

Features

- Proprietary α SiC Schottky Barrier Diode technology
- Negligible reverse recovery current
- Maximum operating junction temperature of 175°C
- Improved switching losses vs. Si bipolar diodes
- Positive temperature coefficient for ease of paralleling

Product Summary (Per Leg)

| | |
|----------------------|--------|
| $V_{DC} @ T_{J,max}$ | 1200 V |
| I_F | 20 A |
| Q_C | 122 nC |
| $T_{J,max}$ | 175°C |

Applications

Renewable

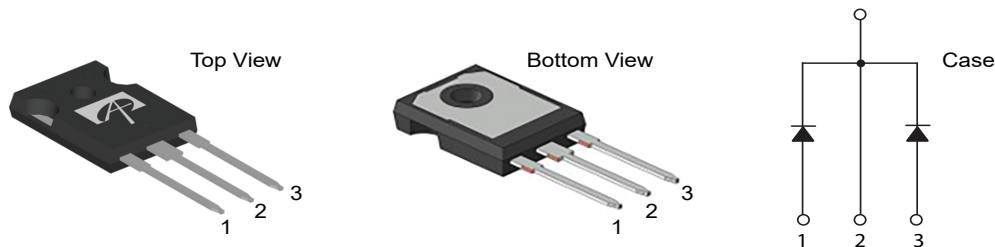
- EV Charger
- Solar Inverters

Industrial

- UPS
- SMPS
- Motor Drives



Pin Configuration



| Ordering Part Number | Package Type | Form | Shipping Quantity |
|----------------------|--------------|------|-------------------|
| AOK40120XSD | TO-247-3L | Tube | 30/Tube |

Absolute Maximum Ratings

($T_A = 25^\circ\text{C}$, unless otherwise noted)

| Symbol | Parameter | AOK40120XSD | Units |
|---------------------------------|--|---------------------------|------------------|
| V_{RRM} | Repetitive Peak Reverse Voltage | 1200 | V |
| V_R | DC Peak Reverse Voltage | 1200 | V |
| I_F | Continuous Forward Current (Per Leg/Device) | $T_C = 25^\circ\text{C}$ | 60/120 |
| | | $T_C = 150^\circ\text{C}$ | 20/40 |
| I_{FSM} at 10 ms | Non-Repetitive Forward Surge Current (Per Leg) | 85 | A |
| $I_{F,MAX}$ at 10 μs | Non-Repetitive Peak Forward Surge Current (Per Leg) | 535 | A |
| P_{TOT} | Power Dissipation ^(A) (Per Leg) | $T_C = 25^\circ\text{C}$ | 250 |
| | | $T_C = 150^\circ\text{C}$ | 41 |
| $\int i^2 dt$ | $i^2 t$ value (Per Leg, $T_C = 25^\circ\text{C}$, 10 ms) | 36 | A ² s |
| T_J, T_{STG} | Junction and Storage Temperature Range | -55 to 175 | °C |
| T_L | Maximum lead temperature for soldering purpose, 1/8" from case for 5 s | 300 | °C |

Thermal Characteristics

| Symbol | Parameter | AOK40120XSD | Units |
|-----------------|--|-------------|-------|
| $R_{\theta JC}$ | Maximum Junction-to-Case ^(B) (Per Leg/Device) | 0.6/0.3 | °C/W |

Electrical Characteristics

(Per Leg, $T_J = 25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units | |
|---------------------------|---------------------------|---|---------------------------|------|------|---------------|---------------|
| STATIC PARAMETERS | | | | | | | |
| V_{DC} | DC Blocking Voltage | $I_D = 250\ \mu\text{A}$ | $T_J = 25^\circ\text{C}$ | 1200 | | V | |
| I_R | Reverse Current | $V_R = 1200\ \text{V}$ | $T_J = 25^\circ\text{C}$ | | 10 | 100 | μA |
| | | | $T_J = 175^\circ\text{C}$ | | 185 | | μA |
| V_F | Diode Forward Voltage | $I_F = 20\ \text{A}$ | $T_J = 25^\circ\text{C}$ | | 1.45 | 1.8 | V |
| | | | $T_J = 175^\circ\text{C}$ | | 1.95 | | V |
| DYNAMIC PARAMETERS | | | | | | | |
| C | Total Capacitance | f = 1 MHz | $V_R = 1\ \text{V}$ | | 1460 | | pF |
| | | | $V_R = 400\ \text{V}$ | | 103 | | pF |
| | | | $V_R = 800\ \text{V}$ | | 77 | | pF |
| Q_C | Total Capacitance Charge | $V_R = 800\ \text{V}$, $Q_C = \int C(V)dV$ | | | 122 | nC | |
| E_C | Capacitance Stored Energy | $V_R = 800\ \text{V}$, f = 1 MHz | | | 42 | μJ | |

Notes:

- The power dissipation P_D is based on $T_{J(\text{MAX})} = 175^\circ\text{C}$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
- The value of $R_{\theta JC}$ is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(\text{MAX})} = 175^\circ\text{C}$.
- These curves are based on $R_{\theta JC}$ which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(\text{MAX})} = 175^\circ\text{C}$.

Typical Electrical and Thermal Characteristics

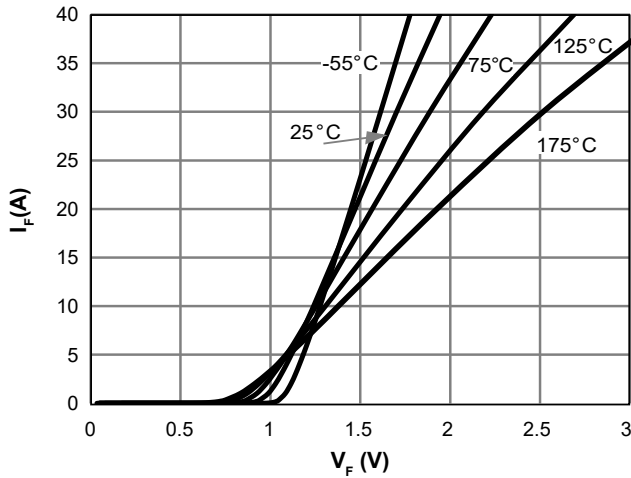


Figure 1. Forward Characteristics

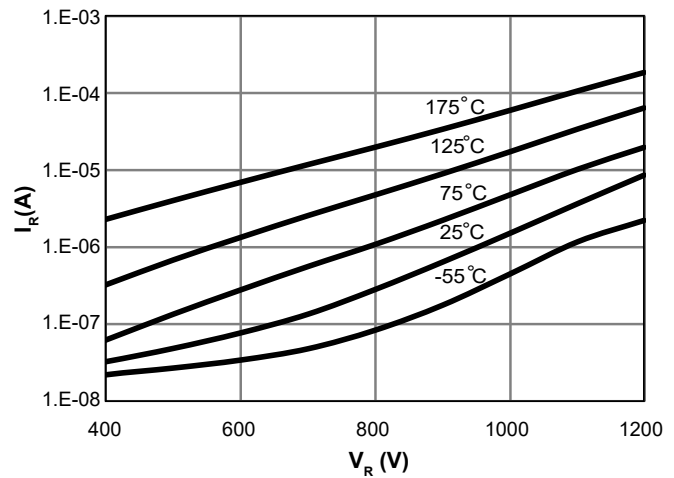


Figure 2. Reverse Characteristics

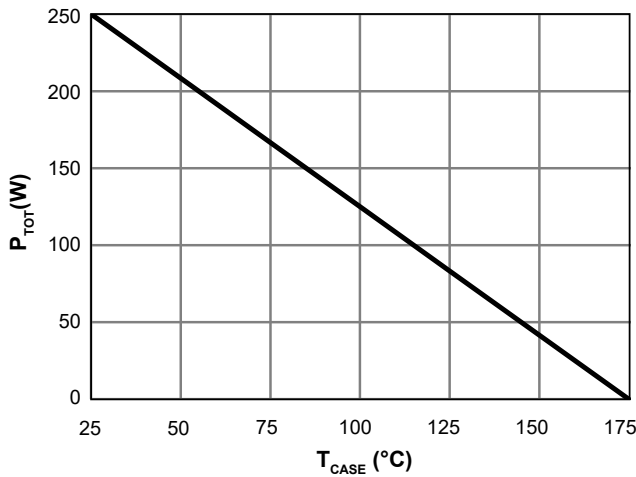


Figure 3. Power De-rating (Note C)

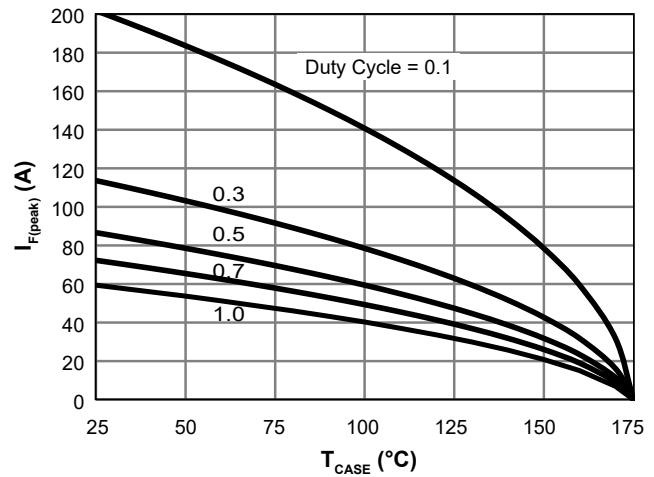


Figure 4. Current De-rating (Note C)

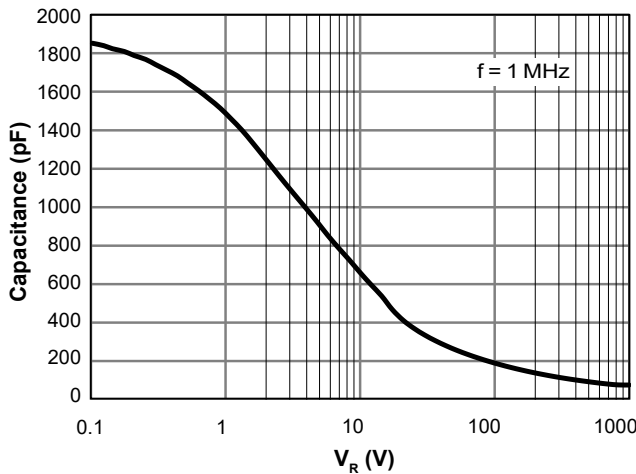


Figure 5. Capacitance Characteristics

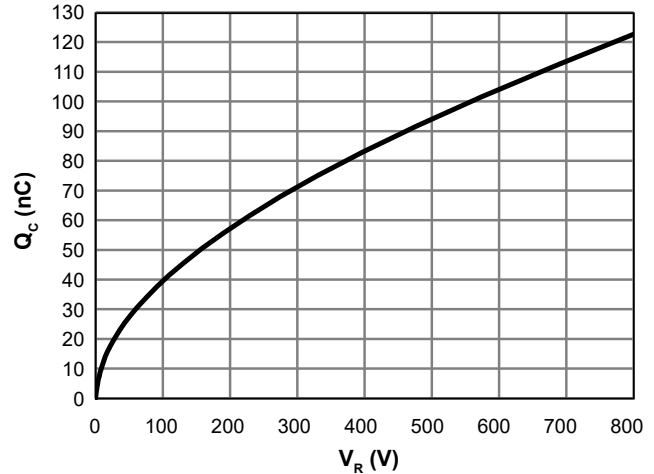


Figure 6. Total Capacitance Charge vs. Reverse Voltage

Typical Electrical and Thermal Characteristics

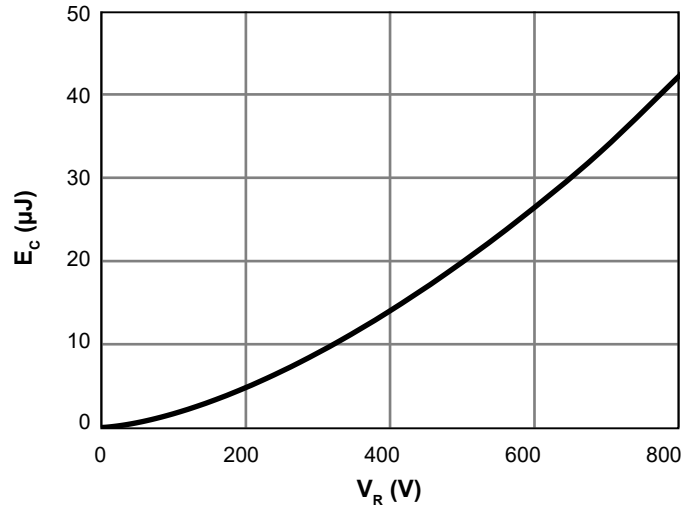


Figure 7. Total Capacitance Stored Energy vs. Reverse Voltage

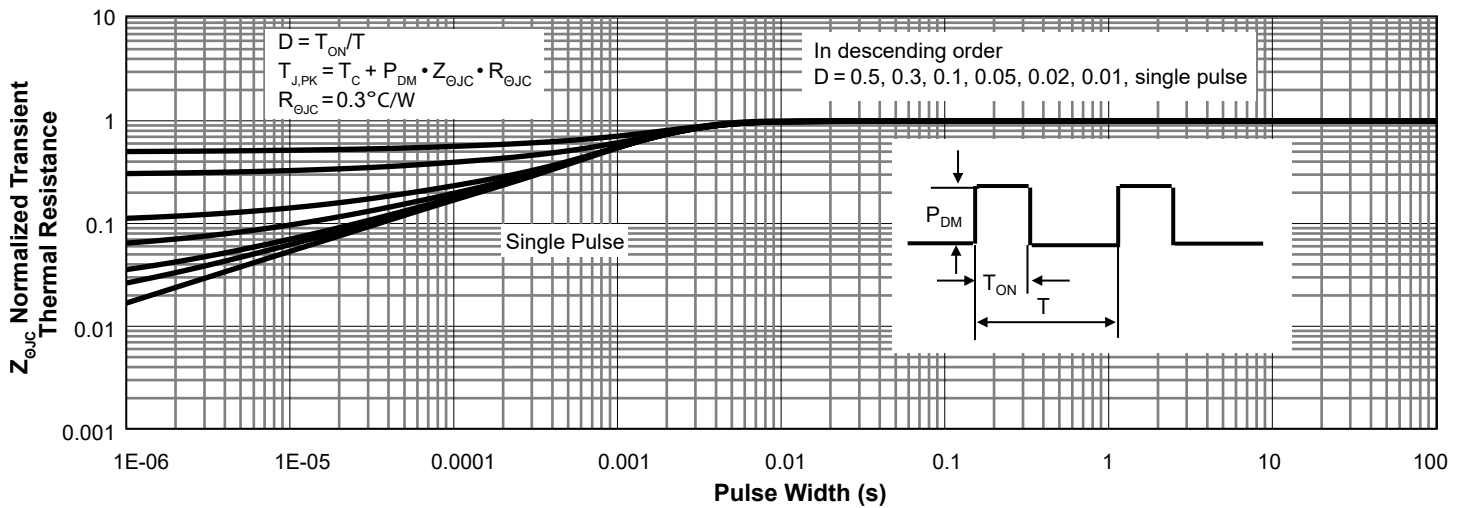
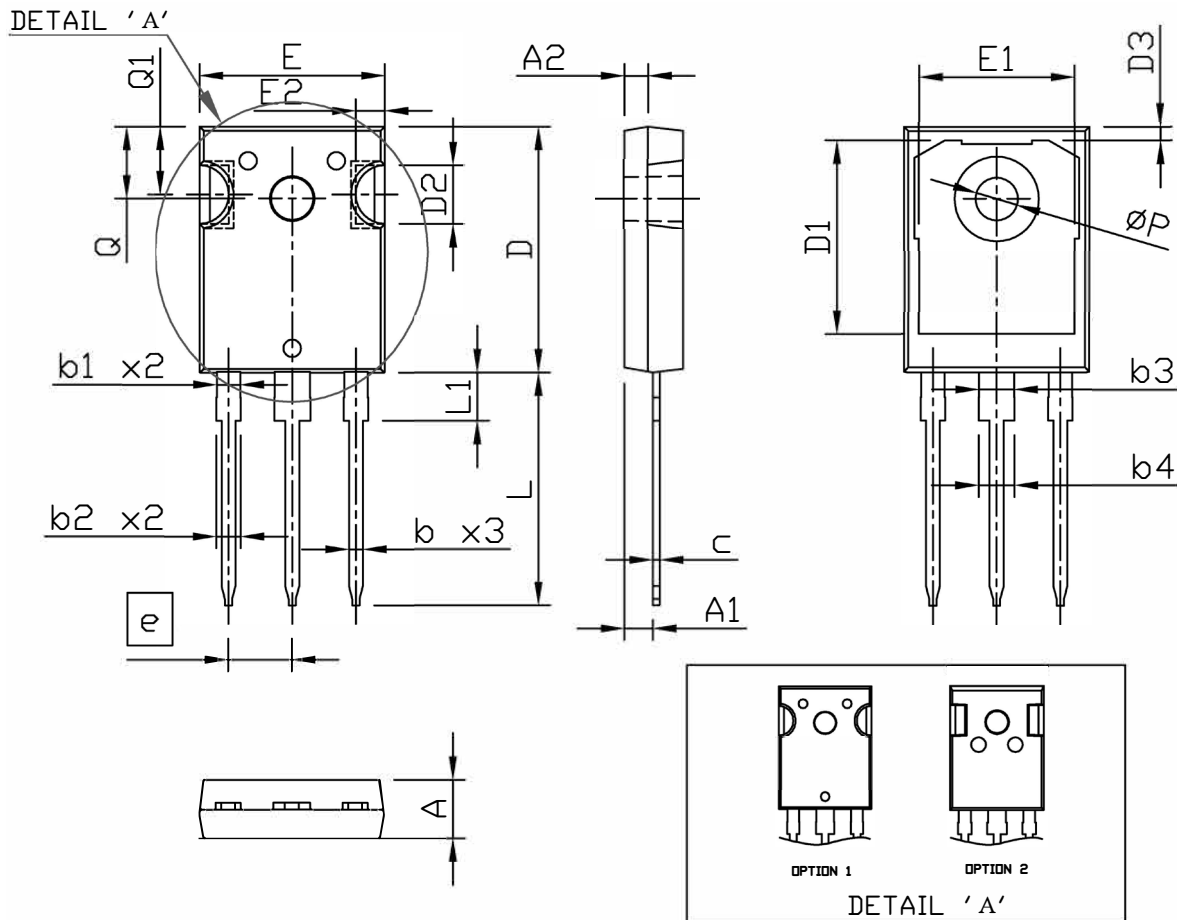
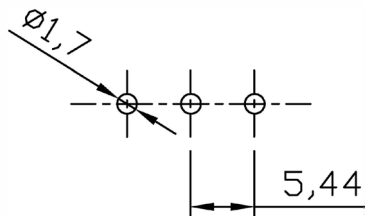


Figure 8. Normalized Maximum Transient Thermal Impedance for AOK40120XSD (Note C)

Package Dimensions, TO-247-3L



RECOMMENDED LAND PATTERN



UNIT: mm

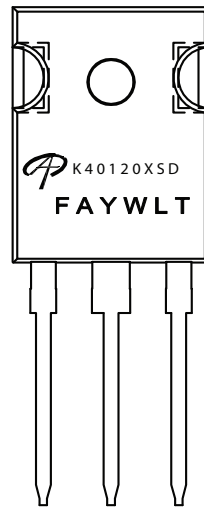
| SYMBOLS | DIMENSIONS IN MILLIMETERS | | | DIMENSIONS IN INCHES | | |
|---------|---------------------------|-------|-------|----------------------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 4.90 | 5.00 | 5.10 | 0.193 | 0.197 | 0.201 |
| A1 | 2.31 | 2.42 | 2.52 | 0.091 | 0.095 | 0.099 |
| A2 | 1.90 | 2.00 | 2.10 | 0.075 | 0.079 | 0.083 |
| b | 1.16 | 1.22 | 1.27 | 0.046 | 0.048 | 0.050 |
| b1 | 1.96 | 2.02 | 2.07 | 0.078 | 0.080 | 0.081 |
| b2 | 2.00 | 2.10 | 2.20 | 0.079 | 0.083 | 0.087 |
| b3 | 2.96 | 3.02 | 3.07 | 0.117 | 0.119 | 0.121 |
| b4 | 3.00 | 3.10 | 3.20 | 0.118 | 0.122 | 0.126 |
| c | 0.59 | 0.62 | 0.66 | 0.023 | 0.024 | 0.026 |
| D | 20.90 | 21.00 | 21.10 | 0.823 | 0.827 | 0.831 |
| D1 | 16.25 | 16.55 | 16.85 | 0.640 | 0.652 | 0.663 |
| D2 | 5.00 TYP | | | 0.197 TYP | | |
| D3 | 1.05 | 1.20 | 1.35 | 0.041 | 0.047 | 0.053 |
| e | 5.44 BSC | | | 0.214 BSC | | |
| E | 15.70 | 15.80 | 15.90 | 0.618 | 0.622 | 0.626 |
| E1 | 13.06 | 13.26 | 13.50 | 0.514 | 0.522 | 0.530 |
| E2 | 2.50 TYP | | | 0.098 TYP | | |
| L | 19.72 | 19.92 | 20.12 | 0.776 | 0.784 | 0.792 |
| L1 | --- | --- | 4.30 | --- | --- | 0.169 |
| Q | 6.15 BSC | | | 0.242 BSC | | |
| Q1 | 5.60 | 5.80 | 6.00 | 0.220 | 0.228 | 0.236 |
| ØP | 3.55 | 3.60 | 3.70 | 0.140 | 0.142 | 0.146 |

NOTE

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6 MILS EACH.
2. CONTROLLING DIMENSION IS MILLIMETER.
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

Part Marking

**AOK40120XSD
TO-247-3L**



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