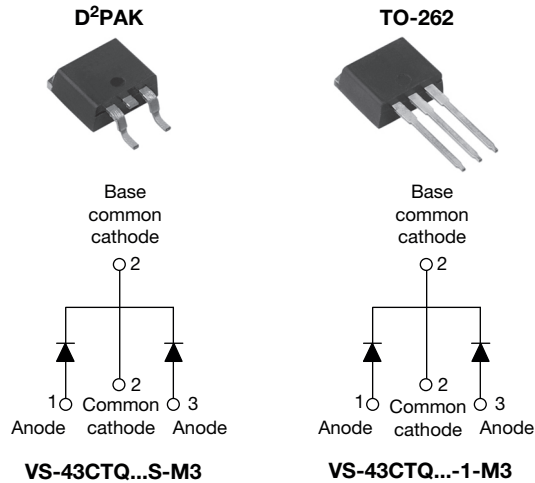


High Performance Schottky Rectifier, 2 x 20 A



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
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

DESCRIPTION

This center tap 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, freewheeling diodes, and reverse battery protection.

PRODUCT SUMMARY	
$I_{F(AV)}$	2 x 20 A
V_R	80 V, 100 V
V_F at I_F	0.67 V
I_{RM} max.	11 mA at 125 °C
T_J max.	175 °C
E_{AS}	7.50 mJ
Package	TO-263AB (D ² PAK), TO-262AA
Diode variation	Common cathode

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

VOLTAGE RATINGS				
PARAMETER	SYMBOL	VS-43CTQ080S-M3 VS-43CTQ080-1-M3	VS-43CTQ100S-M3 VS-43CTQ100-1-M3	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 See fig. 5	I _{F(AV)}	50 % duty cycle at T _C = 135 °C, rectangular waveform	per leg	20	A
			per device	40	
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	Following any rated load condition and with rated V _{RRM} applied	850	
				275	
Non-repetitive avalanche energy per leg	E _{AS}	T _J = 25 °C, I _{AS} = 0.50 A, L = 60 mH		7.50	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		0.50	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg See fig. 1	V _{FM} ⁽¹⁾	20 A 40 A	T _J = 25 °C	0.81	V
				0.98	
		20 A 40 A	T _J = 125 °C	0.67	
				0.81	
Maximum reverse leakage current per leg See fig. 2	I _{RM} ⁽¹⁾	T _J = 25 °C T _J = 125 °C	V _R = Rated V _R	1	mA
				11	
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		0.50	
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		43CTQ080S	
				43CTQ100S	
		Case style TO-262		43CTQ080-1	
				43CTQ100-1	

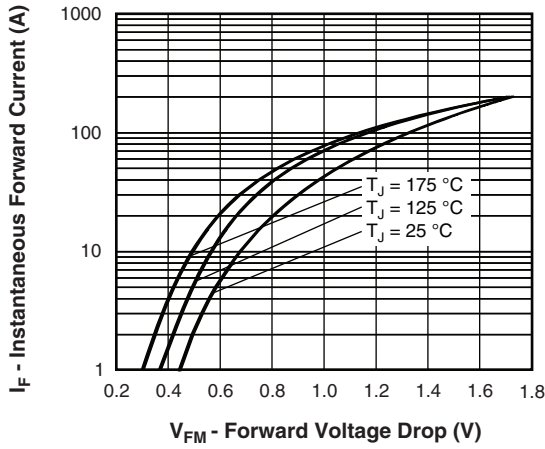


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

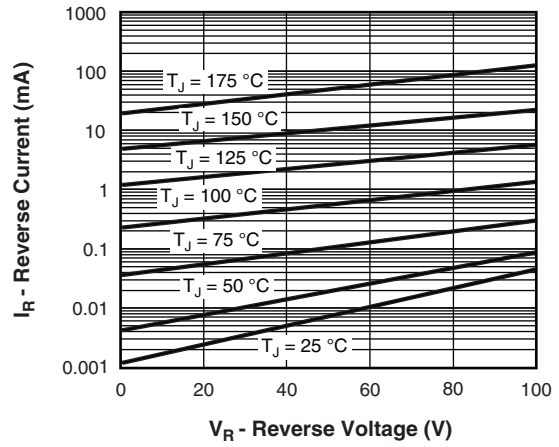


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

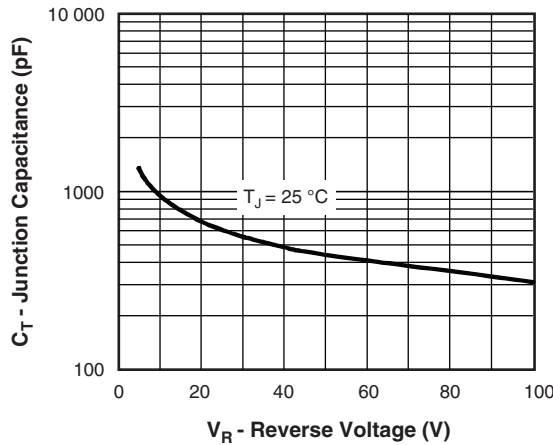


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

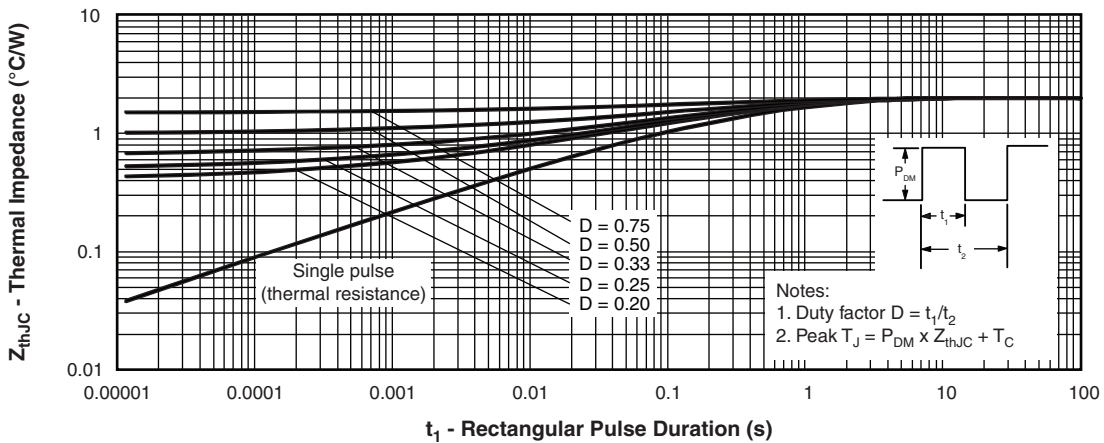


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

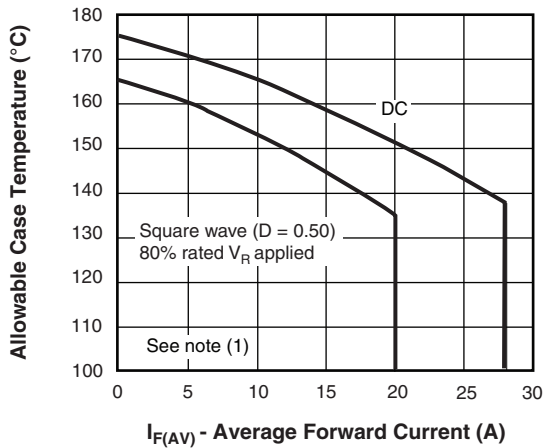


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

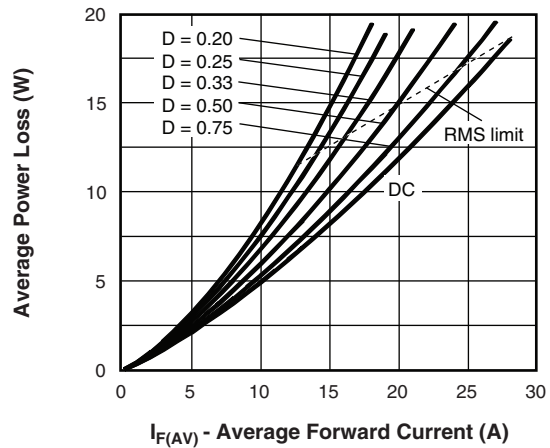


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

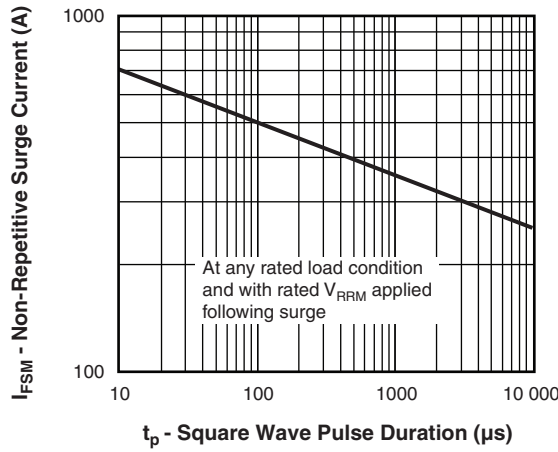


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

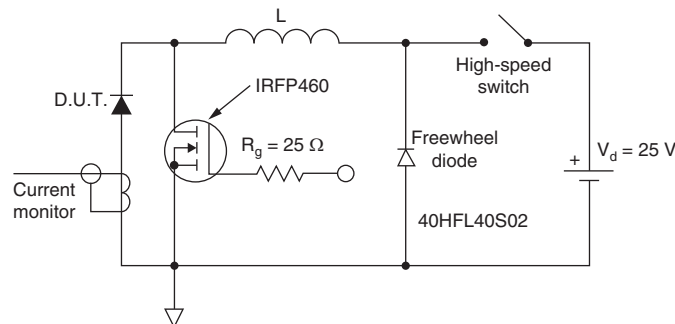


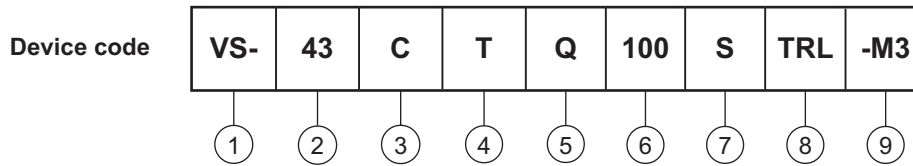
Fig. 8 - Unclamped Inductive Test Circuit

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;
- 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 $V_{R1} = 10\text{ V}$



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (40 A)
- 3** - Circuit configuration: C = Common cathode
- 4** - T = TO-220
- 5** - Schottky "Q" series
- 6** - Voltage ratings

080 = 80 V
100 = 100 V
- 7** -
 - S = D²PAK
 - -1 = TO-262
- 8** -
 - None = Tube
 - TRL = Tape and reel (left oriented - for D²PAK only)
 - TRR = Tape and reel (right oriented - for D²PAK only)
- 9** - -M3 = Halogen-free, RoHS-compliant and termination lead (Pb)-free

ORDERING INFORMATION			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-43CTQ080S-M3	50	1000	Antistatic plastic tubes
VS-43CTQ080STRR-M3	800	800	13" diameter reel
VS-43CTQ080STRL-M3	800	800	13" diameter reel
VS-43CTQ080-1-M3	50	1000	Antistatic plastic tubes
VS-43CTQ100S-M3	50	1000	Antistatic plastic tubes
VS-43CTQ100STRR-M3	800	800	13" diameter reel
VS-43CTQ100STRL-M3	800	800	13" diameter reel
VS-43CTQ100-1-M3	50	1000	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS		
Dimensions	TO-263AB (D ² PAK)	www.vishay.com/doc?95046
Dimensions	TO-262AA	www.vishay.com/doc?95419
Part marking information	TO-263AB (D ² PAK)	www.vishay.com/doc?95444
Part marking information	TO-262AA	www.vishay.com/doc?95443
Packaging information		www.vishay.com/doc?95032
SPIICE model		www.vishay.com/doc?95065

D²PAK

DIMENSIONS in millimeters and inches

Conforms to JEDEC[®] outline D²PAK (SMD-220)



SYMBOL	MILLIMETERS		INCHES		NOTES	SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.			MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190		D1	6.86	8.00	0.270	0.315	3
A1	0.00	0.254	0.000	0.010		E	9.65	10.67	0.380	0.420	2, 3
b	0.51	0.99	0.020	0.039		E1	7.90	8.80	0.311	0.346	3
b1	0.51	0.89	0.020	0.035	4	e	2.54 BSC		0.100 BSC		
b2	1.14	1.78	0.045	0.070		H	14.61	15.88	0.575	0.625	
b3	1.14	1.73	0.045	0.068	4	L	1.78	2.79	0.070	0.110	
c	0.38	0.74	0.015	0.029		L1	-	1.65	-	0.066	3
c1	0.38	0.58	0.015	0.023	4	L2	1.27	1.78	0.050	0.070	
c2	1.14	1.65	0.045	0.065		L3	0.25 BSC		0.010 BSC		
D	8.51	9.65	0.335	0.380	2	L4	4.78	5.28	0.188	0.208	

Notes

- Dimensioning and tolerancing per ASME Y14.5 M-1994
- Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
- Thermal pad contour optional within dimension E, L1, D1 and E1
- Dimension b1 and c1 apply to base metal only
- Datum A and B to be determined at datum plane H
- Controlling dimension: inch
- Outline conforms to JEDEC[®] outline TO-263AB

TO-262

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	2.03	3.02	0.080	0.119	
b	0.51	0.99	0.020	0.039	
b1	0.51	0.89	0.020	0.035	4
b2	1.14	1.78	0.045	0.070	
b3	1.14	1.73	0.045	0.068	4
c	0.38	0.74	0.015	0.029	
c1	0.38	0.58	0.015	0.023	4
c2	1.14	1.65	0.045	0.065	
D	8.51	9.65	0.335	0.380	2
D1	6.86	8.00	0.270	0.315	3
E	9.65	10.67	0.380	0.420	2, 3
E1	7.90	8.80	0.311	0.346	3
e	2.54 BSC		0.100 BSC		
L	13.46	14.10	0.530	0.555	
L1	-	1.65	-	0.065	3
L2	3.56	3.71	0.140	0.146	

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Controlling dimension: inches
- (6) Outline conform to JEDEC TO-262 except A1 (maximum), b (minimum) and D1 (minimum) where dimensions derived the actual package outline



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