

PD004065EP / PD004065EP_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

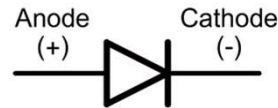
Applications

- 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 $T_C = 25^\circ\text{C}$ $T_C = 150^\circ\text{C}$ | 14 4 | A |
| I_{FRM} | Repetitive Peak Forward Current $T_C = 110^\circ\text{C}$ | 35 | 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 $T_C = 25^\circ\text{C}$ | 56 | 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 | μA |
| 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 | -- | 2.7 | 3.2 | $^{\circ}\text{C}/\text{W}$ |

Package Marking and Ordering Information

| Device Marking | Device | Package | Reel Size | Tape Width | Quantity |
|----------------|--------------|---------|-----------|------------|----------|
| PD004065EP | PD004065EP | TO-220 | - | - | 50 |
| PD004065EP_G | PD004065EP_G | TO-220 | - | - | 50 |

* PD004065EP_G : RoHS Compliant

Typical Characteristics

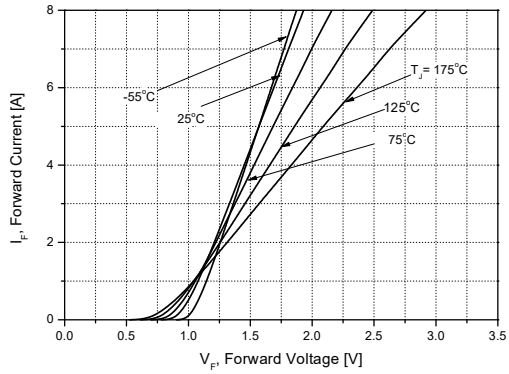


Figure 1. Forward Characteristics

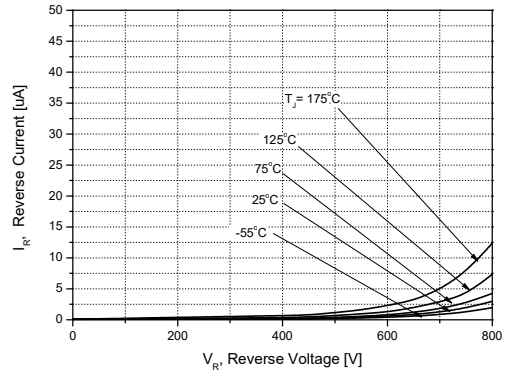


Figure 2. Reverse Characteristics

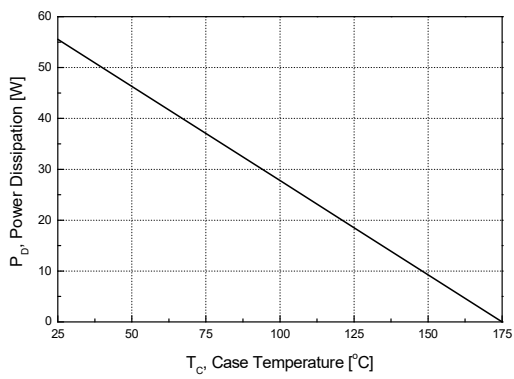


Figure 3. Power Dissipation

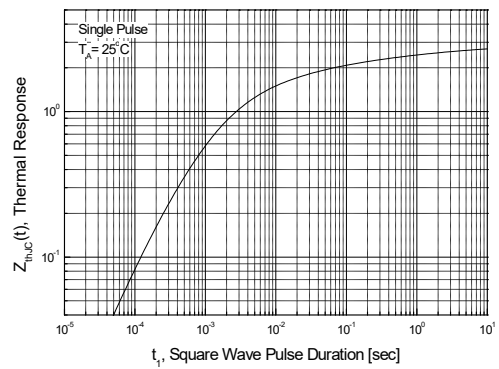


Figure 4. Transient Thermal Resistance

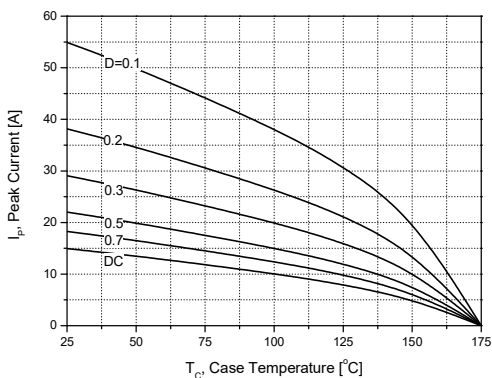


Figure 5. Peak Forward Current Derating

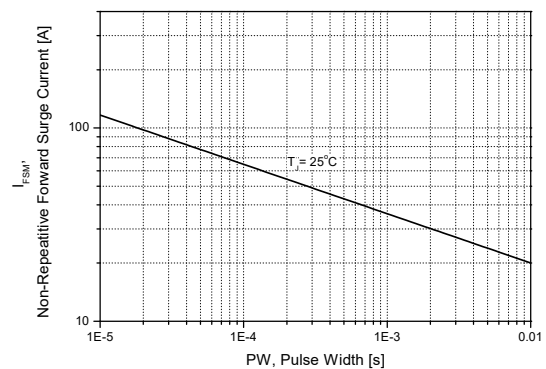


Figure 6. Non-Repetitive Peak Forward Surge Current vs. Pulse Duration

Typical Characteristics

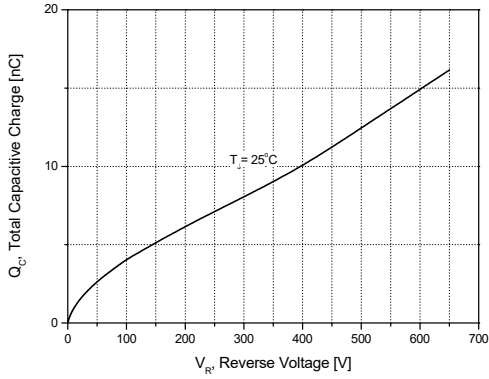


Figure 7. Total Capacitive Charge

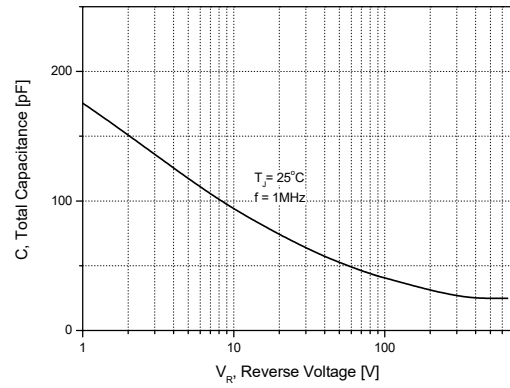


Figure 8. Total Capacitance

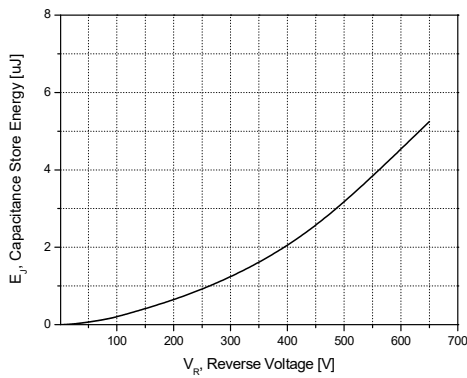


Figure 9. Capacitance Store Energy

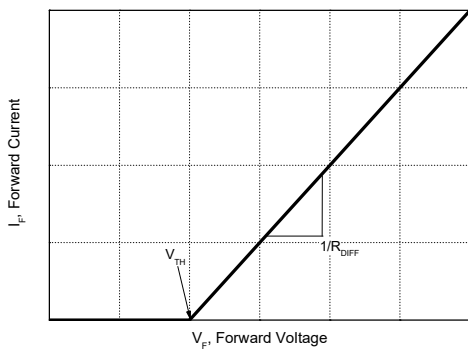


Figure 10. Equivalent Forward Current Curve

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

Threshold Voltage(V_{TH})

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

Differential Resistance (R_{DIFF})

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

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

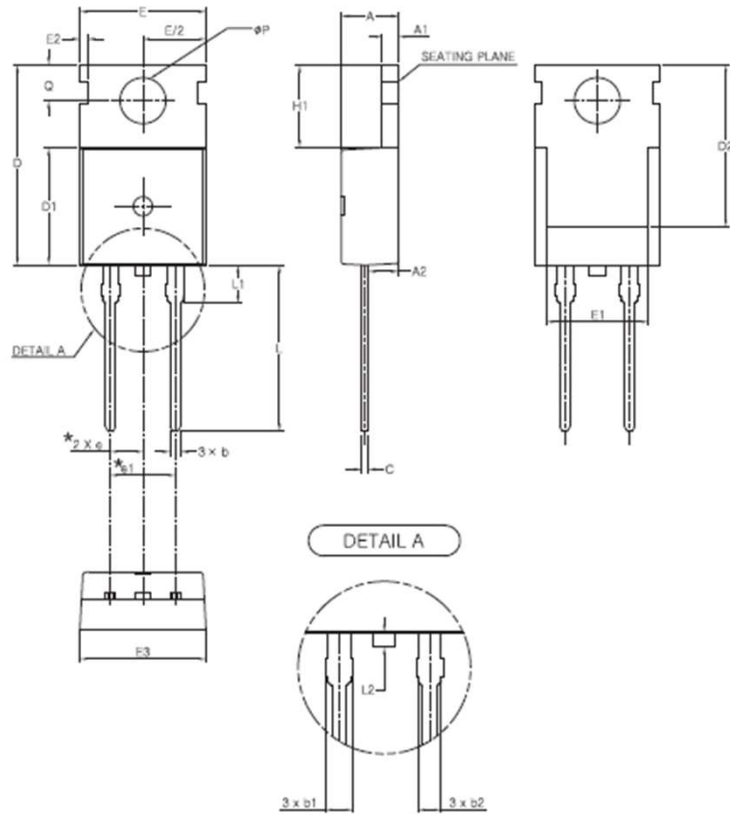
$$B = 4.46 \times 10^{-4}$$

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

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

Package Information

TO-220-2L



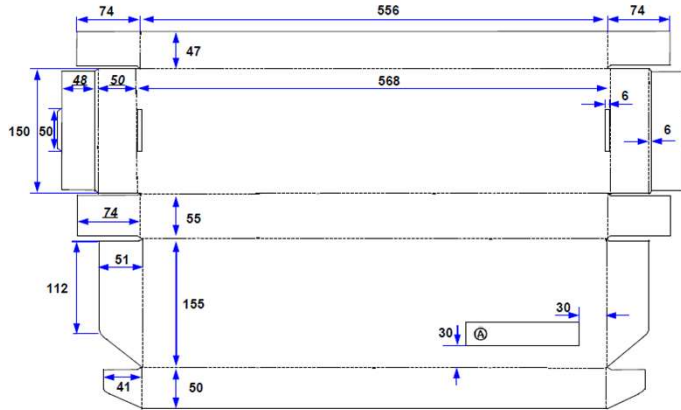
| SYMBOL | MIN | NOM | MAX |
|--------|----------|-------|-------|
| A | 4.30 | 4.50 | 4.70 |
| A1 | 1.25 | 1.30 | 1.40 |
| A2 | 2.20 | 2.40 | 2.60 |
| b | 0.70 | 0.80 | 0.90 |
| b1 | 1.42 | 1.52 | 1.62 |
| b2 | 1.17 | 1.27 | 1.37 |
| c | 0.45 | 0.50 | 0.60 |
| D | 15.50 | 15.70 | 15.90 |
| D1 | 9.00 | 9.20 | 9.40 |
| D2 | (12.70) | | |
| E | 9.70 | 9.90 | 10.10 |
| E1 | (8.00) | | |
| E2 | (0.60) | | |
| E3 | 9.70 | 9.90 | 10.10 |
| e | 2.54 BSC | | |
| e1 | 5.08 BSC | | |
| H1 | 6.30 | 6.50 | 6.70 |
| L | 12.88 | 13.08 | 13.28 |
| L1 | (3.00) | | |
| L2 | - | - | 0.80 |
| phi P | 3.50 | 3.60 | 3.70 |
| Q | 2.70 | 2.80 | 2.90 |

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
- * 4. IT HAVE TO APPLY 'TO-220-3L MOLD DIE'

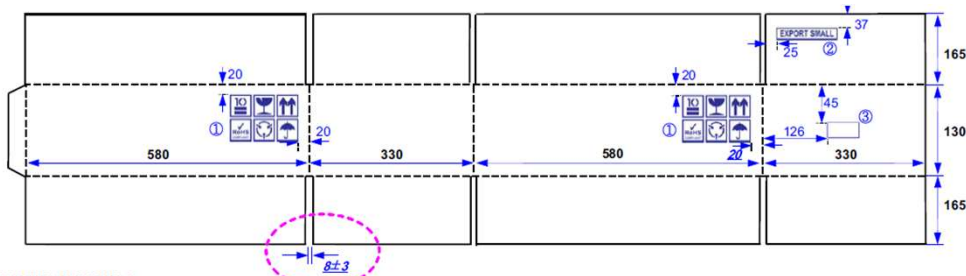
Packing Information

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 : XXXXXXXXXXXX | |
| QTY | : XX,XXXX ea |
| | |
| DATE : XXXX.XX.XX | |

Notes

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