

# PCD08065C

## 650V Silicon Carbide Diode

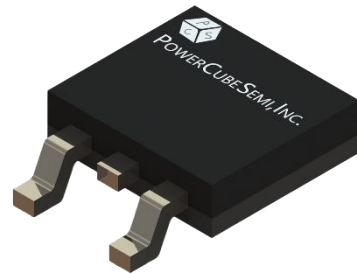
### Features

- 650-Volt Schottky Rectifier
- Shorter recovery time
- High-speed switching possible
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Positive Temperature Coefficient on VF
- RoHS Compliant
- AEC-Q101

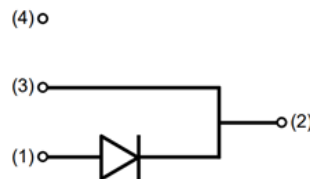
### Applications

- Switch Mode Power Supplies
- Power Factor Correction
- Motor Drives
- Uninterruptible Power Supply
- Solar Inverter
- EV Charger
- On-Board Charger

### Package Outline



PKG : TO-252



1. Anode
2. Case
3. Cathode
4. No Connection

### Absolute Maximum Ratings

$T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Value	Units
$V_{RRM}$	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 $T_C = 25^\circ\text{C}$ $T_C = 150^\circ\text{C}$	24 8	A
$I_{FRM}$	Repetitive Peak Forward Current $T_C = 110^\circ\text{C}$	20	A
$I_{FSM}$	Non-Repetitive Forward Surge Current (PW=10ms sinusoidal) $T_C = 25^\circ\text{C}$ $T_C = 110^\circ\text{C}$	58 46	A
$P_D$	Power Dissipation $T_C = 25^\circ\text{C}$	95	W
$T_J, T_{stg}$	Operating Junction and Storage Temperature	-55 to +175	$^\circ\text{C}$

## Electrical Characteristics

$T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$V_F$	Forward Voltage	$I_F = 8\text{A}, T_C = 25^\circ\text{C}$ $I_F = 8\text{A}, T_C = 175^\circ\text{C}$	- -	1.45 1.95	1.75 2.35	V
$I_R$	Reverse Current	$V_R = 650\text{V}, T_C = 25^\circ\text{C}$ $V_R = 650\text{V}, T_C = 175^\circ\text{C}$	- -	5 25	100 -	$\mu\text{A}$
$Q_C$	Total Capacitive Charge	$V_R = 400\text{V}$	-	28	-	nC
C	Total Capacitance	$V_R = 1\text{V}, f = 1\text{MHz}$ $V_R = 520\text{V}, f = 1\text{MHz}$	- -	325 50	- -	pF

## Thermal Characteristics

$T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Min	Typ	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	--	1.58	1.90	$^\circ\text{C}/\text{W}$

# Typical Characteristics

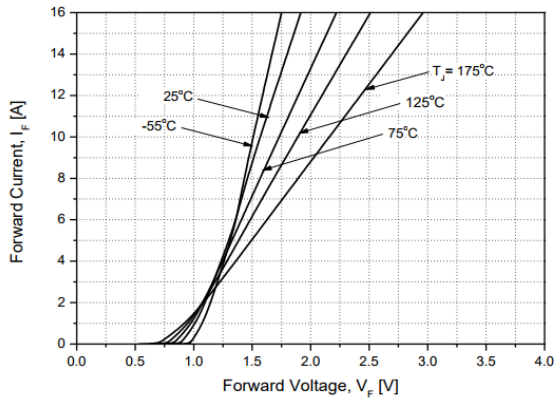


Figure 1. Forward Characteristics

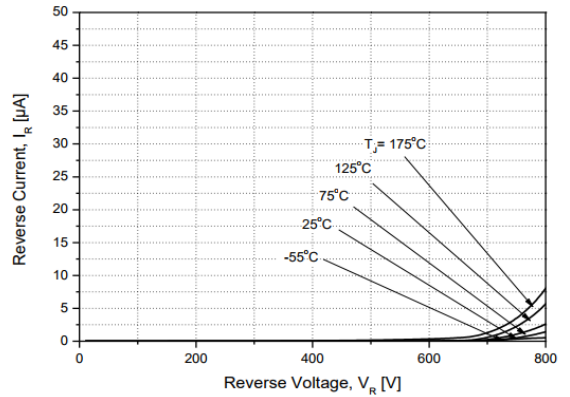


Figure 2. Reverse Characteristics

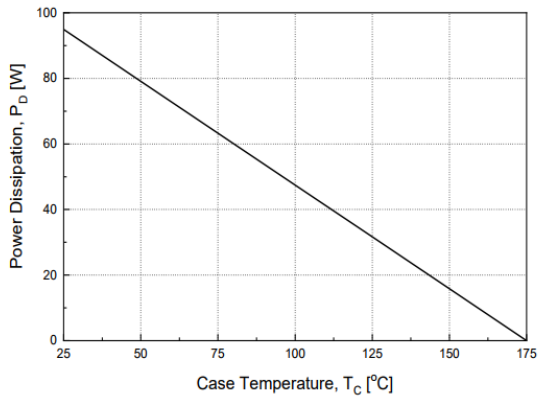


Figure 3. Power Dissipation

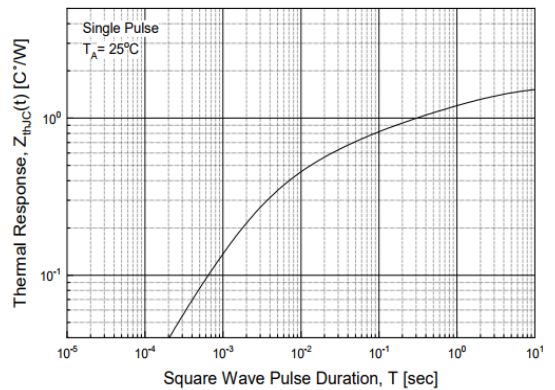


Figure 4. Transient Thermal Resistance

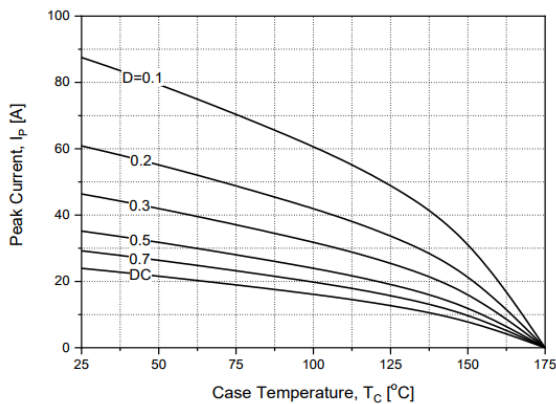


Figure 5. Peak Forward Current Derating

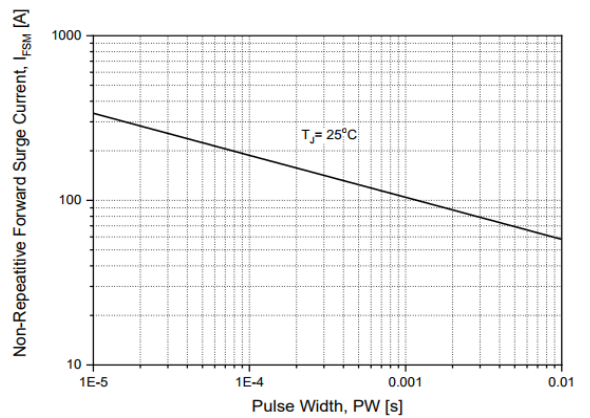


Figure 6. Non-Repetitive Peak Forward Surge Current vs. Pulse Duration

## Typical Characteristics

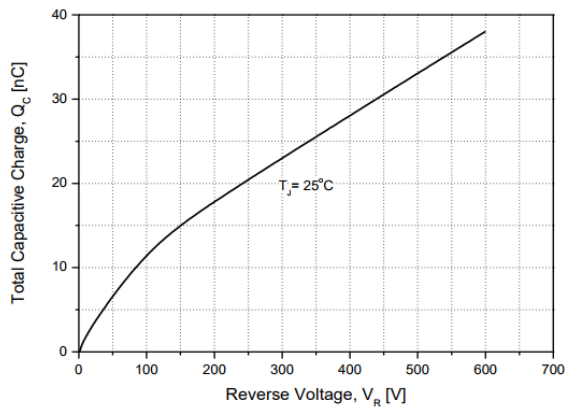


Figure 7. Total Capacitive Charge

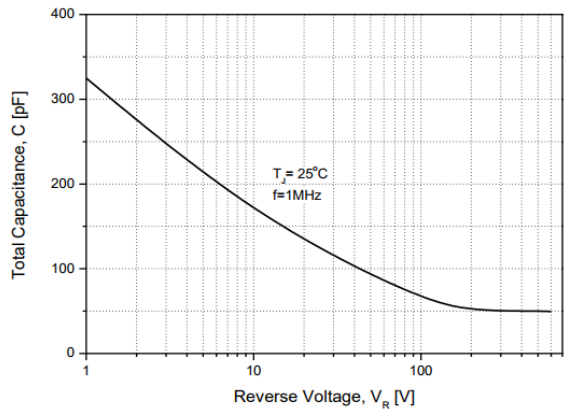


Figure 8. Total Capacitance

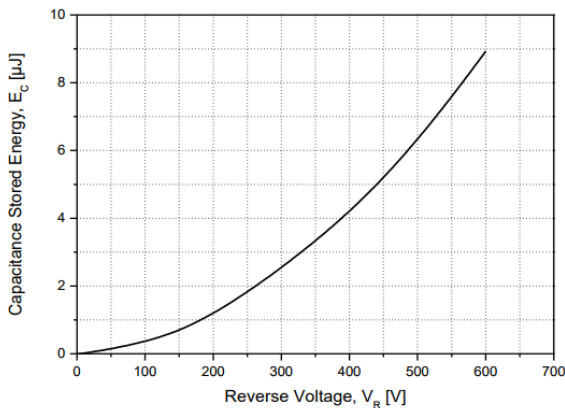


Figure 9. Capacitance Store Energy

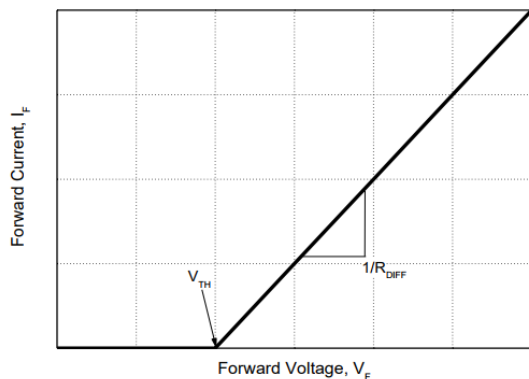


Figure 10. Equivalent Forward Current Curve

$$V_F = V_{TH} + R_{DIFF} \times I_F$$

### Threshold Voltage ( $V_{TH}$ )

$$V_{TH}(T_j) = -0.001 \times (T_j) + 0.950 \text{ [V]}$$

### Differential Resistance ( $R_{DIFF}$ )

$$R_{DIFF}(T_j) = A \times T_j^2 + B \times T_j + C \text{ [}\Omega\text{]}$$

$$A = 9.78 \times 10^{-7}$$

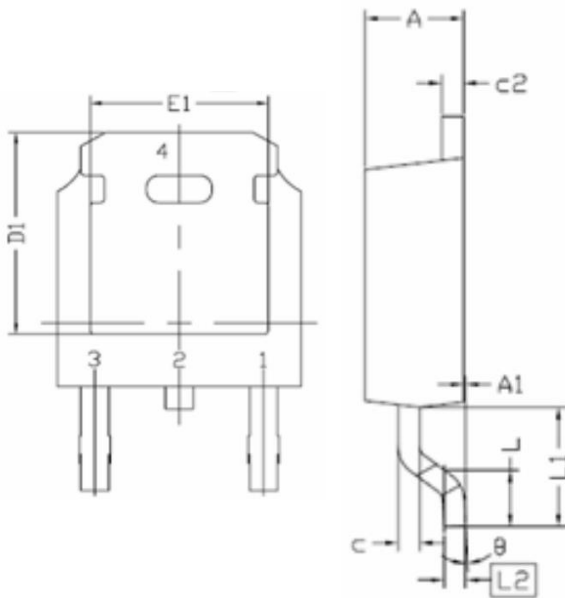
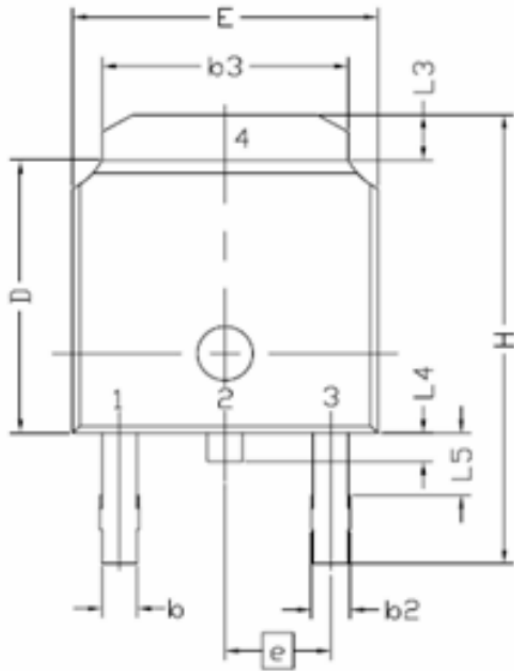
$$B = 2.17 \times 10^{-4}$$

$$C = 5.91 \times 10^{-2}$$

$$[T_j \text{ [}^\circ\text{C]}; -55 \text{ }^\circ\text{C} \leq T_j \leq 175 \text{ }^\circ\text{C}; I_F \leq 8 \text{ A}]$$

# Package Information

Unit : mm



SYMBOL	DIMENSIONS			NOTES
	MIN	NOM	MAX	
E	6.34	6.54	6.74	
L	1.30	1.60	1.90	
L1	2.60	2.90	3.20	
L2	0.5 BSC			
L3	0.82	1.02	1.22	
L4	0.80	1.00	1.20	
L5	2.60	2.90	3.20	
D	5.80	6.10	6.40	
H	8.40	9.00	9.60	
b	1.42	1.52	1.62	
b2	2.35	2.55	2.75	
b3	5.20	5.30	5.40	
e	4.58 BSC			
A	2.08	2.28	2.48	
A1	0.00	0.15	-	
c	0.40	0.50	0.60	
c2	0.40	0.50	0.60	
D1	-	5.25	-	
E1	-	4.8	-	
theta	0.00°	10.00°		