# PD020065E1H / PD020065E1H_G
## 650V Silicon Carbide Diode

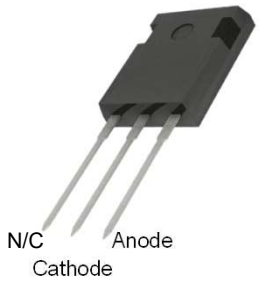
### Features

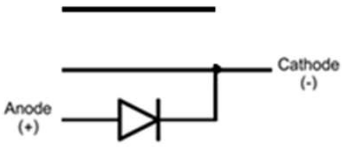
- 650-Volt Schottky Rectifier
- Shorter recovery time
- High-speed switching possible
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Positive Temperature Coefficient on VF
- RoHS Compliant

### 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˚C<br>$T_C$ = 140˚C | 47<br>20 | A |
| $I_{FRM}$ | Repetitive Peak Forward Current | $T_C$ = 110˚C | 106 | A |
| $I_{FSM}$ | Non-Repetitive Forward Surge Current | $T_C$ = 25˚C<br>$T_C$ = 110˚C | 100<br>80 | A |
| $P_D$ | Power Dissipation | $T_C$ = 25˚C | 176 | W |
| $T_J$, Tstg | Operating Junction and Storage Temperature | | -55 to +175 | ℃ |

## Electrical Characteristics

$T_C$ = 25°C unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| $V_F$ | Forward Voltage | $I_F$ = 20A, $T_C$ = 25°C<br>$I_F$ = 20A, $T_C$ = 175°C | -- | 1.5<br>2.0 | 1.8<br>2.4 | V |
| $I_R$ | Reverse Current | $V_R$ = 650V $T_C$ = 25°C<br>$V_R$ = 650V $T_C$ = 175°C | -- | 30<br>60 | 70<br>700 | uA |
| $Q_C$ | Total Capacitive Charge | $V_R$ = 400V | -- | 45 | -- | nC |
| C | Total Capacitance | $V_R$ = 1V, $T_J$ = 25°C, f = 1MHz<br>$V_R$ = 520V, $T_J$ = 25°C, f = 1MHz | -- | 850<br>113 | -- | pF |

## Thermal Characteristics

$T_C$ = 25°C unless otherwise noted

| Symbol | Parameter | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | -- | 0.85 | 1.05 | ℃/W |

## Package Marking and Ordering Information

| Device Marking | Device | Package | Reel Size | Tape Width | Quantity |
|---|---|---|---|---|---|
| PD020065E1H | PD020065E1H | TO-247 | - | - | 30 |
| PD020065E1H_G | PD020065E1H_G | TO-247 | - | - | 30 |

* PD020065E1H_G : RoHS Compliant

## Typical Characteristics

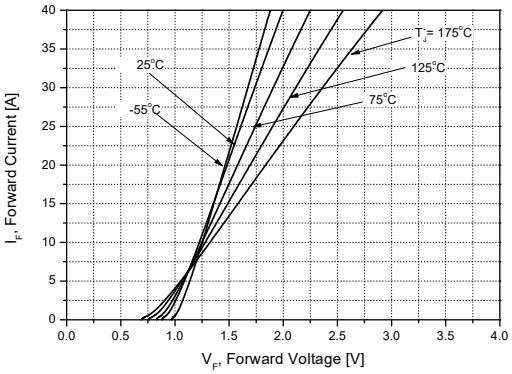



**Figure 1. Forward Characteristics**

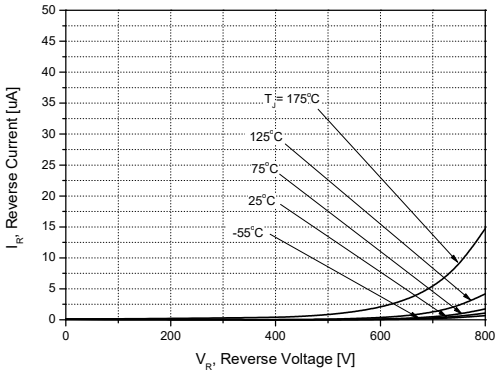



**Figure 2. Reverse Characteristics**

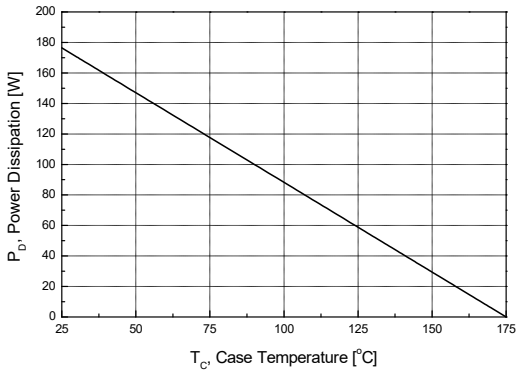



**Figure 3. Power Dissipation**

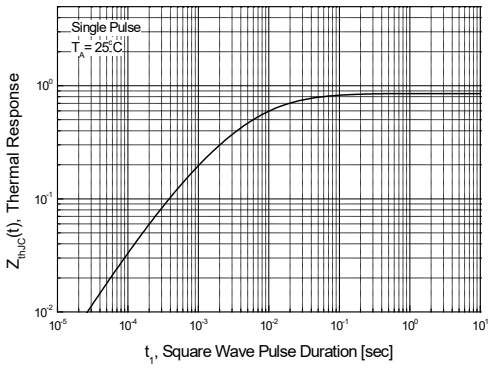



**Figure 4. Transient Thermal Resistance**

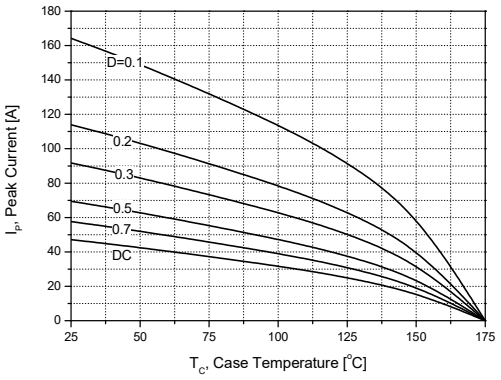



**Figure 5. Peak Forward Current Derating**

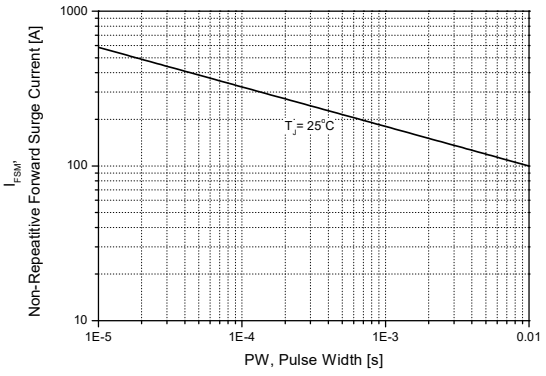



**Figure 6. Non-Repetitive Peak Forward Surge Current vs. Pulse Duration**

## Typical Characteristics

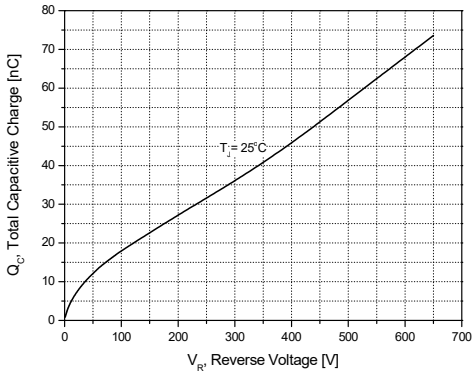



**Figure 7. Total Capacitive Charge**

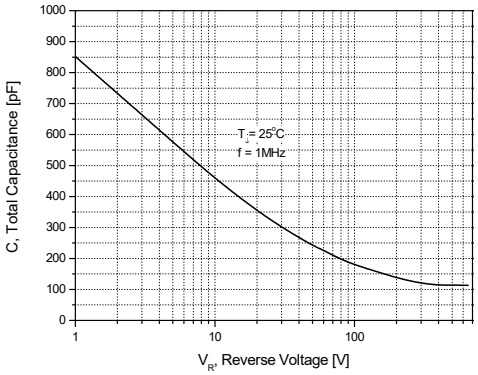



**Figure 8. Total Capacitance**

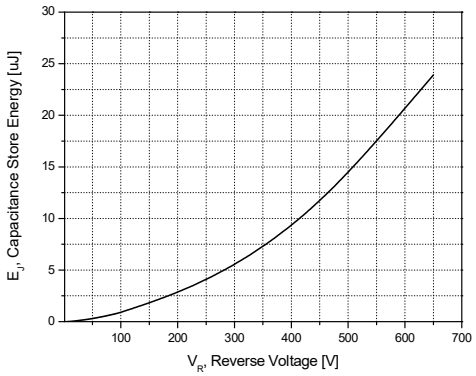



**Figure 9. Capacitance Store Energy**

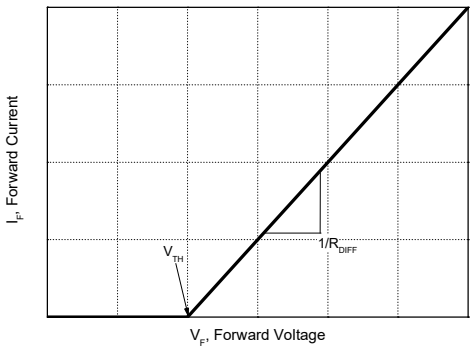



**Figure 10. Equivalent Forward Current Curve**

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

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

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

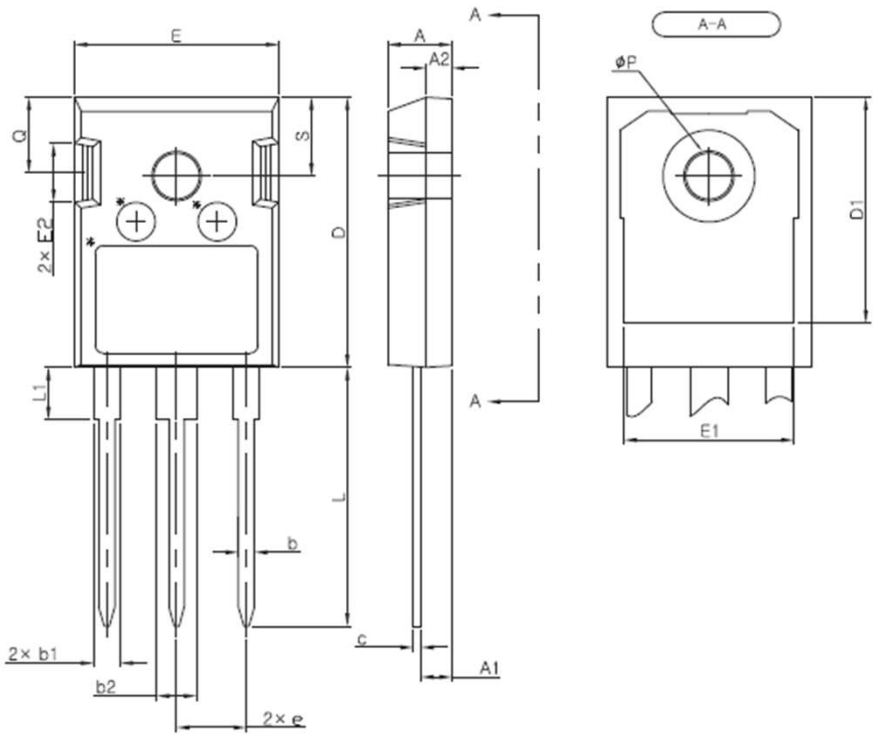
### Differential Resistance ($R_{DIFF}$)

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

$A = 6.82 \times 10^{-7}$
$B = 8.19 \times 10^{-5}$
$C = 2.46 \times 10^{-2}$

*[$T_j$ [°C]; -55 °C ≤ $T_j$ ≤ 175 °C; IF ≤ 20 A]*

## Package Information



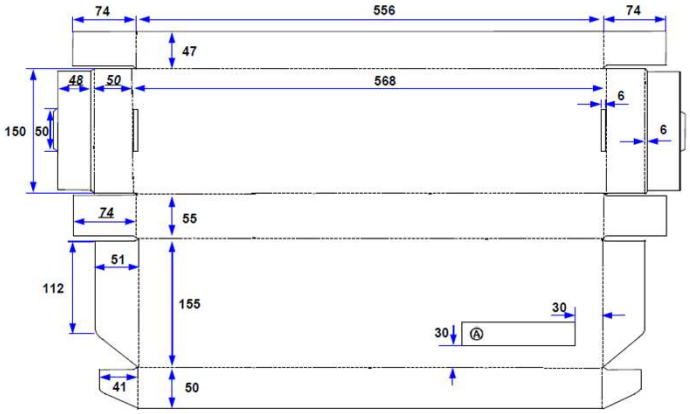

| SYMBOL | MIN | NOM | MAX |
|---|---|---|---|
| A | 4.80 | 5.00 | 5.20 |
| A1 | 2.29 | 2.41 | 2.54 |
| A2 | 1.90 | 2.00 | 2.10 |
| b | 1.10 | 1.20 | 1.30 |
| b1 | 1.91 | 2.10 | 2.20 |
| b2 | 2.92 | 3.10 | 3.20 |
| c | 0.50 | 0.60 | 0.70 |
| D | 20.80 | 21.07 | 21.34 |
| D1 | 17.43 | 17.63 | 17.83 |
| E | 15.75 | 15.94 | 16.13 |
| E1 | 13.06 | 13.26 | 13.46 |
| E2 | 4.32 | 4.58 | 4.83 |
| e | 5.45 BSC | | |
| L | 19.81 | 20.19 | 20.57 |
| L1 | 3.81 | 4.07 | 4.32 |
| ØP | 3.55 | 3.60 | 3.65 |
| Q | 5.59 | 5.90 | 6.20 |
| S | 6.15 BSC | | |

NOTE

1. THESE DIMENSION DO NOT INCLUDE MOLD PROTRUSION

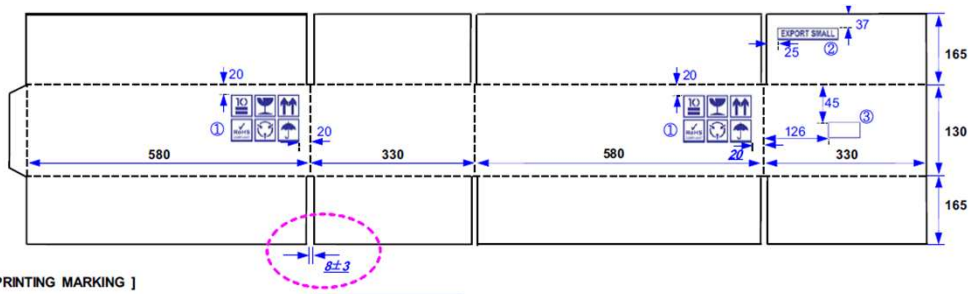
## Packing Information

### Inner Box




| | |
|---|---|
| PART ID<br>PDXXXXXXEX_G | PKG Type<br>XX-XXXX-XX |
| LOT No.<br>XXXXXXXXXXXXX | QTY<br>X,XXX ea |
| YES POWER TECHNIX | DATE : XXXX.XX.XX |

### Outer Box




[ BOX PRINTING MARKING ]

① 

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 ]
1. MATERIAL : KLB175*K180*KLB175*K180*KLB175 (SUK175*K200*K200*K200*SUK175)
2. NAIL QTY : 3 PCS
3. PRINTING TOLERANCE : MARKING SIZE(±3) MARKING POSITION(±5)

PART ID : PDXXXXXXEX_G

LOT NO : XXXXXXXXXXXX

QTY : XX,XXXX ea

YES POWER TECHNIX DATE : XXXX.XX.XX

**Notes**

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