

Product Summary

V_{RRM}	650 V
$I_F (T_C=150^{\circ}\text{C})$	10 A
Q_C	29 nC

Features

- Low leakage current (I_R)
- Zero reverse recovery current
- Temperature independent switching behavior
- Positive temperature coefficient on V_F
- High surge current capacity
- Low capacitive charge

Benefits

- System cost savings due to smaller magnetics
- System efficiency improvement over Si diodes
- Reduction of heat sink requirements
- Enabling higher frequency
- Reduced EMI

Applications

- Switch mode power supplies (SMPS)
- Uninterruptible power supplies
- Server/telecom power supplies
- Power factor correction
- Solar

Package Pin Definitions

- Pin1 and backside - Cathode
- Pin2 - Anode

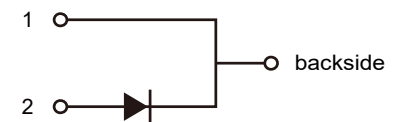
Package Parameters

Part Number	Marking	Package
B2D10065K1	B2D10065K1	TO-220-2

Packing Quantities

Tube Packing	PCS/Tube	Tube/Box	PCS/Box
TO-220-2	50	10	500

Package: TO-220-2

Electrical Connection


Maximum Ratings ($T_c=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test conditions	Value	Unit
V_{RRM}	Repetitive peak reverse voltage		650	V
V_{RSM}	Non-repetitive peak reverse voltage		650	V
I_F	Continuous forward current	$T_c=25^\circ\text{C}$ $T_c=150^\circ\text{C}$	34 10	A
I_{FSM}	Non-repetitive forward surge current	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$ Half sine wave	75	A
		$T_c=110^\circ\text{C}$, $t_p=10\text{ms}$ Half sine wave	65	
$I_{F, Max}$	Non-Repetitive forward surge current	$T_c=25^\circ\text{C}$, $t_p=10\mu\text{s}$, pulse $T_c=110^\circ\text{C}$, $t_p=10\mu\text{s}$, pulse	570 520	A
$\int i^2 dt$	i^2t value	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$	28.12	A^2S
P_{tot}	Power dissipation	$T_c=25^\circ\text{C}$ $T_c=110^\circ\text{C}$	144 62	W
T_j	Operating junction temperature		-55~175	$^\circ\text{C}$
T_{stg}	Storage temperature		-55~175	$^\circ\text{C}$
	TO-220 mounting torque	M3 Screw	0.7	Nm

Thermal Characteristics

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
$R_{th(jc)}$	Thermal resistance from junction to case		1.039		K/W

Electrical Characteristics
Static Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
V_{DC}	DC blocking voltage	$T_j=25^{\circ}\text{C}$	650			V
V_F	Diode forward voltage	$I_F=10\text{A } T_j=25^{\circ}\text{C}$ $I_F=10\text{A } T_j=175^{\circ}\text{C}$		1.31 1.7	1.5 2.4	V
I_R	Reverse current	$V_R=650\text{V } T_j=25^{\circ}\text{C}$ $V_R=650\text{V } T_j=175^{\circ}\text{C}$		1 20	70 200	μA

AC Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Q_C	Total capacitive charge	$V_R=400\text{V } T_j=25^{\circ}\text{C}$ $Q_C=\int_0^{t_{VR}} C(V)dV$		29		nC
C	Total capacitance	$V_R=1\text{V } f=1\text{MHz}$ $V_R=300\text{V } f=1\text{MHz}$ $V_R=600\text{V } f=1\text{MHz}$		429 54 53		pF
E_C	Capacitance stored energy	$V_R=400\text{V}$		7		μJ

Typical Performance

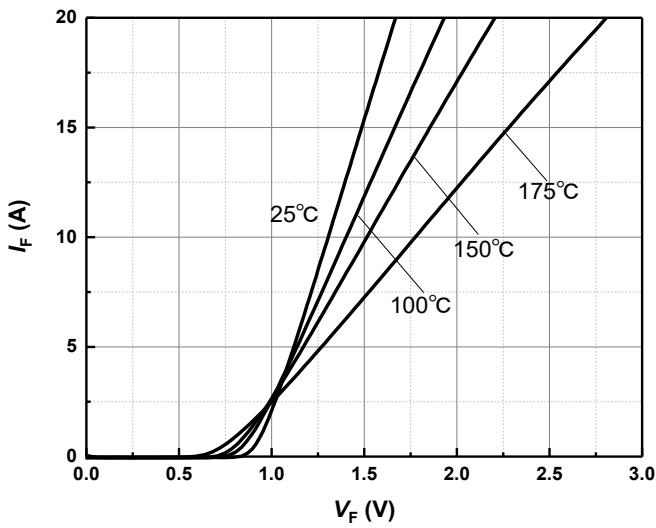


Figure 1 Typical forward characteristics

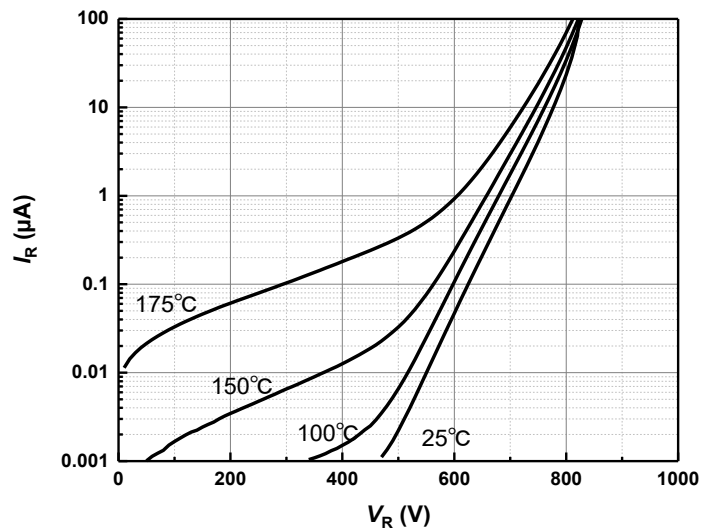


Figure 2 Typical reverse current as function of reverse voltage

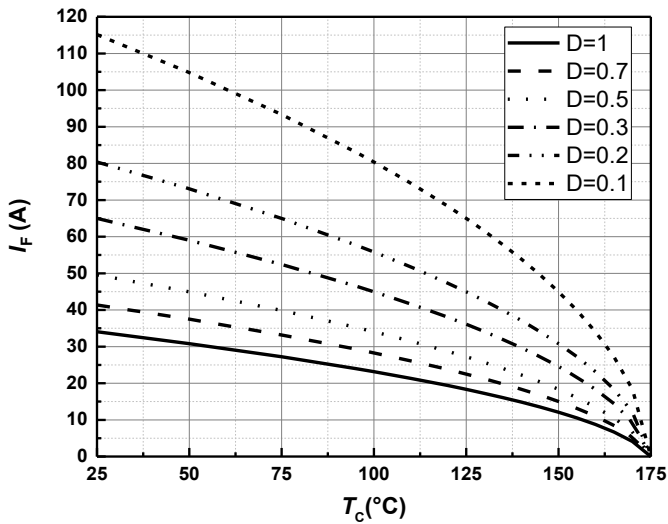


Figure 3 Diode forward current as function of temperature, D=duty cycle

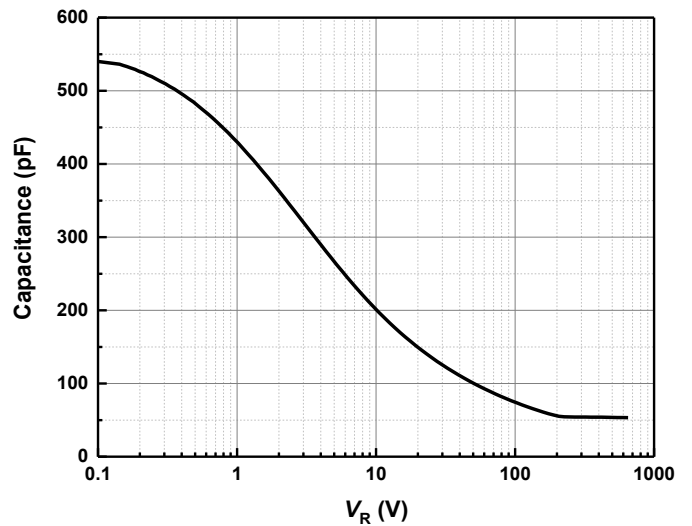


Figure 4 Typical capacitance as function of reverse voltage, $C=f(V_R)$; $T_J=25^\circ\text{C}$; $f=1\text{ MHz}$

Typical Performance

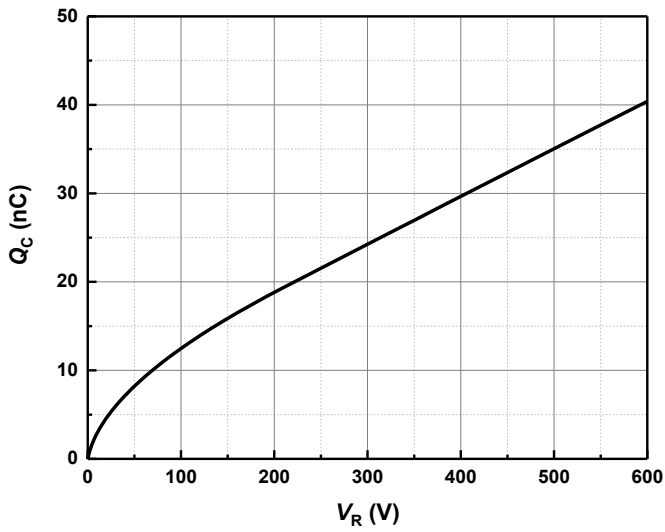


Figure 5 Typical reverse charge as function of reverse voltage

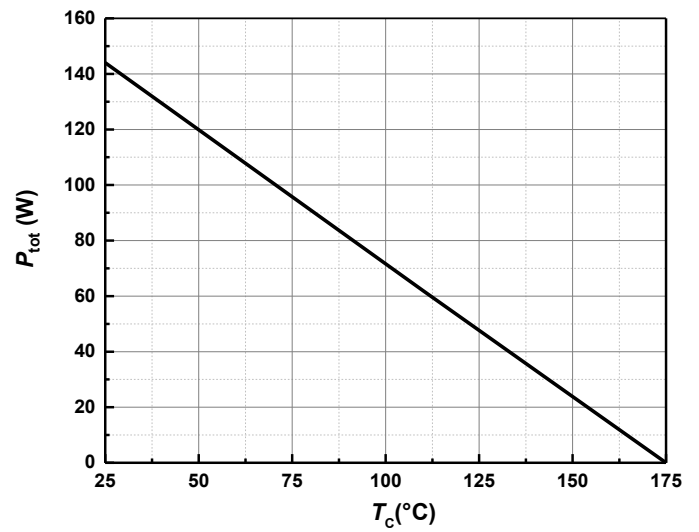


Figure 6 Power dissipation as function of case temperature

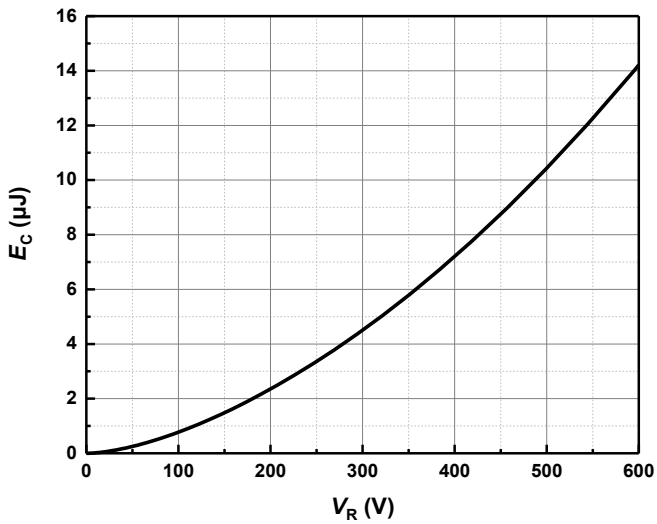


Figure 7 Capacitance stored energy

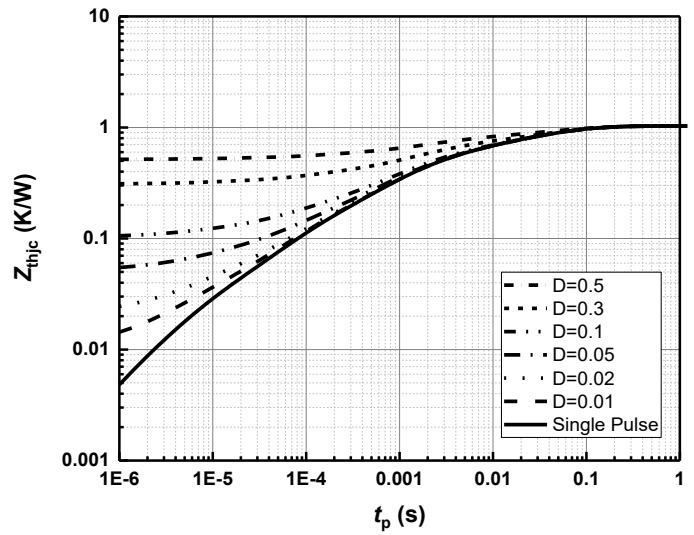


Figure 8 Max. transient thermal impedance, $Z_{thjc} = f(t_p)$, parameter: $D = t_p / T$

Typical Performance

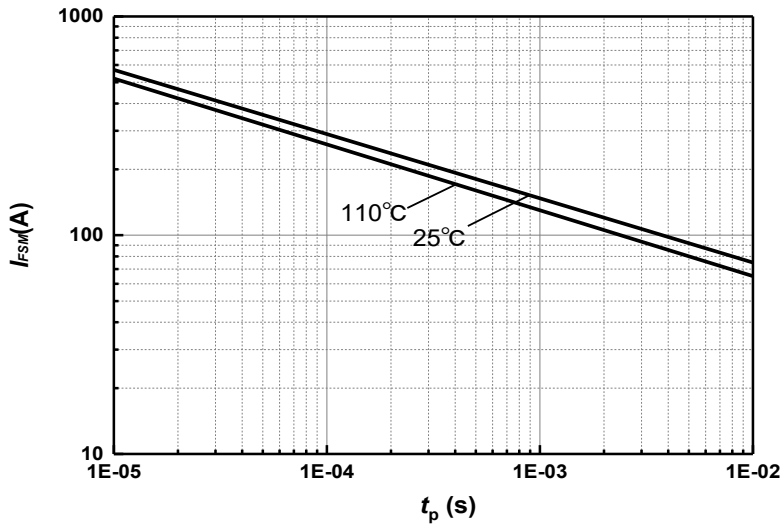
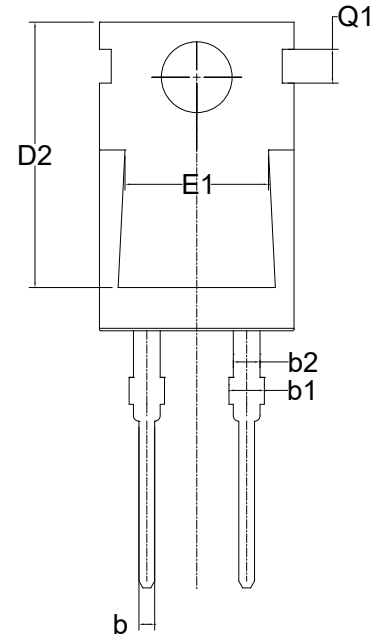
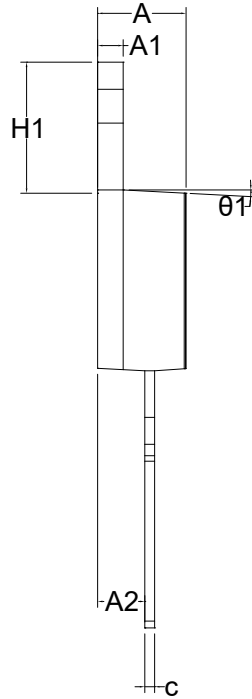
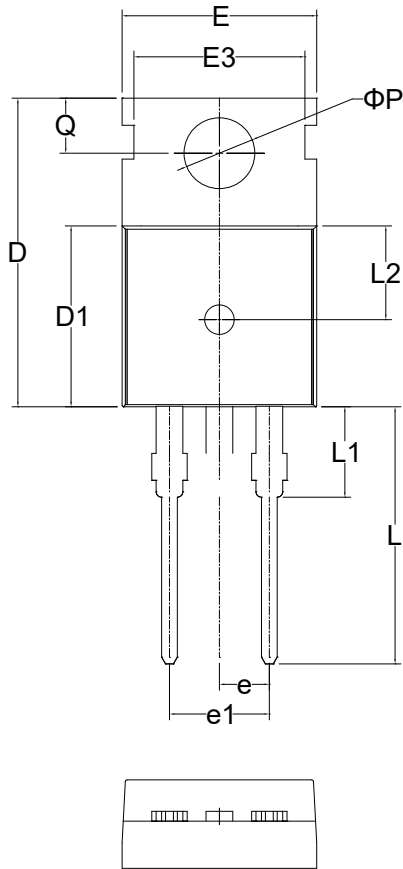
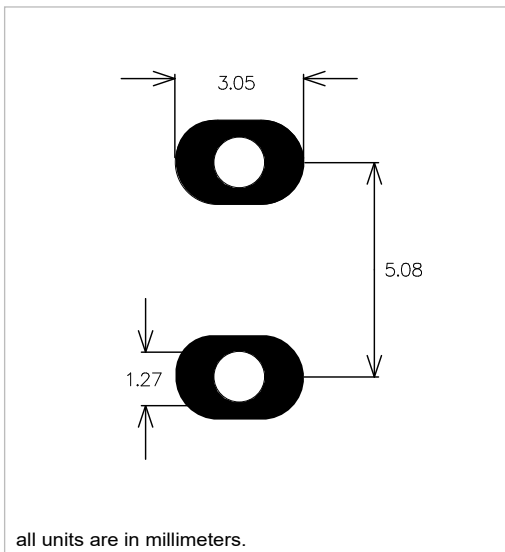


Figure 9 Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

Package Dimensions



Recommended Solder Pad Layout



SYMBOL	mm		
	MIN	NOM	MAX
A	4.24	4.44	4.64
A1	1.15	1.27	1.40
A2	2.30	2.48	2.70
b	0.70	0.80	0.90
b1	1.20	1.55	1.75
b2	1.20	1.45	1.70
c	0.40	0.50	0.60
D	14.70	15.37	16.00
D1	8.82	8.92	9.02
D2	12.43	12.73	12.83
E	9.96	10.16	10.36
E1	6.86	7.77	8.89
E3	8.70REF		
e	2.44	2.54	2.64
e1	4.98	5.08	5.18
H1	6.30	6.45	6.60
L	13.47	13.72	13.97
L1	3.60	3.80	4.00
ΦP	3.75	3.84	3.93
Q	2.60	2.80	3.00
Q1	1.73REF		

REF: For reference only, no measurement is required.

Revision History

Document Version	Date of Release	Description of Changes
Rev. 0.1	2023-04-06	Characteristics updated.
Rev. 0.2	2023-06-16	Characteristics updated.
Rev. 0.3	2023-07-26	Characteristics updated.
Rev. 0.4	2023-09-28	Non-repetitive forward surge current, i_{t} value, Fig 9, POD-D2

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