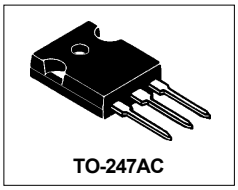
Bulletin PD-20621 05/01

International
IOR Rectifier

STPS40L45CW

SCHOTTKY RECTIFIER

2 x 20 Amps



TO-247AC

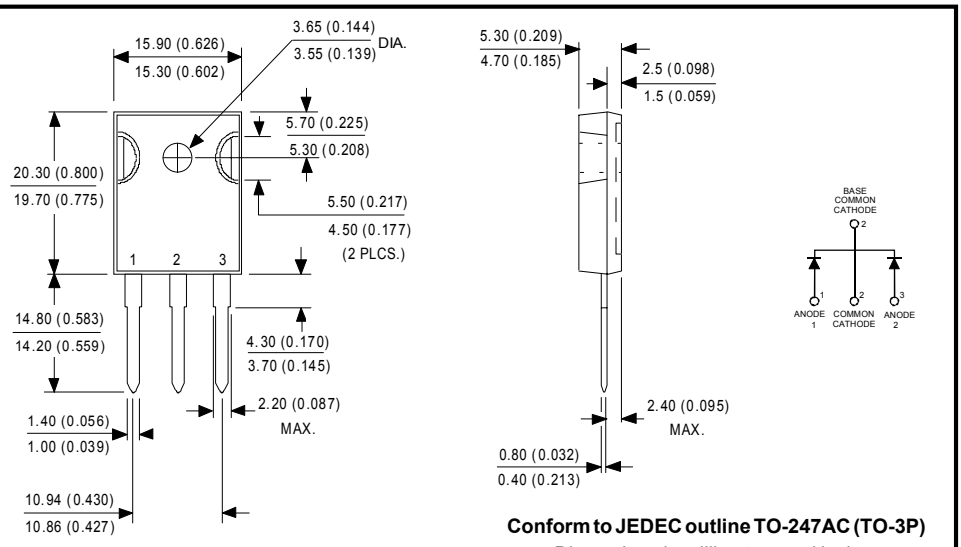
Major Ratings and Characteristics

Characteristics		Value	Units
$I_{F(AV)}$	Rectangular waveform	40	A
V_{RRM}		45	V
I_{FSM}	@tp = 5 µs sine	1240	A
V_F	@20Apk, T_J=125°C (per leg, Typical)	0.42	V
T_J		-55 to 150	°C

Description/Features

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.

- 150° C T_J operation
- Center tap TO-247 package
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability



Conform to JEDEC outline TO-247AC (TO-3P)
Dimensions in millimeters and inches

Voltage Ratings

Part number		STPS40L45CW
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 (Per Leg)	20	A	50% duty cycle @ T_C = 122 °C, rectangular wave form	
	Current * See Fig. 5 (Per Device)	40			
I_{FSM}	Max. Peak One Cycle Non-Repetitive	1240	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
	Surge Current (Per Leg) * See Fig. 7	350		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy (Per Leg)	20	mJ	T_J = 25 °C, I_{AS} = 3 Amps, L = 4.4 mH	
I_{AR}	Repetitive Avalanche Current (Per Leg)	3	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	
		Typ.	Max.			
V_{FM}	Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.48	0.53	V	@ 20A	T_J = 25 °C
		0.61	0.69	V	@ 40A	
		0.42	0.49	V	@ 20A	T_J = 125 °C
		0.60	0.70	V	@ 40A	
I_{RM}	Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	-	1.5	mA	T_J = 25 °C	V_R = rated V_R
		20	80	mA	T_J = 100 °C	
$V_{F(TO)}$	Threshold Voltage	0.27		V	T_J = T_J max.	
r_t	Forward Slope Resistance	8.72		mΩ		
C_T	Max. Junction Capacitance (Per Leg)	-	1500	pF	V_R = 5V_{DC}, (test signal range 100Khz to 1Mhz) 25°C	
L_S	Typical Series Inductance (Per Leg)	7.5	-	nH	Measured lead to lead 5mm from package body	
dv/dt	Max. Voltage Rate of Change (Rated V_R)	10000		V/ µs		

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

Thermal-Mechanical Specifications

	Parameters		40L45CW	Units	Conditions
T_J	Max. Junction Temperature Range		-55 to 150	°C	
T_{stg}	Max. Storage Temperature Range		-55 to 150	°C	
R_{thJC}	Max. Thermal Resistance Junction to Case (Per Leg)		1.6	°C/W	DC operation * See Fig. 4
R_{thJC}	Max. Thermal Resistance Junction to Case (Per Package)		0.8	°C/W	DC operation
R_{thCS}	Typical Thermal Resistance, Case to Heatsink		0.24	°C/W	Mounting surface, smooth and greased
wt	Approximate Weight		6 (0.21)	g (oz.)	
T	Mounting Torque	Min.	6 (5)	Kg-cm (lbf-in)	Non-lubricated threads
		Max.	12 (10)		
	Case Style		TO-247AC (TO-3P)		JEDEC

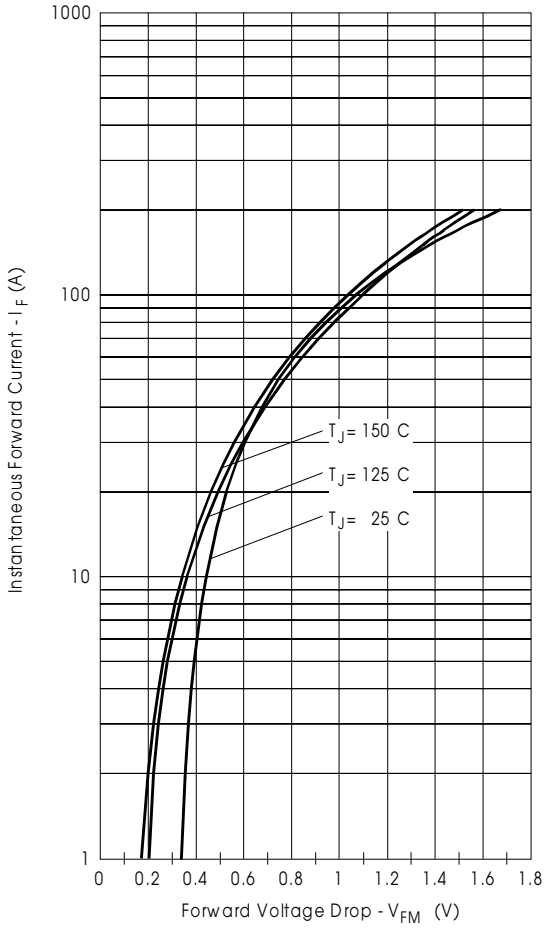


Fig. 1 - Max. Forward Voltage Drop Characteristics (PerLeg)

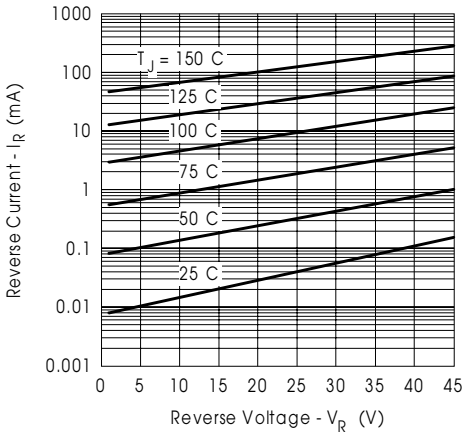


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (PerLeg)

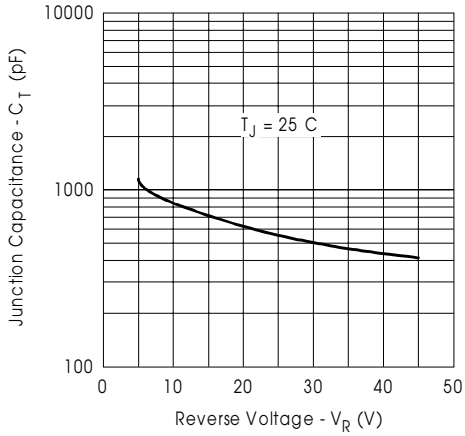


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (PerLeg)

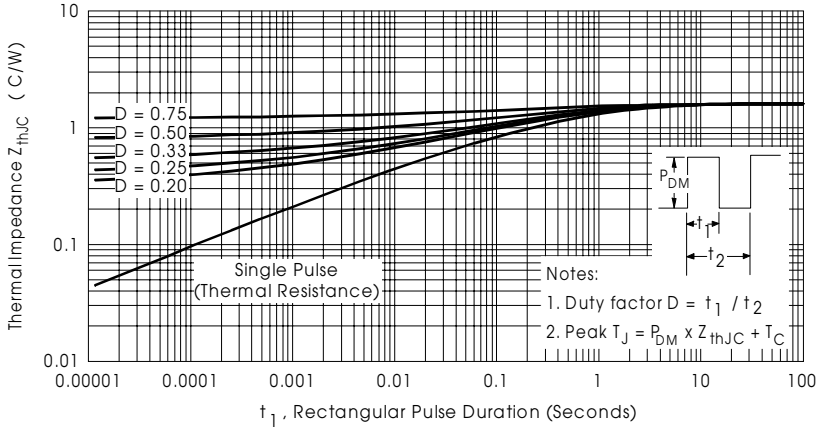


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (PerLeg)

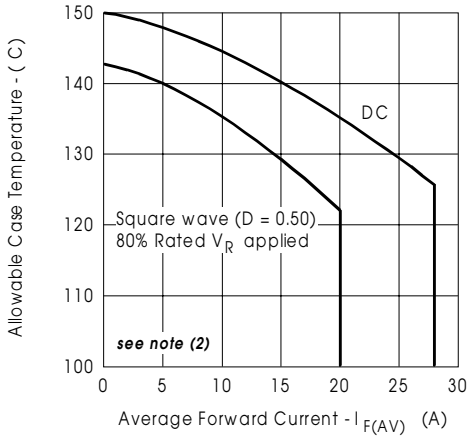


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

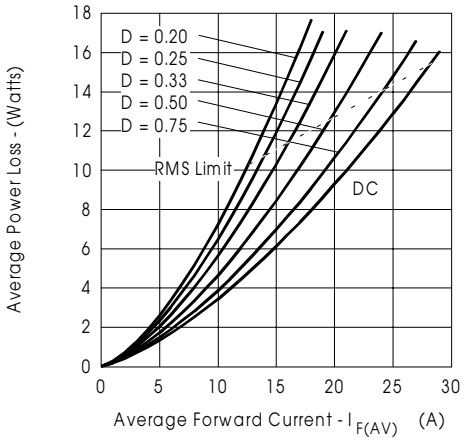


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

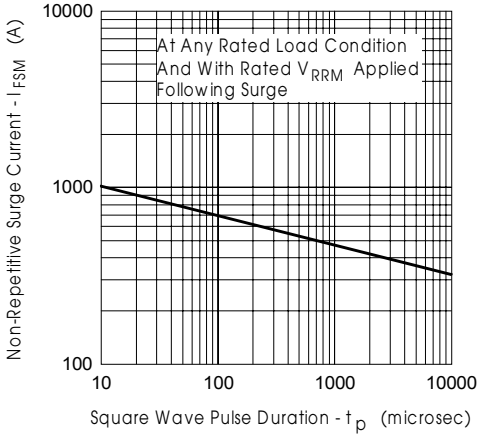


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

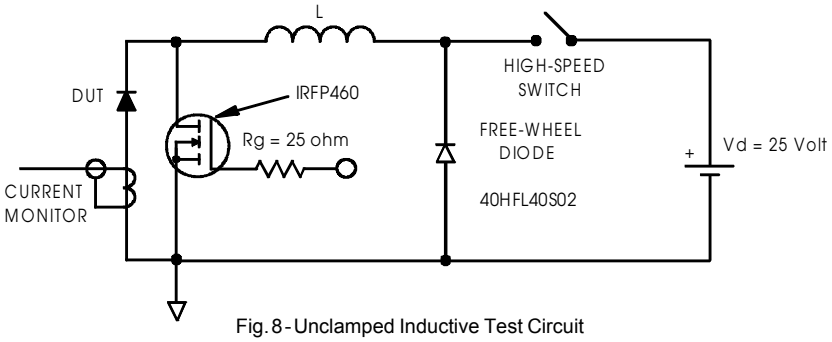


Fig. 8 - Unclamped Inductive Test Circuit

(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

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

International
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IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
Visit us at www.irf.com for sales contact information. 05/01