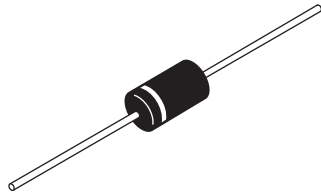




Photovoltaic Solar Cell Protection Schottky Rectifier, 15 A



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)



RoHS
COMPLIANT
HALOGEN
FREE
Available

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

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 ≤ 200 °C for use in solar cell box as a bypass diode for protection, using DC forward current without reverse bias.

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 ≤ 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	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	$T_J = 25\text{ }^\circ\text{C}$	0.54	V
		30 A		0.67	
		15 A	$T_J = 125\text{ }^\circ\text{C}$	0.48	
		30 A		0.62	
		15 A	$T_J = 200\text{ }^\circ\text{C}$	0.46	
		30 A		0.61	
Maximum reverse leakage current See fig. 2	I_{RM}	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	1.75	mA
		$T_J = 125\text{ }^\circ\text{C}$		70	
Maximum junction capacitance	C_T	$V_R = 5\text{ }V_{DC}$, (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$		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	$^\circ\text{C}$
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	$^\circ\text{C}/\text{W}$
	$R_{thJL}^{(2)}$			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) $T_J = 200\text{ }^\circ\text{C}$ for DC solar application without reverse voltage time $\leq 1\text{ h}$

(2) Applicable when used in junction box at $I_F = 12\text{ A}$, $T_{box} = 77\text{ }^\circ\text{C}$

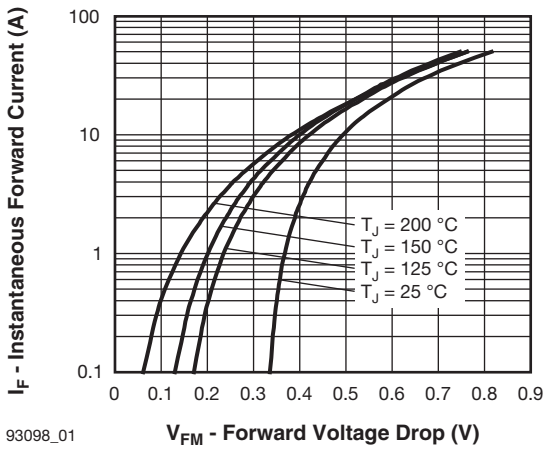


Fig. 1 - Maximum Forward Voltage Drop Characteristics

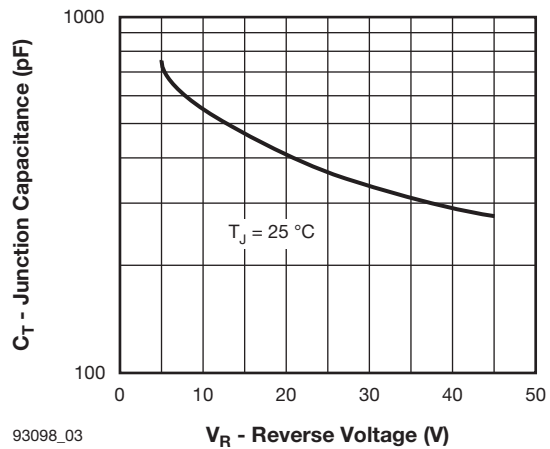


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

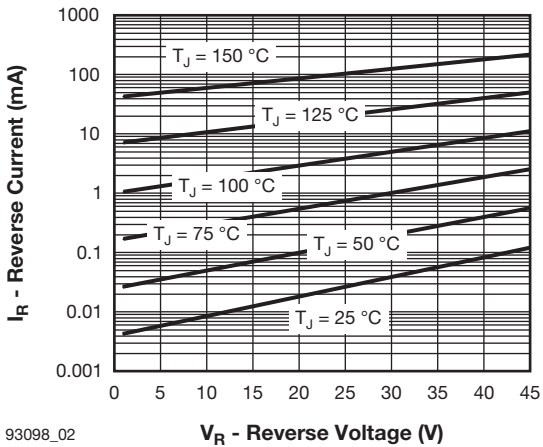


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

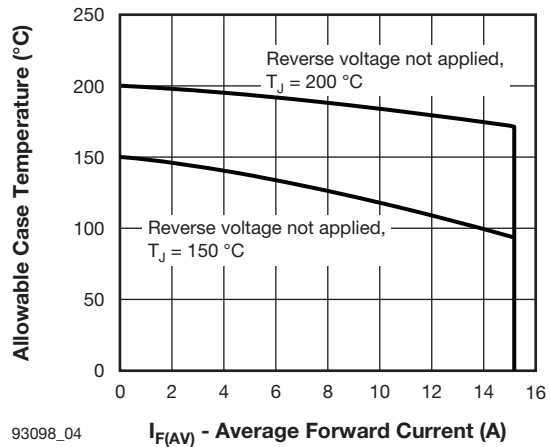


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current

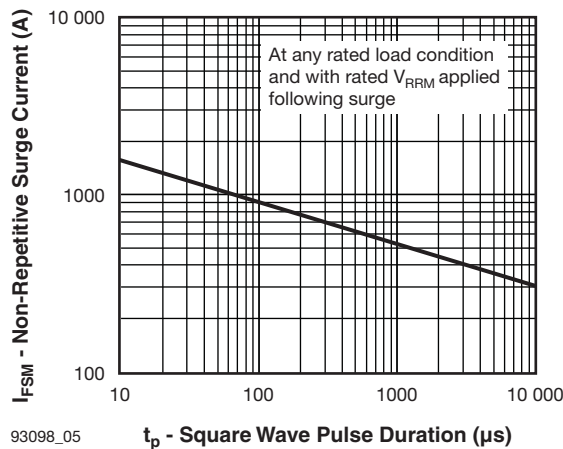


Fig. 5 - Maximum Non-Repetitive Surge Current

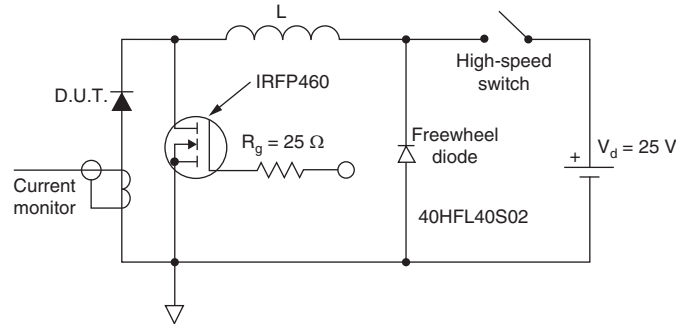


Fig. 6 - Unclamped Inductive Test Circuit

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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