

F2CD40120B

1200V Silicon Carbide Diode

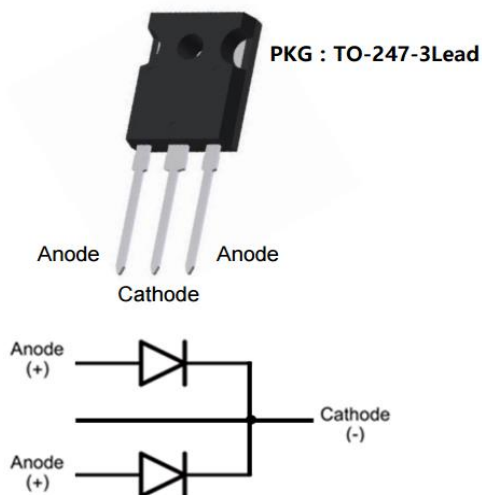
Features

- 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

Applications

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

Package Outline



Absolute Maximum Ratings

$T_C = 25^\circ\text{C}$ 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 $T_C = 25^\circ\text{C}$ $T_C = 150^\circ\text{C}$	53 / 106 20 / 40	A
I_{FRM}	Repetitive Peak Forward Current $T_C = 110^\circ\text{C}$	124 / 248	A
I_{FSM}	Non-Repetitive Forward Surge Current $T_C = 25^\circ\text{C}$ (PW=10ms sinusoidal) $T_C = 110^\circ\text{C}$	160 / 320 128 / 256	A
P_D	Power Dissipation $T_C = 25^\circ\text{C}$	230 / 460	W
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +175	$^\circ\text{C}$

* Per Leg / Per Device



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Electrical Characteristics (Per Leg)

$T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V_F	Forward Voltage	$I_F = 20\text{A}$, $T_C = 25^\circ\text{C}$ $I_F = 20\text{A}$, $T_C = 175^\circ\text{C}$	--	1.45 2.0	1.75 2.4	V
I_R	Reverse Current	$V_R = 1200\text{V}$ $T_C = 25^\circ\text{C}$ $V_R = 1200\text{V}$ $T_C = 175^\circ\text{C}$	--	10 50	200 -	μA
Q_C	Total Capacitive Charge	$V_R = 800\text{V}$	--	119	--	nC
C	Total Capacitance	$V_R = 1\text{V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{MHz}$ $V_R = 800\text{V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{MHz}$	--	1204 88	--	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	--	0.65 / 0.33	0.78 / 0.39	$^\circ\text{C}/\text{W}$

* Per Leg / Per Device

Typical Characteristics (Per Leg)

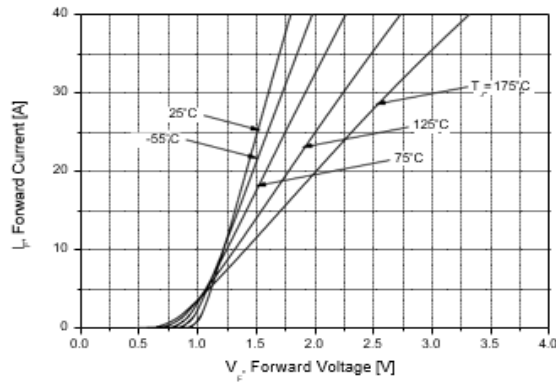


Figure 1. Forward Characteristics

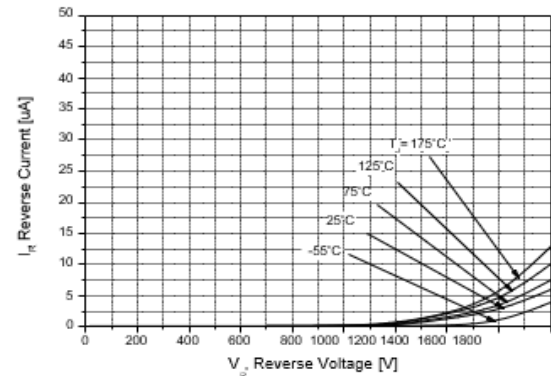


Figure 2. Reverse Characteristics

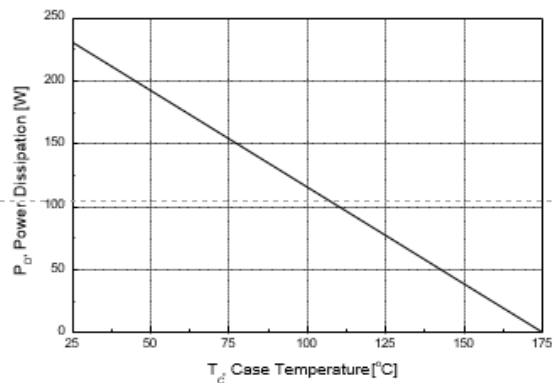


Figure 3. Power Dissipation

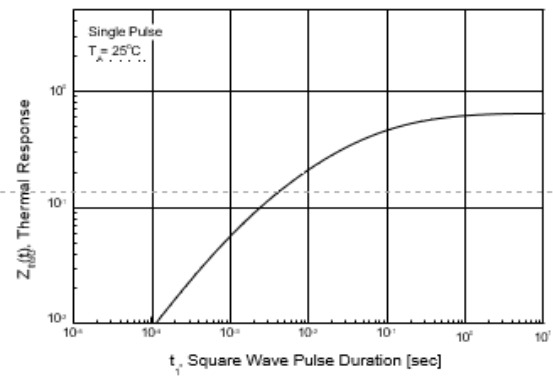


Figure 4. Transient Thermal Resistance

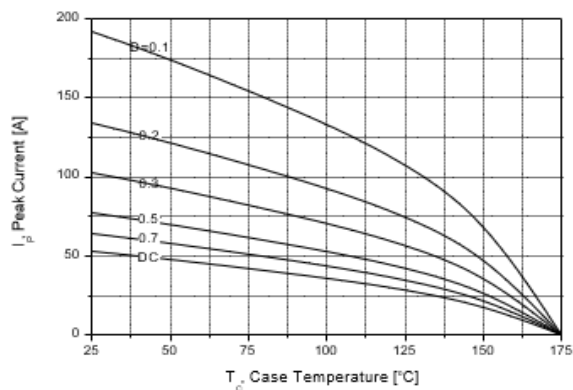


Figure 5. Peak Forward Current Derating

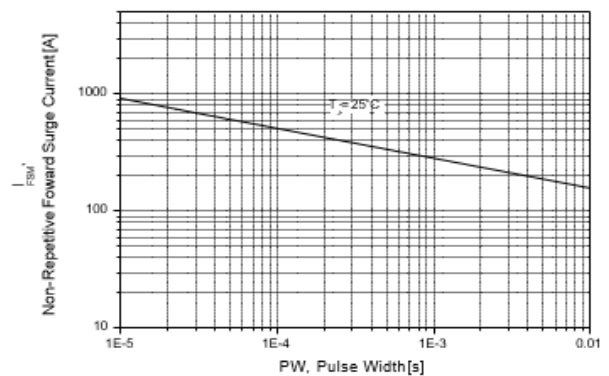


Figure 6. Non-Repetitive Peak Forward Surge Current vs. Pulse Duration

Typical Characteristics (Per Leg)

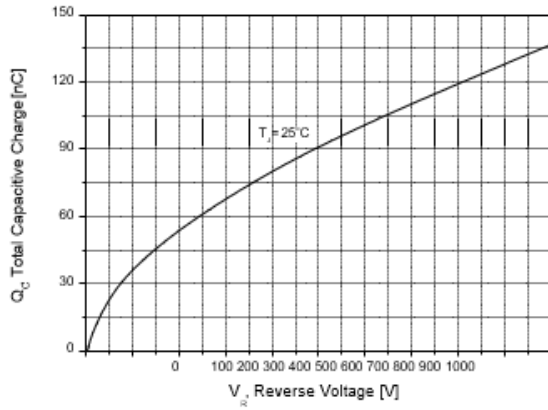


Figure 7. Total Capacitive Charge

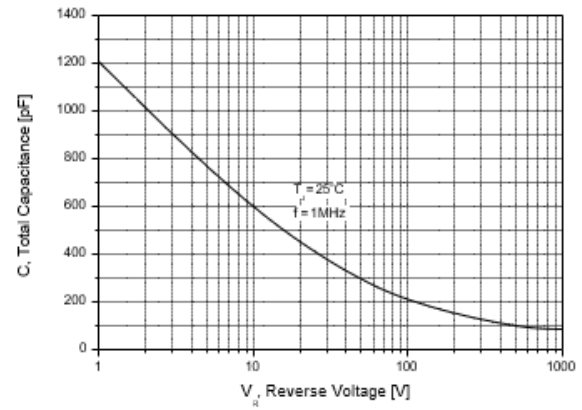


Figure 8. Total Capacitance

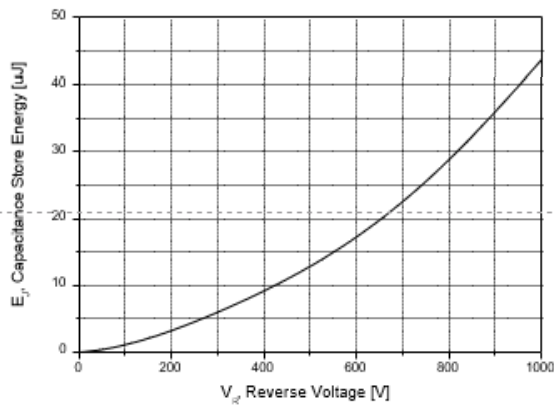


Figure 9. Capacitance Store Energy

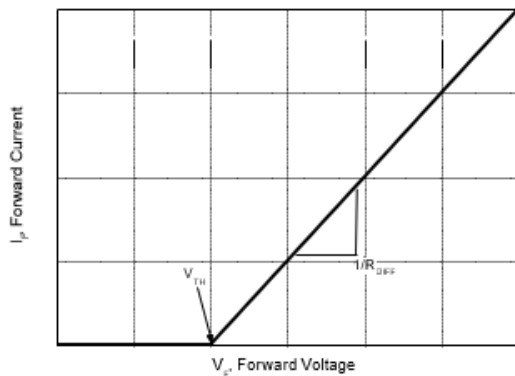


Figure 10. Equivalent Forward Current Curve

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

Threshold Voltage (V_{TH})

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

Differential Resistance (R_{DIFF})

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

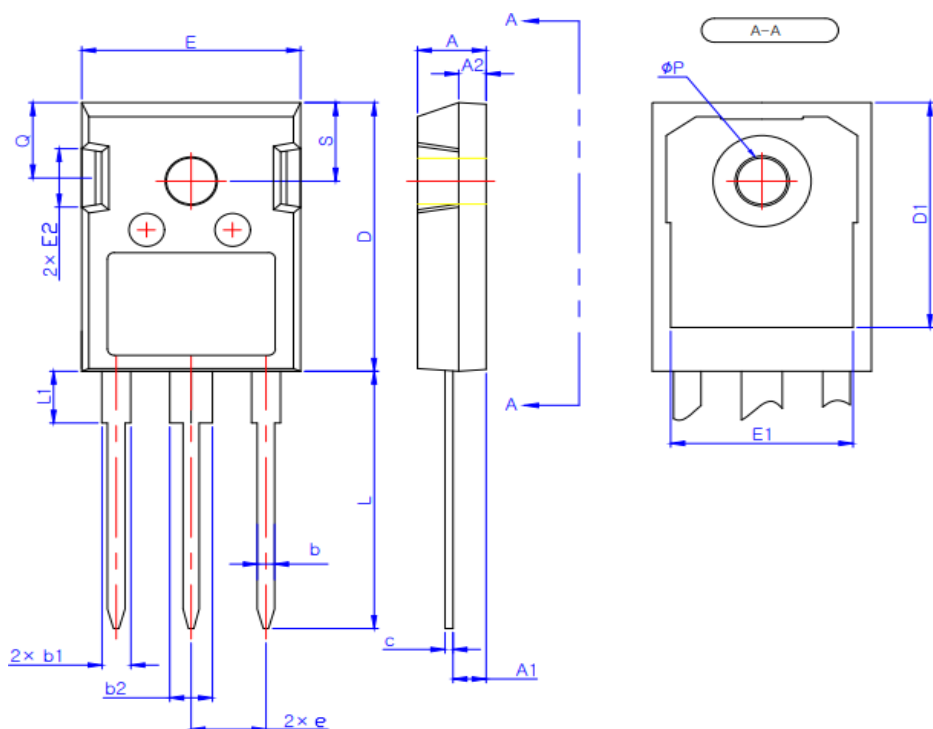
$$A = 9.05 \times 10^{-7}$$

$$B = 7.89 \times 10^{-5}$$

$$C = 2.30 \times 10^{-2}$$

$$[T_j [^\circ\text{C}]; -55^\circ\text{C} \leq T_j \leq 175^\circ\text{C}; I_F \leq 20 \text{ A}]$$

Package Information



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
b2	2.92	3.20
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	5.45 BSC	
L	19.85	20.25
L1	-	4.49
ϕP	3.55	3.65
Q	5.59	6.19
S	6.15 BSC	