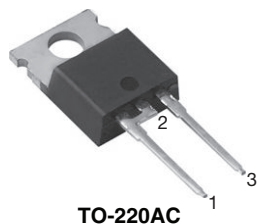
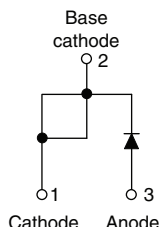


# High Performance Schottky Rectifier, 18 A


**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
- AEC-Q101 qualified meets JESD 201 class 2 whisker test
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## PRIMARY CHARACTERISTICS

$I_{F(AV)}$	18 A
$V_R$	35 V, 40 V, 45 V
$V_F$ at $I_F$	0.53 V
$I_{RM}$ max.	25 mA at 125 °C
$T_J$ max.	175 °C
$E_{AS}$	24 mJ
Package	TO-220AC
Circuit configuration	Single

## DESCRIPTION

The VS-18TQ... 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	18	A
$V_{RRM}$	Range	35 to 45	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	1800	A
$V_F$	18 A <sub>pk</sub> , $T_J = 125$ °C	0.53	V
$T_J$	Range	-55 to +175	°C

## VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-18TQ035HN3	VS-18TQ040HN3	VS-18TQ045HN3	UNITS
Maximum DC reverse voltage	$V_R$	35	40	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 $T_C = 149$ °C, rectangular waveform	18	A
Maximum peak one cycle non-repetitive surge current See fig. 7	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	1800	
		10 ms sine or 6 ms rect. pulse	390	
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25$ °C, $I_{AS} = 3.6$ A, $L = 3.7$ mH	24	mJ
Repetitive avalanche current	$I_{AR}$	Current decaying linearly to zero in 1 $\mu s$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical	3.6	A

**ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	18 A	$T_J = 25\text{ }^{\circ}\text{C}$	0.60	V
		36 A		0.72	
		18 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.53	
		36 A		0.67	
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_R$	2.5	mA
		$T_J = 125\text{ }^{\circ}\text{C}$		25	
Maximum junction capacitance	$C_T$	$V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^{\circ}\text{C}$		1400	pF
Typical series inductance	$L_S$	Measured lead to lead 5 mm from package body		8	nH
Maximum voltage rate of change	dV/dt	Rated $V_R$		10 000	V/ $\mu$ s

**Note**

<sup>(1)</sup> Pulse width < 300  $\mu$ 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 175	$^{\circ}\text{C}$
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation See fig. 4	1.50	$^{\circ}\text{C}/\text{W}$
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	18TQ035H	
			18TQ040H	
			18TQ045H	

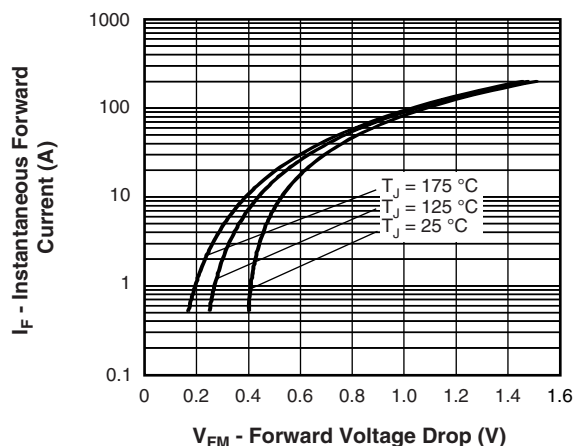


Fig. 1 - Maximum Forward Voltage Drop Characteristics

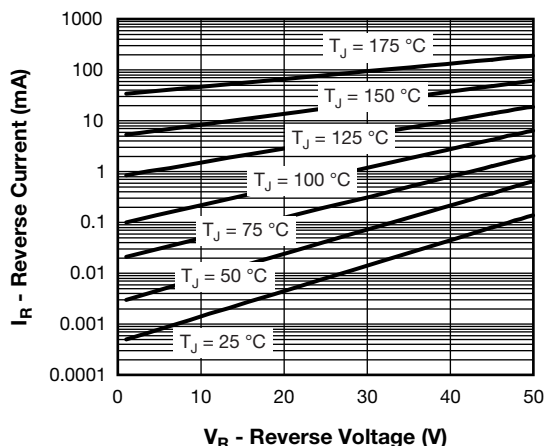


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

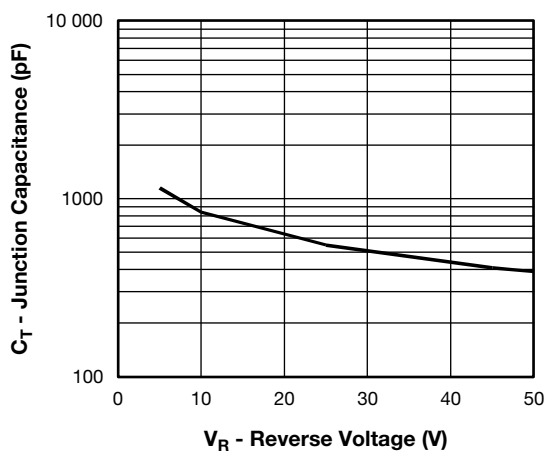
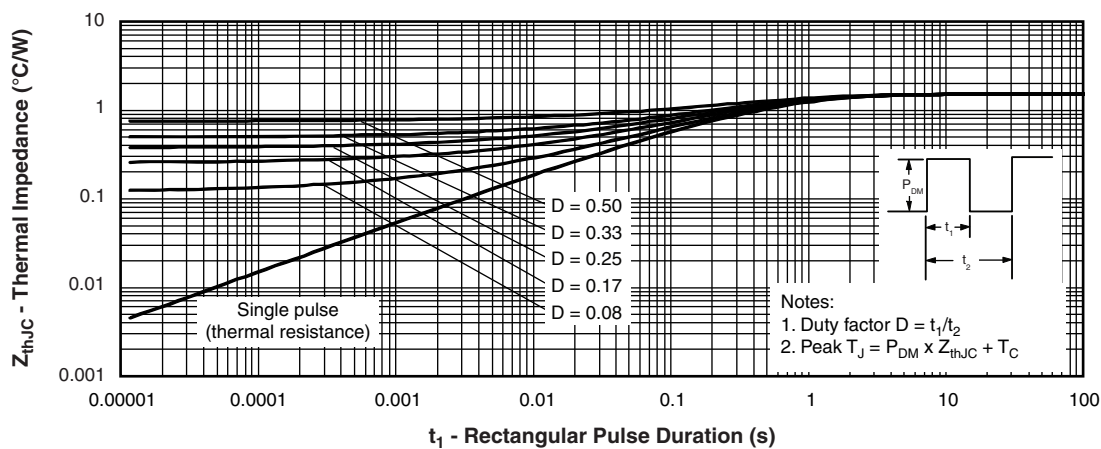


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

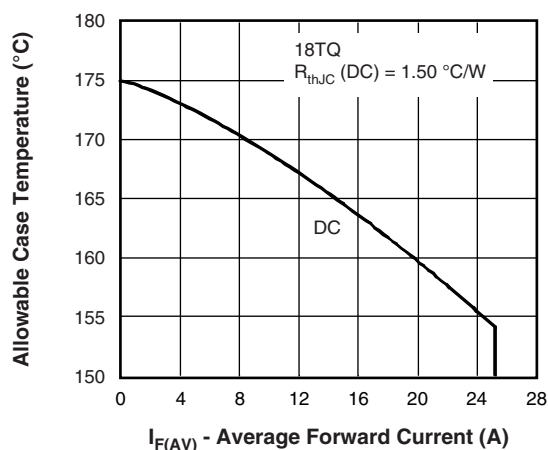


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

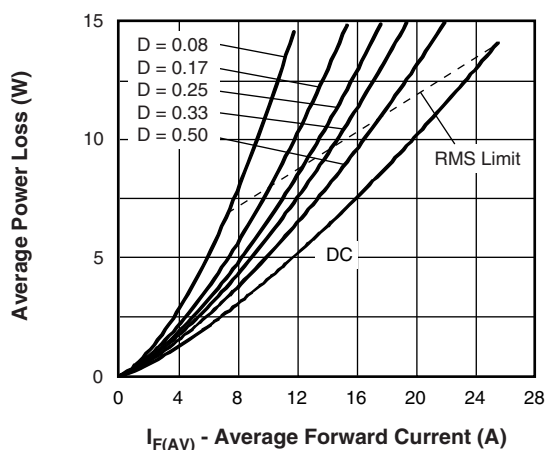


Fig. 6 - Forward Power Loss Characteristics

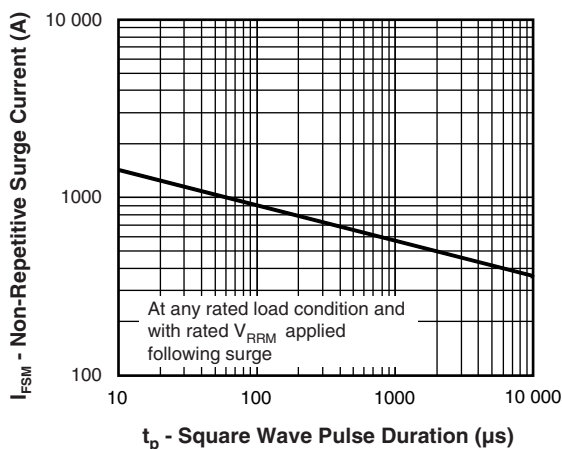


Fig. 7 - Maximum Non-Repetitive Surge Current

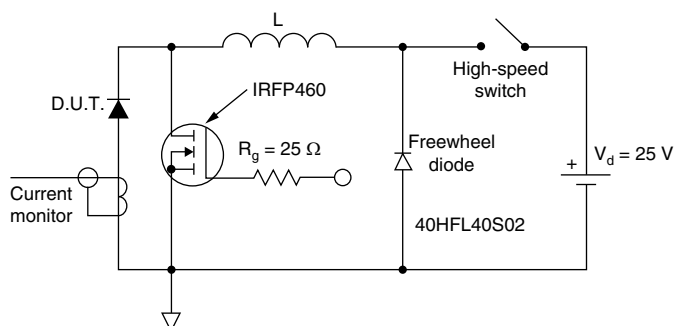


Fig. 8 - Unclamped Inductive Test Circuit

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>18</b>	<b>T</b>	<b>Q</b>	<b>045</b>	<b>H</b>	<b>N3</b>
	①	②	③	④	⑤	⑥	⑦

- |          |   |   |            |
|----------|---|---|------------|
| <b>1</b> | - | Vishay Semiconductors product                                   |            |
| <b>2</b> | - | Current rating (18 = 18 A)                                      |            |
| <b>3</b> | - | Package:  |            |
|          |   | T = TO-220  |            |
| <b>4</b> | - | Schottky "Q" series   | 035 = 35 V |
| <b>5</b> | - | Voltage ratings   | 040 = 40 V |
|          |   |   | 045 = 45 V |
| <b>6</b> | - | H = AEC-Q101 qualified  |            |
| <b>7</b> | - | Environmental digit   |            |
|          |   | • N3 = Halogen-free, RoHS-compliant, and totally lead (Pb)-free |            |

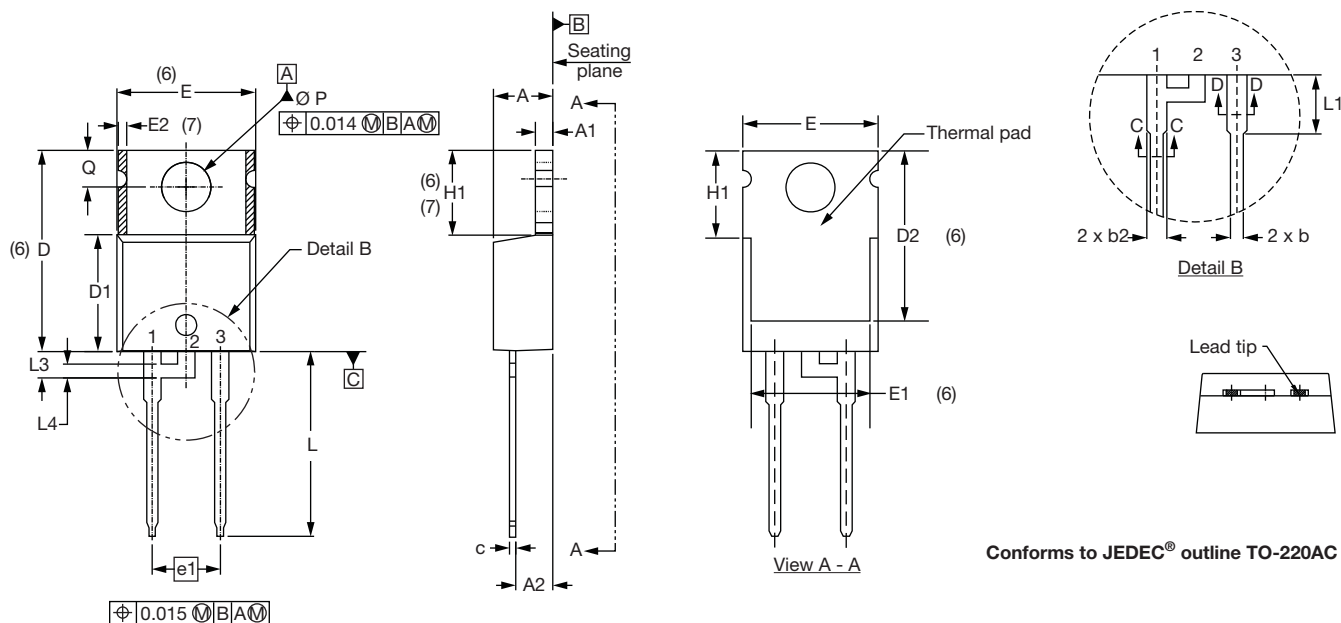
<b>ORDERING INFORMATION</b> (Example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-18TQ035HN3	50	1000	Antistatic plastic tube
VS-18TQ040HN3	50	1000	Antistatic plastic tube
VS-18TQ045HN3	50	1000	Antistatic plastic tube

<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-N3 <a href="http://www.vishay.com/doc?95068">www.vishay.com/doc?95068</a>
SPICE model	<a href="http://www.vishay.com/doc?96209">www.vishay.com/doc?96209</a>



### TO-220AC

**DIMENSIONS** in millimeters and inches



Conforms to JEDEC® outline TO-220AC

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	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
c	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
E	10.11	10.51	0.398	0.414	3, 6

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
E1	6.86	8.89	0.270	0.350	6
E2	-	0.76	-	0.030	7
e1	4.88	5.28	0.192	0.208	
H1	5.84	6.86	0.230	0.270	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
Ø P	3.54	3.73	0.139	0.147	
Q	2.60	3.00	0.102	0.118	

#### Notes

- Dimensioning and tolerancing as per ASME Y14.5M-1994
- Lead dimension and finish uncontrolled in L1
- 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
- Dimension b1, b3 and c1 apply to base metal only
- Controlling dimension: inches
- Thermal pad contour optional within dimensions E, H1, D2 and E1
- Dimension E2 x H1 define a zone where stamping and singulation irregularities are allowed
- Outline conforms to JEDEC TO-220, D2 (minimum) where dimensions are derived from the actual package outline



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