

# PD010065ED / PD010065ED\_G

## 650V Silicon Carbide Diode

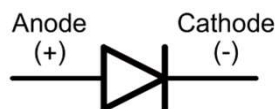
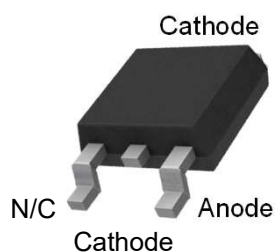
### Features

- 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



### 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	$T_C = 25^\circ\text{C}$ $T_C = 150^\circ\text{C}$	30 10 A
$I_{FRM}$	Repetitive Peak Forward Current	$T_C = 110^\circ\text{C}$	71 A
$I_{FSM}$	Non-Repetitive Forward Surge Current (PW=10ms sinusoidal)	$T_C = 25^\circ\text{C}$ $T_C = 110^\circ\text{C}$	50 40 A
$P_D$	Power Dissipation	$T_C = 25^\circ\text{C}$	106 W
$T_J, T_{stg}$	Operating Junction and Storage Temperature		-55 to +175 °C

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$V_F$	Forward Voltage	$I_F = 10\text{A}, T_C = 25^\circ\text{C}$ $I_F = 10\text{A}, T_C = 175^\circ\text{C}$	--	1.5 2.0	1.8 2.4	V
$I_R$	Reverse Current	$V_R = 650\text{V}, T_C = 25^\circ\text{C}$ $V_R = 650\text{V}, T_C = 175^\circ\text{C}$	--	20 40	50 500	$\mu\text{A}$
$Q_C$	Total Capacitive Charge	$V_R = 400\text{V}$	--	23	--	nC
C	Total Capacitance	$V_R = 1\text{V}, T_J = 25^\circ\text{C}, f = 1\text{MHz}$ $V_R = 520\text{V}, T_J = 25^\circ\text{C}, f = 1\text{MHz}$	--	535 55	--	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	--	1.4	1.7	$^\circ\text{C}/\text{W}$

**Package Marking and Ordering Information**

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
PD010065ED	PD010065ED	D-PAK	380mm	16mm	2500
PD010065ED_G	PD010065ED_G	D-PAK	380mm	16mm	2500

\* PD010065ED\_G : RoHS Compliant

\* Quantity of Tube type : 70ea

### Typical Characteristics

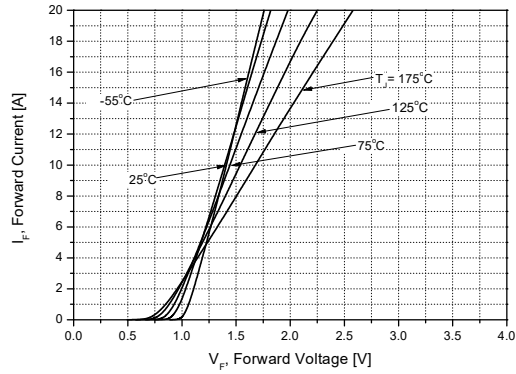


Figure 1. Forward Characteristics

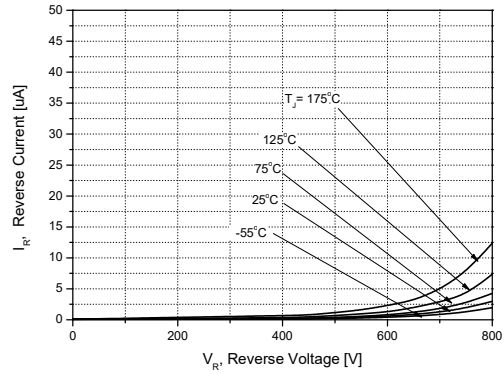


Figure 2. Reverse Characteristics

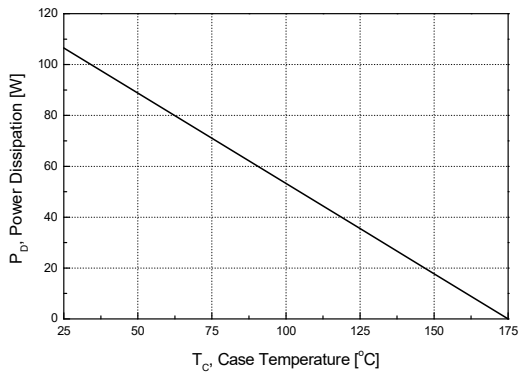


Figure 3. Power Dissipation

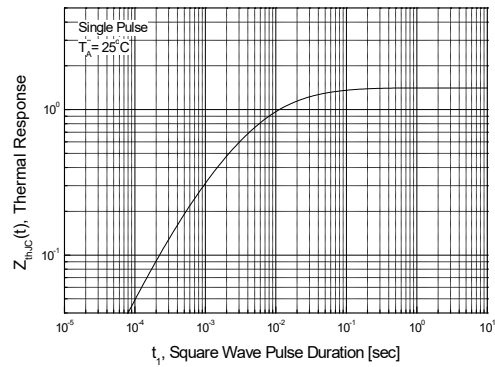


Figure 4. Transient Thermal Resistance

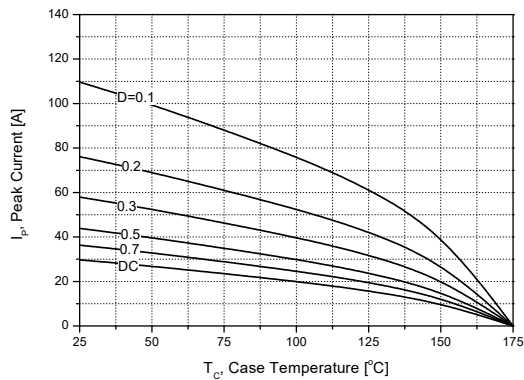


Figure 5. Peak Forward Current Derating

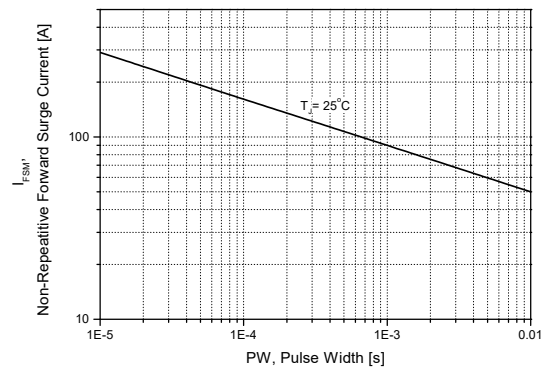
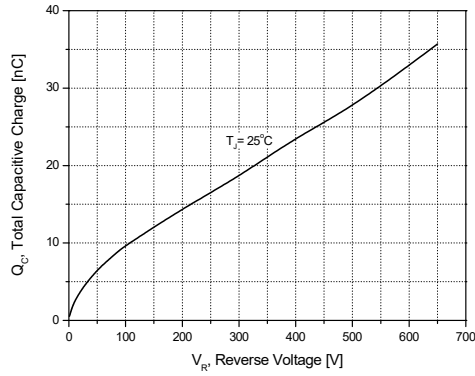
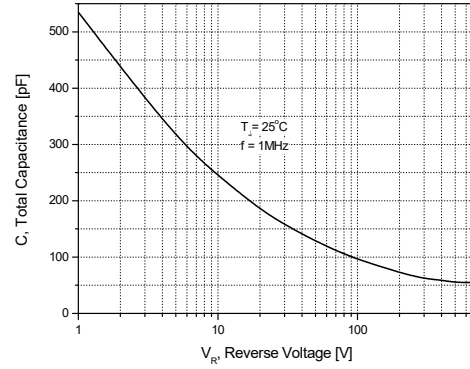


Figure 6. Non-Repetitive Peak Forward Surge Current vs. Pulse Duration

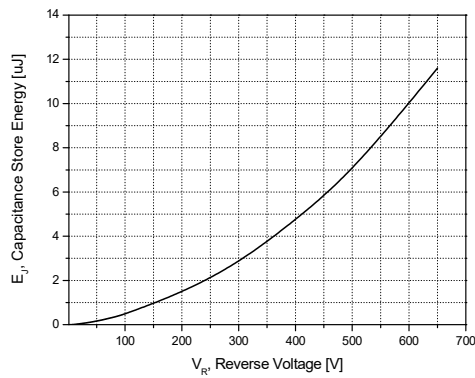
## Typical Characteristics



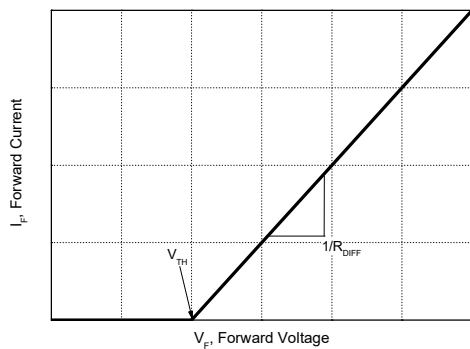
**Figure 7. Total Capacitive Charge**



**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 ( $R_{DIFF}$ )

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

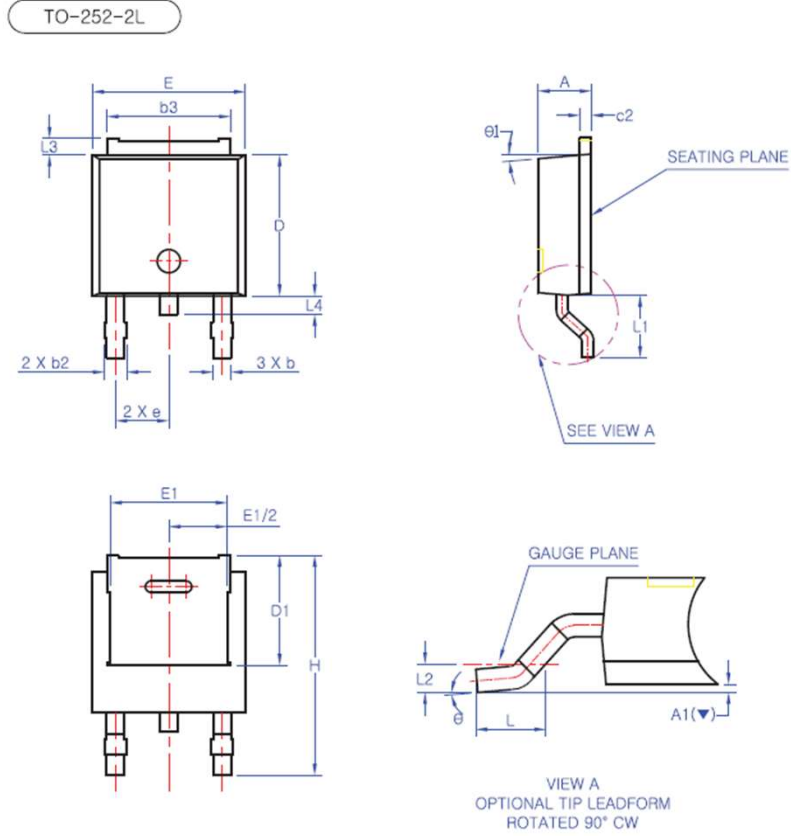
$$A = 9.75 \times 10^{-7}$$

$$B = 1.21 \times 10^{-4}$$

$$C = 3.98 \times 10^{-2}$$

$$[T_j \text{ [}^\circ\text{C]}; -55 \text{ }^\circ\text{C} \leq T_j \leq 175 \text{ }^\circ\text{C}; I_F \leq 10 \text{ A}]$$

## Package Information



SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.40
A1 (▼)	0.00	-	0.127
b	0.66	0.76	0.86
b2	-	-	0.96
b3	5.04	5.34	5.64
c2	0.40	0.50	0.60
D	5.90	6.10	6.30
D1		(4.75)	
E	6.40	6.60	6.80
E1		(5.04)	
e		2.30 BSC	
H	9.20	9.50	9.80
L	1.27	1.47	1.67
L1	2.50	2.70	2.90
L2		0.508 BSC	
L3	0.50	0.70	0.90
L4	0.60	0.80	1.00
θ	0°	-	10°
θ1		(5°)	

**\* NOTE**

1. THESE DIMENSIONS DO NOT INCLUDE PROTRUSIONS OF THE MOLD.
2. THE "( )" MARK IS THE REFERENCE
3. COPLANARITY : MAX 0.10mm
4. THE "L4" SYMBOL IS A PROTRUSION OF THE LEAD FRAME.

## Notes

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