

# B2D10065K1

650V ▲ 10A ▲ 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



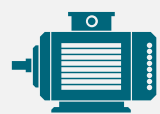




Temperature independent switching

Ultra-low forward voltage and high surge current

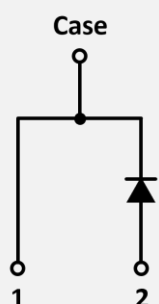
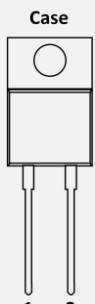
## SPECIFICATION

Item ( $T_C = 25^\circ\text{C}$ , unless otherwise noted)		Characteristics
Operating Temperature Range	$T_J$	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
Storage Temperature Range	$T_S$	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
Repetitive Peak Reverse Voltage	$V_{RRM}$	650V
Continuous Forward Current at $T_C = 150^\circ\text{C}$	$I_F$	10A
Total Capacitive Charge ( $T_J = 25^\circ\text{C}$ )	$Q_C$	29nC
Capacitance Stored Energy ( $V_R = 400\text{V}$ )	$E_C$	7μJ
Diode Forward Voltage ( $T_J = 175^\circ\text{C}$ , $I_F = 10\text{A}$ )	$V_F$	1.7V
Power Dissipation	$P_{TOT}$	144W

## 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		$V_{RRM}$	650	V
Non-Repetitive Peak Reverse Voltage		$V_{RSM}$	650	V
Continuous Forward Current	$T_C = 25^\circ\text{C}$	$I_F$	34	A
Continuous Forward Current	$T_C = 150^\circ\text{C}$	$I_F$	10	A
Non-Repetitive Forward Surge Current	$T_C = 25^\circ\text{C}$ , $t_p = 10\text{ms}$ , Half Sine Wave	$I_{FSM}$	85	A
$I^2t$ Value	$T_C = 25^\circ\text{C}$ , $t_p = 10\text{ms}$	$\int i^2 dt$	36	$\text{A}^2\text{s}$
Power Dissipation	$T_C = 25^\circ\text{C}$	$P_{TOT}$	144	W
Power Dissipation	$T_C = 110^\circ\text{C}$	$P_{TOT}$	62	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

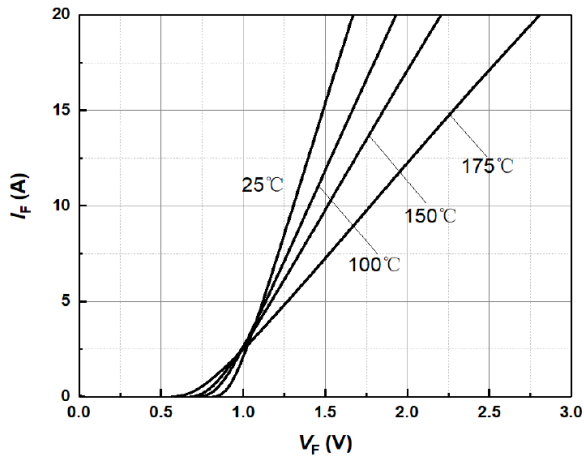
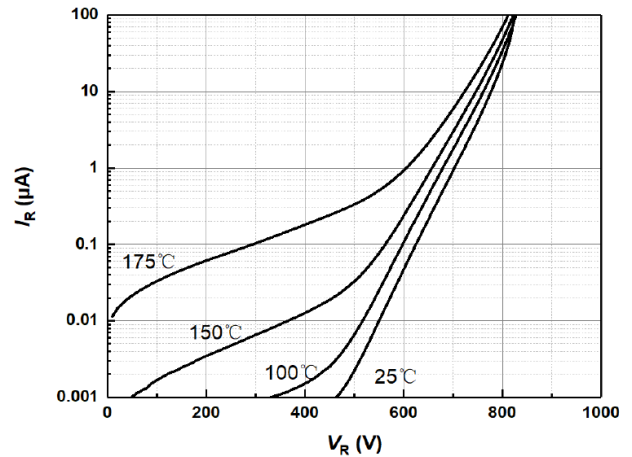
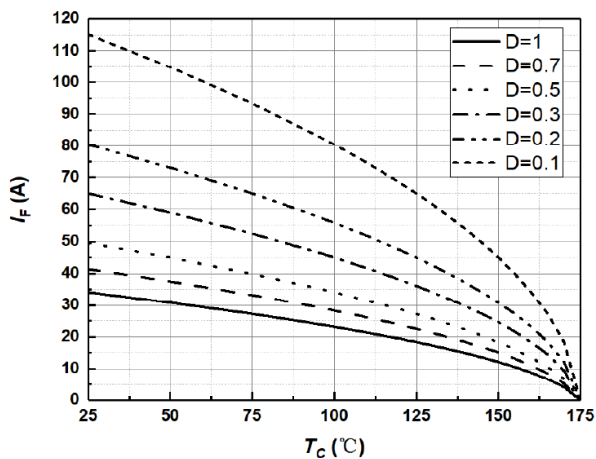
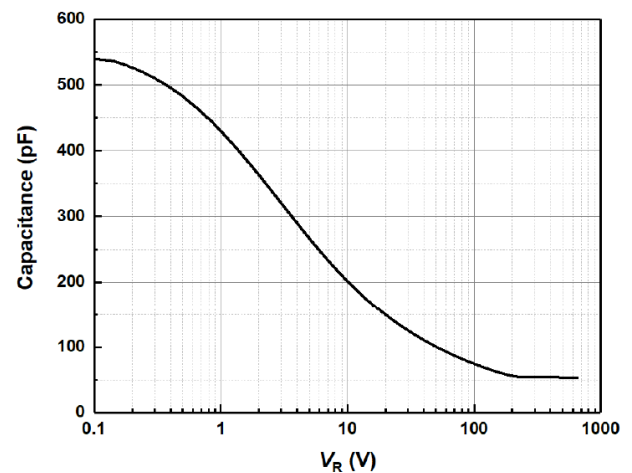
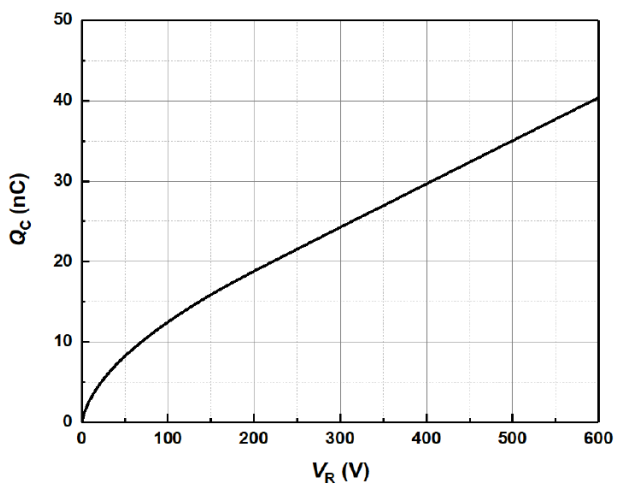
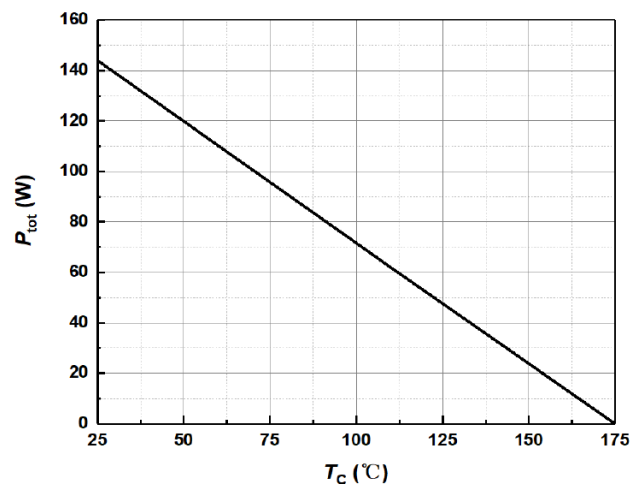
Item	Condition	Symbol	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
DC Blocking Voltage	$T_J = 25^\circ\text{C}$	$V_{DC}$	650			V
Diode Forward Voltage	$I_F = 10\text{A}$ , $T_J = 25^\circ\text{C}$	$V_F$		1.31	1.50	V
Diode Forward Voltage	$I_F = 10\text{A}$ , $T_J = 175^\circ\text{C}$	$V_F$		1.70	2.40	V
Reverse Current	$V_R = 650\text{V}$ , $T_J = 25^\circ\text{C}$	$I_R$		1	70	$\mu\text{A}$
Reverse Current	$V_R = 650\text{V}$ , $T_J = 175^\circ\text{C}$	$I_R$		20	200	$\mu\text{A}$

Item	Condition	Symbol	Min.	Typ.	Max.	Unit
<b>Dynamic Characteristics</b>						
Total Capacitive Charge	$V_R = 400\text{V}$ , $T_J = 25^\circ\text{C}$ $Q_C = \int_0^{V_R} C(V) dV$	$Q_C$		29		nC
Total Capacitance	$V_R = 1\text{V}$ , $f = 1\text{MHz}$ , $T_J = 25^\circ\text{C}$	$C$		429		pF
Total Capacitance	$V_R = 300\text{V}$ , $f = 1\text{MHz}$ , $T_J = 25^\circ\text{C}$	$C$		54		pF
Total Capacitance	$V_R = 600\text{V}$ , $f = 1\text{MHz}$ , $T_J = 25^\circ\text{C}$	$C$		53		pF
Capacitance Stored Energy	$V_R = 400\text{V}$ , $T_J = 25^\circ\text{C}$	$E_C$		7		$\mu\text{J}$

## THERMAL RESISTANCE PERFORMANCE

Item	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$		1.039		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

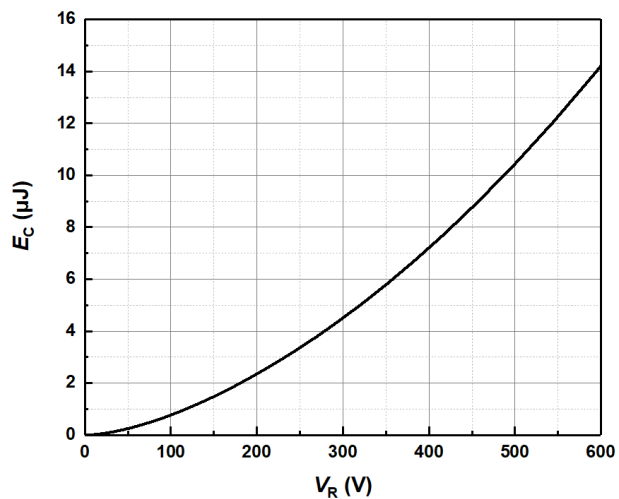
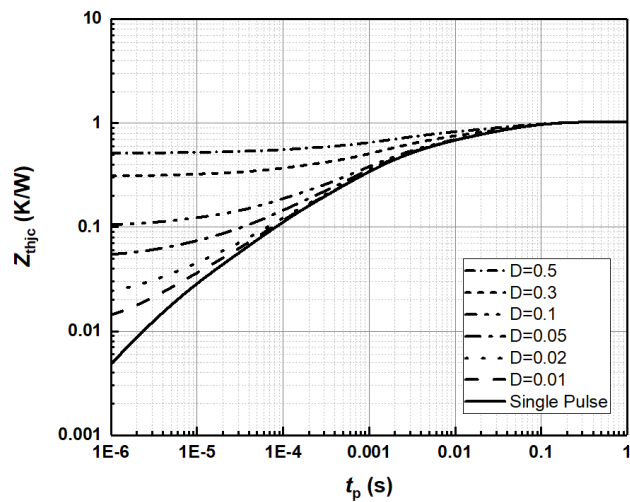
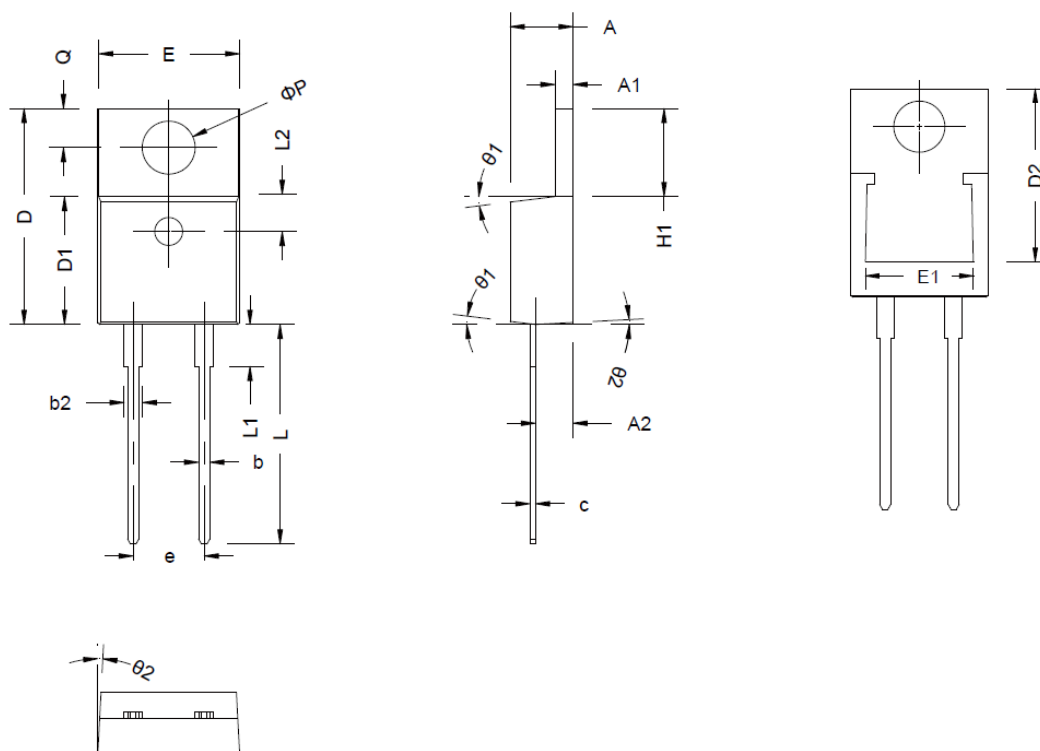


Fig. 8 • Maximum Transient Thermal Impedance,  $Z_{thjc} = f(t)$ , Parameter:  $D = t/T$



## PACKAGE OUTLINE



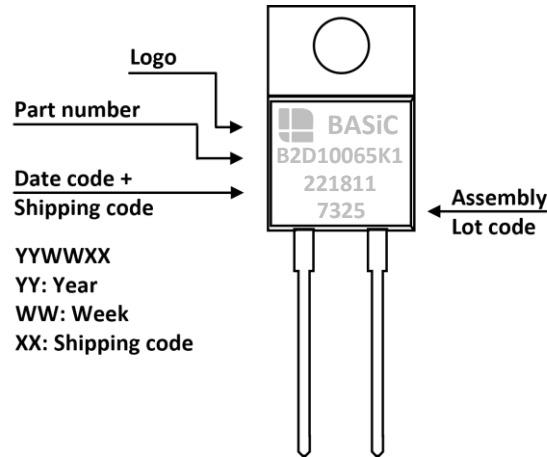
Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
A	4.37	4.57	4.77
A1	1.22	-	1.40
A2	2.49	2.69	2.89
b	0.75	-	0.96
b2	1.22	-	1.47
c	0.30	-	0.48
D	15.15	15.45	15.75
D1	9.05	9.15	9.25
D2	11.40	-	12.88
E	9.86	10.16	10.36

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°

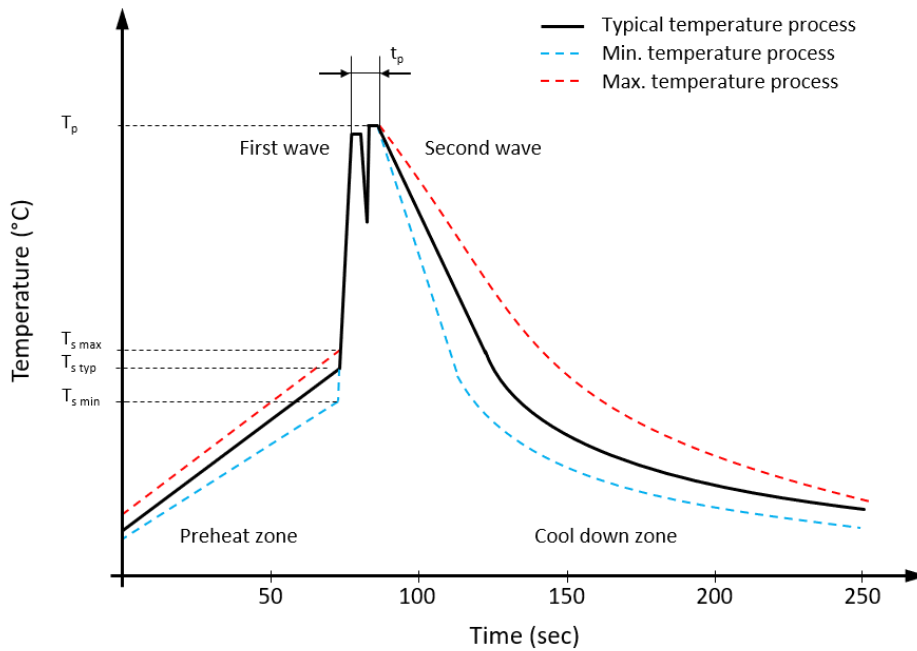
## ORDERING INFORMATION

Part Number	Package	Packing	Tube Qty.	Inner Box Qty.	Outer Box Qty.
B2D10065K1	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	$T_{s\ typ}$	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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