

# International IR Rectifier

## 40L40CWPbF 40L45CWPbF

SCHOTTKY RECTIFIER

2 x 20 Amps

$I_{F(AV)} = 40\text{Amp}$   
 $V_R = 40\text{-}45\text{V}$

### Major Ratings and Characteristics

Characteristics	40L..CW	Units
$I_{F(AV)}$ Rectangular waveform	40	A
$V_{RRM}$	40 - 45	V
$I_{FSM}$ @tp = 5 $\mu$ s sine	1240	A
$V_F$ @20 Apk, $T_J = 125^\circ\text{C}$ (per leg, Typical)	0.42	V
$T_J$	-55 to 150	$^\circ\text{C}$

### Description/ Features

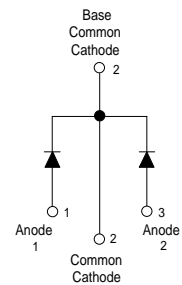
The 40L..CWPbF center tap Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 150 $^\circ\text{C}$  junction temperature. Typical applications are in switching power supplies.

- 150 $^\circ\text{C}$   $T_J$  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
- Lead-Free ("PbF" suffix)

### Case Styles



TO-247AC



Voltage Ratings

Partnumber	40L40CWPbF	40L45CWPbF
V <sub>R</sub> Max. DC Reverse Voltage (V)	40	45
V <sub>RWM</sub> Max. Working Peak Reverse Voltage (V)		

Absolute Maximum Ratings

Parameters	40L..CW	Units	Conditions
I <sub>F(AV)</sub> Max. Average Forward Current (Per Leg) * See Fig. 5 (Per Device)	20 40	A	50% duty cycle @ T <sub>C</sub> = 122 °C, rectangular wave form
I <sub>FSM</sub> Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	1240 350	A	5µs Sine or 3µs Rect. pulse 10ms Sine or 6ms Rect. pulse Following any rated load condition and with rated V <sub>RRM</sub> applied
E <sub>AS</sub> Non-Repetitive Avalanche Energy (Per Leg)	20	mJ	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 3 Amps, L = 4.4 mH
I <sub>AR</sub> Repetitive Avalanche Current (Per Leg)	3	A	Current decaying linearly to zero in 1 µsec Frequency limited by T <sub>Jmax</sub> . V <sub>A</sub> = 1.5 x V <sub>R</sub> typical

Electrical Specifications

Parameters	40L..CW		Units	Conditions	
	Typ.	Max.			
V <sub>FM</sub> Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.48	0.53	V	@ 20A	T <sub>J</sub> = 25 °C
	0.61	0.69	V	@ 40A	
	0.42	0.49	V	@ 20A	T <sub>J</sub> = 125 °C
	0.60	0.70	V	@ 40A	
I <sub>RM</sub> Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	-	1.5	mA	T <sub>J</sub> = 25 °C	V <sub>R</sub> = rated V <sub>R</sub>
	20	80	mA	T <sub>J</sub> = 100 °C	
V <sub>F(TO)</sub> Threshold Voltage	0.27		V	T <sub>J</sub> = T <sub>J</sub> max.	
r <sub>t</sub> Forward Slope Resistance	8.72		mΩ		
C <sub>T</sub> Max. Junction Capacitance (Per Leg)	-	1500	pF	V <sub>R</sub> = 5V <sub>DC</sub> (test signal range 100Khz to 1Mhz) 25°C	
L <sub>S</sub> Typical Series Inductance (Per Leg)	7.5	-	nH	Measured lead to lead 5mm from package body	
dv/dt Max. Voltage Rate of Change	10000		V/µs	(Rated V <sub>R</sub> )	

Thermal-Mechanical Specifications

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

Parameters	40L..CW	Units	Conditions
T <sub>J</sub> Max. Junction Temperature Range	-55 to 150	°C	
T <sub>stg</sub> Max. Storage Temperature Range	-55 to 150	°C	
R <sub>thJC</sub> Max. Thermal Resistance Junction to Case (Per Leg)	1.6	°C/W	DC operation * See Fig. 4
R <sub>thJC</sub> Max. Thermal Resistance Junction to Case (Per Package)	0.8	°C/W	DC operation
R <sub>thCS</sub> 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)	Non-lubricated threads
	Max.	12 (10)	
Case Style	TO-247AC(TO-3P)	JEDEC	
Marking Device	40L40CW		
	40L45CW		

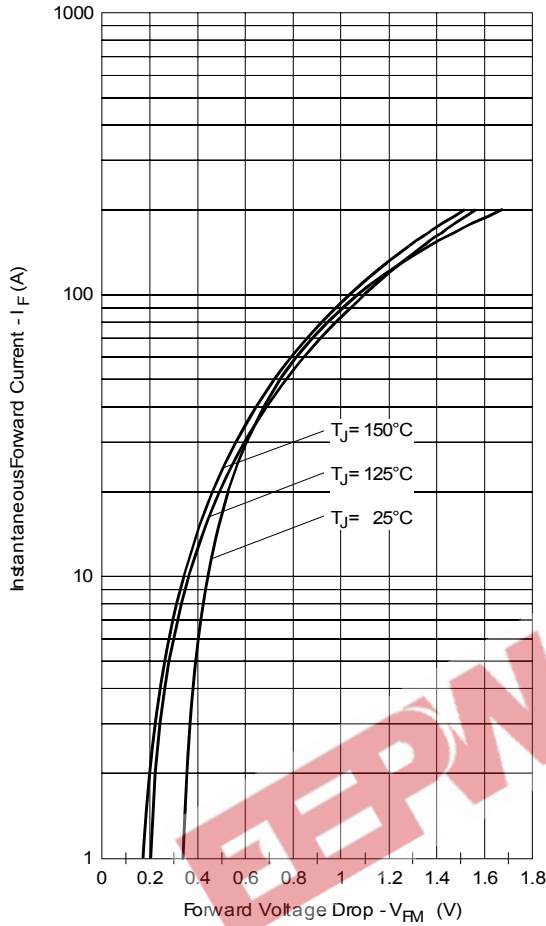


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

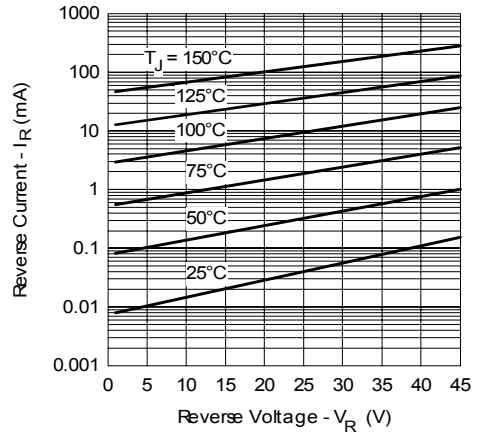


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

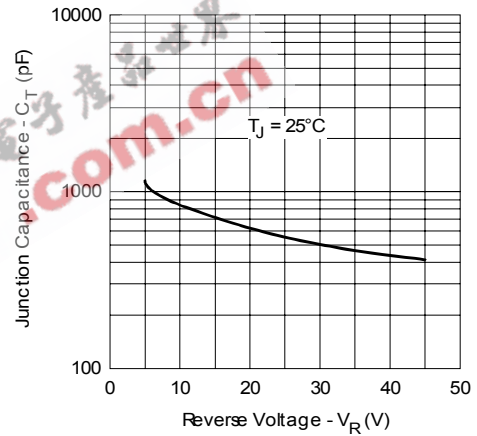


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

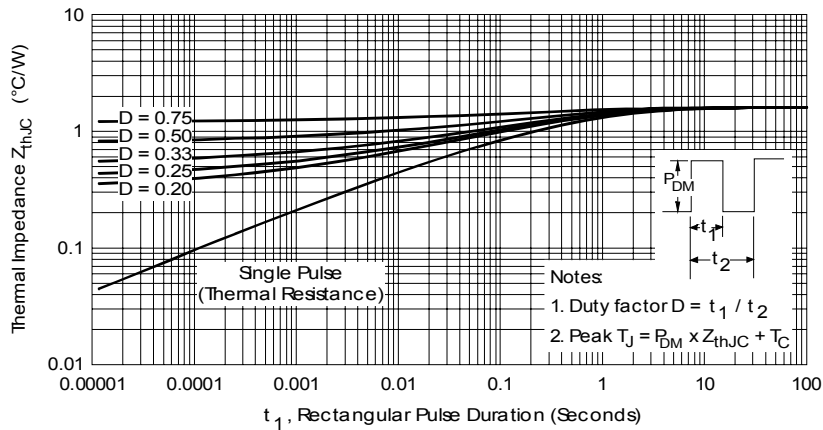


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

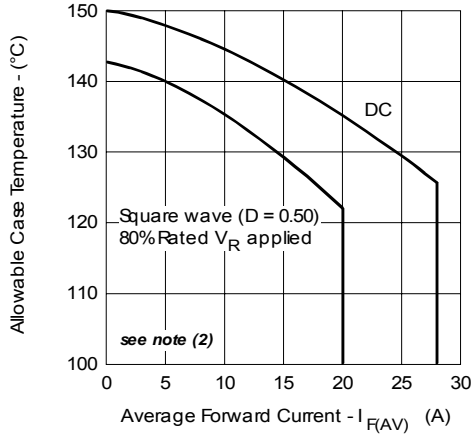


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

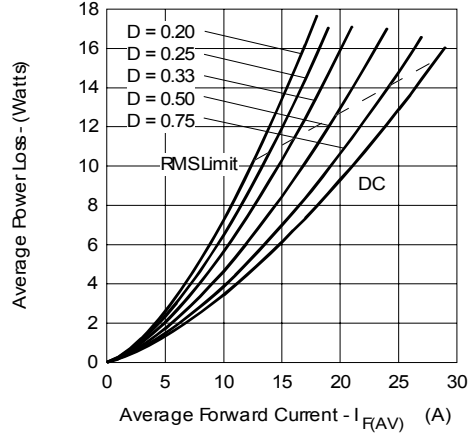


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

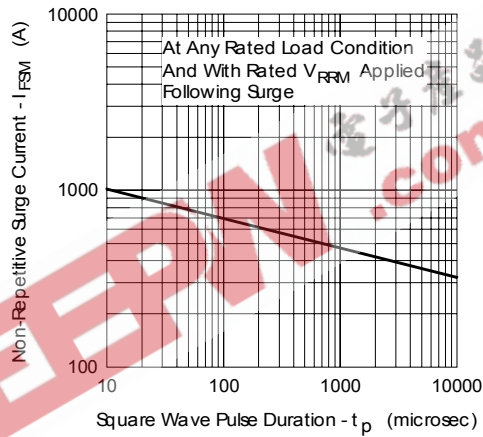


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

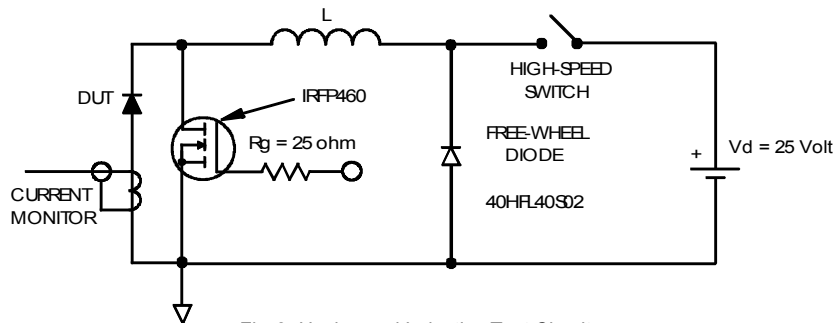


Fig. 8 - Unclamped Inductive Test Circuit

(2) Formula used:  $T_c = T_j - (Pd + Pd_{REV}) \times R_{thJC}$ ;

$Pd = \text{Forward Power Loss} = I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$  (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

**NOTES:**

1. DIMENSIONING AND TOLERANCING AS PER ASME Y14.5M 1994.
2. DIMENSIONS ARE SHOWN IN INCHES.
3. CONTOUR OF SLOT OPTIONAL.
4. DIMENSION D & E DO NOT INCLUDE MOLD FLASH; MOLD FLASH SHALL NOT EXCEED .005" (0.127) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
5. THERMAL PAD CONTOUR OPTIONAL. WITHIN DIMENSIONS D1 & E1.
6. LEAD FINISH UNCONTROLLED IN L1.
7. #P TO HAVE A MAXIMUM DRAFT ANGLE OF 1.5° TO THE TOP OF THE PART WITH A MAXIMUM HOLE DIAMETER OF .154 INCH.
8. OUTLINE CONFORMS TO JEDEC OUTLINE TO-247AC.

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	.183	.209	4.65	5.31	
A1	.087	.102	2.21	2.59	
A2	.009	.009	1.50	2.49	
b	.039	.055	0.99	1.40	
b1	.038	.053	0.99	1.35	
D2	.065	.094	1.65	2.39	
b3	.065	.082	1.65	2.14	
b4	.102	.153	2.59	3.93	
b5	.102	.153	2.59	3.93	
e	.075	.075	0.91	0.91	
e1	.075	.075	0.91	0.91	
D	.776	.815	19.71	20.73	4
D1	.315	-	13.08	-	5
D2	.070	.085	0.81	1.95	
E	.862	.925	19.29	19.87	4
E1	.520	-	13.46	-	
E2	.776	.716	4.52	5.49	
#	.209 BSC	-	5.40 BSC	-	
#P	.166	.166	4.22	4.22	
L	.559	.634	14.20	16.10	
L1	.146	.159	3.71	4.02	
WP	.140	.144	3.56	3.66	
WPH	-	.141	-	3.58	
Q	.200	.224	5.31	5.69	
S	.217 BSC	-	5.51 BSC	-	

**LEAD ASSIGNMENTS**

HEXSEI

- 1- GATE
- 2- DRAIN
- 3- SOURCE
- 4- DRAIN

IGBTs, CUPACK

- 1- GATE
- 2- COLLECTOR
- 3- EMITTER
- 4- COLLECTOR

DODDS

- 1- ANODE/OPEN
- 2- CATHODE
- 3- ANODE

SECTION C-C, D-D, E-E

CONFORM TO JEDEC OUTLINE TO-247AC (TO-3P)  
 Dimensions in millimeters and (inches)

Marking Information

EXAMPLE: THIS IS A 40L45CW  
 WITH ASSEMBLY  
 LOT CODE 5657  
 ASSEMBLED ON WW 35, 2000  
 IN ASSEMBLY LINE "H"

INTERNATIONAL  
 RECTIFIER  
 LOGO

ASSEMBLY  
 LOT CODE

PART NUMBER

DATE CODE  
 P = LEAD-FREE  
 YEAR 0 = 2000  
 WEEK 35  
 LINE H

Ordering Information Table

Device Code					
40	L	45	C	W	PbF
①	②	③	④	⑤	⑥

<b>1</b>	-	Current Rating (40 = 40A)	
<b>2</b>	-	Schottky "L" Series	
<b>3</b>	-	Voltage Code	40 = 40V 45 = 45V
<b>4</b>	-	Circuit Configuration	
		C = Common Cathode	
<b>5</b>	-	Package	
		W = TO-247	
<b>6</b>	-	• none = Standard Production	
		• PbF = Lead-Free	

Tube Standard Pack Quantity : 25 pieces

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