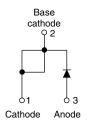


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Schottky Rectifier, 15 A

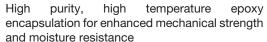




PRODUCT SUMMARY					
Package	TO-220AC				
I _{F(AV)}	15 A				
V _R	35 V, 40 V, 45 V				
V _F at I _F	0.50 V				
I _{RM} max.	70 mA at 125 °C				
T _J max.	150 °C				
Diode variation	Single die				
E _{AS}	16 mJ				

FEATURES

- 150 °C T_J operation
- Very low forward voltage drop
- · High frequency operation





- 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)

DESCRIPTION

The VS-12TQ... 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 _{F(AV)}	Rectangular waveform	15	А			
V _{RRM}	Range	35 to 45	V			
I _{FSM}	t _p = 5 µs sine	990	А			
V _F	15 A _{pk} , T _J = 125 °C	0.50	V			
T _J	Range	- 55 to 150	°C			

VOLTAGE RATINGS									
PARAMETER	SYMBOL	VS- 12TQ035PbF	VS- 12TQ035-N3	VS- 12TQ040PbF	VS- 12TQ040-N3	VS- 12TQ045PbF	VS- 12TQ045-N3	UNITS	
Maximum DC reverse voltage	V _R	0.5	0.5	40	40	45	45	V	
Maximum working peak reverse voltage	V _{RWM}	35	35	40	40	45	45	V	

ABSOLUTE MAXIMUM RATINGS							
PARAMETER	SYMBOL	TEST COND	TEST CONDITIONS VALUE				
Maximum average forward current See fig. 5	I _{F(AV)}	I _{F(AV)} 50 % duty cycle at T _C = 120 °C, rectangular waveform					
Maximum peak one cycle non-repetitive surge current	l	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated	990	Α		
See fig. 7	I _{FSM}	10 ms sine or 6 ms rect. pulse	V _{RRM} applied	250			
Non-repetitive avalanche energy	E _{AS}	T _J = 25 °C, I _{AS} = 2.4 A, L = 5.5 mH		16	mJ		
Repetitive avalanche current	I _{AR}	Current decaying linearly to zer Frequency limited by T _J maxim	2.4	Α			



VS-12TQ...PbF Series, VS-12TQ...-N3 Series

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ELECTRICAL SPECIFICATIONS							
PARAMETER	SYMBOL	TEST CO	NDITIONS	VALUES	UNITS		
		15 A	T 05.00	0.56	V		
Maximum forward voltage drop See fig. 1	V _{FM} ⁽¹⁾	30 A	- T _J = 25 °C	0.71			
		15 A	T 105 °C	0.50			
		30 A	- T _J = 125 °C	0.64			
Maximum reverse leakage current	ı (1)	T _J = 25 °C	$V_{\rm R}$ = Rated $V_{\rm R}$	1.75	mA		
See fig. 2	I _{RM} ⁽¹⁾	T _J = 125 °C	v _R = nateu v _R	70	IIIA		
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	8.0	nH			
Maximum voltage rate of change	dV/dt	Rated V _R		10 000	V/µs		

Note

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

THERMAL - MECHANICAL SPECIFICATIONS							
PARAMETER		SYMBOL TEST CONDITIONS		VALUES	UNITS		
Maximum junction and sto temperature range	orage	T _J , T _{Stg}		- 55 to 150	°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		
Approximate weight				0.07	OZ.		
Mounting torque	minimum			6 (5)	kgf · cm		
Mounting torque maximum				12 (10)	(lbf · in)		
Marking device				12TQ035			
			Case style TO-220AC	12TQ040			
				12TQ045			

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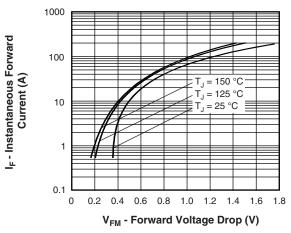


Fig. 1 - Maximum Forward Voltage Drop Characteristics

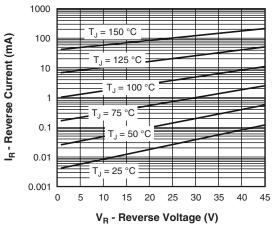


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

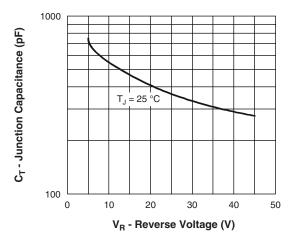


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

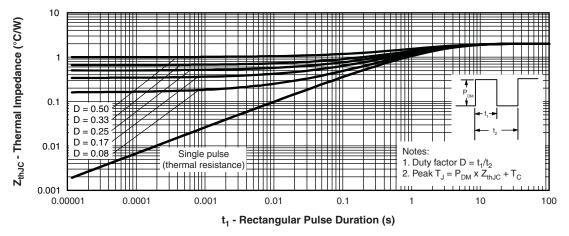


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

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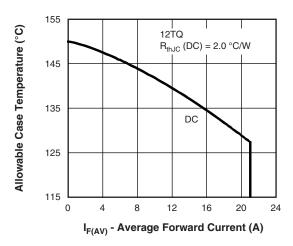


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

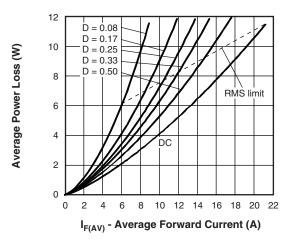


Fig. 6 - Forward Power Loss Characteristics

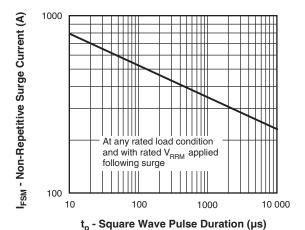


Fig. 7 - Maximum Non-Repetitive Surge Current

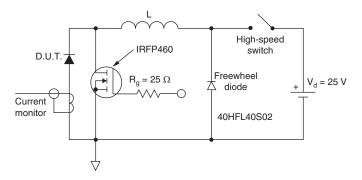
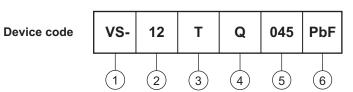


Fig. 8 - Unclamped Inductive Test Circuit

VS-12TQ...PbF Series, VS-12TQ...-N3 Series

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ORDERING INFORMATION TABLE



1 - Vishay Semiconductors product

2 - Current rating (15 A)

- Package:

T = TO-220

4 - Schottky "Q" series

035 = 35 V

Voltage ratings

040 = 40 V045 = 45 V

6 - Environmental digit

0.10 - 10.1

• PbF = Lead (Pb)-free and RoHS compliant

• -N3 = Halogen-free, RoHS compliant, and totally lead (Pb)-free

ORDERING INFORMATION (Example)								
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION					
VS-12TQ035PbF	50	1000	Antistatic plastic tube					
VS-12TQ035-N3	50	1000	Antistatic plastic tube					
VS-12TQ040PbF	50	1000	Antistatic plastic tube					
VS-12TQ040-N3	50	1000	Antistatic plastic tube					
VS-12TQ045PbF	50	1000	Antistatic plastic tube					
VS-12TQ045-N3	50	1000	Antistatic plastic tube					

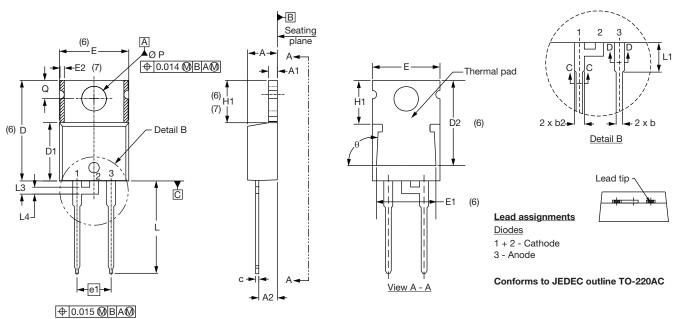
LINKS TO RELATED DOCUMENTS					
Dimensions <u>www.vishay.com/doc?95221</u>					
Part marking information	TO-220AC PbF	www.vishay.com/doc?95224			
Fart marking information	TO-220AC -N3	www.vishay.com/doc?95068			



Vishay Semiconductors

TO-220AC

DIMENSIONS in millimeters and inches



SYMBOL	MILLIN	IETERS	INC	NOTES	
STIVIBUL	MIN.	MAX.	MIN.	MAX.	NOTES
А	4.25	4.65	0.167	0.183	
A1	1.14	1.40	0.045	0.055	
A2	2.56	2.92	0.101	0.115	
b	0.69	1.01	0.027	0.040	
b1	0.38	0.97	0.015	0.038	4
b2	1.20	1.73	0.047	0.068	
b3	1.14	1.73	0.045	0.068	4
С	0.36	0.61	0.014	0.024	
c1	0.36	0.56	0.014	0.022	4
D	14.85	15.25	0.585	0.600	3
D1	8.38	9.02	0.330	0.355	
D2	11.68	12.88	0.460	0.507	6
Е	10.11	10.51	0.398	0.414	3, 6

SYMBOL	MILLIMETERS INCHES		NOTES		
STINIBOL	MIN.	MAX.	MIN.	MAX.	NOTES
E1	6.86	8.89	0.270	0.350	6
E2	-	0.76	-	0.030	7
е	2.41	2.67	0.095	0.105	
e1	4.88	5.28	0.192	0.208	
H1	6.09	6.48	0.240	0.255	6, 7
L	13.52	14.02	0.532	0.552	
L1	3.32	3.82	0.131	0.150	2
L3	1.78	2.13	0.070	0.084	
L4	0.76	1.27	0.030	0.050	2
ØΡ	3.54	3.73	0.139	0.147	
Q	2.60	3.00	0.102	0.118	
θ	θ 90° to 93°		90° t	o 93°	

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension and finish uncontrolled in L1
- (3) Dimension D, D1 and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- (4) Dimension b1, b3 and c1 apply to base metal only
- (5) Controlling dimension: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2 and E1
- (7) Dimension E2 x H1 define a zone where stamping and singulation irregularities are allowed
- (8) Outline conforms to JEDEC TO-220, D2 (minimum) where dimensions are derived from the actual package outline



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