



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.

$T_J \leq 200$ °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}	$t_p = 5 \mu s$ 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-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 $V_A = 1.5 \times V_R$ 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), $25\text{ }^{\circ}\text{C}$		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	°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⁾ $T_J = 200\text{ }^{\circ}\text{C}$ for DC solar application without reverse voltage time $\leq 1\text{ h}$

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

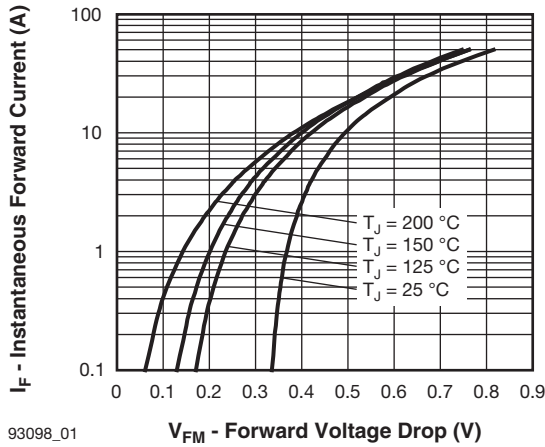


Fig. 1 - Maximum Forward Voltage Drop Characteristics

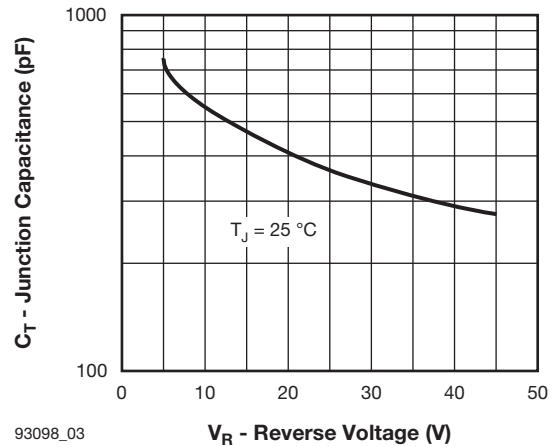


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

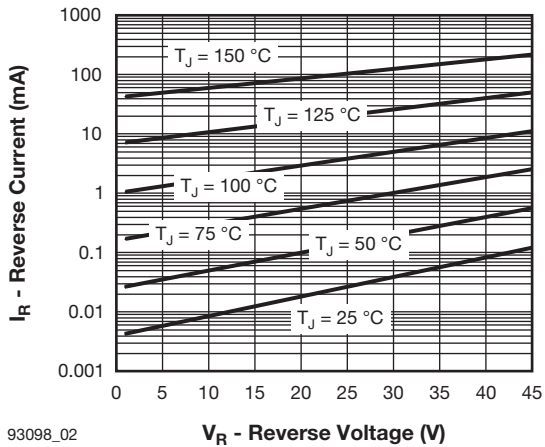


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

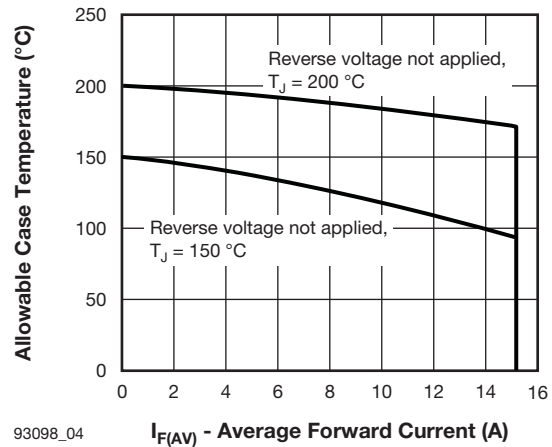


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current

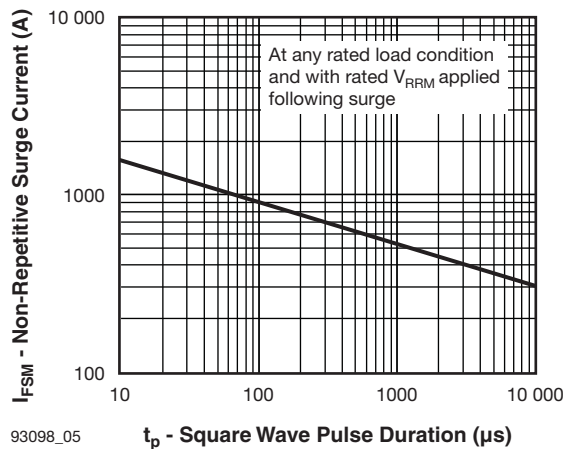


Fig. 5 - Maximum Non-Repetitive Surge Current

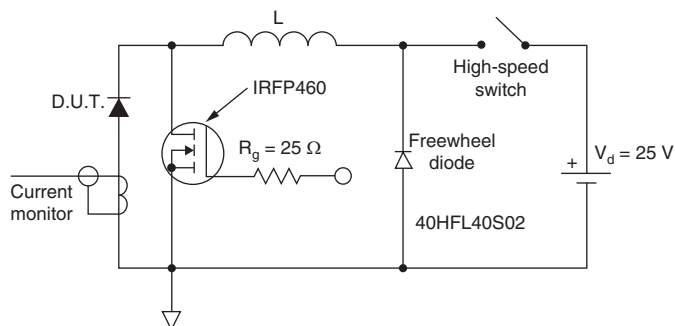


Fig. 6 - Unclamped Inductive Test Circuit

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 |
| 6 | - | <ul style="list-style-type: none"> • TR = Tape and reel package • None = Bulk package |
| 7 | - | Environmental digit <ul style="list-style-type: none"> • None = Lead (Pb)-free and RoHS compliant • -M3 = Halogen-free, RoHS compliant, and terminations lead (Pb)-free |

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

**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

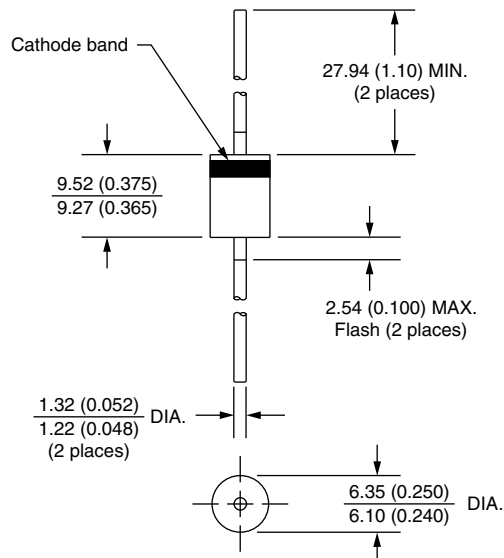
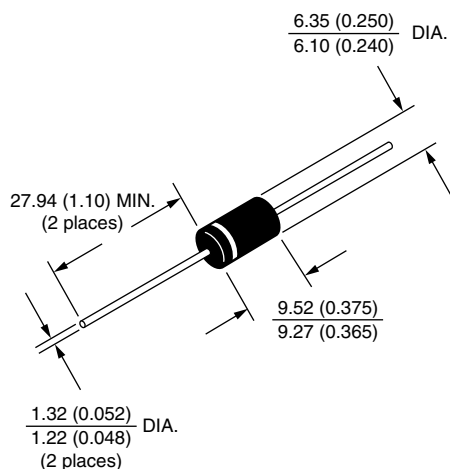
LINKS TO RELATED DOCUMENTS

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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