

# P3CD50065P

650V/50A SiC Power Schottky Barrier Diode Product



## Features

- Positive temperature coefficient for easy parallel use
- Switching characteristics that are not affected by temperature
- Maximum operating temperature 175 °C
- Zero reverse recovery current
- Zero forward recovery voltage

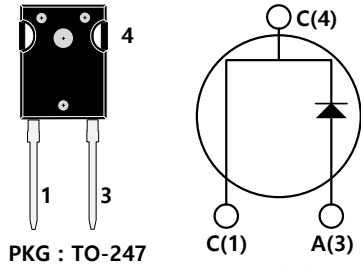
Key Characteristics		
$V_{RRM}$	650	V
$I_F, T_C \leq 100^\circ\text{C}$	50	A
$Q_C$	168	nC

## Benefits

- Unipolar device
- Greatly reduce switching losses
- No thermal crash in parallel devices
- Reduce system dependence on heat sinks

## Applications

- Switch Mode Power Supply (SMPS), Power Factor Correction (PFC)
- Motor drive, photovoltaic inverter, uninterruptible power supply, Wind turbines, train traction systems, electric vehicles.



PKG : TO-247



## Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test Condition	Value	Unit
$V_{RRM}$	Repetitive Peak Reverse Voltage		650	V
$V_{RSM}$	Surge Peak Reverse Voltage		650	V
$V_{DC}$	DC Blocking Voltage		650	V
$I_F$	Continuous Forward Current	$T_C=25^\circ\text{C}$	74	A
		$T_C=100^\circ\text{C}$	50	A
		$T_C=150^\circ\text{C}$	25	A
$I_{FRM}$	Repetitive Peak Forward Surge Current	$T_C=25^\circ\text{C}$ , $t_p=10\text{ms}$ , Half Sine Wave, $D=0.3$	250	A
$I_{FSM}$	Non-repetitive Peak Forward Surge Current	$T_C=25^\circ\text{C}$ , $t_p=10\text{ms}$ , Half Sine Wave	400	A
$P_{TOT}$	Power Dissipation	$T_C=25^\circ\text{C}$	206.5	W
		$T_C=110^\circ\text{C}$	89.5	
$T_j$	Operating Junction		-55 to 175	$^\circ\text{C}$
$T_{stg}$	Storage Temperature		-55 to 175	$^\circ\text{C}$



**Thermal Characteristics**

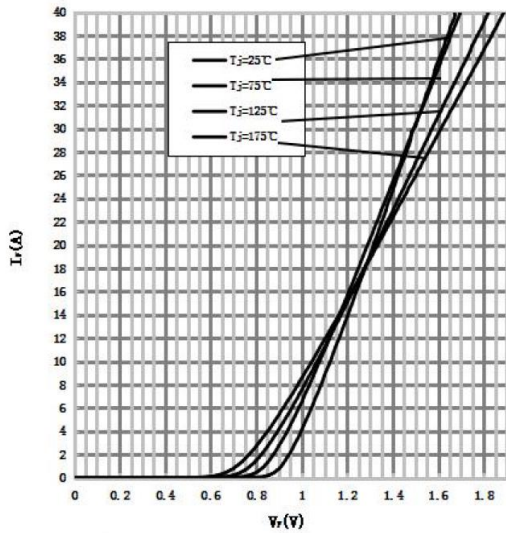
Symbol	Parameter	Test Condition	Value	Unit
			Typ.	
$R_{thJc}$	Thermal resistance from junction to case		0.73	°C/W

**Electrical Characteristics, no specific temperature, junction temperature  $T_j=25^\circ\text{C}$**

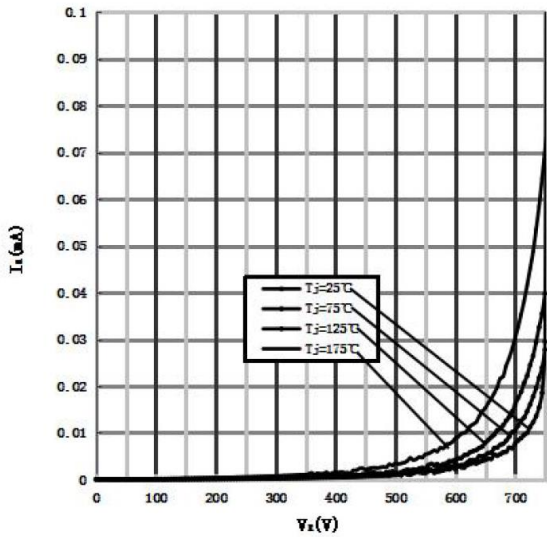
Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$V_F$	Forward Voltage	$I_F=40\text{A}, T_j=25^\circ\text{C}$	1.62	1.8	V
		$I_F=40\text{A}, T_j=175^\circ\text{C}$	1.9	2.5	
$I_R$	Reverse Current	$V_R=650\text{V}, T_j=25^\circ\text{C}$	10	100	$\mu\text{A}$
		$V_R=650\text{V}, T_j=175^\circ\text{C}$	20	200	
$Q_C$	Total capacitive Charge	$V_R=400\text{V}, T_j=150^\circ\text{C}$ $Q_C = \int_0^{V_R} C(V)dV$	168	-	nC
C	Total Capacitance	$V_R=0\text{V}, T_j=25^\circ\text{C}, f=1\text{MHZ}$	4400	4500	pF
		$V_R=200\text{V}, T_j=25^\circ\text{C}, f=1\text{MHZ}$	306	320	
		$V_R=400\text{V}, T_j=25^\circ\text{C}, f=1\text{MHZ}$	302.5	310	

## Performance Graphs

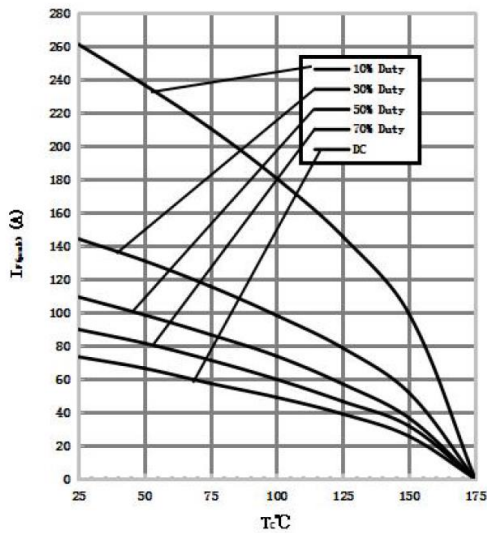
1) Forward IV characteristics as a function of  $T_j$



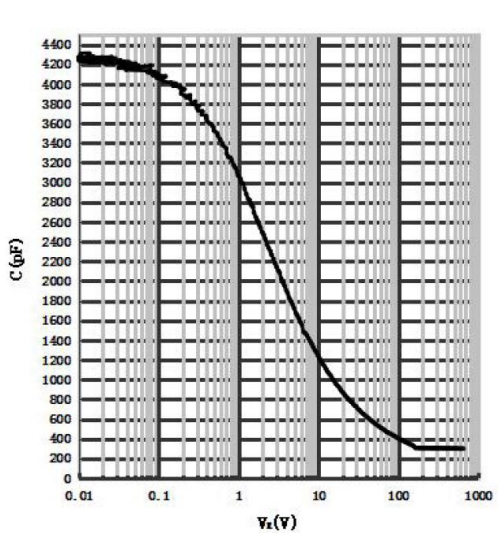
2) Reverse IV characteristics as a function of  $T_j$



3) Current Derating

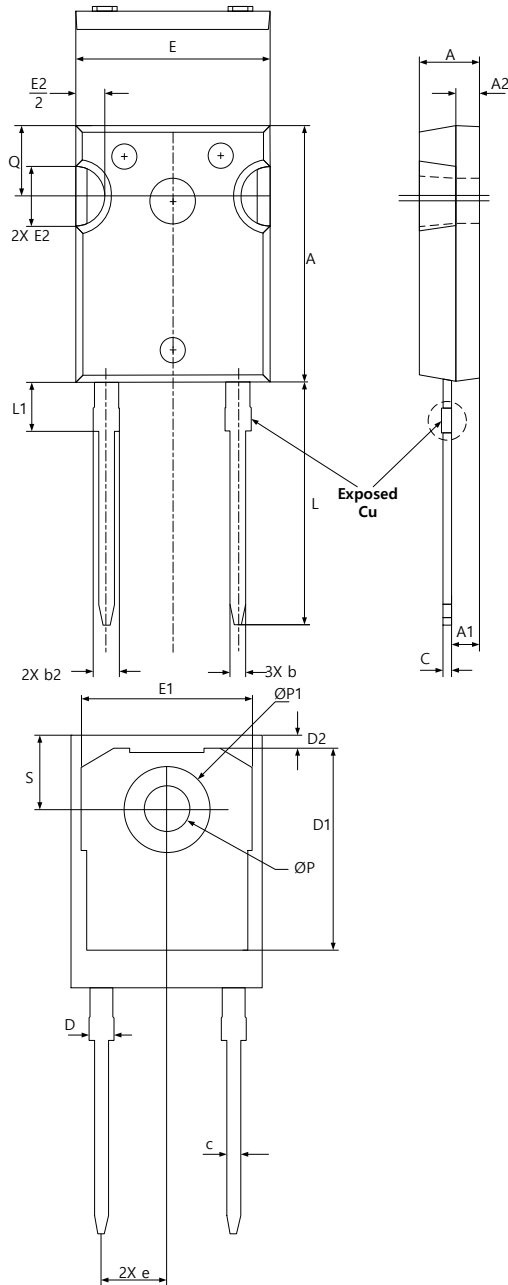


4) Capacitance VS. reverse voltage





### Package Outline



SYMBOL	DIMENSIONS			NOTES
	MIN	NOM	MAX	
<b>A</b>	4.83	5.02	5.21	
<b>A1</b>	2.29	2.41	2.55	
<b>A2</b>	1.50	2.00	2.49	
<b>B</b>	1.12	1.20	1.33	
<b>B1</b>	1.12	1.20	1.28	
<b>B2</b>	1.91	2.00	2.39	6
<b>B3</b>	1.91	2.00	2.34	
<b>C</b>	0.55	0.60	0.69	6
<b>C1</b>	0.55	0.60	0.65	
<b>D</b>	20.80	20.95	21.10	4
<b>D1</b>	16.25	16.55	17.65	5
<b>D2</b>	0.51	1.19	1.35	
<b>E</b>	15.75	15.94	16.13	4
<b>E1</b>	13.46	14.02	14.16	5
<b>E2</b>	4.32	4.91	5.49	3
<b>e</b>	5.44BSC			
<b>L</b>	19.81	20.07	20.32	
<b>L1</b>	4.10	4.19	4.40	6
<b>ØP</b>	3.56	3.61	3.65	7
<b>ØP1</b>	7.19REF			
<b>Q</b>	5.39	5.79	6.20	
<b>S</b>	6.04	6.17	6.30	

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
M <sub>d</sub>	Mounting torque	TO-247 M3 Screw 6-32 Screw	1/8.8	-	Nm/lbf.in.