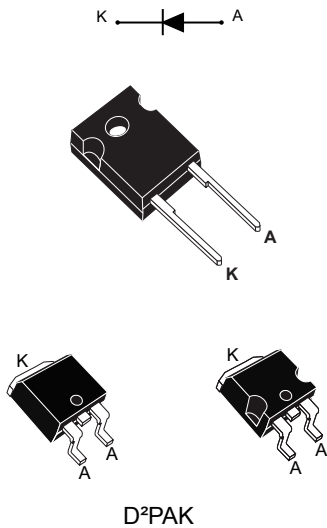


**600 V ultrafast rectifier**

**Features**

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching and conduction losses

**Applications**

- Telecom power supply
- OBC
- Industrial equipments
- Switching diode

**Description**

The **STTH30L06**, which is using ST Turbo 2 600 V technology, is specially suited for use in switching power supplies, and industrial applications, as rectification and discontinuous mode PFC boost diode.

Product status	
STTH30L06	
Product summary	
$I_{F(AV)}$	30 A
$V_{RRM}$	600 V
$T_j(max.)$	175 °C
$V_F(typ.)$	1.00 V
$t_{rr(max.)}$	65 ns

# 1 Characteristics

**Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified)**

Symbol	Parameter	Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	Forward rms current	50	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$ , square wave	$T_C = 120\text{ °C}$	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms}$ sinusoidal	A
$T_{stg}$	Storage temperature range	-65 to +175	°C
$T_j$	Maximum operating junction temperature	175	°C

**Table 2. Thermal resistance parameter**

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	1.1	°C/W

For more information, please refer to the following application note:

- AN5088: Rectifiers thermal management, handling and mounting recommendations

**Table 3. Static electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	-	80	25	$\mu\text{A}$
		$T_j = 150\text{ °C}$				
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	-	1.00	1.55	V
		$T_j = 150\text{ °C}$				

1. Pulse test:  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

2. Pulse test:  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses, use the following equation:  $P = 0.95 \times I_{F(AV)} + 0.010 \times I_F^2 (RMS)$

For more information, please refer to the following application notes related to the power losses:

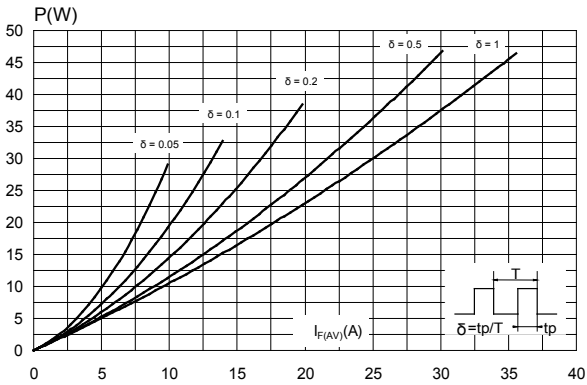
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses in a power diode

**Table 4. Dynamic characteristics**

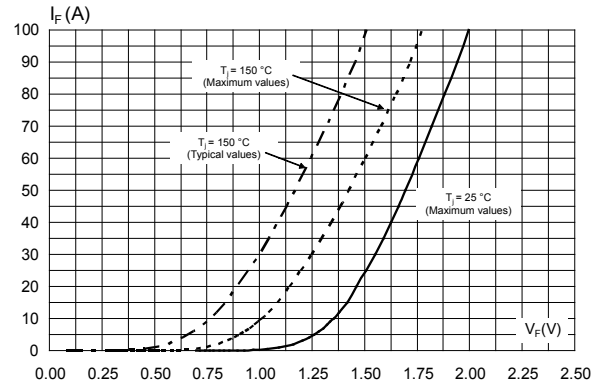
Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ °C}$	-	65	90	ns
		$I_F = 0.5\text{ A}$ , $I_{rr} = 0.25\text{ A}$ , $I_R = 1\text{ A}$ $I_F = 1\text{ A}$ , $V_R = 30\text{ V}$ , $dI_F/dt = 50\text{ A}/\mu\text{s}$				
$t_{fr}$	Forward recovery time	$T_j = 25\text{ °C}$	-	500		ns
$V_{FP}$	Peak forward voltage	$T_j = 25\text{ °C}$	-	2.5		V
$I_{RM}$	Reverse recovery current	$T_j = 125\text{ °C}$	-	11.5	16	A

## 1.1 Characteristics (curves)

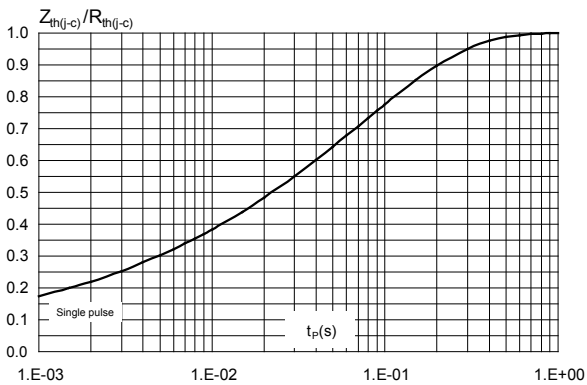
**Figure 1. Conduction losses versus average forward current**



**Figure 2. Forward voltage drop versus forward current**



**Figure 3. Relative variation of thermal impedance junction to case versus pulse duration**



**Figure 4. Peak reverse recovery current versus  $di_F/dt$  (typical values)**

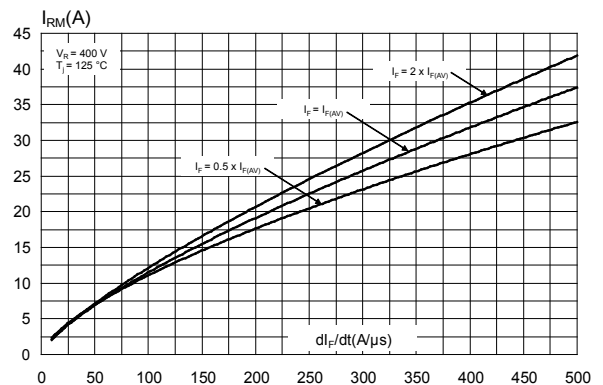


Figure 5. Reverse recovery time versus  $di_F/dt$  (typical values)

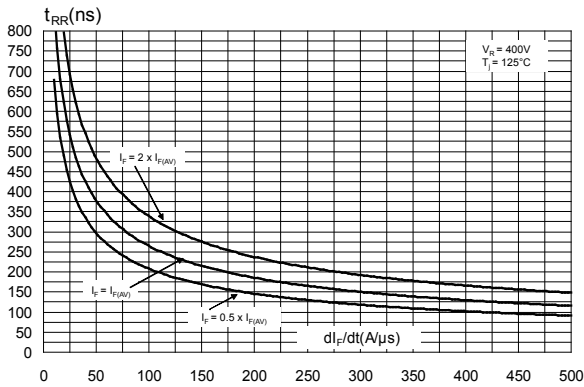


Figure 6. Reverse recovery charges versus  $di_F/dt$  (typical values)

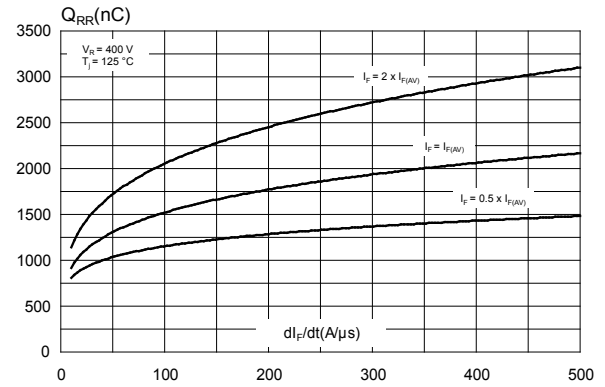


Figure 7. Reverse recovery softness factor versus  $di_F/dt$  (typical values)

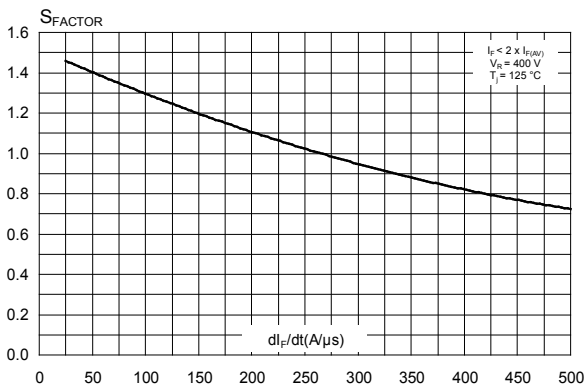


Figure 8. Relative variations of dynamic parameters versus junction temperature

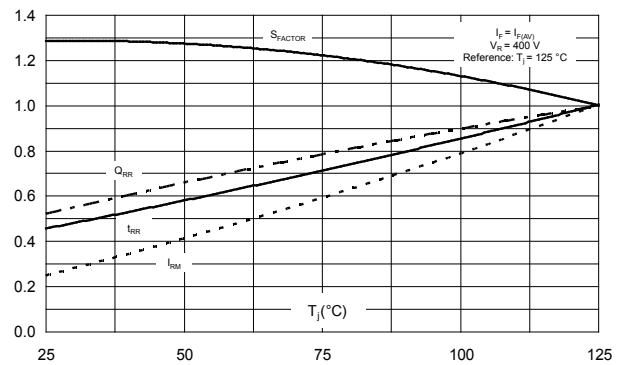


Figure 9. Transient peak forward voltage versus  $di_F/dt$  (typical values)

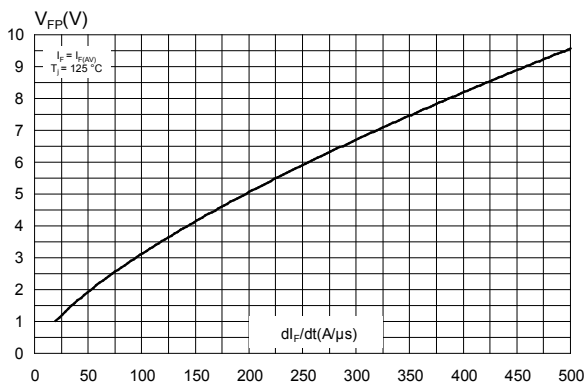
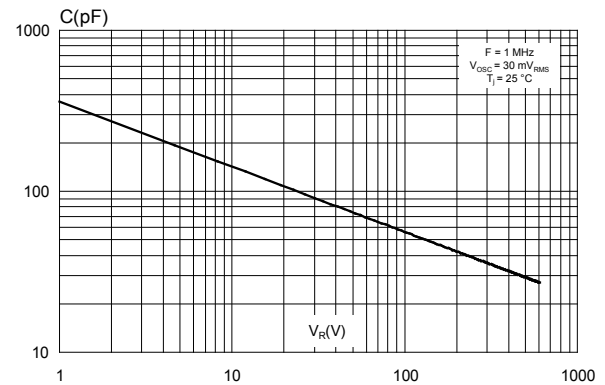
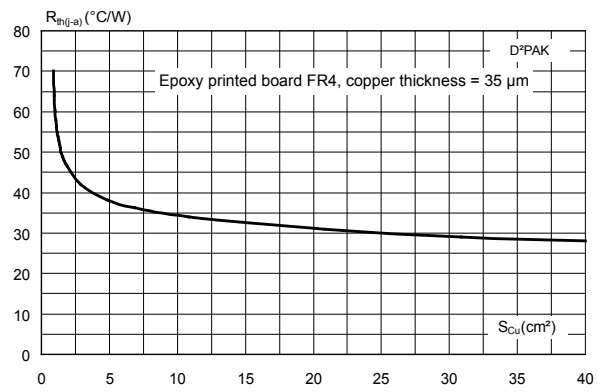


Figure 10. Junction capacitance versus reverse voltage applied (typical values)



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



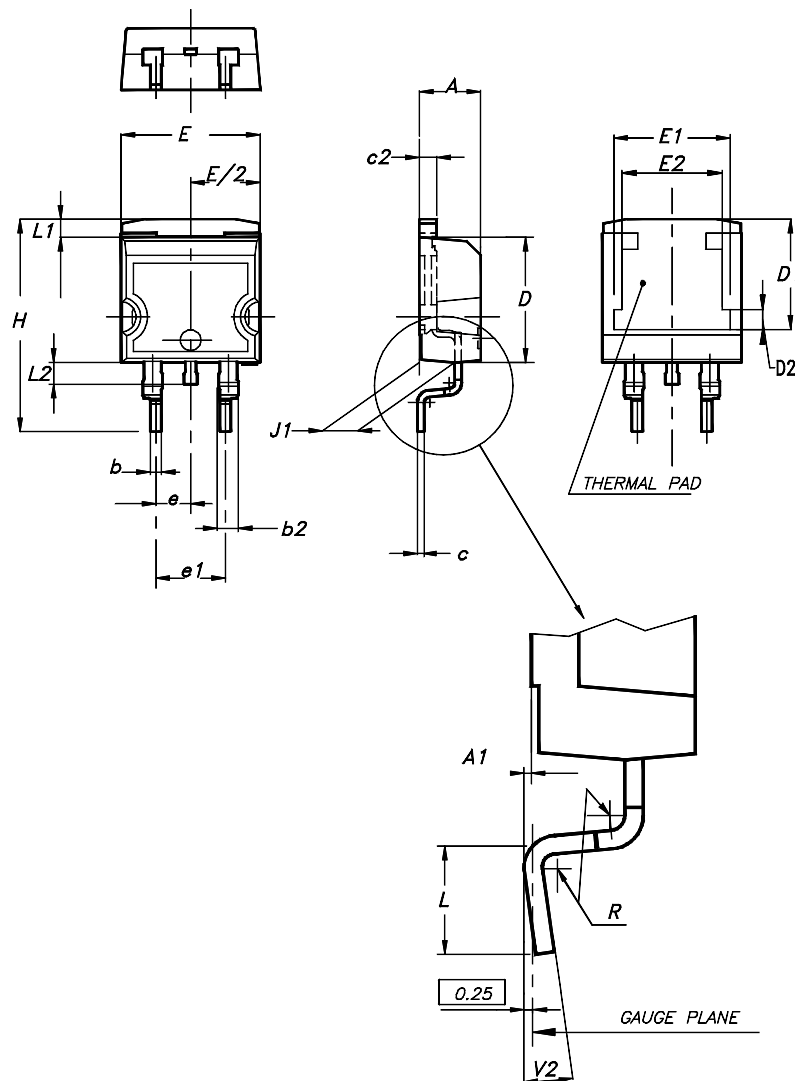
## 2 Package information

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.

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

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

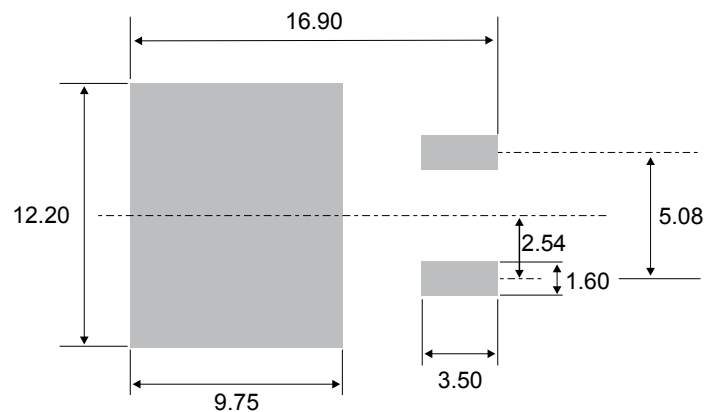
**Figure 12. D<sup>2</sup>PAK package outline**



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

**Table 5. D<sup>2</sup>PAK package mechanical data**

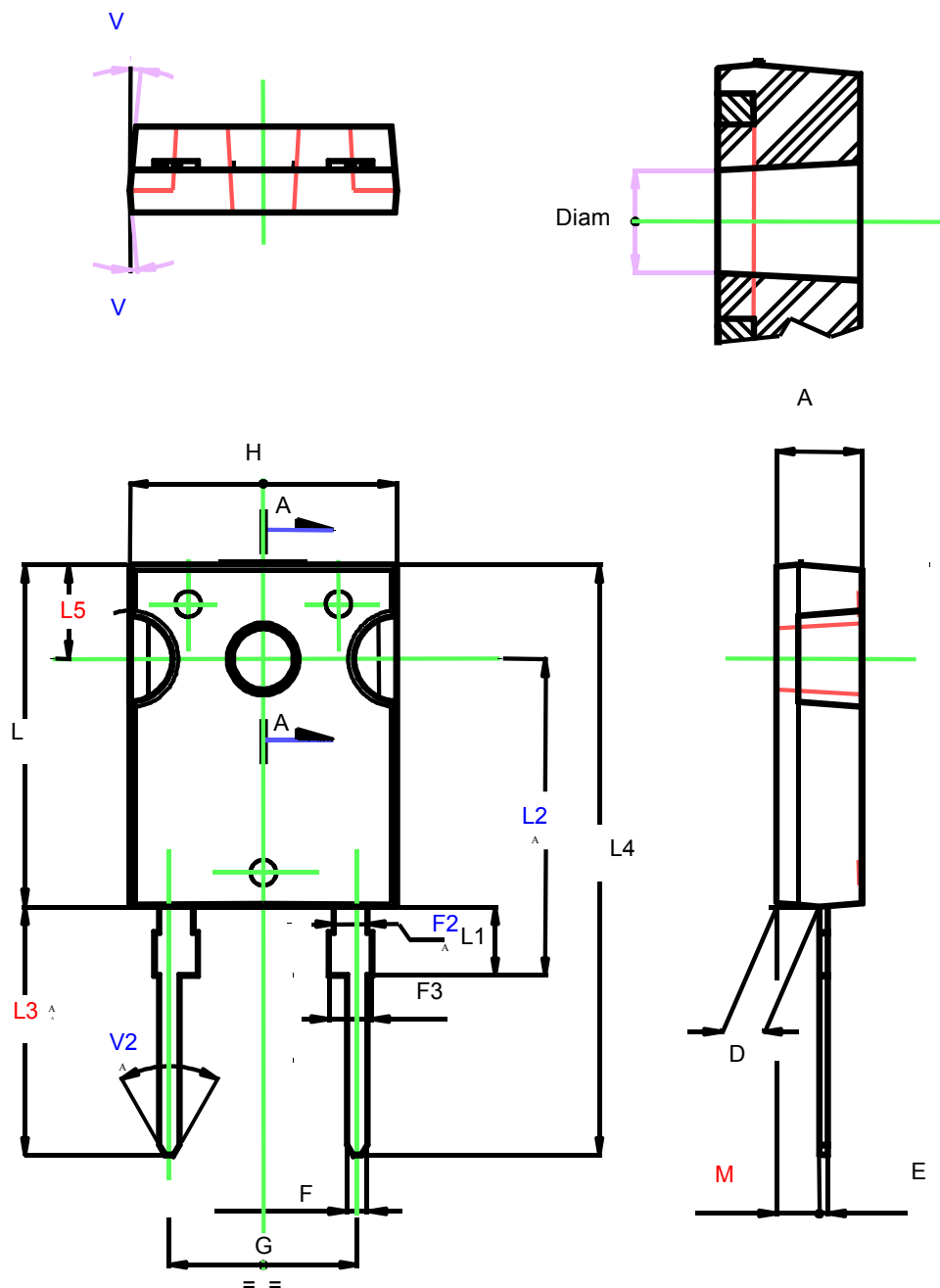
Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A	4.36	4.60	0.172	0.181
A1	0.00	0.25	0.000	0.010
b	0.70	0.93	0.028	0.037
b2	1.14	1.70	0.045	0.067
c	0.38	0.69	0.015	0.027
c2	1.19	1.36	0.047	0.053
D	8.60	9.35	0.339	0.368
D1	6.90	8.00	0.272	0.311
D2	1.10	1.50	0.043	0.060
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)**


## 2.2 DO-247 package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 N·m
- Maximum torque value: 1.0 N·m

Figure 14. DO-247 package outline





**Table 6. DO-247 package mechanical data**

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.1909		0.2027
D	2.2		2.6	0.0866		0.1023
E	0.4		0.8	0.0157		0.0314
F	1		1.4	0.0393		0.0551
F2		2			0.0787	
F3	2		2.4	0.0787		0.0944
G		10.9			0.4291	
H	15.45		15.75	0.6082		0.6200
L	19.85		20.15	0.7814		0.7933
L1	3.7		4.3	0.1456		0.1692
L2		18.5			0.7283	
L3	14.2		14.8	0.5590		0.5826
L4		34.6			1.3622	
L5		5.5			0.2165	
M	2		3	0.0787		0.1181
V		5°			5°	
V2		60°			60°	
Diam.	3.55		3.65	0.1397		0.1437

### 3 Ordering information

**Table 7. Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH30L06G	STTH30L06G	D <sup>2</sup> PAK	1.48 g	50	Tube
STTH30L06G-TR	STTH30L06G	D <sup>2</sup> PAK	1.48 g	1000	Tape and reel
STTH30L06W	STTH30L06W	DO-247	4.40 g	30	Tube

## Revision history

**Table 8. Document revision history**

Date	Revision	Changes
07-Sep-2004	1	First issue.
21-Oct-2004	2	DOP3I package added.
11-Jan-06	3	On page 2: <ul style="list-style-type: none"> <li>• <math>I_{F(RMS)}</math> corrected from 30 A to 50 A</li> <li>• <math>I_{F(AV)}</math> corrected from 50 A to 30 A</li> </ul>
10-Aug-2006	4	Reformatted to current standards. SOD-93 package removed.
06-Sep-2011	5	Updated $I_{FSM}$ from 160 A to 300 A. Removed TO-220 and DOP3I.
09-Nov-2017	6	Removed D <sup>2</sup> PAK package. Minor text change to improve readability.
10-Jan-2018	7	Updated Table 7: "Ordering information"
25-Sep-2018	8	Added D <sup>2</sup> PAK package. Updated <a href="#">Table 7. Ordering information</a> . Removed figure 10.

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