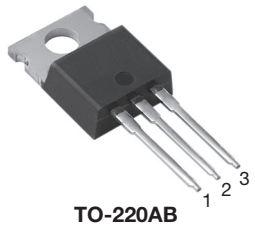
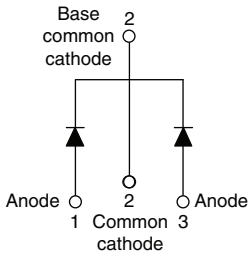
High Performance Schottky Rectifier, 2 x 8 A



TO-220AB



FEATURES

- 175 °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
- AEC-Q101 qualified
- Meets JESD 201 class 2 whisker test
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

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, converters, freewheeling diodes, and reverse battery protection.

PRODUCT SUMMARY	
Package	TO-220AB
$I_{F(AV)}$	2 x 8 A
V_R	60 V, 80 V, 100 V
V_F at I_F	0.58 V
I_{RM} max.	7 mA at 125 °C
T_J max.	175 °C
Diode variation	Common cathode
E_{AS}	7.5 mJ

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	16	A
V_{RRM}		60 to 100	V
I_{FSM}	t_p = 5 µs sine	850	A
V_F	8 A_{pk}, T_J = 125 °C (per leg)	0.58	V
T_J	Range	- 55 to 175	°C

VOLTAGE RATINGS					
PARAMETER	SYMBOL	VS-16CTQ060HN3	VS-16CTQ080HN3	VS-16CTQ100HN3	UNITS
Maximum DC reverse voltage	V_R	60	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	per leg	$I_{F(AV)}$	50 % duty cycle at T_C = 148 °C, rectangular waveform		8	A
	per device				16	
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
			10 ms sine or 6 ms rect. pulse		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)	8 A	T_J = 25 °C	0.72	V
		16 A		0.88	
		8 A	T_J = 125 °C	0.58	
		16 A		0.69	
Maximum reverse leakage current per leg See fig. 2	I_{RM} (1)	T_J = 25 °C	V_R = rated V_R	0.55	mA
		T_J = 125 °C		7.0	
Threshold voltage	$V_{F(TO)}$	T_J = T_J maximum		0.415	V
Forward slope resistance	r_t			11.07	mΩ
Maximum junction capacitance per leg	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °C		500	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	3.25	°C/W
Maximum thermal resistance junction to case per package	R_{thJC}		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)
Mounting torque maximum			12 (10)	
Marking device		Case style TO-220AB	16CTQ060H	
			16CTQ080H	
			16CTQ100H	

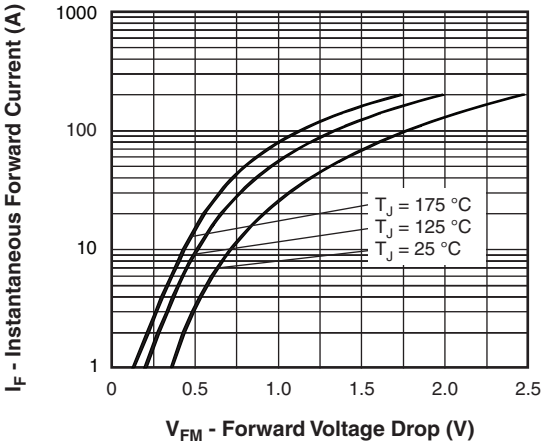


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

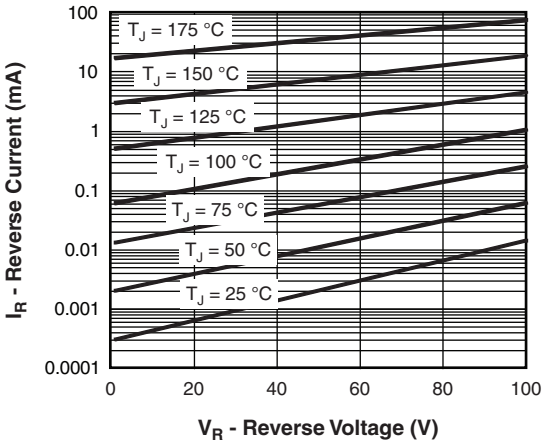


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

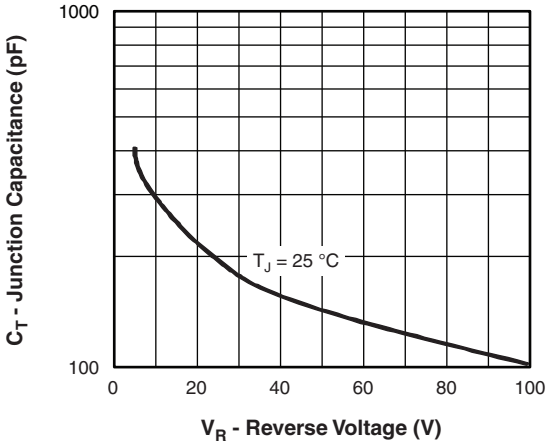


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

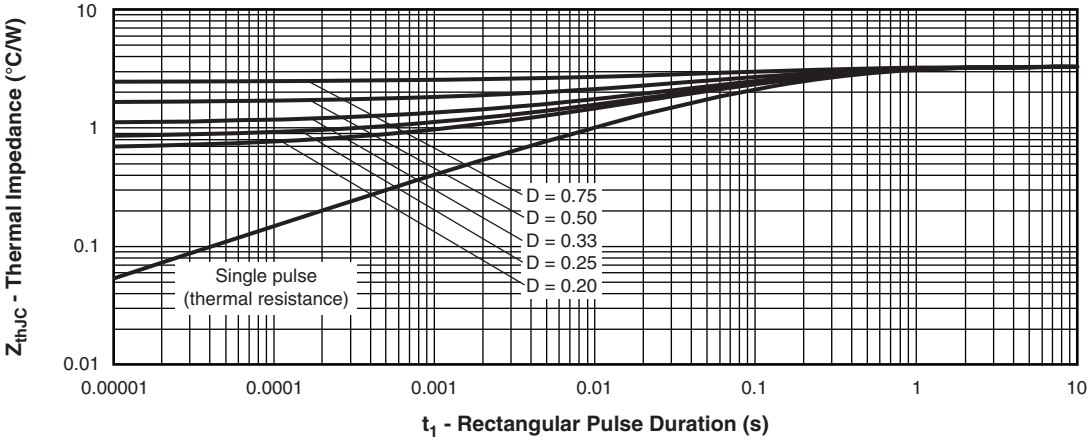


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

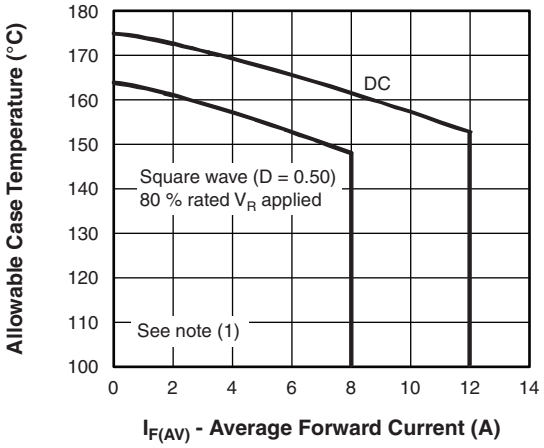


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

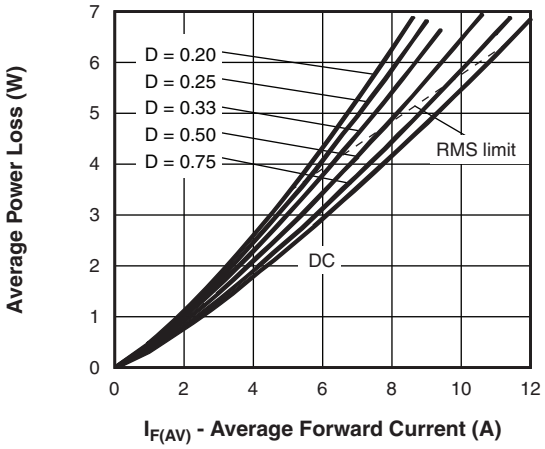


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

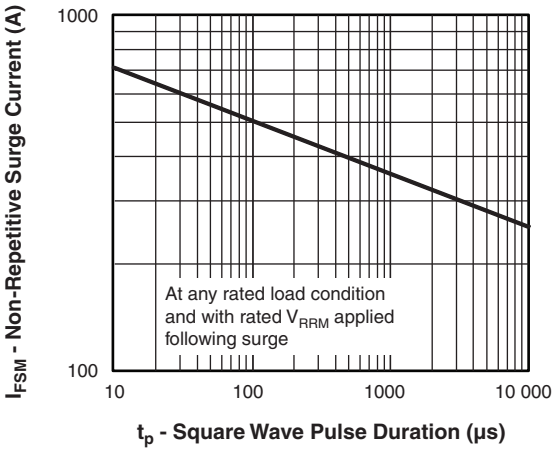


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

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 applied

ORDERING INFORMATION TABLE

Device code

VS-	16	C	T	Q	100	H	N3
1	2	3	4	5	6	7	8

1 - Vishay Semiconductors product

2 - Current rating (16 = 16 A)

3 - Circuit configuration
C = Common cathode

4 - Package
T = TO-220

5 - Schottky “Q” series

6 - Voltage rating
060 = 60 V
080 = 80 V
100 = 100 V

7 - H = AEC-Q101 qualified

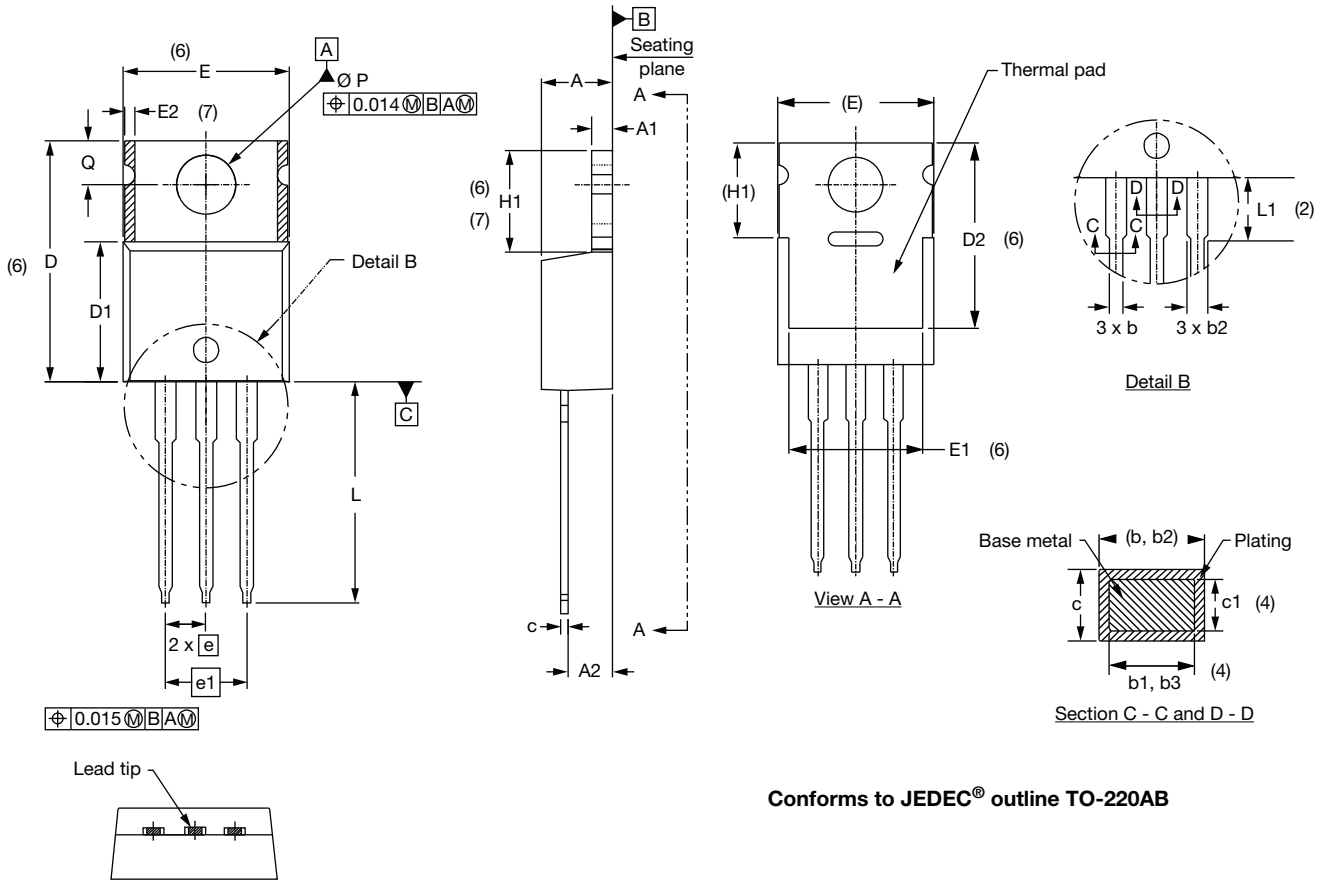
8 - Environmental digit
- N3 = Halogen-free, RoHS-compliant, and totally lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	**QUANTITY PER T/R**	**MINIMUM ORDER QUANTITY**	**PACKAGING DESCRIPTION**
VS-16CTQ060HN3	50	1000	Antistatic plastic tube
VS-16CTQ080HN3	50	1000	Antistatic plastic tube
VS-16CTQ100HN3	50	1000	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS		
Dimensions		www.vishay.com/doc?95222
Part marking information	TO-220AB -N3	www.vishay.com/doc?95028
SPICE model		www.vishay.com/doc?95279

TO-220AB

DIMENSIONS in millimeters and inches



Conforms to JEDEC® outline TO-220AB

SYMBOL	MILLIMETERS		INCHES		NOTES	SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.			MIN.	MAX.	MIN.	MAX.	
A	4.25	4.65	0.167	0.183		D2	11.68	12.88	0.460	0.507	6
A1	1.14	1.40	0.045	0.055		E	10.11	10.51	0.398	0.414	3, 6
A2	2.56	2.92	0.101	0.115		E1	6.86	8.89	0.270	0.350	6
b	0.69	1.01	0.027	0.040		E2	-	0.76	-	0.030	7
b1	0.38	0.97	0.015	0.038	4	e	2.41	2.67	0.095	0.105	
b2	1.20	1.73	0.047	0.068		e1	4.88	5.28	0.192	0.208	
b3	1.14	1.73	0.045	0.068	4	H1	5.84	6.86	0.230	0.270	6, 7
c	0.36	0.61	0.014	0.024		L	13.52	14.02	0.532	0.552	
c1	0.36	0.56	0.014	0.022	4	L1	3.32	3.82	0.131	0.150	2
D	14.85	15.25	0.585	0.600	3	Ø P	3.54	3.73	0.139	0.147	
D1	8.38	9.02	0.330	0.355		Q	2.60	3.00	0.102	0.118	

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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