

Product Summary

V_{RRM}	650 V
$I_F (T_c=150^\circ\text{C})$	40 A
Q_c	130 nC

Features

- Extremely low reverse current
- No reverse recovery current
- Temperature independent switching
- Positive temperature coefficient on V_F
- Excellent surge current capability
- Low capacitive charge

Benefits

- Essentially no switching losses
- System efficiency improvement over Si diodes
- Increased power density
- Enabling higher switching frequency
- Reduction of heat sink requirements
- System cost savings due to smaller magnetics
- Reduced EMI

Applications

- Switch mode power supplies (SMPS)
- Uninterruptible power supplies
- Motor drivers
- Power factor correction

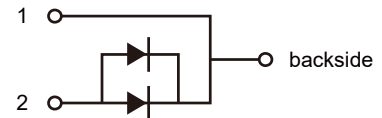
Package Pin Definitions

- Pin1 and backside - Cathode
- Pin2- Anode

Package Parameters

Part Number	Marking	Package
B1D40065H	B1D40065H	TO-247-2

Package: TO-247-2

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	$T_c=25^\circ\text{C}$ $T_c=150^\circ\text{C}$	124 40	A
I_{FSM}	Non-repetitive forward surge current	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$, Half sine wave	310	A
$\int i^2 dt$	i^2t value	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$	480	A ² S
P_{tot}	Power dissipation	$T_c=25^\circ\text{C}$ $T_c=110^\circ\text{C}$	416 185	W
T_j	Operating junction temperature		-55~175	$^\circ\text{C}$
T_{stg}	Storage temperature		-55~175	$^\circ\text{C}$
	TO-247 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		0.36		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	$I_F=40\text{A } T_J=25^\circ\text{C}$ $I_F=40\text{A } T_J=175^\circ\text{C}$		1.42 1.62		V
I_R	Reverse current	$V_R=650\text{V } T_J=25^\circ\text{C}$ $V_R=650\text{V } T_J=175^\circ\text{C}$		2 20		μA

AC Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Q_C	Total capacitive charge	$V_R=400\text{V } T_J=25^\circ\text{C}$ $Q_C=\int_0^{V_R} C(V)dV$		130		nC
C	Total capacitance	$V_R=1\text{V } f=1\text{MHz}$ $V_R=300\text{V } f=1\text{MHz}$ $V_R=600\text{V } f=1\text{MHz}$		2057 223 220		pF
E_C	Capacitance stored energy	$V_R=400\text{V}$		32		μJ

Typical Performance

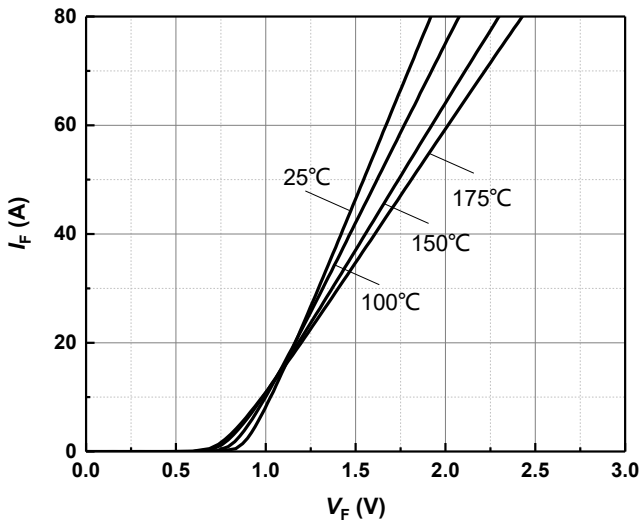


Figure 1 Typical forward characteristics

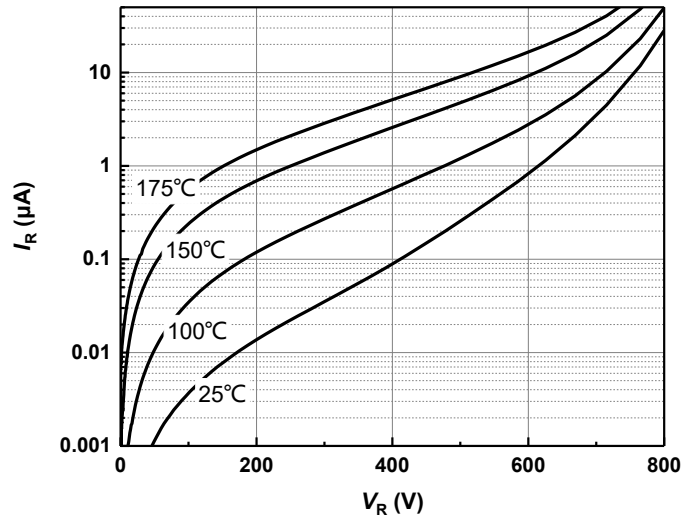


Figure 2 Typical reverse current as function of reverse voltage

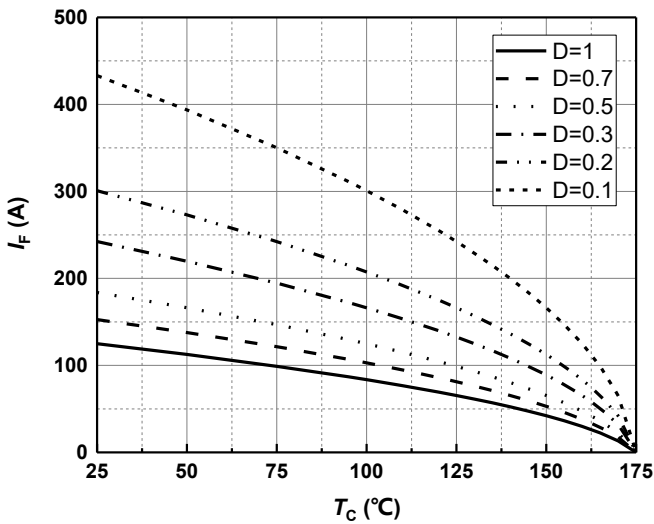


Figure 3 Diode forward current as function of temperature, D=duty cycle

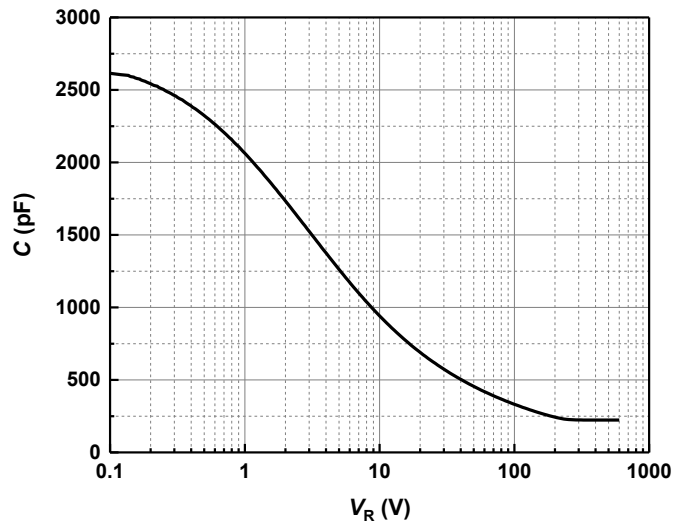


Figure 4 Typical capacitance as function of reverse voltage, $C=f(V_R)$; $T_j=25^{\circ}$ C; $f=1$ MHz

Typical Performance

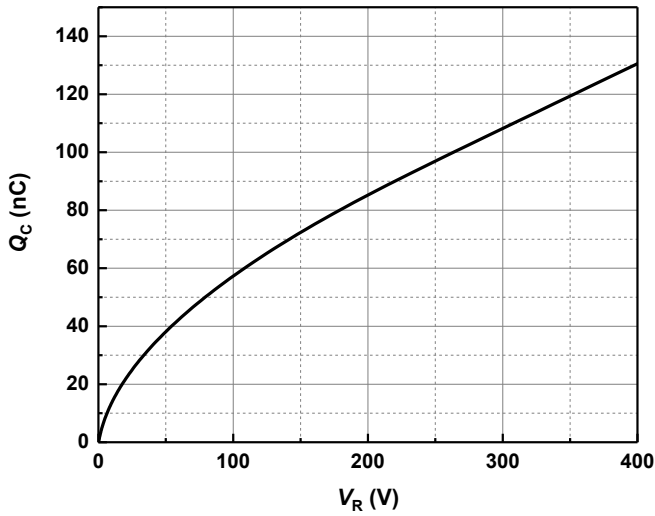


Figure 5 Typical reverse charge as function of reverse voltage

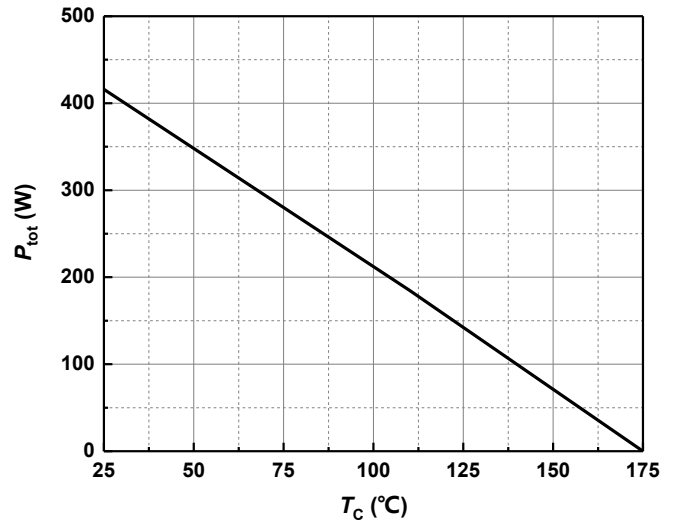


Figure 6 Power dissipation as function of case temperature

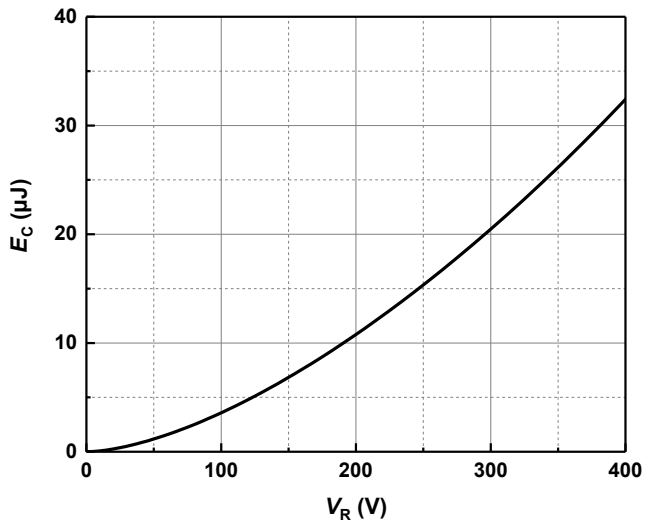


Figure 7 Capacitance stored energy

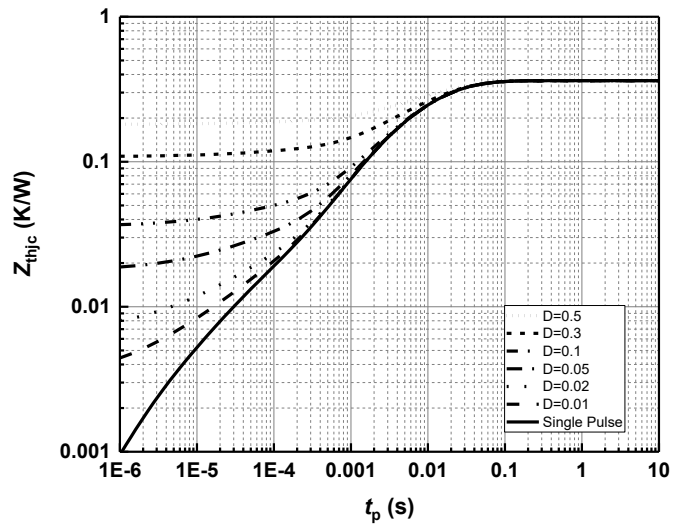
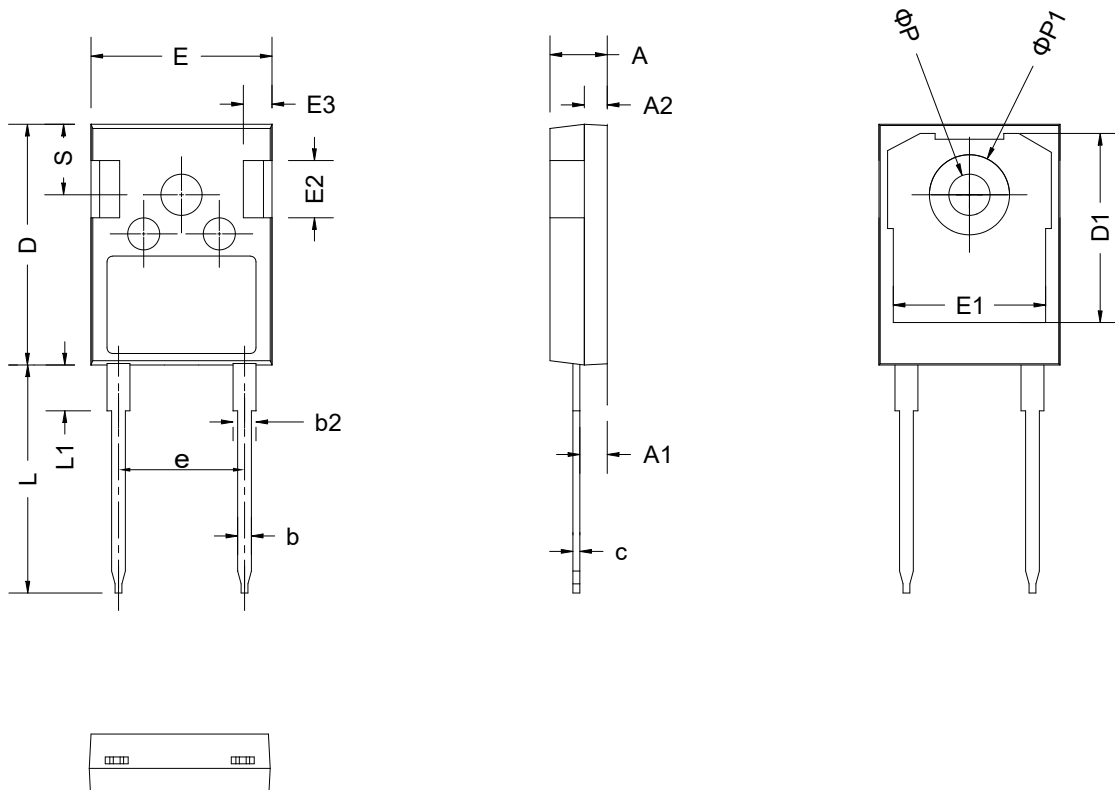


Figure 8 Max. transient thermal impedance, $Z_{thjc} = f(t)$, parameter: $D = t / T$

Package Dimensions


SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.61
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	10.88 BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
φ P	3.40	3.60	3.80
φ P1	-	-	7.30
S	6.15 BSC		

Revision History

Document Version	Date of Release	Description of Changes
Rev 0.0	2020-03-20	Release of the preliminary datasheet.
Rev 0.1	2020-07-06	Characteristics updated.
Rev 0.2	2022-03-02	Characteristics updated.

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