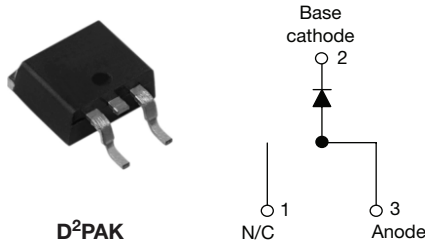


Schottky Rectifier, 6 A



FEATURES

- 175 °C T_J operation
- High frequency operation
- Low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Halogen-free according to IEC 61249-2-21 definition
- Compliant to RoHS directive 2002/95/EC
- AEC-Q101 qualified



RoHS
COMPLIANT
HALOGEN
FREE

PRODUCT SUMMARY

$I_{F(AV)}$	6 A
V_R	35 V to 45 V

DESCRIPTION

The VS-6TQ... 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	6	A
V_{RRM}	Range	35 to 45	V
I_{FSM}	$t_p = 5 \mu s$ sine	690	A
V_F	6 Apk, $T_J = 125 \text{ }^\circ\text{C}$	0.53	V
T_J	Range	- 55 to 175	$^\circ\text{C}$

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-6TQ035SPbF	VS-6TQ040SPbF	VS-6TQ045SPbF	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 $T_C = 164 \text{ }^\circ\text{C}$, rectangular waveform	6	A
Maximum peak one cycle non-repetitive surge current See fig. 7	I_{FSM}	5 μs sine or 3 μs rect. pulse	690	
		10 ms sine or 6 ms rect. pulse	140	
Non-repetitive avalanche energy	E_{AS}	$T_J = 25 \text{ }^\circ\text{C}$, $I_{AS} = 1.20 \text{ A}$, $L = 11.10 \text{ mH}$	8	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	1.20	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	6 A	$T_J = 25\text{ }^\circ\text{C}$	0.60	V
		12 A		0.73	
		6 A	$T_J = 125\text{ }^\circ\text{C}$	0.53	
		12 A		0.64	
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	0.8	mA
		$T_J = 125\text{ }^\circ\text{C}$		7	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.35	V
Forward slope resistance	r_t			18.23	m Ω
Maximum junction capacitance	C_T	$V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz), 25 $^\circ\text{C}$		400	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 175	$^\circ\text{C}$
Maximum thermal resistance, junction to case	R_{thJC}	DC operation See fig. 4		2.2	$^\circ\text{C}/\text{W}$
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 ² PAK		6TQ035S	
				6TQ040S	
				6TQ045S	



VS-6TQ035SPbF, VS-6TQ040SPbF, VS-6TQ045SPbF

Schottky Rectifier, 6 A Vishay High Power Products

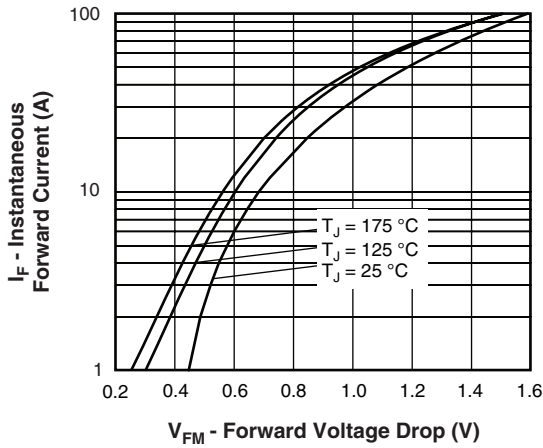


Fig. 1 - Maximum Forward Voltage Drop Characteristics

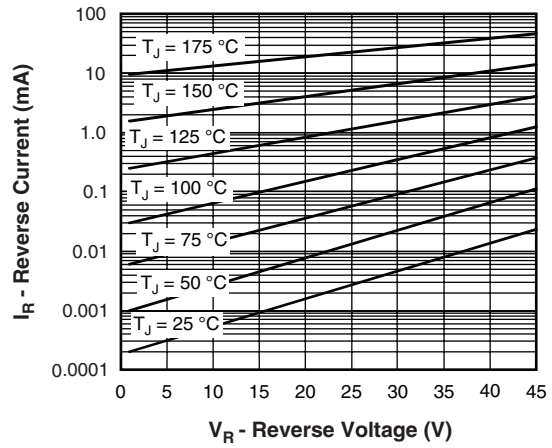


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

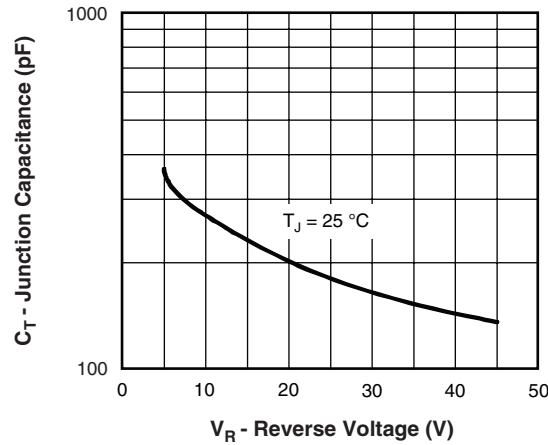


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

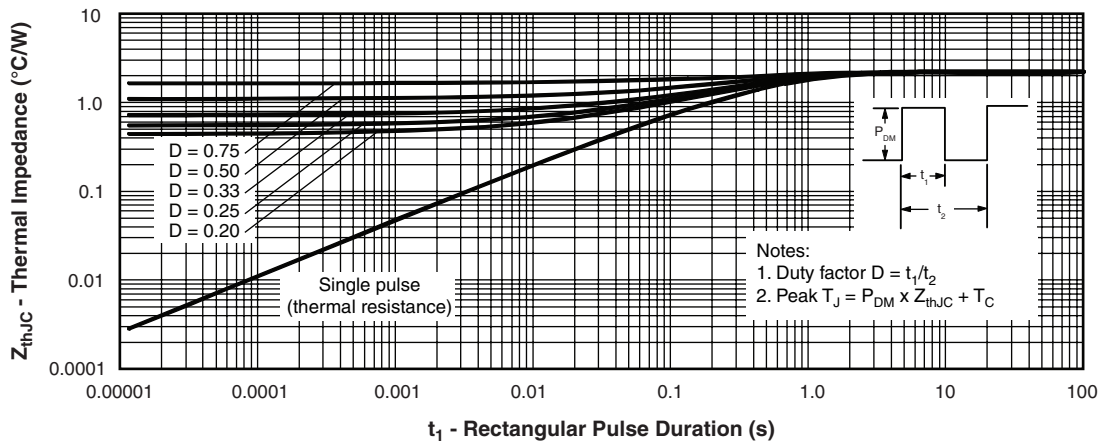


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

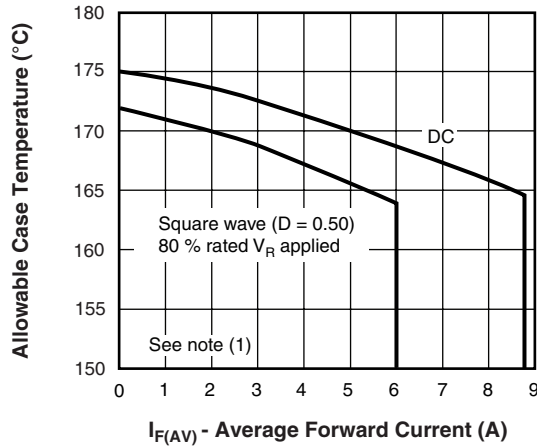


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

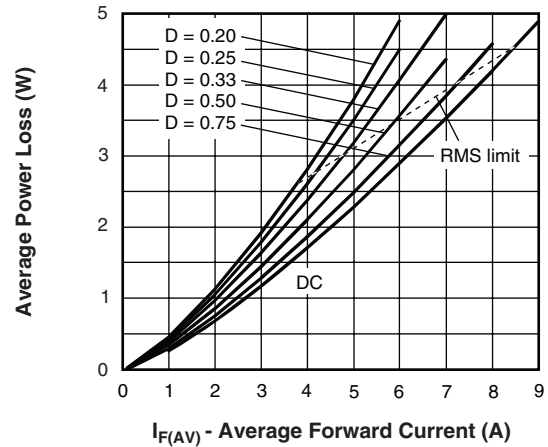


Fig. 6 - Forward Power Loss Characteristics

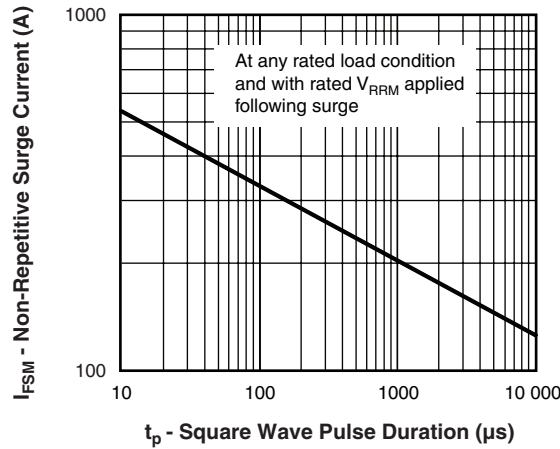


Fig. 7 - Maximum Non-Repetitive Surge Current

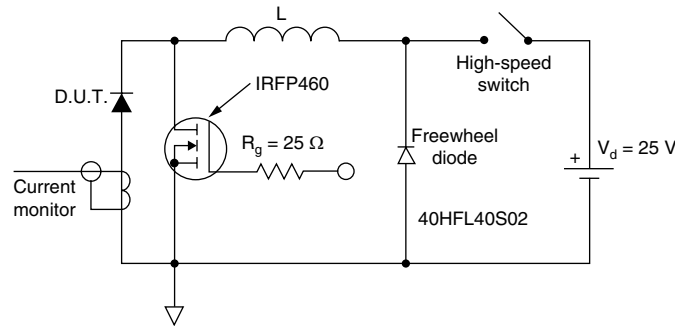


Fig. 8 - Unclamped Inductive Test Circuit

Note

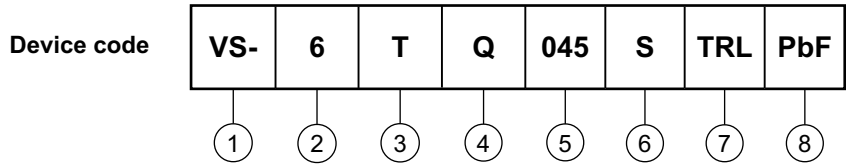
- (1) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;
- P_d = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
- $P_{d_{REV}}$ = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at $V_{R1} = 80\%$ rated V_R



VS-6TQ035SPbF, VS-6TQ040SPbF, VS-6TQ045SPbF

Schottky Rectifier, 6 A Vishay High Power Products

ORDERING INFORMATION TABLE



- | | | | |
|---|---|--|--|
| 1 | - | HPP product suffix | |
| 2 | - | Current rating (6 A) | |
| 3 | - | Package: T = TO-220 | |
| 4 | - | Schottky "Q" series | |
| 5 | - | Voltage ratings | 035 = 35 V
040 = 40 V
045 = 45 V |
| 6 | - | S = D ² PAK | |
| 7 | - | <ul style="list-style-type: none"> • None = Tube (50 pieces) • TRL = Tape and reel (left oriented) • TRR = Tape and reel (right oriented) | |
| 8 | - | PbF = Lead (Pb)-free | |

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95046
Part marking information	www.vishay.com/doc?95054
Packaging information	www.vishay.com/doc?95032



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