PowerCubeSemi, Inc.
Potential · Convergence · Smart

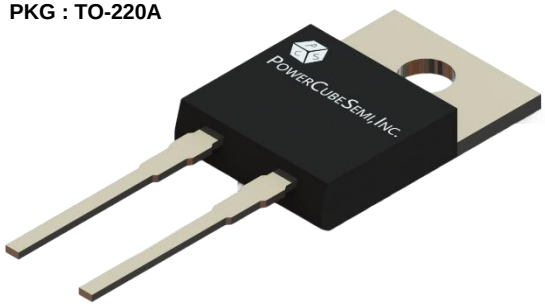
# PCD15120A
## 1200V Silicon Carbide Diode

### Features

- 1200-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

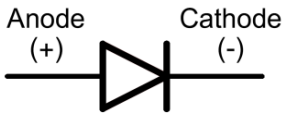
### Package Outline

**PKG : TO-220A**




### Applications

- Switch Mode Power Supplies
- Server/Telecom Power Supplies
- Industrial Power Supplies
- Solar Inverter
- Uninterruptible Power Supply




RoHS

Halogen-Free

### Absolute Maximum Ratings

$T_C$ = 25°C unless otherwise noted

| Symbol | Parameter | | Value | Units |
|---|---|---|---|---|
| $V_{RRM}$ | Repetitive Peak Reverse Voltage | | 1200 | V |
| $V_{RSM}$ | Surge Peak Reverse Voltage | | 1200 | V |
| $V_{DC}$ | DC Blocking Voltage | | 1200 | V |
| $I_F$ | Continuous Forward Current | $T_C$ = 25˚C<br>$T_C$ = 145˚C | 38<br>15 | A |
| $I_{FRM}$ | Repetitive Peak Forward Current | $T_C$ = 110˚C | 89 | A |
| $I_{FSM}$ | Non-Repetitive Forward Surge Current (PW=10ms sinusoidal) | $T_C$ = 25˚C<br>$T_C$ = 110˚C | 120<br>96 | A |
| $P_D$ | Power Dissipation | $T_C$ = 25˚C | 174 | 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 | $I_F$ = 15A, $T_C$ = 25°C<br>$I_F$ = 15A, $T_C$ = 175°C | -- | 1.45<br>2.0 | 1.75<br>2.4 | V |
| $I_R$ | Reverse Current | $V_R$ = 1200V $T_C$ = 25°C<br>$V_R$ = 1200V $T_C$ = 175°C | -- | 10<br>50 | 200<br>- | uA |
| $Q_C$ | Total Capacitive Charge | $V_R$ = 800V | -- | 88 | -- | nC |
| C | Total Capacitance | $V_R$ = 1V, $T_J$ = 25°C, f = 1MHz<br>$V_R$ = 800V, $T_J$ = 25°C, f = 1MHz | -- | 844<br>70 | -- | pF |

## Thermal Characteristics

$T_C$ = 25°C unless otherwise noted

| Symbol | Parameter | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | -- | 0.86 | 1.03 | ℃/W |

## Typical Characteristics

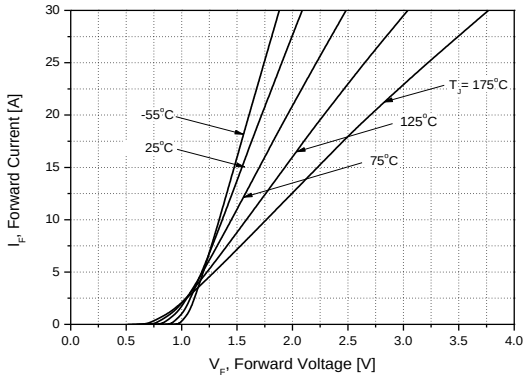



**Figure 1. Forward Characteristics**

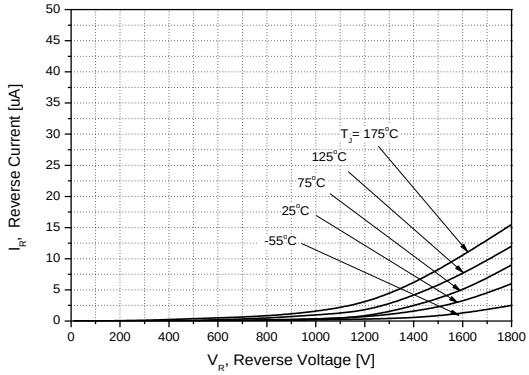



**Figure 2. Reverse Characteristics**

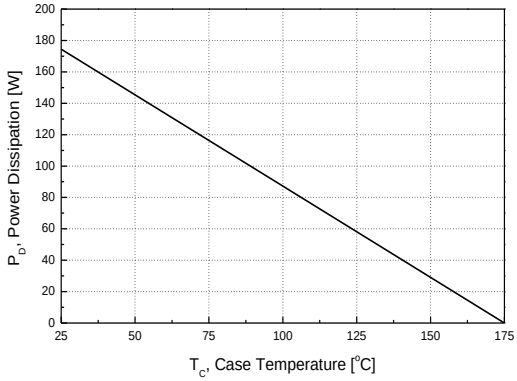



**Figure 3. Power Dissipation**

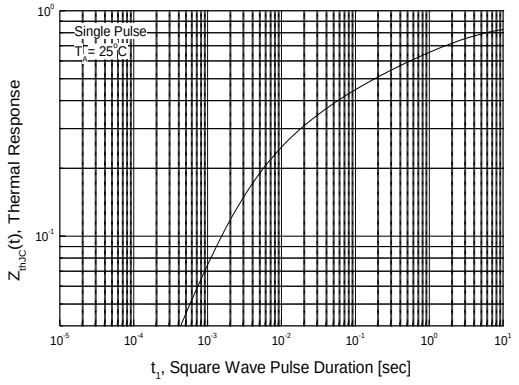



**Figure 4. Transient Thermal Resistance**

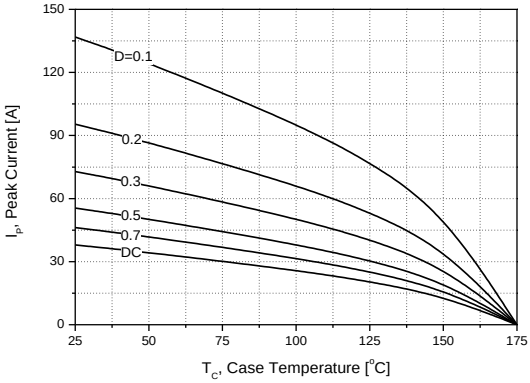



**Figure 5. Peak Forward Current Derating**

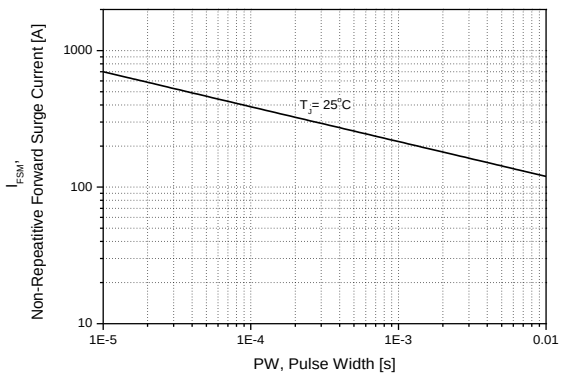



**Figure 6. Non-Repetitive Peak Forward Surge Current vs. Pulse Duration**

## Typical Characteristics

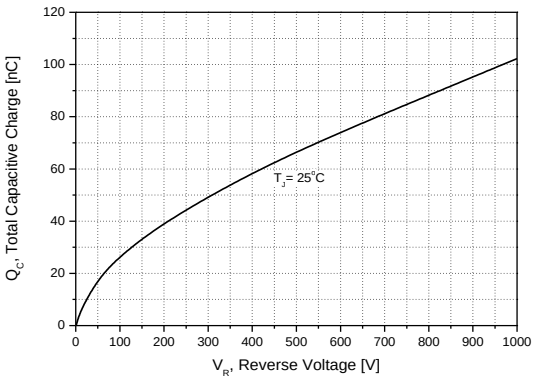



**Figure 7. Total Capacitive Charge**

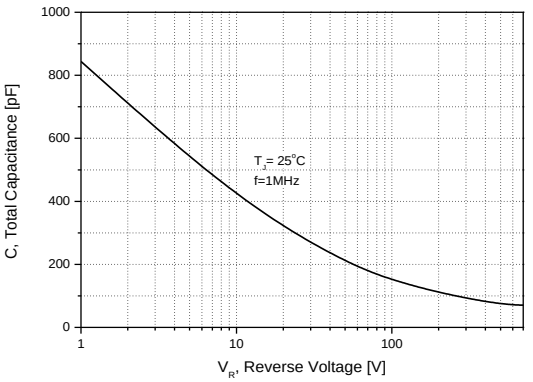



**Figure 8. Total Capacitance**

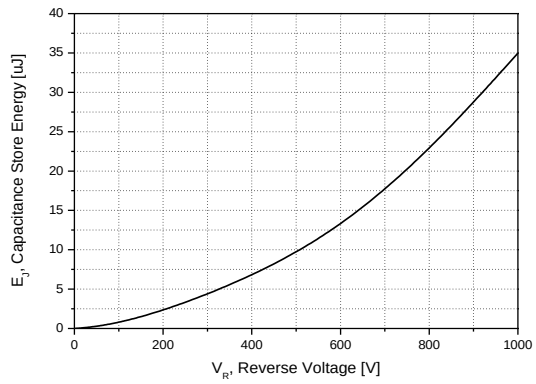



**Figure 9. Capacitance Store Energy**

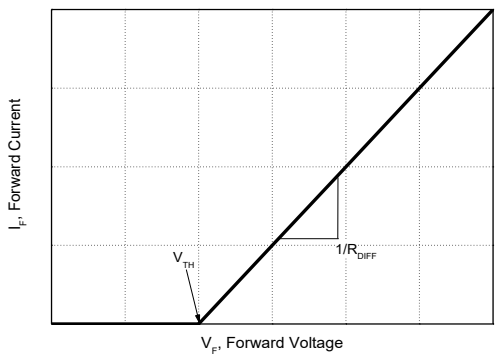



**Figure 10. Equivalent Forward Current Curve**

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

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

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

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

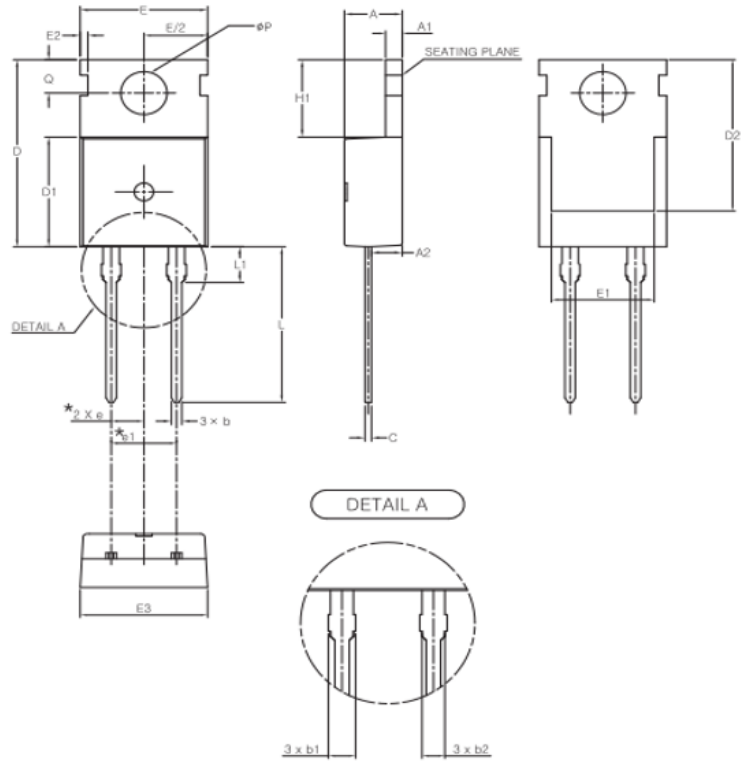
$R_{DIFF}(T_j) = A \times T_j^2 + B \times T_j + C$ [Ω]

$A = 9.54 \times 10^{-7}$
$B = 2.12 \times 10^{-4}$
$C = 3.04 \times 10^{-2}$

*[$T_j$ [°C]; -55 °C ≤ $T_j$ ≤ 175 °C; IF ≤ 15 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) | |
| ΦP | 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. IT HAVE TO APPLY THE "TO-220-2L MOLD DIE"