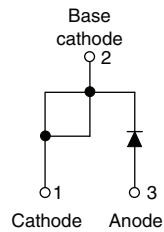


## Schottky Rectifier, 19 A


**TO-220AC**


### FEATURES

- 125 °C  $T_J$  operation ( $V_R < 5$  V)
- Optimized for OR-ing applications
- Ultralow 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 according to JEDEC-JESD47
- Halogen-free according to IEC 61249-2-21 definition (-N3 only)



PRODUCT SUMMARY	
Package	TO-220AC
$I_{F(AV)}$	19 A
$V_R$	15 V
$V_F$ at $I_F$	0.32 V
$I_{RM}$ max.	522 mA at 100 °C
$T_J$ max.	125 °C
Diode variation	Single die
$E_{AS}$	6.75 mJ

### DESCRIPTION

The VS-19TQ015... Schottky rectifier has been optimized for ultralow forward voltage drop specifically for the OR-ing of parallel power supplies. The proprietary barrier technology allows for reliable operation up to 125 °C junction temperature. Typical applications are in parallel switching power supplies, converters, reverse battery protection, and redundant power subsystems.

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	19	A
$V_{RRM}$		15	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	700	A
$V_F$	19 A <sub>pk</sub> , $T_J = 75$ °C	0.32	V
$T_J$	Range	- 55 to 125	°C

VOLTAGE RATINGS				
PARAMETER	SYMBOL	VS-19TQ015PbF	VS-19TQ015-N3	UNITS
Maximum DC reverse voltage	$V_R$	15	15	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 $T_C = 80$ °C, rectangular waveform	19	A	
Maximum peak one cycle non-repetitive surge current See fig. 7	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	Following any rated load condition and with rated $V_{RRM}$ applied		700
		10 ms sine or 6 ms rect. pulse			330
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25$ °C, $I_{AS} = 1.50$ A, $L = 6$ mH	6.75	mJ	
Repetitive avalanche current	$I_{AR}$	Current decaying linearly to zero in 1 $\mu s$ Frequency limited by $T_J$ maximum $V_A = 3 \times V_R$ typical	1.50	A	



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	19 A	$T_J = 25\text{ }^\circ\text{C}$	0.36	V
		38 A		0.46	
		19 A	$T_J = 75\text{ }^\circ\text{C}$	0.32	
		38 A		0.43	
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 100\text{ }^\circ\text{C}, V_R = 12\text{ V}$		465	mA
		$T_J = 100\text{ }^\circ\text{C}, V_R = 5\text{ V}$		285	
		$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	10.5	
		$T_J = 100\text{ }^\circ\text{C}$		522	
Maximum junction capacitance	$C_T$	$V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$		2000	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/ $\mu\text{s}$

**Note**

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

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction temperature range	$T_J$			- 55 to 125	$^\circ\text{C}$
Maximum storage temperature range	$T_{Stg}$			- 55 to 150	
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation See fig. 4		1.50	$^\circ\text{C/W}$
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 maximum			6 (5)	kgf · cm (lbf · in)
				12 (10)	
Marking device		Case style TO-220AC		19TQ015	

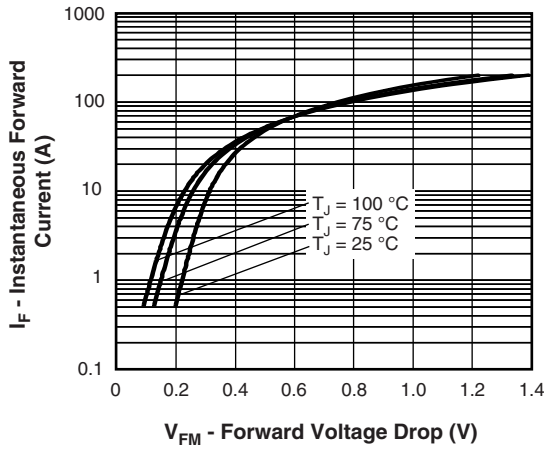


Fig. 1 - Maximum Forward Voltage Drop Characteristics

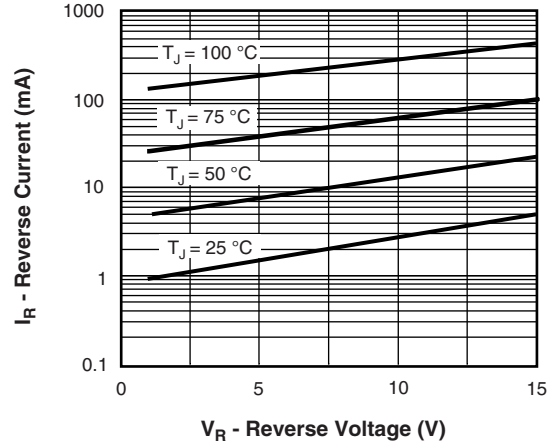


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

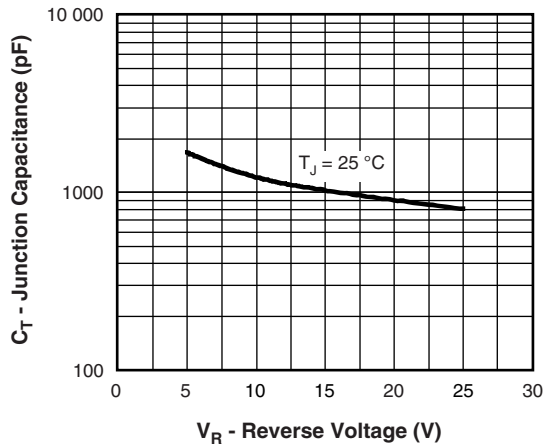


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

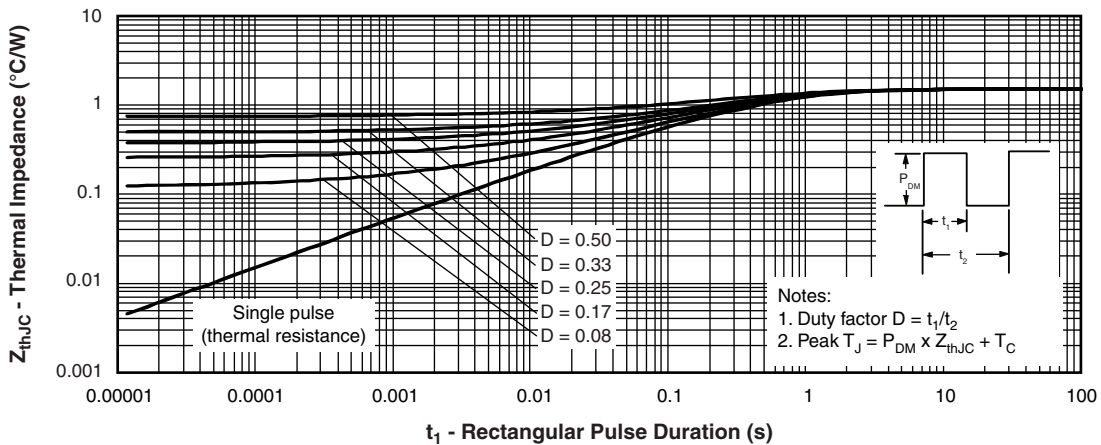


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

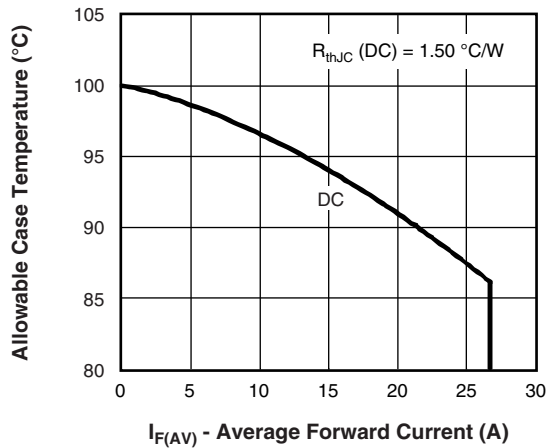


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

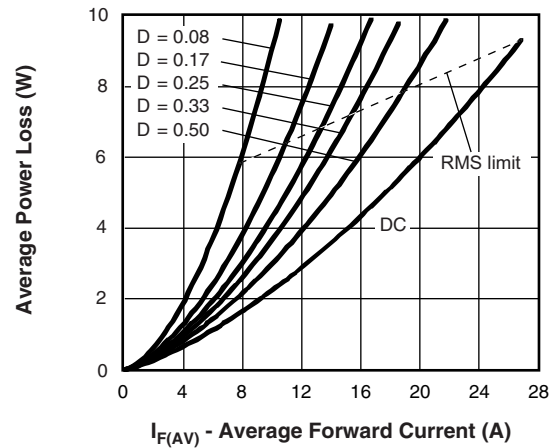


Fig. 6 - Forward Power Loss Characteristics

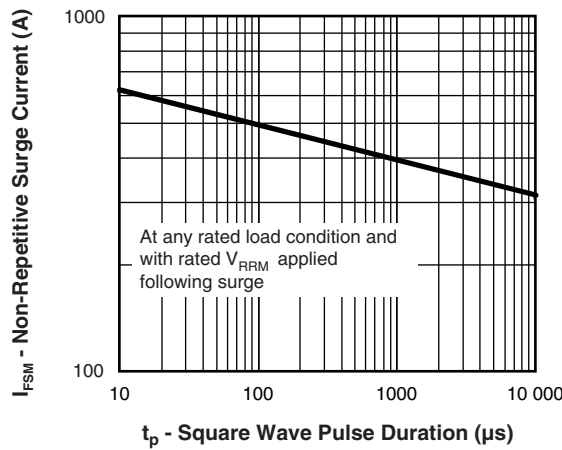


Fig. 7 - Maximum Non-Repertive Surge Current

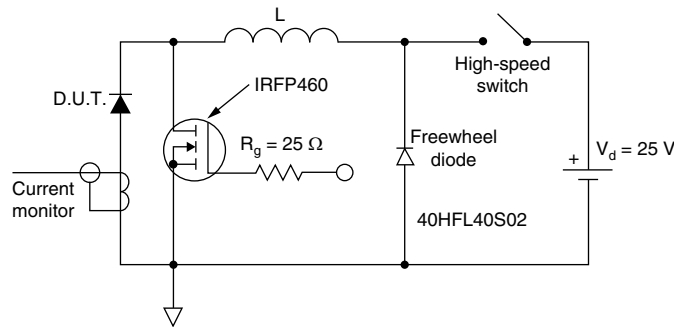
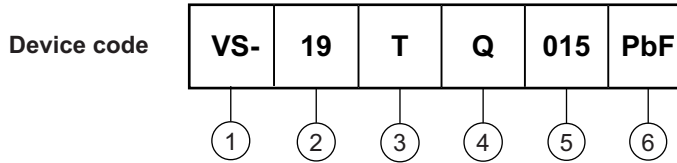


Fig. 8 - Unclamped Inductive Test Circuit



## ORDERING INFORMATION TABLE



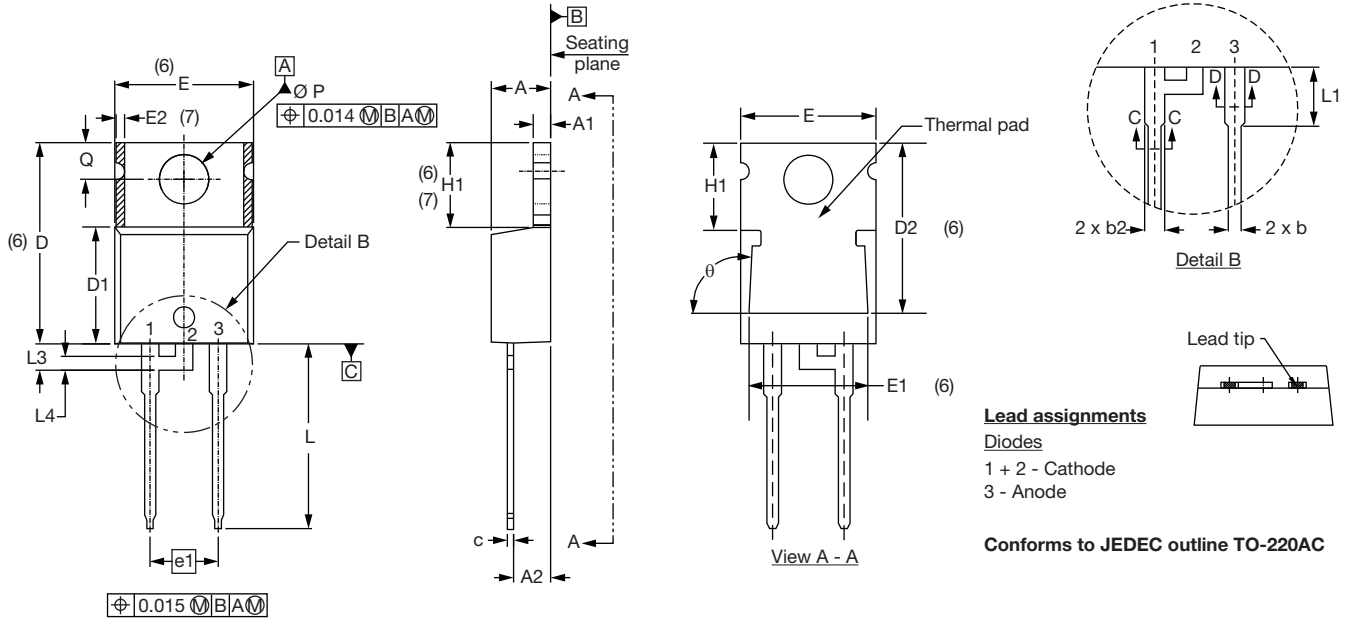
- 1** - Vishay Semiconductors product
- 2** - Current rating (19 = 19 A)
- 3** - Package:  
T = TO-220
- 4** - Schottky "Q" series
- 5** - Voltage rating (015 = 15 V)
- 6** - Environmental digit
  - PbF = Lead (Pb)-free and RoHS compliant
  - -N3 = Halogen-free, RoHS compliant, and totally lead (Pb)-free

<b>ORDERING INFORMATION</b> (Example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-19TQ015PbF	50	1000	Antistatic plastic tube
VS-19TQ015-N3	50	1000	Antistatic plastic tube

<b>LINKS TO RELATED DOCUMENTS</b>		
Dimensions		<a href="http://www.vishay.com/doc?95221">www.vishay.com/doc?95221</a>
Part marking information	TO-220AC PbF	<a href="http://www.vishay.com/doc?95224">www.vishay.com/doc?95224</a>
	TO-220AC -N3	<a href="http://www.vishay.com/doc?95068">www.vishay.com/doc?95068</a>

## TO-220AC

**DIMENSIONS** in millimeters and inches



**Lead assignments**  
 Diodes  
 1 + 2 - Cathode  
 3 - Anode

Conforms to JEDEC outline TO-220AC

SYMBOL	MILLIMETERS		INCHES		NOTES	SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.			MIN.	MAX.	MIN.	MAX.	
A	4.25	4.65	0.167	0.183		E1	6.86	8.89	0.270	0.350	6
A1	1.14	1.40	0.045	0.055		E2	-	0.76	-	0.030	7
A2	2.56	2.92	0.101	0.115		e	2.41	2.67	0.095	0.105	
b	0.69	1.01	0.027	0.040		e1	4.88	5.28	0.192	0.208	
b1	0.38	0.97	0.015	0.038	4	H1	6.09	6.48	0.240	0.255	6, 7
b2	1.20	1.73	0.047	0.068		L	13.52	14.02	0.532	0.552	
b3	1.14	1.73	0.045	0.068	4	L1	3.32	3.82	0.131	0.150	2
c	0.36	0.61	0.014	0.024		L3	1.78	2.13	0.070	0.084	
c1	0.36	0.56	0.014	0.022	4	L4	0.76	1.27	0.030	0.050	2
D	14.85	15.25	0.585	0.600	3	$\emptyset P$	3.54	3.73	0.139	0.147	
D1	8.38	9.02	0.330	0.355		Q	2.60	3.00	0.102	0.118	
D2	11.68	12.88	0.460	0.507	6	$\theta$	90° to 93°		90° to 93°		
E	10.11	10.51	0.398	0.414	3, 6						

**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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