

B2D40065HC

650V ▲ 2x20A ▲ SiC SCHOTTKY DIODE

SILICON CARBIDE SiC SCHOTTKY DIODE ▲ THT type

Common cathode circuit configuration

Easy paralleling due to positive V_F temperature coefficient

TO-247-3L package ▲ Epoxy meets UL94-V0

Temperature independent switching

Ultra-low forward voltage and high surge current



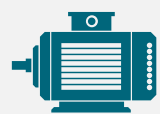




SPECIFICATION

Item ($T_C = 25^\circ\text{C}$, unless otherwise noted)		Characteristics
Operating Temperature Range	T_J	-55°C to $+175^\circ\text{C}$
Storage Temperature Range	T_S	-55°C to $+175^\circ\text{C}$
Repetitive Peak Reverse Voltage	V_{RRM}	650V
Continuous Forward Current at $T_C = 155^\circ\text{C}$ ^{Note 1}	I_F	20A
Continuous Forward Current at $T_C = 155^\circ\text{C}$ ^{Note 2}	I_F	40A
Total Capacitive Charge ($T_J = 25^\circ\text{C}$) ^{Note 2}	Q_C	128nC
Diode Forward Voltage ($T_J = 175^\circ\text{C}$, $I_F = 20\text{A}$) ^{Note 1}	V_F	1.63V
Power Dissipation ^{Note 1}	P_{TOT}	252W

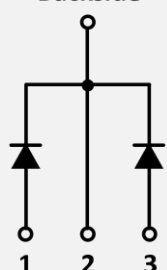
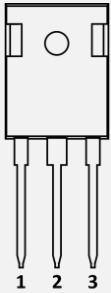
Notes

- 1: Per leg
2: Per device

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>3</p>	<p>Anode Diode 1</p> <p>Common Cathode (Backside)</p> <p>Anode Diode 2</p>

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

Item	Condition	Symbol		Unit
Repetitive Peak Reverse Voltage		V_{RRM}	650	V
Non-Repetitive Peak Reverse Voltage		V_{RSM}	650	V
Continuous Forward Current	$T_C = 25^\circ\text{C}$	I_F	68 ^{Note 1} / 136 ^{Note 2}	A
Continuous Forward Current	$T_C = 155^\circ\text{C}$	I_F	20 ^{Note 1} / 40 ^{Note 2}	A
Non-Repetitive Forward Surge Current	$T_C = 25^\circ\text{C}$, $t_p = 10\text{ms}$, Half Sine Wave	I_{FSM}	160 ^{Note 1}	A
I^2t Value	$T_C = 25^\circ\text{C}$, $t_p = 10\text{ms}$	$\int i^2 dt$	128 ^{Note 1}	A^2s
Power Dissipation	$T_C = 25^\circ\text{C}$	P_{TOT}	252 ^{Note 1}	W
Power Dissipation	$T_C = 110^\circ\text{C}$	P_{TOT}	109 ^{Note 1}	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

Notes

- 1: Per leg
2: Per device

ELECTRICAL CHARACTERISTICS ▲ PER LEG

Item	Condition	Symbol	Min.	Typ.	Max.	Unit
Static Characteristics						
DC Blocking Voltage	$T_J = 25^\circ\text{C}$	V_{DC}	650			V
Diode Forward Voltage	$I_F = 20\text{A}$, $T_J = 25^\circ\text{C}$	V_F		1.28	1.60	V
Diode Forward Voltage	$I_F = 20\text{A}$, $T_J = 175^\circ\text{C}$	V_F		1.63	2.70	V
Reverse Current	$V_R = 650\text{V}$, $T_J = 25^\circ\text{C}$	I_R		1	48	μA
Reverse Current	$V_R = 650\text{V}$, $T_J = 175^\circ\text{C}$	I_R		20	200	μA

Item	Condition	Symbol	Min.	Typ.	Max.	Unit
Dynamic Characteristics						
Total Capacitive Charge	$V_R = 400\text{V}$, $T_J = 25^\circ\text{C}$ $Q_C = \int_0^{V_R} C(V) dV$	Q_C		64		nC
Total Capacitance	$V_R = 1\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$	C		998		pF
Total Capacitance	$V_R = 300\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$	C		110		pF
Total Capacitance	$V_R = 600\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$	C		109		pF
Capacitance Stored Energy	$V_R = 400\text{V}$, $T_J = 25^\circ\text{C}$	E_C		16		μJ

THERMAL RESISTANCE PERFORMANCE

Item	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case, per Leg	$R_{\theta,JC}$		0.59		K/W
Thermal Resistance, Junction to Case, per Device	$R_{\theta,JC}$		0.30		K/W

REFERENCE DATA ▲ TYPICAL PERFORMANCE PER LEG

Fig. 1 • Typical Forward Characteristics I_F vs. V_F

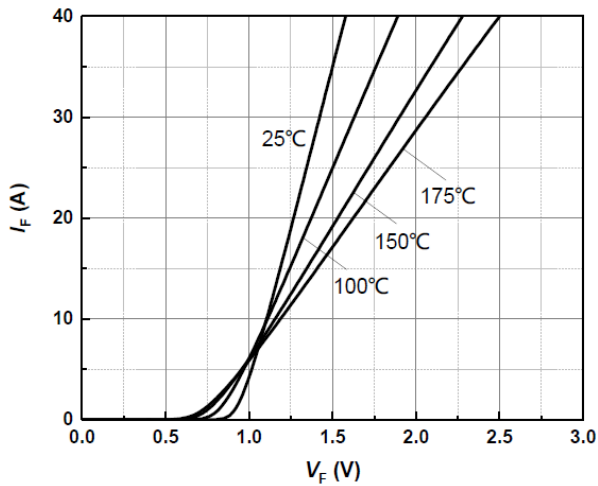


Fig. 2 • Typical Reverse Current I_R as function of Reverse Voltage V_R

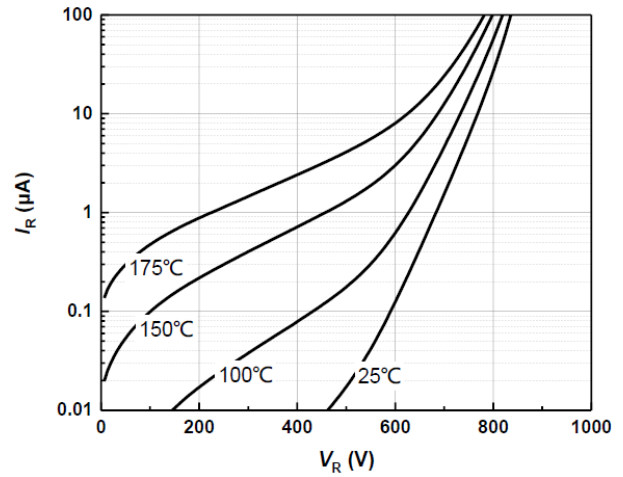


Fig. 3 • Diode Forward Current I_F as function of Case Temperature T_C ($D = \text{Duty Cycle}$)

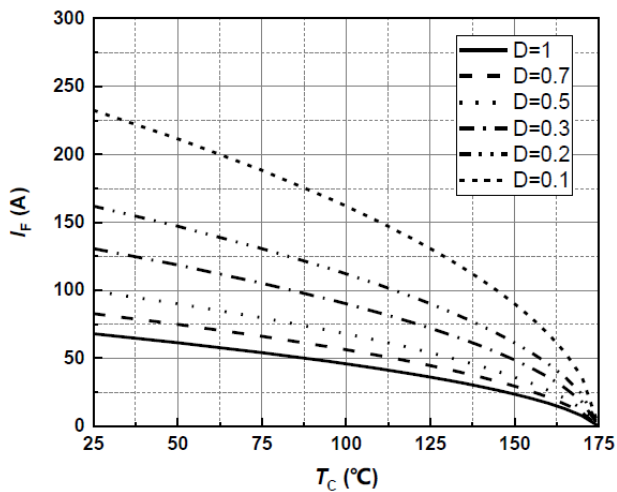


Fig. 4 • Typical Capacitance C as function of Reverse Voltage V_R , $C = f(V_R)$, $T_J = 25^\circ\text{C}$, $f = 1\text{MHz}$

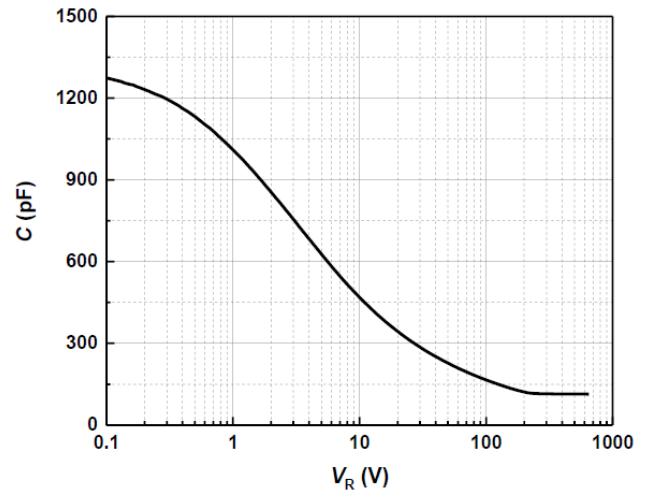


Fig. 5 • Typical Reverse Charge Q_C as function of Reverse Voltage V_R

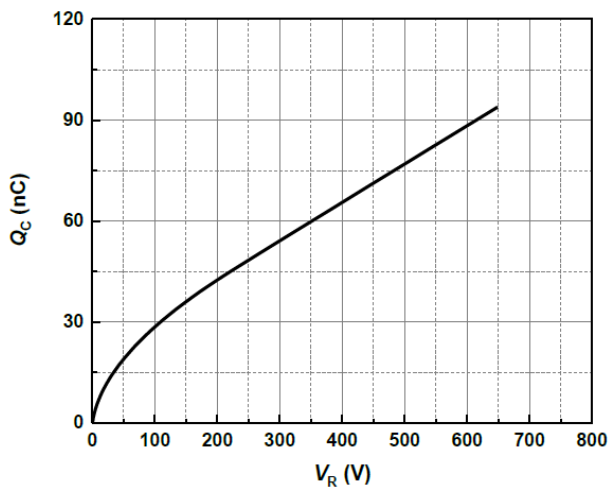
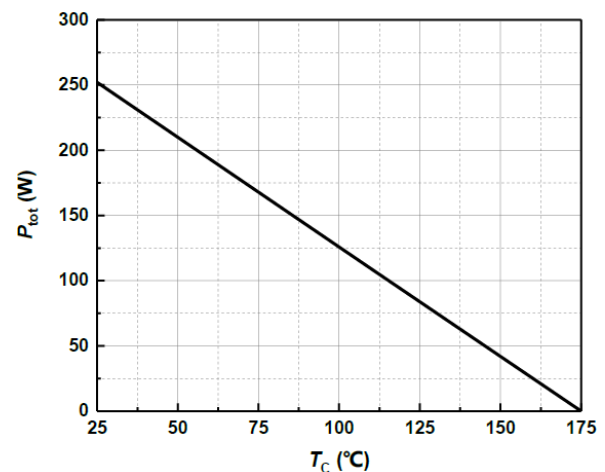


Fig. 6 • Power Dissipation P_{TOT} as function of Case Temperature T_C



REFERENCE DATA ▲ TYPICAL PERFORMANCE PER LEG

Fig. 7 • Capacitance Stored Energy

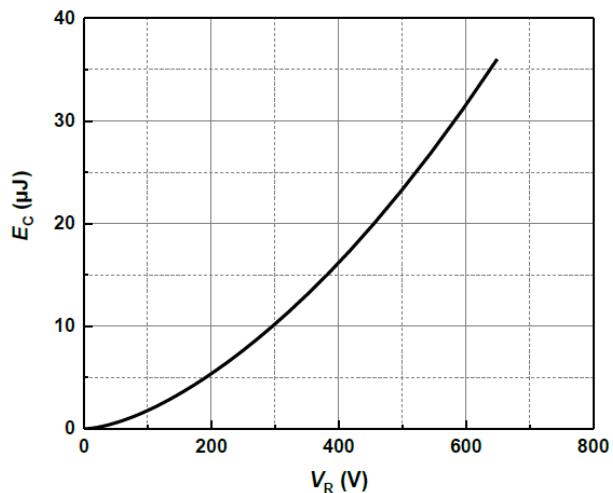
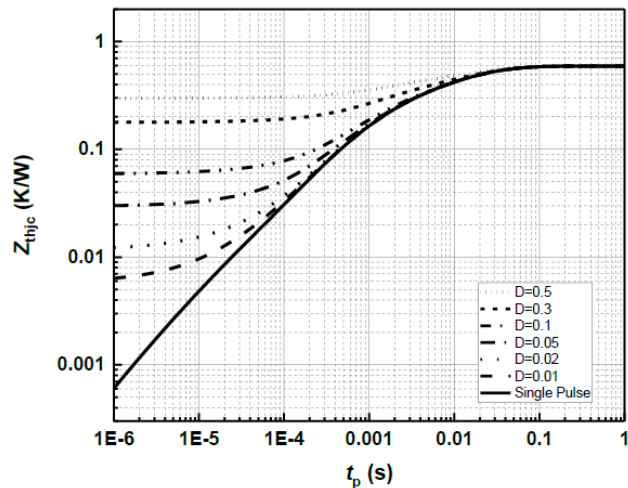
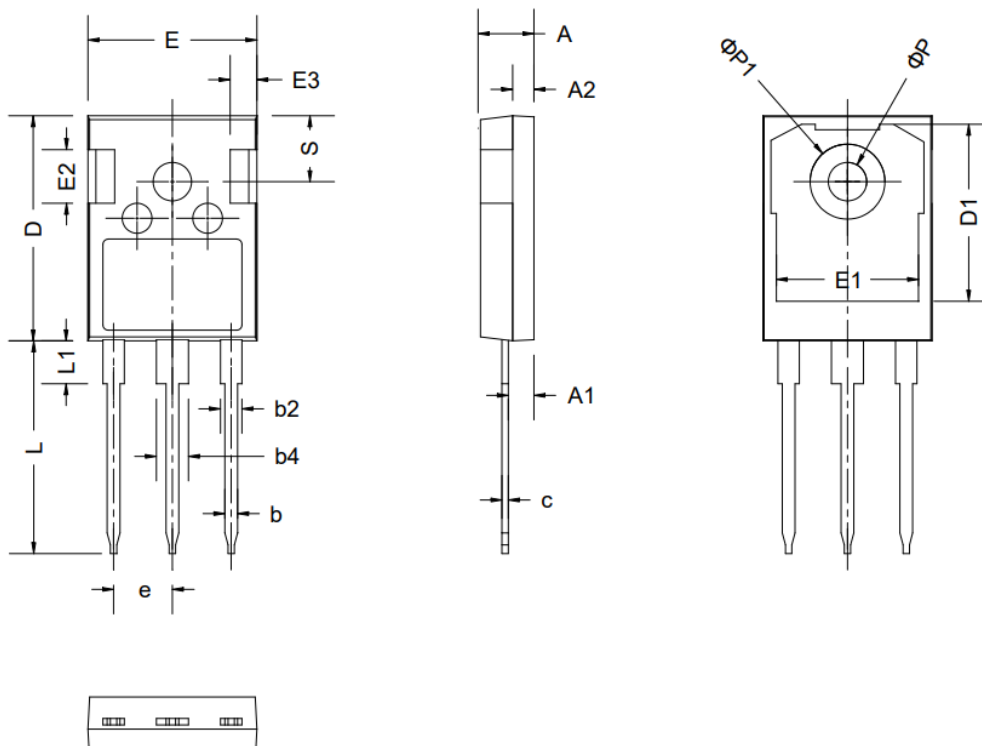


Fig. 8 • Maximum Transient Thermal Impedance, $Z_{thjc} = f(t)$, Parameter: $D = t/T$



PACKAGE OUTLINE



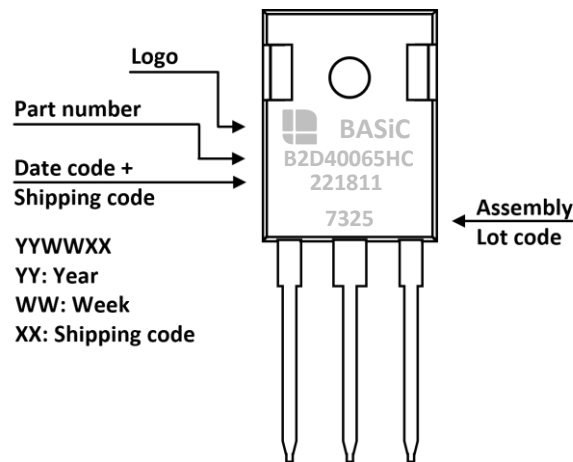
Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.80	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10

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	5.44 BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
ØP	3.40	3.60	3.80
ØP1	-	-	7.30
S	6.16 BSC		

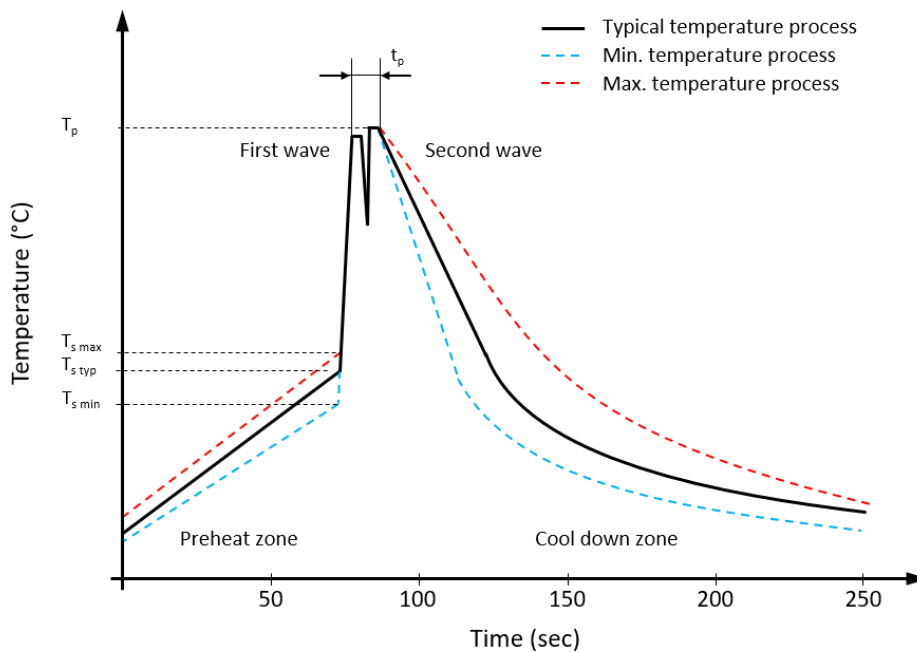
ORDERING INFORMATION

Part Number	Package	Packing	Tube Qty.	Inner Box Qty.	Outer Box Qty.
B2D40065HC	TO-247-3L	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 date 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

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.