PowerCubeSemi, Inc.
Potential · Convergence · Smart

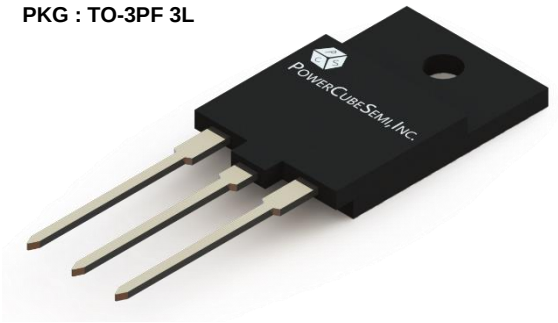
PCD20065V
650V Silicon Carbide Diode

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

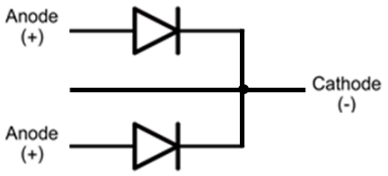
Package Outline

PKG : TO-3PF 3L



Applications

- Switch Mode Power Supplies
- Power Factor Correction
- Motor Drives
- Uninterruptible Power Supply
- Solar Inverter
- EV Charger



RoHS

Halogen-Free

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

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 T_C = 95˚C	14 / 28 10 / 20	A
I_{FRM}	Repetitive Peak Forward Current	T_C = 110˚C	36 / 72	A
I_{FSM}	Non-Repetitive Forward Surge Current (PW=10ms sinusoidal)	T_C = 25˚C T_C = 110˚C	80 / 160 64 / 128	A
P_D	Power Dissipation	T_C = 25˚C	34 / 68	W
T_J, Tstg	Operating Junction and Storage Temperature		-55 to +175	℃

* Per Leg / Per Device

Electrical Characteristics (Per Leg)

T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V_F	Forward Voltage	I_F = 10A, T_C = 25°C I_F = 10A, T_C = 175°C	--	1.45 2.0	1.75 2.4	V
I_R	Reverse Current	V_R = 650V T_C = 25°C V_R = 650V T_C = 175°C	--	5 25	100 -	uA
Q_C	Total Capacitive Charge	V_R = 400V	--	39	--	nC
C	Total Capacitance	V_R = 1V, T_J = 25°C, f = 1MHz V_R = 520V, T_J = 25°C, f = 1MHz	--	467 67	--	pF

Thermal Characteristics

T_C = 25°C unless otherwise noted

Symbol	Parameter	Min	Typ	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	--	4.4 / 2.2	5.3 / 2.6	℃/W

* Per Leg / Per Device

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
P2CD20065V	P2CD20065	TO-3PF-3L	-	-	30

* P2DCD20065V : RoHS Compliant

Typical Characteristics (Per Leg)

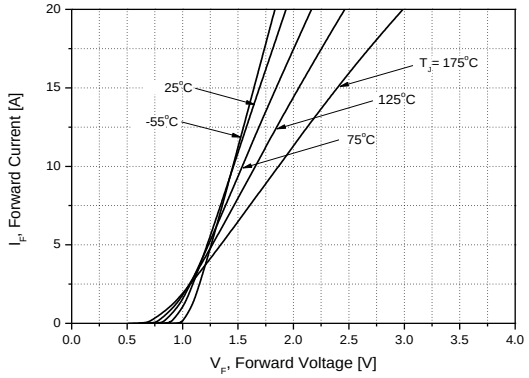


Figure 1. Forward Characteristics

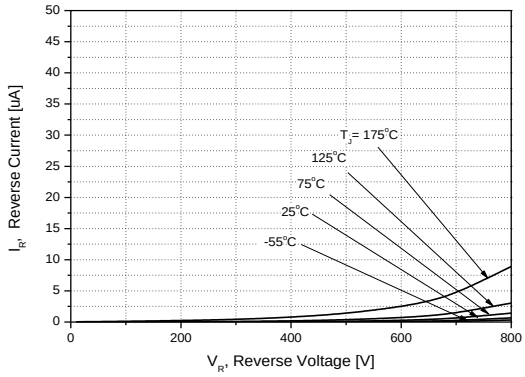


Figure 2. Reverse Characteristics

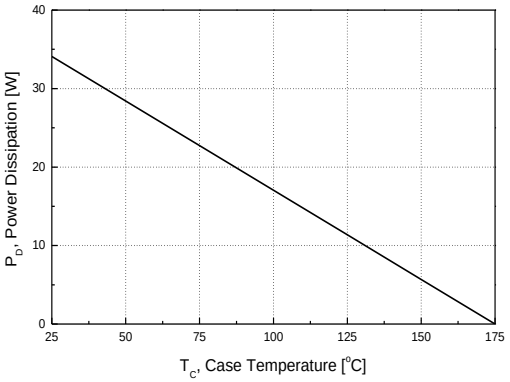


Figure 3. Power Dissipation

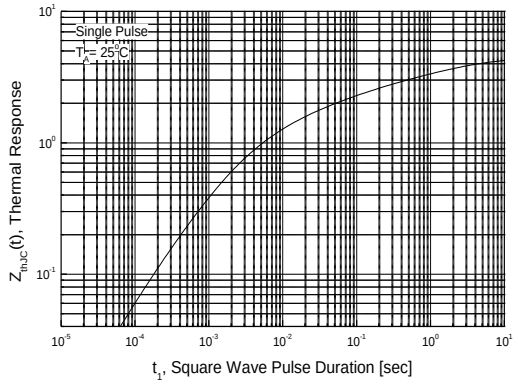


Figure 4. Transient Thermal Resistance

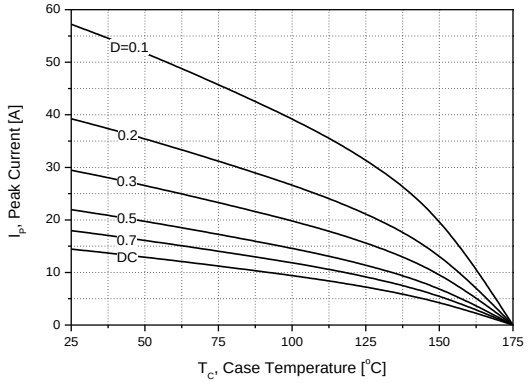


Figure 5. Peak Forward Current Derating

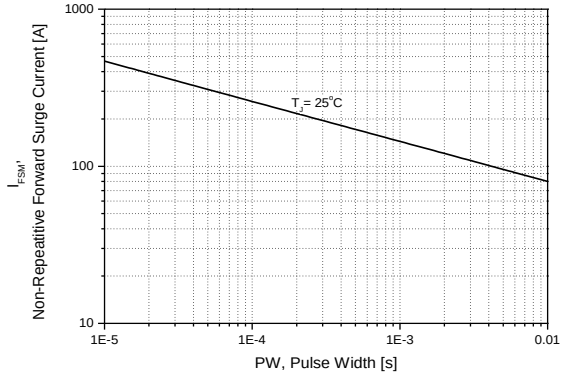


Figure 6. Non-Repetitive Peak Forward Surge Current vs. Pulse Duration

Typical Characteristics (Per Leg)

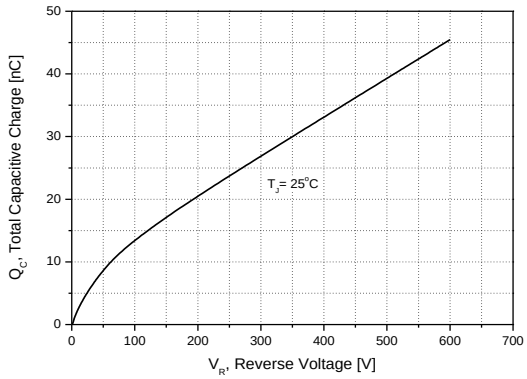


Figure 7. Total Capacitive Charge

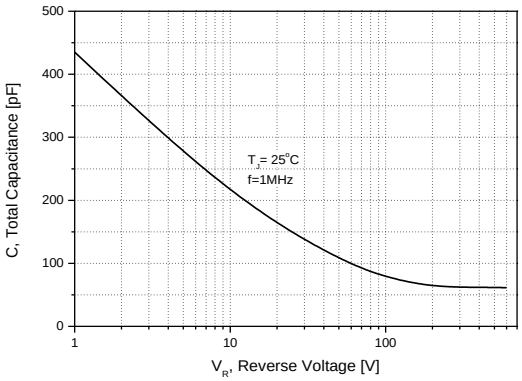


Figure 8. Total Capacitance

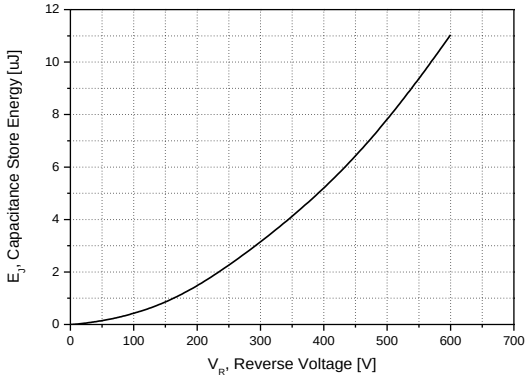


Figure 9. Capacitance Store Energy

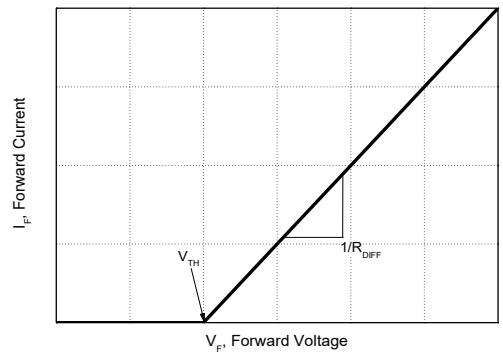


Figure 10. Equivalent Forward Current Curve

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

Threshold Voltage(V_{TH})

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

Differential Resistance (R_{DIFF})

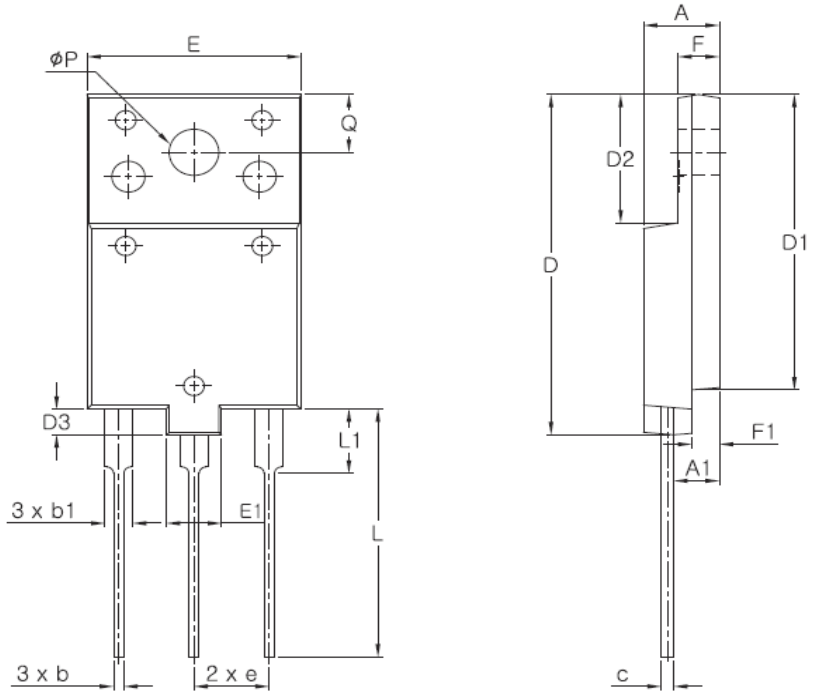
$R_{DIFF}(T_j) = A \times T_j^2 + B \times T_j + C$ [Ω]

$A = 5.92 \times 10^{-7}$
$B = 2.27 \times 10^{-4}$
$C = 4.17 \times 10^{-2}$

[T_j [°C]; -55 °C ≤ T_j ≤ 175 °C; IF ≤ 10 A]

Package Information

TO-3PF-3L



SYMBOL	MIN	NOM	MAX
A	5.30	5.50	5.70
A1	3.10	3.30	3.50
b	0.65	0.75	0.85
b1	1.80	2.00	2.20
c	0.80	0.90	1.00
D	26.30	26.50	26.70
D1	22.80	23.00	23.20
D2	9.80	10.00	10.20
D3	1.80	2.00	2.20
E	15.30	15.50	15.70
E1	3.80	4.00	4.20
e	* 5.15	* 5.45	* 5.75
F	2.80	3.00	3.20
F1	1.80	2.00	2.20
L	19.10	19.30	19.50
L1	4.80	5.00	5.20
Q	4.30	4.50	4.70
ØP	3.40	3.60	3.80

NOTE

1. THESE DIMENSIONS DO NOT INCLUDE PROTRUSIONS OF THE M
2. THE "( )" MARK IS THE REFERENCE