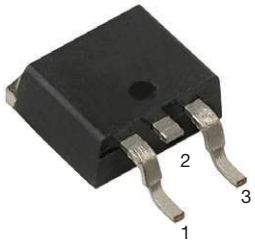
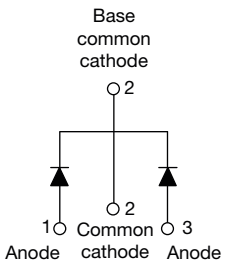
High Performance Schottky Rectifier, 2 x 15 A



D²PAK (TO-263AB)



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 15 A
V_R	35 V, 40 V, 45 V
V_F at I_F	0.50 V
I_{RM} typ.	70 mA at 125 °C
T_J max.	150 °C
E_{AS}	20 mJ
Package	D²PAK (TO-263AB)
Circuit configuration	Common cathode

FEATURES

- 150 °C T_J operation
- Center tap configuration
- 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
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- AEC-Q101 qualified, meets JESD 201 class 2 whisker test
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

DESCRIPTION

The VS-25CTQ... center tap 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.

MECHANICAL DATA

Case: D²PAK (TO-263AB)
Molding compound meets UL 94 V-0 flammability rating

Terminals: matte tin plated leads, solderable per J-STD-002

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	30	A
V_{RRM}	Range	35 to 45	V
I_{FSM}	t_p = 5 µs sine	990	A
V_F	15 A_{pk}, T_J = 125 °C (per leg)	0.50	V
T_J	Range	-55 to +150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-25CTQ045SLHM3	UNITS
Maximum DC reverse voltage	V_R	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 = 102 °C, rectangular waveform		30	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	990	
		10 ms sine or 6 ms rect. pulse		250	
Non-repetitive avalanche energy per leg	E_{AS}	T_J = 25 °C, I_{AS} = 3 A, L = 4.40 mH		20	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		3	A

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg See fig. 1	V_{FM} (1)	15 A	T_J = 25 °C	0.56	V
		30 A		0.71	
		15 A	T_J = 125 °C	0.50	
		30 A		0.64	
Maximum reverse leakage current per leg	I_{RM} (1)	T_J = 25 °C	V_R = Rated V_R	1.75	mA
		T_J = 125 °C		110	
Typical reverse leakage current	I_{RM} (1)	T_J = 125 °C	V_R = Rated V_R	70	mA
Maximum junction capacitance per leg	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz), 25 °C		900	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 150	°C
Maximum thermal resistance, junction to case per leg		R_{thJC}	DC operation See fig. 4	3.25	°C/W
Maximum thermal resistance, junction to case per package			DC operation	1.63	
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^2PAK (TO-263AB)	25CTQ045SH	

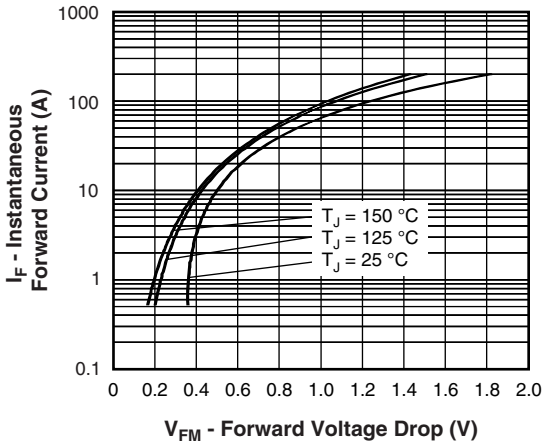


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

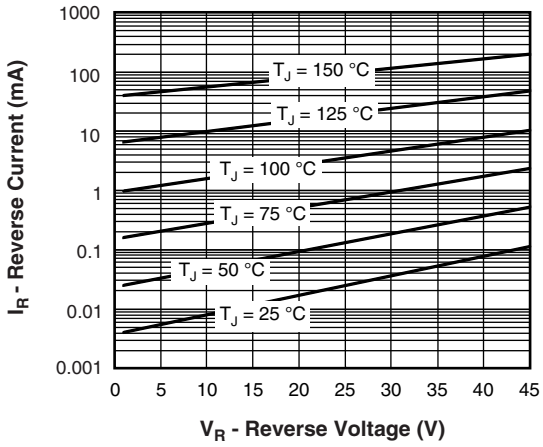


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

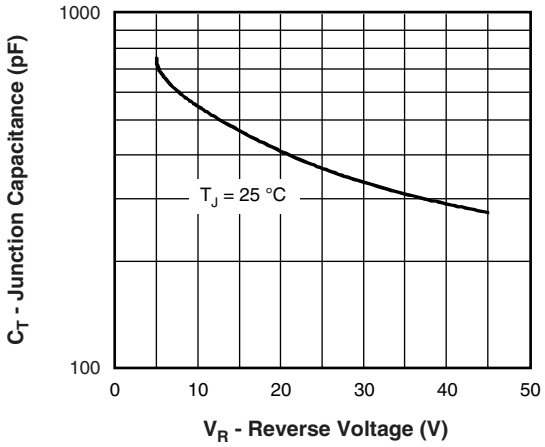


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

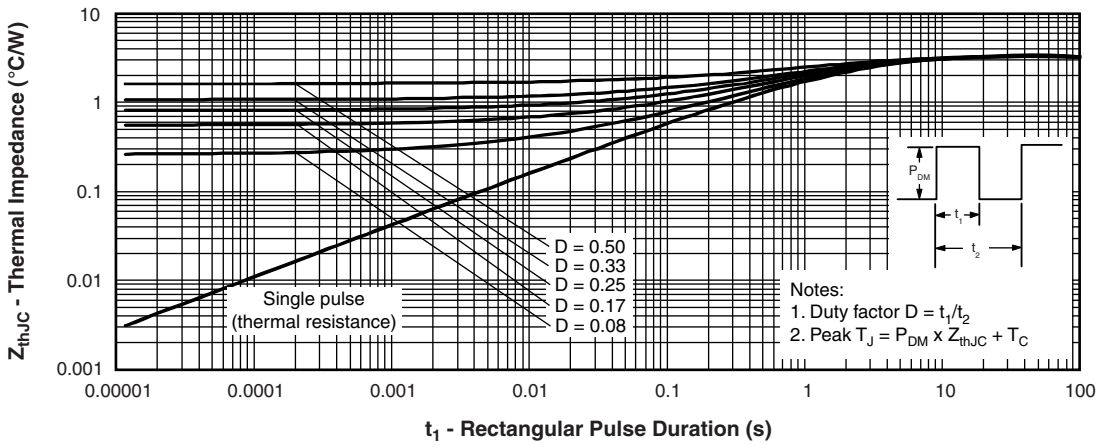


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

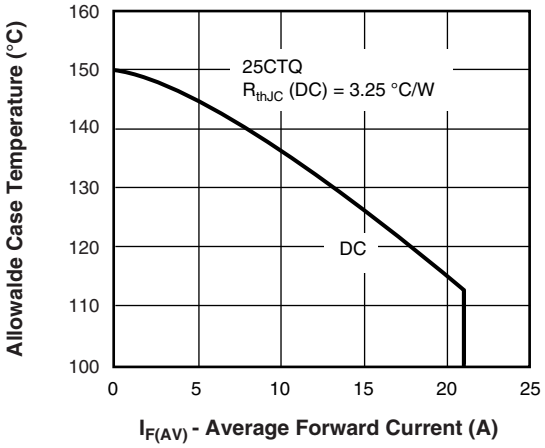


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

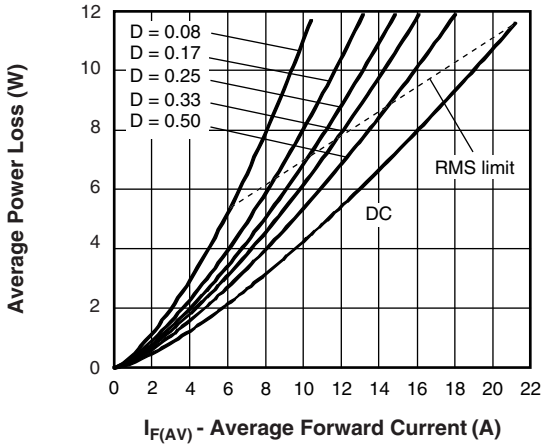


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

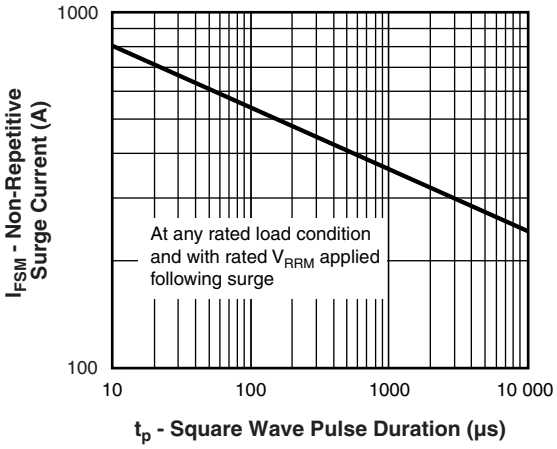


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

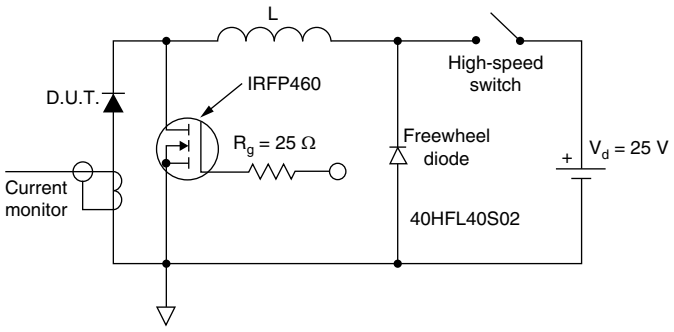


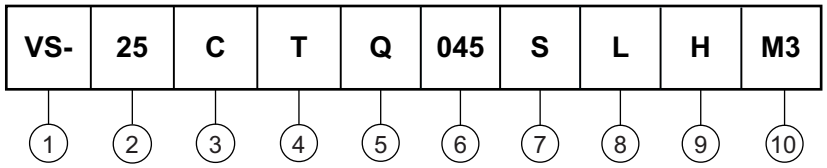
Fig. 8 - Unclamped Inductive Test Circuit

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} = 80 % rated V_R

ORDERING INFORMATION TABLE

Device code



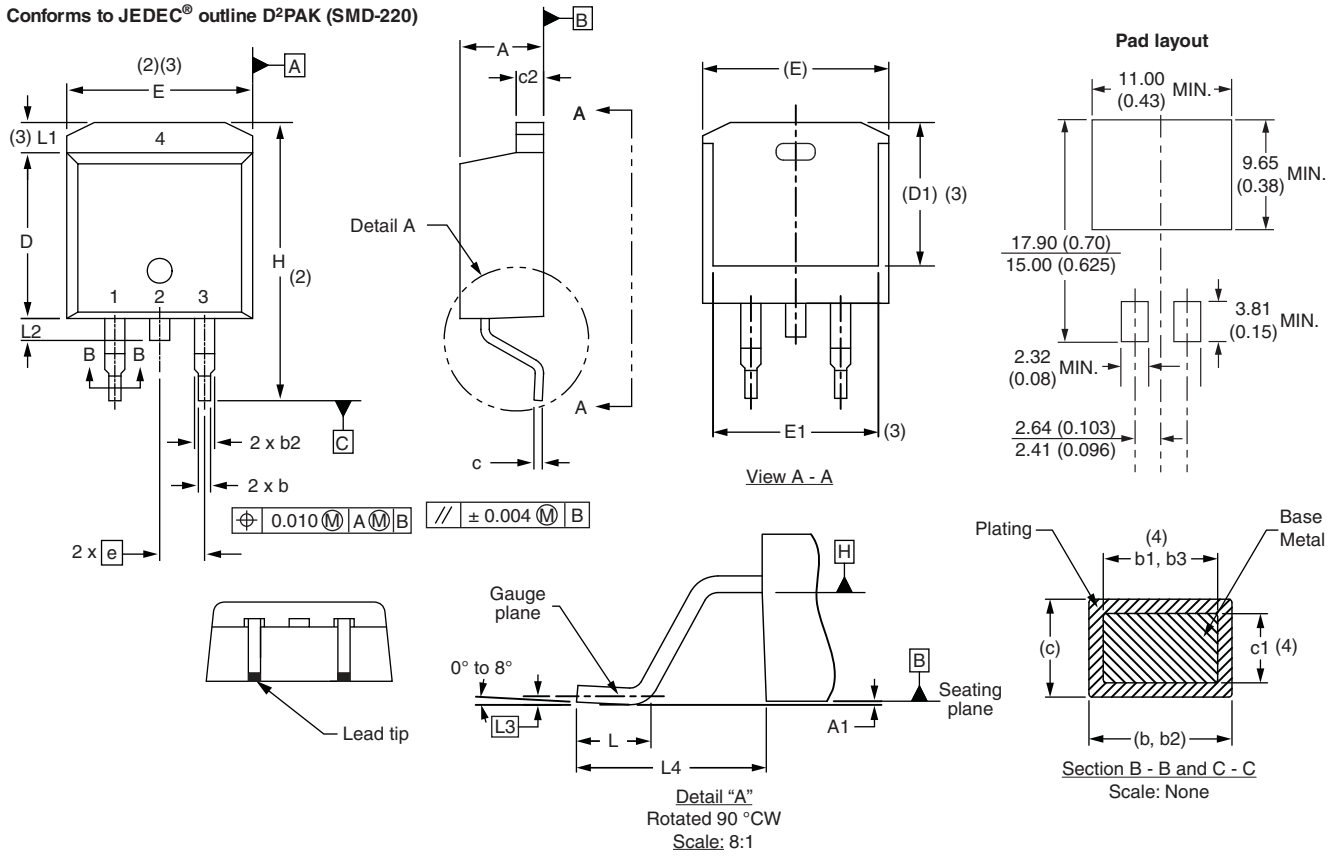
1	-	Vishay Semiconductors product
2	-	Current rating (25 A)
3	-	Circuit configuration: C = common cathode
4	-	T = TO-220 or D^2PAK / TO-262
5	-	Schottky “Q” series
6	-	Voltage rating (045 = 45 V)
7	-	S = D^2PAK (TO-263AB)
8	-	L = tape and reel (left oriented) - for different orientation, contact factory
9	-	H = AEC-Q101 qualified
10	-	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-25CTQ045SLHM3	800	800	13" diameter reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95046
Part marking information	www.vishay.com/doc?95444
Packaging information	www.vishay.com/doc?96317
SPICE model	www.vishay.com/doc?95285

D^2PAK

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	0.00	0.254	0.000	0.010	
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

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
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		
H	14.61	15.88	0.575	0.625	
L	1.78	2.79	0.070	0.110	
L1	-	1.65	-	0.066	3
L2	1.27	1.78	0.050	0.070	
L3	0.25 BSC		0.010 BSC		
L4	4.78	5.28	0.188	0.208	

Notes

(1) Dimensioning and tolerancing per ASME Y14.5 M-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) Datum A and B to be determined at datum plane H

(6) Controlling dimension: inch

(7) Outline conforms to JEDEC® outline TO-263AB

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