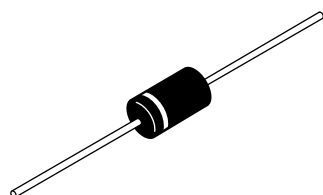


Photovoltaic Solar Cell Protection Schottky Rectifier, 15 A


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}	$t_p = 5 \mu s$ 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	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 $V_A = 1.5 \times V_R$ 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 °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 μ s, 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) $T_J = 200\text{ °C}$ for DC solar application without reverse voltage time $\leq 1\text{ h}$

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

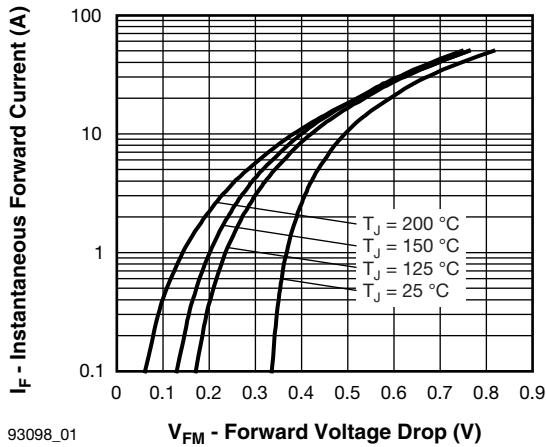


Fig. 1 - Maximum Forward Voltage Drop Characteristics

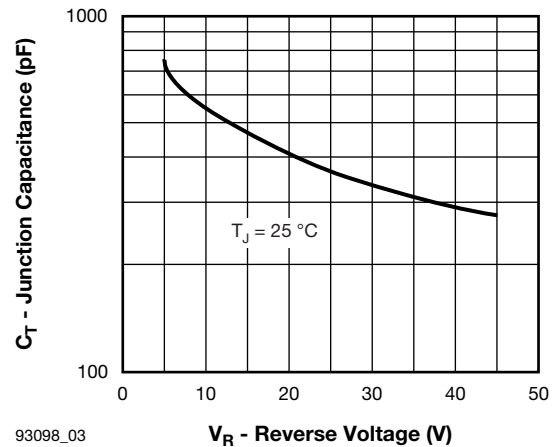


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

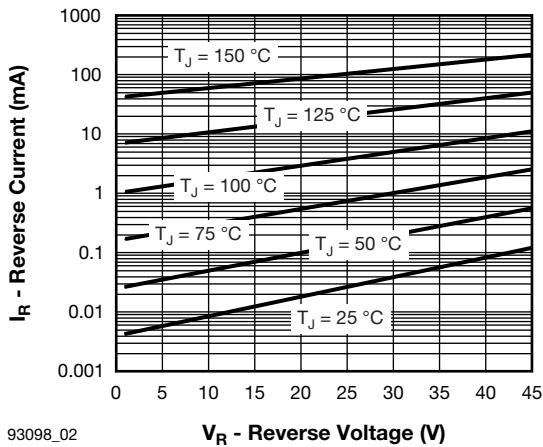


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

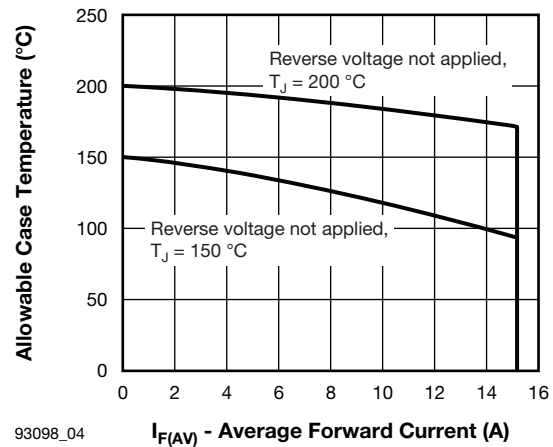


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current

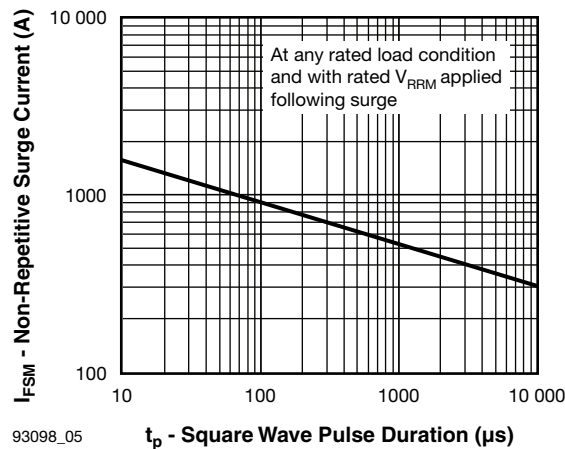


Fig. 5 - Maximum Non-Replicative Surge Current

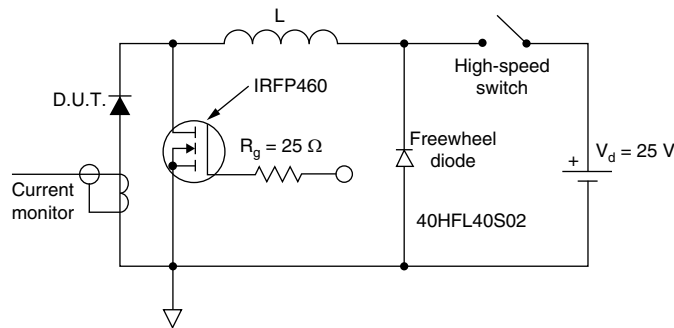


Fig. 6 - Unclamped Inductive Test Circuit

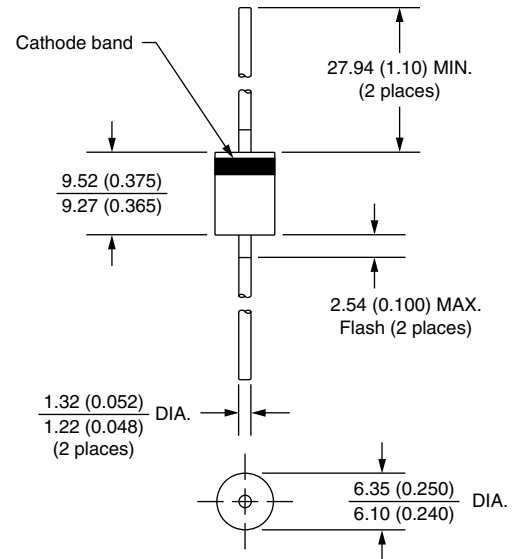
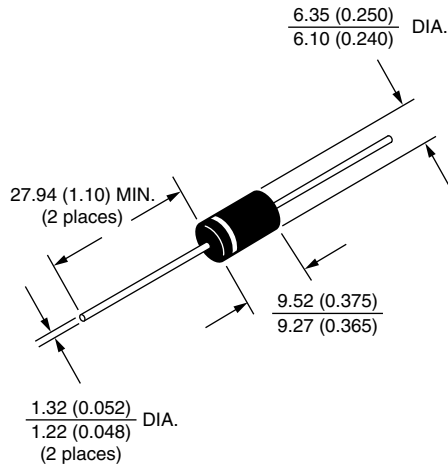
ORDERING INFORMATION TABLE

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)





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