EMIPAK 2B PressFit Full Bridge Inverter Silicon Carbide MOSFET Power Modules



EMIPAK 2B
(package example)

FEATURES

- Silicon carbide power MOSFET
- Very tight variation of on-resistance vs. temperature
- Slight variation of switching losses with temperature
- Very fast body diode
- PressFit pins technology
- Exposed Al_2O_3 substrate with low thermal resistance
- Low input capacitance
- Low internal inductance
- Easy to drive
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

PRIMARY CHARACTERISTICS	
FULL BRIDGE INVERTER - Q1 to Q6 MOSFET	
V_{DSS}	1200 V
$R_{DS(on)}$ typical at I_D = 20 A	71 mΩ
I_D at T_C = 80 °C	26 A
Type	Modules - MOSFET
Package	EMIPAK 2B
Circuit configuration	Full bridge

DESCRIPTION

The EMIPAK 2B 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.

TYPICAL APPLICATIONS

- Solar inverter

ABSOLUTE MAXIMUM RATINGS				
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
Q1 to Q6 - MOSFET				
Drain to source voltage	V_{DSS}		1200	V
Gate to source voltage	V_{GSS}		-10 / +25	
Pulsed drain current	I_{DM} (1)		90	A
Continuous drain current	I_D	T_C = 25 °C	32	A
		T_C = 80 °C	26	
		T_{SINK} = 80 °C	22	
Power dissipation	P_D	T_C = 25 °C	143	W
		T_C = 80 °C	90	
Pulsed source current (body diode)	I_{SM}		90	A

Note

(1) Pulse width limited by safe operating area

For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

ELECTRICAL SPECIFICATIONS (T_J = 25 °C unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Q1 to Q6 - MOSFET						
Drain to source on resistance	$R_{DS(on)}$	V_{GS} = 20 V, I_D = 20 A	-	71	105	mΩ
		V_{GS} = 20 V, I_D = 20 A, T_J = 150 °C	-	79	-	
		V_{GS} = 20 V, I_D = 20 A, T_J = 175 °C	-	81	-	
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 1.0 mA	1.6	3.6	6.5	V
Temperature coefficient of threshold voltage	$\Delta V_{GS(th)}/\Delta T_J$	V_{DS} = V_{GS}, I_D = 1.0 mA (25 °C to 125 °C)	-	-8.3	-	mV/°C
Forward transconductance	g_{fs}	V_{DS} = 20 V, I_D = 20 A	-	9.5	-	S
Transfer characteristics	V_{GS}	V_{DS} = 20 V, I_D = 20 A	-	12	-	V
Zero gate voltage drain current	I_{DSS}	V_{GS} = 0 V, V_{DD} = 1200 V	-	25	230	µA
		V_{GS} = 0 V, V_{DD} = 1200 V, T_J = 150 °C	-	50	-	
Gate to source leakage current	I_{GSS}	V_{GS} = +20 V / -10 V, V_{DS} = 0 V	-	-	150	nA
Q1 to Q6 - BODY DIODE						
Forward voltage drop	V_{SD}	I_{SD} = 10 A; V_{GS} = 0	-	3.2	-	V

SWITCHING CHARACTERISTICS (T_J = 25 °C unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Q1 to Q6 - MOSFET						
Total gate charge (turn-on)	Q_g	I_D = 20 A V_{DD} = 800 V V_{GS} = 20 V	-	105	-	nC
Gate to source charge (turn-on)	Q_{gs}		-	16	-	
Gate to drain charge (turn-on)	Q_{gd}		-	40	-	
Turn-on delay time	$t_{d(on)}$	I_D = 20 A V_{DD} = 600 V V_{GS} = +20 V/-2 V R_g = 4.7 Ω, L = 500 µH	-	41	-	ns
Rise time	t_r		-	29	-	
Turn-off delay time	$t_{d(off)}$		-	79	-	
Fall time	t_f		-	62	-	
Turn-on delay time	$t_{d(on)}$	I_D = 20 A V_{DD} = 600 V V_{GS} = +20 V/-2 V R_g = 4.7 Ω, L = 500 µH, T_J = 150 °C	-	41	-	ns
Rise time	t_r		-	30	-	
Turn-off delay time	$t_{d(off)}$		-	91	-	
Fall time	t_f		-	75	-	
Input capacitance	C_{iss}	V_{GS} = 0 V V_{DS} = 400 V f = 1 MHz	-	1700	-	pF
Output capacitance	C_{oss}		-	130	-	
Reverse transfer capacitance	C_{rss}		-	25	-	
Q1 to Q6 - BODY DIODE						
Diode reverse recovery time	t_{rr}	V_R = 400 V, T_J = 25 °C I_S = 20 A dI/dt = 100 A/µs	-	140	-	ns
Diode reverse recovery current	I_{rr}		-	3.1	-	A
Diode reverse recovery charge	Q_{rr}		-	220	-	nC

For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

INTERNAL NTC - THERMISTOR SPECIFICATIONS				
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**VALUE**	**UNITS**
Resistance	R_{25}	T_J = 25 °C	22 000 ± 5 %	Ω
	R_{150}	T_J = 150 °C	483.86 ± 5 %	
B constant	$B_{25/85}$		3800 ± 1 %	K
Operating temperature range at zero power			-40 to +150	°C
Maximum dissipation at 25 °C			210	mW
Dissipation factor	D		3.5	mW/K
Thermal time constant	τ		≈ 10	s

INTERNAL C1 / C3 DC LINK CAPACITOR - ELECTRICAL SPECIFICATIONS				
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**VALUE**	**UNITS**
Capacitance	C		0.047 ± 10 %	µF
Voltage			1000	V

THERMAL AND MECHANICAL SPECIFICATIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Q1 to Q6 - MOSFET - Junction to case thermal resistance (per switch)	R_{thJC}	-	-	1.05	°C/W
Q1 to Q6 - MOSFET - Case to sink thermal resistance (per switch)	R_{thCS}	-	0.55	-	
Mounting torque (M4) (1)		2	-	3	Nm
Weight		-	45	-	g

Note

(1) See application note for further suggestion on mounting operation: www.vishay.com/doc?95580.

For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

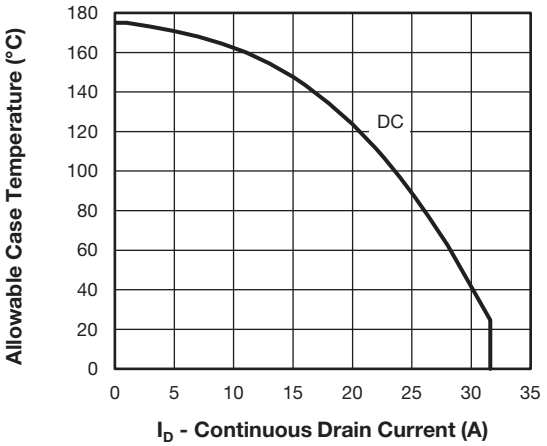


Fig. 1 - Maximum Continuous Drain Current vs. Case Temperature

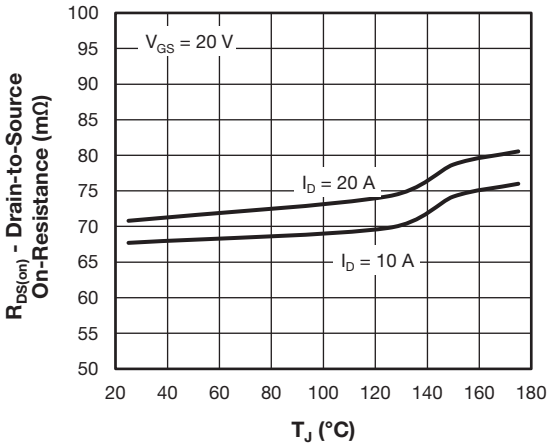


Fig. 4 - Typical Drain-to-Source On-Resistance vs. Temperature

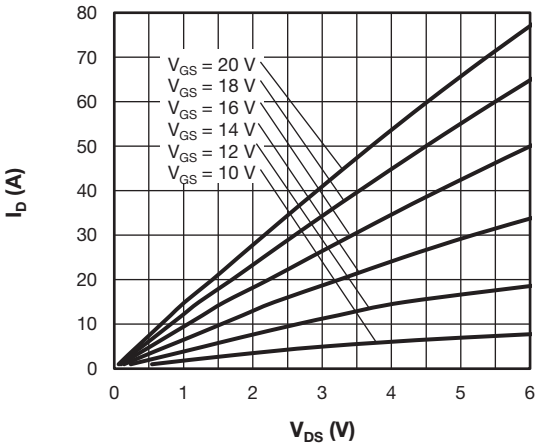


Fig. 2 - Typical Drain-to-Source Current Output Characteristics at T_J = 25 °C

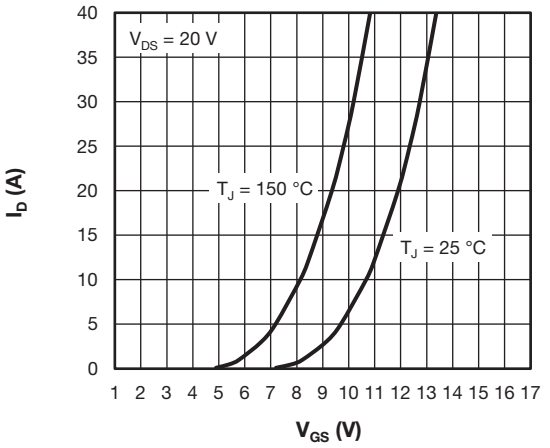


Fig. 5 - Typical Transfer Characteristics

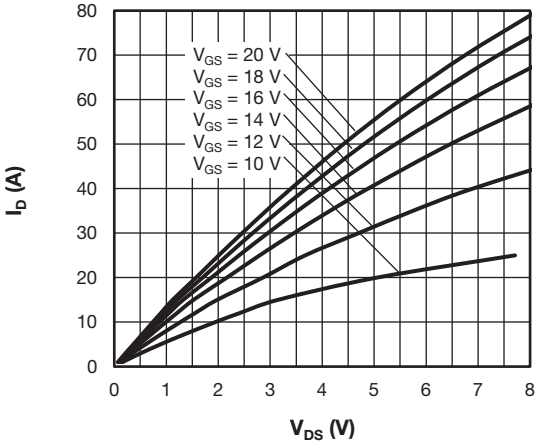


Fig. 3 - Typical Drain-to-Source Current Output Characteristics at T_J = 150 °C

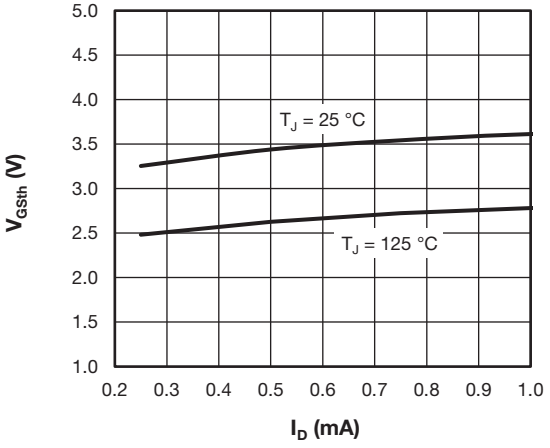


Fig. 6 - Typical Gate Threshold Voltage Characteristics

For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

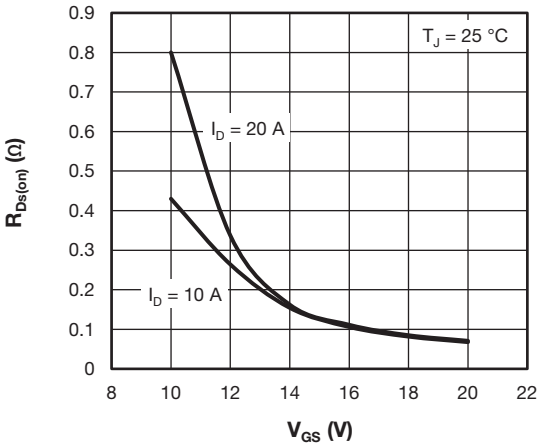


Fig. 7 - Typical Drain-State Resistance vs. Gate-to-Source Voltage

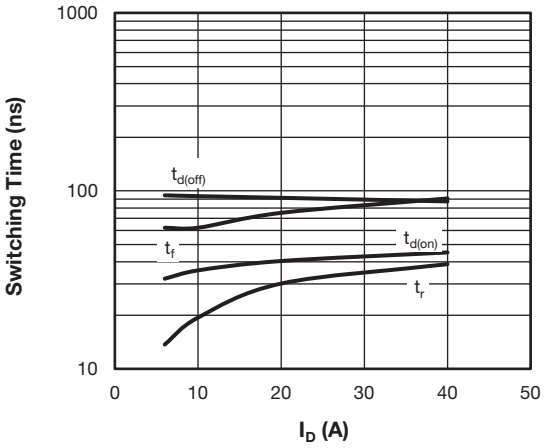


Fig. 10 - Typical Switching Time vs. I_D
T_J = 150 °C, V_{DD} = 600 V, R_g = 4.7 Ω, V_{GS} = +20 V/-2 V, L = 500 µH

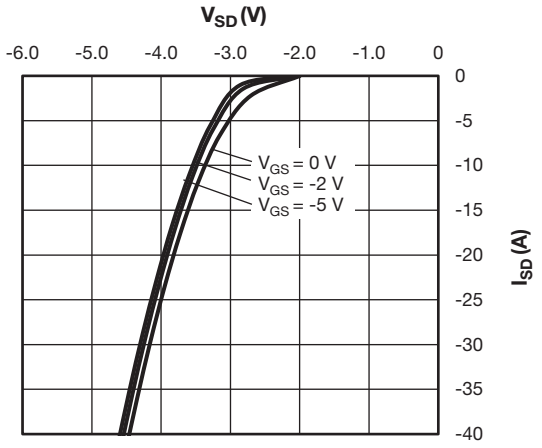


Fig. 8 - Typical Body Diode Source-to-Drain Current Characteristics
at T_J = 25 °C

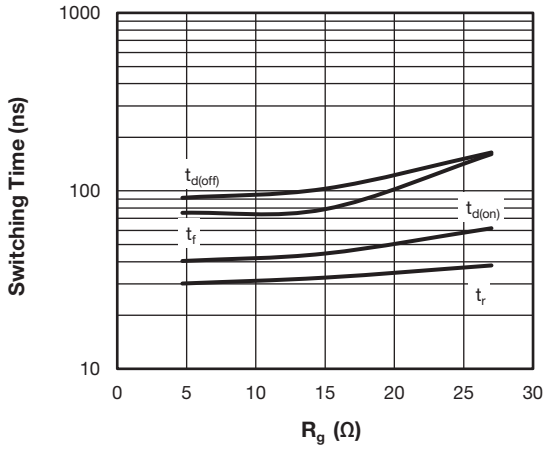


Fig. 11 - Typical Switching Time vs. R_g
T_J = 150 °C, V_{DD} = 600 V, I_D = 20 A, V_{GS} = +20 V / -2 V, L = 500 µH

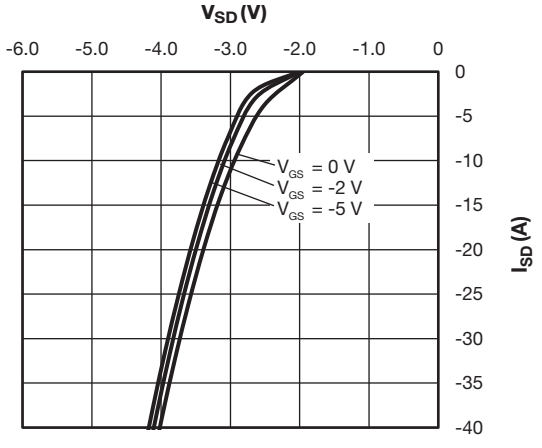


Fig. 9 - Typical Body Diode Source-to-Drain Current Characteristics
at T_J = 150 °C

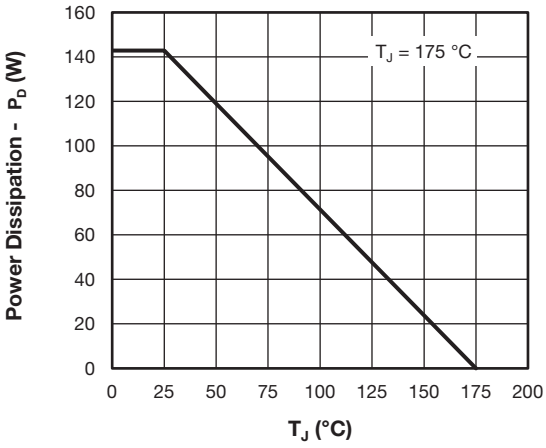


Fig. 12 - Power Dissipation Curve

For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

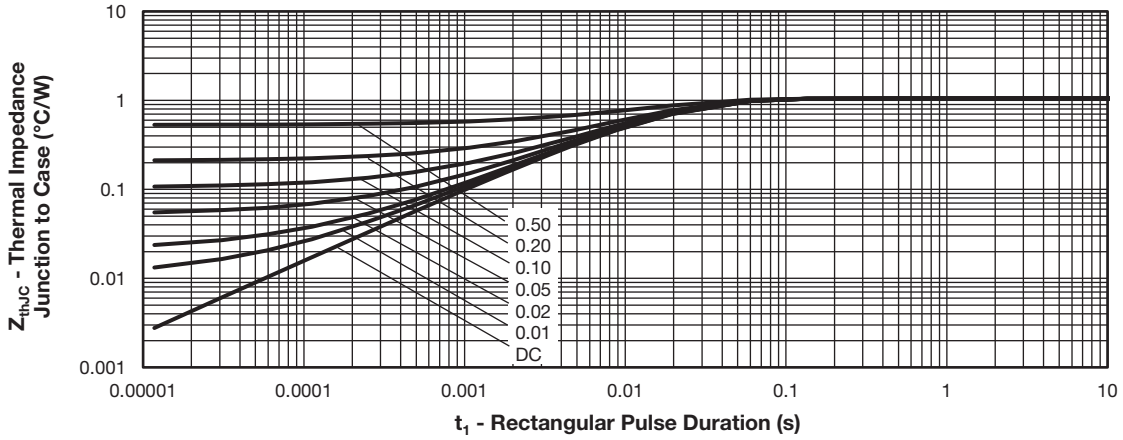


Fig. 13 - Maximum Thermal Impedance Junction-to-Case Characteristics

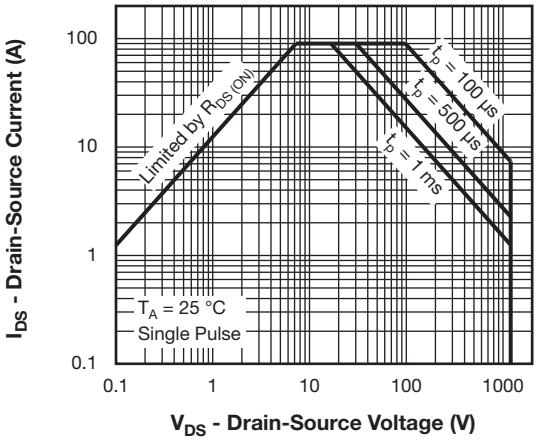


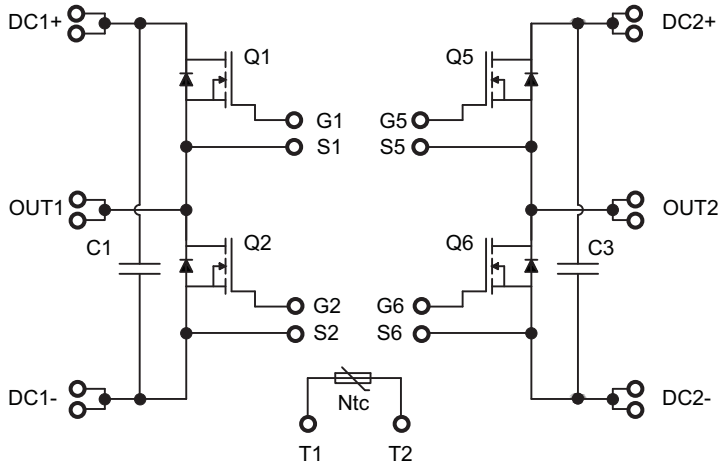
Fig. 14 - Safe Operating Area

ORDERING INFORMATION TABLE

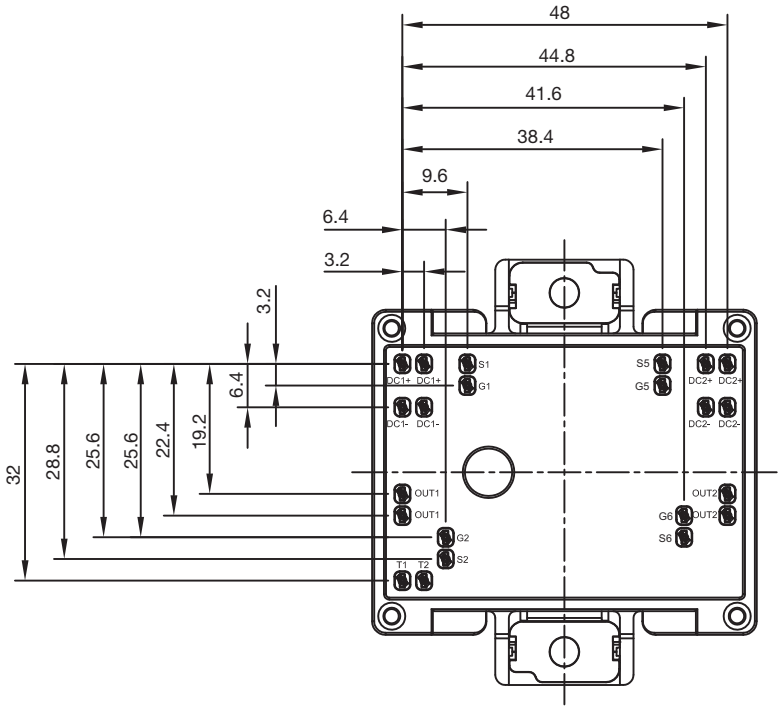
Device code	VS-	ET	Y	020	P	120	F
	1	2	3	4	5	6	7

- 1 - Vishay Semiconductors product
- 2 - Package indicator (ET = EMIPAK 2B)
- 3 - Circuit configuration (Y = full bridge inverter)
- 4 - Current rating (020 = 20 A)
- 5 - Switch die technology
- 6 - Voltage rating (120 = 1200 V)
- 7 - Diode die technology

For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

CIRCUIT CONFIGURATION		
CIRCUIT	**CIRCUIT CONFIGURATION CODE**	**CIRCUIT DRAWING**
Full bridge inverter	Y	

PACKAGE



LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95559

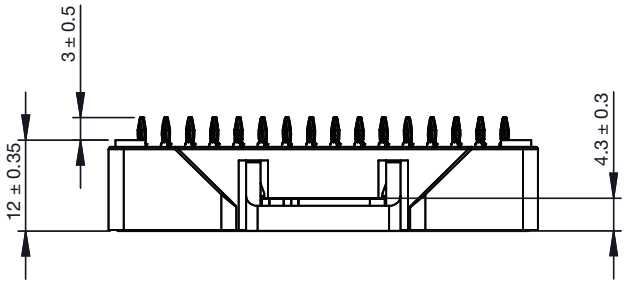
For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

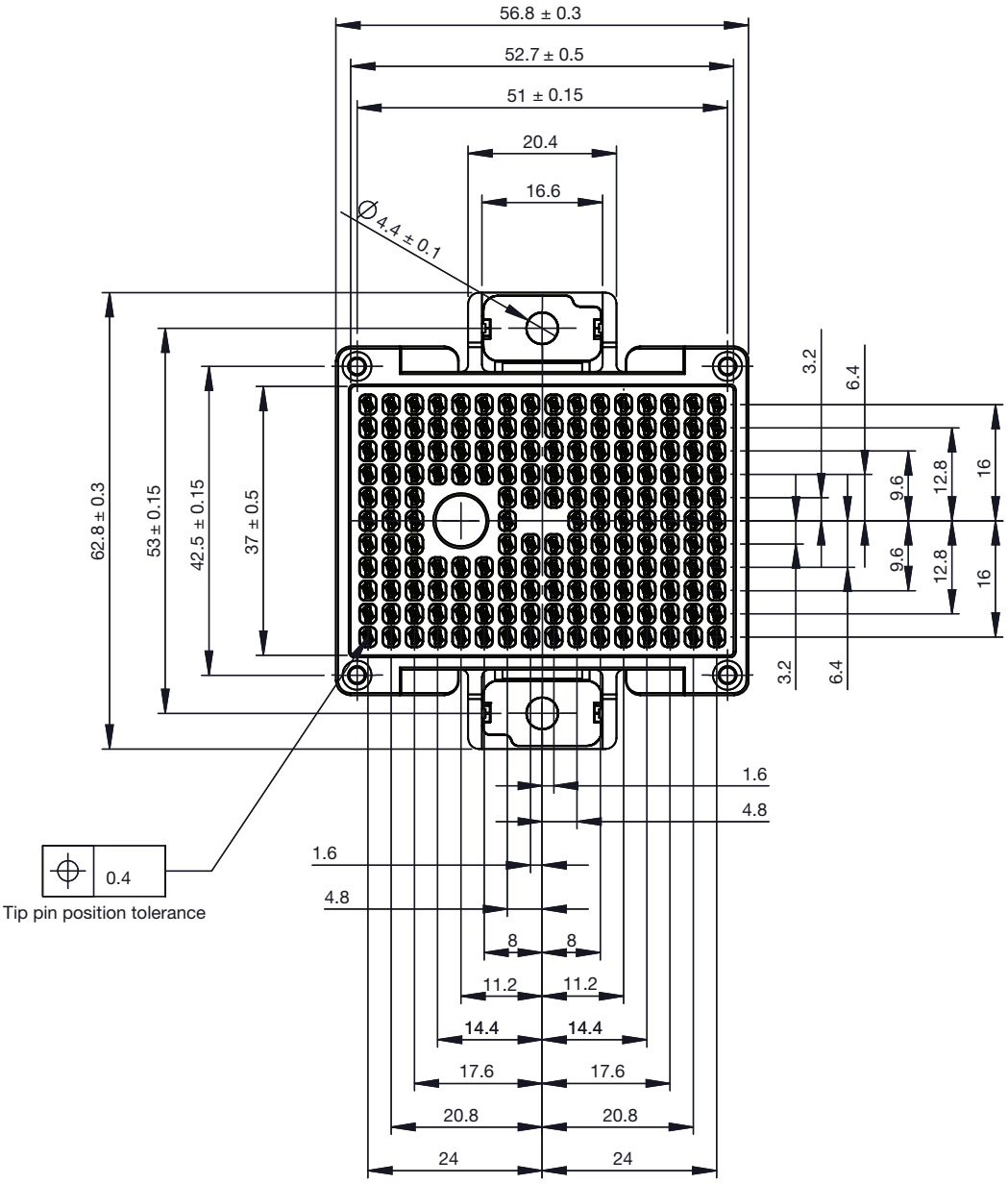
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

EMIPAK 2B

DIMENSIONS in millimeters

The tolerance of the total height is lower than the sum of the single tolerances listed





For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

© 2026 VISHAY INTERTECHNOLOGY, INC. ALL RIGHTS RESERVED

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

ENTEGRECİ

Bu belge www.entegreci.com üzerinden sunulmaktadır.

Elektronik komponent tedarikinde Entegreci

Entegreci, Eskişehir merkezli, Türkiye geneline satış yapan bir elektronik komponent mağazasıdır. Entegreler (IC), mikrodenetleyiciler, transistörler, diyotlar, pasif elemanlar, konnektörler, modüller ve geliştirme kartları tek adetten seri üretim adetlerine kadar satılır. Ürün sayfalarında güncel stok durumunu, fiyatı ve datasheet bağlantısını bulabilirsiniz.

Parça koduyla arama

Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

www.entegreci.com

Ürün kategorileri

Entegreden kapasitöre tüm elektronik komponent kategorileri.

Kategorilere göz atın

Üreticiler

Aradığınız üreticinin ürünlerini tek sayfada inceleyin.

Üreticileri görün

Toplu alım ve teklif

Listede olmayan ya da yüksek adetli parçalar için teklif isteyin.

Teklif isteyin

www.entegreci.com | **destek@entegreci.com** | **0850 305 90 34**

Entegreci is an online electronic components store based in Türkiye. Search by manufacturer part number to see stock, prices and datasheets for integrated circuits, microcontrollers, transistors, passive components and connectors, or request a quote for parts that are not listed.

Bu sayfa Entegreci tarafından eklenmiştir. Belgenin önceki sayfaları asıl yayıncısına aittir ve içeriği değiştirilmemiştir; en güncel sürüm için belgenin yayıncısına başvurun.