

# B1D20120H

1200V ▲ 20A ▲ SiC SCHOTTKY DIODE

SILICON CARBIDE SiC SCHOTTKY DIODE ▲ THT type

Excellent surge capability

Easy paralleling due to positive  $V_F$  temperature coefficient

TO-247-2L package ▲ Epoxy meets UL94-V0



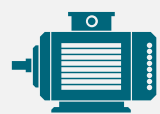




Low forward voltage

Temperature independent switching

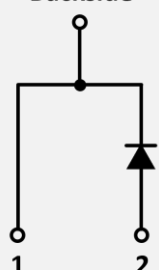
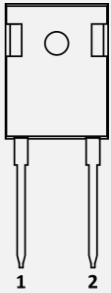
## SPECIFICATION

Item ( $T_C = 25^\circ\text{C}$ , unless otherwise noted)		Characteristics
Operating Temperature Range	$T_J$	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
Storage Temperature Range	$T_S$	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
Repetitive Peak Reverse Voltage	$V_{RRM}$	1200V
Continuous Forward Current at $T_C = 160^\circ\text{C}$	$I_F$	20A
Total Capacitive Charge ( $T_J = 25^\circ\text{C}$ )	$Q_C$	101nC
Capacitance Stored Energy ( $V_R = 800\text{V}$ )	$E_C$	52μJ
Diode Forward Voltage ( $T_J = 175^\circ\text{C}$ , $I_F = 20\text{A}$ )	$V_F$	1.9V
Power Dissipation	$P_{TOT}$	269W

## APPLICATIONS

EV Charging	Industrial Inverters	Motors & Drives	Power Factor Correction	Renewable Energy	SMPS	UPS
						

## PIN DESCRIPTION

Circuit Diagram	Outline - Front View	Pin No.	Description
<p>Backside</p> 		<p>1</p> <p>2</p>	<p>Cathode (Backside)</p> <p>Anode</p>

## ABSOLUT MAXIMUM RATINGS ▲ $T_C = 25^\circ\text{C}$ , unless otherwise noted

Item	Condition	Symbol		Unit
Repetitive Peak Reverse Voltage		$V_{RRM}$	1200	V
Non-Repetitive Peak Reverse Voltage		$V_{RSM}$	1200	V
Continuous Forward Current	$T_C = 25^\circ\text{C}$	$I_F$	60	A
Continuous Forward Current	$T_C = 150^\circ\text{C}$	$I_F$	20	A
Non-Repetitive Forward Surge Current	$T_C = 25^\circ\text{C}$ , $t_p = 10\text{ms}$ , Half Sine Wave	$I_{FSM}$	150	A
$I^2t$ Value	$T_C = 25^\circ\text{C}$ , $t_p = 10\text{ms}$	$\int i^2 dt$	112.5	$\text{A}^2\text{s}$
Power Dissipation	$T_C = 25^\circ\text{C}$	$P_{TOT}$	269	W
Power Dissipation	$T_C = 110^\circ\text{C}$	$P_{TOT}$	116	W
Operating Junction Temperature		$T_J$	-55 to +175	$^\circ\text{C}$
Storage Temperature Range		$T_{STG}$	-55 to +175	$^\circ\text{C}$
TO-247 Mounting Torque	M3 Screw		0.7	Nm

## ELECTRICAL CHARACTERISTICS

Item	Condition	Symbol	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
DC Blocking Voltage	$T_J = 25^\circ\text{C}$	$V_{DC}$	1200			V
Diode Forward Voltage	$I_F = 20\text{A}$ , $T_J = 25^\circ\text{C}$	$V_F$		1.46	1.61	V
Diode Forward Voltage	$I_F = 20\text{A}$ , $T_J = 175^\circ\text{C}$	$V_F$		1.90	2.35	V
Reverse Current	$V_R = 1200\text{V}$ , $T_J = 25^\circ\text{C}$	$I_R$		10	120	$\mu\text{A}$
Reverse Current	$V_R = 1200\text{V}$ , $T_J = 175^\circ\text{C}$	$I_R$		40	400	$\mu\text{A}$

Item	Condition	Symbol	Min.	Typ.	Max.	Unit
<b>Dynamic Characteristics</b>						
Total Capacitive Charge	$V_R = 800\text{V}$ , $T_J = 25^\circ\text{C}$ $Q_C = \int_0^{V_R} C(V) dV$	$Q_C$		101		nC
Total Capacitance	$V_R = 1\text{V}$ , $f = 1\text{MHz}$ , $T_J = 25^\circ\text{C}$	$C$		1170		pF
Total Capacitance	$V_R = 400\text{V}$ , $f = 1\text{MHz}$ , $T_J = 25^\circ\text{C}$	$C$		95		pF
Total Capacitance	$V_R = 800\text{V}$ , $f = 1\text{MHz}$ , $T_J = 25^\circ\text{C}$	$C$		69		pF
Capacitance Stored Energy	$V_R = 800\text{V}$ , $T_J = 25^\circ\text{C}$	$E_C$		52		$\mu\text{J}$

## THERMAL RESISTANCE PERFORMANCE

Item	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$		0.557		K/W

## REFERENCE DATA ▲ TYPICAL PERFORMANCE

Fig. 1 • Typical Forward Characteristics  $I_F$  vs.  $V_F$

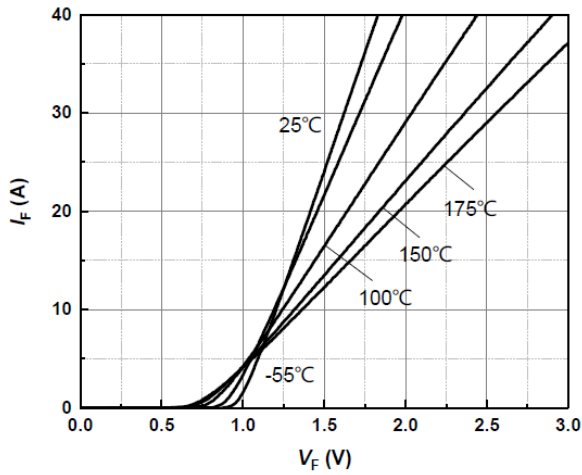


Fig. 2 • Typical Reverse Current  $I_R$  as function of Reverse Voltage  $V_R$

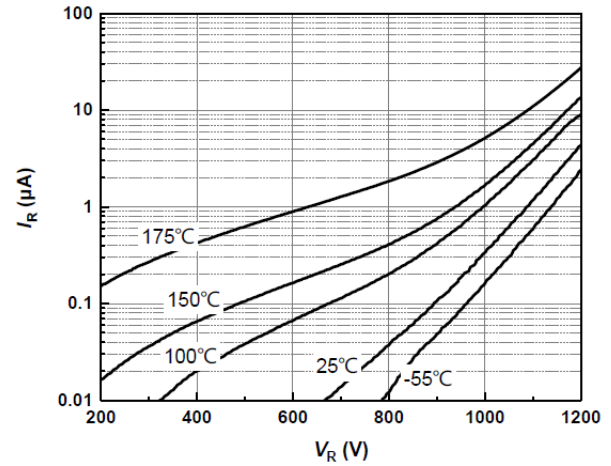


Fig. 3 • Diode Forward Current  $I_F$  as function of Case Temperature  $T_C$  (D = Duty Cycle)

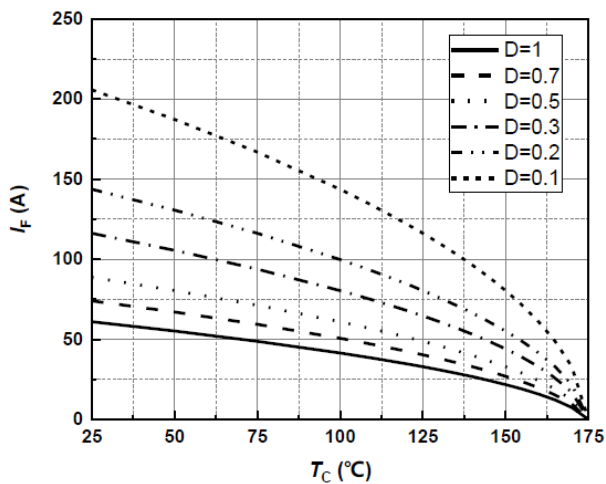


Fig. 4 • Typical Capacitance  $C$  as function of Reverse Voltage  $V_R$ ,  $C = f(V_R)$ ,  $T_J = 25^\circ\text{C}$ ,  $f = 1\text{MHz}$

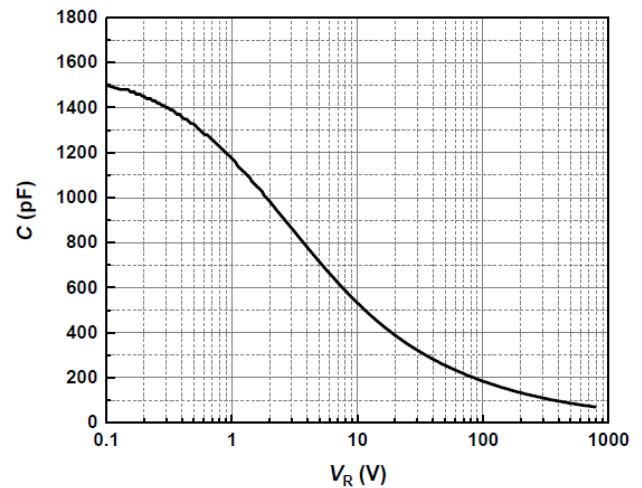


Fig. 5 • Typical Reverse Charge  $Q_C$  as function of Reverse Voltage  $V_R$

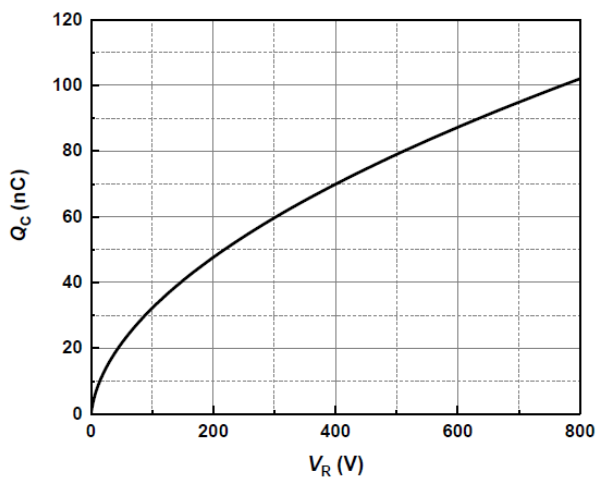
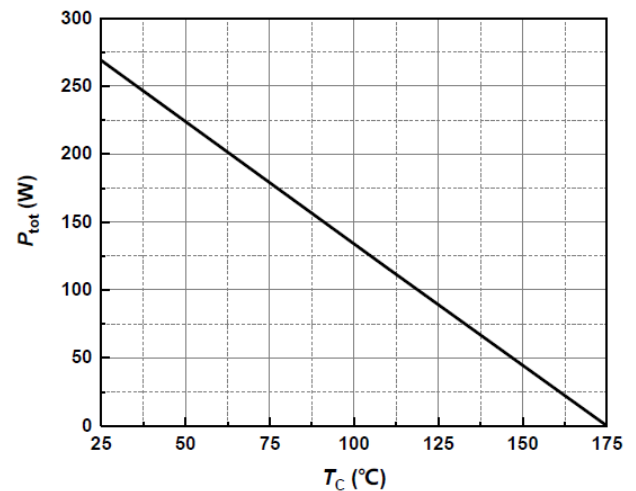


Fig. 6 • Power Dissipation  $P_{TOT}$  as function of Case Temperature  $T_C$



## REFERENCE DATA ▲ TYPICAL PERFORMANCE

Fig. 7 • Capacitance Stored Energy

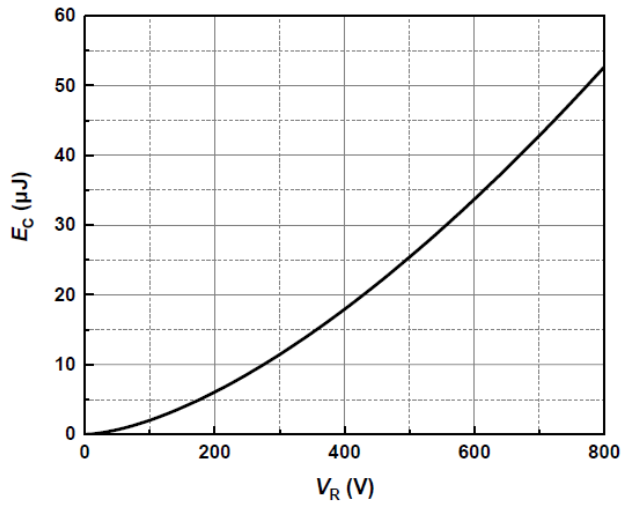
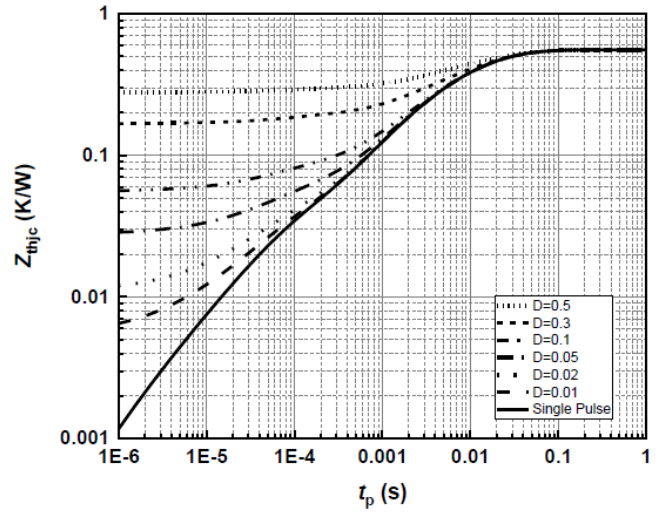
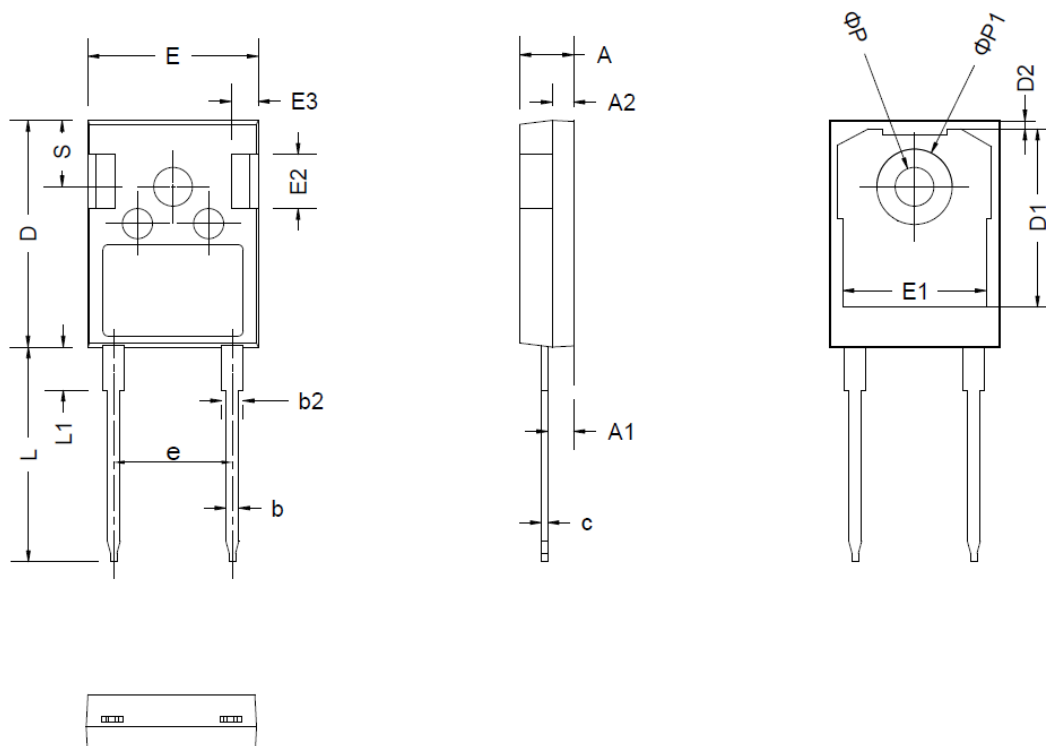


Fig. 8 • Maximum Transient Thermal Impedance,  $Z_{thjc} = f(t)$ , Parameter:  $D = t/T$



## PACKAGE OUTLINE



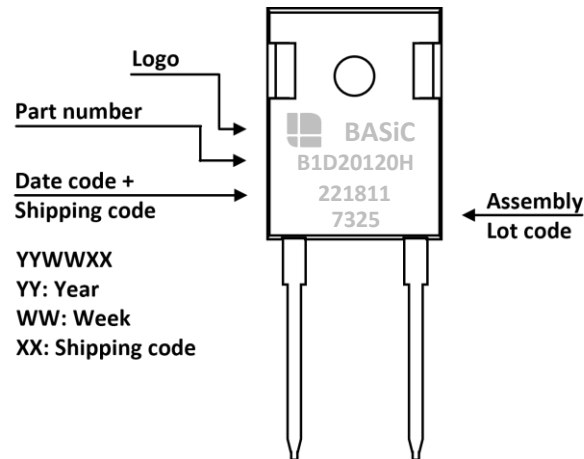
Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
A	4.80	5.00	5.20
A1	2.21	2.41	2.61
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
c	0.51	0.61	0.75
D	20.80	21.00	21.30
D1	16.25	16.55	16.85
D2	1.05	1.17	1.35
E	15.50	15.80	16.10

Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	10.88 BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
ØP	3.40	3.60	3.80
ØP1	-	-	7.30
S	6.15 BSC		

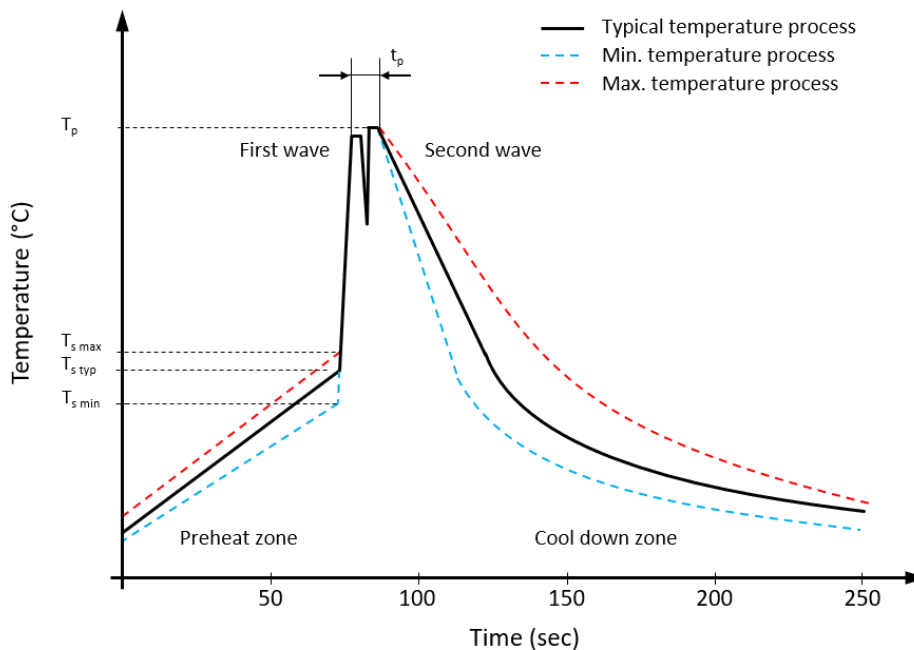
## ORDERING INFORMATION

Part Number	Package	Packing	Tube Qty.	Inner Box Qty.	Outer Box Qty.
B1D20120H	TO-247-2L	Tube	30pcs	600pcs	3,000pcs

## PART MARKING



## RECOMMENDED WAVE SOLDERING PROFILE ▲ THT PACKAGE



## Classification wave soldering profile ▲ Refer to EN 61760-1: 2006

Profile Features		Value ▲ Sn-Pb Assembly	Value ▲ Pb-free Assembly
Preheat temperature min.	$T_{s\ min}$	100 °C	100 °C
Preheat temperature typical	$T_{s\ typ}$	120 °C	120 °C
Preheat temperature max.	$T_{s\ max}$	130 °C	130 °C
Preheat time $t_s$ from $T_{s\ min}$ to $T_{s\ max}$	$t_s$	70 seconds	70 seconds
Peak temperature	$T_p$	235 °C to 260 °C	245 °C to 260 °C
Time of actual peak temperature	$t_p$	Max. 10 seconds Max. 5 second each wave	Max. 10 seconds Max. 5 second each wave
Ramp-down rate min.		~ 2 °C/second	~ 2 °C/second
Ramp-down rate typical		~ 3.5 °C/second	~ 3.5 °C/second
Ramp-down rate max.		~ 5 °C/second	~ 5 °C/second
Time 25°C to 25°C		4 minutes	4 minutes

## REVISION TABLE

Revision	Date	Status	Notes
001	30/09/2022	Initial release	Initial publication

## DISCLAIMER

Except for the written expressed warranties, MGT does not implicitly, by assumption or whatever else, warrant, under-take, promise any other warranty or guaranty for any MGT product.

All information and technical specifications made available by MGT are for guidance only and we reserve the right to change or modify them without prior notice. Unless expressly stated in writing by MGT, we reject any guarantees, obligations, or warranties.

All MGT products with the technical specifications described are suitable for use in certain applications. Operating, production, storage and environmental conditions can have a massive influence on the parameters mentioned in the data sheets, which cause the performance to vary over time.

It is subject to the user's duty of care to design and validate his products in such a way that appropriate measures are taken, such as protective circuits or redundant systems to ensure the safety standards required in the application.

MGT components are not designed or rated for use in life support, rescue, safety critical, military, or aerospace applications where failure or malfunction could result in property or environmental damage, serious injury or death. In the aforementioned cases, please contact us before using MGT products.

In principle, we reserve all rights and MGT's general terms and conditions apply. You can find them on our website [www.mgt.co.com](http://www.mgt.co.com).