

# B2D10065KS

650V ▲ 10A ▲ SiC SCHOTTKY DIODE

SILICON CARBIDE SiC SCHOTTKY DIODE ▲ THT type

Excellent surge capability

Easy paralleling due to positive  $V_F$  temperature coefficient

Temperature independent switching



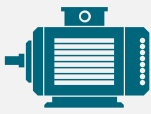




Ultra-low forward voltage and high surge current

TO-220 ISO-2L ceramic package ▲ 2.5kV isolation voltage

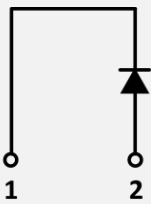
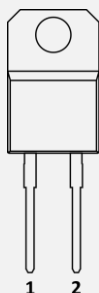
## SPECIFICATION

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 ( $V_R = 400\text{V}$ )	$E_C$	7.5μJ
Diode Forward Voltage ( $T_J = 175^\circ\text{C}$ , $I_F = 10\text{A}$ )	$V_F$	1.7V
Power Dissipation	$P_{TOT}$	109W

## 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 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	$T_C = 25^\circ\text{C}$	$I_F$	30	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	$T_C = 25^\circ\text{C}$ , $t_p = 10\text{ms}$	$\int i^2 dt$	36.12	$\text{A}^2\text{s}$
Power Dissipation	$T_C = 25^\circ\text{C}$	$P_{TOT}$	109	W
Power Dissipation	$T_C = 110^\circ\text{C}$	$P_{TOT}$	47	W
Operating Junction Temperature		$T_J$	-55 to +175	$^\circ\text{C}$
Storage Temperature Range		$T_{STG}$	-55 to +175	$^\circ\text{C}$
Isolation Voltage	AC, $t = 1\text{s}$	$V_{ISOL}$	2500	$V_{RMS}$
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	$I_F = 10\text{A}$ , $T_J = 25^\circ\text{C}$	$V_F$		1.36		V
Diode Forward Voltage	$I_F = 10\text{A}$ , $T_J = 175^\circ\text{C}$	$V_F$		1.70		V
Reverse Current	$V_R = 650\text{V}$ , $T_J = 25^\circ\text{C}$	$I_R$		1		$\mu\text{A}$
Reverse Current	$V_R = 650\text{V}$ , $T_J = 175^\circ\text{C}$	$I_R$		10		$\mu\text{A}$

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	$V_R = 1\text{V}$ , $f = 1\text{MHz}$ , $T_J = 25^\circ\text{C}$	$C$		457		pF
Total Capacitance	$V_R = 300\text{V}$ , $f = 1\text{MHz}$ , $T_J = 25^\circ\text{C}$	$C$		49.7		pF
Total Capacitance	$V_R = 600\text{V}$ , $f = 1\text{MHz}$ , $T_J = 25^\circ\text{C}$	$C$		49.3		pF
Capacitance Stored Energy	$V_R = 400\text{V}$ , $T_J = 25^\circ\text{C}$	$E_C$		7.5		$\mu\text{J}$

## THERMAL RESISTANCE PERFORMANCE

Item	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$		1.373		K/W

## REFERENCE DATA ▲ TYPICAL PERFORMANCE

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

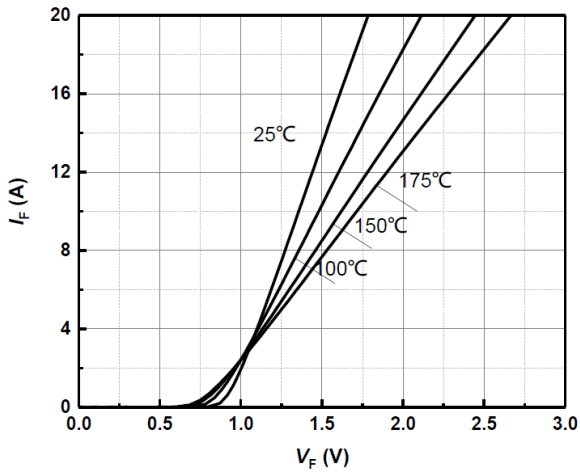


Fig. 2 • Typical Reverse Current  $I_R$  as function of Reverse Voltage  $V_R$

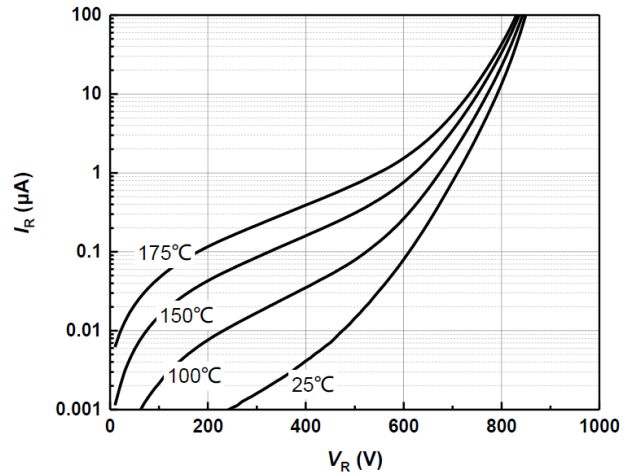


Fig. 3 • Diode Forward Current  $I_F$  as function of Case Temperature  $T_C$  (D = Duty Cycle)

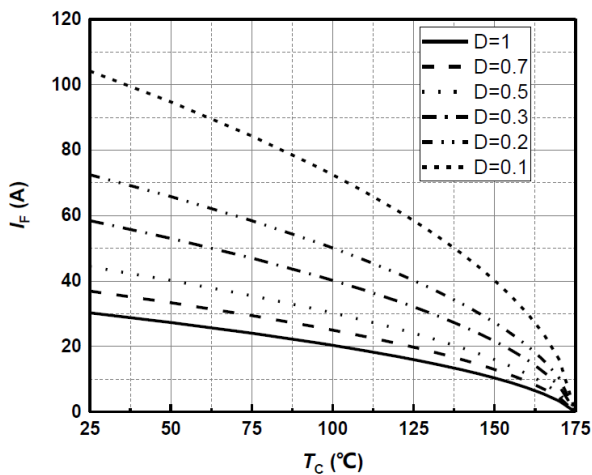


Fig. 4 • Typical Capacitance C as function of Reverse Voltage  $V_R$ ,  $C = f(V_R)$ ,  $T_J = 25^\circ\text{C}$ ,  $f = 1\text{MHz}$

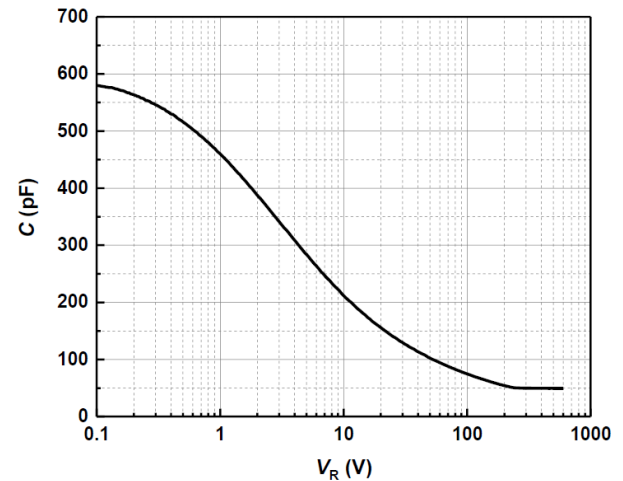


Fig. 5 • Typical Reverse Charge  $Q_C$  as function of Reverse Voltage  $V_R$

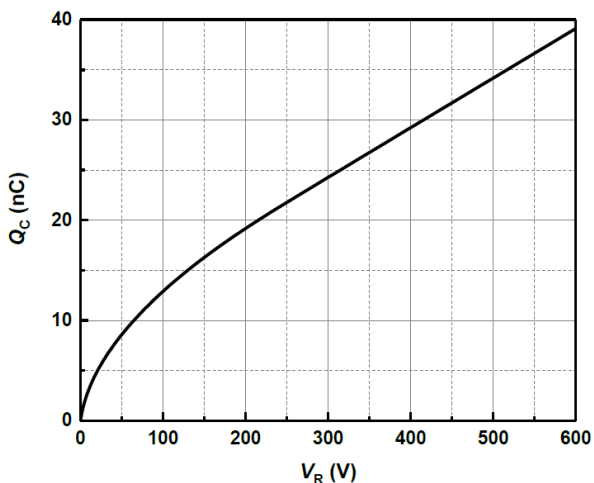
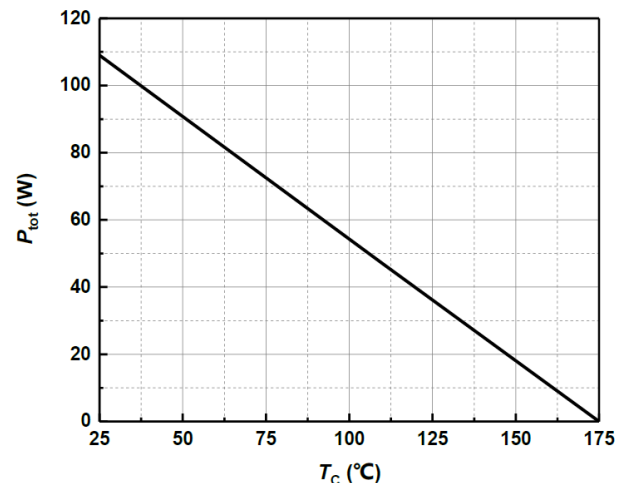


Fig. 6 • Power Dissipation  $P_{TOT}$  as function of Case Temperature  $T_C$



## REFERENCE DATA ▲ TYPICAL PERFORMANCE

Fig. 7 • Capacitance Stored Energy

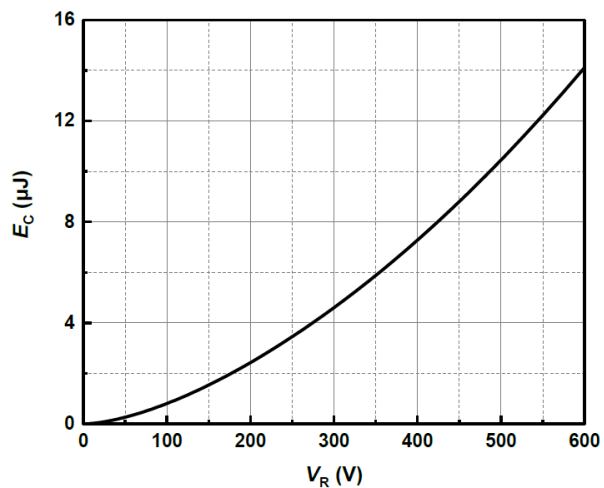
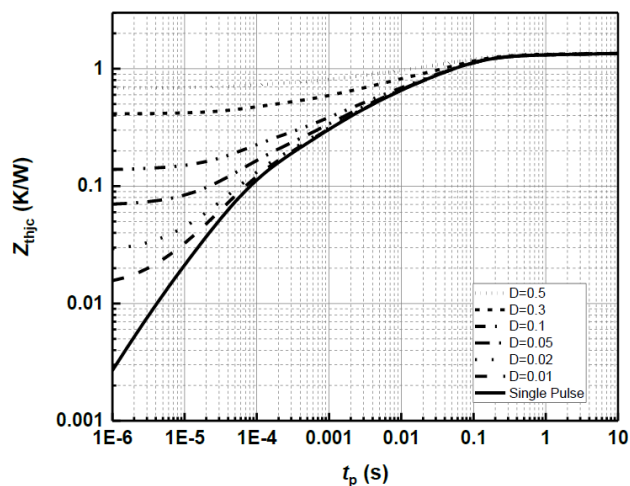
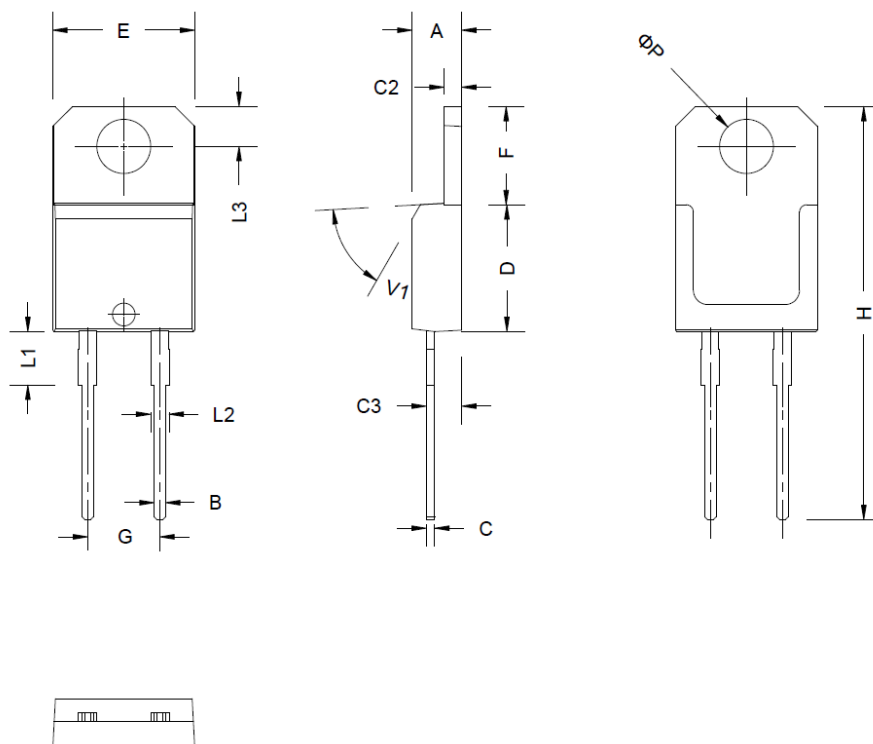


Fig. 8 • Maximum Transient Thermal Impedance,  $Z_{thjc} = f(t)$ , Parameter:  $D = t/T$



## PACKAGE OUTLINE



Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
A	4.40	4.50	4.60
B	0.61	0.75	0.88
C	0.46	0.58	0.70
C2	1.21	1.265	1.32
C3	2.40	2.56	2.72
D	8.60	9.15	9.70
E	9.80	10.10	10.40
F	6.55	6.75	6.95

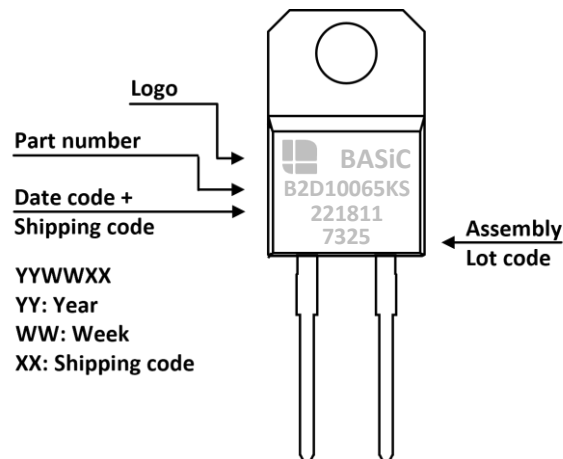
Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
G	5.08 BSC		
H	28.00	28.90	29.80
L1	-	3.75	-
L2	1.14	-	1.70
L3	2.65	2.80	2.95
V1	-	45°	-
ØP	-	-	3.88

TO-220 ISO-2L package ▲ Epoxy meets UL94-V0

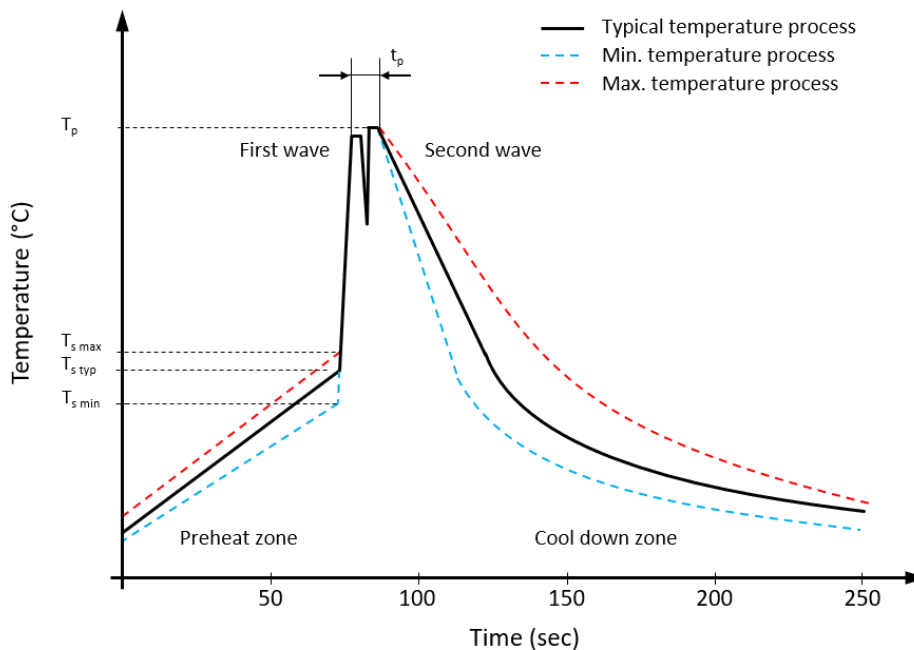
## ORDERING INFORMATION

Part Number	Package	Packing	Tube Qty.	Inner Box Qty.	Outer Box Qty.
B2D10065KS	TO-220 ISO-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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