

B1D02120K

1200V ▲ 2A ▲ SiC SCHOTTKY DIODE

SILICON CARBIDE SiC SCHOTTKY DIODE ▲ THT type

Excellent surge capability

Easy paralleling due to positive V_F temperature coefficient

TO-220-2L 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°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 $T_C = 165^\circ\text{C}$	I_F	2A
Total Capacitive Charge ($T_J = 25^\circ\text{C}$)	Q_C	12nC
Capacitance Stored Energy ($V_R = 800\text{V}$)	E_C	$6.3\mu\text{J}$
Diode Forward Voltage ($T_J = 175^\circ\text{C}$, $I_F = 2\text{A}$)	V_F	1.9V
Power Dissipation	P_{TOT}	77W

APPLICATIONS

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

PIN DESCRIPTION

Circuit Diagram	Outline - Front View	Pin No.	Description
		1 2	Cathode (Case Backside) Anode

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	11	A
Continuous Forward Current	$T_C = 165^\circ\text{C}$	I_F	2	A
Non-Repetitive Forward Surge Current	$T_C = 25^\circ\text{C}$, $t_p = 10\text{ms}$, Half Sine Wave	I_{FSM}	16	A
I^2t Value	$T_C = 25^\circ\text{C}$, $t_p = 10\text{ms}$	$\int i^2 dt$	1.28	A^2s
Power Dissipation	$T_C = 25^\circ\text{C}$	P_{TOT}	77	W
Power Dissipation	$T_C = 110^\circ\text{C}$	P_{TOT}	33	W
Operating Junction Temperature		T_J	-55 to +175	$^\circ\text{C}$
Storage Temperature Range		T_{STG}	-55 to +175	$^\circ\text{C}$
TO-220 Mounting Torque	M3 Screw		0.7	Nm

ELECTRICAL CHARACTERISTICS

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	$I_F = 2\text{A}$, $T_J = 25^\circ\text{C}$	V_F		1.42		V
Diode Forward Voltage	$I_F = 2\text{A}$, $T_J = 175^\circ\text{C}$	V_F		1.90		V
Reverse Current	$V_R = 1200\text{V}$, $T_J = 25^\circ\text{C}$	I_R		1		μA
Reverse Current	$V_R = 1200\text{V}$, $T_J = 175^\circ\text{C}$	I_R		20		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		12		nC
Total Capacitance	$V_R = 1\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$	C		132		pF
Total Capacitance	$V_R = 400\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$	C		11.8		pF
Total Capacitance	$V_R = 800\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$	C		8.9		pF
Capacitance Stored Energy	$V_R = 800\text{V}$, $T_J = 25^\circ\text{C}$	E_C		6.3		μJ

THERMAL RESISTANCE PERFORMANCE

Item	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case	$R_{\theta,JC}$		1.946		K/W

REFERENCE DATA ▲ TYPICAL PERFORMANCE

Fig. 1 • Typical Forward Characteristics I_F vs. V_F

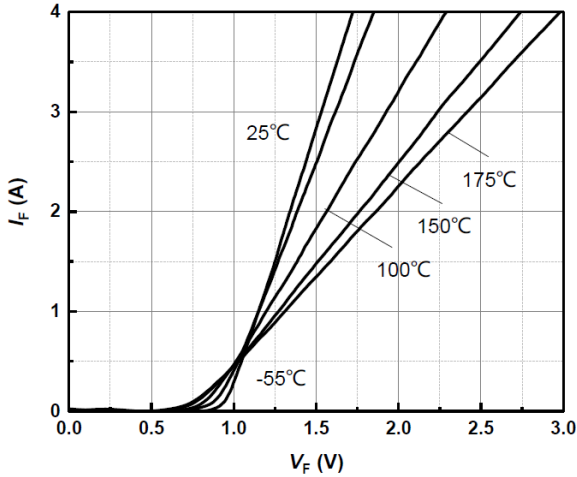


Fig. 2 • Typical Reverse Current I_R as function of Reverse Voltage V_R

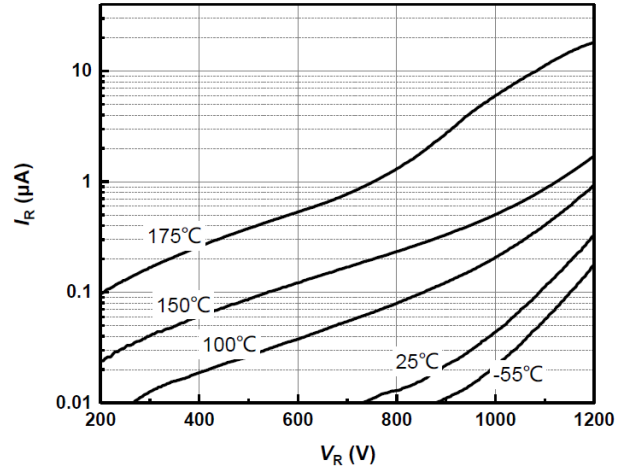


Fig. 3 • Diode Forward Current I_F as function of Case Temperature T_C ($D = \text{Duty Cycle}$)

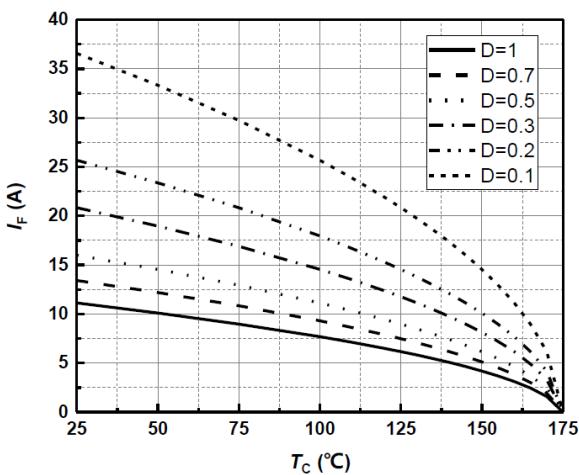


Fig. 4 • Typical Capacitance C as function of Reverse Voltage V_R , $C = f(V_R)$, $T_J = 25^\circ\text{C}$, $f = 1\text{MHz}$

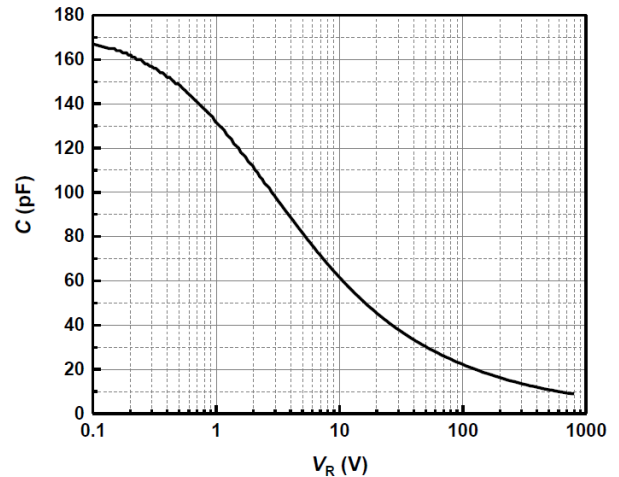


Fig. 5 • Typical Reverse Charge Q_C as function of Reverse Voltage V_R

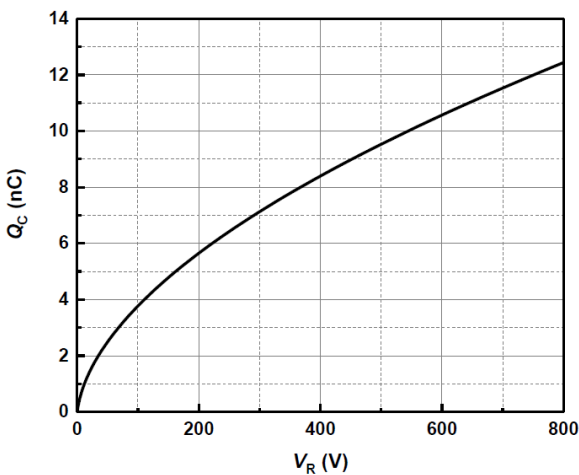
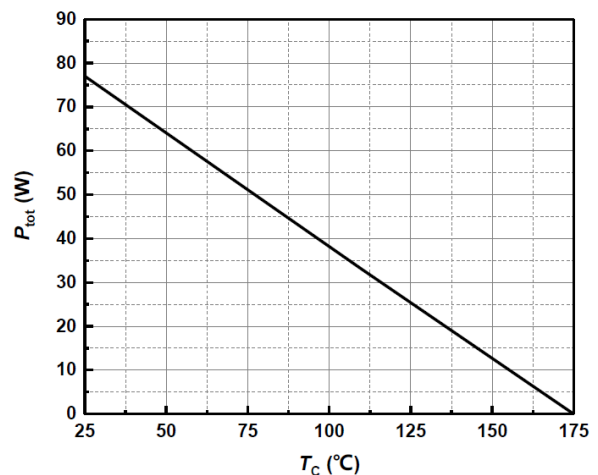


Fig. 6 • Power Dissipation P_{TOT} as function of Case Temperature T_C



REFERENCE DATA ▲ TYPICAL PERFORMANCE

Fig. 7 - Capacitance Stored Energy

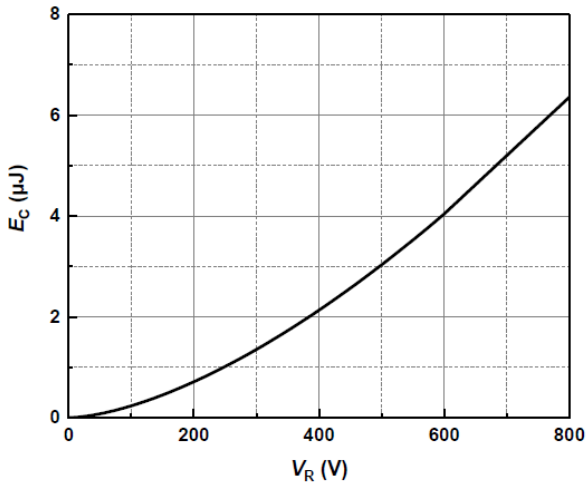
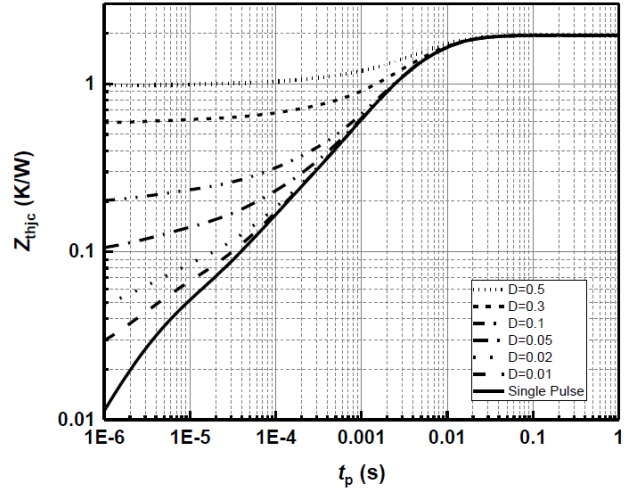
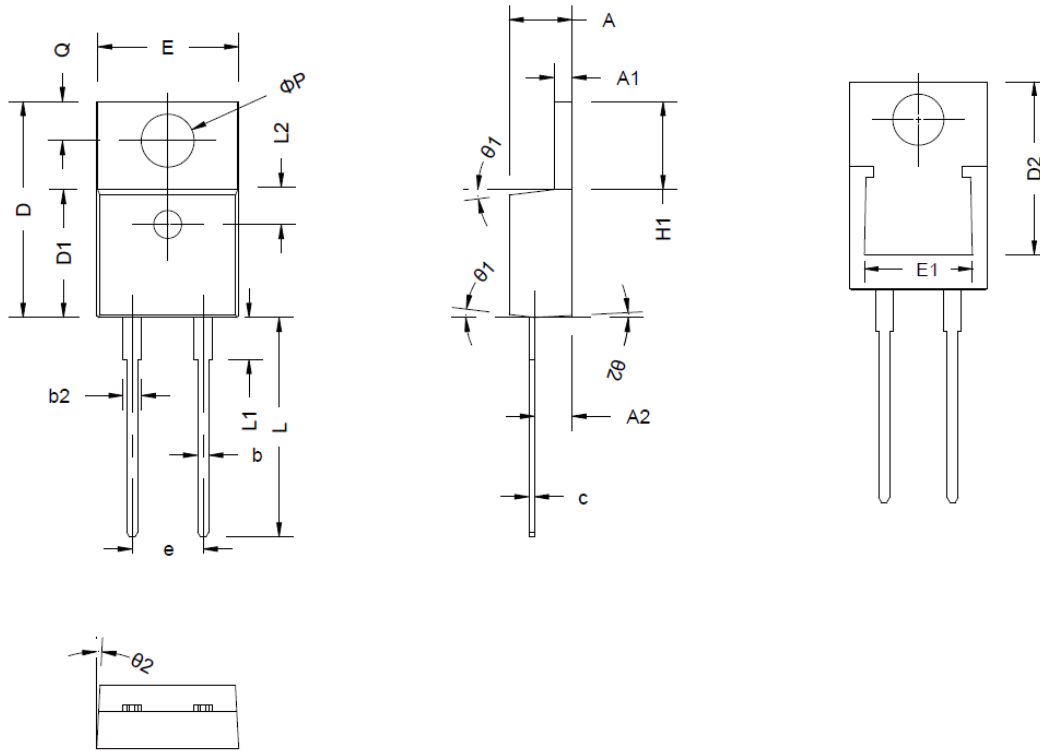


Fig. 8 - Maximum Transient Thermal Impedance, $Z_{thjc} = f(t)$, Parameter: $D = t/T$



PACKAGE OUTLINE


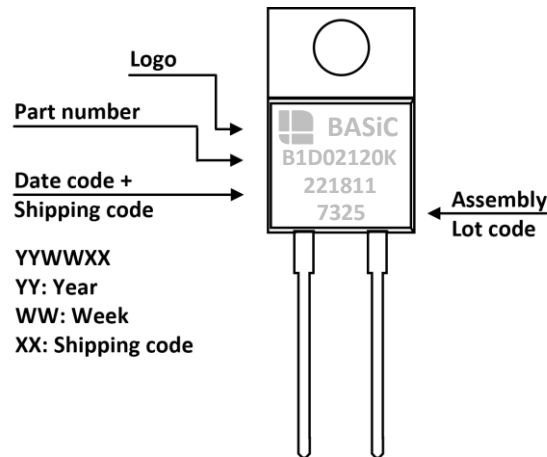
Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
A	4.37	4.57	4.77
A1	1.22	-	1.40
A2	2.49	2.69	2.89
b	0.75	-	0.96
b2	1.22	-	1.47
c	0.30	-	0.48
D	15.15	15.45	15.75
D1	9.05	9.15	9.25
D2	11.40	-	12.88
E	9.86	10.16	10.36

Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
E1	6.86	-	8.89
e	4.98	5.08	5.18
H1	6.10	6.30	6.50
L	12.70	-	13.70
L1	-	-	4.10
L2	2.50 REF		
ØP	3.70	3.84	3.99
Q	2.54	-	2.94
θ 1	5°	7°	9°
θ 2	1°	3°	5°

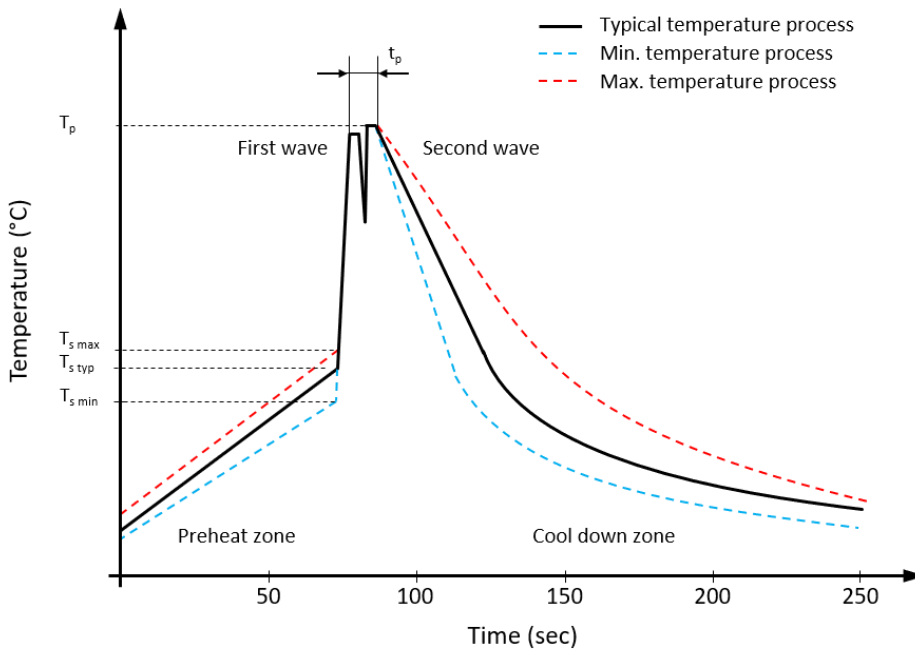
ORDERING INFORMATION

Part Number	Package	Packing	Tube Qty.	Inner Box Qty.	Outer Box Qty.
B1D02120K	TO-220-2L	Tube	50pcs	500pcs	5,000pcs

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	$T_{s \text{ typ}}$	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

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