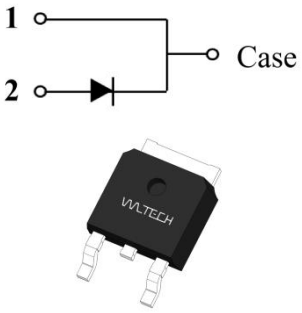
Silicon Carbide Schottky Diode (SiC SBD)

1. Product Features:

- Revolutionary semiconductor material - Silicon Carbide
- Temperature independent switching behavior
- Low forward voltage even at high operating temperature
- Excellent thermal performance
- Specified dv/dt ruggedness
- Qualified according to JEDEC for target applications
- Pb-free lead plating; RoHS compliant

HDD04S065A



Pin 1 and backside – cathode

Pin 2 – anode

Package: TO-252-2

2. Product Applications

- Solar Inverters
- Uninterruptable Power Supplies (UPS)
- Power Factor Correction (PFC)
- Switch Mode Power Supplies (SMPS)
- On Board Charger (OBC)
- EV Charger

3. Typical Performance Parameters

Tab.1. Typical Performance Parameters

Type	V_{DC}	I_F	Q_C	T_{vjmax}	Marking	Package
HDD04S065A	650V	4A	9.1nC	175°C	HDD04S065A	TO-252-2

4. Maximum Ratings

Tab.2. Maximum Ratings

Parameters	Symbol	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	650	V
Surge Peak Reverse Voltage	V_{RSM}	650	V
Continuous Forward Current T_c =25℃ T_c = 125℃ T_c = 150℃	I_F	 29 10 4.9	A
Repetitive Peak Forward Surge Current T_c = 25℃, t_p = 10ms	I_{FRM}	21	
Non-Repetitive Peak Forward Surge Current T_c = 25℃, t_p = 10ms, Half Sine Wave	I_{FSM}	40	
Non-Repetitive Peak Forward Current T_c = 25℃, t_p = 10μs	$I_{F, max}$	220	
Power Dissipation T_c = 25℃ T_c = 125℃ T_c = 150℃	P_{tot}	 60 20 10	W
Operating Junction	T_j	-55 to +175	℃
Storage Temperature	T_{stg}	-55 to +150	

5. Thermal Properties

Tab.3. Thermal Properties

Parameters	Symbol	Typ. value	Unit
Thermal resistance (junction - case)	$R_{th(j-c)}$	2.52	℃/W

6. Electrical Characteristics

Tab.4. Static Characteristic (T_{vj} = 25℃, unless otherwise specified)

Parameters	Symbol	Conditions	Min. value	Typ. value	Max. value	Unit
DC blocking voltage	V_{DC}	T_j = 25℃	650	-	-	V
Diode forward voltage	V_F	I_F =4A, T_j = 25℃ I_F =4A, T_j = 175℃	- -	1.5 2.0	1.7 2.0	V
Reverse current	I_R	V_R =650V, T_j = 25℃ V_R =650V, T_j = 175℃	- -	3 5	20 100	μA

Tab.5. Dynamic Characteristic (T_{vj} = 25℃, unless otherwise specified)

Parameters	Symbol	Conditions	Min. value	Typ. value	Max. value	Unit
Total capacitive charge	Q_C	V_R = 400V, $Q_C = \int_0^{V_R} C(V)dV$	-	9.1	-	nC
Total Capacitance	C	V_R = 0V, f = 1MHz V_R = 200V, f = 1MHz V_R = 400V, f = 1MHz	- - -	174 17 16	- - -	pF
Capacitance Stored Energy	E_C	V_R = 400V	-	2.2	-	μJ

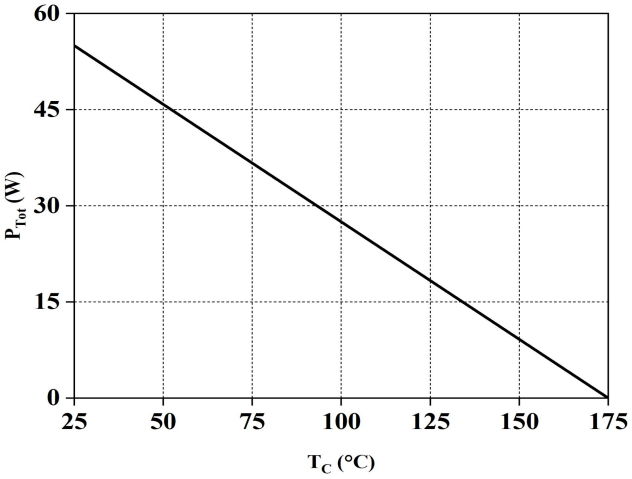


Fig.1. Power dissipation vs.case temperature

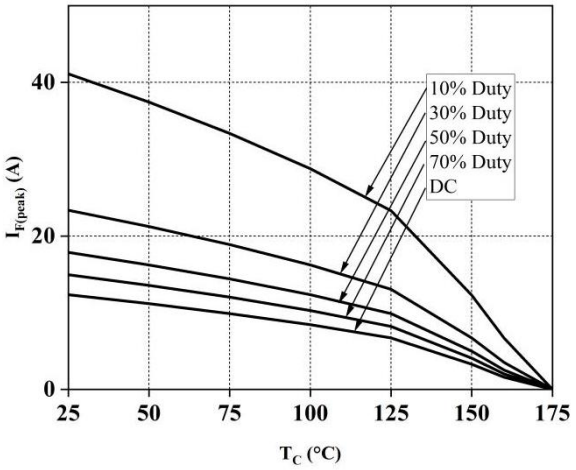


Fig.2. Diode forward current vs. case temperature

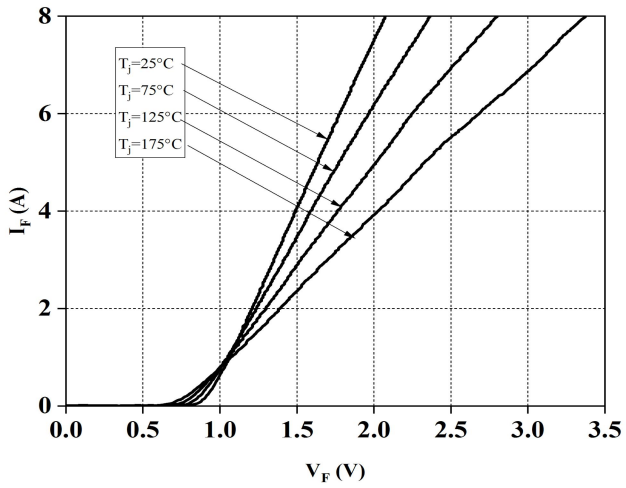


Fig.3.Typical forward characteristics

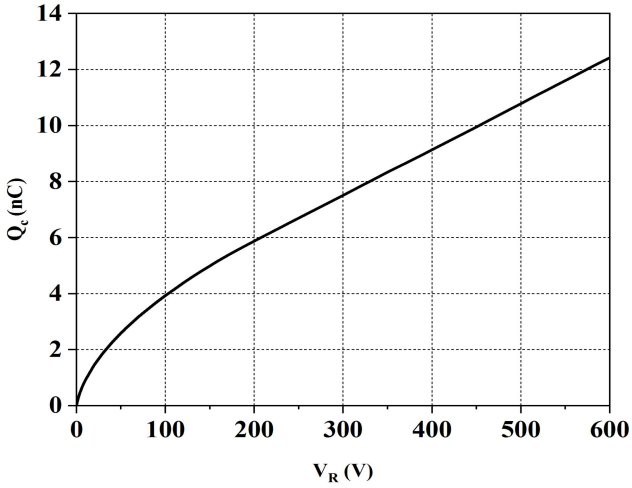


Fig.4. Typical capacitance charge vs. reverse voltage

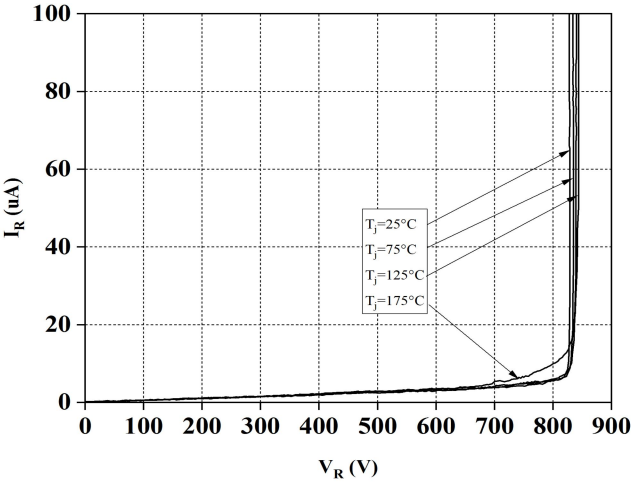


Fig.5. Typical reverse current vs.reverse voltage

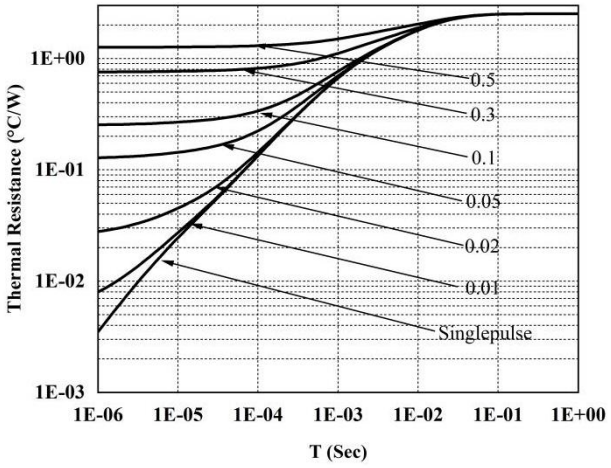


Fig.6. Max. transient thermal impedance

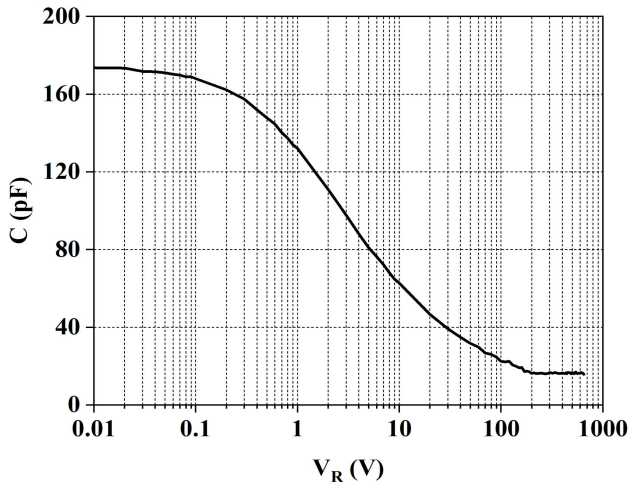


Fig.7. Typical capacitance vs. reverse voltage

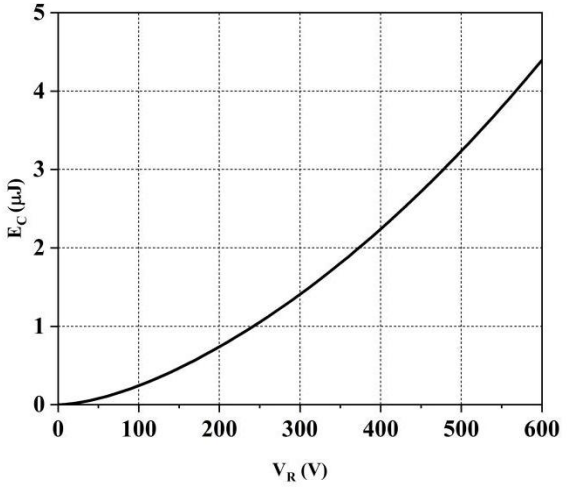
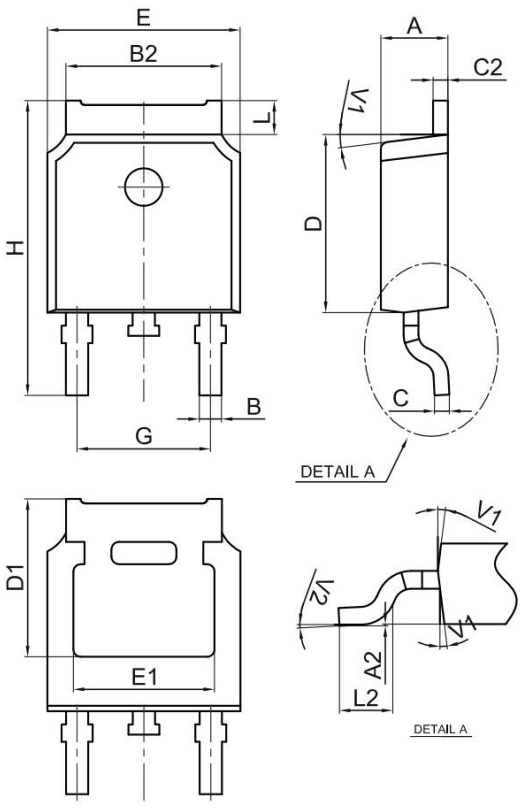


Fig.8. Typical capacitance stored energy vs. reverse voltage

7. Package Dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

8. Version Information

Version No.	Status	Date changed	Version revision record
V1.0	Preview edition	2022/06	