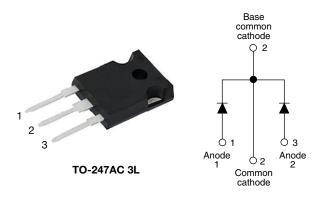
**Vishay Semiconductors** 

# High Performance Schottky Rectifier, 2 x 15 A



www.vishay.com

PRIMARY CHARACTERISTICS								
I <sub>F(AV)</sub>	2 x 15 A							
V <sub>R</sub>	140 V, 150 V							
V <sub>F</sub> at I <sub>F</sub>	0.78 V							
I <sub>RM</sub> max.	15 mA at 125 °C							
T <sub>J</sub> max.	175 °C							
E <sub>AS</sub>	11.25 mJ							
Package	TO-247AC 3L							
Circuit configuration	Common cathode							

### **FEATURES**

- 175 °C T<sub>J</sub> operation
- Low forward voltage drop
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance



RoHS COMPLIANT HALOGEN FREE

- Guard ring for enhanced ruggedness and long term reliability
- Designed and qualified according to JEDEC<sup>®</sup>-JESD 47
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

## DESCRIPTION

The VS-30CPQ... center tap Schottky rectifier series has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

MAJOR RATINGS AND CHARACTERISTICS								
SYMBOL	CHARACTERISTICS	VALUES	UNITS					
I <sub>F(AV)</sub>	Rectangular waveform	30	А					
V <sub>RRM</sub>		150	V					
I <sub>FSM</sub>	$t_p = 5 \ \mu s \ sine$	1000	А					
VF	15 $A_{pk}$ , $T_J$ = 125 °C (per leg)	0.78	V					
TJ		-55 to +175	°C					

VOLTAGE RATINGS								
PARAMETER	SYMBOL	VS-30CPQ140-N3	VS-30CPQ150-N3	UNITS				
Maximum DC reverse voltage	V <sub>R</sub>	140	150	V				
Maximum working peak reverse voltage	V <sub>RWM</sub>	140	150	v				

ABSOLUTE MAXIMUM RATINGS										
PARAMETER		SYMBOL	TEST COND	VALUES	UNITS					
Maximum average forward per devic		1	50 % duty cycle at $T_{C}$ = 135 °C	rootangular wayoform	30	A				
current, see fig. 5	per leg	I <sub>F(AV)</sub>	$50\%$ duty cycle at $T_{\rm C} = 135\%$	15						
Maximum peak one cycle non-repetitive surge current per leg See fig. 7			5 µs sine or 3 µs rect. pulse	Following any rated load condition and with rated	1000					
		I <sub>FSM</sub>	10 ms sine or 6 ms rect. pulse	V <sub>RRM</sub> applied	340					
Non-repetitive avalanche energy per leg		E <sub>AS</sub>	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 0.50 A, L = 90 mH		11.25	mJ				
Repetitive avalanche current per leg		I <sub>AR</sub>	Current decaying linearly to zer Frequency limited by T <sub>J</sub> maxim		0.50	А				

Revision: 02-Jan-18

For technical questions within your region: <u>DiodesAmericas@vishay.com</u>, <u>DiodesAsia@vishay.com</u>, <u>DiodesEurope@vishay.com</u> THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT <u>www.vishay.com/doc?91000</u>

1



Vishay Semiconductors

ELI	ECTRICA	L SPECII	FICATIONS

ELECTRICAL SPECIFICATIONS										
PARAMETER	SYMBOL	TEST CO	VALUES	UNITS						
		15 A	T <sub>.1</sub> = 25 °C	1.00	v					
Maximum forward voltage drop per leg	V <sub>FM</sub> <sup>(1)</sup>	30 A	1j=25 C	1.19						
See fig. 1	VFM (")	15 A	T.I = 125 °C	0.78						
		30 A	$I_{\rm J} = 125$ C	0.93						
Maximum reverse leakage current per leg	. (1)	T <sub>J</sub> = 25 °C	$V_{\rm B}$ = Rated $V_{\rm B}$	0.1						
See fig. 2	I <sub>RM</sub> <sup>(1)</sup>	T <sub>J</sub> = 125 °C	$v_{\rm R} = naleu v_{\rm R}$	15	mA					
Maximum junction capacitance per leg	CT	$V_{R} = 5 V_{DC}$ (test signal range	ge 100 kHz to 1 MHz) 25 °C	340	pF					
Typical series inductance per leg	L <sub>S</sub>	Measured lead to lead 5 m	7.5	nH						
Maximum voltage rate of change	dV/dt	Rated V <sub>R</sub>	10 000	V/µs						

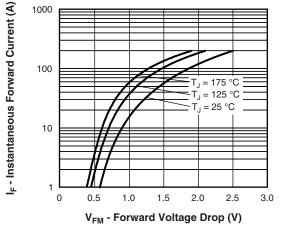
#### Note

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

THERMAL - MECHANICAL SPECIFICATIONS								
PARAMETER		SYMBOL	YMBOL TEST CONDITIONS		UNITS			
Maximum junction and storage temperature range		T <sub>J</sub> , T <sub>Stg</sub>		-55 to 175	°C			
Maximum thermal resistance, junction to case per leg		- R <sub>thJC</sub>	DC operation See fig. 4	2.20				
Maximum thermal resistance, junction to case per package		⊓thJC	DC operation	1.10	°C/W			
Typical thermal resistance, case to heatsink		R <sub>thCS</sub>	Mounting surface, smooth and greased	0.24				
Approximate weight				6	g			
Approximate weight				0.21	oz.			
Mounting torque	minimum			6 (5)	kgf ⋅ cm			
Mounting torque	maximum			12 (10)	(lbf · in)			
Mand the she fac				30CPQ140				
Marking device			Case style TO-247AC 3L	30CPQ150				



**Vishay Semiconductors** 



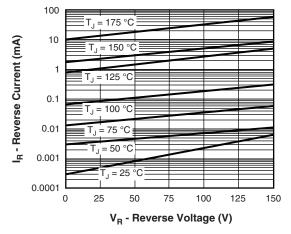


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

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

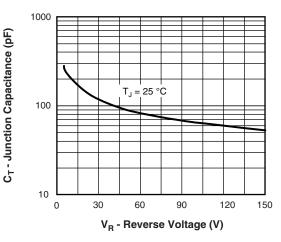


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

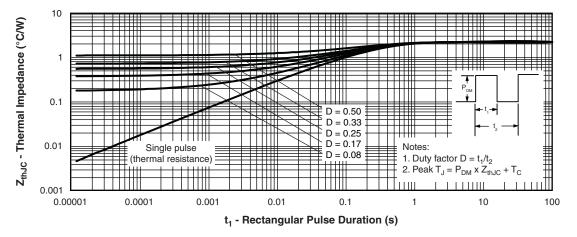


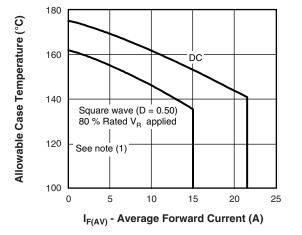
Fig. 4 - Maximum Thermal Impedance ZthJC Characteristics (Per Leg)

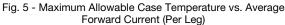
 Revision: 02-Jan-18
 3
 Document Number: 96455

 For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com
 THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT<br/>ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000



**Vishay Semiconductors** 





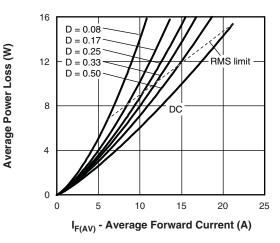


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

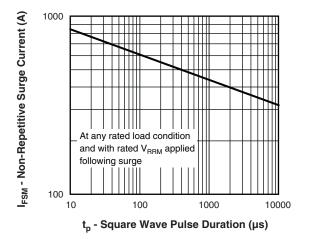


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

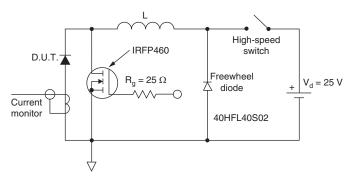


Fig. 8 - Unclamped Inductive Test Circuit

#### Note

<sup>(1)</sup> Formula used:  $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$ ;

 $\begin{array}{l} \mathsf{Pd} = \mathsf{forward} \ \mathsf{power} \ \mathsf{loss} = \mathsf{I}_{\mathsf{F}(\mathsf{AV})} \ x \ \mathsf{V}_{\mathsf{FM}} \ \mathsf{at} \ (\mathsf{I}_{\mathsf{F}(\mathsf{AV})}/\mathsf{D}) \ (\mathsf{see} \ \mathsf{fig.} \ \mathsf{6}); \\ \mathsf{Pd}_{\mathsf{REV}} = \mathsf{inverse} \ \mathsf{power} \ \mathsf{loss} = \mathsf{V}_{\mathsf{R1}} \ x \ \mathsf{I}_{\mathsf{R}} \ (\mathsf{1} \ - \mathsf{D}); \ \mathsf{I}_{\mathsf{R}} \ \mathsf{at} \ \mathsf{V}_{\mathsf{R1}} = \mathsf{80} \ \% \ \mathsf{rated} \ \mathsf{V}_{\mathsf{R}} \end{array}$ 

Revision: 02-Jan-18

4

For technical questions within your region: <u>DiodesAmericas@vishay.com</u>, <u>DiodesAsia@vishay.com</u>, <u>DiodesEurope@vishay.com</u> THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT <u>www.vishay.com/doc?91000</u>



Vishay Semiconductors

## **ORDERING INFORMATION TABLE**

Device code	VS-	30	С	Р	Q	150	-N3	
		2	3	4	5	6	7	
	<ul> <li>1 - Vishay Semiconductors product</li> <li>2 - Current rating (30 = 30 A)</li> <li>3 - Circuit configuration: C = common cathode</li> <li>4 - Package: P = TO-247</li> </ul>							
	5 - 6 - 7 -	Volta Env		e —— ital digit			140 = 14 150 = 15	50 V
		-N3	= halog	en-free,	RoHS-	complia	nt, and	totally lead (Pb)

ORDERING INFORMATION (Example)								
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION					
VS-30CPQ140-N3	25	500	Antistatic plastic tube					
VS-30CPQ150-N3	25	500	Antistatic plastic tube					

	LINKS TO RELATED DOCUMENTS
Dimensions	www.vishay.com/doc?96138
Part marking information	www.vishay.com/doc?95007



**Vishay Semiconductors** 

TO-247AC 3L

## **DIMENSIONS** in millimeters and inches



SYMBOL	MILLIMETERS		INC	HES	NOTES	SYMBOL	MILLIN	IETERS	INC	HES	NOTES	
STWIDOL	MIN.	MAX.	MIN.	MAX.	NOTES		STWDOL	MIN.	MAX.	MIN.	MAX.	NOTES
A	4.65	5.31	0.183	0.209			D2	0.51	1.35	0.020	0.053	
A1	2.21	2.59	0.087	0.102			E	15.29	15.87	0.602	0.625	3
A2	1.17	1.37	0.046	0.054			E1	13.46	-	0.53	-	
b	0.99	1.40	0.039	0.055			е	5.46	BSC	0.215	5 BSC	
b1	0.99	1.35	0.039	0.053			ØК	0.2	254	0.0	)10	
b2	1.65	2.39	0.065	0.094			L	14.20	16.10	0.559	0.634	
b3	1.65	2.34	0.065	0.092			L1	3.71	4.29	0.146	0.169	
b4	2.59	3.43	0.102	0.135			ØΡ	3.56	3.66	0.14	0.144	
b5	2.59	3.38	0.102	0.133			Ø P1	-	7.39	-	0.291	
С	0.38	0.89	0.015	0.035			Q	5.31	5.69	0.209	0.224	
c1	0.38	0.84	0.015	0.033			R	4.52	5.49	0.178	0.216	
D	19.71	20.70	0.776	0.815	3		S	5.51	BSC	0.217	' BSC	
D1	13.08	-	0.515	-	4							

#### Notes

<sup>(1)</sup> 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

<sup>(5)</sup> Lead finish uncontrolled in L1

<sup>(6)</sup> 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")

<sup>(7)</sup> Outline conforms to JEDEC<sup>®</sup> outline TO-247 with exception of dimension Q

Revision: 20-Jun-17

1



Vishay

# Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.