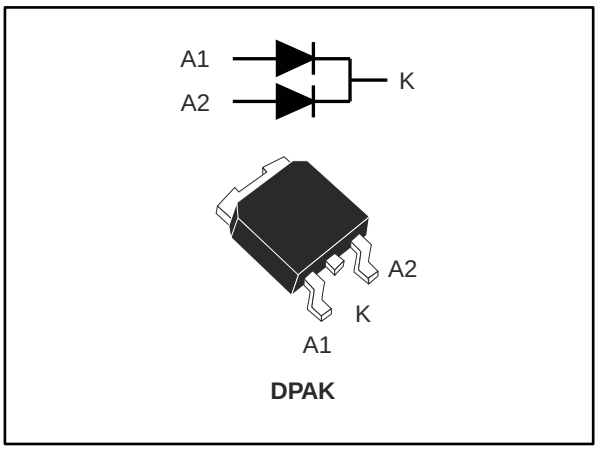
STTH602C-Y

Automotive ultrafast recovery diode

Datasheet - production data



DPAK

Features

- AEC-Q101 qualified
- Suited for SMPS
- Low losses
- Low forward and reverse recovery time
- High surge current capability
- High junction temperature
- PPAP capable

Description

This dual center tap diode is suited for switch mode power supplies and high frequency DC to DC converters.

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

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	2 x 3 A
V_{RRM}	200 V
V_F(typ.)	0.80 V
T_j(max.)	175 °C
T_{rr}(typ.)	14 ns

This is information on a product in full production.

1 Characteristics

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

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		200	V
$I_{F(RMS)}$	Forward rms current		11	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	T_c = 160 °C	3	A
		T_c = 155 °C	6	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	60	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature range		-40 to +175	°C

Table 3: Thermal parameters

Symbol	Parameter		Max. value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	5	°C/W
		Per device	3	
$R_{th(c)}$	Coupling		1	

When the two diodes 1 and 2 are used simultaneously:

ΔT_j(diode 1) = P (diode 1) x $R_{th(j-c)}$ (Per diode) + P (diode 2) x $R_{th(c)}$

Table 4: Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		3	µA
		T_j = 125 °C		-	3	30	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 3 A	-	0.98	1.1	V
		T_j = 150 °C		-	0.8	0.95	
		T_j = 25 °C	I_F = 6 A	-	1.1	1.25	
		T_j = 150 °C		-	0.9	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:

$P = 0.85 \times I_{F(AV)} + 0.033 \times I_{F^2(RMS)}$

Table 5: Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	I_F = 1 A, dI_F/dt = -100 A/µs, V_R = 30 V, T_j = 25 °C	-	14	20	ns
		I_F = 1 A, dI_F/dt = -50 A/µs, V_R = 30 V, T_j = 25 °C	-	21	30	
I_{RM}	Reverse recovery current	I_F = 3 A, dI_F/dt = 200 A/µs, V_R = 160 V, T_j = 125 °C	-	4	5.5	A
t_{fr}	Forward recovery time	I_F = 3 A, dI_F/dt = 200 A/µs V_{FR} = 1.1 x V_{Fmax}, T_j = 25 °C	-	24		ns
V_{FP}	Forward recovery voltage	I_F = 3 A, dI_F/dt = 200 A/µs, T_j = 25 °C	-	3.7		V

1.1 Characteristics (curves)

Figure 1: Peak current versus duty cycle (per diode)

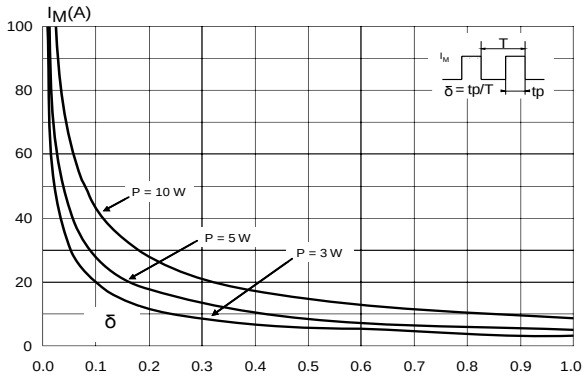


Figure 2: Forward voltage drop versus forward current (typical values, per diode)

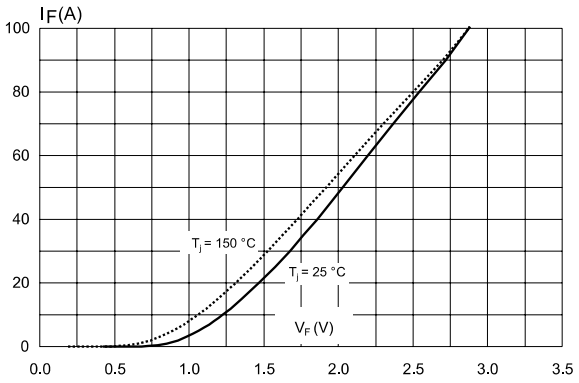


Figure 3: Forward voltage drop versus forward current (maximum values, per diode)

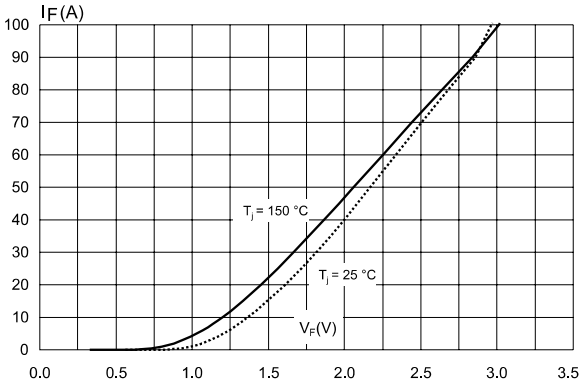


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration (per diode)

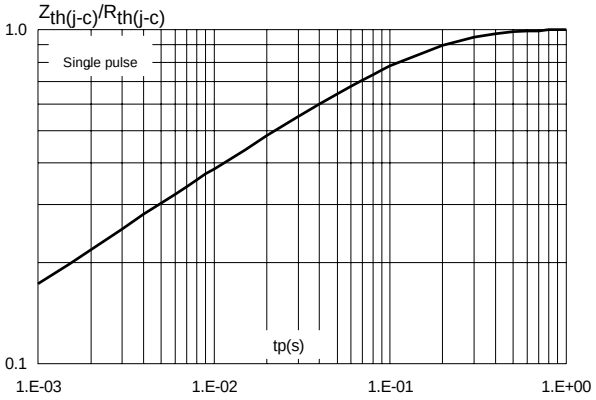


Figure 5: Junction capacitance versus reverse applied voltage (typical values, per diode)

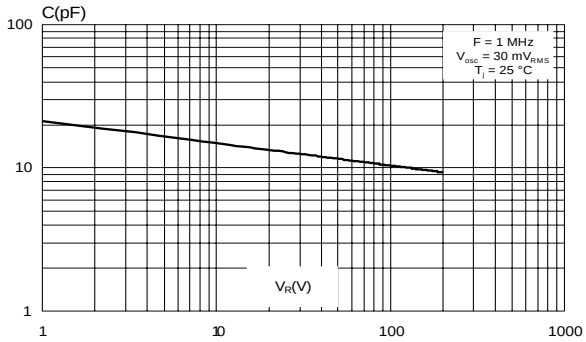


Figure 6: Reverse recovery charges versus dI_F/dt (typical values, per diode)

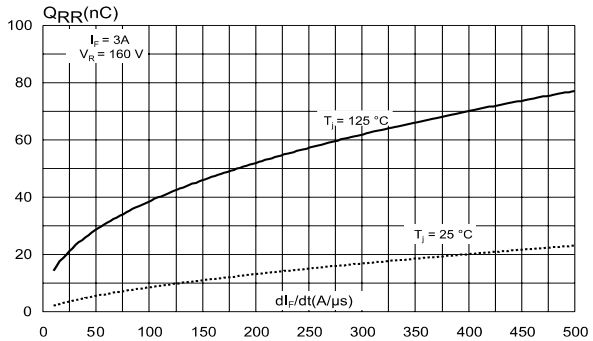


Figure 7: Reverse recovery time versus dI_F/dt (typical values, per diode)

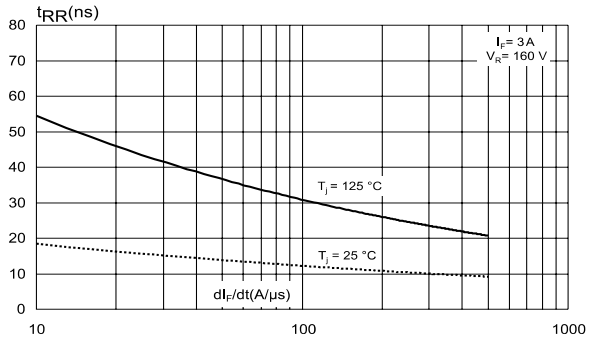


Figure 8: Reverse recovery current versus dI_F/dt (typical values, per diode)

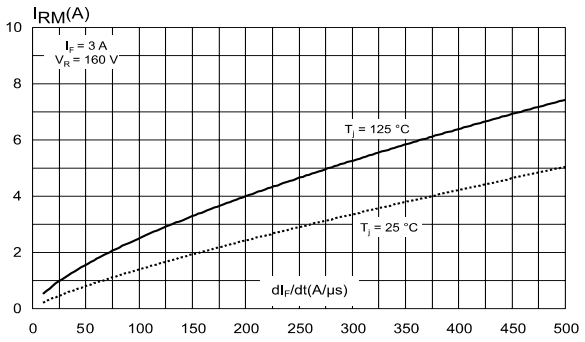


Figure 9: Dynamic parameters versus junction temperature

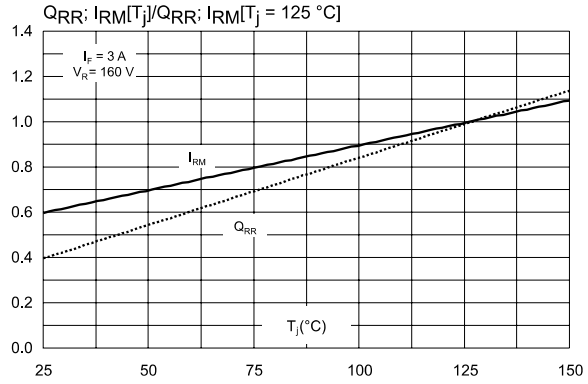
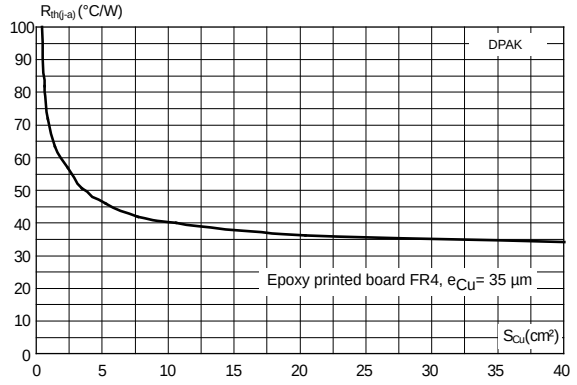


Figure 10: Thermal resistance junction to ambient versus copper surface under tab for DPAK package (typical values)



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.

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

2.1 DPAK package information

Figure 11: DPAK package outline

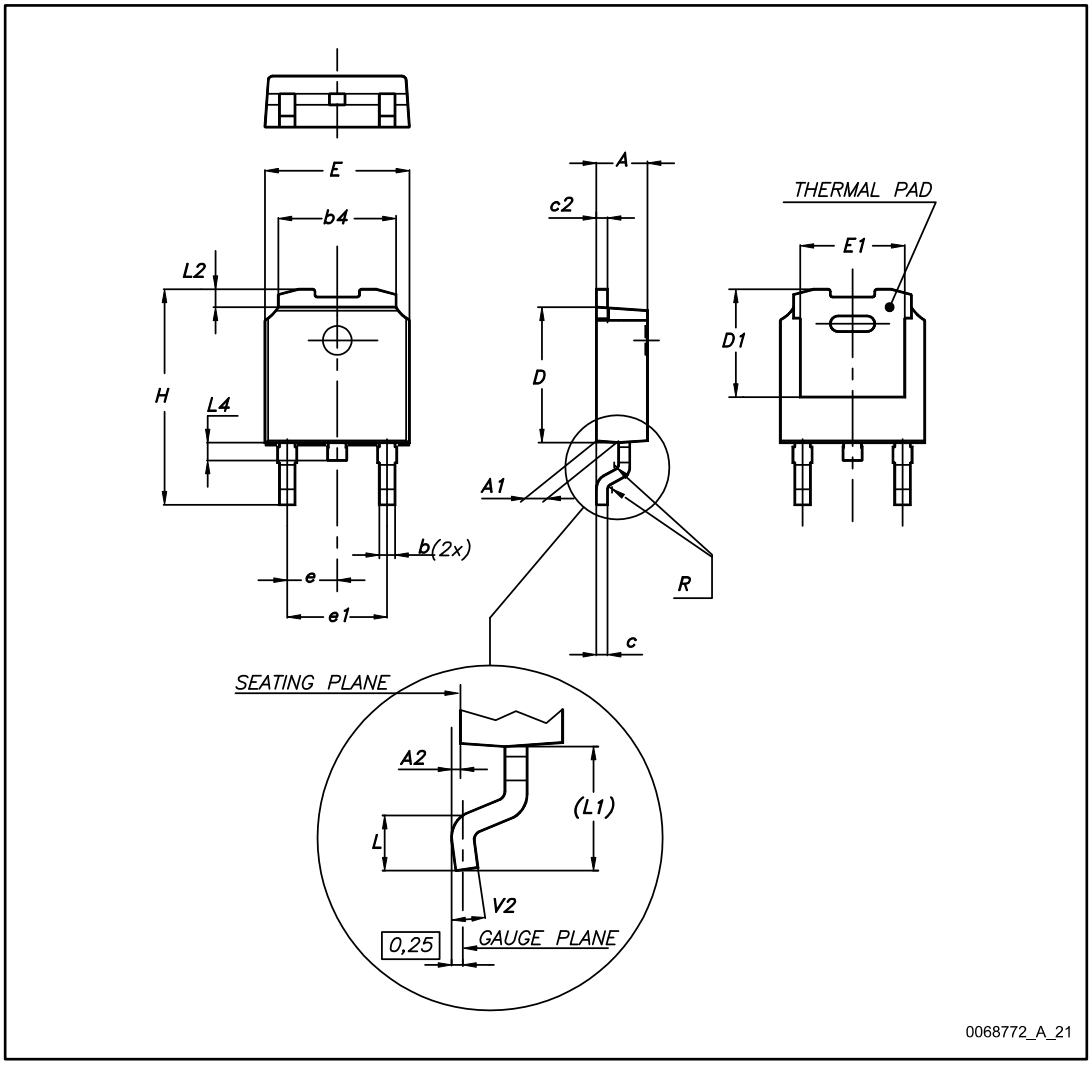
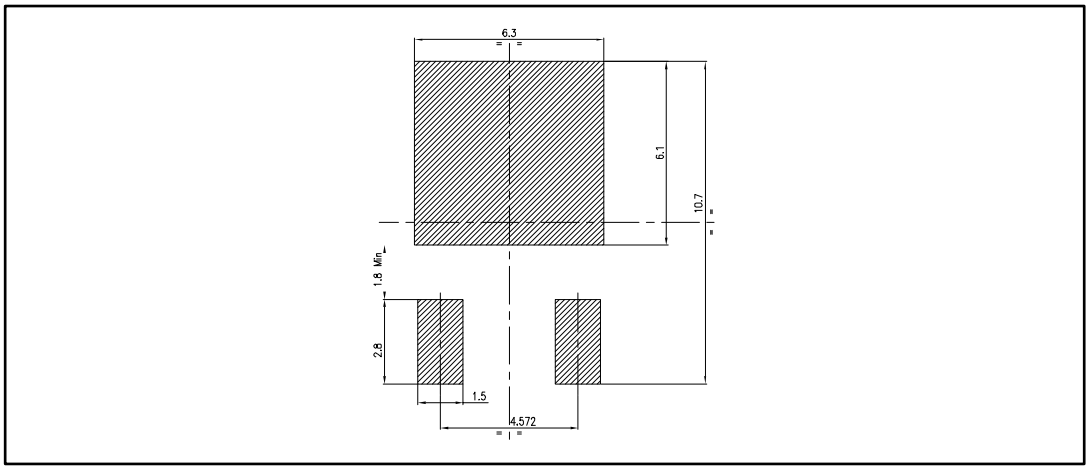


Table 6: DPAK mechanical data

Dim.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.087		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
b	0.64		0.90	0.025		0.035
b4	5.20		5.40	0.205		0.213
c	0.45		0.60	0.018		0.024
c2	0.48		0.60	0.019		0.024
D	6.00		6.20	0.236		0.244
D1	4.95	5.10	5.25	0.195	0.201	0.207
E	6.40		6.60	0.252		0.260
E1	5.10	5.20	5.30	0.201	0.205	0.209
e	2.16	2.28	2.40	0.085	0.090	0.094
e1	4.40		4.60	0.173		0.181
H	9.35		10.10	0.368		0.398
L	1.00		1.50	0.039		0.059
(L1)	2.60	2.80	3.00	0.102	0.110	0.118
L2	0.65	0.80	0.95	0.026	0.031	0.037
L4	0.60		1.00	0.024		0.039
R		0.20			0.008	
V2	0°		8°	0°		8°

Figure 12: DPAK recommended footprint (dimensions are in mm)



3 Ordering information

Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH602CBY-TR	STTH6 02CBY	DPAK	0.30 g	2500	Tape and reel

4 Revision history

Table 8: Document revision history

Date	Revision	Changes
24-Oct-2012	1	First issue.
16-Mar-2017	2	Updated *Table 3: "Thermal parameters"*. Minor text changes.

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