

# PD004065EF / PD004065EF\_G

## 650V Silicon Carbide Diode

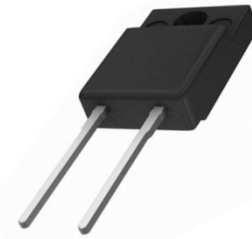
### Features

- 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

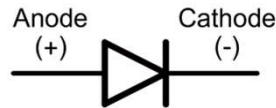
### Applications

- Switch Mode Power Supplies
- Power Factor Correction
- Motor Drives
- HID Lighting

### Package Outline



Cathode Anode



### Absolute Maximum Ratings

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 $T_C = 25^\circ\text{C}$ $T_C = 140^\circ\text{C}$	9 4	A
$I_{FRM}$	Repetitive Peak Forward Current $T_C = 110^\circ\text{C}$	21	A
$I_{FSM}$	Non-Repetitive Forward Surge Current (PW=10ms sinusoidal) $T_C = 25^\circ\text{C}$ $T_C = 110^\circ\text{C}$	20 16	A
$P_D$	Power Dissipation $T_C = 25^\circ\text{C}$	30	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	$I_F = 4\text{A}, T_C = 25^\circ\text{C}$ $I_F = 4\text{A}, T_C = 175^\circ\text{C}$	--	1.5 2.0	1.8 2.4	V
$I_R$	Reverse Current	$V_R = 650\text{V}, T_C = 25^\circ\text{C}$ $V_R = 650\text{V}, T_C = 175^\circ\text{C}$	--	14 28	38 380	$\mu\text{A}$
$Q_C$	Total Capacitive Charge	$V_R = 400\text{V}$	--	10	--	nC
C	Total Capacitance	$V_R = 1\text{V}, T_J = 25^\circ\text{C}, f = 1\text{MHz}$ $V_R = 520\text{V}, T_J = 25^\circ\text{C}, f = 1\text{MHz}$	--	180 25	--	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	--	5.0	6.0	$^\circ\text{C}/\text{W}$

**Package Marking and Ordering Information**

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
PD004065EF	PD004065EF	TO-220F	-	-	50
PD004065EF_G	PD004065EF_G	TO-220F	-	-	50

\* PD004065EF\_G : RoHS Compliant

### Typical Characteristics

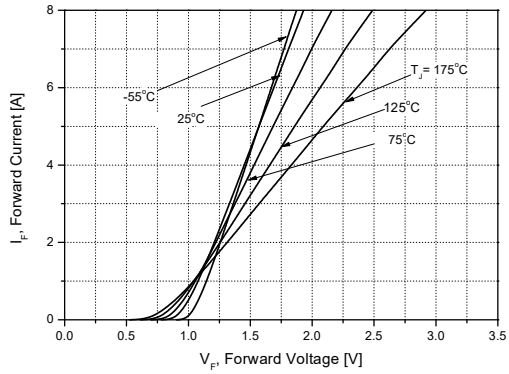


Figure 1. Forward Characteristics

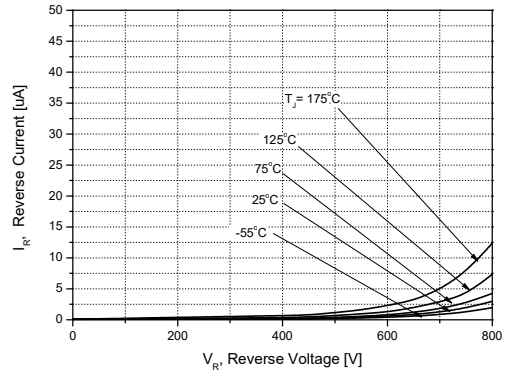


Figure 2. Reverse Characteristics

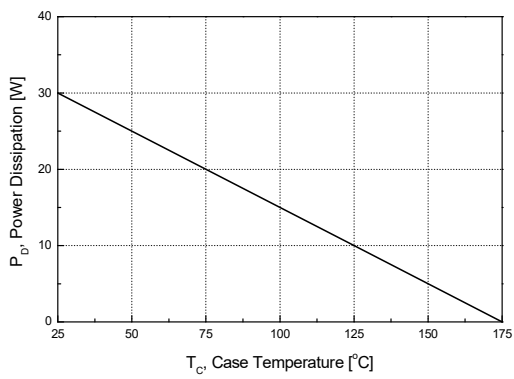


Figure 3. Power Dissipation

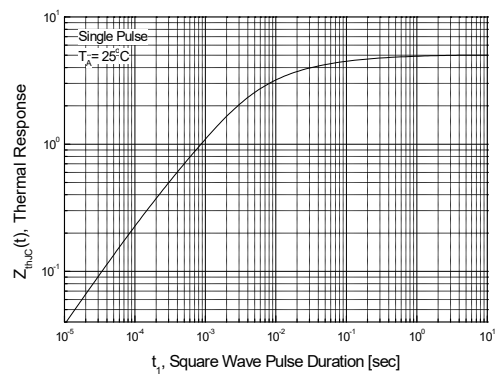


Figure 4. Transient Thermal Resistance

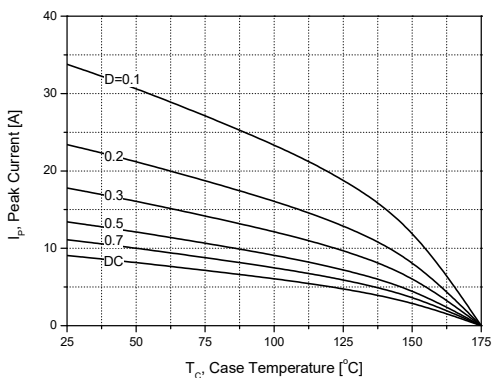


Figure 5. Peak Forward Current Derating

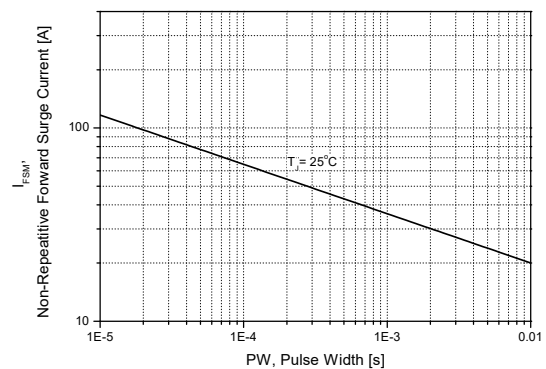
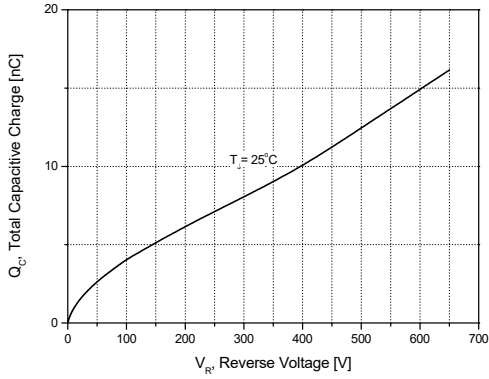
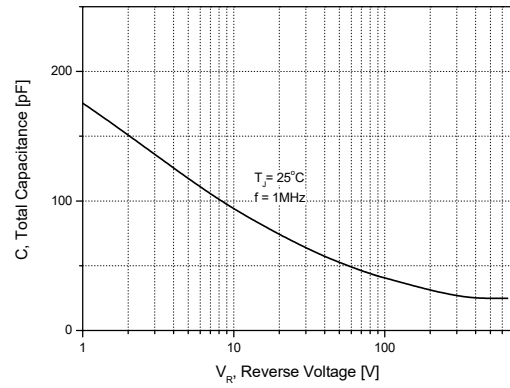


Figure 6. Non-Repetitive Peak Forward Surge Current vs. Pulse Duration

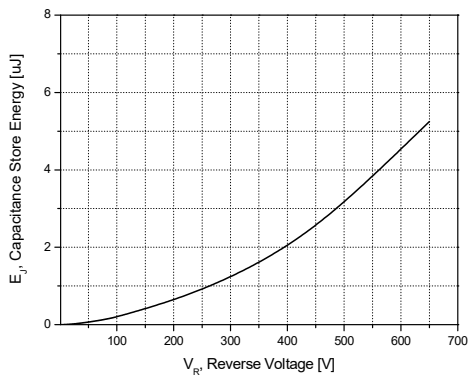
## Typical Characteristics



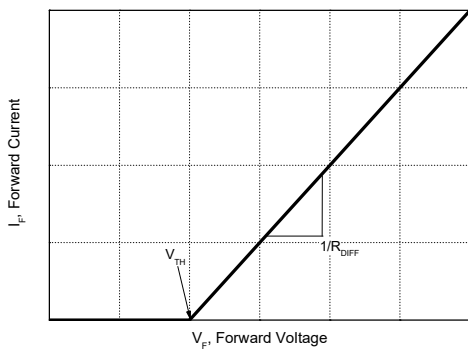
**Figure 7. Total Capacitive Charge**



**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 ( $R_{DIFF}$ )

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

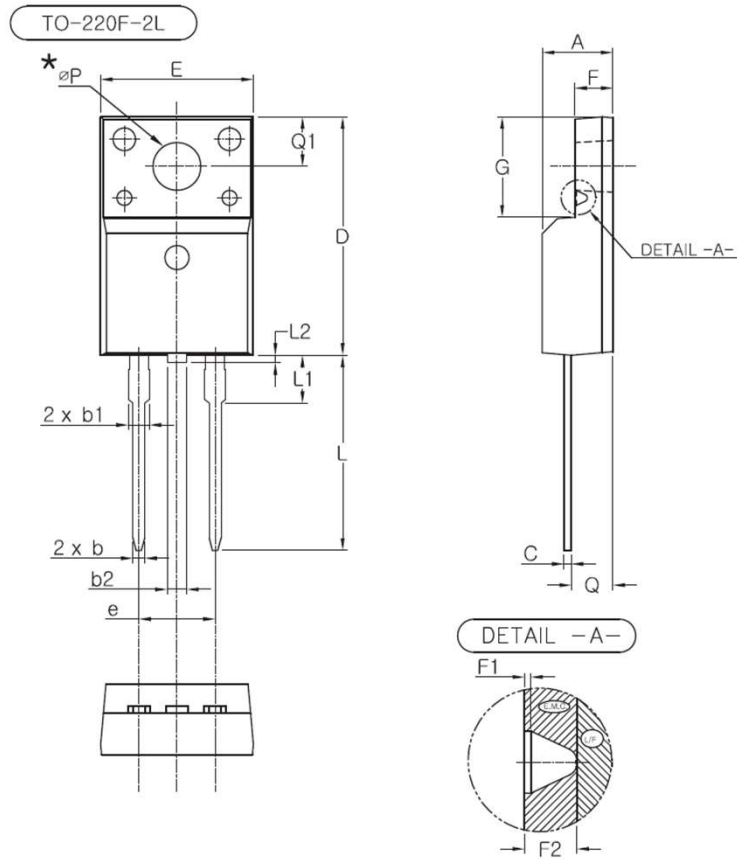
$$A = 2.56 \times 10^{-6}$$

$$B = 4.46 \times 10^{-4}$$

$$C = 10.9 \times 10^{-2}$$

$$[T_j \text{ [}^\circ\text{C]}; -55 \text{ }^\circ\text{C} \leq T_j \leq 175 \text{ }^\circ\text{C}; I_F \leq 4 \text{ A}]$$

Package Information



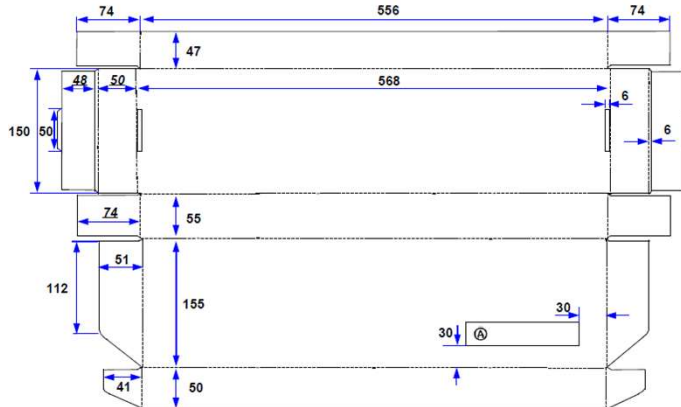
SYMBOL	MIN	NOM	MAX
A	4.50	4.70	4.90
b	0.70	0.80	0.90
b1	1.33	1.40	1.47
b2	0.98	1.28	1.58
C	0.45	0.50	0.60
D	15.67	15.87	16.07
E	9.96	10.16	10.36
e	5.08 BSC		
F	2.34	2.54	2.74
F1	(0.10)		
F2	(0.84)		
G	6.48	6.68	6.88
L	12.78	12.98	13.18
L1	2.98	3.18	3.38
L2	-	-	0.80
Q	2.56	2.76	2.96
Q1	3.10	3.30	3.50
*øP	3.08	3.18	3.28

NOTE

1. THESE DIMENSIONS DO NOT INCLUDE PROTRUSIONS OF THE MOLD.
2. THE '( )' MARK IS THE REFERENCE
3. THE 'L2' SYMBOL IS A PROTRUSION OF THE MOLD.

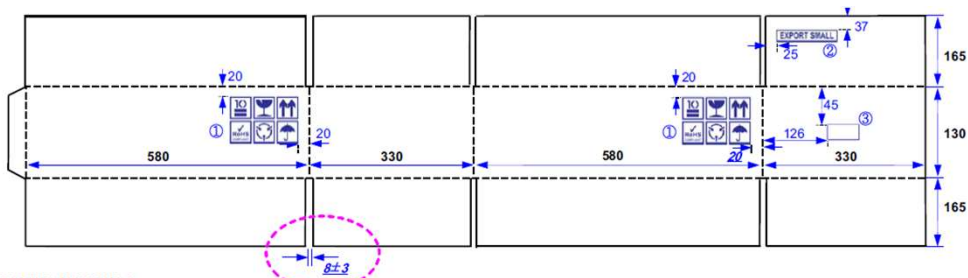
### Packing Information

#### Inner Box



PART ID PDXXXXXXEX_G	PKG Type XX-XXXX-XX
LOT No. XXXXXXXXXXXXXX	QTY X,XXX ea
DATE : XXXX.XX.XX	

#### Outer Box



[ BOX PRINTING MARKING ]



MARKING SIZE (Each Symbol 30\*30)  
COLOR (DARK BLUE)

- ② **EXPORT SMALL**  
MARKING SIZE (112\*20)  
COLOR (DARK BLUE)
- ③   
LABEL MARKING SIZE (75\*35)  
COLOR (DARK BLUE)

- [ NOTE ]
- MATERIAL : KLB175\*K180\*KLB175\*K180\*KLB175  
(SUK175\*K200\*K200\*K200\*SUK175)
  - NAIL QTY : 3 PCS
  - PRINTING TOLERANCE : MARKING SIZE(±3)  
MARKING POSITION(±5)

PART ID : PDXXXXXXEX_G	
LOT NO : XXXXXXXXXXXXX	
QTY : XX,XXXX ea	
DATE : XXXX.XX.XX	

## Notes

- A. Specifications mentioned in this publication are subject to change without notice.
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