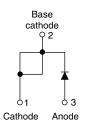


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High Performance Schottky Rectifier, 15 A

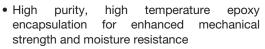




PRODUCT SUMMARY					
Package	TO-220AC				
I _{F(AV)}	15 A				
V _R	60 V				
V _F at I _F	0.56 V				
I _{RM} max.	45 mA at 125 °C				
T _J max.	150 °C				
Diode variation	Single die				
E _{AS}	6 mJ				

FEATURES

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





- Guard ring for enhanced ruggedness and long term reliability
- Designed and qualified according to JEDEC®-JESD47
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

DESCRIPTION

The VS-15TQ060... Schottky rectifier 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}		60	V			
I _{FSM}	t _p = 5 μs sine	1000	А			
V _F	15 A _{pk} , T _J = 125 °C	0.56	V			
T _J	Range	-55 to 150	°C			

VOLTAGE RATINGS						
PARAMETER	SYMBOL	VS-15TQ060PbF	VS-15TQ060-N3	UNITS		
Maximum DC reverse voltage	V_{R}	60	60	V		
Maximum working peak reverse voltage	V_{RWM}	00	00	V		

ABSOLUTE MAXIMUM RATINGS						
PARAMETER	SYMBOL	TEST CONDI	VALUES	UNITS		
Maximum average forward current See fig. 5	I _{F(AV)}	50 % duty cycle at T _C = 104 °C	15			
Maximum peak one cycle		5 μs sine or 3 μs rect. pulse	Following any rated load condition and	1000	А	
non-repetitive surge current See fig. 7	I _{FSM}	10 ms sine or 6 ms rect. pulse	with rated V _{RRM} applied	260		
Non-repetitive avalanche energy	E _{AS}	T _J = 25 °C, I _{AS} = 1.50 A, L = 11.5 mH		6	mJ	
Repetitive avalanche current	I _{AR}	Current decaying linearly to zero in 1 μ s Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical		1.50	А	



VS-15TQ060PbF, VS-15TQ060-N3

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ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CO	VALUES	UNITS		
		15 A	T _{.1} = 25 °C	0.62	V	
Maximum forward voltage drop	V _{FM} ⁽¹⁾	30 A	- IJ=25 C	0.82		
See fig. 1	VFM (1)	15 A	T _{.I} = 125 °C	0.56		
		30 A	- IJ = 125 C	0.71		
Maximum reverse leakage curent	I _{RM} (1)	T _J = 25 °C	V _R = Rated V _R	0.80	- mA	
See fig. 2		T _J = 125 °C	v _R = nateu v _R	45		
Maximum junction capacitance	C _T	$V_R = 5 V_{DC}$, (test signal range 100 kHz to 1 MHz) 25 °C		720	pF	
Typical series inductance	L _S	Measured lead to lead 5 n	8	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 stora temperature range	age	T _J , T _{Stg}		-55 to 150	°C	
Maximum thermal resistanc junction to case	e,	R _{thJC}	DC operation See fig. 4	3.25		
Typical thermal resistance, case to heatsink		R _{thCS}	Mounting surface, smooth and greased	0.50	- °C/W	
Approximate weight				2	g	
				0.07	OZ.	
Maunting toyous	minimum			6 (5)	kgf · cm	
Mounting torque -	maximum			12 (10)	(lbf · in)	
Marking device Case style TO-220AC (JEDEC)		15T0	2060			

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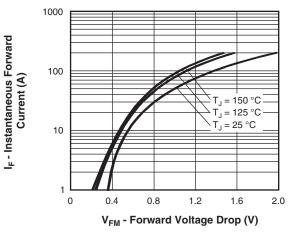


Fig. 1 - Maximum Forward Voltage Drop Characteristics

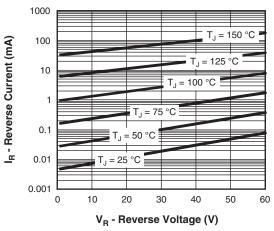


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

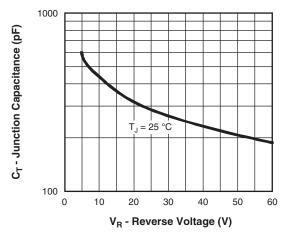


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

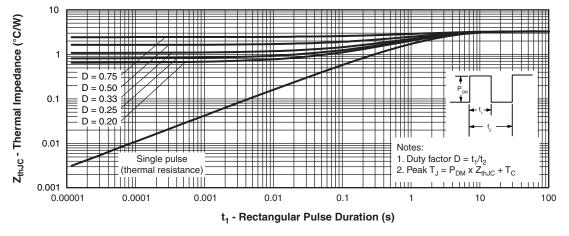
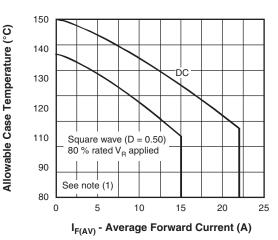


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

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

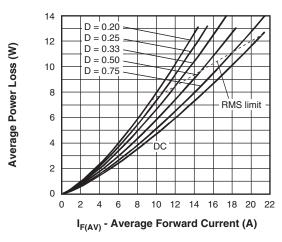


Fig. 6 - Forward Power Loss Characteristics

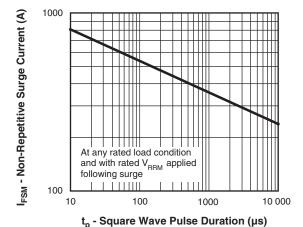


Fig. 7 - Maximum Non-Repetitive Surge Current

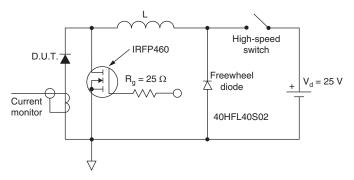


Fig. 8 - Unclamped Inductive Test Circuit

Note

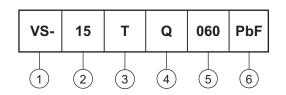
 $\begin{array}{ll} \text{(1)} & \text{Formula used: } T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}; \\ Pd = \text{Forward power loss} = I_{F(AV)} \times V_{FM} \text{ at } (I_{F(AV)}/D) \text{ (see fig. 6)}; \\ Pd_{REV} = \text{Inverse power loss} = V_{R1} \times I_R \text{ (1 - D); } I_R \text{ at } V_{R1} = 80 \text{ \% rated } V_R \\ \end{array}$

VS-15TQ060PbF, VS-15TQ060-N3

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ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - Current rating (15 = 15 A)

Package:

T = TO-220

4 - Schottky "Q" series

5 - Voltage rating (060 = 60 V)

6 - Environmental digit

• 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-15TQ060PbF	50	1000	Antistatic plastic tube			
VS-15TQ060-N3	50	1000	Antistatic plastic tube			

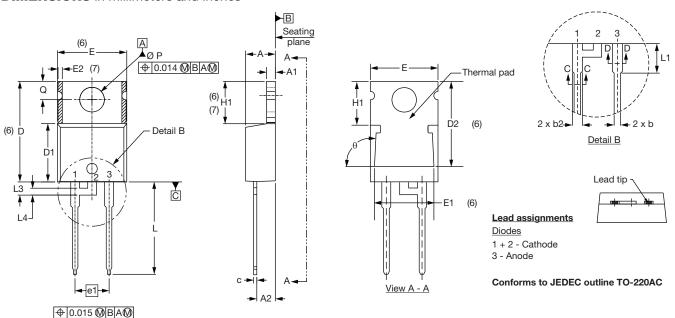
LINKS TO RELATED DOCUMENTS					
Dimensions <u>www.vishay.com/doc?95221</u>					
Doub wooding information	TO-220ACPbF	www.vishay.com/doc?95224			
Part marking information	TO-220AC-N3	www.vishay.com/doc?95068			
SPICE model		www.vishay.com/doc?95600			



Vishay Semiconductors

TO-220AC

DIMENSIONS in millimeters and inches



CVMPOL	SYMBOL MILLIMETERS INCHES		HES	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		
STIVIBUL	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	90° t	o 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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