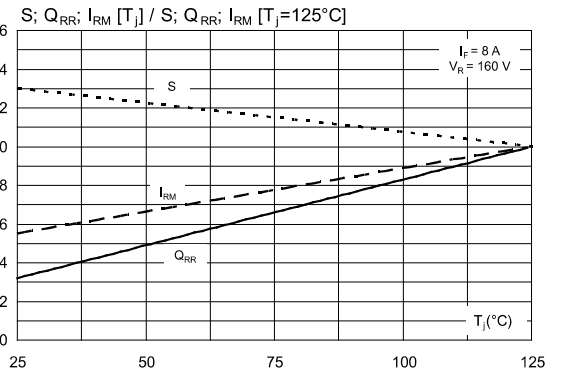
**Figure 8: Peak reverse recovery current versus  $di_F/dt$  (typical values, per diode)**



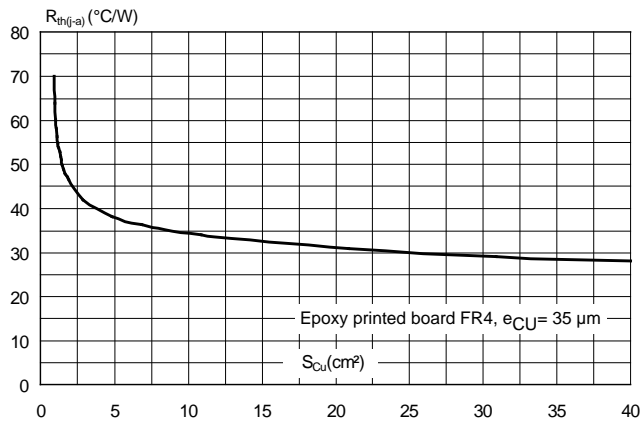
**Figure 9: Softness factor versus  $di_F/dt$  (typical values, per diode)**



**Figure 10: Dynamic parameters versus junction temperature**



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



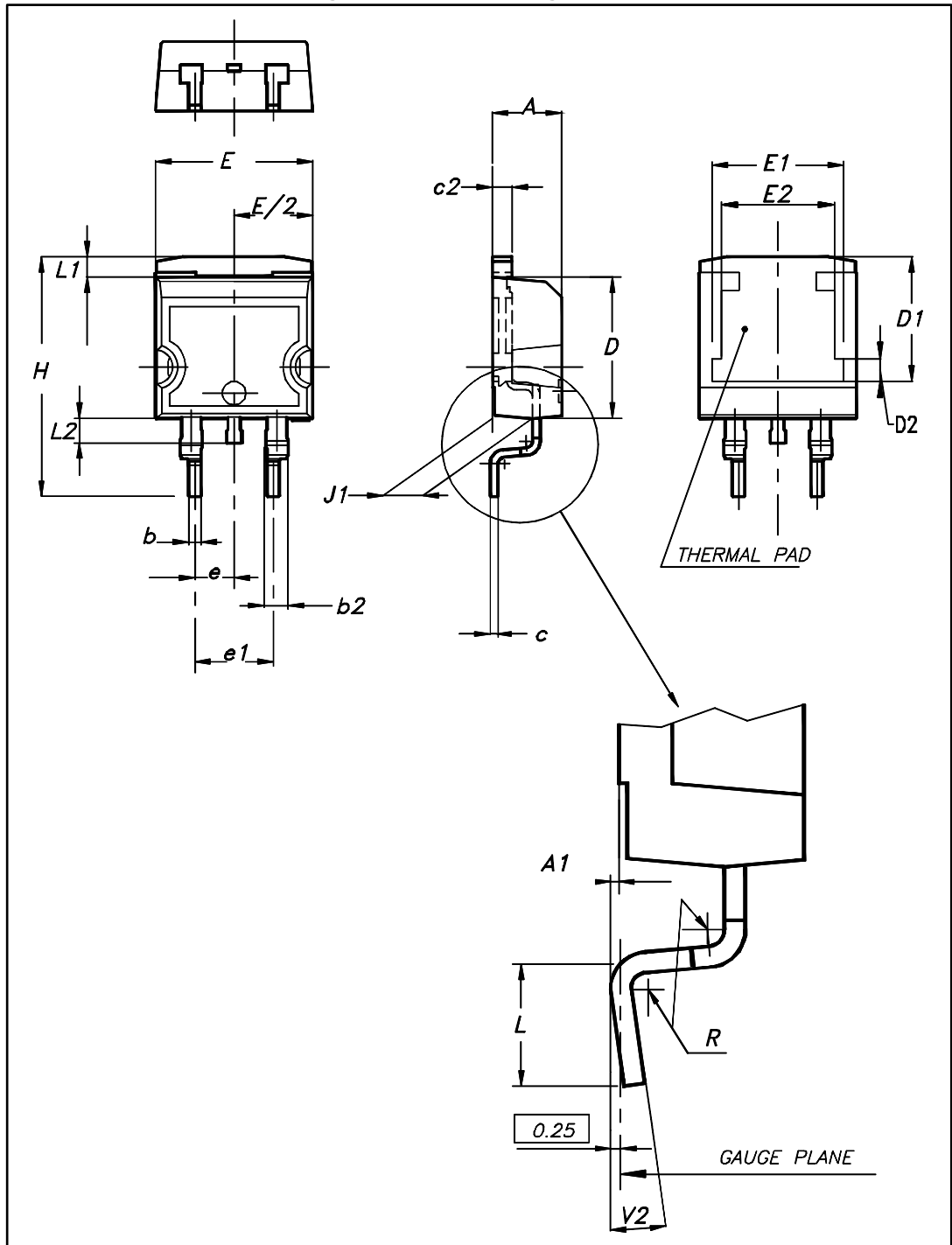
## 2 Package information

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](http://www.st.com). ECOPACK® is an ST trademark.

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

2.1 D<sup>2</sup>PAK package information

Figure 12: D<sup>2</sup>PAK package outline



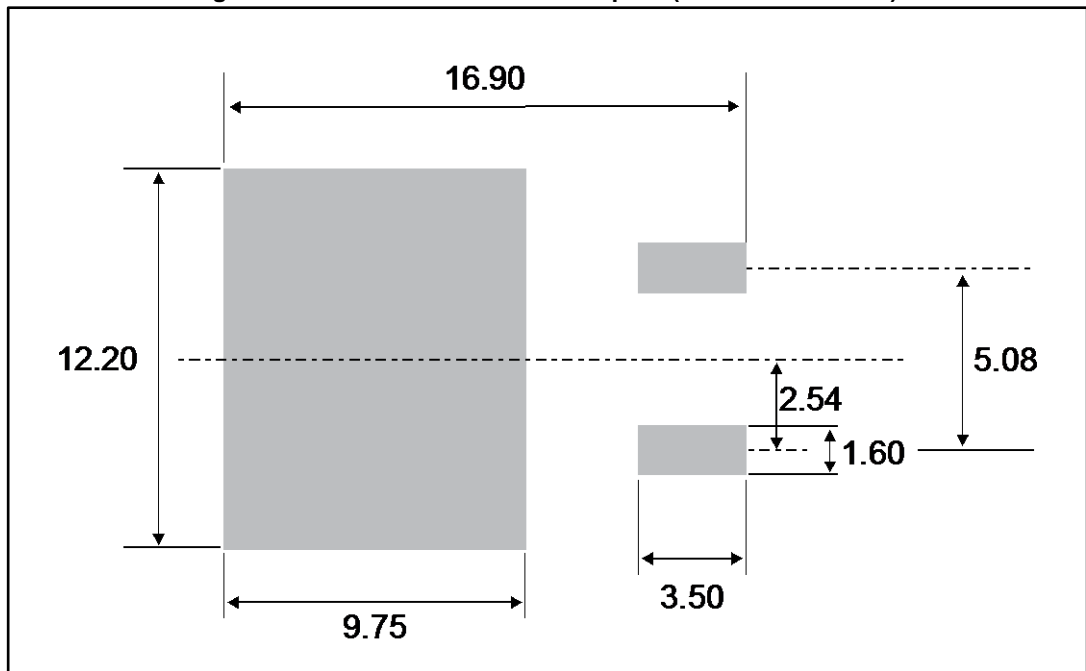
This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 6: D<sup>2</sup>PAK 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: D<sup>2</sup>PAK 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 <sup>2</sup> PAK	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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