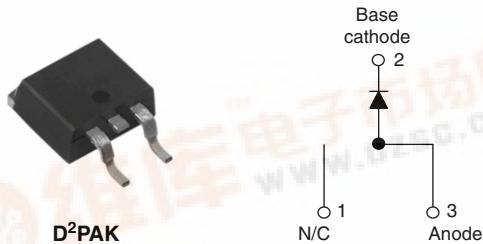




12TQ...S

Vishay High Power Products

## Schottky Rectifier, 15 A



## FEATURES

- 150 °C  $T_J$  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
- Designed and qualified for Q101 level

## DESCRIPTION

The 12TQ...S 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.

## PRODUCT SUMMARY

$I_{F(AV)}$	15 A
$V_R$	35 to 45 V

## MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	15	A
$V_{RRM}$	Range	35 to 45	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	990	A
$V_F$	15 Apk, $T_J = 125^\circ C$	0.50	V
$T_J$	Range	- 55 to 150	$^\circ C$

## VOLTAGE RATINGS

PARAMETER	SYMBOL	12TQ035S	12TQ040S	12TQ045S	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 $T_C = 120^\circ C$ , rectangular waveform	15	A
Maximum peak one cycle non-repetitive surge current See fig. 7	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	990	A
		10 ms sine or 6 ms rect. pulse	250	
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25^\circ C$ , $I_{AS} = 2.4$ A, $L = 5.5$ mH	16	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	2.4	A



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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 <sub>J</sub> , T <sub>Stg</sub>		- 55 to 150	°C
Maximum thermal resistance, junction to case		R <sub>thJC</sub>	DC operation See fig. 4	2.0	°C/W
Typical thermal resistance, case to heatsink		R <sub>thCS</sub>	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	12TQ035S		
			12TQ040S		
			12TQ045S		

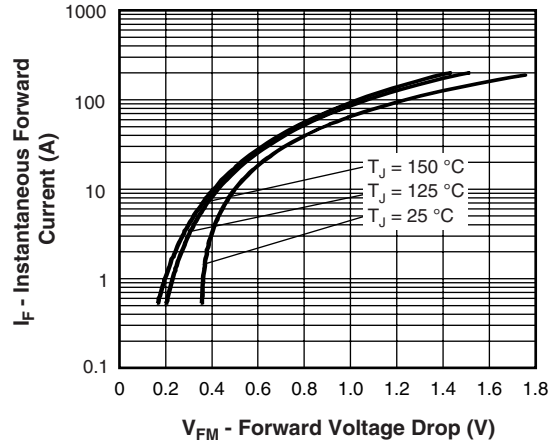


Fig. 1 - Maximum Forward Voltage Drop Characteristics

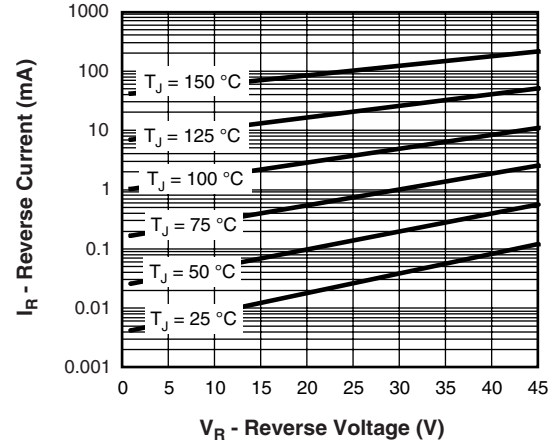


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

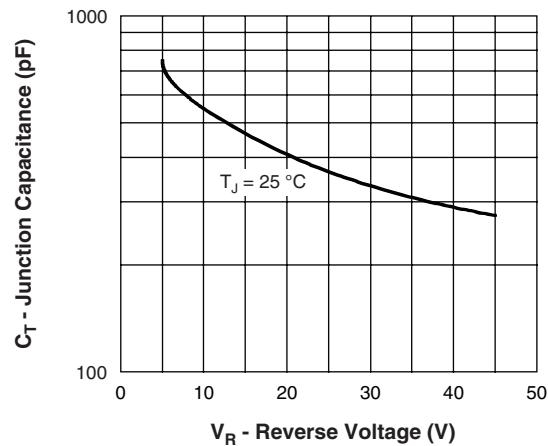
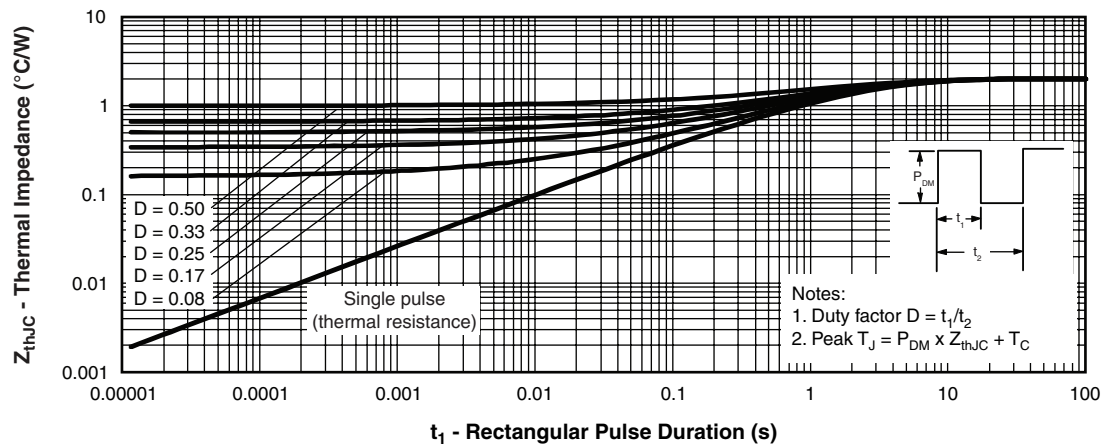


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

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

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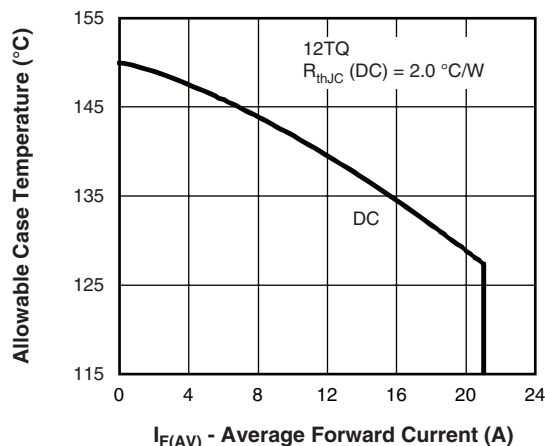


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

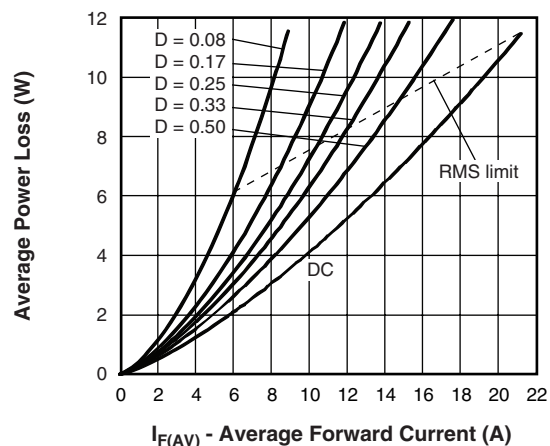


Fig. 6 - Forward Power Loss Characteristics

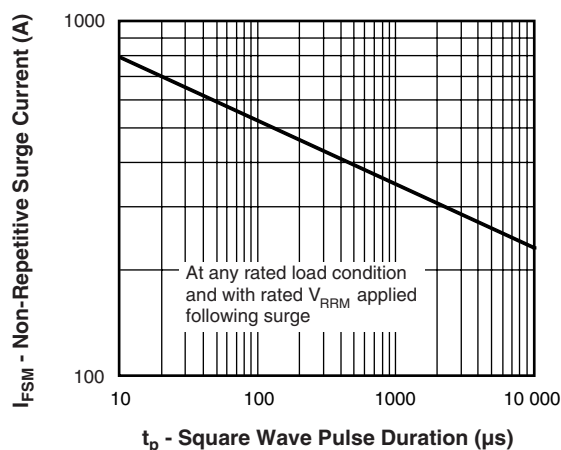


Fig. 7 - Maximum Non-Repetitive Surge Current

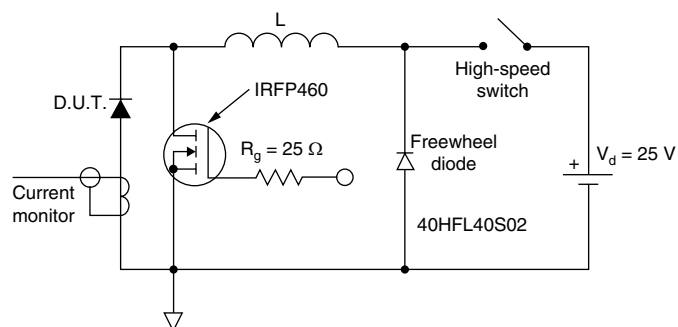


Fig. 8 - Unclamped Inductive Test Circuit

**ORDERING INFORMATION TABLE**

Device code	12	T	Q	045	S	TRL	-
	1	2	3	4	5	6	7
	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">http://www.vishay.com/doc?95014</a>
Part marking information	<a href="http://www.vishay.com/doc?95008">http://www.vishay.com/doc?95008</a>
Packaging information	<a href="http://www.vishay.com/doc?95032">http://www.vishay.com/doc?95032</a>



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