



PCD30065P

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

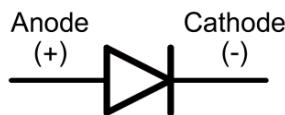
Package Outline

PKG : TO-247 2L



Applications

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



Absolute Maximum Ratings

$T_C = 25^\circ\text{C}$ 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 $T_C = 25^\circ\text{C}$ $T_C = 140^\circ\text{C}$	74 30	A
I_{FRM}	Repetitive Peak Forward Current $T_C = 110^\circ\text{C}$	179	A
I_{FSM}	Non-Repetitive Forward Surge Current (PW=10ms sinusoidal) $T_C = 25^\circ\text{C}$ $T_C = 110^\circ\text{C}$	240 192	A
P_D	Power Dissipation $T_C = 25^\circ\text{C}$	254	W
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +175	°C

Electrical Characteristics

T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V _F	Forward Voltage	I _F = 30A, T _C = 25°C I _F = 30A, 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	--	93	--	nC
C	Total Capacitance	V _R = 1V, T _J = 25°C, f = 1MHz V _R = 520V, T _J = 25°C, f = 1MHz	--	1256 168	--	pF

Thermal Characteristics

T_C = 25°C unless otherwise noted

Symbol	Parameter	Min	Typ	Max	Units
R _{θJC}	Thermal Resistance, Junction-to-Case	--	0.59	0.71	°C/W

Typical Characteristics

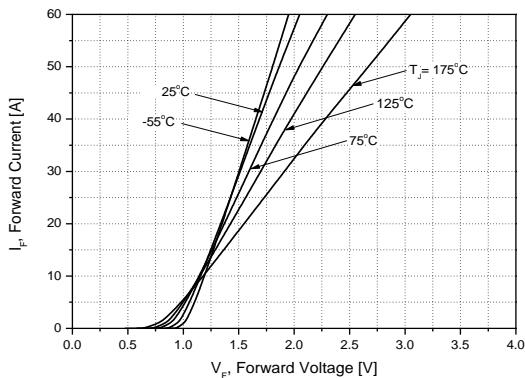


Figure 1. Forward Characteristics

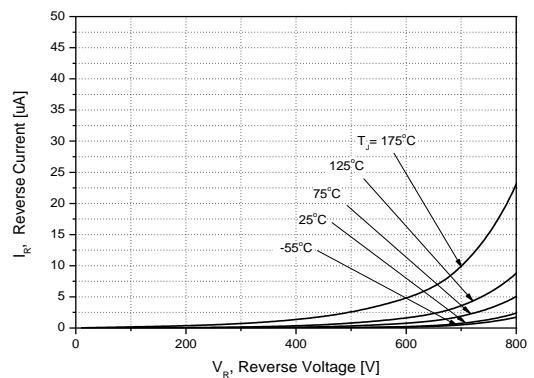


Figure 2. Reverse Characteristics

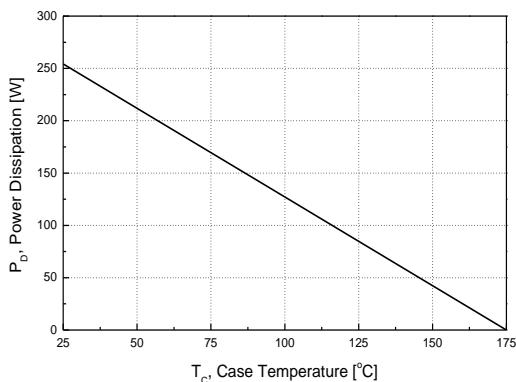


Figure 3. Power Dissipation

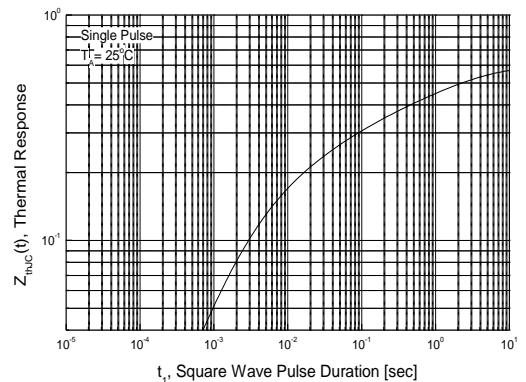


Figure 4. Transient Thermal Resistance

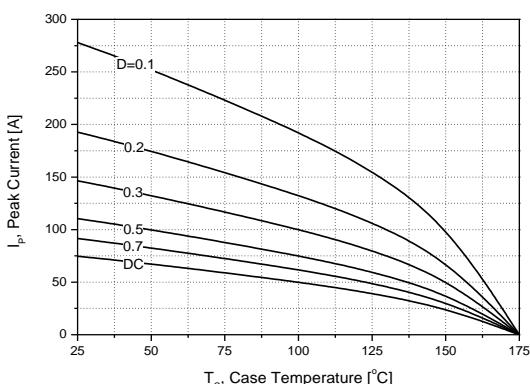


Figure 5. Peak Forward Current Derating

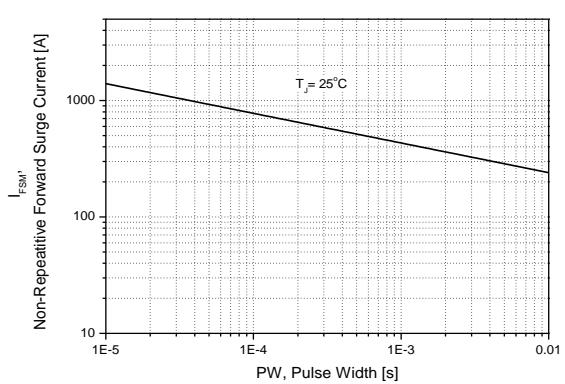


Figure 6. Non-Repetitive Peak Forward Surge Current vs. Pulse Duration

Typical Characteristics

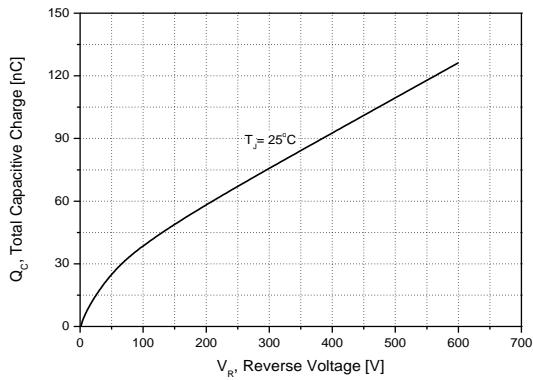


Figure 7. Total Capacitive Charge

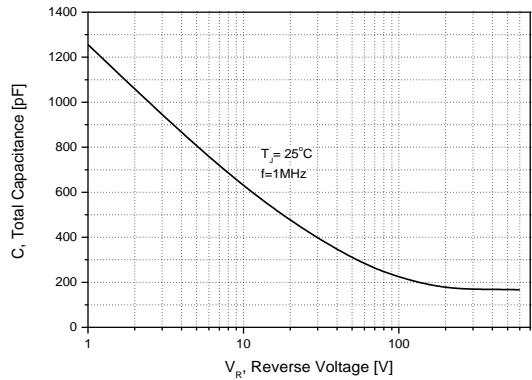


Figure 8. Total Capacitance

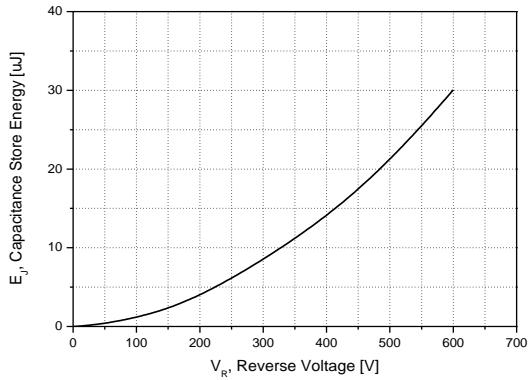


Figure 9. Capacitance Store Energy

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

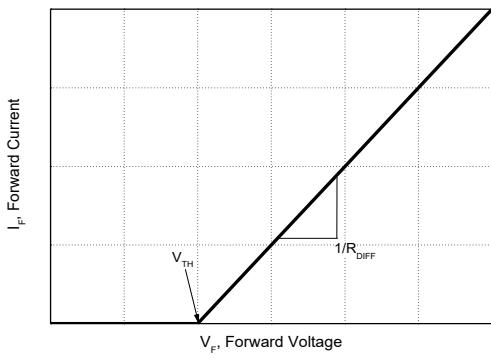


Figure 10. Equivalent Forward Current Curve

Threshold Voltage (V_{TH})

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

Differential Resistance (R_{DIFF})

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

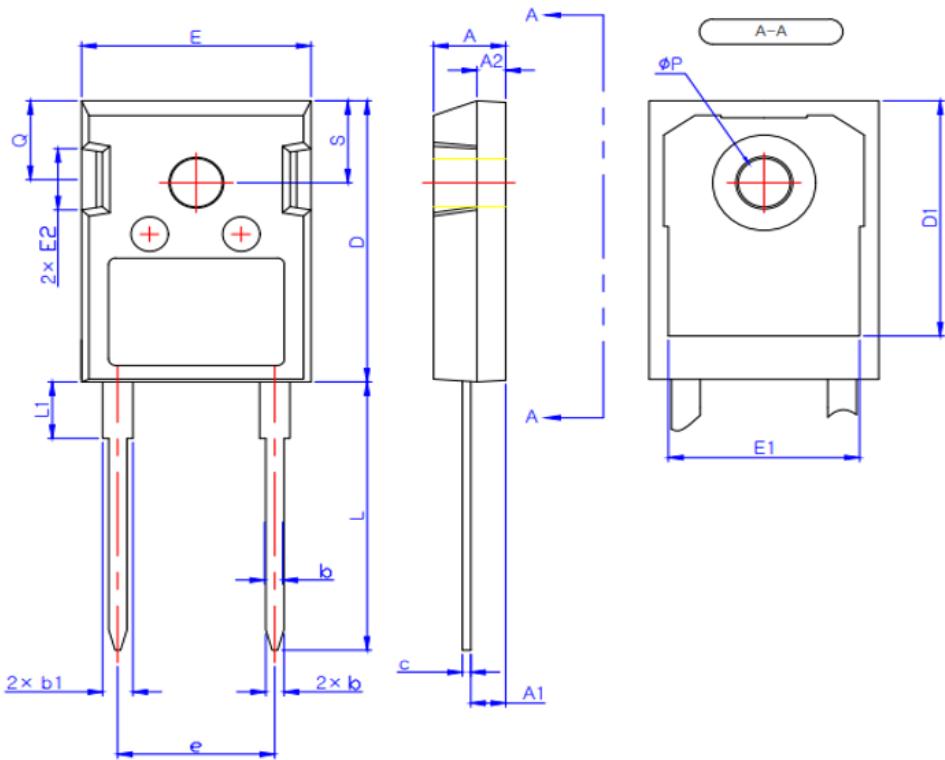
$$A = 1.54 \times 10^{-8}$$

$$B = 9.82 \times 10^{-5}$$

$$C = 1.55 \times 10^{-2}$$

$[T_j \text{ [}^\circ\text{C} \text{]}; -55 \text{ }^\circ\text{C} \leq T_j \leq 175 \text{ }^\circ\text{C}; IF \leq 30 \text{ A}]$

Package Information



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SYMBOL	MIN	MAX
A	4.80	5.20
A1	2.29	2.54
A2	1.90	2.10
b	1.10	1.30
b1	1.91	2.20
c	0.50	0.70
D	20.80	21.34
D1	17.43	17.83
E	15.75	16.13
E1	13.06	13.46
E2	4.32	4.83
e	10.90 BSC	
L	19.85	20.25
L1	-	4.49
ϕP	3.55	3.65
Q	5.59	6.19
S	6.15 BSC	

NOTE

1. THESE DIMENSION DO NOT INCLUDE MOLD PROTRUSION