

## Schottky Rectifier, 9 A



DO-204AR



### FEATURES

- 150 °C T<sub>J</sub> operation
- Low forward voltage drop
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified for commercial level
- Halogen-free according to IEC 61249-2-21 definition (-M3 only)



PRODUCT SUMMARY	
Package	DO-204AR
I <sub>F(AV)</sub>	9 A
V <sub>R</sub>	30 V, 35 V, 40 V, 45 V
V <sub>F</sub> at I <sub>F</sub>	0.42 V
I <sub>RM</sub> max.	70 mA at 125 °C
T <sub>J</sub> max.	150 °C
Diode variation	Single die
E <sub>AS</sub>	12 mJ

### DESCRIPTION

The VS-90SQ... 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.

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
I <sub>F(AV)</sub>	Rectangular waveform	9	A
V <sub>R</sub> RRM	Range	30 to 45	V
I <sub>FSM</sub>	t <sub>p</sub> = 5 μs sine	2150	A
V <sub>F</sub>	9 Apk, T <sub>J</sub> = 125 °C	0.42	V
T <sub>J</sub>	Range	- 55 to 150	°C

VOLTAGE RATINGS						
PARAMETER	SYMBOL	VS-90SQ030 VS-90SQ030-M3	VS-90SQ035 VS-90SQ035-M3	VS-90SQ040 VS-90SQ040-M3	VS-90SQ045 VS-90SQ045-M3	UNITS
Maximum DC reverse voltage	V <sub>R</sub>	30	35	40	45	V
Maximum working peak reverse voltage	V <sub>RWM</sub>					

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current See fig. 5	I <sub>F(AV)</sub>	50 % duty cycle at T <sub>C</sub> = 69 °C, rectangular waveform		9	A
Maximum peak one cycle non-repetitive surge current See fig. 7	I <sub>FSM</sub>	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V <sub>RWM</sub> applied	2150	
		10 ms sine or 6 ms rect. pulse		340	
Non-repetitive avalanche energy	E <sub>AS</sub>	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 1.8 A, L = 7.4 mH		12	mJ
Repetitive avalanche current	I <sub>AR</sub>	Current decaying linearly to zero in 1 μs Frequency limited by, T <sub>J</sub> maximum V <sub>A</sub> = 1.5 x V <sub>R</sub> typical		1.8	A

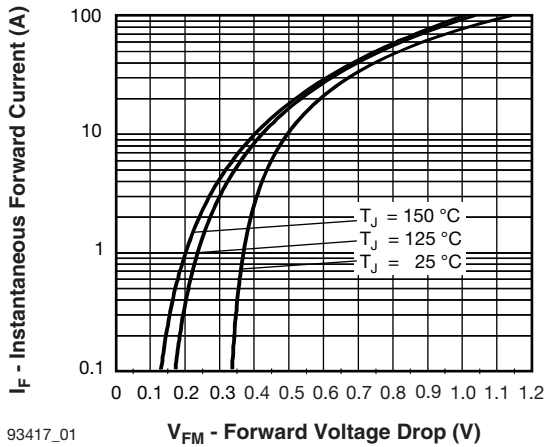


ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	9 A	$T_J = 25\text{ }^\circ\text{C}$	0.48	V
		18 A		0.57	
		9 A	$T_J = 125\text{ }^\circ\text{C}$	0.42	
		18 A		0.52	
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	1.75	mA
		$T_J = 125\text{ }^\circ\text{C}$		70	
Maximum junction capacitance	$C_T$	$V_R = 5 V_{DC}$ , (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/ $\mu\text{s}$

Note

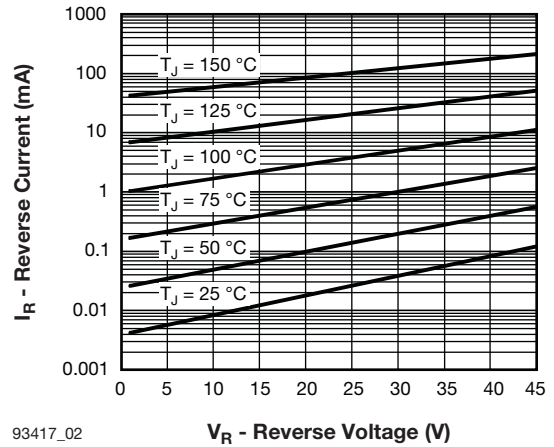
(1) Pulse width < 300  $\mu\text{s}$ , duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction and storage temperature range	$T_J, T_{Stg}$			- 55 to 150	$^\circ\text{C}$
Maximum thermal resistance, junction to lead	$R_{thJL}$	DC operation; see fig. 4 1/8" lead length		8.0	$^\circ\text{C/W}$
Typical thermal resistance, junction to air	$R_{thJA}$			44	
Approximate weight				1.4	g
				0.049	oz.
Marking device		Case style DO-204AR (JEDEC)		90SQ030	
				90SQ035	
				90SQ040	
				90SQ045	



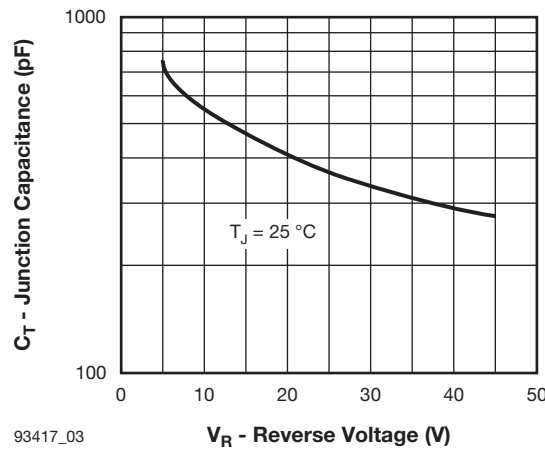
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Fig. 1 - Maximum Forward Voltage Drop Characteristics



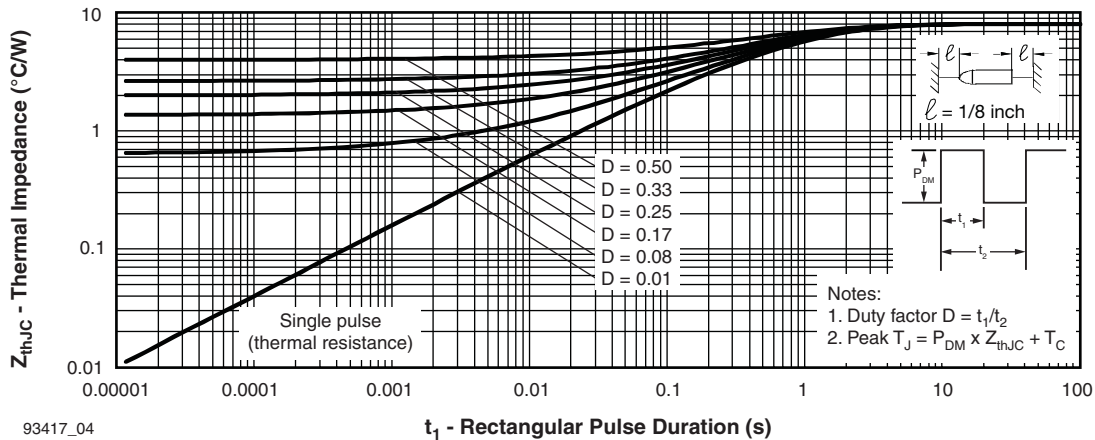
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Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage



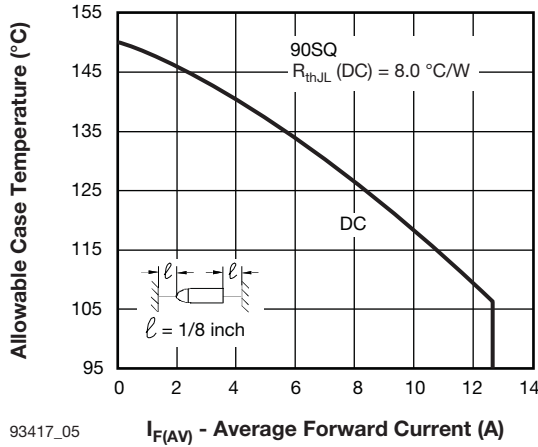
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Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage



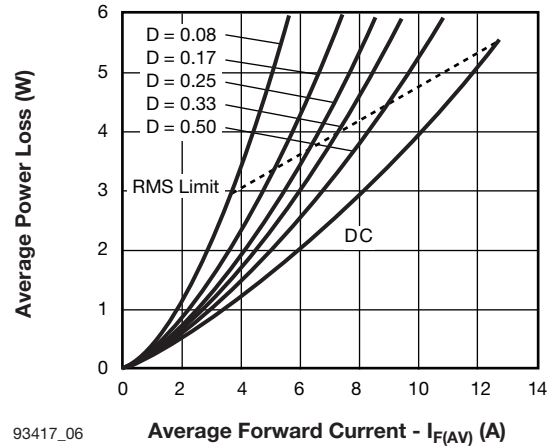
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Fig. 4 - Maximum Thermal Impedance  $Z_{thJL}$  Characteristics



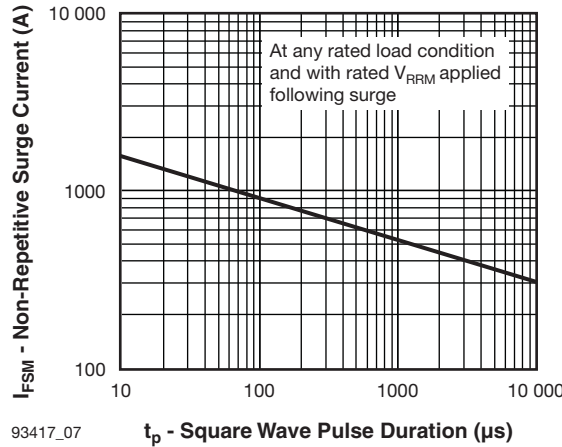
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Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current



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Fig. 6 - Forward Power Loss Characteristics



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Fig. 7 - Maximum Non-Repetitive Surge Current

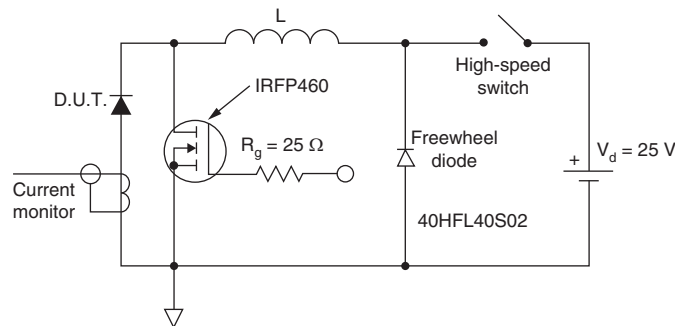
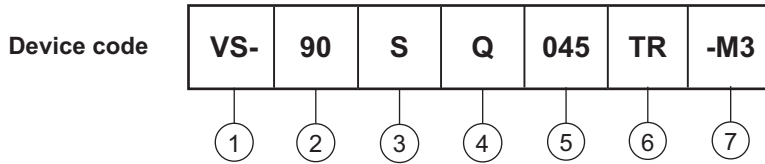


Fig. 8 - Unclamped Inductive Test Circuit



## ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - 90 = Current x 10
- 3** - S = DO-204AR
- 4** - Q = Schottky Q.. series
- 5** - Voltage rating
 

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-90SQ030	300	300	Bulk
VS-90SQ030TR	1500	1500	Tape and reel
VS-90SQ030-M3	300	300	Bulk
VS-90SQ030TR-M3	1500	1500	Tape and reel
VS-90SQ035	300	300	Bulk
VS-90SQ035TR	1500	1500	Tape and reel
VS-90SQ035-M3	300	300	Bulk
VS-90SQ035TR-M3	1500	1500	Tape and reel
VS-90SQ040	300	300	Bulk
VS-90SQ040TR	1500	1500	Tape and reel
VS-90SQ040-M3	300	300	Bulk
VS-90SQ040TR-M3	1500	1500	Tape and reel
VS-90SQ045	300	300	Bulk
VS-90SQ045TR	1500	1500	Tape and reel
VS-90SQ045-M3	300	300	Bulk
VS-90SQ045TR-M3	1500	1500	Tape and reel

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95243">www.vishay.com/doc?95243</a>
Part marking information	<a href="http://www.vishay.com/doc?95325">www.vishay.com/doc?95325</a>
Packaging information	<a href="http://www.vishay.com/doc?95332">www.vishay.com/doc?95332</a>



## Axial DO-204AR

**DIMENSIONS** in millimeters (inches)





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