STPS1045HR

Aerospace 2 x 10 A - 45 V Schottky rectifier

Features

- Forward current: 2 x 10 A
- Repetitive peak voltage: 45 V
- Low forward voltage drop: 0.75 V
- Maximum junction temperature: 175 °C
- Negligible switching losses
- Low capacitance
- High reverse avalanche surge capability
- Hermetic package
- Target radiation qualification:
  - 150 krad (Si) low dose rate
  - 1 Mrad high dose rate
- ESCC qualified

SMD.5

Description

This power Schottky rectifier is designed and packaged to comply with the ESCC5000 specification for aerospace products. Housed in a hermetically sealed surface mount package, it is ideal for use in applications for aerospace and other harsh environments.

The STPS1045HR is intended for use in medium voltage applications and in high frequency circuits where low switching losses and low noise are required.

Table 1. Device summary

Order code	ESCC detailed specification	Quality level	Configuration	Package	Lead finish	EPPL
STPS1045CS1	-	Engineering model	Double die common cathode	SMD.5	Gold	-
STPS1045CSHRB	5106/017/02	ESCC flight				-

1 Characteristics

Table 2. Absolute maximum ratings

Symbol	Characteristic	Value	Unit
I_{FSM}	Forward surge current (per diode)(1)	200	A
V_{RRM}	Repetitive peak reverse voltage(2)	45	V
I_{RRM}	Repetitive peak reverse current(3)	1	A
I_O	Average output rectified current (50% duty cycle):(4) per diode per device	 10 20	A
$I_{F(RMS)}$	Forward rms current (per diode)	15	A
T_{OP}	Operating temperature range (case temperature)	-65 to +175	°C
T_J	Junction temperature	+175	°C
T_{STG}	Storage temperature range	-65 to +175	°C
T_{SOL}	Soldering temperature(5)	+245	°C
dV/dt	Critical rate of rise of reverse voltage	10000	V/µs

1. Sinusoidal pulse of 10 ms duration
2. Pulsed, duration 5 ms, F = 50 Hz
3. Pulsed, duration 2 µs, F = 1 kHz
4. For T_{case} > +140 °C, derate linearly to 0 A at +175 °C.
5. Duration 5 seconds maximum and the same package shall not be resoldered until 3 minutes have elapsed.

Table 3. Thermal resistance

Symbol	Characteristic	Value	Unit
$R_{th(j-c)}$(1)	Thermal resistance, junction to case per diode per device(2)	 1.65 0.85	°C/W

1. Package mounted on infinite heatsink
2. The per device ratings apply only when both anode terminals are tied togther.

Table 4. Electrical measurements at ambiant temperature (per diode), T_{amb} = 22 ±3 °C

Symbol	Characteristic	MIL-STD-750 test method	Test conditions	Values		Units
				Min.	Max.	
I_R	Reverse Current	4016	DC method, V_R = 45V	-	100	µA
V_{F1}(1)	Forward Voltage	4011	Pulse method, I_F = 3 A	-	620	mV
V_{F2}(1)			Pulse method, I_F = 20 A	-	750	mV
V_{F3}(1)			Pulse method, I_F = 20 A		880	mV
C	Capacitance	4001	V_R = 5 V, F = 1 MHz	-	500	pF
$Z_{th(j-c)}$(2)	Relative thermal impedance, junction to case	3101	I_H = 15 to 40 A, t_H = 50 ms I_M = 50 mA, t_{md} = 100 µs	Calculate ΔV_F(3)		°C/W

1. Pulse width ≤ 300 µs, Duty Cycle ≤ 2%
2. Performed only during screening tests parameter drift values (initial measurements), go-no-go
3. The limits for ΔVF shall be defined by the manufacturer on every lot in accordance with MIL-STD-750 Method 3101 and shall guarantee the $R_{th(j-c)}$ limits specified in maximum ratings.

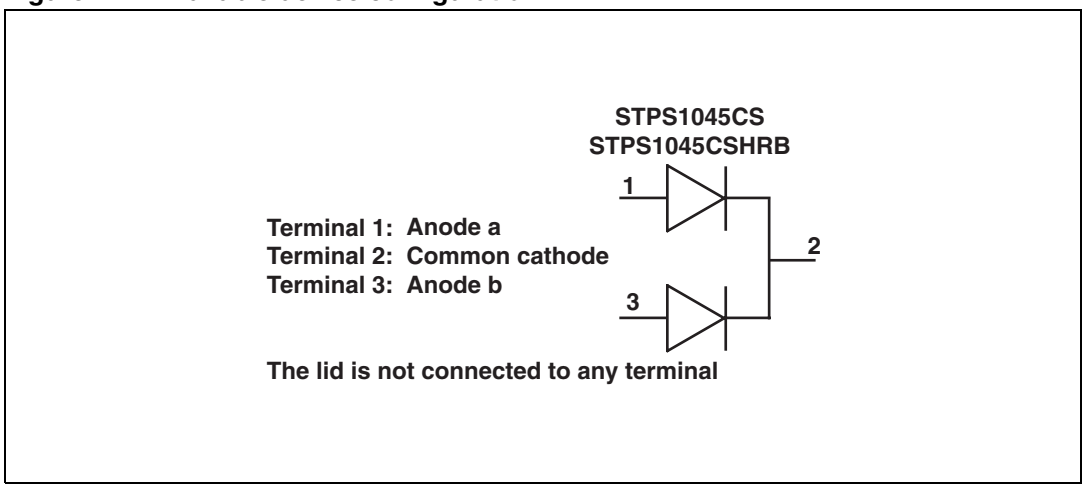
Table 5. Electrical measurements at high and low temperatures (per diode)

Symbol	Characteristic	MIL-STD-750 test method	Test conditions(1)	Values		Units
				Min.	Max.	
I_R	Reverse Current	4016	T_{case} = +125 (+0, -5) °C DC method, V_R = 45 V	-	15	mA
V_{F1}(2)	Forward Voltage	4011	T_{case} = +125 (+0, -5) °C pulse method, I_F = 3 A	-	570	mV
V_{F2}(2)			T_{case} = +125 (+0, -5) °C pulse method, I_F = 10 A	-	700	mV
			T_{case} = -55 (+0, -5) °C pulse method, I_F = 10 A	-	850	mV
V_{F3}(2)			T_{case} = +125 (+0, -5) °C pulse method, I_F = 20 A	-	800	mV

1. Read and record measurements shall be performed on a sample of 5 components with 0 failures allowed. Alternatively a 100% inspection may be performed.
2. Performed only during screening tests parameter drift values (initial measurements for HTRB), go-no-go.

2 Configuration

Figure 1. Available device configuration



3 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.

Figure 2. Surface mount package (SMD.5), 3-terminal dimension definitions

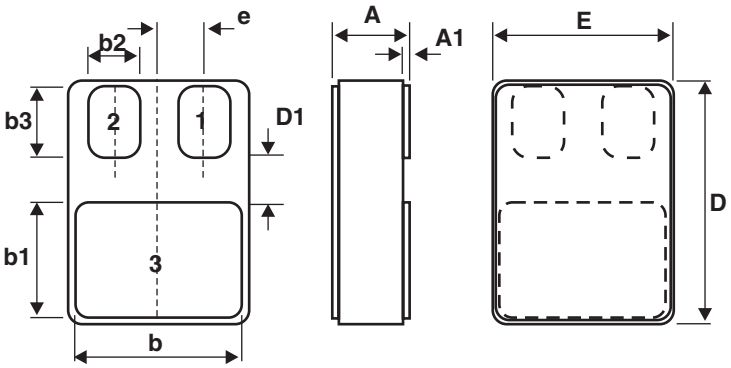


Table 6. Surface mount package (SMD.5), 3-terminal dimension values

Reference	Dimension in millimetres		Dimlension in inches	
	Min.	Max.	Min.	Max.
A	2.84	3.15	0.112	0.124
A1	0.25	0.51	0.010	0.20
b	7.13	7.39	0.281	0.291
b1	5.58	5.84	0.220	0.230
b2(1)	2.28	2.54	0.090	0.100
b3(1)	2.92	3.18	0.115	0.125
D	10.03	10.28	0.395	0.405
D1(1)	0.76	-	0.030	-
E	7.39	7.64	0.291	0.301
e(1)	1.91 BSC		0.075	

1. 2 locations

4 Ordering Information

Table 7. Ordering information

Order code	ESCC detailed specification	Package	Lead finish	Marking	EPPL	Mass (g)	Packing
STPS1045CS1	-	SMD.5	Gold	STPS1045CS1	-	2.0	Strip pack
STPS1045CSHRB	5106/017/02		Gold	510601702	-		

5 Revision history

Table 8. Document revision history

Date	Revision	Changes
16-June-2010	1	Initial release.

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