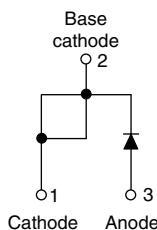


Schottky Rectifier, 20 A



TO-220AC

FEATURES

- 150 °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
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for industrial level


 RoHS*
COMPLIANT

PRODUCT SUMMARY

$I_{F(AV)}$	20 A
V_R	35 to 45 V

DESCRIPTION

The 20TQ...PbF 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	20	A
V_{RRM}	Range	35 to 45	V
I_{FSM}	$t_p = 5 \mu s$ sine	1800	A
V_F	20 Apk, $T_J = 125^\circ C$	0.51	V
T_J	Range	- 55 to 150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	20TQ035PbF	20TQ040PbF	20TQ045PbF	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 $T_C = 116^\circ C$, rectangular waveform		20	A
Maximum peak one cycle non-repetitive surge current See fig. 7	I_{FSM}	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	1800	
		10 ms sine or 6 ms rect. pulse		400	
Non-repetitive avalanche energy	E_{AS}	$T_J = 25^\circ C$, $I_{AS} = 4 A$, $L = 3.4 \text{ mH}$		27	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		4	A

* Pb containing terminations are not RoHS compliant, exemptions may apply

20TQ...PbF Series

Vishay High Power Products

Schottky Rectifier, 20 A



ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	20 A	$T_J = 25 \text{ }^\circ\text{C}$	0.57	V	
		40 A		0.73		
		20 A	$T_J = 125 \text{ }^\circ\text{C}$	0.51		
		40 A		0.67		
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25 \text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	2.7	mA	
		$T_J = 125 \text{ }^\circ\text{C}$		105		
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		8.0	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 150	°C		
Maximum thermal resistance, junction to case	R_{thJC}	DC operation See fig. 4		1.50	°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		20TQ035			
				20TQ040			
				20TQ045			

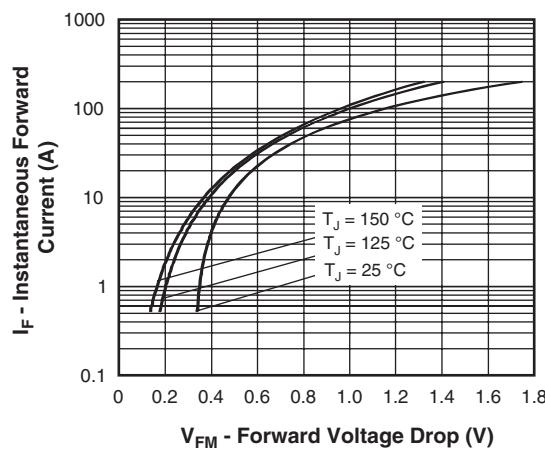


Fig. 1 - Maximum Forward Voltage Drop Characteristics

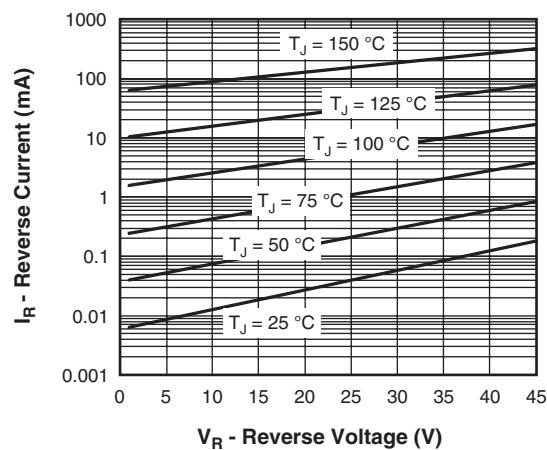


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

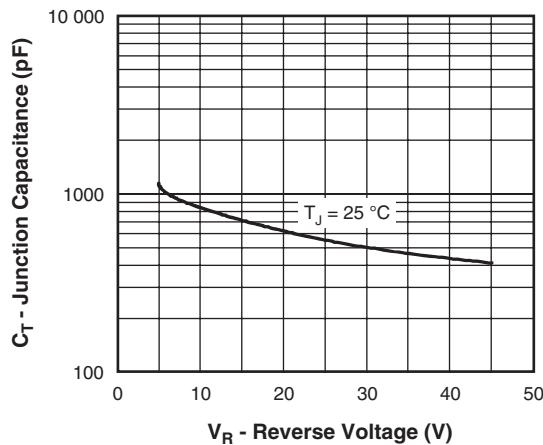


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

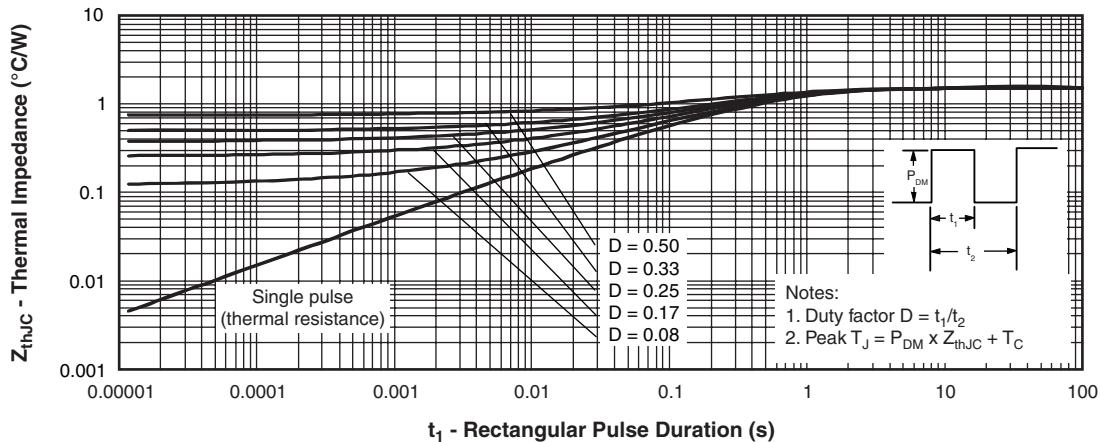


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

20TQ...PbF Series

Vishay High Power Products Schottky Rectifier, 20 A

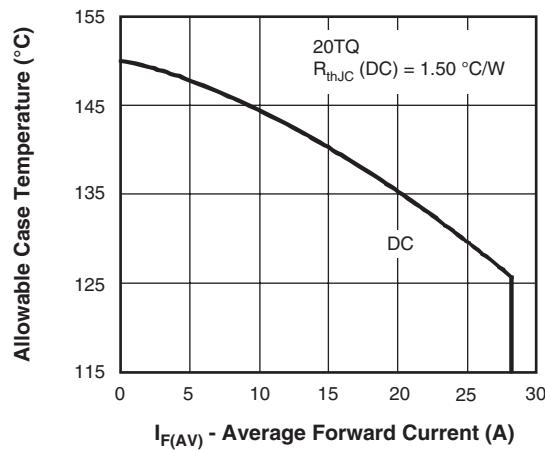


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

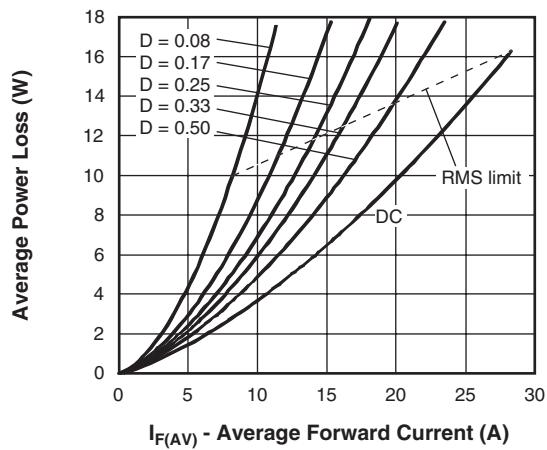


Fig. 6 - Forward Power Loss Characteristics

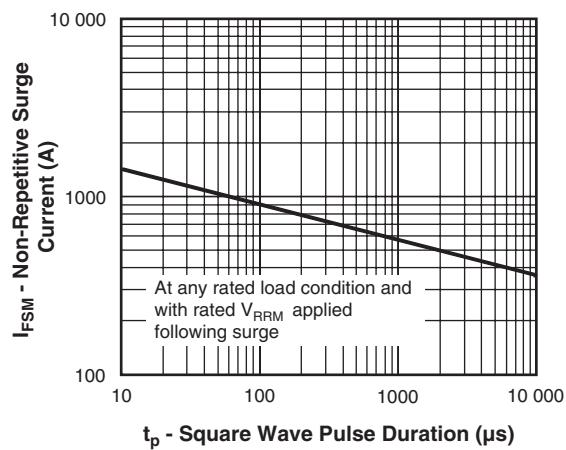


Fig. 7 - Maximum Non-Repetitive Surge Current

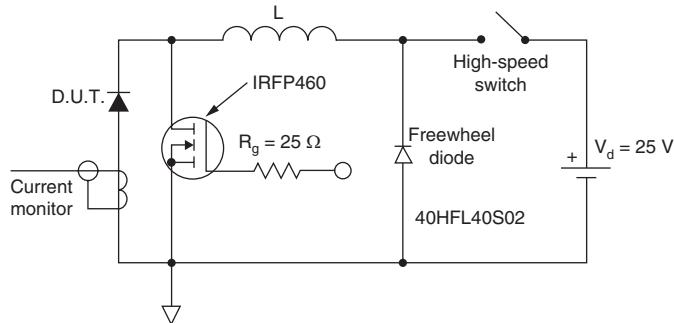


Fig. 8 - Unclamped Inductive Test Circuit

ORDERING INFORMATION TABLE

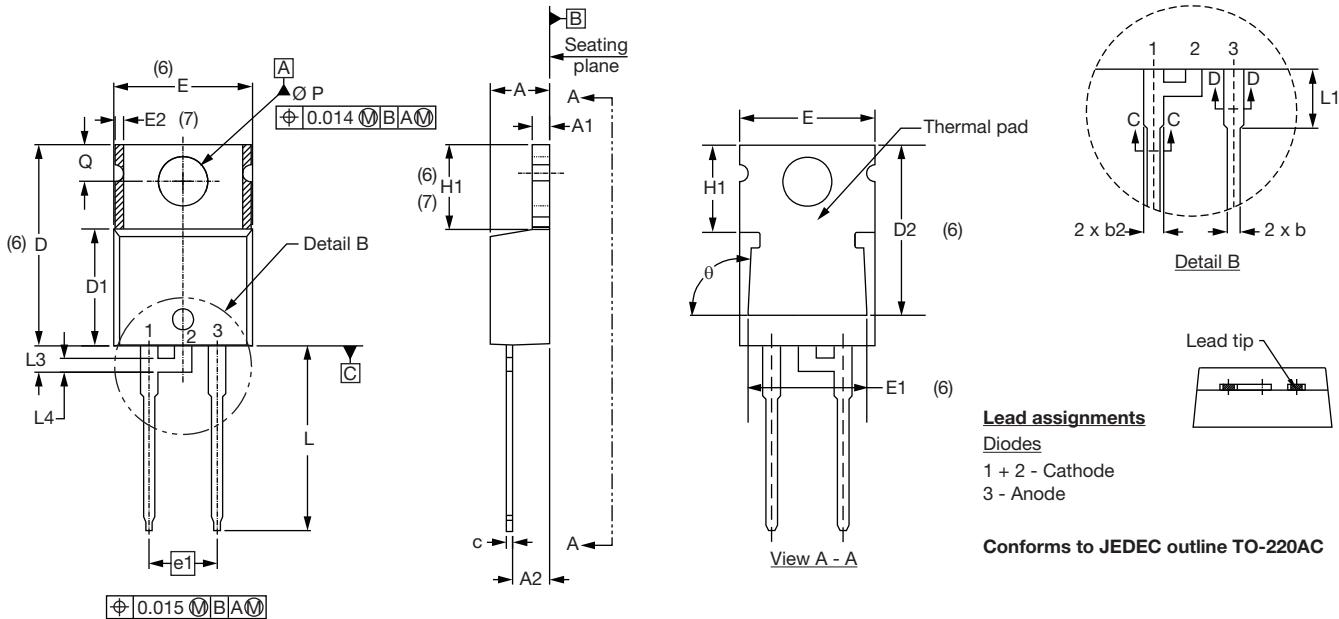
Device code	20	T	Q	045	PbF
	1	2	3	4	5
[1]	- Current rating (20 = 20 A)				
[2]	- Package: T = TO-220				
[3]	- Schottky "Q" series				
[4]	- Voltage ratings				
[5]	• None = Standard production • PbF = Lead (Pb)-free				
					035 = 35 V 040 = 40 V 045 = 45 V

Tube standard pack quantity: 50 pieces

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95221
Part marking information	http://www.vishay.com/doc?95224

TO-220AC

DIMENSIONS in millimeters and inches



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
e	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
Ø P	3.54	3.73	0.139	0.147	
Q	2.60	3.00	0.102	0.118	
θ	90° to 93°		90° to 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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