

## SiC SBD P3D12005E2

### 1200V SiC Schottky Diode



#### Features

- Ultra-Fast Switching
- Zero Reverse Recovery Current
- High-Frequency Operation
- Positive Temperature Coefficient on  $V_F$
- High Surge Current
- 100% UIS tested

TO-252-2

Cathode	1
Anode	2



#### Standards Benefits

- Improve System Efficiency
- Reduction of Heat Sink Requirement
- Essentially No Switching Losses
- Parallel Devices Without Thermal Runaway



#### Application

- Consumer SMPS
- Boost Diodes in PFC or DC/DC Stages
- AC/DC Converters



#### Order Information

Part Number	Package	Marking
P3D12005E2	TO-252-2	P3D12005E2



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PN Junction Semiconductor

## 1. Maximum Ratings

At  $T_J = 25^\circ\text{C}$ , unless specified otherwise

Parameter	Symbol	Value	Unit	Test condition
Repetitive Peak Reverse Voltage	$V_{RRM}$	1200	V	$T_C = 25^\circ\text{C}$
Surge Peak Reverse Voltage	$V_{RSM}$	1200	V	$T_C = 25^\circ\text{C}$
DC Blocking Voltage	$V_R$	1200	V	$T_C = 25^\circ\text{C}$
Forward Current	$I_F$	19 8 5	A	$T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$ $T_C = 155^\circ\text{C}$
Repetitive Peak Forward Surge Current	$I_{FRM}$	24 17	A	$T_C = 25^\circ\text{C}, t_p = 10\text{ms}$ $T_C = 125^\circ\text{C}, t_p = 10\text{ms}$
Non-Repetitive Forward Surge Current	$I_{FSM}$	55 50	A	$T_C = 25^\circ\text{C}, t_p = 10\text{ms}$ $T_C = 125^\circ\text{C}, t_p = 10\text{ms}$
Non-Repetitive Forward Surge Current	$I_{F, MAX}$	595 560	A	$T_C = 25^\circ\text{C}, t_p = 10\mu\text{s}$ $T_C = 125^\circ\text{C}, t_p = 10\mu\text{s}$
Power Dissipation	$P_{tot}$	102	W	$T_C = 25^\circ\text{C}$
Operating Junction and Storage Temperature	$T_J, T_{STG}$	-55 to +175	$^\circ\text{C}$	

## 2. Thermal Characteristics

Parameter	Symbol	Values	Unit
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.47	$^\circ\text{C}/\text{W}$

### 3. Electrical Characteristics

At  $T_J = 25^\circ\text{C}$ , unless specified otherwise

Parameter	Symbol	Values			Unit	Test condition
		Min.	Typ.	Max.		
Forward Voltage	$V_F$	/	1.5	1.8	V	$I_F = 5\text{A}, T_J = 25^\circ\text{C}$
			2.1	/		$I_F = 5\text{A}, T_J = 175^\circ\text{C}$
Reverse Current	$I_R$	/	1.73	44	$\mu\text{A}$	$V_R = 1200\text{V}, T_J = 25^\circ\text{C}$
			149	/		$V_R = 1200\text{V}, T_J = 175^\circ\text{C}$
Total Capacitance	C	/	304	/	$\text{pF}$	$V_R = 0\text{V}, T_J = 25^\circ\text{C}$ $f = 1\text{MHz}$
			39			$V_R = 400\text{V}, T_J = 25^\circ\text{C}$ $f = 1\text{MHz}$
			37			$V_R = 800\text{V}, T_J = 25^\circ\text{C}$ $f = 1\text{MHz}$
Total Capacitive Charge	$Q_C$	/	36.8	/	nC	$V_R = 800\text{V}, I_F = 5\text{A}$ $di/dt = 200\text{A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$
Capacitance Stored Energy	$E_C$	/	11.9	/	$\mu\text{J}$	$V_R = 800\text{V}$

## 4. Typical Performance

At  $T_J = 25^\circ\text{C}$ , unless specified otherwise

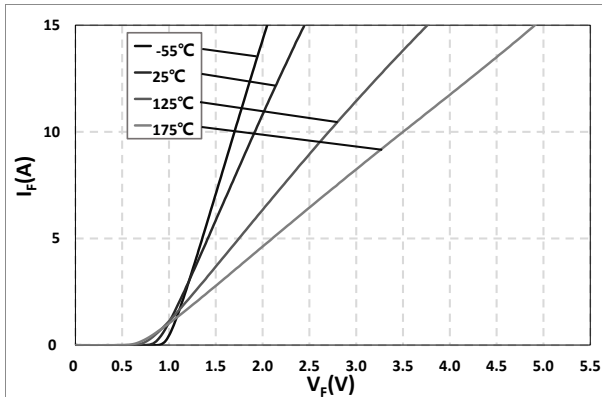


Fig. 1 Typical Forward Characteristics  
 $I_F = f(V_F)$ ;  $T_J = -55^\circ\text{C}, 25^\circ\text{C}, 125^\circ\text{C}, 175^\circ\text{C}$

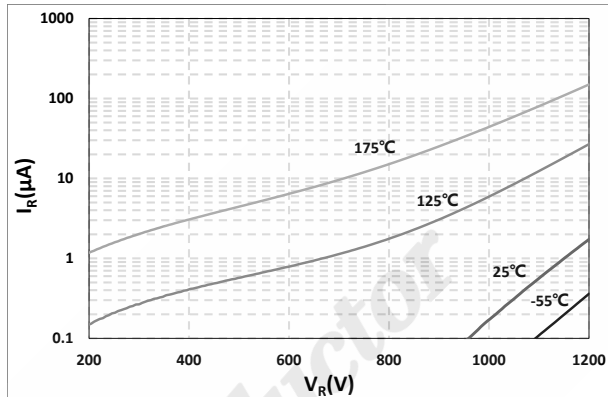


Fig. 2 Reverse Characteristics  
 $I_R = f(V_R)$ ;  $T_J = -55^\circ\text{C}, 25^\circ\text{C}, 125^\circ\text{C}, 175^\circ\text{C}$

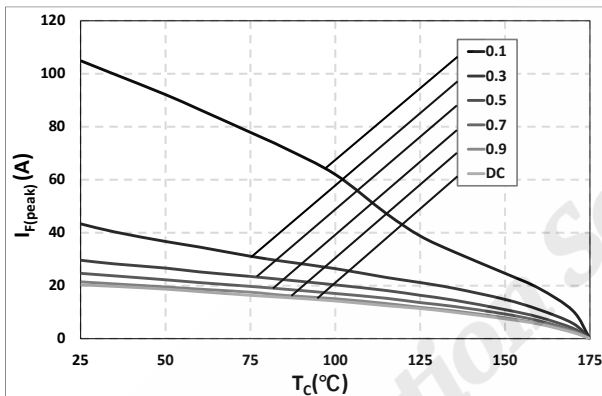


Fig. 3 Current Derating

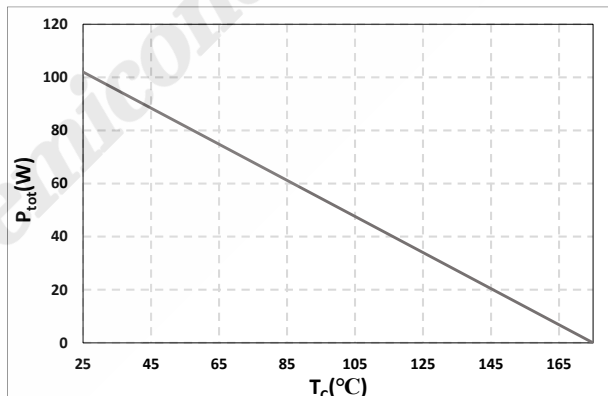


Fig. 4 Typical Power Derating  
 $P_{tot} = f(T_C)$

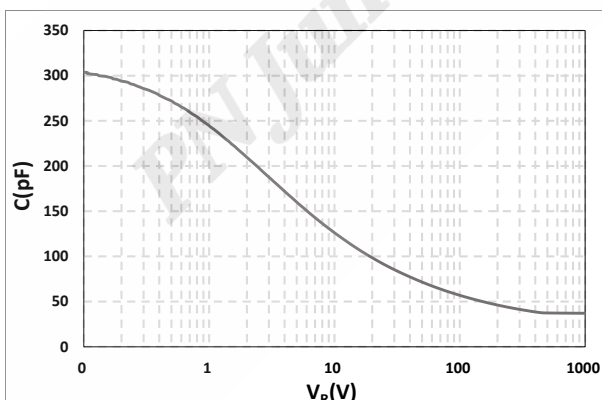


Fig. 5 Typical Total Capacitance  
 $C = f(V_R)$

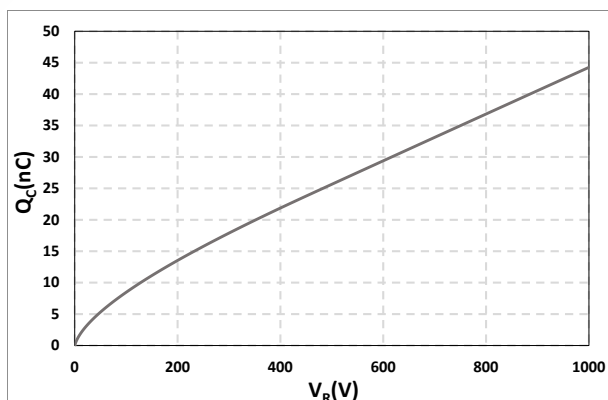


Fig. 6 Typical Total Capacitive Charge  
 $Q_C = f(V_R)$

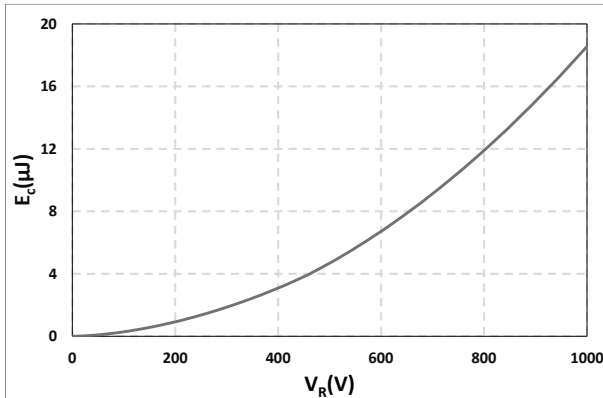


Fig. 7 Capacitance Stored Energy  
 $E_C = f(V_R)$

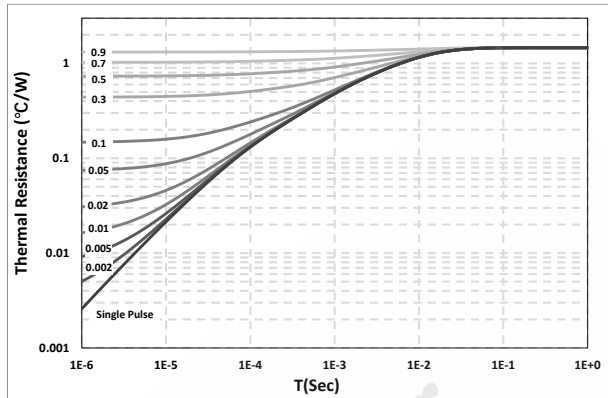
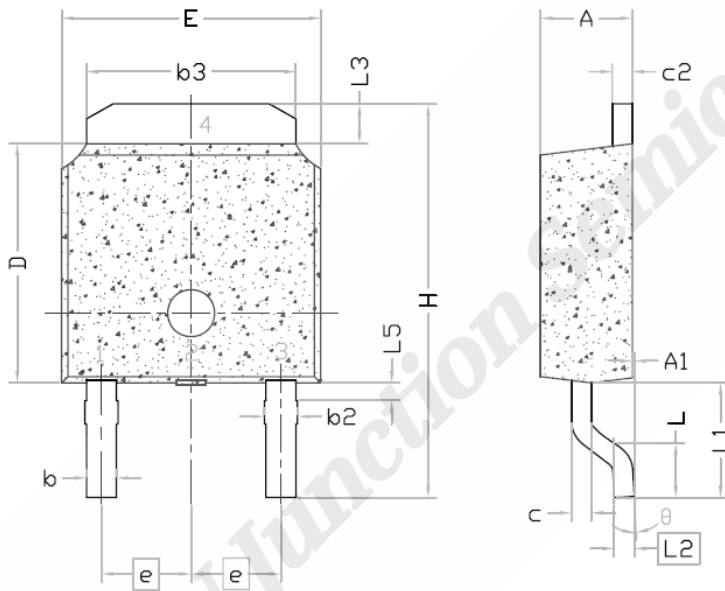


Fig. 8 Transient Thermal Impedance

### 5. Package Outlines



SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
E	6.40	6.60	6.731
L	1.40	1.52	1.77
L1	2.743 REF		
L2	0.508 BSC		
L3	0.89	--	1.27
L5	--	--	--
D	6.00	6.10	6.223
H	9.40	10.00	10.40
b	0.64	0.76	0.88
b2	0.77	0.84	1.14
b3	5.21	5.34	5.46
e	2.286 BSC		
A	2.20	2.30	2.38
A1	0	--	0.127
c	0.46	0.50	0.60
c2	0.46	0.50	0.58
D1	5.21	--	--
E1	4.40	--	--
F	--	--	0.45
θ	0°	--	10°

Drawing and dimensions