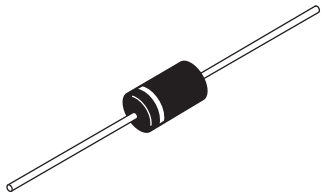
Photovoltaic Solar Cell Protection Schottky Rectifier, 15 A



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
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified for commercial level
- Halogen-free according to IEC 61249-2-21 definition (-M3 only)

Pb
e3
RoHS COMPLIANT
HALOGEN FREE Available

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	
Package	DO-204AR
$I_{F(AV)}$	15 A
V_R	30 V, 35 V, 40 V, 45 V
V_F at I_F	0.48 V
I_{RM} max.	70 mA at 125 °C
T_J max.	150 °C
Diode variation	Single die
E_{AS}	12 mJ

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-150SQ030-M3	VS-150SQ035 VS-150SQ035-M3	VS-150SQ040 VS-150SQ040-M3	VS-150SQ045 VS-150SQ045-M3	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

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

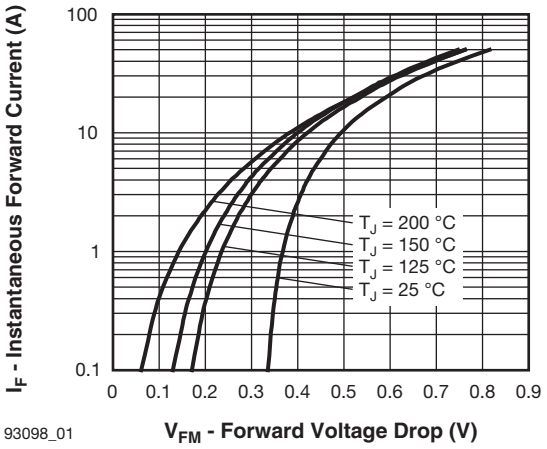


Fig. 1 - Maximum Forward Voltage Drop Characteristics

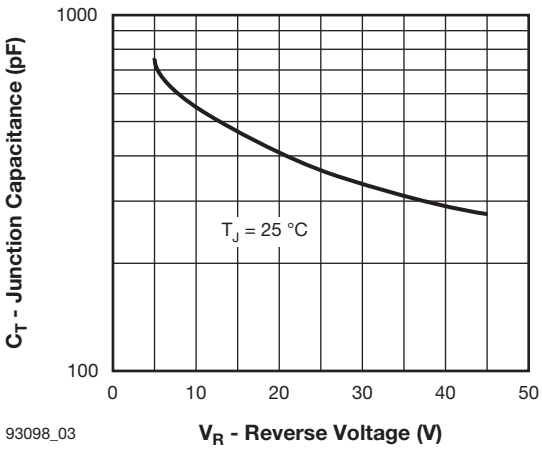


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

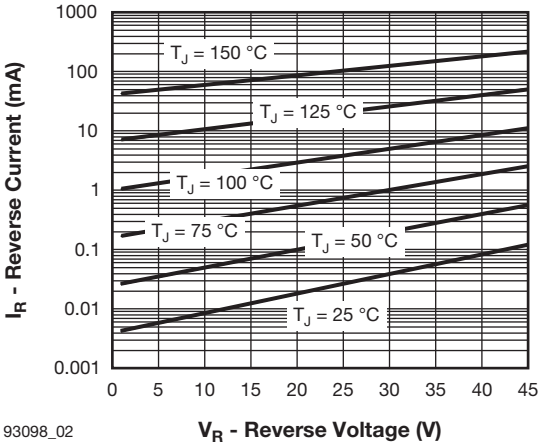


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

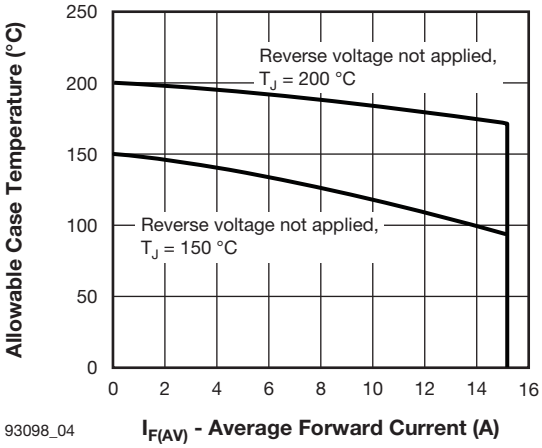


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current

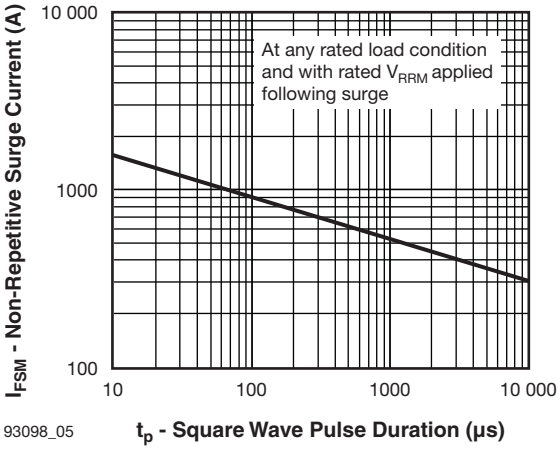


Fig. 5 - Maximum Non-Repetitive Surge Current

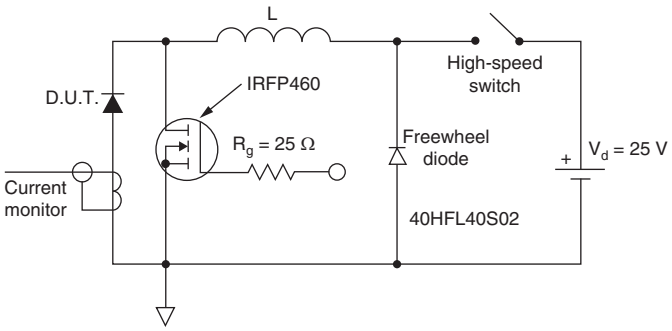


Fig. 6 - Unclamped Inductive Test Circuit

ORDERING INFORMATION TABLE

Device code

VS-	150	S	Q	045	TR	-M3
1	2	3	4	5	6	7

1 - Vishay Semiconductors product

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
• None = Bulk package

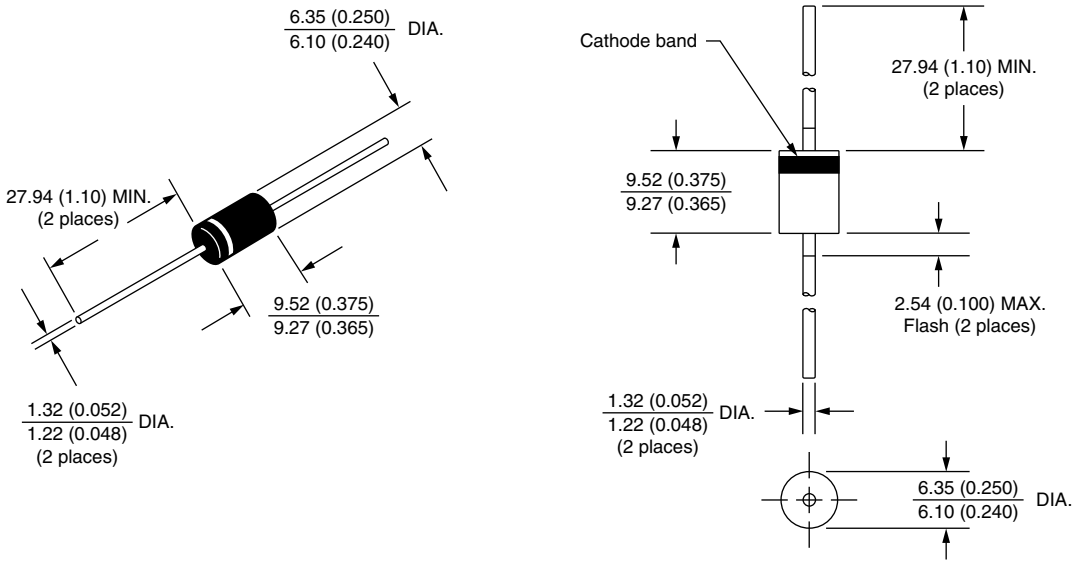
7 - Environmental digit
• None = Lead (Pb)-free and RoHS compliant
• -M3 = Halogen-free, RoHS compliant, and terminations lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	**QUANTITY PER T/R**	**MINIMUM ORDER QUANTITY**	**PACKAGING DESCRIPTION**
VS-150SQ030	300	300	Bulk
VS-150SQ030TR	1500	1500	Tape and reel
VS-150SQ030-M3	300	300	Bulk
VS-150SQ030TR-M3	1500	1500	Tape and reel
VS-150SQ035	300	300	Bulk
VS-150SQ035TR	1500	1500	Tape and reel
VS-150SQ035-M3	300	300	Bulk
VS-150SQ035TR-M3	1500	1500	Tape and reel
VS-150SQ040	300	300	Bulk
VS-150SQ040TR	1500	1500	Tape and reel
VS-150SQ040-M3	300	300	Bulk
VS-150SQ040TR-M3	1500	1500	Tape and reel
VS-150SQ045	300	300	Bulk
VS-150SQ045TR	1500	1500	Tape and reel
VS-150SQ045-M3	300	300	Bulk
VS-150SQ045TR-M3	1500	1500	Tape and reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95243
Part marking information	www.vishay.com/doc?95325
Packaging information	www.vishay.com/doc?95338

Axial DO-204AR

DIMENSIONS in millimeters (inches)



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