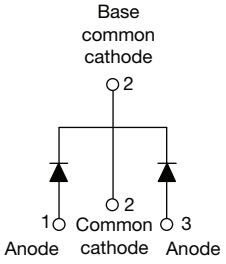
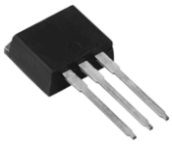
Schottky Rectifier, 2 x 20 A

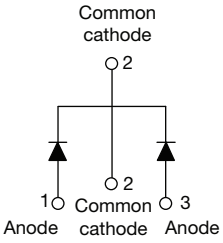
VS-43CTQ...GS



D²PAK

VS-43CTQ...G-1





TO-262

FEATURES

- 175 °C T_J operation
- Center tap configuration
- Low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- High frequency operation
- 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

Pb e3 RoHS COMPLIANT HALOGEN FREE

DESCRIPTION

This center tap Schottky rectifier series has been optimized for very 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.

PRODUCT SUMMARY	
$I_{F(AV)}$	2 x 20 A
V_R	80 V/100 V

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	40	A
V_{RRM}		80/100	V
I_{FSM}	t_p = 5 µs sine	850	A
V_F	20 Apk, T_J = 125 °C (per leg)	0.67	V
T_J	Range	- 55 to 175	°C

VOLTAGE RATINGS				
PARAMETER	SYMBOL	VS-43CTQ080GSPbF VS-43CTQ080G-1PbF	VS-43CTQ100GSPbF VS-43CTQ100G-1PbF	UNITS
Maximum DC reverse voltage	V_R	80	100	V
Maximum working peak reverse voltage	V_{RWM}			

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current (per leg) See fig. 5	$I_{F(AV)}$	50 % duty cycle at T_C = 135 °C, rectangular waveform		20	A
Maximum average forward current (per device) See fig. 5	$I_{F(AV)}$	50 % duty cycle at T_C = 135 °C, rectangular waveform		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	Following any rated load condition and with rated V_{RRM} applied	850	A
Maximum peak one cycle non-repetitive surge current per leg See fig. 7	I_{FSM}	10 ms sine or 6 ms rect. pulse	Following any rated load condition and with rated V_{RRM} applied	275	A
Non-repetitive avalanche energy per leg	E_{AS}	T_J = 25 °C, I_{AS} = 0.5 A, L = 60 mH		7.5	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 x V_R typical		0.5	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 °C	0.81	V
		40 A		0.98	
		20 A	T_J = 125 °C	0.67	
		40 A		0.81	
Maximum reverse leakage current per leg See fig. 2	I_{RM} (1)	T_J = 25 °C	V_R = Rated V_R	0.36	mA
		T_J = 125 °C		13	
Threshold voltage	$V_{F(TO)}$	T_J = T_J maximum		0.71	V
Forward slope resistance	r_t			0.43	mΩ
Maximum junction capacitance per leg	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz), 25 °C		1480	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	2.0	°C/W
Maximum thermal resistance, junction to case per package				1.0	
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			6 (5)	kgf · cm (lbf · in)
	maximum			12 (10)	
Marking device			Case style D²PAK	43CTQ080GS	
				43CTQ100GS	
			Case style TO-262	43CTQ080G-1	
				43CTQ100G-1	

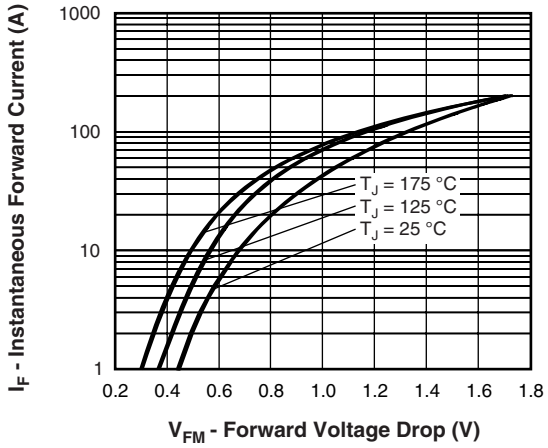


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

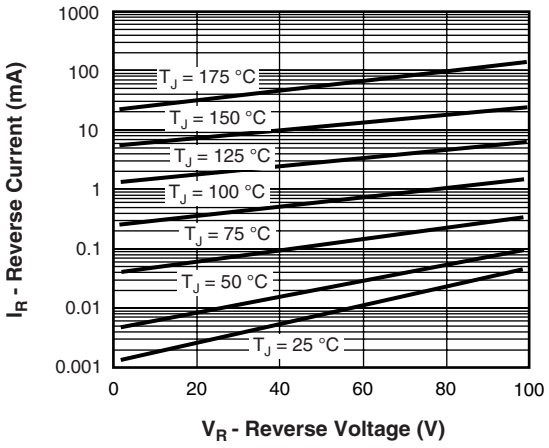


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

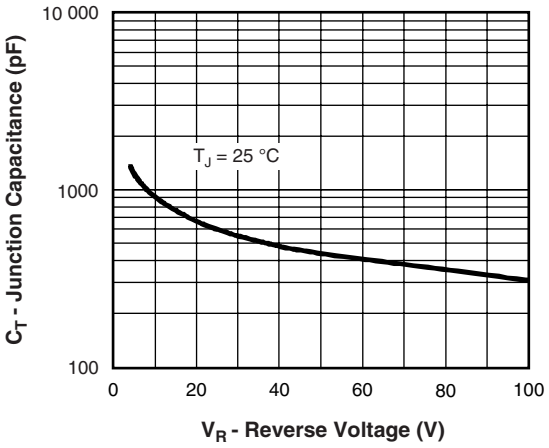


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

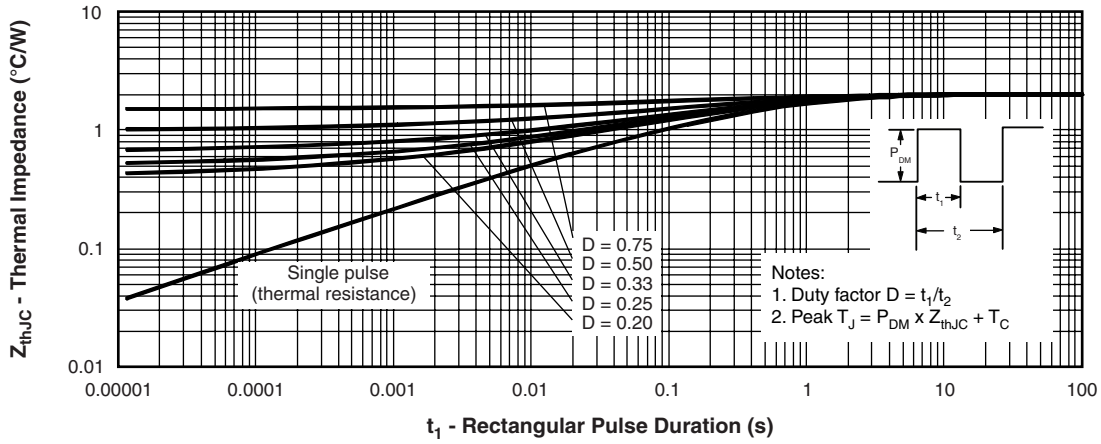


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

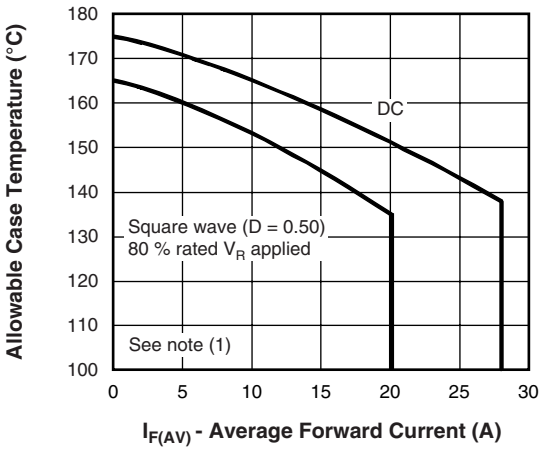


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

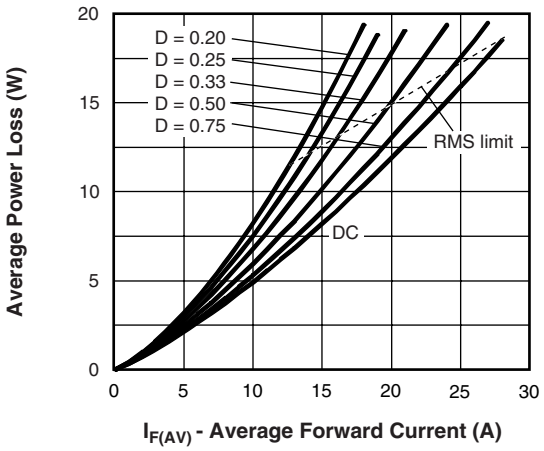


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

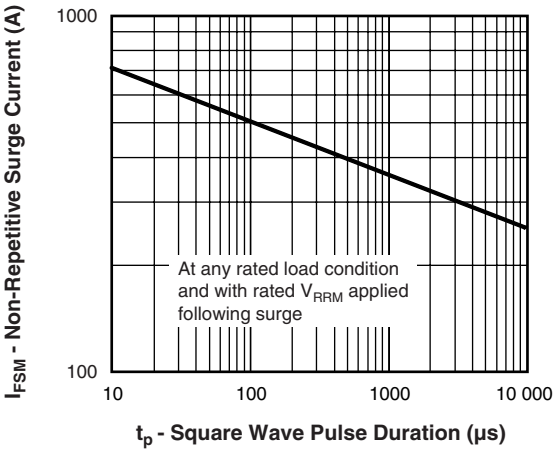


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

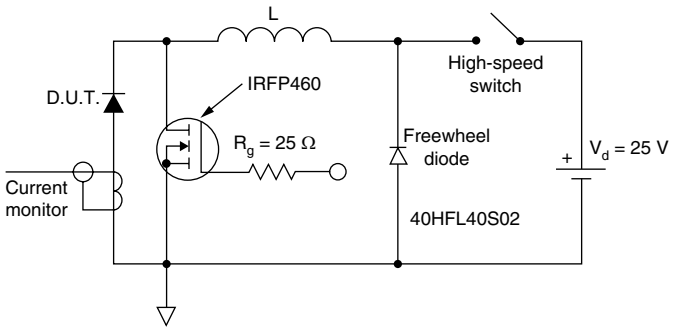


Fig. 8 - Unclamped Inductive Test Circuit

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6);
Pd_{REV} = Inverse power loss = $V_{R1} \times I_R$ (1 - D); I_R at V_{R1} = 10 V

ORDERING INFORMATION TABLE

Device code

VS-	43	C	T	Q	100	G	S	TRL	PbF
1	2	3	4	5	6	7	8	9	10

1 - HPP product suffix

2 - Current rating (40 = 40 A)

3 - C = Common cathode

4 - T = TO-220, TO-262, D^2PAK

5 - Q = Schottky "Q" series

6 - Voltage ratings — 080 = 80 V, 100 = 100 V

7 - G = Schottky generation

8 -
- None = TO-220
- -1 = TO-262
- S = D^2PAK

9 -
- None = Tube (50 pieces)
- TRL = Tape and reel (left oriented - for D^2PAK only)
- TRR = Tape and reel (right oriented - for D^2PAK only)

10 -
- PbF = Lead (Pb)-free (for D^2PAK tube and TO-262)
- P = Lead (Pb)-free (for D^2PAK TRL and TRR)

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95014
Part marking information	www.vishay.com/doc?95057
Packaging information	www.vishay.com/doc?95032
SPICE model	www.vishay.com/doc?95065

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