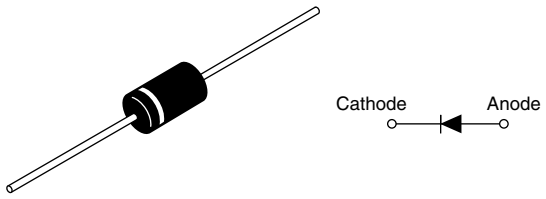
Photovoltaic Solar Cell Protection Schottky Rectifier, 15 A



DO-204AR

FEATURES

- 150 °C T_J operation
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Lead (Pb)-free plating
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for industrial level

RoHS COMPLIANT

DESCRIPTION

The VS-150SQ... axial leaded Schottky rectifier series 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, converters, freewheeling diodes, and reverse battery protection.
$T_J \leq 200$ °C for use in solar cell box as a bypass diode for protection, using DC forward current without reverse bias.

PRODUCT SUMMARY	
$I_{F(AV)}$	15 A
V_R	30 V to 45 V

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	DC	15	A
V_{RRM}		30 to 45	V
I_{FSM}	t_p = 5 µs sine	2150	A
V_F	15 Apk, T_J = 125 °C	0.48	V
T_J	Range (1)	- 55 to 150	°C

Note

(1) $T_J \leq 200$ °C for DC current without reverse voltage

VOLTAGE RATINGS						
PARAMETER	SYMBOL	VS-150SQ030	VS-150SQ035	VS-150SQ040	VS-150SQ045	UNITS
Maximum DC reverse voltage	V_R	30	35	40	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	$I_{F(AV)}$	For DC solar application T_C = 172 °C (T_J = 200 °C)		15	A
Maximum peak one cycle non-repetitive surge current See fig. 7	I_{FSM}	5 µs sine or 3 µs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	2150	
		10 ms sine or 6 ms rect. pulse		340	
Non-repetitive avalanche energy	E_{AS}	T_J = 25 °C, I_{AS} = 1.8 A, L = 7.4 mH		12	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 µs Frequency limited by, T_J maximum V_A = 1.5 x V_R typical		1.8	A

For technical questions within your region, please contact one of the following:
DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	V_{FM} (1)	15 A	T_J = 25 °C	0.54	V
		30 A		0.67	
		15 A	T_J = 125 °C	0.48	
		30 A		0.62	
		15 A	T_J = 200 °C	0.46	
		30 A		0.61	
Maximum reverse leakage current See fig. 2	I_{RM}	T_J = 25 °C	V_R = Rated V_R	1.75	mA
		T_J = 125 °C		70	
Maximum junction capacitance	C_T	V_R = 5 V_{DC}, (test signal range 100 kHz to 1 MHz), 25 °C		900	pF
Typical series inductance	L_S	Measured lead to lead 5 mm from body		10.0	nH
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 temperature range	T_J (1)		- 55 to 150	°C
Maximum storage temperature range	T_{Stg}		- 55 to 150	
Maximum thermal resistance, junction to lead	R_{thJL}	DC operation; 1/8" lead length	8.0	°C/W
	R_{thJL} (2)		4.0	
Typical thermal resistance, junction to air	R_{thJA}		44	
Approximate weight			1.4	g
			0.049	oz.
Marking device		Case style DO-204AR (JEDEC)	150SQ030	
			150SQ035	
			150SQ040	
			150SQ045	

Notes

(1) T_J = 200 °C for DC solar application without reverse voltage time ≤ 1 h

(2) Applicable when used in junction box at I_F = 12 A, T_{box} = 77 °C

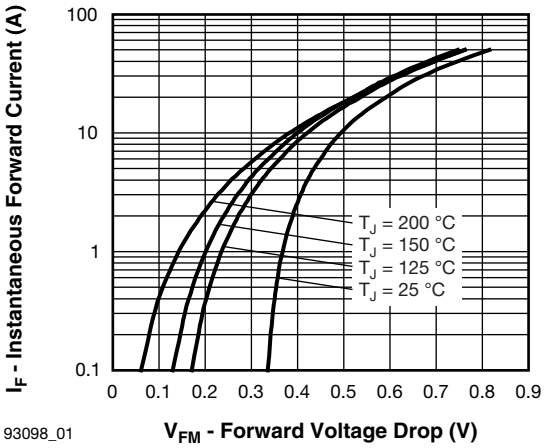


Fig. 1 - Maximum Forward Voltage Drop Characteristics

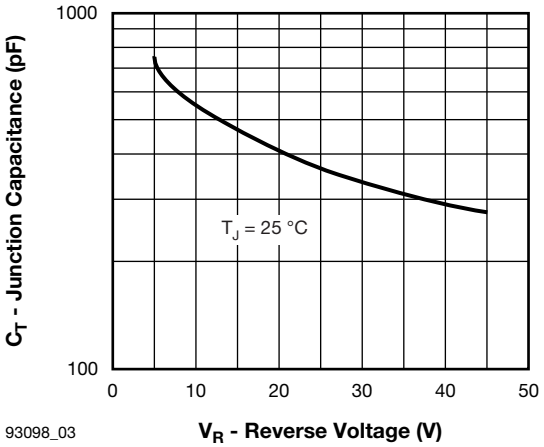


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

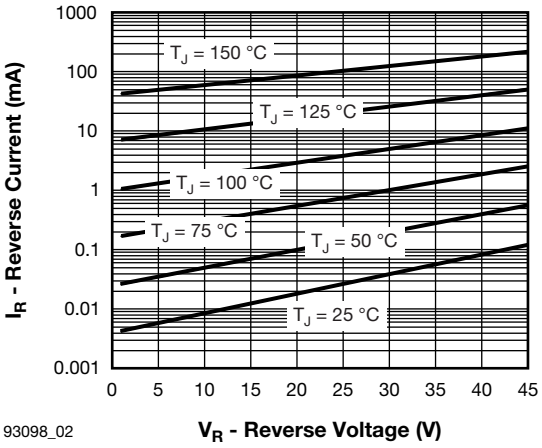


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

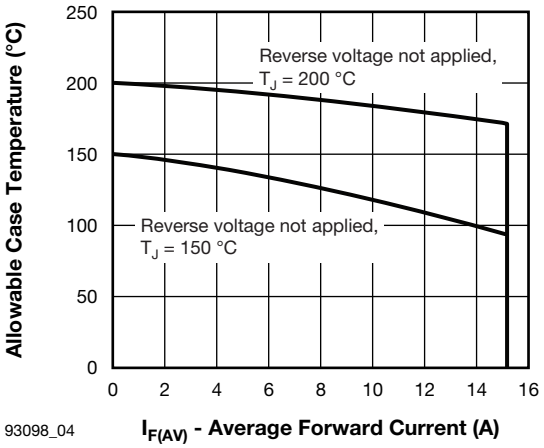


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current

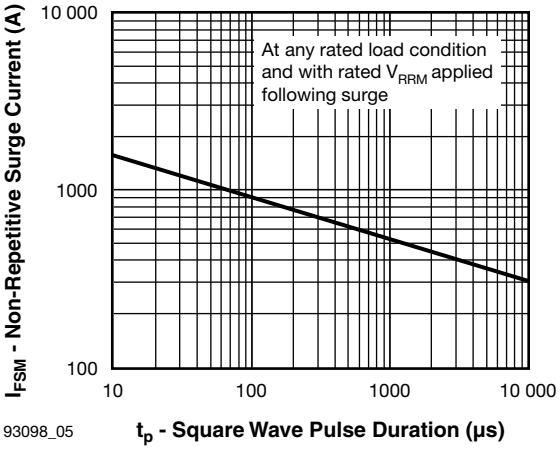


Fig. 5 - Maximum Non-Repetitive Surge Current

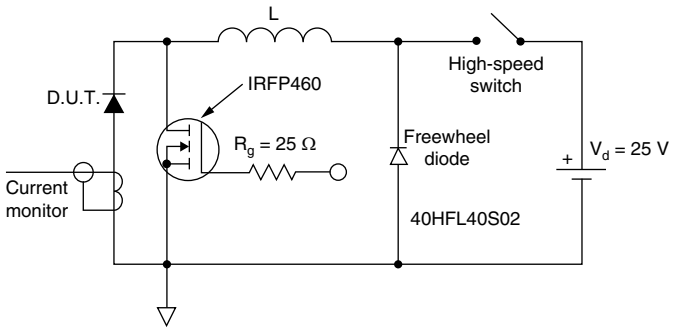


Fig. 6 - Unclamped Inductive Test Circuit

ORDERING INFORMATION TABLE

Device code

VS-	150	S	Q	045	TR
1	2	3	4	5	6

1 - HPP product suffix

2 - 150 = Current x 10

3 - S = DO-204AR

4 - Q = Schottky Q.. series

5 - Voltage ratings

030 = 30 V
035 = 35 V
040 = 40 V
045 = 45 V

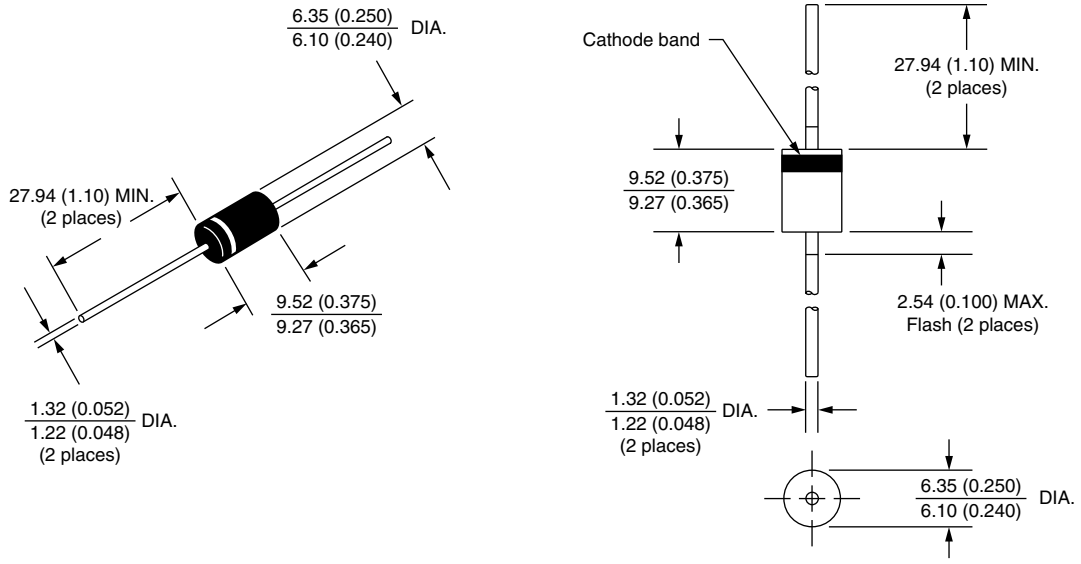
6 - • TR = Tape and reel package (1500 pcs)

• None = Box package (300 pcs)

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95243
Part marking information	www.vishay.com/doc?95325
Packaging information	www.vishay.com/doc?95332

Axial DO-204AR

DIMENSIONS in millimeters (inches)



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 and agree to fully indemnify and hold Vishay and its distributors harmless from and against any and all claims, liabilities, expenses and damages arising or resulting in connection with such use or sale, including attorneys fees, even if such claim alleges that Vishay or its distributor was negligent regarding the design or manufacture of the part. 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.