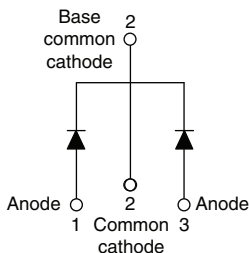


Schottky Rectifier, 2 x 20 A


TO-220AB


FEATURES

- 175 °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
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified according to JEDEC-JESD47
- Halogen-free according to IEC 61249-2-21 definition (-N3 only)



PRODUCT SUMMARY

Package	TO-220AB
$I_{F(AV)}$	2 x 20 A
V_R	150 V
V_F at I_F	0.71 V
I_{RM} max.	15 mA at 125 °C
T_J max.	175 °C
Diode variation	Common cathode
E_{AS}	1.0 mJ

DESCRIPTION

The VS-40CTQ... center tap Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. 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	40	A
V_{RRM}		150	V
I_{FSM}	$t_p = 5 \mu s$ sine	1500	A
V_F	20 A _{pk} , $T_J = 125$ °C (per leg)	0.71	V
T_J		- 55 to 175	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-40CTQ150PbF	VS-40CTQ150-N3	UNITS
Maximum DC reverse voltage	V_R	150	150	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 $T_C = 140$ °C, rectangular waveform	20 40	A
Maximum peak one cycle non-repetitive surge current per leg See fig. 7	I_{FSM}	5 μs sine or 3 μs rect. pulse 10 ms sine or 6 ms rect. pulse	1500 250	
Non-repetitive avalanche energy per leg	E_{AS}	$T_J = 25$ °C, $I_{AS} = 1.5$ A, $L = 0.9$ mH	1.0	mJ
Repetitive avalanche current per leg	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical	1.5	A

**ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg See fig. 1	$V_{FM}^{(1)}$	20 A	$T_J = 25\text{ }^{\circ}\text{C}$	0.93	V
		40 A		1.16	
		20 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.71	
		40 A		0.85	
Maximum reverse leakage current per leg See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_R$	50	μA
		$T_J = 125\text{ }^{\circ}\text{C}$		15	mA
Maximum junction capacitance per leg	C_T	$V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^{\circ}\text{C}$		450	pF
Typical series inductance per leg	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	°C
Maximum thermal resistance, junction to case per leg	R _{thJC}	DC operation See fig. 4	1.5	°C/W
Maximum thermal resistance, junction to case per package		DC operation	0.75	
Typical thermal resistance, case to heatsink	R _{thCS}	Mounting surface, smooth and greased	0.5	
Approximate weight			2	g
			0.07	oz.
Mounting torque	minimum	Non-lubricated threads	6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style TO-220AB	40CTQ150	

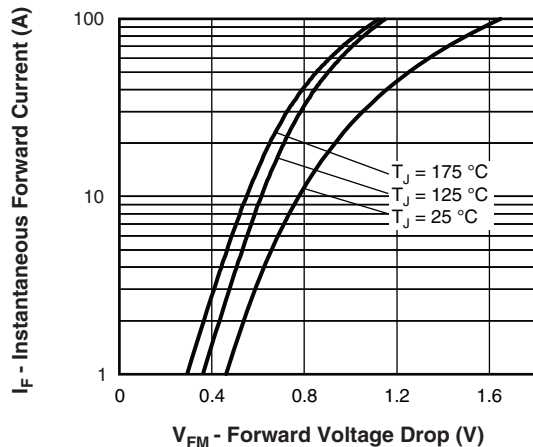


Fig. 1 - Maximum Forward Voltage Drop Characteristics

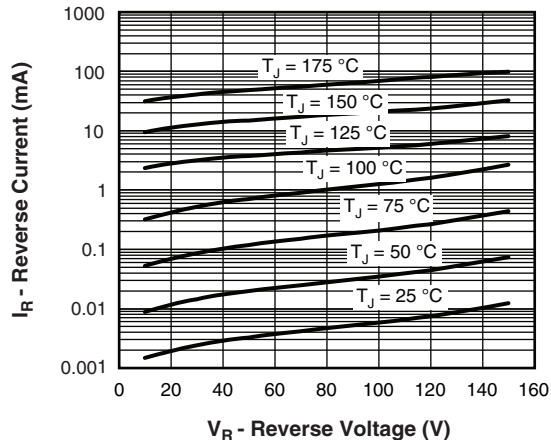


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

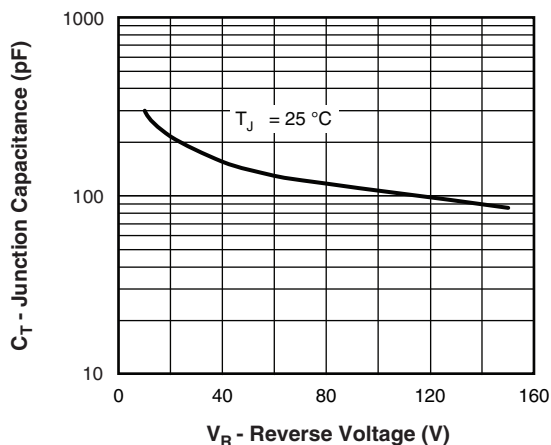
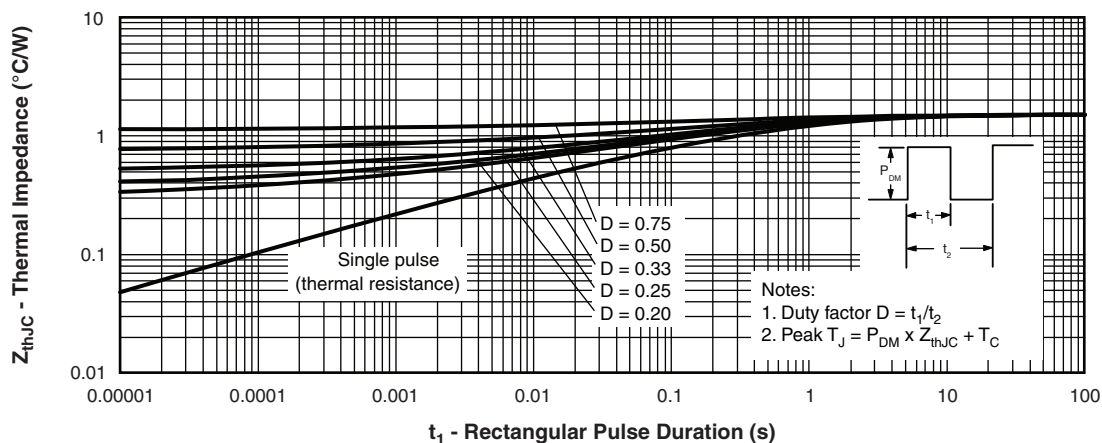


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

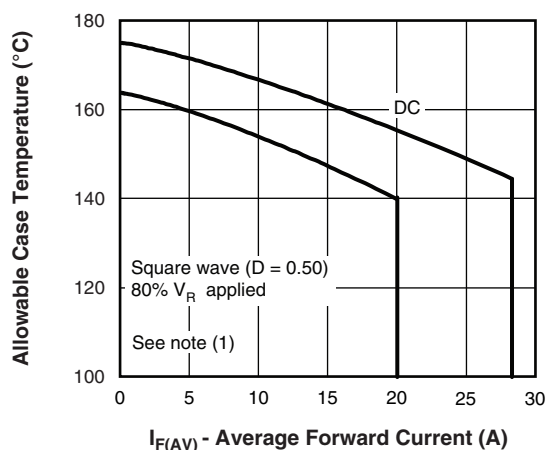


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

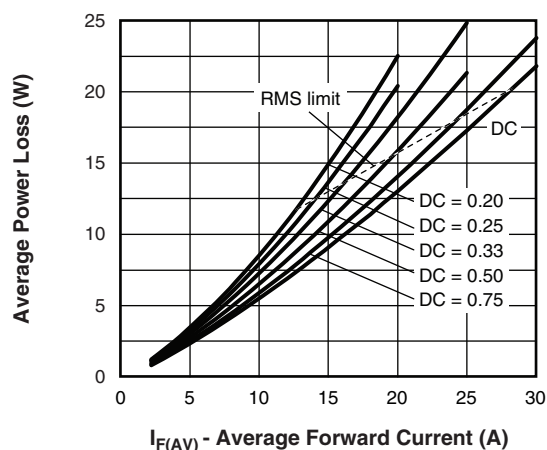


Fig. 6 - Forward Power Loss Characteristics

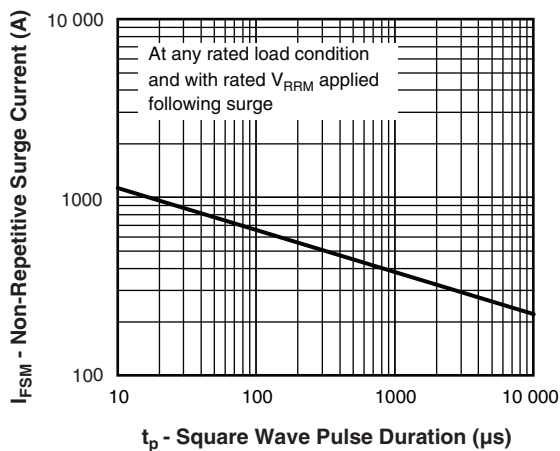


Fig. 7 - Maximum Non-Repetitive Surge Current

Note

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

**ORDERING INFORMATION TABLE**

Device code	VS-	40	C	T	Q	150	PbF
	1	2	3	4	5	6	7

- | | | |
|----------|---|--|
| 1 | - | Vishay Semiconductors product |
| 2 | - | Current rating (40 = 40 A) |
| 3 | - | Circuit configuration:
C = Common cathode |
| 4 | - | Package:
T = TO-220 |
| 5 | - | Schottky "Q" series |
| 6 | - | Voltage ratings (150 = 150 V) |
| 7 | - | Environmental digit |
- PbF = Lead (Pb)-free and RoHS compliant
 - -N3 = Halogen-free, RoHS compliant, and totally lead (Pb)-free

ORDERING INFORMATION (Example)

PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-40CTQ150PbF	50	1000	Antistatic plastic tube
VS-40CTQ150-N3	50	1000	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS

Dimensions		www.vishay.com/doc?95222
Part marking information	TO-220AB PbF	www.vishay.com/doc?95225
	TO-220AB -N3	www.vishay.com/doc?95028



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