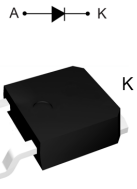
STBR1508-Y

Datasheet

Automotive 800 V, 15 A bridge rectifier diode



DPAK HV 2L

Features

- AEC-Q101 qualified
- PPAP capable
- Ultralow conduction losses
- Ultralow reverse losses
- V_{RRM} guaranteed from -40 to +175 °C
- High overcurrent capability
- High creepage DPAK
- MSL: Level 1
- ECOPACK2 compliant

Application

- Bridge function
- On board charger (OBC)
- Reverse battery protection
- EV charging stations
- By-Pass function
- O-ring function

Description

The STBR1508-Y is a ultralow V_F rectifier. 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 ultralow conduction losses, the STBR1508-Y is especially suitable for use as input bridge diode in battery chargers and charging stations. It is also ideal for usage in reverse battery protection circuit.

Product status link
STBR1508-Y

Product summary	
Symbol	**Value**
$I_{F(AV)}$	15 A
V_{RRM}	800 V
T_j	-40 to +175 °C
V_F (typ.)	0.88 V

1 Characteristics

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

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage	T_j = -40 °C to +175 °C	800	V
V_{RSM}	Non-repetitive surge reverse voltage	t_p = 10 ms square	900	V
$I_{F(RMS)}$	Forward rms current		21	A
$I_{F(AV)}$	Average forward current	T_C = 160 °C, δ = 0.5 square wave	15	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	200	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	0.56	°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 °C	V_R = 800 V	-		1	µA
		T_j = 150 °C		-	5	50	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 15 A	-	1.00	1.09	V
		T_j = 150 °C		-	0.88	0.97	

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:

$P = 0.75 \times I_{F(AV)} + 0.0147 \times I_F{}^2{}_{(RMS)}$

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

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

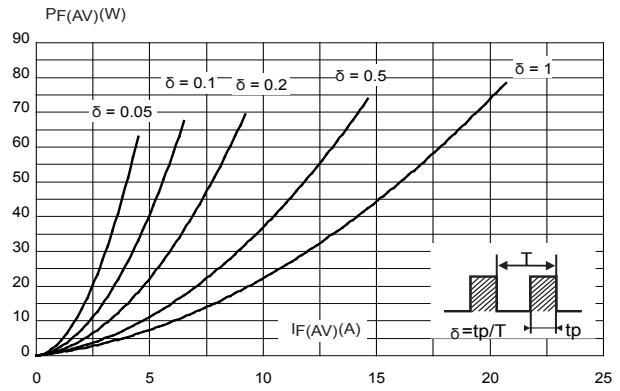


Figure 2. Forward voltage drop versus forward current (typical values)

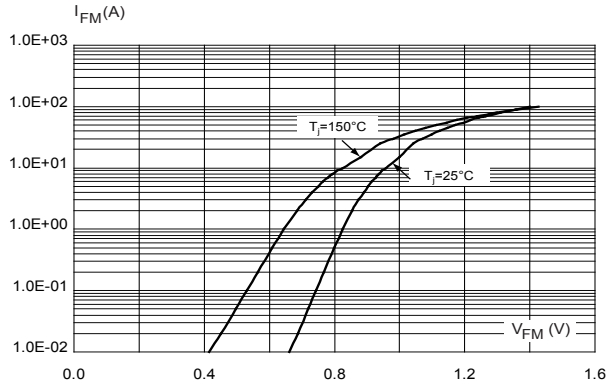


Figure 3. Forward voltage drop versus forward current (maximum values)

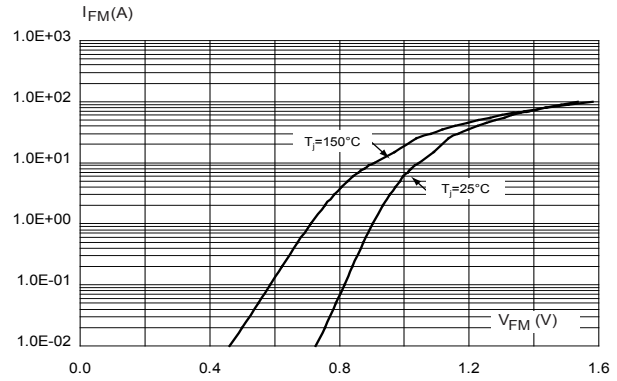


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

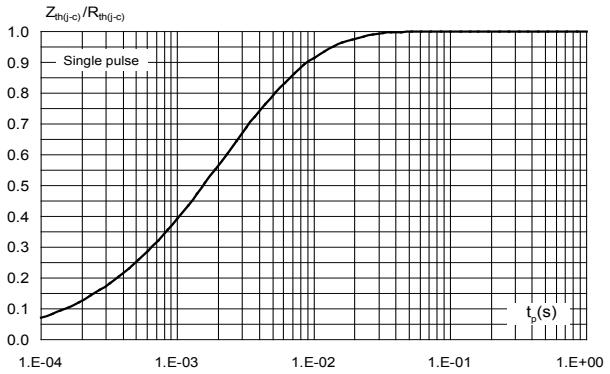


Figure 5. Junction capacitance versus reverse voltage applied (typical values)

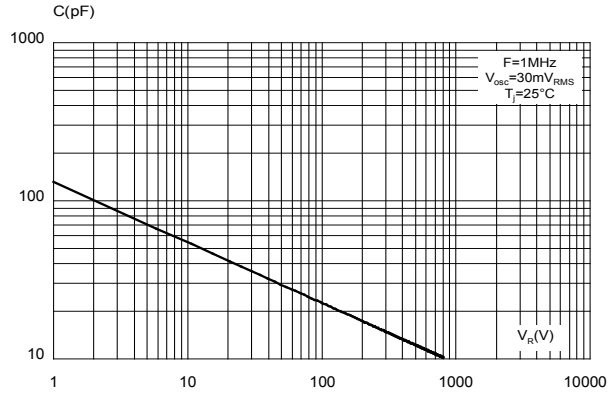


Figure 6. Relative variation of non-repetitive peak surge forward current versus pulse duration (sinusoidal waveform)

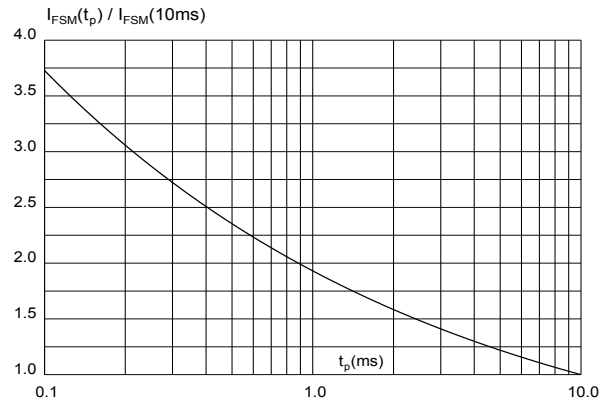


Figure 7. Relative variation of non-repetitive peak surge forward current versus initial junction temperature (sinusoidal waveform)

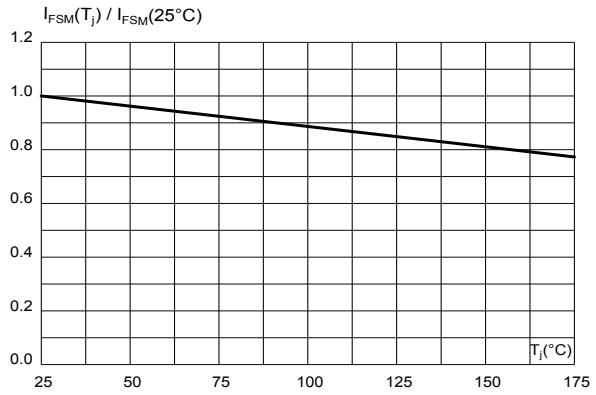


Figure 8. Non repetitive surge peak forward current versus number of cycles

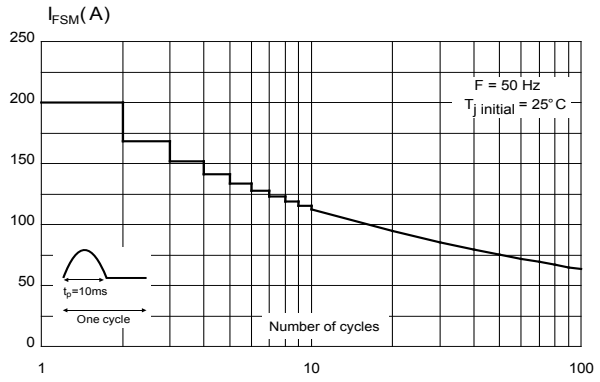
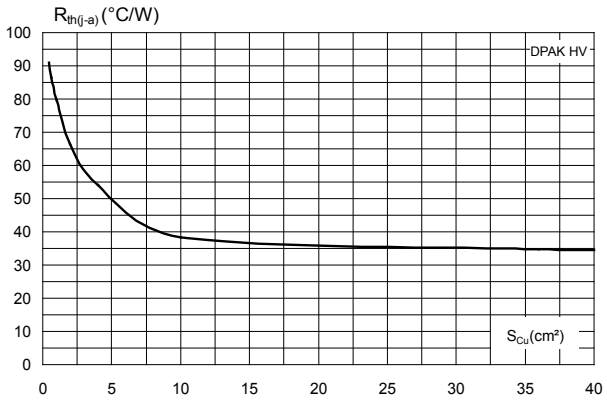


Figure 9. Thermal resistance junction to ambient versus copper surface under tab (typical values, epoxy printed board FR4, e_{Cu} = 70 µm)



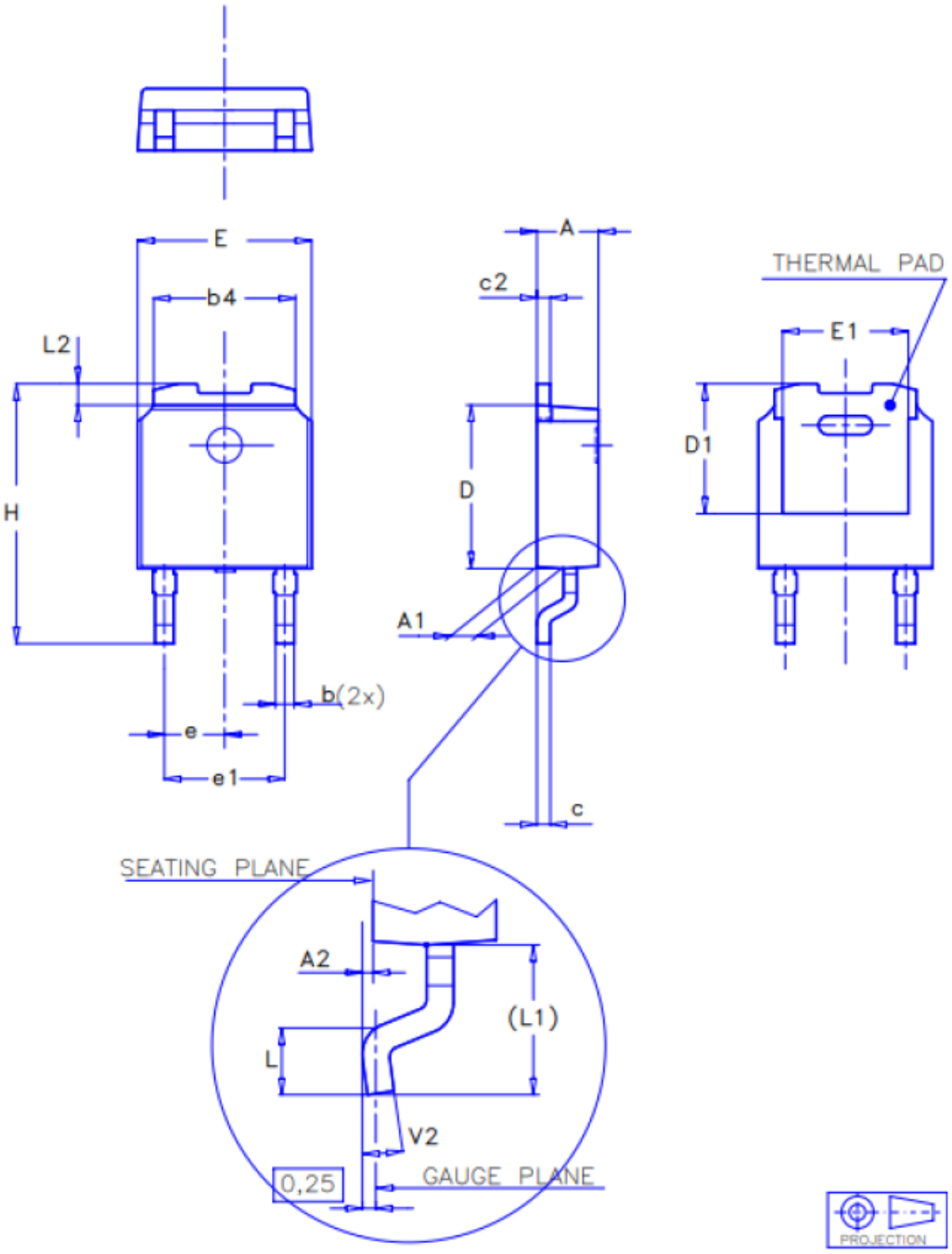
2 Package information

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.

2.1 DPAK HV 2L package information

- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)

Figure 10. DPAK HV 2L package outline

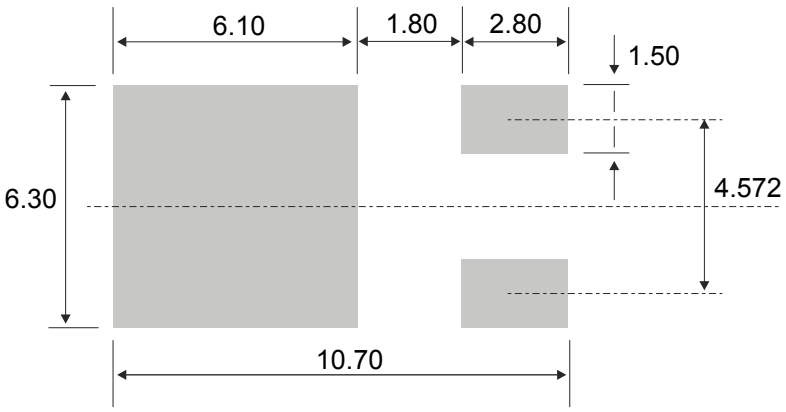


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 4. DPAK HV 2L package mechanical data

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20	2.29	2.40	0.086	0.090	0.095
A1	0.90		1.10	0.035		0.044
A2	0.03		0.23	0.001		0.010
b	0.64	0.76	0.90	0.025	0.030	0.036
b4	5.10	5.20	5.40	0.201	0.204	0.213
c	0.45		0.60	0.017		0.024
c2	0.48		0.60	0.018		0.024
D	6.00		6.20	0.236		0.245
D1	4.60	4.70	4.80	0.181	0.185	0.189
E	6.40		6.60	0.251		0.260
E1	4.95	5.10	5.25	0.194	0.201	0.207
e	2.16	2.28	2.40	0.085	0.090	0.095
e1	4.40		4.60	0.173		0.182
H	9.35		10.10	0.368		0.398
L	1.00		1.50	0.039		0.060
L1	2.60	2.80	3.00	0.102	0.110	0.119
L2	0.65	0.80	0.95	0.025	0.031	0.038
V2	0°		8°	0°		8°

Figure 11. Footprint (dimensions in mm)



Note: For package and tape orientation, reel and inner box dimensions and tape outline please check TN1173.

2.1.1 Creepage distance between anode and cathode

Table 5. Creepage distance between anode and cathode

Symbol	Parameter		Value	Unit
Cd_{A-K}	Minimum creepage distance between A and K	DPAK HV	3.0	mm

Note: DPAK HV creepage distance (anode to cathode) =3.0 mm min. (refer to IEC 60664-1)

3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STBR1508B2Y-TR	BR15 08B2Y	DPAK HV	0.355 g	2500	Tape and reel

Revision history

Table 7. **Document revision history**

Date	Revision	Changes
17-May-2022	1	First issue.

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