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[STPS40L45CW](#)

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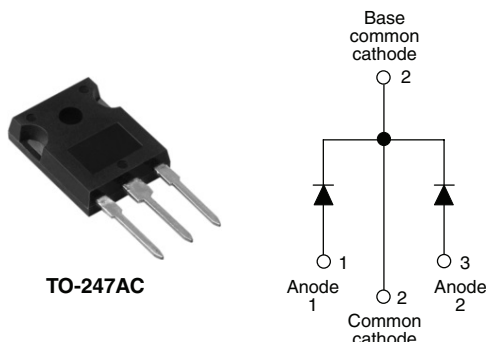
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# STPS40L45CW

Vishay High Power Products

## Schottky Rectifier, 2 x 20 A



### FEATURES

- 150 °C T<sub>J</sub> operation
- Center tap TO-247 package
- Very low forward voltage drop
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Designed and qualified for industrial level

### DESCRIPTION

The STPS40L45CW center tap Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in switching power supplies.

PRODUCT SUMMARY	
I <sub>F(AV)</sub>	2 x 20 A
V <sub>R</sub>	45 V
I <sub>RM</sub>	80 mA at 100 °C

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
I <sub>F(AV)</sub>	Rectangular waveform	40	A
V <sub>RRM</sub>		45	V
I <sub>FSM</sub>	t <sub>p</sub> = 5 μs sine	1240	A
V <sub>F</sub>	20 Apk, T <sub>J</sub> = 125 °C (per leg, typical)	0.42	V
T <sub>J</sub>		- 55 to 150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	STPS40L45CW	UNITS
Maximum DC reverse voltage	V <sub>R</sub>	45	V
Maximum working peak reverse voltage	V <sub>RWM</sub>		

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 5	I <sub>F(AV)</sub>	50 % duty cycle at T <sub>C</sub> = 122 °C, rectangular waveform	40	A
			per device	
Maximum peak one cycle non-repetitive surge current per leg See fig. 7	I <sub>FSM</sub>	5 μs sine or 3 μs rect. pulse	1240	A
		10 ms sine or 6 ms rect. pulse	350	
Non-repetitive avalanche energy per leg	E <sub>AS</sub>	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 3 A, L = 4.4 mH	20	mJ
Repetitive avalanche current per leg	I <sub>AR</sub>	Current decaying linearly to zero in 1 μs Frequency limited by T <sub>J</sub> maximum V <sub>A</sub> = 1.5 x V <sub>R</sub> typical	3	A

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ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Maximum forward voltage drop per leg See fig. 1	$V_{FM}^{(1)}$	20 A	$T_J = 25\text{ }^\circ\text{C}$	0.48	0.53	V
		40 A		0.61	0.69	
		20 A	$T_J = 125\text{ }^\circ\text{C}$	0.42	0.49	
		40 A		0.60	0.70	
Reverse leakage current per leg See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	-	1.5	mA
		$T_J = 100\text{ }^\circ\text{C}$		20	80	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.27		V
Forward slope resistance	$r_t$	$T_J = T_J \text{ maximum}$		8.72		m $\Omega$
Maximum junction capacitance per leg	$C_T$	$V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) 25 $^\circ\text{C}$		-	1500	pF
Typical series inductance per leg	$L_S$	Measured lead to lead 5 mm from package body		7.5	-	nH
Maximum voltage rate of change	dV/dt	Rated $V_R$		10 000		V/ $\mu\text{s}$

**Note**

(1) Pulse width < 300  $\mu\text{s}$ , duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	$T_J, T_{Stg}$		- 55 to 150	$^\circ\text{C}$
Maximum thermal resistance, junction to case per leg	$R_{thJC}$	DC operation See fig. 4	1.6	$^\circ\text{C/W}$
Maximum thermal resistance, junction to case per package		DC operation	0.8	
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth and greased	0.24	
Approximate weight			6	g
			0.21	oz.
Mounting torque	minimum	Non-lubricated threads	6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style TO-247AC (TO-3P) (JEDEC)	STPS40L45CW	



**STPS40L45CW**

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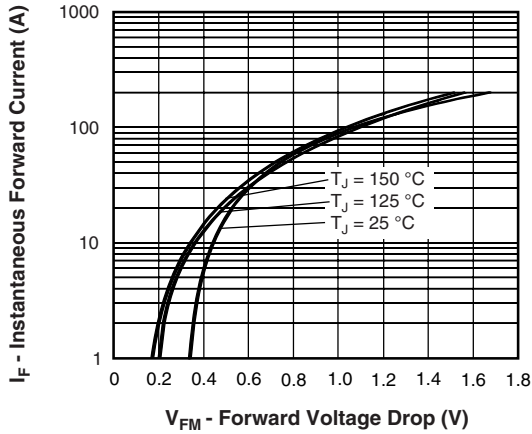


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

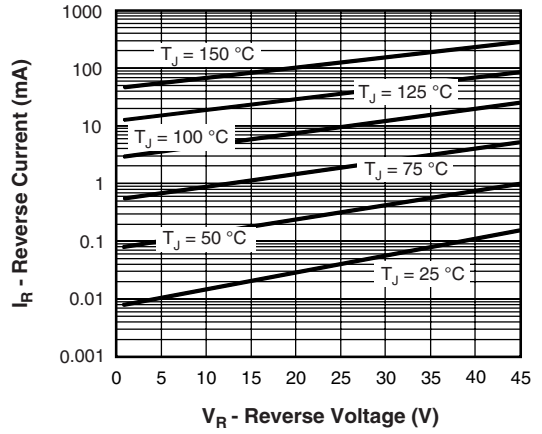


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

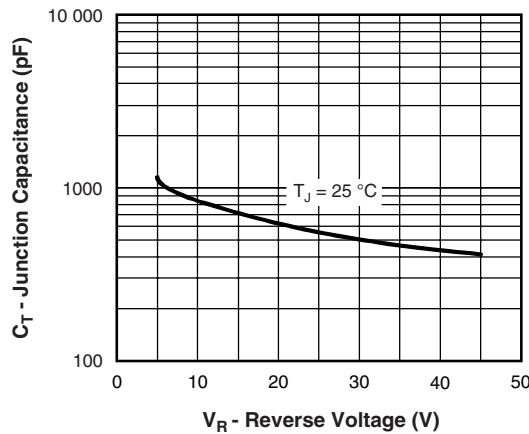


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

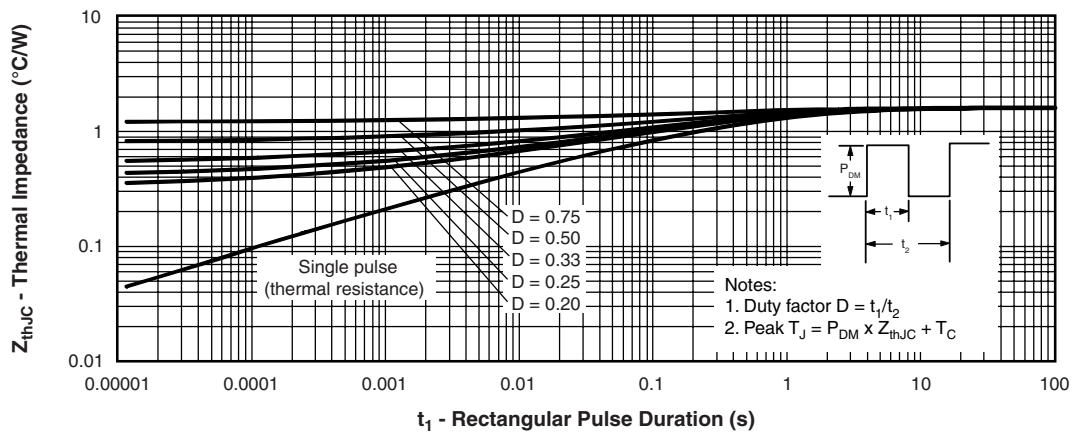
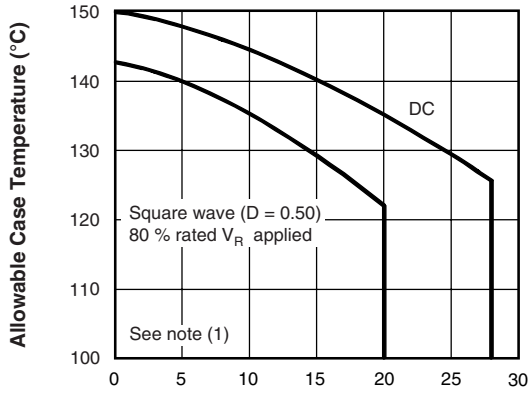


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

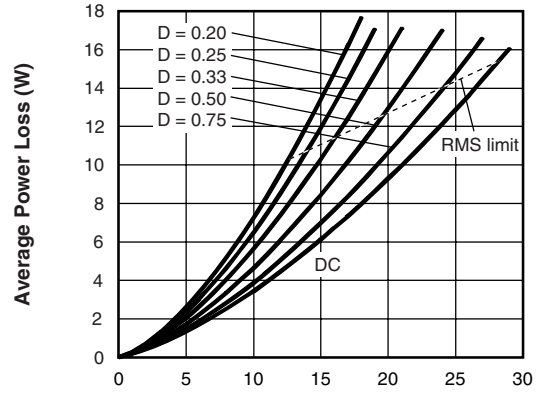
# STPS40L45CW



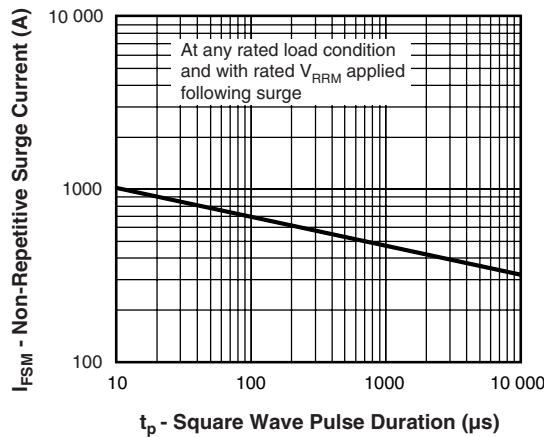
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**I<sub>F(AV)</sub> - Average Forward Current (A)**  
 Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)



**I<sub>F(AV)</sub> - Average Forward Current (A)**  
 Fig. 6 - Forward Power Loss Characteristics (Per Leg)



**t<sub>p</sub> - Square Wave Pulse Duration (µs)**  
 Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

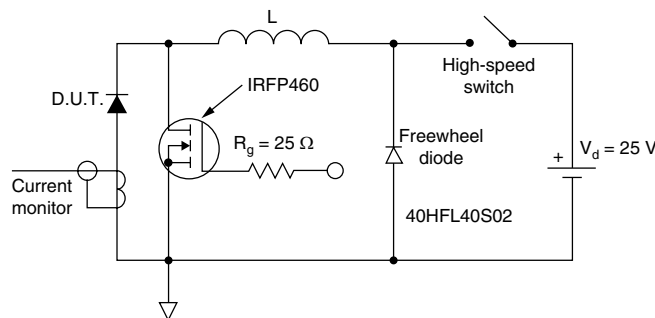


Fig. 8 - Unclamped Inductive Test Circuit

**Note**

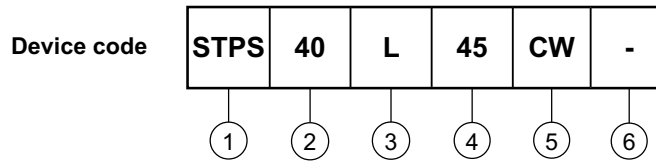
- (1) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$ ;  
 $P_d$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $P_{dREV}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 80\%$  rated  $V_R$



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## ORDERING INFORMATION TABLE



- 1** - Schottky STPS series
- 2** - Current ratings (40 = 40 A)
- 3** - L = Low forward voltage
- 4** - Voltage code (45 = 45 V)
- 5** - Package:  
CW = TO-247
- 6** -
  - None = Standard production
  - PbF = Lead (Pb)-free

Tube standard pack quantity: 25 pieces

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95223">http://www.vishay.com/doc?95223</a>
Part marking information	<a href="http://www.vishay.com/doc?95226">http://www.vishay.com/doc?95226</a>



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