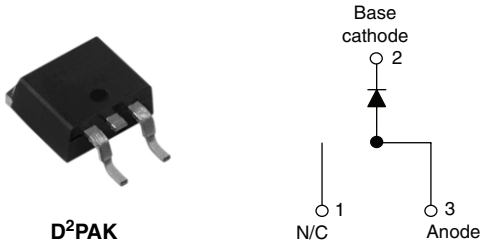


## Schottky Rectifier, 15 A



### FEATURES

- 150 °C T<sub>J</sub> operation
- Very 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
- Compliant to RoHS directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition
- AEC-Q101 qualified



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

### PRODUCT SUMMARY

I <sub>F(AV)</sub>	15 A
V <sub>R</sub>	35 V to 45 V

### DESCRIPTION

The 12TQ...SPbF 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 <sub>F(AV)</sub>	Rectangular waveform	15	A
V <sub>RRM</sub>	Range	35 to 45	V
I <sub>FSM</sub>	t <sub>p</sub> = 5 μs sine	990	A
V <sub>F</sub>	15 Apk, T <sub>J</sub> = 125 °C	0.50	V
T <sub>J</sub>	Range	- 55 to 150	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	12TQ035SPbF	12TQ040SPbF	12TQ045SPbF	UNITS
Maximum DC reverse voltage	V <sub>R</sub>	35	40	45	V
Maximum working peak reverse voltage	V <sub>RWM</sub>				

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 5	I <sub>F(AV)</sub>	50 % duty cycle at T <sub>C</sub> = 120 °C, rectangular waveform	15	A
Maximum peak one cycle non-repetitive surge current See fig. 7	I <sub>FSM</sub>	5 μs sine or 3 μs rect. pulse	990	A
		10 ms sine or 6 ms rect. pulse	250	
Non-repetitive avalanche energy	E <sub>AS</sub>	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 2.4 A, L = 5.5 mH	16	mJ
Repetitive avalanche current	I <sub>AR</sub>	Current decaying linearly to zero in 1 μs Frequency limited by T <sub>J</sub> maximum V <sub>A</sub> = 1.5 x V <sub>R</sub> typical	2.4	A

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

# 12TQ035SPbF, 12TQ040SPbF, 12TQ045SPbF



Vishay High Power Products Schottky Rectifier, 15 A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	15 A	$T_J = 25\text{ }^\circ\text{C}$	0.56	V
		30 A		0.71	
		15 A	$T_J = 125\text{ }^\circ\text{C}$	0.50	
		30 A		0.64	
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	1.75	mA
		$T_J = 125\text{ }^\circ\text{C}$		70	
Maximum junction capacitance	$C_T$	$V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$		900	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/ $\mu$ s

**Note**

(1) 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 150	$^\circ\text{C}$
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation See fig. 4		2.0	$^\circ\text{C}/\text{W}$
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 D <sup>2</sup> PAK		12TQ045S	

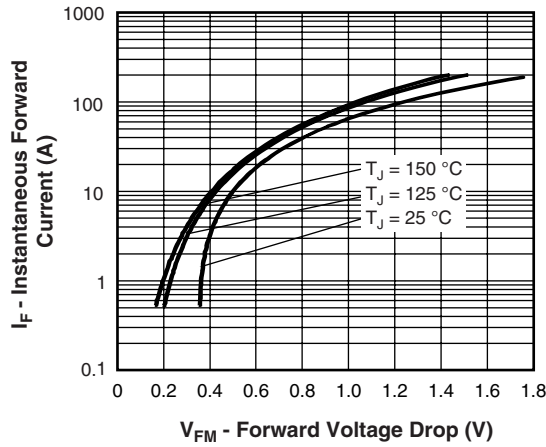


Fig. 1 - Maximum Forward Voltage Drop Characteristics

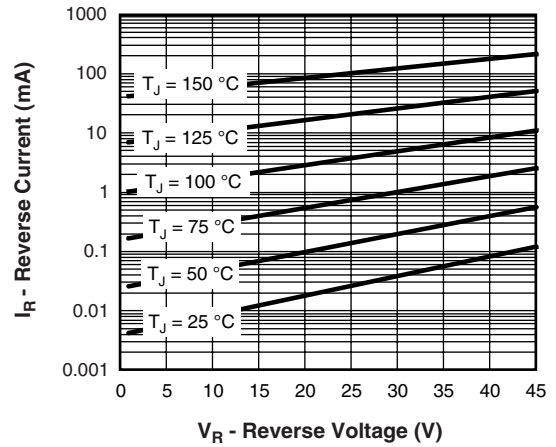


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

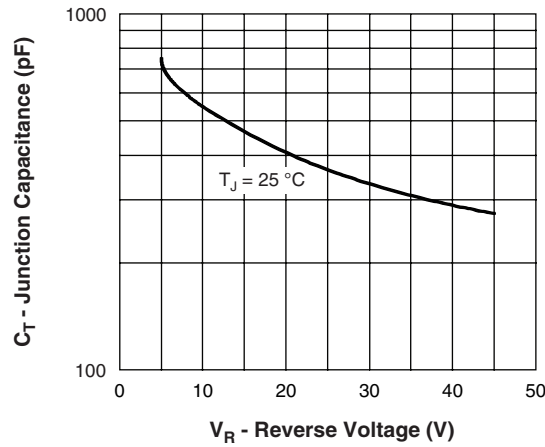


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

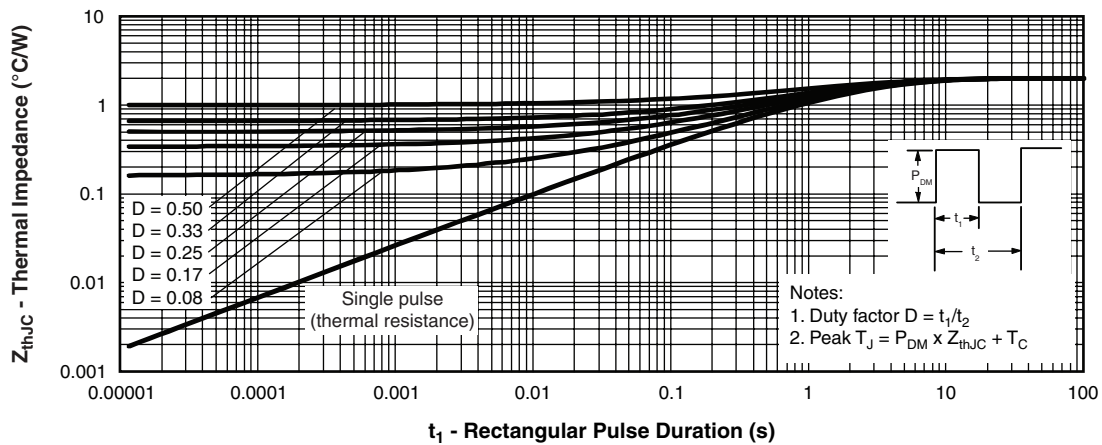


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

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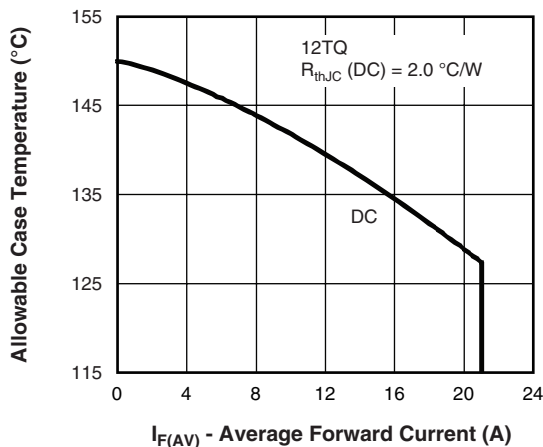


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

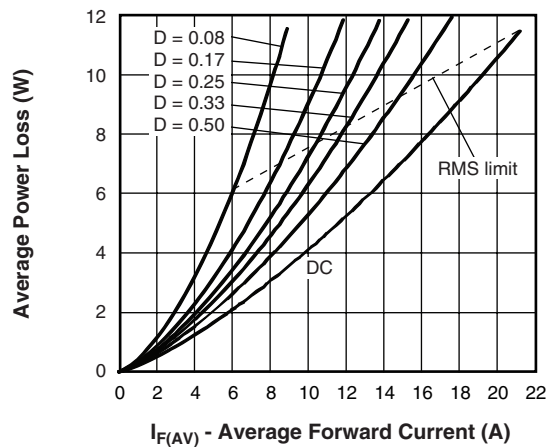


Fig. 6 - Forward Power Loss Characteristics

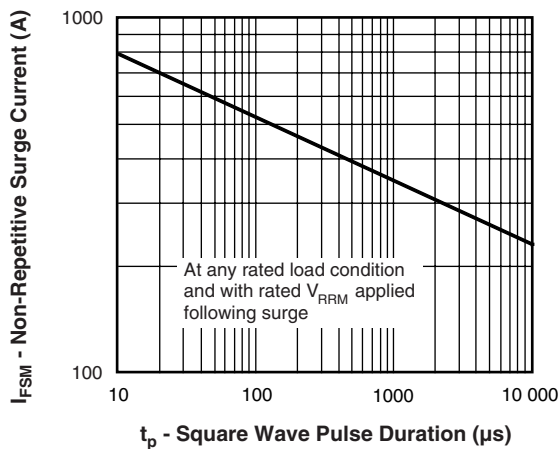


Fig. 7 - Maximum Non-Repetitive Surge Current

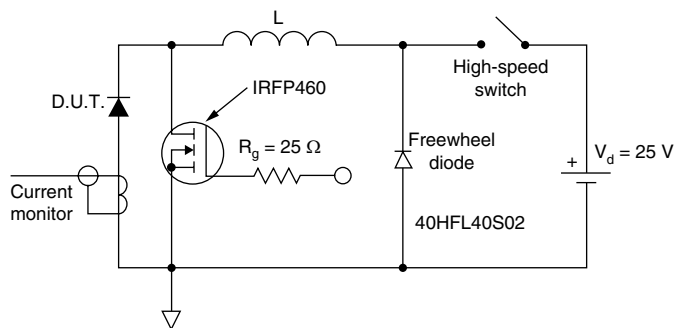


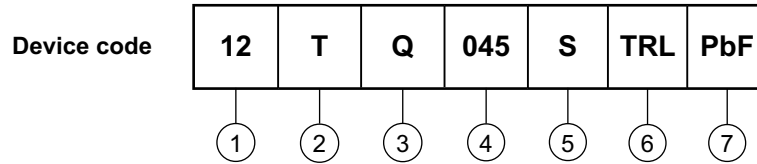
Fig. 8 - Unclamped Inductive Test Circuit



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Schottky Rectifier, 15 A Vishay High Power Products

## ORDERING INFORMATION TABLE



- 1** - Current rating
  - 2** - Package:  
T = TO-220
  - 3** - Schottky "Q" series
  - 4** - Voltage ratings
  - 5** - • S = D<sup>2</sup>PAK
  - 6** - • None = Tube (50 pieces)  
• TRL = Tape and reel (left oriented)  
• TRR = Tape and reel (right oriented)
  - 7** - • None = Standard production  
• PbF = Lead (Pb)-free
- |            |
|------------|
| 035 = 35 V |
| 040 = 40 V |
| 045 = 45 V |

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95014">www.vishay.com/doc?95014</a>
Part marking information	<a href="http://www.vishay.com/doc?95008">www.vishay.com/doc?95008</a>
Packaging information	<a href="http://www.vishay.com/doc?95032">www.vishay.com/doc?95032</a>



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