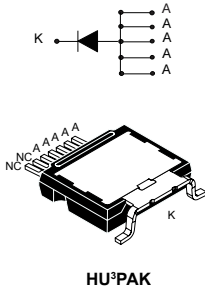



## Automotive high voltage rectifier for bridge applications



## Features

- AEC-Q101 qualified 
- Ultra low conduction losses
- Ultra-low reverse losses
- High junction temperature capability (+175 °C)
- $V_{RRM}$  guaranteed from -40 to +175 °C
- PPAP capable
- ECOPACK2 compliant

## Application

- On board charger
- Bridge

## Description

The high quality design of this diode has produced a device with consistently reproducible characteristics and intrinsic ruggedness. These characteristics make it ideal for heavy duty applications that demand long term reliability like automotive applications.

Thanks to its ultra-low conduction losses, the STBR3012L2Y-TR is especially suitable for use as input bridge diode in battery chargers.

## Product status link

STBR3012L2Y-TR

## Product summary

Symbol	Value
$I_{F(AV)}$	30 A
$V_{RRM}$	1200 V
$T_j$	+175 °C
$V_F$ (typ.)	0.95 V

# 1 Characteristics

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

Symbol	Parameter	Value	Unit
$V_{RSM}$	Non-repetitive surge reverse voltage	1600	V
$V_{RRM}$	Repetitive peak reverse voltage	$T_j = -40\text{ °C to }+175\text{ °C}$	V
$I_{F(RMS)}$	Forward rms current	45	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$ square wave	$T_C = 150\text{ °C}$	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}$	A
$T_{stg}$	Storage temperature range	-65 to +175	°C
$T_j$	Operating junction temperature	-40 to +175	°C

**Table 2. Thermal parameters**

Symbol	Parameter	Typ. value	Unit
$R_{th(j-c)}$	Junction to case	0.45	°C/W

For more information you can refer to:

- [TN1378](#): HU3PAK package mounting and thermal behavior.

**Table 3. Static electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	-	-	2	$\mu\text{A}$
		$T_j = 150\text{ °C}$				
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	-	1.05	1.3	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:

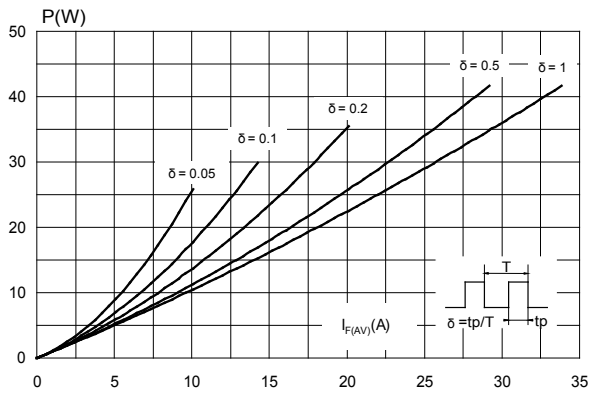
$$P = 0.96 \times I_{F(AV)} + 0.008 \times I_{F(RMS)}^2$$

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

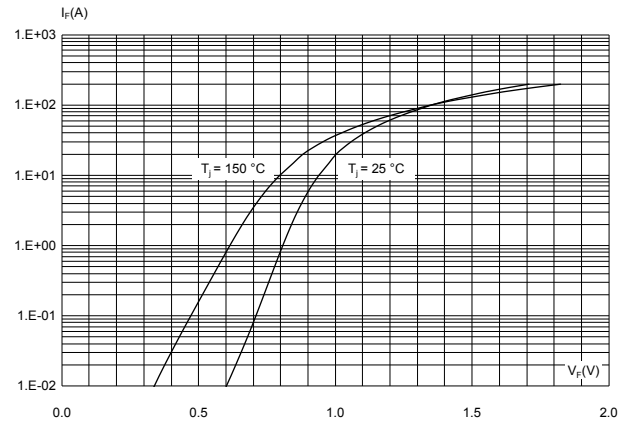
- [AN604](#): Calculation of conduction losses in a power rectifier
- [AN4021](#): Calculation of reverse losses in a power diode

## 1.1 Characteristics (curves)

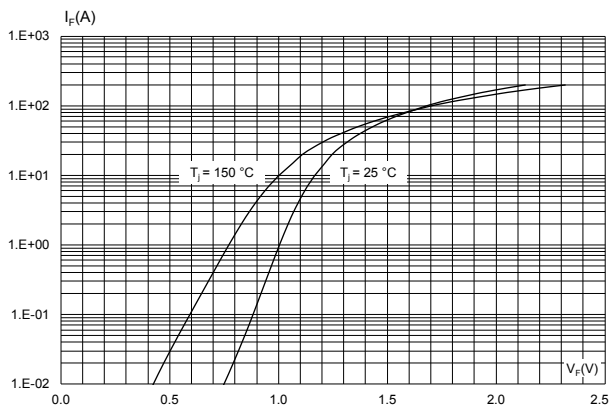
**Figure 1. Average forward power dissipation versus average forward current**



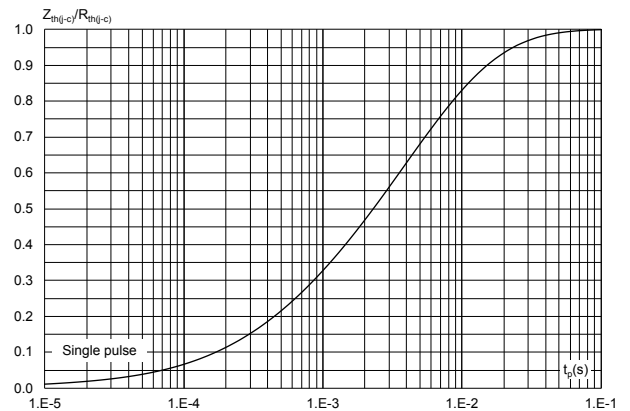
**Figure 2. Forward voltage drop versus forward current (typical values)**



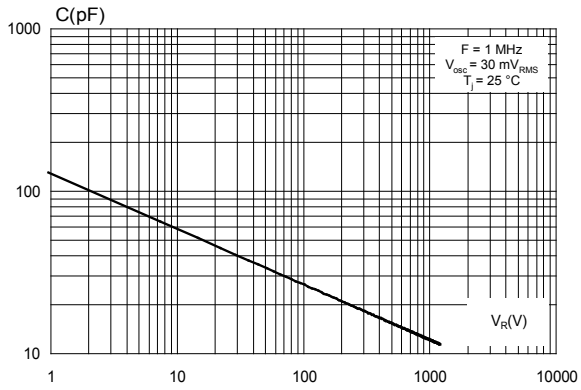
**Figure 3. Forward voltage drop versus forward current (maximum values)**



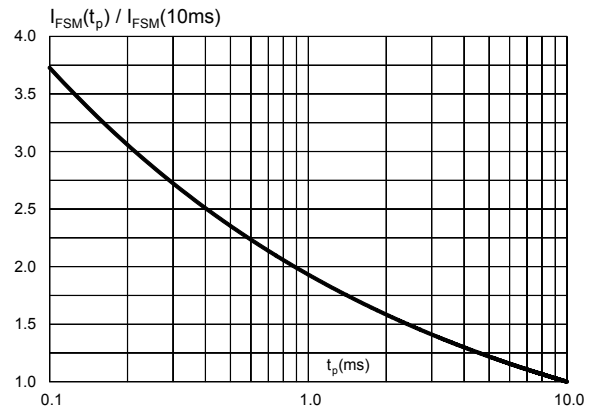
**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**



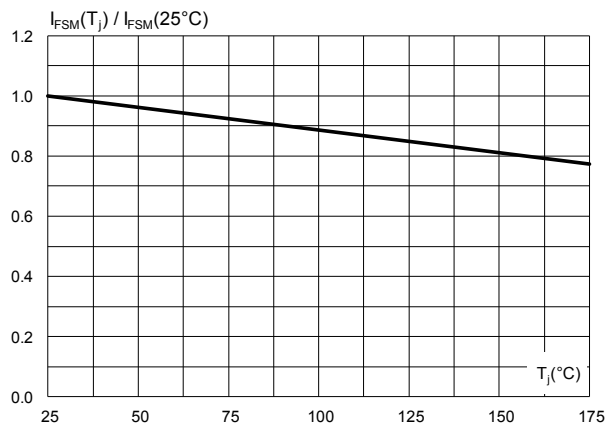
**Figure 5. Junction capacitance versus reverse voltage applied (typical values)**



**Figure 6. Relative variation of non-repetitive peak surge forward current versus pulse duration (sinusoidal waveform)**



**Figure 7. Relative variation of non-repetitive peak surge forward current versus initial junction temperature (sinusoidal waveform)**



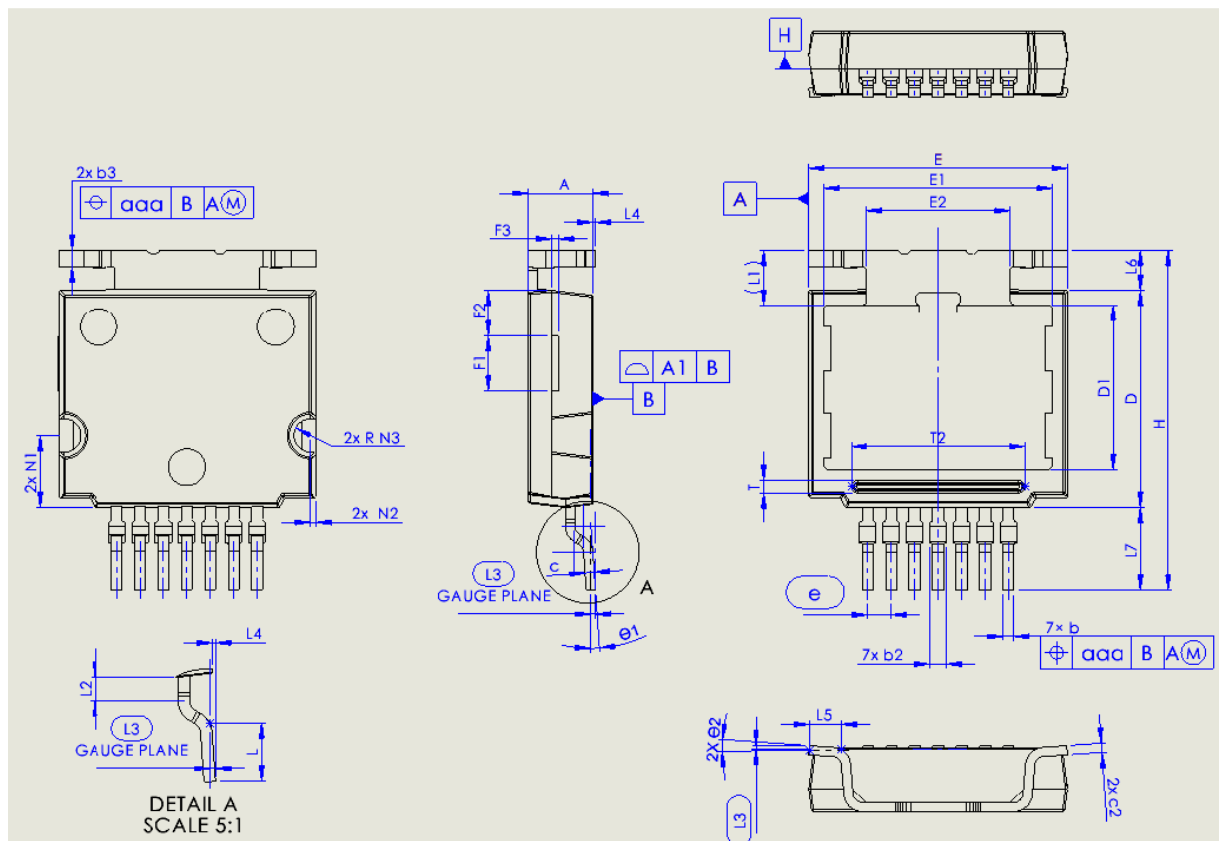
## 2 Package information

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 HU<sup>3</sup>PAK package information

- Epoxy meets UL94, V0

Figure 8. HU<sup>3</sup>PAK package outline



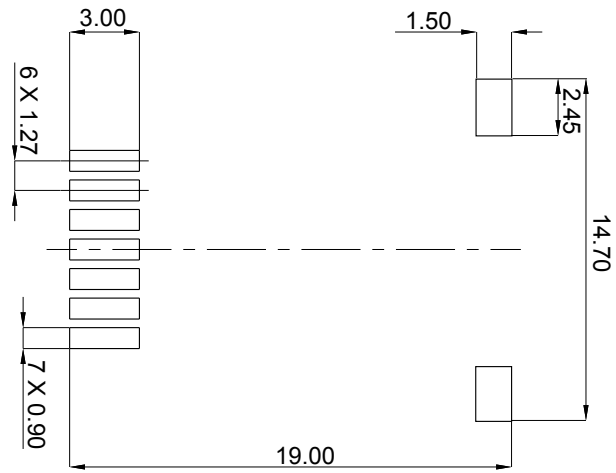
**Note:** This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

**Table 4. HU<sup>3</sup>PAK package mechanical data**

Ref.	Dimensions		
	mm		
	Min.	Typ.	Max.
A	3.40	3.50	3.60
A1		0.05	
b	0.50	0.60	0.70
b2	0.50	0.70	1.00
b3	0.80	0.90	1.00
c	0.40	0.50	0.60
c2	0.40	0.50	0.60
D	11.70	11.80	11.90
D1	8.80	8.955	9.10
E	13.90	14.00	14.10
E1	12.30	12.40	12.50
E2	7.75	7.80	7.85
e	BSC 1.27		
H	18.00	18.58	19.00
L	2.40	2.52	2.60
L1		3.05	
L2	0.90	1.00	1.10
L3	BSC 0.26		
L4	0.075	0.125	0.175
L5	1.83	1.93	2.03
L6	2.14	2.24	2.34
L7	4.44	4.54	4.64
aaa		0.10	
F1	2.90	3.00	3.10
F2	2.40	2.50	2.60
F3	0.25	0.35	0.45
N1	3.80	3.90	4.00
N2	0.25	0.30	0.45
N3	0.80	0.90	1.00
T	0.50	0.67	0.70
T2	9.18	9.38	9.43
θ1		0°	8°
θ2		0°	8°

1. Package outline exclusive of any mold flashes dimensions.
2. Package outline exclusive of burr dimensions.
3. Max resin gate protrusion: 0.25 mm.
4. The planarity of the package backside 50 micron max.
5. BSC: basic spacing between centers

Figure 9. HU<sup>3</sup>PAK recommended footprint (dimensions are in mm)



Note: For packing details you can see technical note [TN1173: Packing information for IPAD, protection, rectifiers, thyristors and AC Switches](#).

### 3 Ordering information

**Table 5. Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STBR3012L2Y-TR	STBR3012L2Y	HU <sup>3</sup> PAK	2.32 g	600	Tape and reel



## Revision history

**Table 6. Document revision history**

Date	Revision	Changes
14-Mar-2024	1	Initial release.

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