



# THE DATASHEET OF STPS1045BTRL



International  
**IOR** Rectifier

# STPS1045B

## SCHOTTKY RECTIFIER

## 10 Amp

$$I_{F(AV)} = 10\text{Amp}$$

$$V_R = 45\text{V}$$

### Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	10	A
$V_{RRM}$	45	V
$I_{FSM}$ @ $t_p = 5\mu\text{s}$ sine	390	A
$V_F$ @10Apk, $T_J = 125^\circ\text{C}$	0.57	V
$T_J$ range	-40 to 175	$^\circ\text{C}$

### Description/ Features

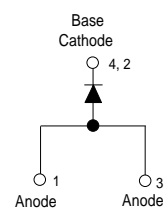
The STPS1045B surface mount Schottky rectifier has been designed for applications requiring low forward drop and small foot prints on PC board. Typical applications are in disk drives, switching power supplies, converters, free-wheeling diodes, battery charging, and reverse battery protection.

- Popular D-PAK outline
- Small foot print, surface mountable
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

### Case Styles



D-PAK (TO-252AA)



## Voltage Ratings

Part number	STPS1045B
$V_R$ Max. DC Reverse Voltage (V)	45
$V_{RWM}$ Max. Working Peak Reverse Voltage (V)	

## Absolute Maximum Ratings

Parameters	Value	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current * See Fig. 5	10	A	50% duty cycle @ $T_C = 151^\circ\text{C}$ , rectangular wave form
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7	390	A	Following any rated load condition and with rated $V_{RWM}$ applied
	75		
$E_{AS}$ Non-Repetitive Avalanche Energy	20	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 3.0$ Amps, $L = 4.40$ mH
$I_{AR}$ Repetitive Avalanche Current	3.0	A	Current decaying linearly to zero in 1 $\mu\text{sec}$ Frequency limited by $T_J$ max. $V_A = 1.5 \times V_R$ typical

## Electrical Specifications

Parameters	Value	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop * See Fig. 1 (1)	0.63	V	@ 10A $T_J = 25^\circ\text{C}$
	0.84	V	@ 20A
	0.57	V	@ 10A $T_J = 125^\circ\text{C}$
	0.72	V	@ 20A
$I_{RM}$ Max. Reverse Leakage Current * See Fig. 2 (1)	0.2	mA	$T_J = 25^\circ\text{C}$ $V_R = \text{rated } V_R$
	15	mA	$T_J = 125^\circ\text{C}$
$C_T$ Typical Junction Capacitance	760	pF	$V_R = 5V_{DC}$ (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$
$L_S$ Typical Series Inductance	5.0	nH	Measured lead to lead 5mm from package body
dv/dt Max. Voltage Rate of Change	10000	V/ $\mu\text{s}$	(Rated $V_R$ )

(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle < 2%

## Thermal-Mechanical Specifications

Parameters	Value	Units	Conditions
$T_J$ Max. Junction Temper. Range (*)	- 40 to 175	$^\circ\text{C}$	
$T_{stg}$ Max. Storage Temperature Range	- 40 to 175	$^\circ\text{C}$	
$R_{thJC}$ Max. Thermal Resistance Junction to Case	3.0	$^\circ\text{C}/\text{W}$	DC operation * See Fig. 4
$R_{thJA}$ Max. Thermal Resistance Junction to Ambient	50	$^\circ\text{C}/\text{W}$	
wt Approximate Weight	0.3(0.01)	g(oz.)	
Case Style	D - PAK		Similar to TO-252AA
Device Marking	STPS1045B		

(\*)  $\frac{dP_{tot}}{dT_J} < \frac{1}{R_{th(j-a)}}$  thermal runaway condition for a diode on its own heatsink

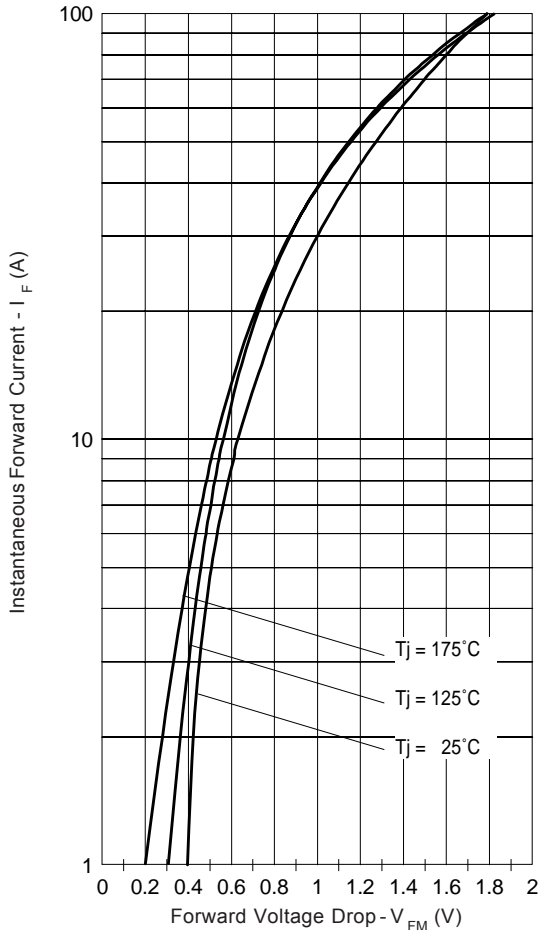


Fig. 1 - Maximum Forward Voltage Drop Characteristics

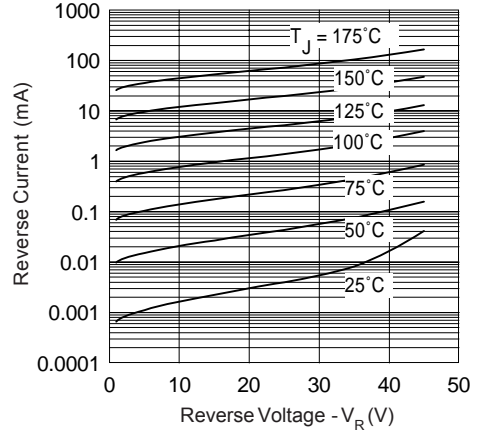


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

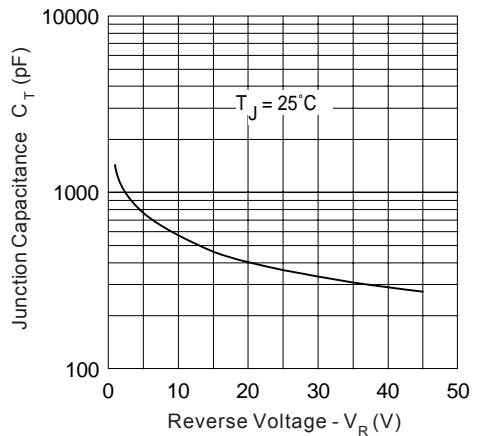


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

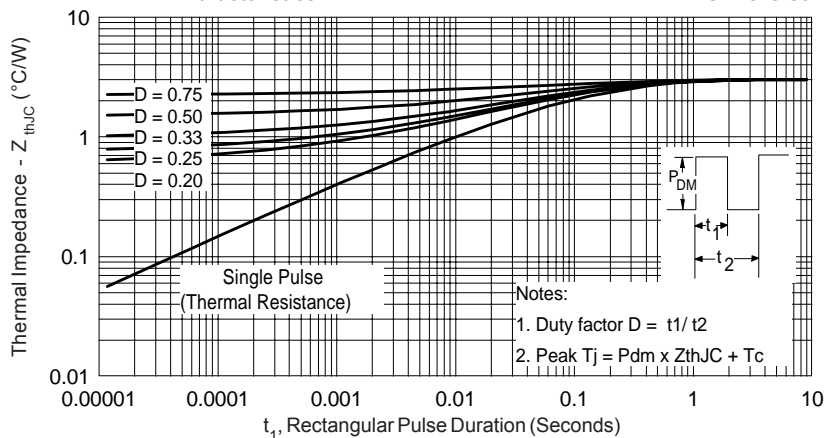
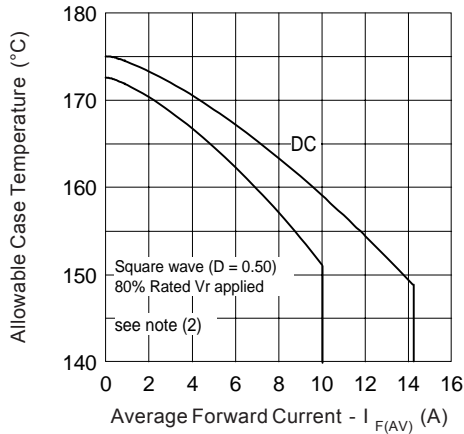
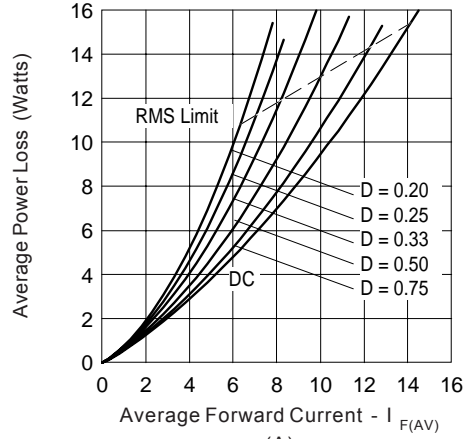


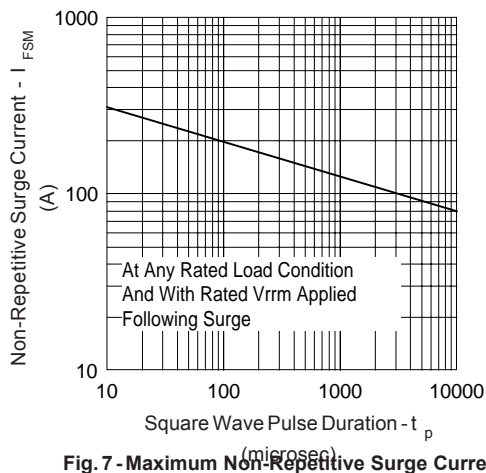
Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics



**Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current**



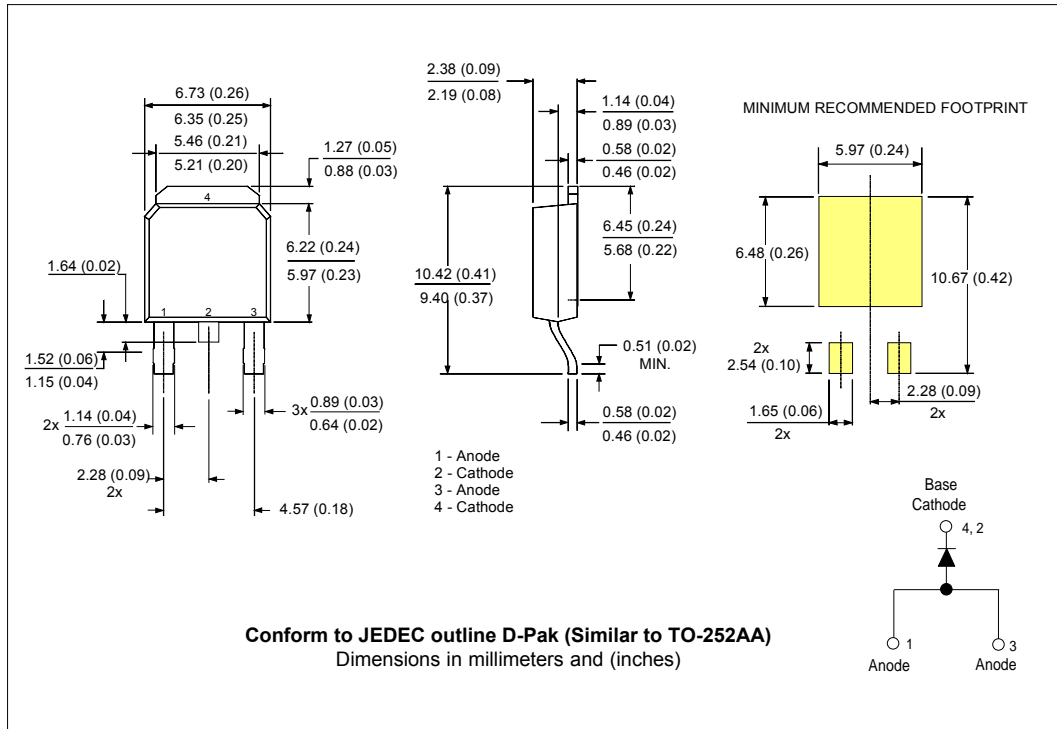
**Fig. 6 - Forward Power Loss Characteristics**



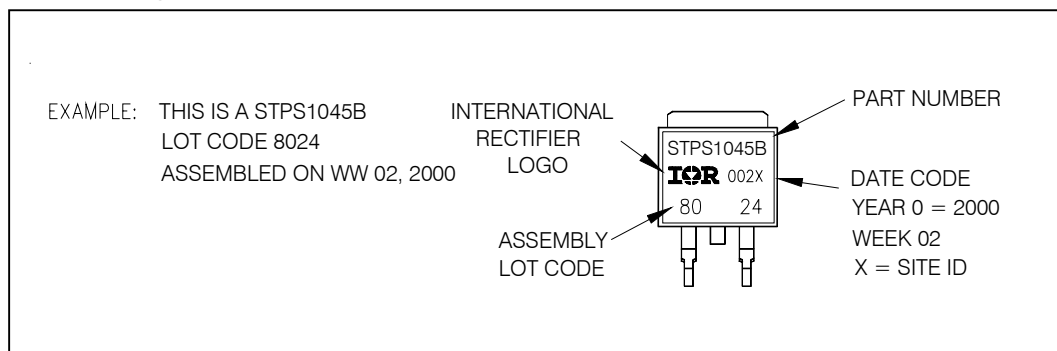
**Fig. 7 - Maximum Non-Repetitive Surge Current**

(2) Formula used:  $T_c = T_j - (Pd + Pd_{REV}) \times R_{thJC}$ ;  
 $Pd = \text{Forward Power Loss} = I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$  (see Fig. 6);  
 $Pd_{REV} = \text{Inverse Power Loss} = V_{R1} \times I_R (1 - D)$ ;  $I_R @ V_{R1} = 80\% \text{ rated } V_R$

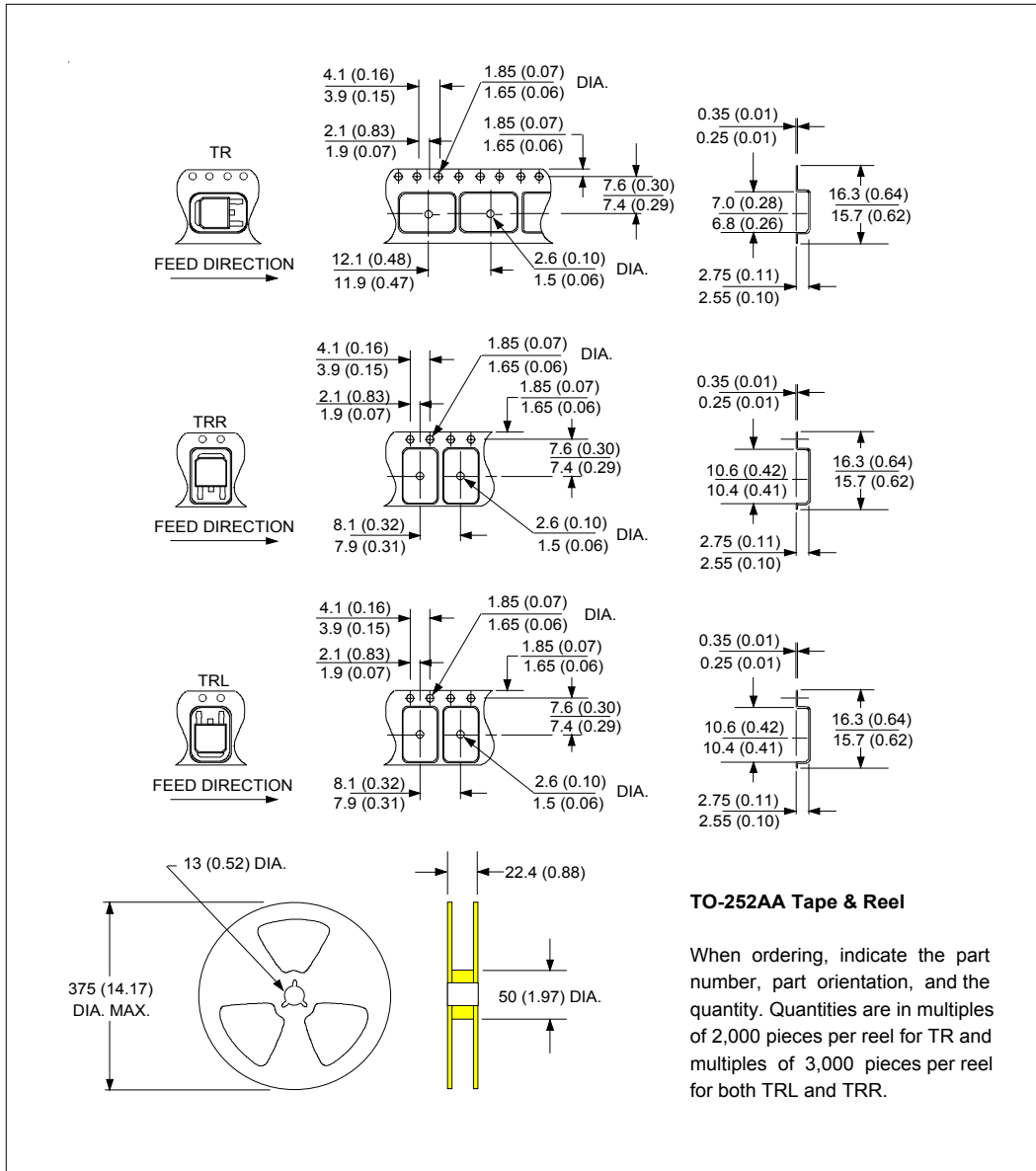
Outline Table



Part Marking Information



Tape & Reel Information



Ordering Information Table

Device Code													
	<table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">STPS</td> <td style="padding: 5px;">10</td> <td style="padding: 5px;">45</td> <td style="padding: 5px;">B</td> <td style="padding: 5px;">TRL</td> <td style="padding: 5px;">-</td> </tr> <tr> <td style="text-align: center;">①</td> <td style="text-align: center;">②</td> <td style="text-align: center;">③</td> <td style="text-align: center;">④</td> <td style="text-align: center;">⑤</td> <td style="text-align: center;">⑥</td> </tr> </table>	STPS	10	45	B	TRL	-	①	②	③	④	⑤	⑥
STPS	10	45	B	TRL	-								
①	②	③	④	⑤	⑥								
<b>1</b>	- Schottky STPS Series												
<b>2</b>	- Current Rating (10A)												
<b>3</b>	- Voltage Rating (45 = 45V)												
<b>4</b>	- B = Essential Part Number												
<b>5</b>	- <ul style="list-style-type: none"> <li>• none = Tube (50 pieces)</li> <li>• TR = Tape &amp; Reel</li> <li>• TRL = Tape &amp; Reel (Left Oriented)</li> <li>• TRR = Tape &amp; Reel (Right Oriented)</li> </ul>												
<b>6</b>	- <ul style="list-style-type: none"> <li>• none = Standard Production</li> <li>• PbF = Lead-Free</li> </ul>												

Data and specifications subject to change without notice.  
 This product has been designed and qualified for AEC Q101 Level.  
 Qualification Standards can be found on IR's Web site.



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