Vishay Semiconductors

High Voltage, Input Rectifier Diode, 10 A



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PRIMARY CHARACTERISTICS							
I _{F(AV)}	10 A						
V _R	1200 V						
V _F at I _F	1.1 V						
I _{FSM}	160 A						
T _J max.	150 °C						
Package	TO-220AC 2L						
Circuit configuration	Single						

FEATURES

- · Glass passivated pellet chip junction
- Meets JESD 201 class 1A whisker test
- RoHS COMPLIANT • Flexible solution for reliable AC power HALOGEN rectification
- FREE • High surge, low V_F rugged blocking diode for DC charging stations
- AEC-Q101 gualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

- On-board and off-board EV/HEV battery chargers
- Input rectification

DESCRIPTION

High voltage rectifiers optimized for very low forward voltage drop with moderate leakage.

These devices are intended for use in main rectification (single or three phase bridge).

OUTPUT CURRENT IN TYPICAL APPLICATIONS								
APPLICATIONS	SINGLE-PHASE BRIDGE	THREE-PHASE BRIDGE	UNITS					
Capacitive input filter $T_A = 55 \text{ °C}$, $T_J = 125 \text{ °C}$ common heatsink of 1 °C/W	12.0	16.0	А					

MAJOR RATINGS AND CHARACTERISTICS									
SYMBOL	CHARACTERISTICS	VALUES	UNITS						
I _{F(AV)}	Sinusoidal waveform	10	A						
V _{RRM}		1200	V						
I _{FSM}		160	A						
V _F	10 A, T _J = 25 °C	1.1	V						
TJ		-40 to +150	°C						

VOLTAGE RATINGS			
PART NUMBER	V _{RRM} , MAXIMUM PEAK REVERSE VOLTAGE V	V _{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I _{RRM} AT 150 °C mA
VS-10ETS12THM3	1200	1300	0.5

ABSOLUTE MAXIMUM RATINGS									
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS					
Maximum average forward current	I _{F(AV)}	T_C = 105 °C, 180° conduction half sine wave	10						
Maximum peak one cycle	I _{FSM}	10 ms sine pulse, rated V _{RRM} applied 135		А					
non-repetitive surge current		10 ms sine pulse, no voltage reapplied	160						
Maximum I ² t for fusing	l ² t	10 ms sine pulse, rated V _{RRM} applied	91	A ² s					
Maximum Ft for fusing	1-1	10 ms sine pulse, no voltage reapplied	130	A-S					
Maximum I ² \sqrt{t} for fusing	l²√t	t = 0.1 ms to 10 ms, no voltage reapplied	1300	A²√s					

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ELECTRICAL SPECIFICATIONS								
PARAMETER	SYMBOL	TEST CO	VALUES	UNITS				
Maximum forward voltage drop	V _{FM}	10 A, T _J = 25 °C	1.1	V				
Forward slope resistance	r _t	T. = 150 °C	20	mΩ				
Threshold voltage	V _{F(TO)}	1j = 150 C	0.82	V				
Maximum rayaraa laakaga ayrrant	I _{RM}	$T_J = 25 ^{\circ}C$		0.05	mA			
Maximum reverse leakage current		T _J = 150 °C	V_{R} = Rated V_{RRM}	0.50	ШA			

THERMAL - MECHANICAL SPECIFICATIONS									
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS					
Maximum junction and storage temperature range	T _J , T _{Stg}		-40 to +150	°C					
Maximum thermal resistance, junction to case	R _{thJC}	DC operation	2.5						
Maximum thermal resistance, junction to ambient (PCB mount)	R _{thJA}		62	°C/W					
Soldering temperature	Ts		240	°C					
Approvimeto weight			2	g					
Approximate weight			0.07	oz.					
Marking device		Case style TO-220AC 2L	10ETS	612TH					



Fig. 1 - Current Rating Characteristics



Fig. 2 - Current Rating Characteristics





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Fig. 3 - Forward Power Loss Characteristics



Fig. 4 - Forward Power Loss Characteristics



Number of Equal Amplitude Half Cycle Current Pulses (N)

Fig. 5 - Maximum Non-Repetitive Surge Current



Fig. 6 - Maximum Non-Repetitive Surge Current



Fig. 7 - Forward Voltage Drop Characteristics

 Revision: 28-Feb-2023
 3
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Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

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SHA

Device code	VS-	10	Е	т	S	12	т	н	МЗ
		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	\bigcirc		\bigcirc	4	\bigcirc	\bigcirc	(\mathbf{I})	\bigcirc	9
	1 -	· Visł	nay Sem	iconduc	ctors pro	oduct			
	2 -	- Cur	rent rati	ng (10 =	10 A)				
	3 -	Circ	uit conf	iguratio	n:				
		E =	2L TO-2	220AC					
	4	Pac	kage:						
		Τ=	TO-220						
	5 -	• Тур	e of silio	con:					
		S =	standar	d recove	ery recti	fier			_
	6 -	· Volt	age coo	de x 100	$= V_{RRM}$	1	12 =	= 1200 '	V
	7 -	• N	one = T	0-220A	В				
		• T	= true p	oin TO-2	20				
	8 -	• H=	AEC-Q	101 qua	lified				
	9 -	- Env	ironmen	tal digit:					
		М3	= halog	en-free,	RoHS-	complia	ant, and	termina	ations le

ORDERING INFORMATION (Example)								
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION					
VS-10ETS12THM3	50	1000	Antistatic plastic tubes					

LINKS TO RELATED DOCUMENTS						
Dimensions	wwv	v.vishay.com/doc?96069				
Part marking information www.vishay.com/doc?95391						
Revision: 28-Feb-2023	4	Document Number: 96537				
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TO-220AC 2L

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES	SYMBOL	SYMBOL	MILLIN	IETERS	INC	HES	NOTES
SYMBOL	MIN.	MAX.	MIN.	MAX.	NOTES		STIVIDUL	MIN.	MAX.	MIN.	MAX.	NOTES
A	4.25	4.65	0.167	0.183			E1	6.86	8.89	0.270	0.350	6
A1	1.14	1.40	0.045	0.055			E2	-	0.76	-	0.030	7
A2	2.56	2.92	0.101	0.115			e1	4.88	5.28	0.192	0.208	
b	0.69	1.01	0.027	0.040			H1	5.84	6.86	0.230	0.270	6, 7
b1	0.38	0.97	0.015	0.038	4		L	13.52	14.02	0.532	0.552	
b2	1.20	1.73	0.047	0.068			L1	3.32	3.82	0.131	0.150	2
b3	1.14	1.73	0.045	0.068	4		ØΡ	3.54	3.73	0.139	0.147	
с	0.36	0.61	0.014	0.024			Q	2.60	3.00	0.102	0.118	
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							
E	10.11	10.51	0.398	0.414	3, 6							

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 dimension: inches

⁽⁶⁾ Thermal pad contour optional within dimensions E, H1, D2 and E1

 $^{\left(7\right) }$ Dimension E2 x H1 define a zone where stamping and singulation irregularities are allowed

⁽⁸⁾ Outline conforms to JEDEC[®] TO-220, except D2, where JEDEC[®] minimum is 0.480"

Revision: 14-Mar-2022

Document Number: 96069



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