LBP01

LED bypass protection

Datasheet – production data

Features

- Bidirectional device: LBP01-0810B
- Unidirectional device: LBP01-0803SC5
- RoHS compliant

Benefits

- Keep LED strings on in case of LED open mode failure
- Reduced maintenance cost
- Increase lifetime of the lighting system

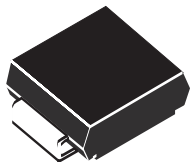
Complies with the following standards:

- IEC61000-4-2 level 4
  - ±15 kV (air discharge)
  - ±8 kV (contact discharge)
- IEC 61000-4-5
  - ±1kV / 24 A

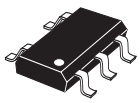
Applications

This device shunts failed LEDs in applications where LED strings can not be turned-off for safety reason due to a LED failure. Main applications are:

- Automotive headlights
- Traffic lights
- Aircraft runaway lights
- Emergency lighting systems
- Display panel backlighting
- Street lighting

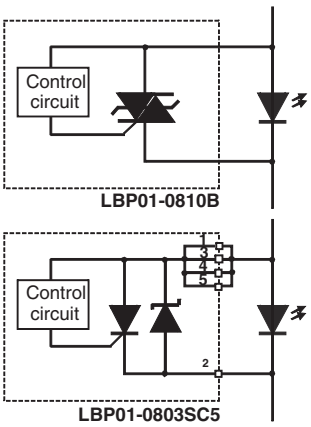


SMB
(DO-214AA)
LBP01-0810B



SOT23-5L
LBP01-0803SC5

Figure 1. Functional diagrams



Description

The LBP01 series are bypass switches to be connected in parallel with 1 or 2 LEDs. In case of LED failure, this allows the current to flow through the other LEDs.

It also provides an overvoltage protection against surges defined in IEC 61000-4-2 and IEC 61000-4-5

Their robust dice also protect LEDs against surge.

These devices are compatible with LEDs up to 1 A.

LBP01 are packaged either in SMB or SOT23-5L

This is information on a product in full production. www.st.com

1 Characteristics

Table 1. Absolute maximum ratings (T_{amb} = 25 °C)

Symbol	Parameter		Value	Unit
V_{PP}	Peak pulse voltage	IEC 61000-4-2 contact discharge	30	kV
I_{PP}	Repetitive peak pulse current (8/20µs)		24	A
I_F	On-state DC current	SOT23-5L	0.35	A
		SMB	1	A
T_j	Operating junction temperature range		-55 to 150	°C
T_{stg}	Storage temperature range		-65 to 150	°C
T_L	Maximum lead temperature for soldering during 10 s		260	°C

Table 2. Electrical characteristics (T_{amb} = 25 °C)

Symbol	Test conditions		Min.	Typ.	Max.	Unit
I_{RM}	V_{RM} = 3 V				100	nA
V_{BO}			8		15	V
I_H		SOT23-5L			200	mA
		SMB			200	
V_{on}	I_{on} = 0.35 A (1)	SOT23-5L			2	V
	I_{on} = 0.35 A	SMB			1.3	V
	I_{on} = 1 A	SMB			1.5	V
dV/dt			300			V/µs
$R_{th(j-a)}$	On recommended pad layout with copper area of 1 cm^2	SOT23-5L		140		°C/W
		SMB		100		°C/W

1. Measured between pin 1, 3, 4, or 5 and pin 2

Figure 2. Thermal resistance, junction to ambient, versus copper area under each lead (SMB)

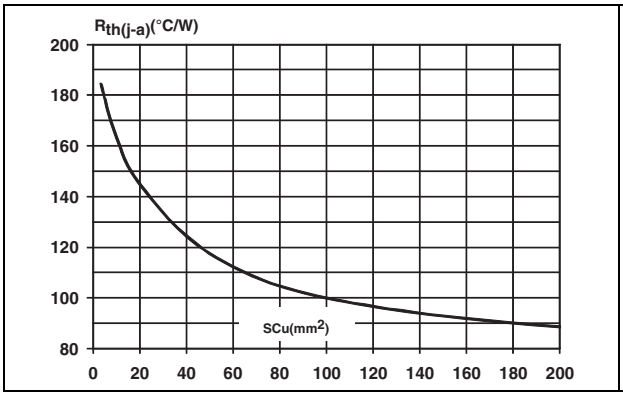
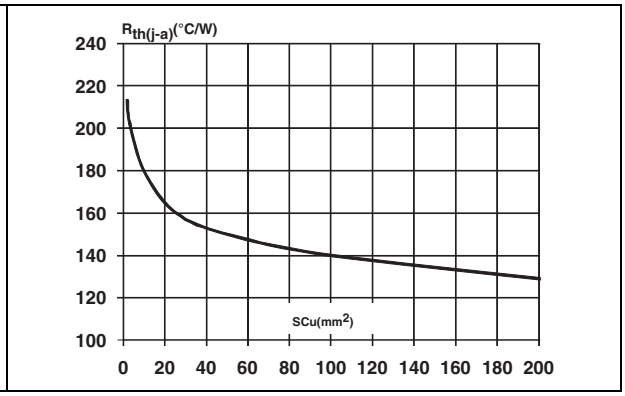
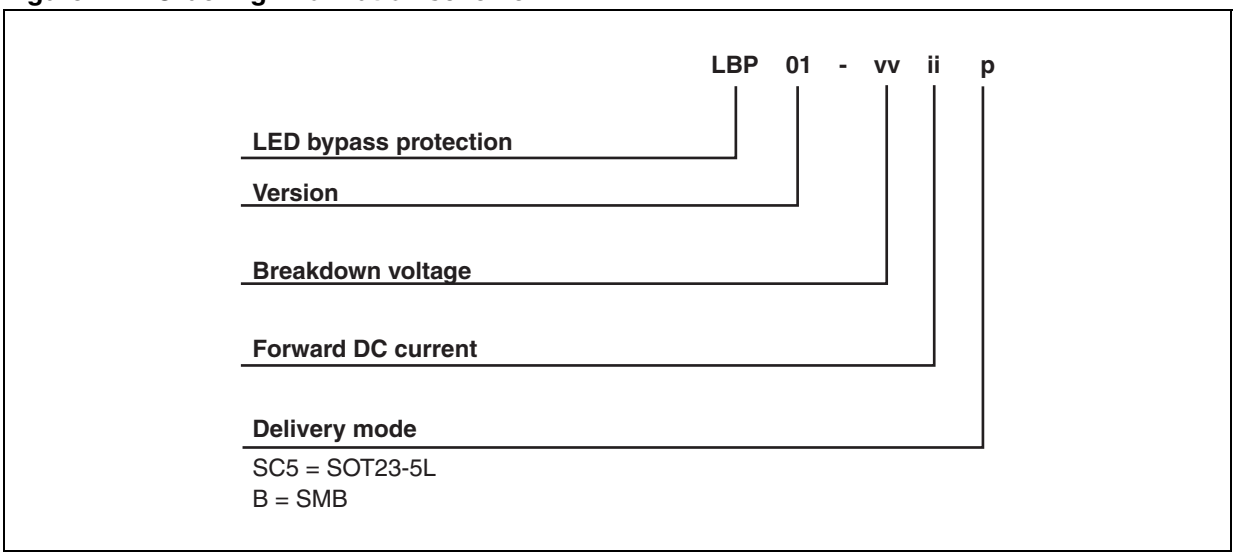


Figure 3. Thermal resistance, junction to ambient, versus copper area under each lead (SOT23-5L)



2 Ordering information scheme

Figure 4. Ordering information scheme

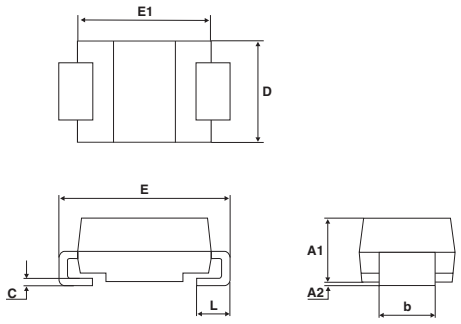


3 Package information

- Epoxy meets UL94, V0
- Lead-free package

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.

Table 3. SMB dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.40	0.006	0.016
D	3.30	3.95	0.130	0.156
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
L	0.75	1.50	0.030	0.059

Figure 5. Footprint, dimensions in mm (inches)

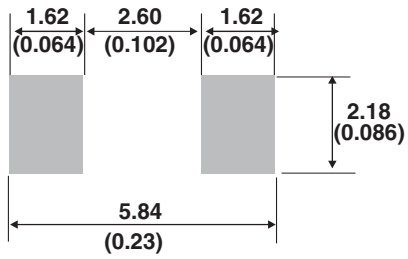
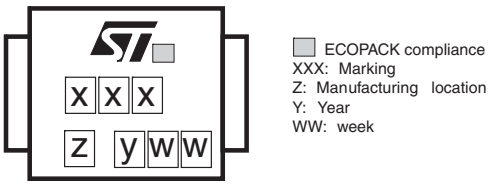
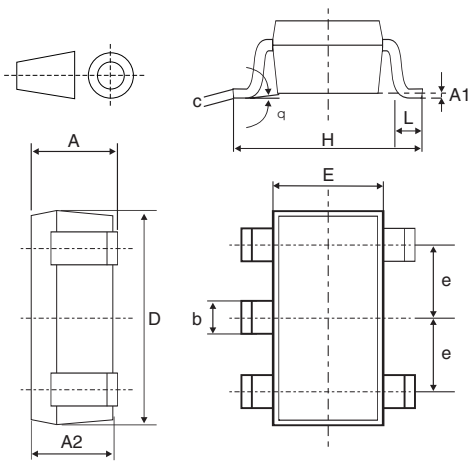


Figure 6. Marking(1)



1. Product marking may be rotated by 90° for assembly plant differentiation. In no case should this product marking be used to orient the component for its placement on a PCB. Only pin 1 mark is to be used for this purpose.

Table 4. SOT23-5L dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.45	0.035		0.057
A1	0		0.10	0		0.004
A2	0.90		1.30	0.035		0.051
b	0.35		0.50	0.014		0.020
c	0.09		0.20	0.004		0.008
D	2.80		3.05	0.11		0.118
E	1.50		1.75	0.059		0.069
e		0.95			0.037	
H	2.60		3.00	0.102		0.118
L	0.10		0.60	0.004		0.024
M	0°		10°	0°		10°

Figure 7. Footprint, dimensions in mm (inches)

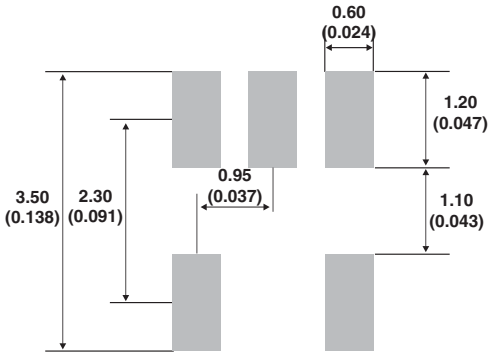
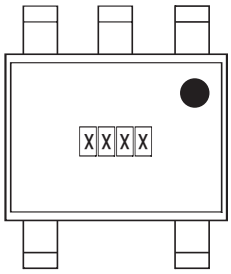


Figure 8. Marking

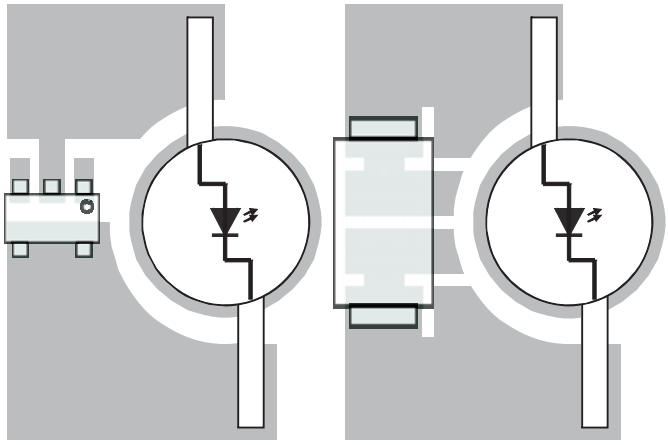


4 Recommendations on PCB assembly

4.1 PCB design

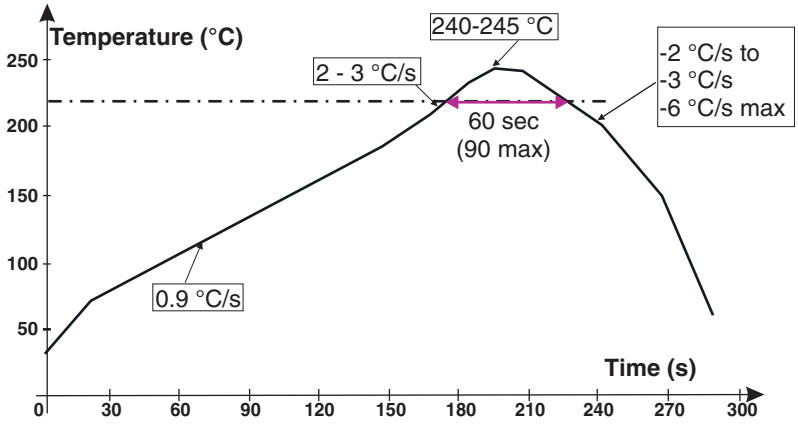
1. To control the solder paste amount, the closed via is recommended instead of open vias.
2. The position of tracks and open vias in the solder area should be well balanced. The symmetrical layout is recommended, in case any tilt phenomena caused by asymmetrical solder paste amount due to the solder flow away.

Figure 9. Printed circuit board layout



4.2 Reflow profile

Figure 10. ST ECOPACK® recommended soldering reflow profile for PCB mounting



Note: Minimize air convection currents in the reflow oven to avoid component movement.

5 Ordering information

Table 5. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
LBP01-0803SC5	XT08	SOT23-5L	16 mg	3000	Tape and reel
LBP01-0810B	L08(1)	SMB	0.11 g	2500	Tape and reel

1. *The marking can be rotated by 90° to differentiate assembly location.*

6 Revision history

Table 6. Document revision history

Date	Revision	Changes
20-Mar-2012	1	Initial release.

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