

B2D40120HC1

1200V ▲ 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



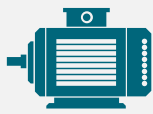




SPECIFICATION

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}	1200V
Continuous Forward Current at $T_C = 150^\circ\text{C}$ ^{Note 1}	I_F	20A
Continuous Forward Current at $T_C = 150^\circ\text{C}$ ^{Note 2}	I_F	40A
Total Capacitive Charge ($T_J = 25^\circ\text{C}$) ^{Note 2}	Q_C	240nC
Diode Forward Voltage ($T_J = 175^\circ\text{C}$, $I_F = 20\text{A}$) ^{Note 1}	V_F	1.92V
Power Dissipation ^{Note 1}	P_{TOT}	259W

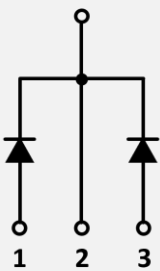
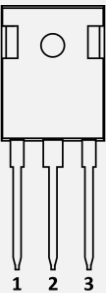
Notes

- 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}	1200	V
Non-Repetitive Peak Reverse Voltage		V_{RSM}	1200	V
Continuous Forward Current	$T_C = 25^\circ\text{C}$	I_F	60 ^{Note 1} / 120 ^{Note 2}	A
Continuous Forward Current	$T_C = 150^\circ\text{C}$	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}	180 ^{Note 1}	A
I^2t Value	$T_C = 25^\circ\text{C}$, $t_p = 10\text{ms}$	$\int i^2 dt$	162 ^{Note 1}	A^2s
Power Dissipation	$T_C = 25^\circ\text{C}$	P_{TOT}	259 ^{Note 1}	W
Power Dissipation	$T_C = 110^\circ\text{C}$	P_{TOT}	112 ^{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}	1200			V
Diode Forward Voltage	$I_F = 20\text{A}$, $T_J = 25^\circ\text{C}$	V_F		1.36	1.60	V
Diode Forward Voltage	$I_F = 20\text{A}$, $T_J = 175^\circ\text{C}$	V_F		1.92	2.90	V
Reverse Current	$V_R = 1200\text{V}$, $T_J = 25^\circ\text{C}$	I_R		5	160	μA
Reverse Current	$V_R = 1200\text{V}$, $T_J = 175^\circ\text{C}$	I_R		30	300	μA

Item	Condition	Symbol	Min.	Typ.	Max.	Unit
Dynamic Characteristics						
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		120		nC
Total Capacitance	$V_R = 1\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$	C		1408		pF
Total Capacitance	$V_R = 400\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$	C		112		pF
Total Capacitance	$V_R = 800\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$	C		82		pF
Capacitance Stored Energy	$V_R = 800\text{V}$, $T_J = 25^\circ\text{C}$	E_C		62		μJ

THERMAL RESISTANCE PERFORMANCE

Item	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case, per Leg	$R_{\theta,JC}$		0.580		K/W
Thermal Resistance, Junction to Case, per Device	$R_{\theta,JC}$		0.280		K/W

REFERENCE DATA ▲ TYPICAL PERFORMANCE PER LEG

Fig. 1 • Typical Forward Characteristics I_F vs. V_F

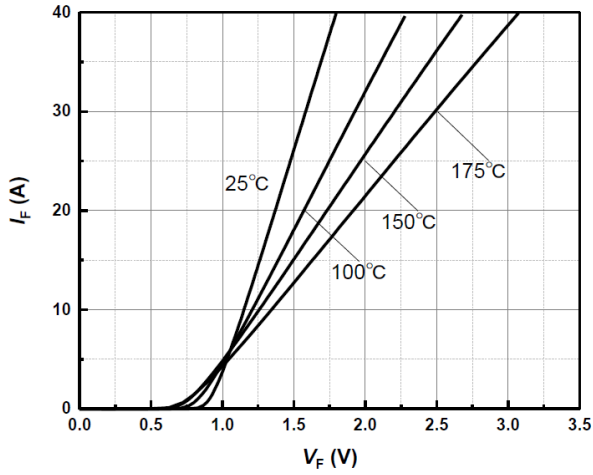


Fig. 2 • Typical Reverse Current I_R as function of Reverse Voltage V_R

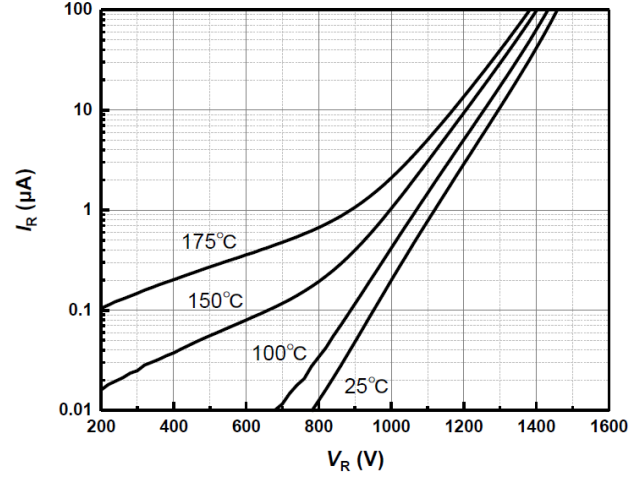


Fig. 3 • Diode Forward Current I_F as function of Case Temperature T_C ($D = \text{Duty Cycle}$)

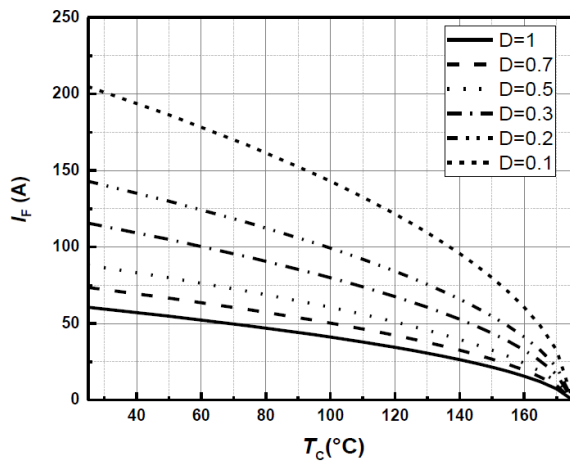


Fig. 4 • Typical Capacitance C as function of Reverse Voltage V_R , $C = f(V_R)$, $T_J = 25^\circ\text{C}$, $f = 1\text{MHz}$

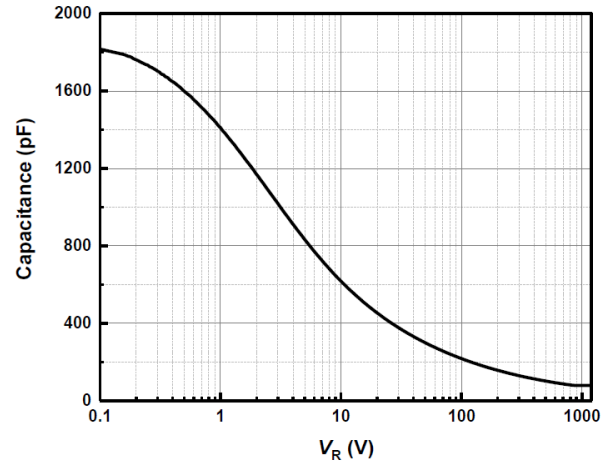


Fig. 5 • Typical Reverse Charge Q_C as function of Reverse Voltage V_R

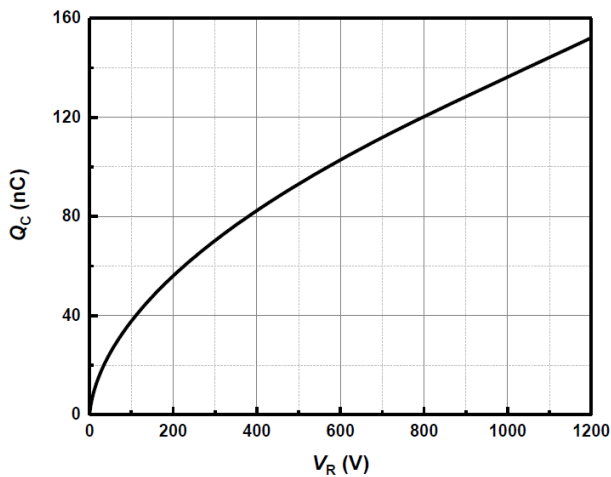
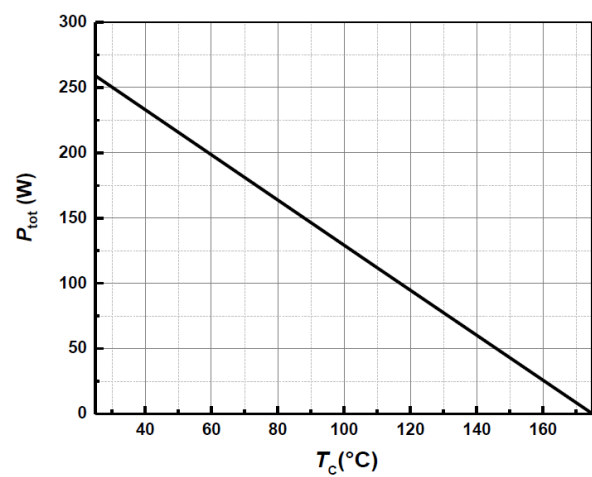


Fig. 6 • Power Dissipation P_{TOT} as function of Case Temperature T_C



REFERENCE DATA ▲ TYPICAL PERFORMANCE PER LEG

Fig. 7 • Capacitance Stored Energy

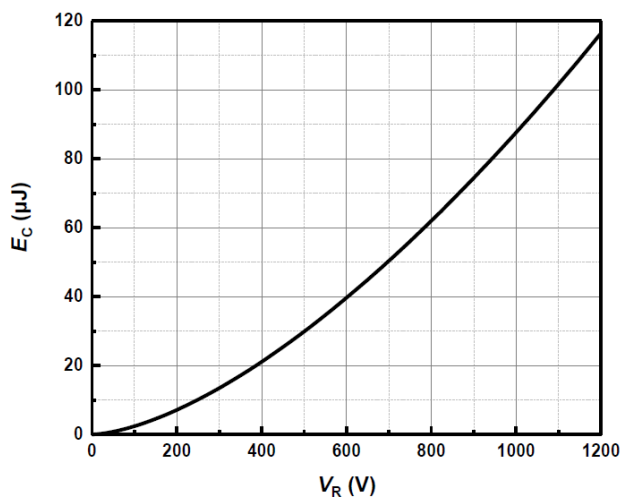
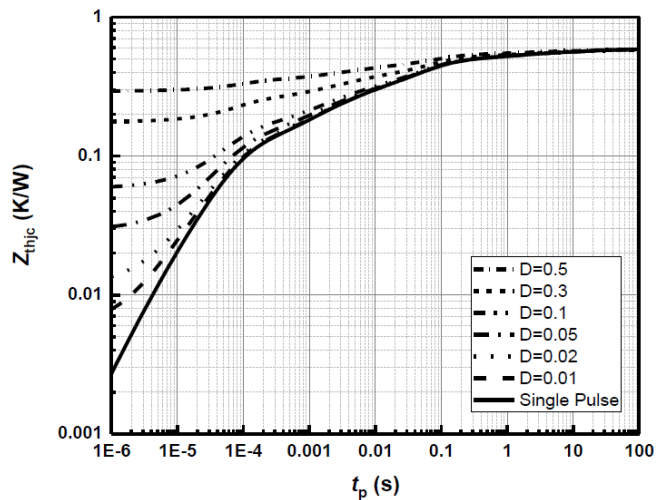
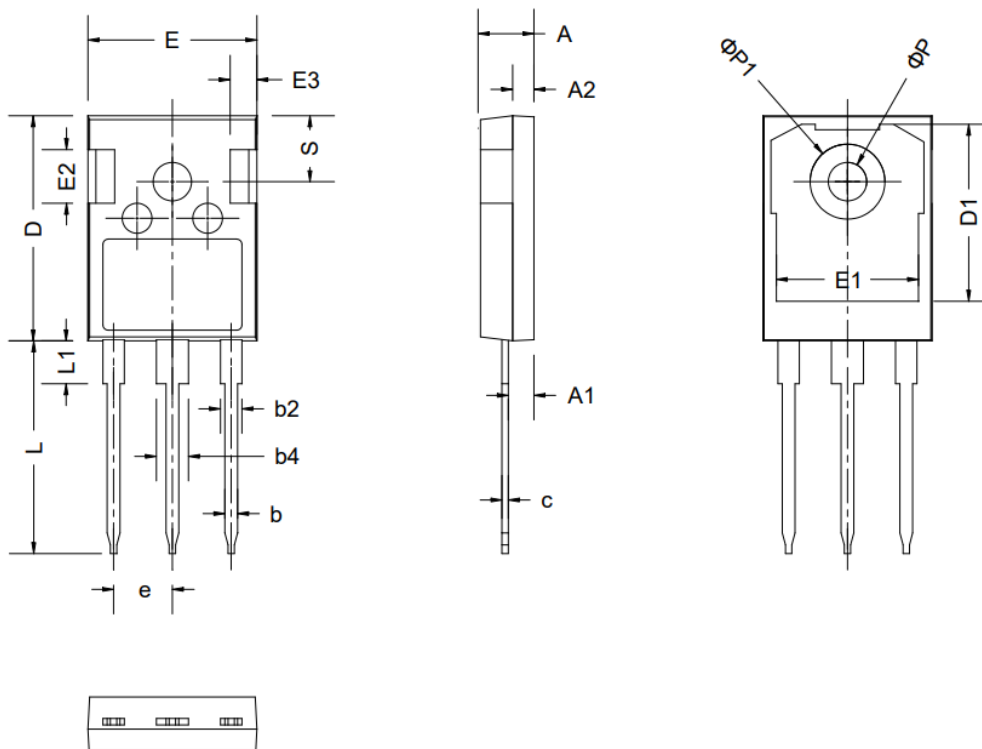


Fig. 8 • Maximum Transient Thermal Impedance, $Z_{thjc} = f(t)$, Parameter: $D = t/T$



PACKAGE OUTLINE



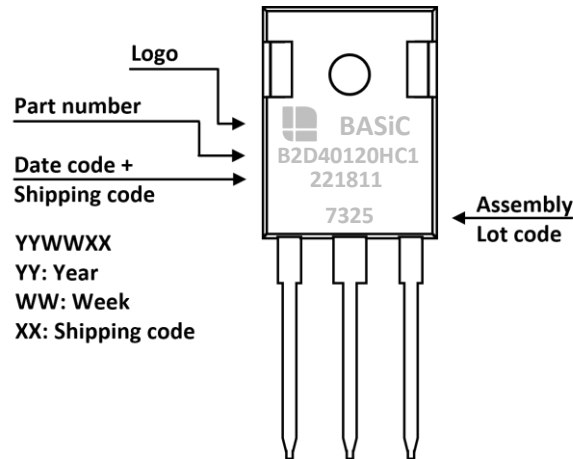
Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.80	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10

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
ϕP	3.40	3.60	3.80
$\phi P1$	-	-	7.30
S	6.16 BSC		

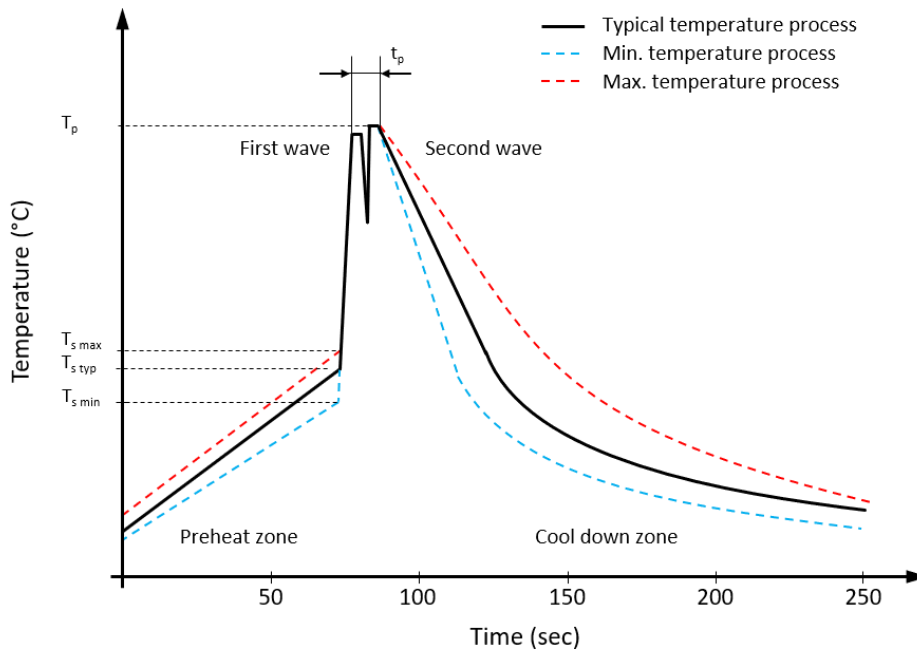
ORDERING INFORMATION

Part Number	Package	Packing	Tube Qty.	Inner Box Qty.	Outer Box Qty.
B2D40120HC1	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

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