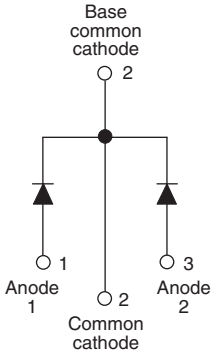
Schottky Rectifier, 2 x 20 A

TO-247AC



FEATURES

- 150 °C T_J operation
- 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
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified according to JEDEC-JESD47
- Halogen-free according to IEC 61249-2-21 definition (-N3 only)

Pb-free
e3
RoHS COMPLIANT
HALOGEN FREE Available

DESCRIPTION

The VS-40L...CW... 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 parallel switching power supplies.

PRODUCT SUMMARY	
Package	TO-247AC
$I_{F(AV)}$	2 x 20 A
V_R	40 V, 45 V
V_F at I_F	0.49 V
I_{RM} max.	80 mA at 100 °C
T_J max.	150 °C
Diode variation	Common cathode
E_{AS}	20 mJ

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	40	A
V_{RRM}		40/45	V
I_{FSM}	t_p = 5 µs sine	1240	A
V_F	20 Apk, T_J = 125 °C (per leg, typical)	0.42	V
T_J		- 55 to 150	°C

VOLTAGE RATINGS						
PARAMETER	SYMBOL	VS-40L40CWPbF	VS-40L40CW-N3	VS-40L45CWPbF	VS-40L45CW-N3	UNITS
Maximum DC reverse voltage	V_R	40	40	45	45	V
Maximum working peak reverse voltage	V_{RWM}					

ABSOLUTE MAXIMUM RATINGS						
PARAMETER		SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current See fig. 5	per leg	$I_{F(AV)}$	50 % duty cycle at T_C = 122 °C, rectangular waveform		20	A
	per device				40	
Maximum peak one cycle non-repetitive surge current per leg See fig. 7		I_{FSM}	5 µs sine or 3 µs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	1240	
			10 ms sine or 6 ms rect. pulse		350	
Non-repetitive avalanche energy per leg		E_{AS}	T_J = 25 °C, I_{AS} = 3 A, L = 4.4 mH		20	mJ
Repetitive avalanche current per leg		I_{AR}	Current decaying linearly to zero in 1 µs Frequency limited by T_J maximum V_A = 1.5 x V_R typical		3	A

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 °C	0.48	0.53	V
		40 A		0.61	0.69	
		20 A	T_J = 125 °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 °C	V_R = Rated V_R	-	1.5	mA
		T_J = 100 °C		20	80	
Threshold voltage	$V_{F(TO)}$	T_J = T_J maximum		0.27		V
Forward slope resistance	r_t			8.72		mΩ
Maximum junction capacitance per leg	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °C		-	1500	pF
Maximum voltage rate of change	dV/dt	Rated V_R		10 000		V/µs

Note

(1) Pulse width < 300 µs, 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	°C
Maximum thermal resistance, junction to case per leg		R_{thJC}	DC operation See fig. 4	1.6	°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 (JEDEC)	40L40CW	
				40L45CW	

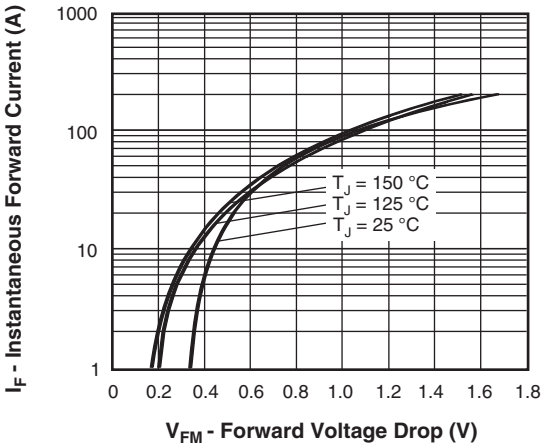


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

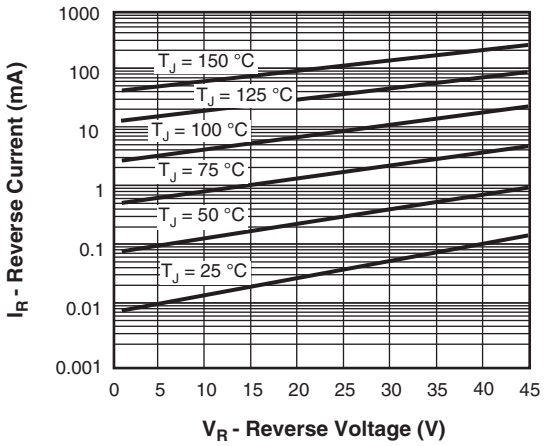


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

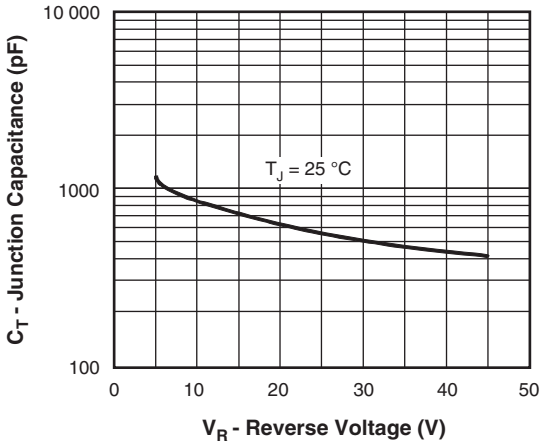


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

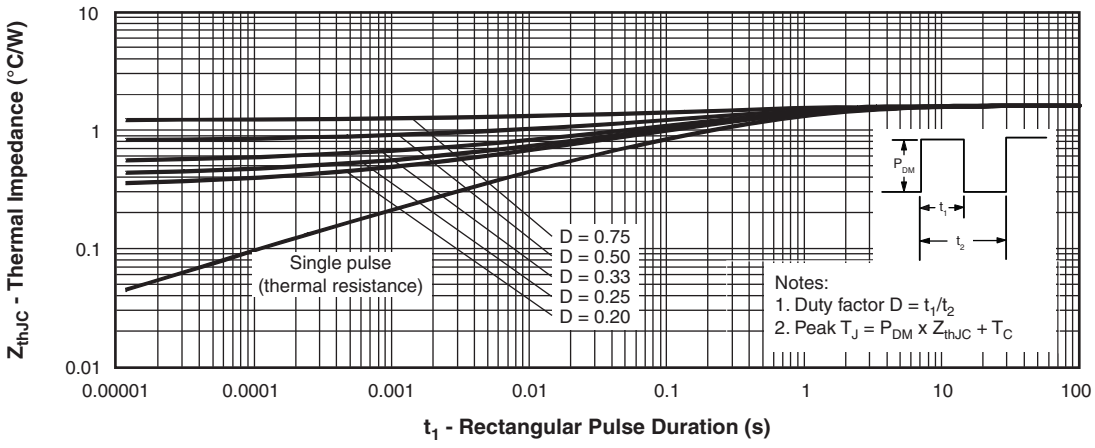


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

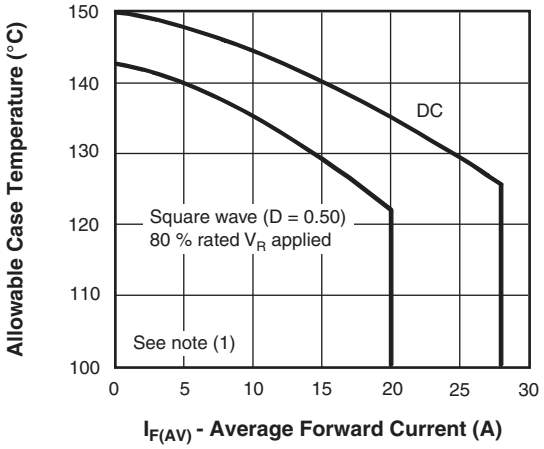


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

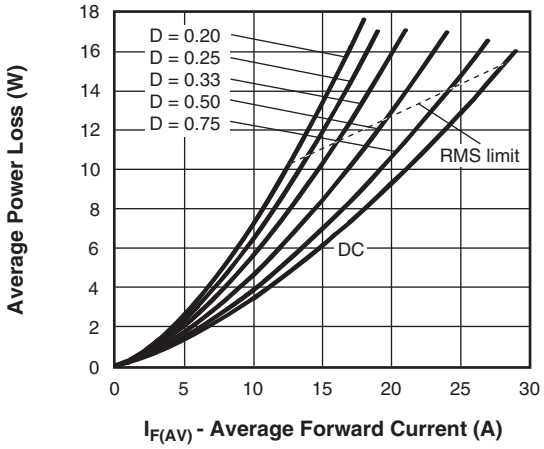


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

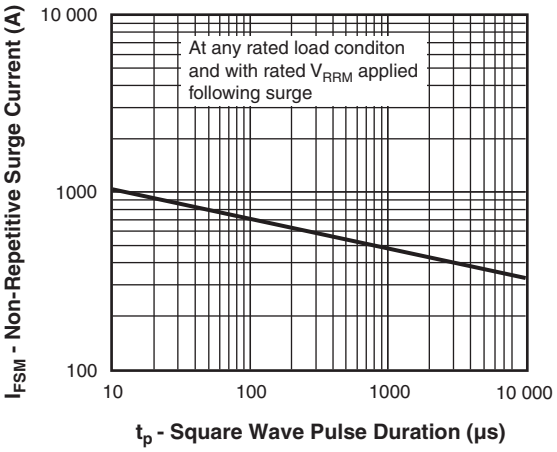


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

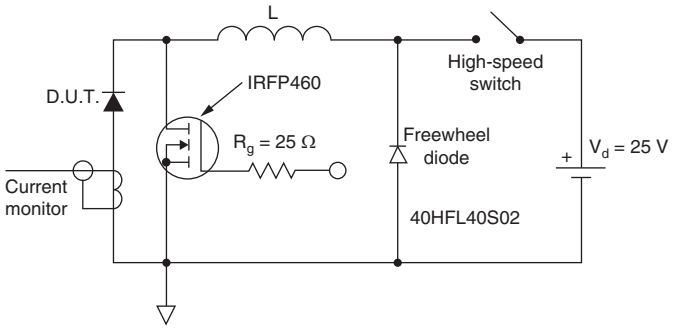


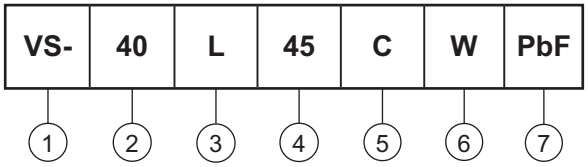
Fig. 8 - Unclamped Inductive Test Circuit

Note

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

ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - Current rating (40 = 40 A)

3 - Schottky “L” series

4 - Voltage code — 40 = 40 V, 45 = 45 V

5 - Circuit configuration:
C = Common cathode

6 - Package:
W = TO-247

7 - Environmental digit
- PbF = Lead (Pb)-free and RoHS compliant
- -N3 = Halogen-free, RoHS compliant, and totally lead (Pb)-free

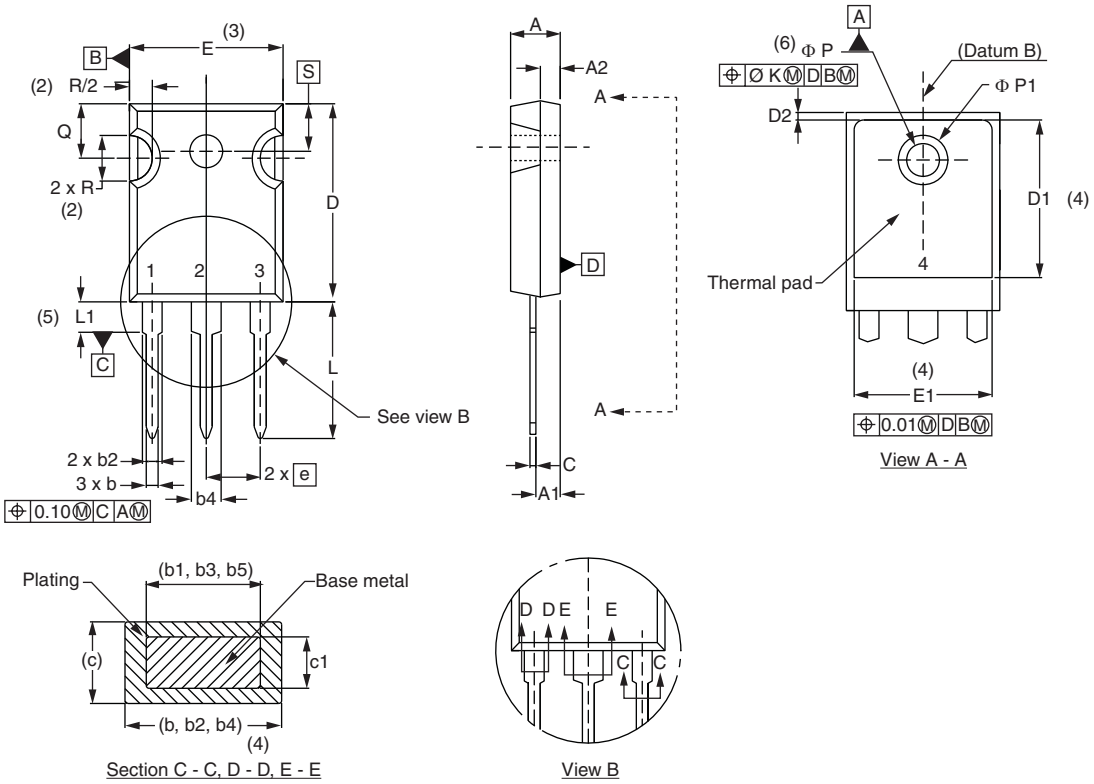
ORDERING INFORMATION (Example)

PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-40L40CWPbF	25	500	Antistatic plastic tube
VS-40L40CW-N3	25	500	Antistatic plastic tube
VS-40L45CWPbF	25	500	Antistatic plastic tube
VS-40L45CW-N3	25	500	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS		
Dimensions		www.vishay.com/doc?95223
Part marking information	TO-247AC PbF	www.vishay.com/doc?95226
	TO-247AC -N3	www.vishay.com/doc?95007

TO-247AC

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.65	5.31	0.183	0.209	
A1	2.21	2.59	0.087	0.102	
A2	1.50	2.49	0.059	0.098	
b	0.99	1.40	0.039	0.055	
b1	0.99	1.35	0.039	0.053	
b2	1.65	2.39	0.065	0.094	
b3	1.65	2.34	0.065	0.092	
b4	2.59	3.43	0.102	0.135	
b5	2.59	3.38	0.102	0.133	
c	0.38	0.89	0.015	0.035	
c1	0.38	0.84	0.015	0.033	
D	19.71	20.70	0.776	0.815	3
D1	13.08	-	0.515	-	4

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D2	0.51	1.30	0.020	0.051	
E	15.29	15.87	0.602	0.625	3
E1	13.72	-	0.540	-	
e	5.46 BSC		0.215 BSC		
Ø K	2.54		0.010		
L	14.20	16.10	0.559	0.634	
L1	3.71	4.29	0.146	0.169	
Ø P	3.56	3.66	0.14	0.144	
Ø P1	-	6.98	-	0.275	
Q	5.31	5.69	0.209	0.224	
R	4.52	5.49	0.178	0.216	
S	5.51 BSC		0.217 BSC		

Notes

(1) Dimensioning and tolerancing per ASME Y14.5M-1994

(2) Contour of slot optional

(3) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body

(4) Thermal pad contour optional with dimensions D1 and E1

(5) Lead finish uncontrolled in L1

(6) Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")

(7) Outline conforms to JEDEC® outline TO-247 with exception of dimension c

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