EMIPAK 1B PressFit Power Module
1200 V Silicon Carbide Single Phase Bridge, 30 A

EMIPAK 1B
(package example)

FEATURES

- SiC diode technology
- Exposed Al_2O_3 substrate with low thermal resistance
- Very high frequency operating
- Low internal inductances
- Qualified using AQG324 guideline as reference
- PressFit pins locking technology
  PATENT(S): www.vishay.com/patents
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

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.

PRIMARY CHARACTERISTICS	
SINGLE PHASE BRIDGE	
V_{RRM}	1200 V
V_{FM} typical at 30 A	1.35 V
I_O at T_{SINK} = 138 °C	30 A
Q_C typical at 30 A	118 nC
Package	EMIPAK 1B
Circuit configuration	SiC diodes full bridge

ABSOLUTE MAXIMUM RATINGS (T_J = 25 °C unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Operating junction temperature	T_J		175	°C
Storage temperature range	T_{Stg}		-40 to +150	
RMS isolation voltage	V_{ISOL}	T_J = 25 °C, all terminals shorted, f = 50 Hz, t = 1 s	3500	V
SINGLE PHASE BRIDGE				
Maximum output current of bridge	I_O	180° conduction angle, T_{SINK} = 25 °C	67	A
		180° conduction angle, T_{SINK} = 80 °C	52	
Maximum peak one cycle forward non-repetitive surge current	I_{FSM}	10 ms sine or 6 ms rectangular pulse, T_J = 25 °C, no voltage reapplied	230	A
		8.3 ms sine, T_J = 25 °C, no voltage reapplied	241	A
Maximum I^2t capability for fusing	I^2t	No voltage reapplied, t = 10 ms	265	A^2s
		No voltage reapplied, t = 8.3 ms	240	
Maximum $I^2\sqrt{t}$ capability for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied	2645	$A^2\sqrt{s}$

ELECTRICAL SPECIFICATIONS (T_J = 25 °C unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
D1 - D4 SINGLE PHASE BRIDGE						
Forward voltage drop (per diode)	V_{FM}	I_F = 30 A	-	1.35	1.82	V
		I_F = 30 A, T_J = 150 °C	-	1.79	-	
Breakdown voltage (per diode)	V_{BR}	I_R = 1 mA	1200	-	-	V
Reverse leakage current (per diode)	I_{RM}	V_R = 1200 V	-	75	800	µA
		V_R = 1200 V, T_J = 150 °C	-	900	-	

PATENT(S): www.vishay.com/patents
This Vishay product is protected by one or more United States and international patents.

SWITCHING CHARACTERISTICS (T_J = 25 °C unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
D1 - D4 SINGLE PHASE BRIDGE						
Total capacitive charge (per diode)	Q_C	V_R = 800 V, dI/dt = 500 A/µs	-	118	-	nC
Total capacitance (per diode)	C	V_R = 1 V, f = 1 MHz	-	2780	-	pF
		V_R = 800 V, f = 1 MHz	-	253	-	

INTERNAL NTC - THERMISTOR SPECIFICATIONS				
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**VALUE**	**UNITS**
Resistance	R_{25}	T_C = 25 °C	5000	Ω
	R_{100}	T_C = 100 °C	493 ± 5 %	
B-value	$B_{25/50}$	$R_2 = R_{25}$ 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**
SINGLE PHASE BRIDGE - Thermal resistance junction to sink (per diode) (1)	R_{thJS}	-	0.90	-	°C/W
Case to sink thermal resistance (per module) (1)		-	0.1	-	
Mounting torque (M4)		2	-	3	Nm
Weight		-	28	-	g

Note

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

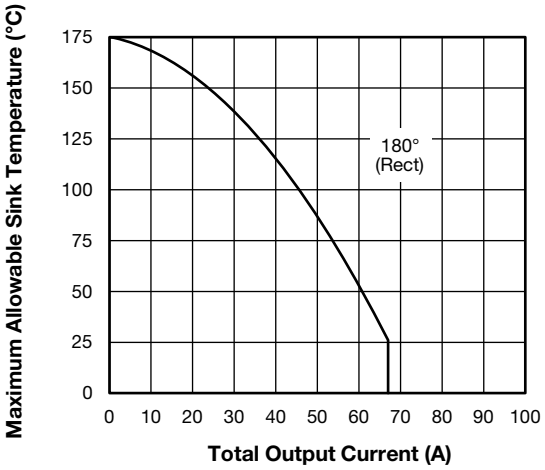


Fig. 1 - Current Rating Characteristics

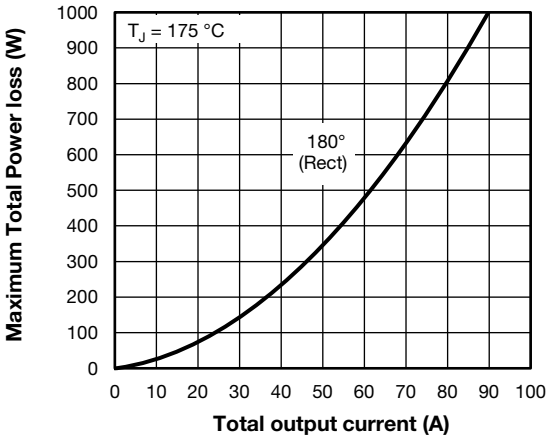


Fig. 2 - Total Power Loss Characteristics

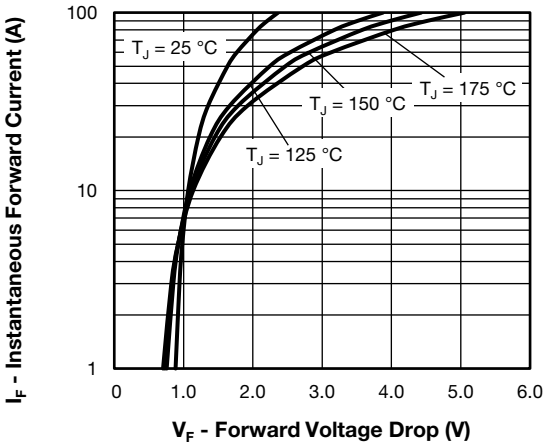


Fig. 3 - Typical Forward Voltage Drop vs. Instantaneous Forward Current (Per Diode)

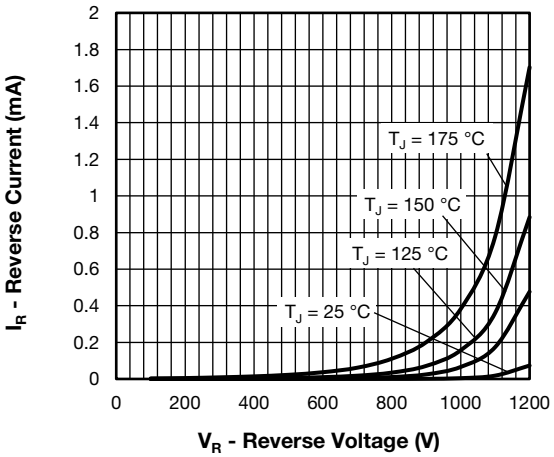


Fig. 4 - Typical Reverse Current vs. Reverse Voltage (Per Diode)

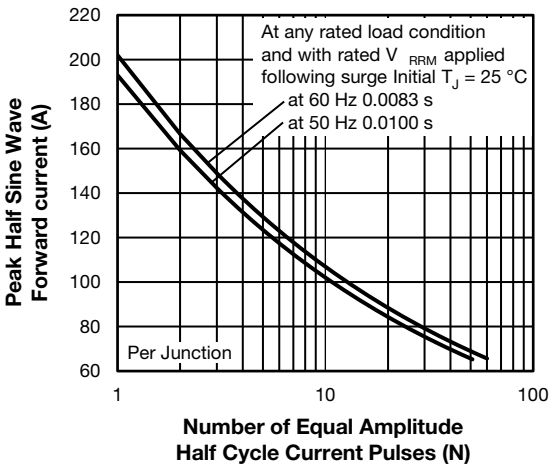


Fig. 5 - Maximum Non-Repetitive Surge Current (1)

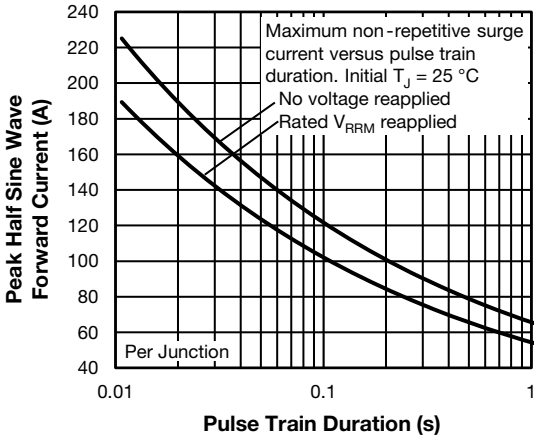


Fig. 6 - Maximum Non-Repetitive Surge Current (2)

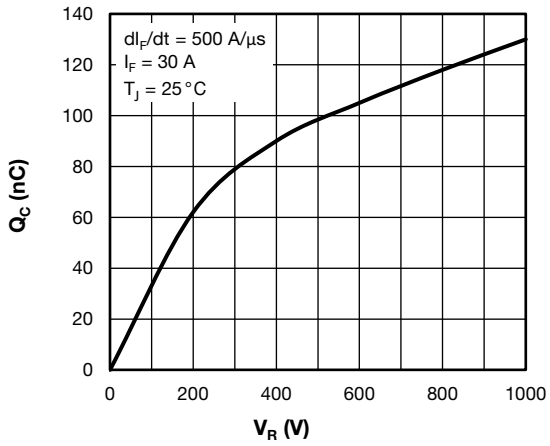


Fig. 7 - Total Capacitance Charge vs. Reverse Voltage (Per Diode)

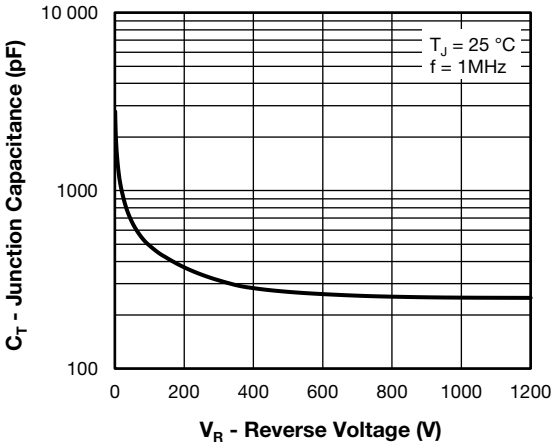


Fig. 8 - Typical Junction Capacitance vs. Reverse Voltage (Per Diode)

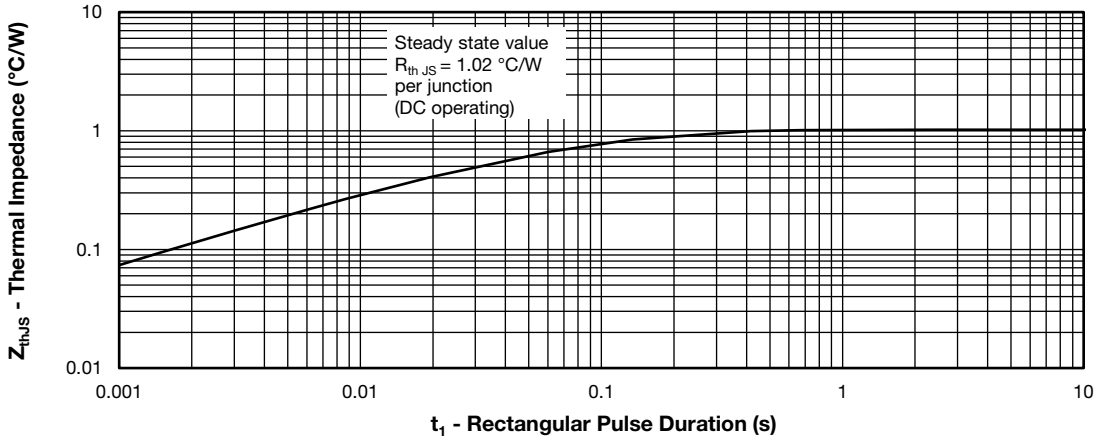


Fig. 9 - Z_{thJS} Thermal Impedance Characteristic (Per Diode)

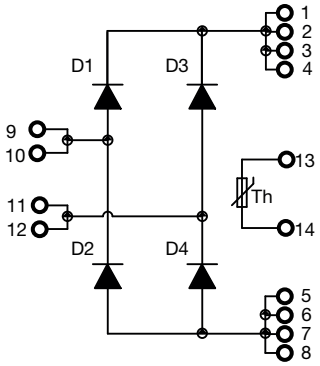
ORDERING INFORMATION TABLE

Device code

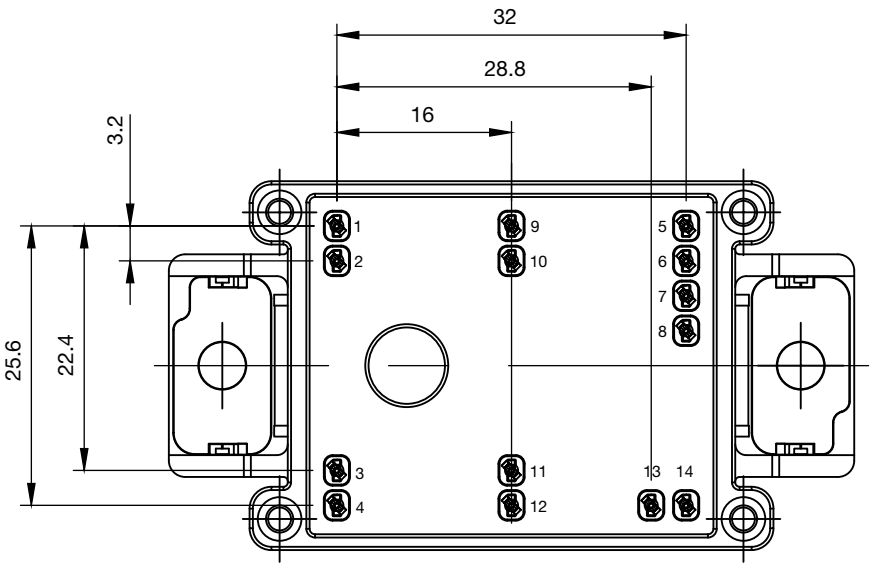
VS-	EN	W	30	S	120	T
1	2	3	4	5	6	7

1	-	Vishay Semiconductors product
2	-	Package indicator (EN = EMIPAK 1B)
3	-	Circuit configuration (W = SiC diodes full bridge)
4	-	Current rating (30 = 30 A)
5	-	Die technology (S = SiC diode)
6	-	Voltage rating (120 = 1200 V)
7	-	T = thermistor

CIRCUIT CONFIGURATION



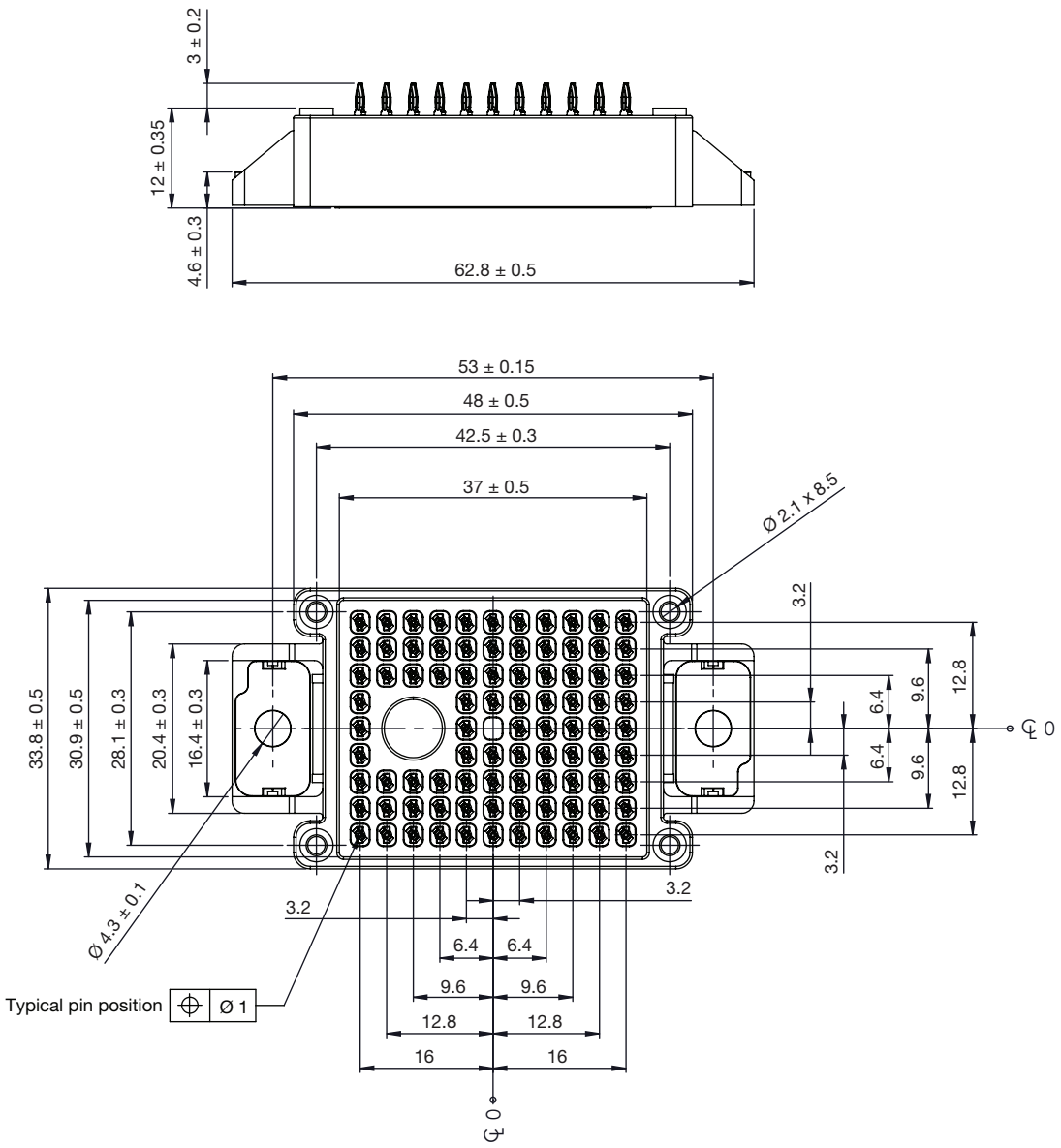
PACKAGE



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

EMIPAK-1B PressFit

DIMENSIONS in millimeters



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