

**Product Summary**

$V_{RRM}$	650 V
$I_F (T_C=125^\circ\text{C})$	30 A**
$Q_C$	100 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**

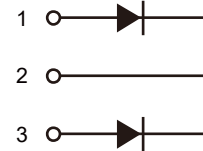
- Pin1 - Anode
- Pin2 - Cathode
- Pin3 - Anode

**Package Parameters**

Part Number	Marking	Package
B1D30065TF	B1D30065TF	TO-3PF

\* Per Leg, \*\* Per Device

**Package: TO-3PF**

**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	$T_c=25^\circ\text{C}$ $T_c=125^\circ\text{C}$	30*/60** 15*/30**	A
$I_{FSM}$	Non-repetitive forward surge current	$T_c=25^\circ\text{C}$ , $t_p=10\text{ms}$ Half sine wave	110*	A
$\int i^2 dt$	$i^2t$ value	$T_c=25^\circ\text{C}$ , $t_p=10\text{ms}$	61*	A <sup>2</sup> S
$P_{tot}$	Power dissipation	$T_c=25^\circ\text{C}$ $T_c=110^\circ\text{C}$	72* 31*	W
$T_j$	Operating junction temperature		-55~175	$^\circ\text{C}$
$T_{stg}$	Storage temperature		-55~175	$^\circ\text{C}$
	TO-3PF mounting torque	M3 Screw	0.6	Nm

\* Per Leg, \*\* Per Device

**Thermal Characteristics**

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
$R_{th(jc)}$	Thermal resistance from junction to case		2.09*/ 1.05**		K/W

\* Per Leg, \*\* Per Device

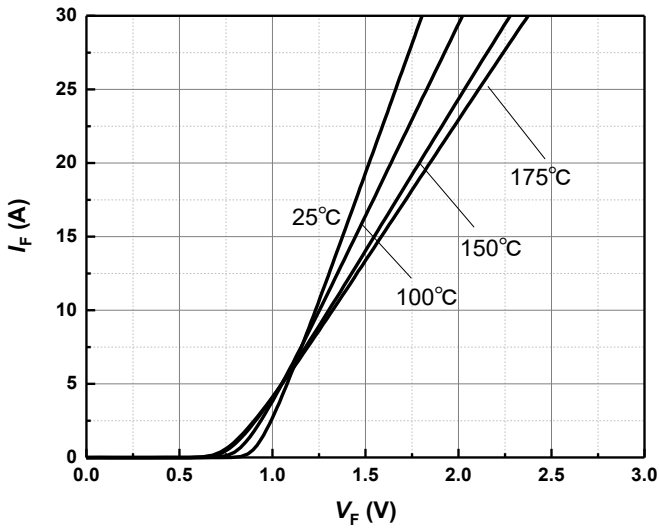
**Electrical Characteristics (Per Leg)**  
**Static Characteristics**

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	$I_F=15\text{A } T_j=25^\circ\text{C}$ $I_F=15\text{A } T_j=175^\circ\text{C}$		1.37 1.62	1.6 2.3	V
$I_R$	Reverse current	$V_R=650\text{V } T_j=25^\circ\text{C}$ $V_R=650\text{V } T_j=175^\circ\text{C}$		5 30	120 300	$\mu\text{A}$

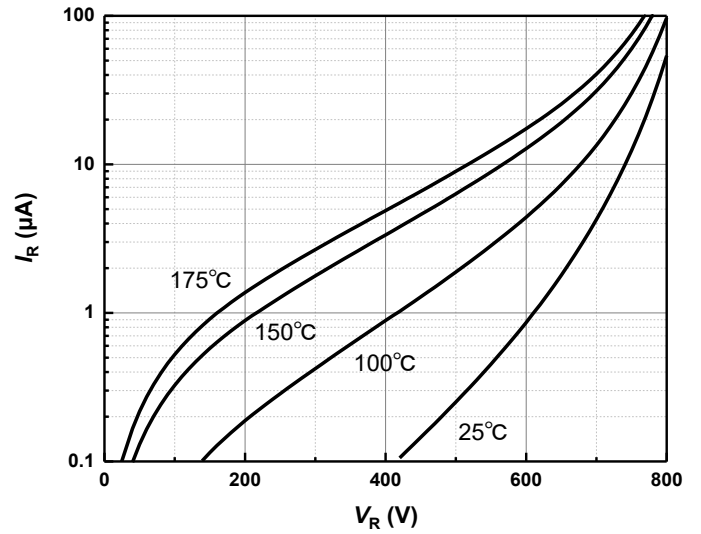
**AC Characteristics**

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
$Q_C$	Total capacitive charge	$V_R=400\text{V } T_j=25^\circ\text{C}$ $Q_C=\int_0^{V_R} C(V)dV$		50		nC
$C$	Total capacitance	$V_R=1\text{V } f=1\text{MHz}$ $V_R=300\text{V } f=1\text{MHz}$ $V_R=600\text{V } f=1\text{MHz}$		761 89 88		pF
$E_C$	Capacitance stored energy	$V_R=300\text{V}$		12		$\mu\text{J}$

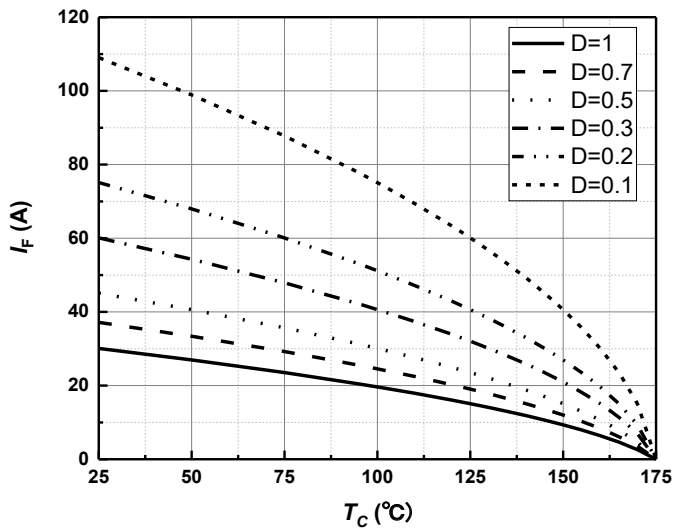
**Typical Performance (Per Leg)**



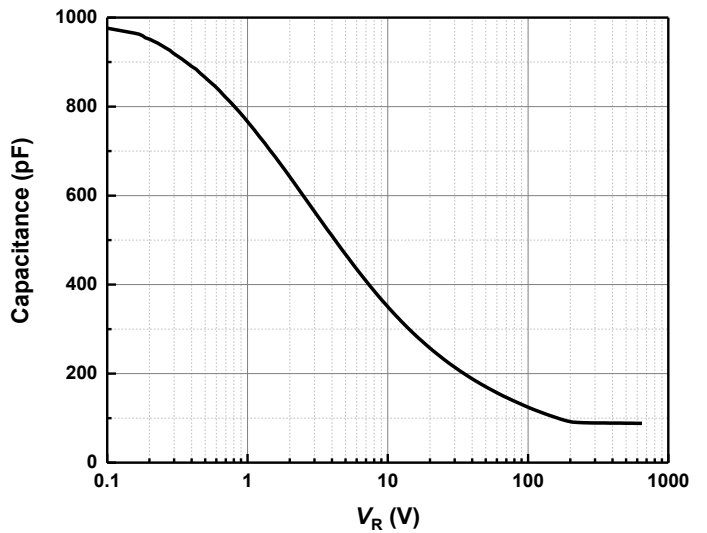
**Figure 1** Typical forward characteristics



**Figure 2** Typical reverse current as function of reverse voltage

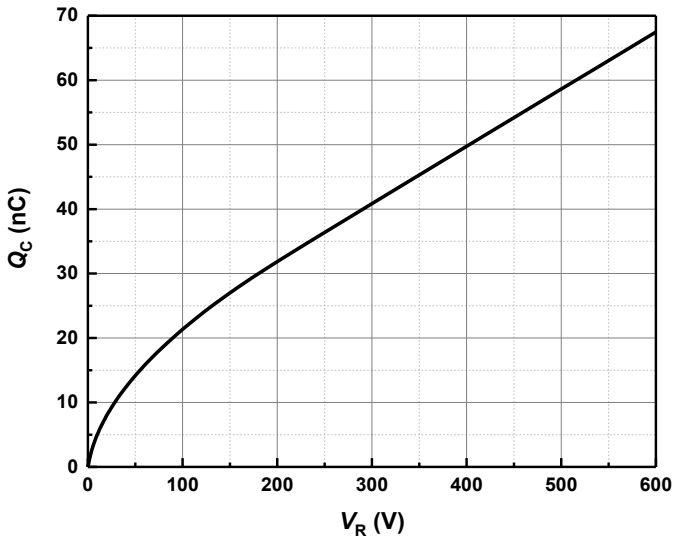


**Figure 3** Diode forward current as function of temperature, D=duty cycle

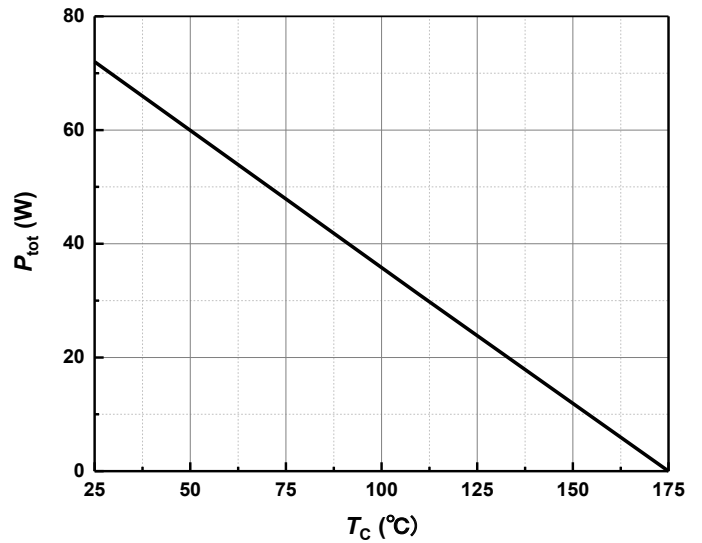


**Figure 4** Typical capacitance as function of reverse voltage,  $C=f(V_R)$ ;  $T_j=25^{\circ}$ C;  $f=1$  MHz

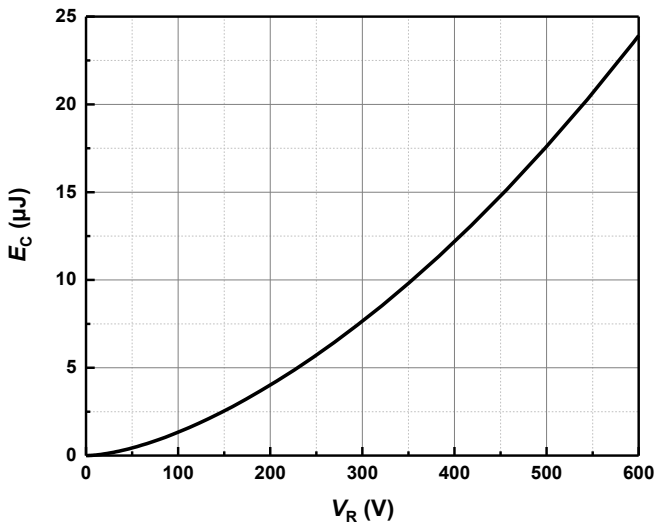
**Typical Performance**



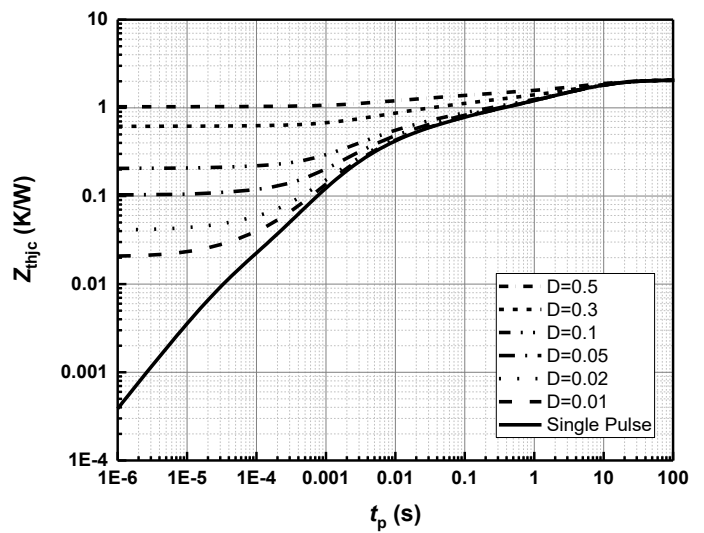
**Figure 5** Typical reverse charge as function of reverse voltage



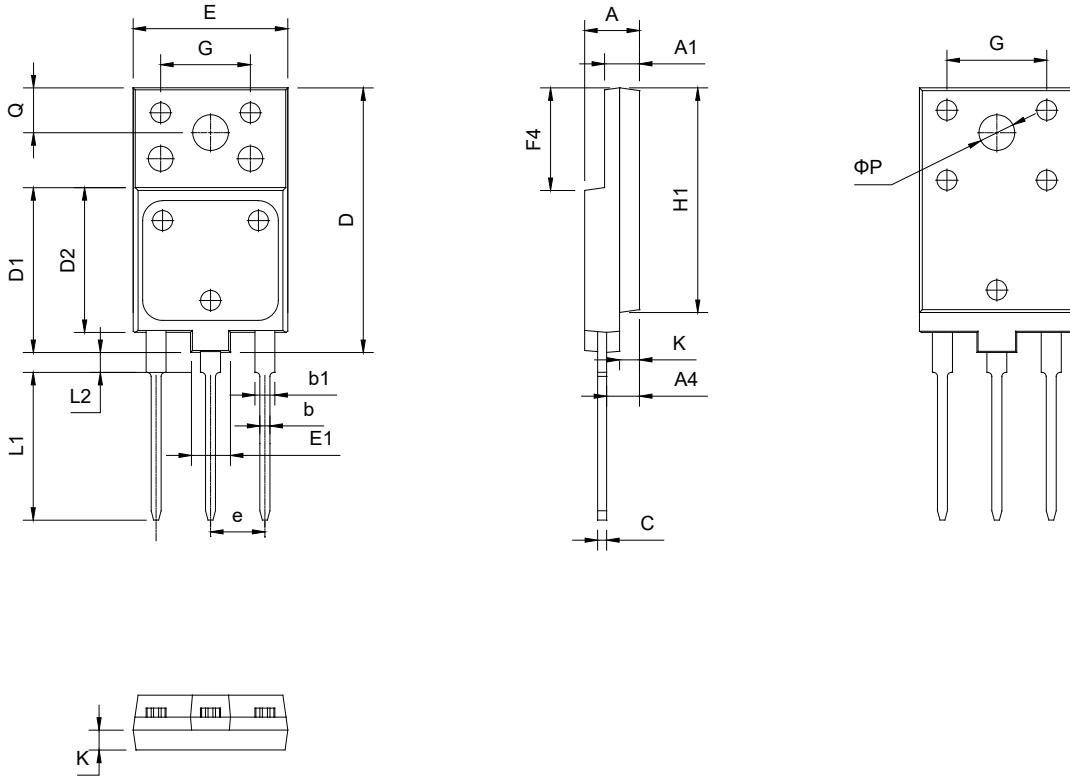
**Figure 6** Power dissipation as function of case temperature



**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	5.3	5.5	5.7
A1	2.8	3	3.2
b	0.66	0.86	0.95
b1	1.8	2	2.2
A4	3.1	3.3	3.5
C	0.8	0.9	1
D	26.3	26.5	26.7
D1	16.3	16.5	16.7
D2	14.3	14.5	14.7
P	3.4	3.6	3.8
E	15.3	15.5	15.7
E1	3.8	4	4.2
e	5.15	5.45	5.75
G	9.7	9.9	10.1
Q	4.35	4.5	4.65
L1	14.6	14.8	15
L2	2.3	2.5	2.7
K	1.8	2	2.2
F4	9.8	10	10.2
H1	22.8	23	23.2
K	1.8	2	2.2

**Revision History**

<b>Document Version</b>	<b>Date of Release</b>	<b>Description of Changes</b>
Rev 0.0	2022-05-20	Release of the datasheet.

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