Bulletin PD-20754 rev. D 10/05

International
IOR Rectifier

STPS1045B

SCHOTTKY RECTIFIER

10 Amp

$I_{F(AV)}$ = 10Amp
V_R = 45V

Major Ratings and Characteristics

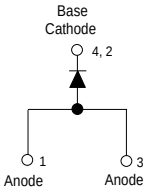
Characteristics		Values	Units
$I_{F(AV)}$	Rectangular waveform	10	A
V_{RRM}		45	V
I_{FSM}	@tp = 5 µs sine	390	A
V_F	@10 Apk, T_J = 125°C	0.57	V
T_J	range	-40 to 175	°C

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 moutable
- 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°C, rectangular wave form	
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7	390	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
		75		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy	20	mJ	T_J = 25 °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 µsec Frequency limited by T_J max. V_A = 1.5 x 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 °C
		0.84	V	@ 20A	
		0.57	V	@ 10A	T_J = 125 °C
		0.72	V	@ 20A	
I_{RM}	Max. Reverse Leakage Current * See Fig. 2 (1)	0.2	mA	T_J = 25 °C	V_R = rated V_R
		15	mA	T_J = 125 °C	
C_T	Typical Junction Capacitance	760	pF	V_R = 5V_{DC} (test signal range 100Khz to 1Mhz) 25 °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/ µs	(Rated V_R)	

(1) Pulse Width < 300µs, Duty Cycle < 2%

Thermal-Mechanical Specifications

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

(*) $\frac{dPtot}{dTj} < \frac{1}{Rth(j\text{-}a)}$ thermal runaway condition for a diode on its own heatsink

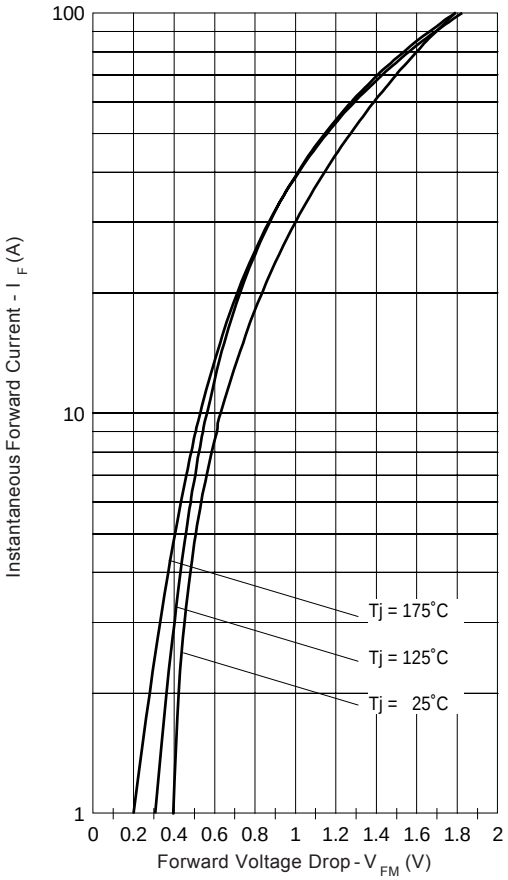


Fig. 1 - Maximum Forward Voltage Drop Characteristics

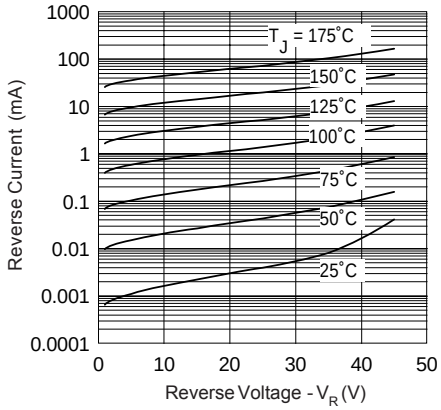


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

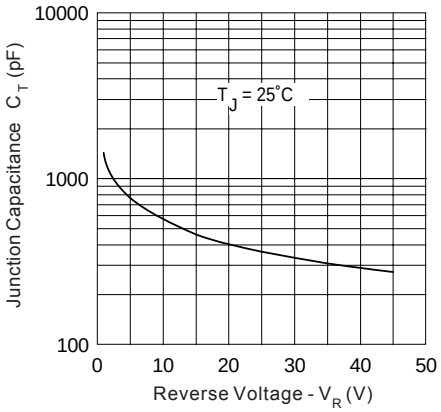


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

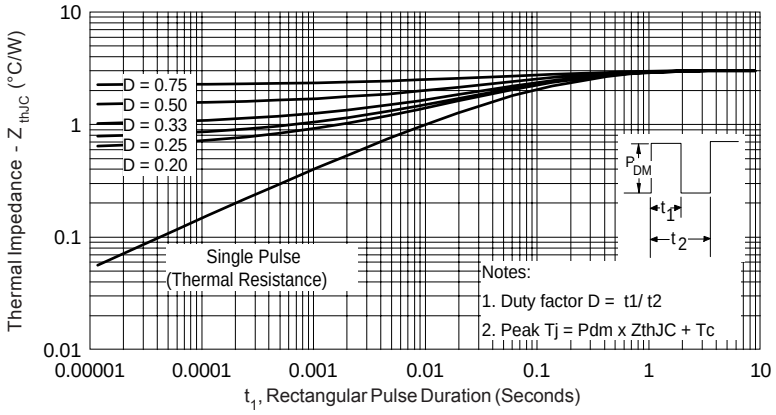


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

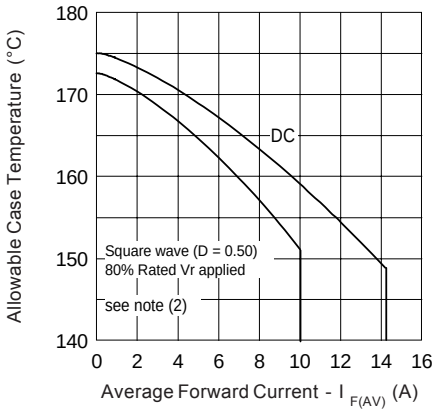


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

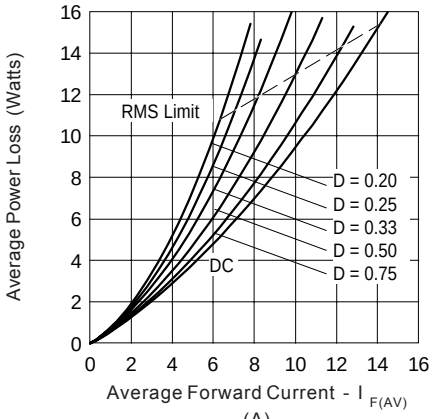


Fig. 6 - Forward Power Loss Characteristics

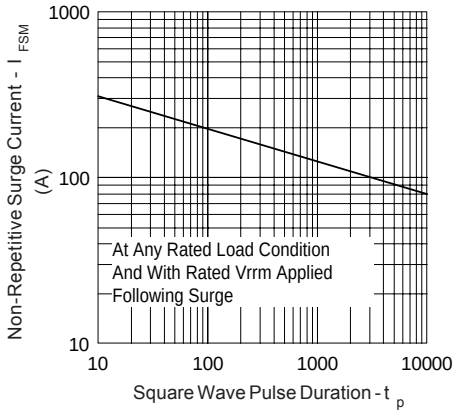
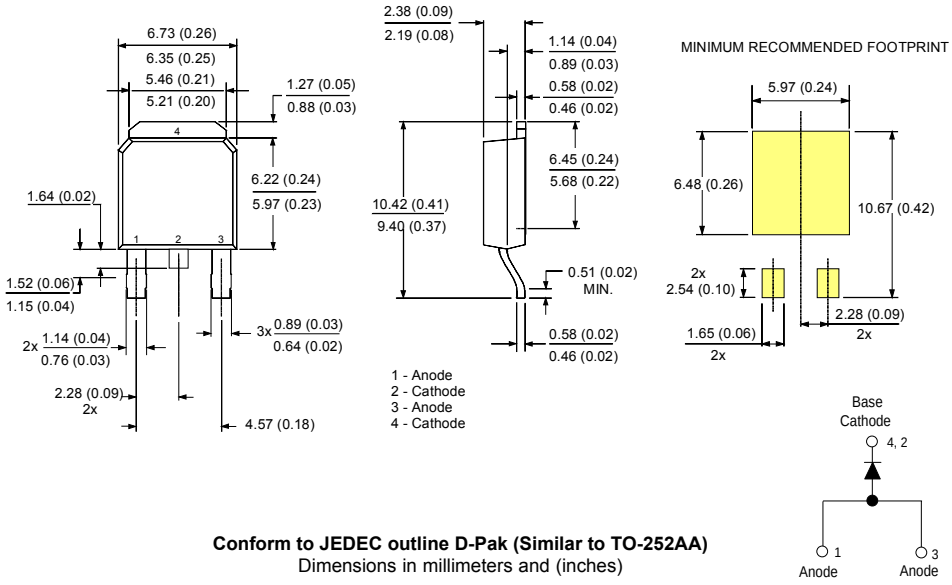


Fig. 7 - Maximum Non-Repetitive Surge Current

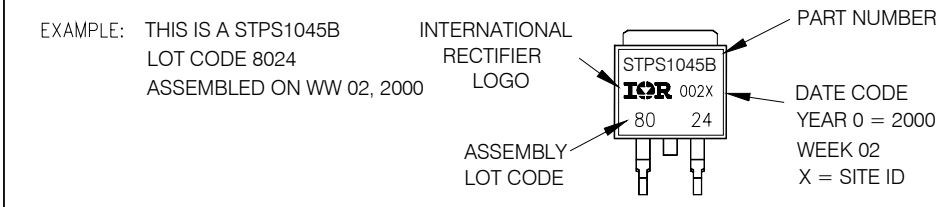
(2) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);
Pd_{REV} = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1}$ = 80% rated V_R

Outline Table

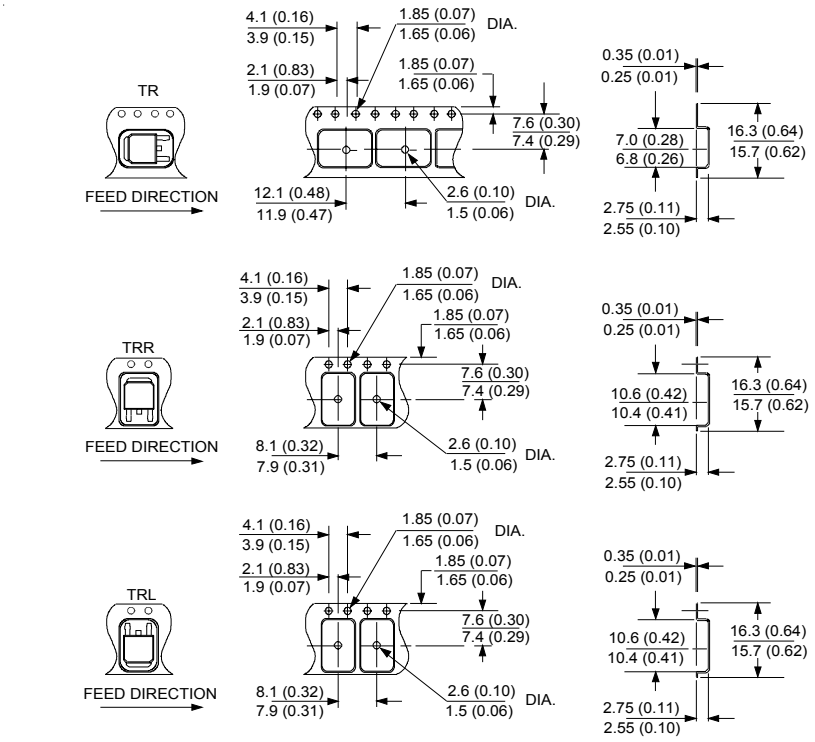


Conform to JEDEC outline D-Pak (Similar to TO-252AA)
Dimensions in millimeters and (inches)

Part Marking Information



Tape & Reel Information

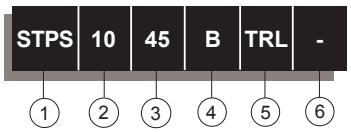


TO-252AA Tape & Reel

When ordering, indicate the part number, part orientation, and the quantity. Quantities are in multiples of 2,000 pieces per reel for TR and multiples of 3,000 pieces per reel for both TRL and TRR.

Ordering Information Table

Device Code



1	-	Schottky STPS Series
2	-	Current Rating (10A)
3	-	Voltage Rating (45 = 45V)
4	-	B = Essential Part Number
5	-	• none = Tube (50 pieces) • TR = Tape & Reel • TRL = Tape & Reel (Left Oriented) • TRR = Tape & Reel (Right Oriented)
6	-	• none = Standard Production • PbF = Lead-Free

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.

International
IOR Rectifier

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10/05

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