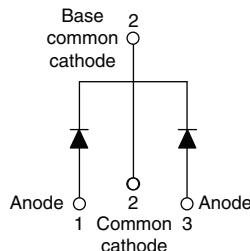


## Schottky Rectifier, 2 x 15 A


**TO-220AB**


<b>PRODUCT SUMMARY</b>	
Package	TO-220AB
$I_{F(AV)}$	2 x 15 A
$V_R$	25 V, 40 V, 45 V
$V_F$ at $I_F$	0.50 V
$I_{RM}$ max.	70 mA at 125 °C
$T_J$ max.	150 °C
Diode variation	Common cathode
$E_{AS}$	20 mJ

### FEATURES

- 150 °C  $T_J$  operation
- 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)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available

### 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.

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

<b>VOLTAGE RATINGS</b>								
PARAMETER	SYMBOL	VS-25CTQ035PbF	VS-25CTQ035-N3	VS-25CTQ040PbF	VS-25CTQ040-N3	VS-25CTQ045PbF	VS-25CTQ045-N3	UNITS
Maximum DC reverse voltage	$V_R$	35	35	40	40	45	45	V
Maximum working peak reverse voltage	$V_{RWM}$							

<b>ABSOLUTE MAXIMUM RATINGS</b>								
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 $\mu s$ sine or 3 $\mu s$ rect. pulse	Following any rated load condition and with rated $V_{RRM}$ applied		990	A		
		10 ms sine or 6 ms rect. pulse			250			
Non-repetitive avalanche energy per leg	$E_{AS}$	$T_J = 25$ °C, $I_{AS} = 3.0$ A, $L = 4.40$ mH			20	mJ		
Repetitive avalanche current per leg	$I_{AR}$	Current decaying linearly to zero in 1 $\mu s$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ 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	$T_J = 25 \text{ }^\circ\text{C}$	0.56	V	
		30 A		0.71		
		15 A	$T_J = 125 \text{ }^\circ\text{C}$	0.50		
		30 A		0.64		
Maximum reverse leakage current per leg See fig. 2	$I_{RM}^{(1)}$	$T_J = 25 \text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	1.75	mA	
		$T_J = 125 \text{ }^\circ\text{C}$		70		
Maximum junction capacitance per leg	$C_T$	$V_R = 5 \text{ V}_{\text{DC}}$ (test signal range 100 kHz to 1 MHz) $25 \text{ }^\circ\text{C}$		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/ $\mu$ s	

**Note**

<sup>(1)</sup> Pulse width < 300  $\mu$ s, 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	$^\circ\text{C}$	
Maximum thermal resistance, junction to case per leg	$R_{thJC}$	DC operation See fig. 4	3.25	$^\circ\text{C/W}$	
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			2.0	g	
			0.07	oz.	
Mounting torque	minimum maximum		6 (5)	$\text{kgf} \cdot \text{cm}$ (lbf · in)	
			12 (10)		
Marking device		Case style TO-220AB	25CTQ035		
			25CTQ040		
			25CTQ045		

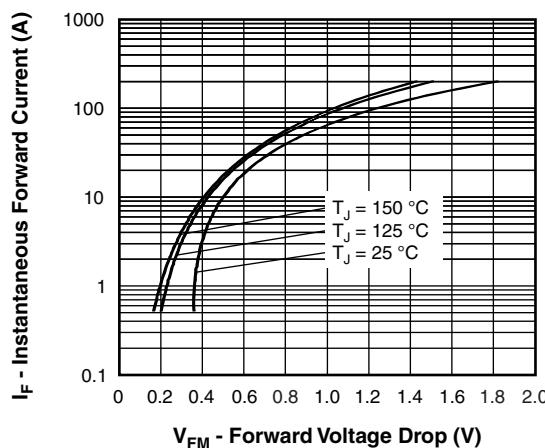


Fig. 1 - Maximum Forward Voltage Drop Characteristics  
(Per Leg)

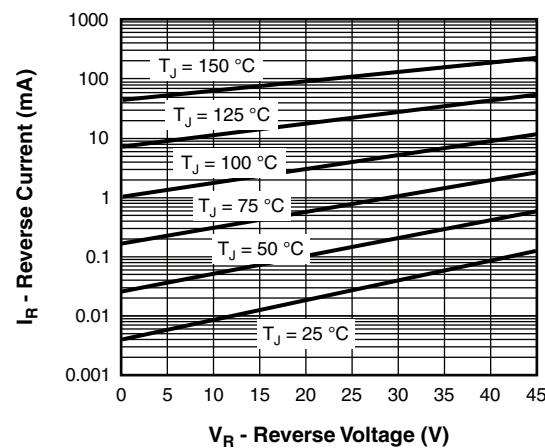


Fig. 2 - Typical Values of Reverse Current vs.  
Reverse Voltage (Per Leg)

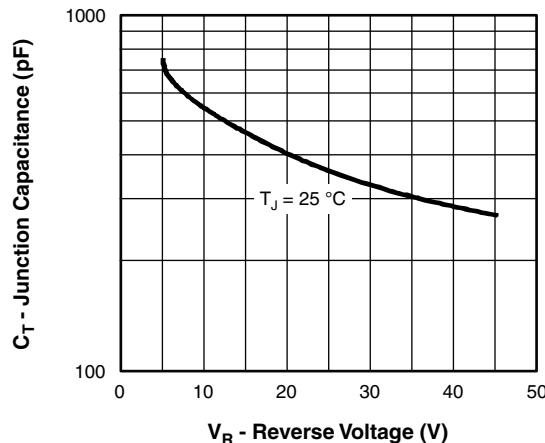


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

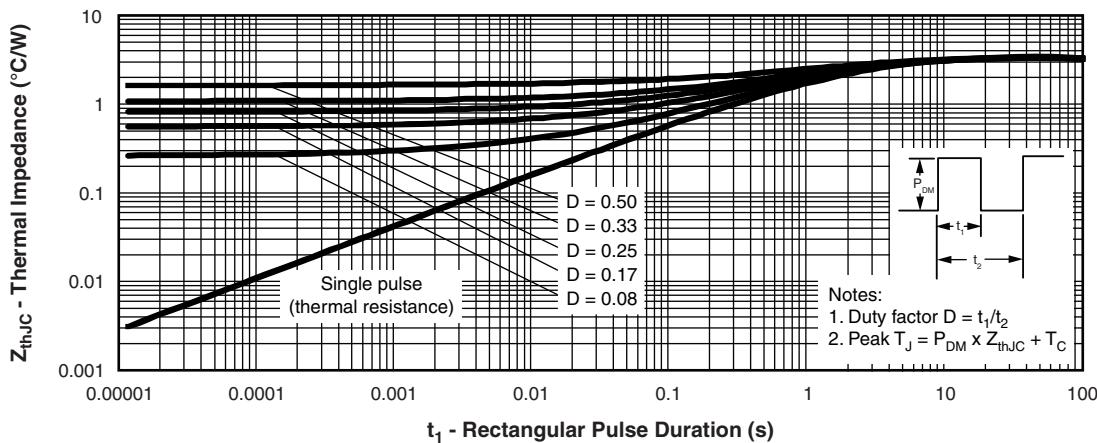


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

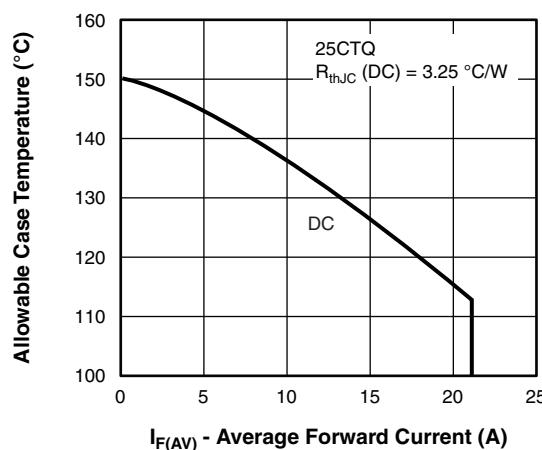


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

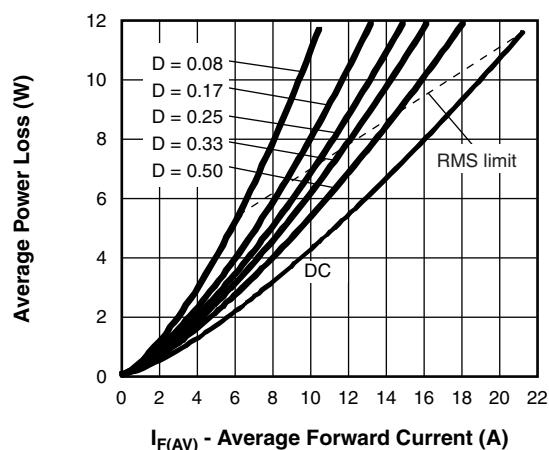


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

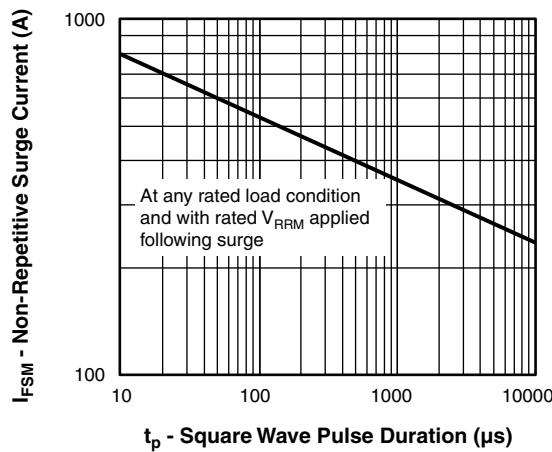


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

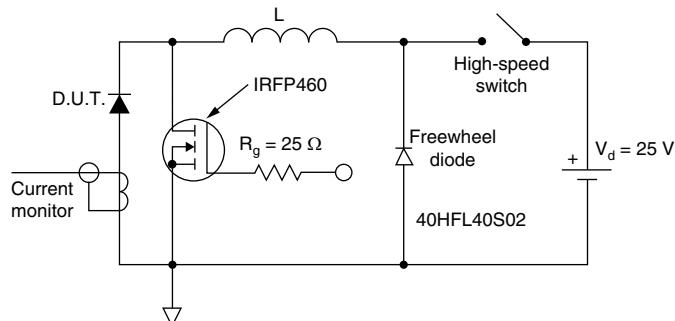


Fig. 8 - Unclamped Inductive Test Circuit

**ORDERING INFORMATION TABLE**

Device code	VS-	25	C	T	Q	045	PbF
	(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1)	- Vishay Semiconductors product	
(2)	- Current rating (25 = 25 A)	
(3)	- Circuit configuration: C = Common cathode	
(4)	- Package: T = TO-220	
(5)	- Schottky "Q" series	035 = 35 V
(6)	- Voltage ratings	040 = 40 V
(7)	- Environmental digit	045 = 45 V

- PbF = Lead (Pb)-free and RoHS compliant
- -N3 = Halogen-free, RoHS compliant, and totally lead (Pb)-free

**ORDERING INFORMATION (Example)**

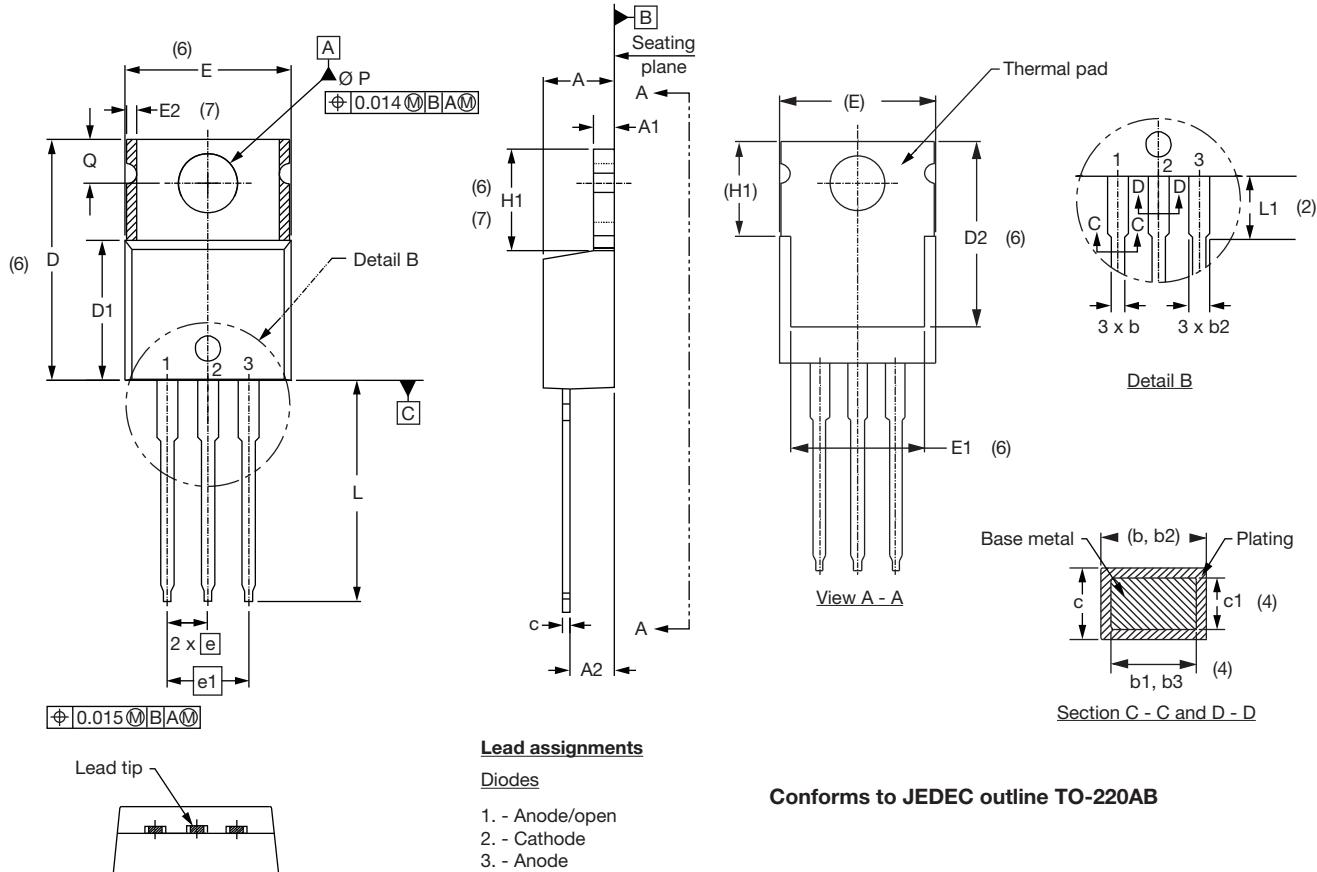
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-25CTQ035PbF	50	1000	Antistatic plastic tube
VS-25CTQ035-N3	50	1000	Antistatic plastic tube
VS-25CTQ040PbF	50	1000	Antistatic plastic tube
VS-25CTQ040-N3	50	1000	Antistatic plastic tube
VS-25CTQ045PbF	50	1000	Antistatic plastic tube
VS-25CTQ045-N3	50	1000	Antistatic plastic tube

**LINKS TO RELATED DOCUMENTS**

Dimensions	<a href="http://www.vishay.com/doc?95222">www.vishay.com/doc?95222</a>
Part marking information	<a href="http://www.vishay.com/doc?95225">www.vishay.com/doc?95225</a>
TO-220AB PbF	<a href="http://www.vishay.com/doc?95028">www.vishay.com/doc?95028</a>
TO-220AB -N3	<a href="http://www.vishay.com/doc?95285">www.vishay.com/doc?95285</a>
SPICE model	<a href="http://www.vishay.com/doc?95285">www.vishay.com/doc?95285</a>

# TO-220AB

**DIMENSIONS** in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.25	4.65	0.167	0.183	
A1	1.14	1.40	0.045	0.055	
A2	2.56	2.92	0.101	0.115	
b	0.69	1.01	0.027	0.040	
b1	0.38	0.97	0.015	0.038	4
b2	1.20	1.73	0.047	0.068	
b3	1.14	1.73	0.045	0.068	4
c	0.36	0.61	0.014	0.024	
c1	0.36	0.56	0.014	0.022	4
D	14.85	15.25	0.585	0.600	3
D1	8.38	9.02	0.330	0.355	
D2	11.68	12.88	0.460	0.507	6

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
E	10.11	10.51	0.398	0.414	3, 6
E1	6.86	8.89	0.270	0.350	6
E2	-	0.76	-	0.030	7
e	2.41	2.67	0.095	0.105	
e1	4.88	5.28	0.192	0.208	
H1	6.09	6.48	0.240	0.255	6, 7
L	13.52	14.02	0.532	0.552	
L1	3.32	3.82	0.131	0.150	2
Ø P	3.54	3.73	0.139	0.147	
Q	2.60	3.00	0.102	0.118	
θ	90° to 93°		90° to 93°		

## Notes

**Notes**

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension and finish uncontrolled in L1
- (3) Dimension D, D1 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 outermost extremes of the plastic body
- (4) Dimension b1, b3 and c1 apply to base metal only
- (5) Controlling dimensions: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2 and E1

- (7) Dimensions E2 x H1 define a zone where stamping and singulation irregularities are allowed
- (8) Outline conforms to JEDEC TO-220, except A2 (maximum) and D2 (minimum) where dimensions are derived from the actual package outline

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[25CTQ035STRR](#) [25CTQ040S](#) [25CTQ040STRL](#) [25CTQ040STRR](#) [25CTQ045S](#) [25CTQ045STRL](#) [25CTQ045STRR](#)  
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