

EMIPAK 1B PressFit Power Module 1200 V AC Line Input Rectification, Flexible Configuration, 20 A



EMIPAK 1B (package example)

PRIMARY CHARACTERISTICS			
D1 - D12			
V _{RRM}	1200 V		
V _{FM} typical at 20 A	1.29 V		
I _O at T _{SINK} = 97 °C	20 A		
Package	EMIPAK 1B		
Circuit configuration	6 x independent diodes legs for AC line input rectification		
Туре	Modules - diode, high voltage		

FEATURES





- Exposed Al₂O₃ substrate with low thermal resistance
- · Very low forward voltage drop
- Low internal inductances
- · Qualified using AQG324 guideline as reference
- PressFit pins locking technology PATENT(S): www.vishav.com/patents
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

DESCRIPTION

The EMIPAK 1B package is easy to use thanks to the PressFit pins. The exposed substrate provides improved thermal performance.

The optimized layout also helps to minimize stray parameters, allowing for better EMI performance.

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Operating junction temperature	TJ		150	
Storage temperature range	T _{Stq}		-40 to +150	°C
RMS isolation voltage	V _{ISOL}	$T_J = 25$ °C, all terminals shorted, $f = 50$ Hz, $t = 1$ s	3500	V
D1 - D12				
Maximum DC output current	I _{F(AV)}	T _{SINK} = 25 °C	33	^
		T _{SINK} = 80 °C	23	Α
Power dissipation	P _D	T _{SINK} = 25 °C	87	W
		T _{SINK} = 80 °C	49	
Maximum peak one cycle forward non-repetitive	I _{FSM}	10 ms sine or 6 ms rectangular pulse, T _J = 150 °C, no voltage reapplied	230	Α
surge current		8.3 ms sine, T _J = 150 °C, no voltage reapplied	241	Α
Manianum 12t ann abilitu fau funian	I ² t	No voltage reapplied, t = 10 ms	264	A2-
Maximum I ² t capability for fusing		No voltage reapplied, t = 8.3 ms	241	A ² s
Maximum I ² √t capability for fusing	l²√t	t = 0.1 ms to 10 ms, no voltage reapplied	2647	A²√s
Repetitive peak reverse voltage	V_{RRM}		1200	V
Low level value of threshold voltage	V _{F(TO)1}	$(16.7 \% \text{ x } I_{F(AV)} < I < \text{x } I_{F(AV)}), T_J = T_J \text{ maximum}$	0.92	V
High level value of threshold voltage	V _{F(TO)2}	$(I > x I_{F(AV)}), T_J = T_J \text{ maximum}$		v
Low level value of forward slope resistance	r _{f1}	r_{f1} (16.7 % x $I_{F(AV)} < I < x I_{F(AV)}$), $T_J = T_J$ maximum		
High level value of forward slope resistance	r _{f2}	$(I > x I_{F(AV)}), T_J = T_J maximum$	50.8	mΩ

PATENT(S): www.vishay.com/patents

This Vishay product is protected by one or more United States and international patents.



ELECTRICAL SPECIFICATIONS (T _J = 25 °C unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
D1 - D12						
Forward voltage drop V _{FM}	V	I _F = 20 A	-	1.29	1.90	V
	I _F = 20 A, T _J = 150 °C	-	1.26	-	V	
Breakdown voltage	V_{BR}	$I_R = 500 \mu A$	1200	-	-	V
Reverse leakage current I _{RM}	_	V _R = 1200 V	-	1.0	100	
	IRM	V _R = 1200 V, T _J = 150 °C	-	900	-	μΑ

INTERNAL NTC - THERMISTOR SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS VALUE		UNITS	
Resistance	R ₂₅	T _C = 25 °C	5000	0	
Resistance	R ₁₀₀	T _C = 100 °C	493 ± 5 %	Ω	
B-value	B _{25/50}	$R_2 = R_{25} \text{ exp. } [B_{25/50}(1/T2 - 1/(298.15K))]$	3375 ± 5 %	K	
Maximum operating temperature			220	°C	
Dissipation constant			2	mW/°C	
Thermal time constant			8	S	

THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	
D1 - D12 - thermal resistance junction to sink (per diode) (1)	R _{thJS}	-	1.19	-	°C/W	
Case to sink thermal resistance (per module) (1)		-	0.1	-	C/W	
Mounting torque (M4)		2	-	3	Nm	
Weight		-	28	-	g	

Note

 $^{^{(1)}}$ Mounting surface flat, smooth, and greased, λ_{grease} = 0.67 W/mK

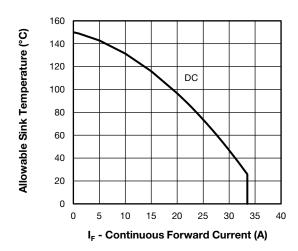


Fig. 1 - Allowable Sink Temperature vs. Continuous Forward Current (Forward Current vs. Sink Temperature)

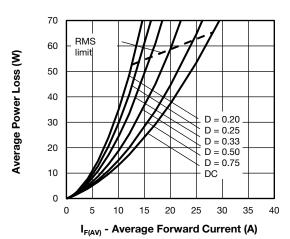


Fig. 2 - Average Power Loss vs Average Forward Current (Forward Power Loss Characteristics)

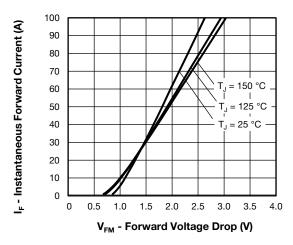


Fig. 3 - Typical Forward Voltage Drop vs. Instantaneous Forward Current (Per Diode)

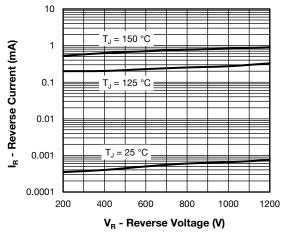
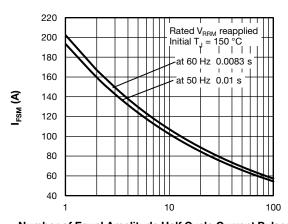
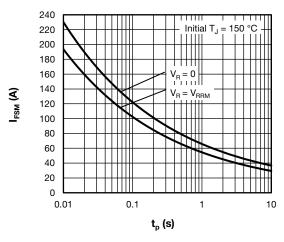


Fig. 4 - Typical Reverse Current vs. Reverse Voltage (Per Diode)



Number of Equal Amplitude Half Cycle Current Pulses (N)

 $\label{eq:Fig. 5-loss} \mbox{Fig. 5-l}_{\rm FSM} \mbox{ vs. N} \\ \mbox{(Non-Repetitive Peak Forward Surge Current vs. Number Pulses)}$



 $\label{eq:Fig. 6-loss} Fig.~6-l_{FSM}~vs.~t_p\\ (Non-Repetitive~Peak~Forward~Surge~Current~vs.~Pulse~Duration)$

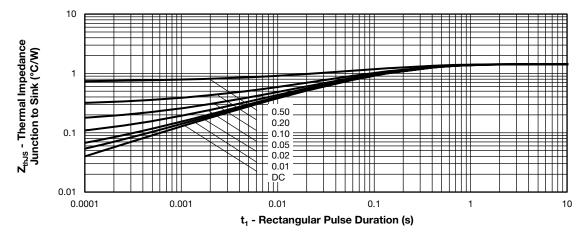
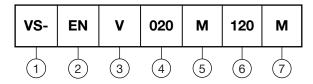


Fig. 7 - Z_{thJS} Thermal Impedance Junction to Sink vs. t1 Rectangular Pulse Duration (Maximum Thermal Impedance Z_{thJS} Characteristics Per Diode)

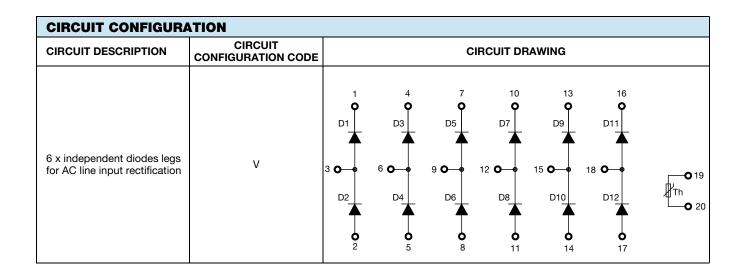


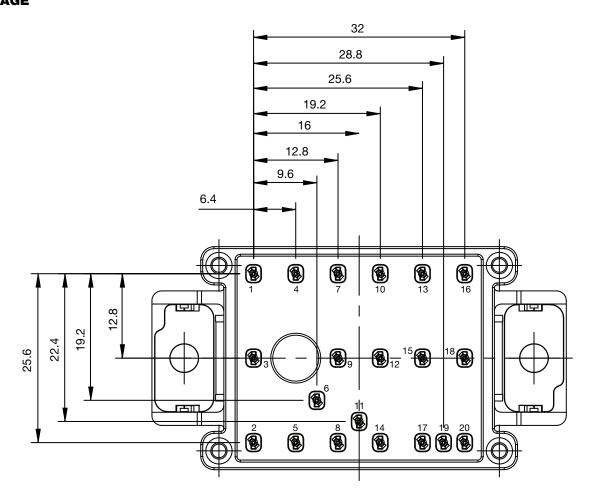
ORDERING INFORMATION TABLE

Device code



- Vishay Semiconductors product
- 2 Package indicator (EN = EMIPAK 1B)
- Gircuit configuration (V = 6 x independent diodes legs for AC line input rectification)
- 4 Current rating (020 = 20 A)
- 5 Switch die technology (M = MOAT standard recovery diode)
- 6 Voltage rating (120 = 1200 V)
- 7 Diode technology (M = MOAT standard recovery diode)



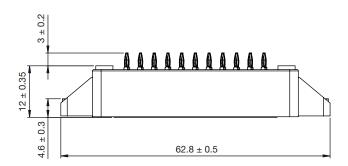


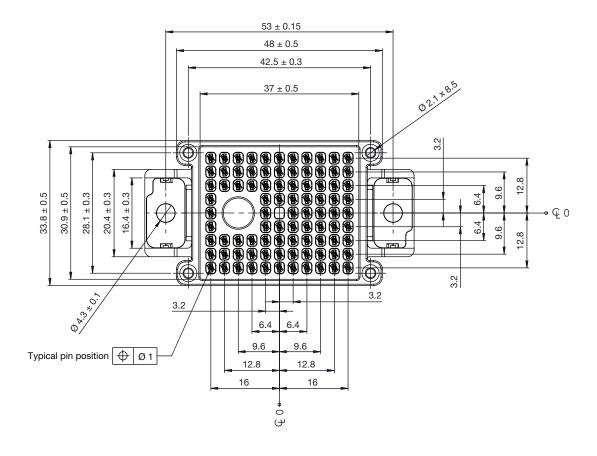
LINKS TO RELATED DOCUMENTS			
Dimensions <u>www.vishay.com/doc?95558</u>			
Application Note	www.vishay.com/doc?95580		



EMIPAK-1B PressFit

DIMENSIONS in millimeters







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