



B1D04065KF

650V ▲ 4A ▲ 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



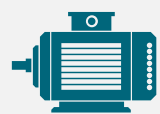




Low forward voltage

TO-220F-2L package ▲ Electrical insulated mounting tab

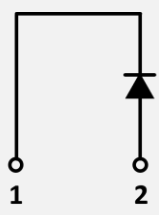
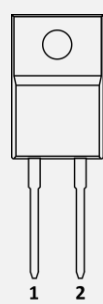
SPECIFICATION

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}	650V
Continuous Forward Current at $T_C = 140^\circ\text{C}$	I_F	4A
Total Capacitive Charge ($T_J = 25^\circ\text{C}$)	Q_C	12nC
Capacitance Stored Energy ($V_R = 400\text{V}$)	E_C	3μJ
Diode Forward Voltage ($T_J = 175^\circ\text{C}$, $I_F = 4\text{A}$)	V_F	1.7V
Power Dissipation	P_{TOT}	30W

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	10	A
Continuous Forward Current	$T_C = 140^\circ\text{C}$	I_F	4	A
Non-Repetitive Forward Surge Current	$T_C = 25^\circ\text{C}$, $t_p = 10\text{ms}$, Half Sine Wave	I_{FSM}	30	A
I^2t Value	$T_C = 25^\circ\text{C}$, $t_p = 10\text{ms}$	$\int i^2 dt$	4.5	A^2s
Power Dissipation	$T_C = 25^\circ\text{C}$	P_{TOT}	30	W
Power Dissipation	$T_C = 110^\circ\text{C}$	P_{TOT}	13	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}	650			V
Diode Forward Voltage	$I_F = 4\text{A}$, $T_J = 25^\circ\text{C}$	V_F		1.40	1.60	V
Diode Forward Voltage	$I_F = 4\text{A}$, $T_J = 175^\circ\text{C}$	V_F		1.70	2.80	V
Reverse Current	$V_R = 650\text{V}$, $T_J = 25^\circ\text{C}$	I_R		1	120	μA
Reverse Current	$V_R = 650\text{V}$, $T_J = 175^\circ\text{C}$	I_R		10	200	μA

Item	Condition	Symbol	Min.	Typ.	Max.	Unit
Dynamic Characteristics						
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		12		nC
Total Capacitance	$V_R = 1\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$	C		181		pF
Total Capacitance	$V_R = 300\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$	C		21.6		pF
Total Capacitance	$V_R = 600\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$	C		21.3		pF
Capacitance Stored Energy	$V_R = 400\text{V}$, $T_J = 25^\circ\text{C}$	E_C		3		μJ

THERMAL RESISTANCE PERFORMANCE

Item	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$		4.996		K/W

REFERENCE DATA ▲ TYPICAL PERFORMANCE

Fig. 1 • Typical Forward Characteristics I_F vs. V_F

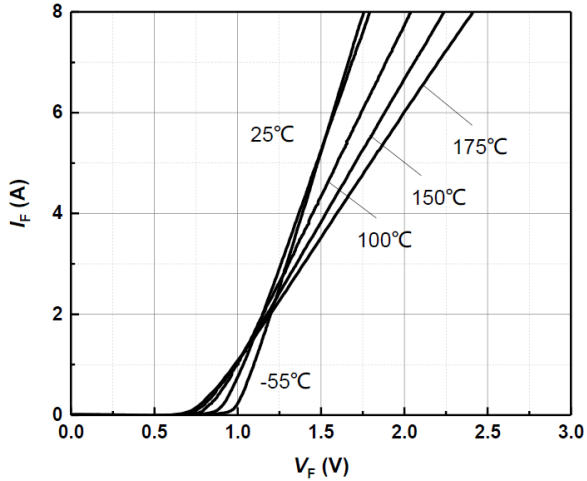


Fig. 2 • Typical Reverse Current I_R as function of Reverse Voltage V_R

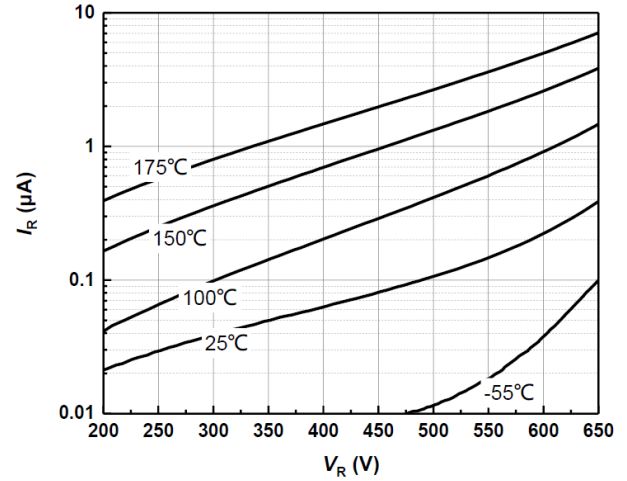


Fig. 3 • Diode Forward Current I_F as function of Case Temperature T_C (D = Duty Cycle)

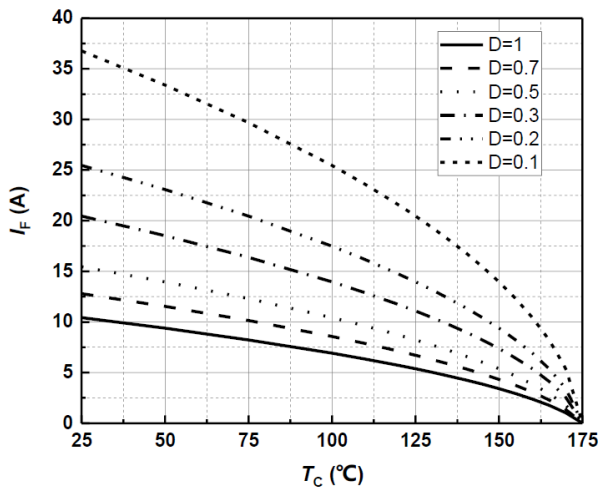


Fig. 4 • Typical Capacitance C as function of Reverse Voltage V_R , $C = f(V_R)$, $T_J = 25^\circ\text{C}$, $f = 1\text{MHz}$

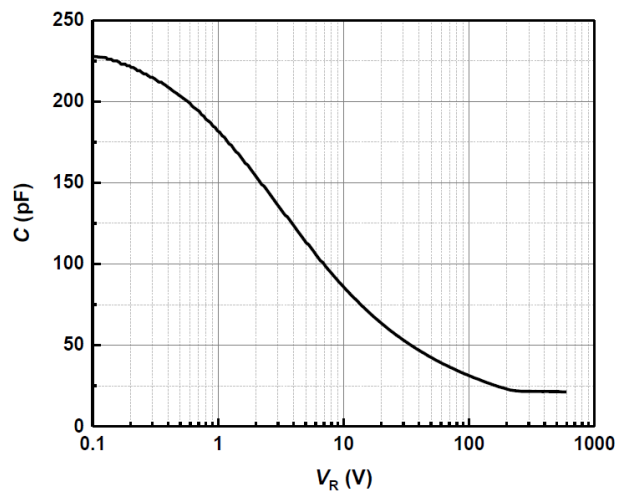


Fig. 5 • Typical Reverse Charge Q_C as function of Reverse Voltage V_R

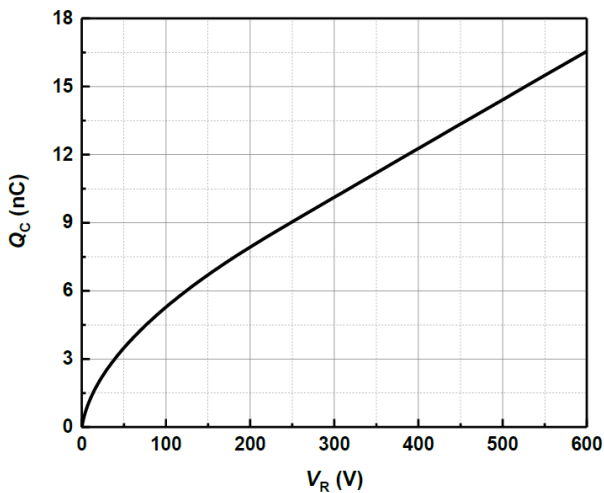
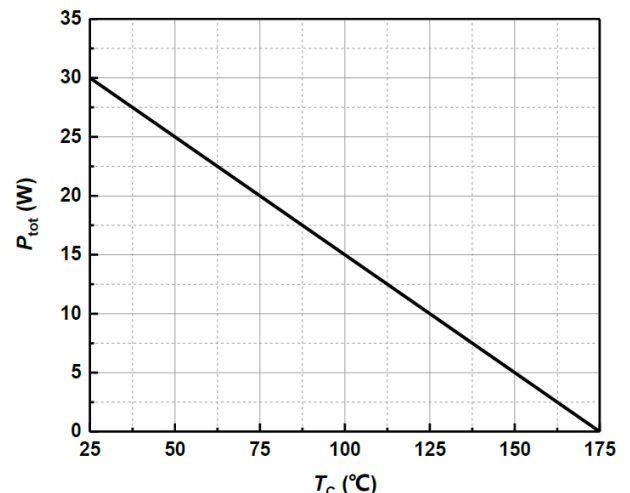


Fig. 6 • Power Dissipation P_{TOT} as function of Case Temperature T_C



REFERENCE DATA ▲ TYPICAL PERFORMANCE

Fig. 7 • Capacitance Stored Energy

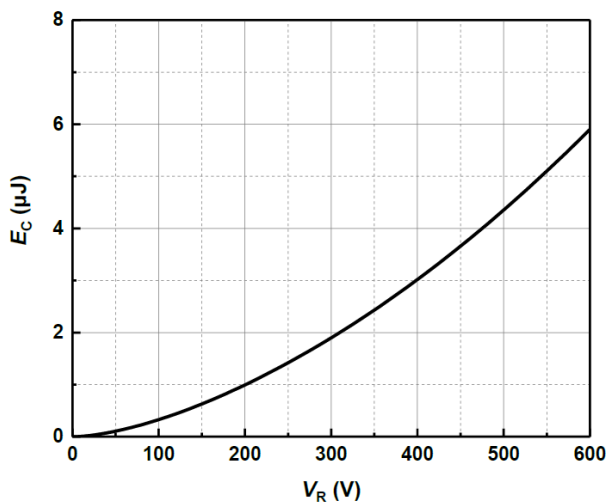
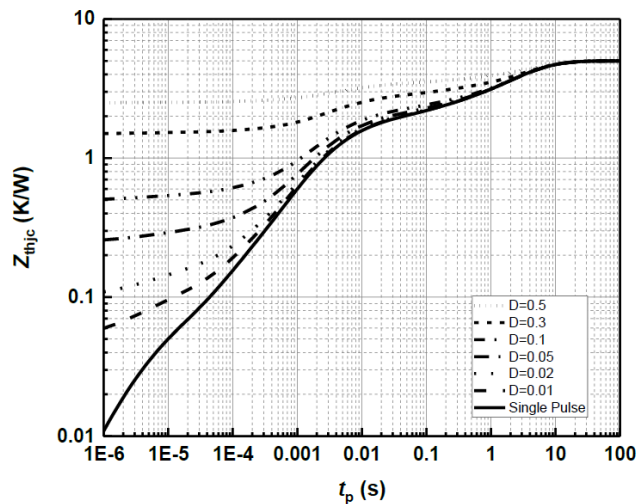
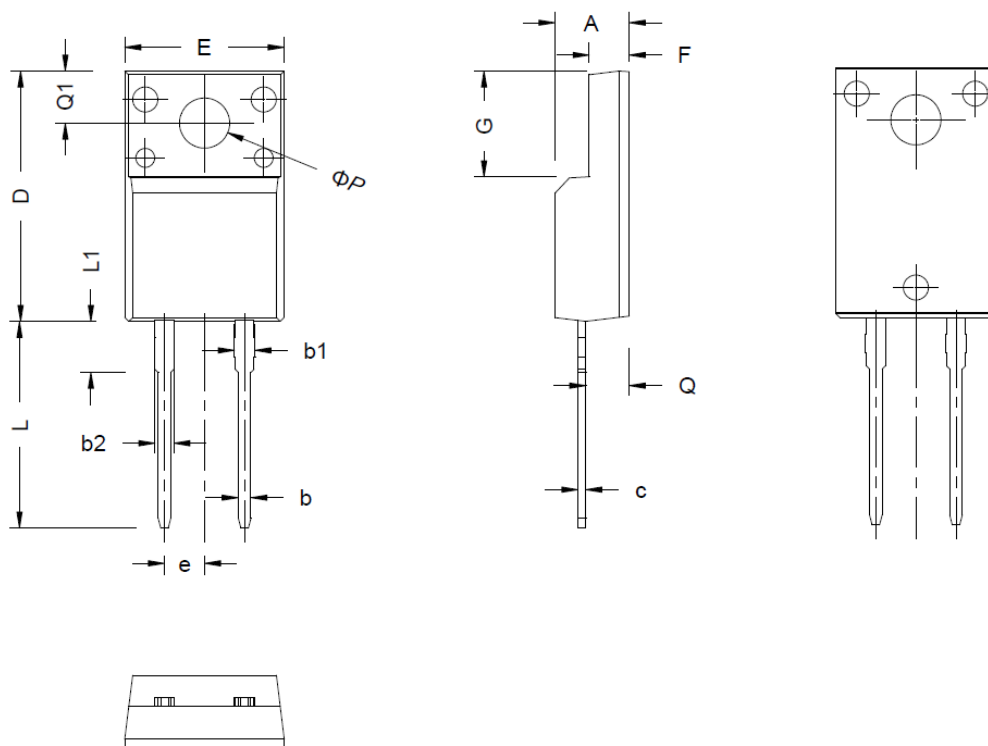


Fig. 8 • Maximum Transient Thermal Impedance, $Z_{thjc} = f(t)$, Parameter: $D = t/T$



PACKAGE OUTLINE



Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
A	4.60	4.70	4.80
b	0.70	0.80	0.91
b1	1.20	1.30	1.47
b2	1.10	1.20	1.30
c	0.45	0.50	0.63
D	15.80	15.87	15.97
D	15.15	15.45	15.75
e	2.54 BSC		
E	10.00	10.10	10.30

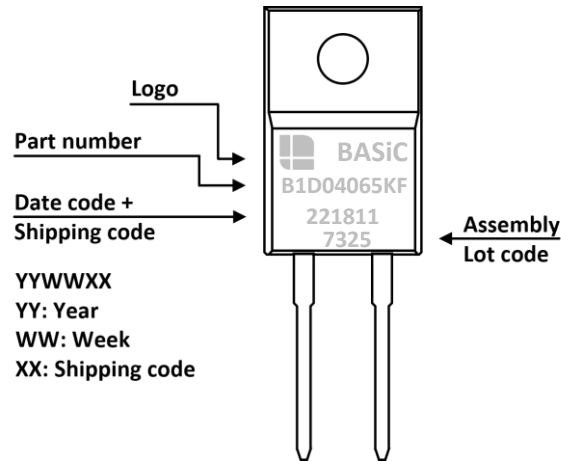
Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
F	2.44	2.54	2.64
G	6.50	6.70	6.90
L	12.90	13.10	13.30
L	12.70	-	13.70
L1	3.13	3.23	3.33
Q	2.65	2.75	2.85
Q1	3.20	3.30	3.40
ØP	2.08	3.18	3.28

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

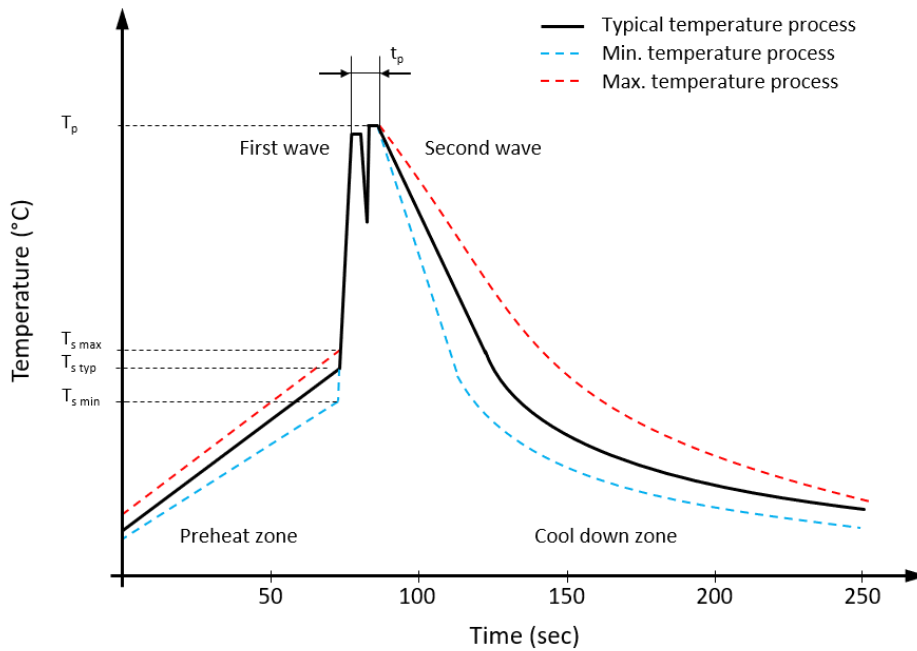
ORDERING INFORMATION

Part Number	Package	Packing	Tube Qty.	Inner Box Qty.	Outer Box Qty.
B1D04065KF	TO220F-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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