

Schottky Rectifier, 10 A


TO-220AC


FEATURES

- 175 °C T_J 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 according to JEDEC-JESD47
- Halogen-free according to IEC 61249-2-21 definition (-N3 only)



PRODUCT SUMMARY	
Package	TO-220AC
$I_{F(AV)}$	10 A
V_R	35 V, 40 V, 45 V
V_F at I_F	0.49 V
I_{RM}	15 mA at 125 °C
T_J max.	175 °C
Diode variation	Single die
E_{AS}	13 mJ

DESCRIPTION

The VS-10TQ... Schottky rectifier series has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175 °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
$I_{F(AV)}$	Rectangular waveform	10	A
V_{RRM}		35/45	V
I_{FSM}	$t_p = 5 \mu s$ sine	1050	A
V_F	10 A_{pk} , $T_J = 125$ °C	0.49	V
T_J	Range	- 55 to 175	°C

VOLTAGE RATINGS								
PARAMETER	SYMBOL	VS-10TQ035PbF	VS-10TQ035-N3	VS-10TQ040PbF	VS-10TQ040-N3	VS-10TQ045PbF	VS-10TQ045-N3	UNITS
Maximum DC reverse voltage	V_R	35	35	40	40	45	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	$I_{F(AV)}$	50 % duty cycle at $T_C = 151$ °C, rectangular waveform	10	A
Maximum peak one cycle non-repetitive surge current See fig. 7	I_{FSM}	5 μs sine or 3 μs rect. pulse	1050	
		10 ms sine or 6 ms rect. pulse	280	
Non-repetitive avalanche energy	E_{AS}	$T_J = 25$ °C, $I_{AS} = 2$ A, $L = 6.5$ mH	13	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	2	A



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	V _{FM} ⁽¹⁾	10 A	T _J = 25 °C	0.57	V
		20 A		0.67	
		10 A	T _J = 125 °C	0.49	
		20 A		0.61	
Maximum reverse leakage current See fig. 2	I _{RM} ⁽¹⁾	T _J = 25 °C	V _R = Rated V _R	2	mA
		T _J = 125 °C		15	
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 package body		8.0	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 and storage temperature range	T _J , T _{Stg}			- 55 to 175	°C
Maximum thermal resistance, junction to case	R _{thJC}	DC operation See fig. 4		2.0	°C/W
Typical thermal resistance, case to heatsink	R _{thCS}	Mounting surface, smooth and greased		0.50	
Approximate weight				2	g
				0.07	oz.
Mounting torque	minimum			6 (5)	kgf · cm (lbf · in)
	maximum			12 (10)	
Marking device		Case style TO-220AC		10TQ035	
				10TQ045	

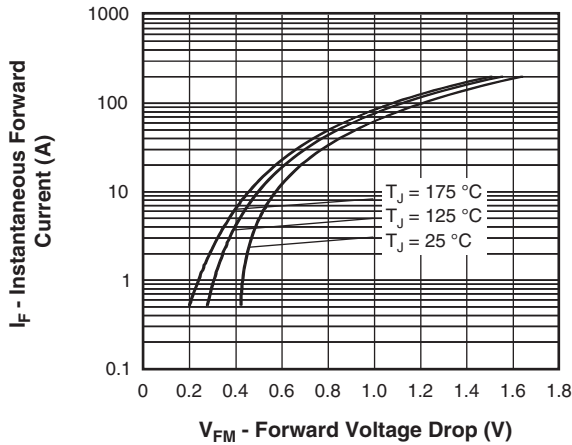


Fig. 1 - Maximum Forward Voltage Drop Characteristics

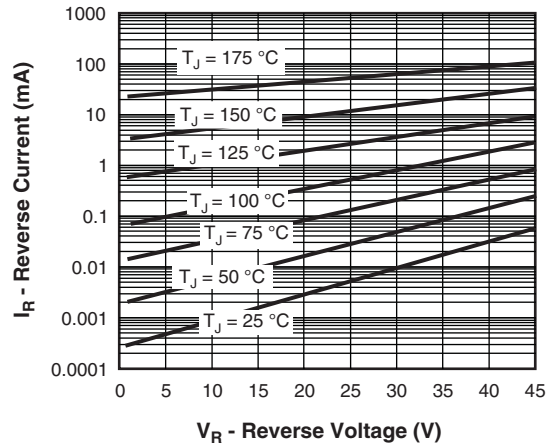


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

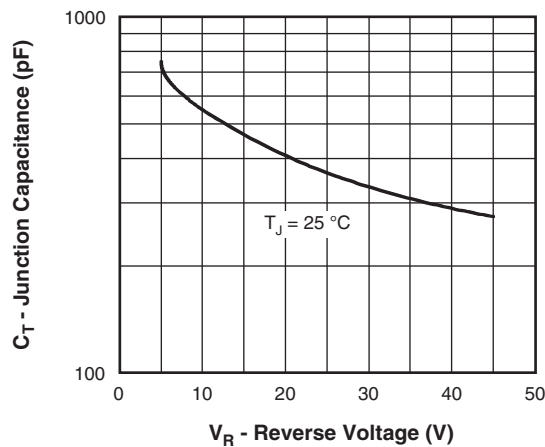


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

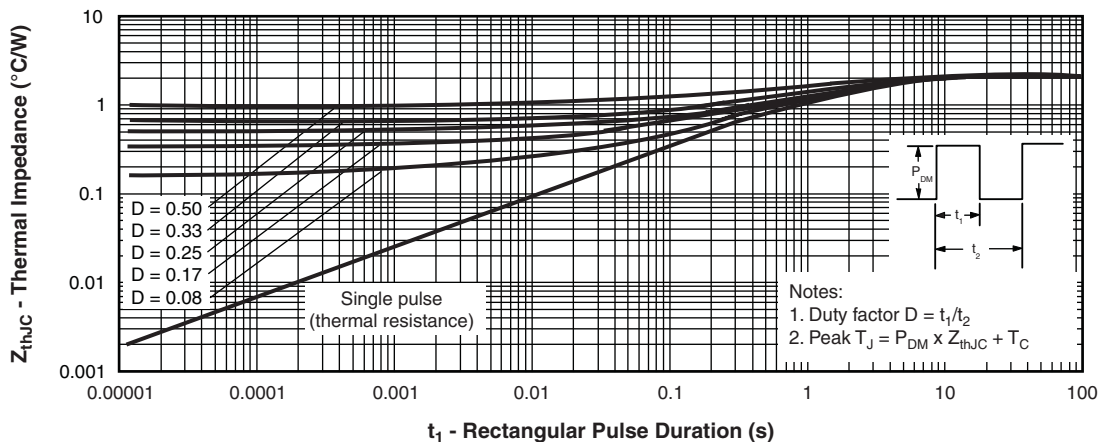


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics



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

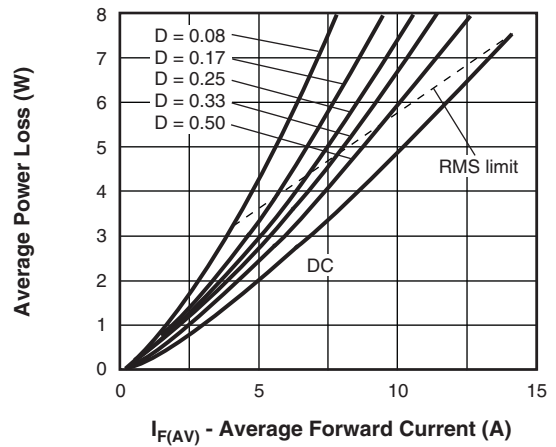


Fig. 6 - Forward Power Loss Characteristics



Fig. 7 - Maximum Non-Repetitive Surge Current



Fig. 8 - Unclamped Inductive Test Circuit



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (10 = 10 A)
- 3** - Package:
T = TO-220
- 4** - Schottky "Q" series
- 5** - Voltage ratings
- 6** - Environmental digit
 - PbF = Lead (Pb)-free and RoHS compliant
 - -N3 = Halogen-free, RoHS compliant, and totally lead (Pb)-free

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-10TQ035PbF	50	1000	Antistatic plastic tube
VS-10TQ035-N3	50	1000	Antistatic plastic tube
VS-10TQ040PbF	50	1000	Antistatic plastic tube
VS-10TQ040-N3	50	1000	Antistatic plastic tube
VS-10TQ045PbF	50	1000	Antistatic plastic tube
VS-10TQ045-N3	50	1000	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95221
Part marking information	TO-220ACPbF www.vishay.com/doc?95224
	TO-220AC-N3 www.vishay.com/doc?95068



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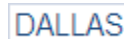
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