ALPHA & OMEGA SEMICONDUCTOR

AOK40120XSD

1200 V αSiC Silicon Carbide Schottky Barrier Diode

Features

- Proprietary αSiC 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

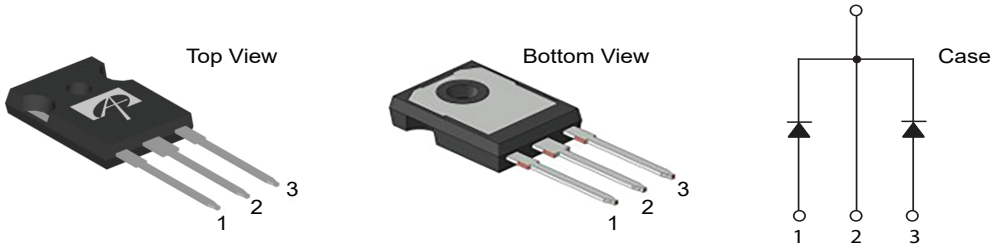
Applications

Renewable
- EV Charger
- Solar Inverters

Industrial
- UPS
- SMPS
- Motor Drives

RoHS Compliant

Pin Configuration



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

Absolute Maximum Ratings

(T_A = 25°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°C	60/120	A
		T_C = 150°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°C	250	W
		T_C = 150°C	41	
$\int i^2dt$	i^2t value (Per Leg, T_C = 25°C, 10 ms)		36	A^2s
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°C unless otherwise noted)

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

Notes:

A. The power dissipation P_D is based on $T_{J(MAX)}$=175°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

B. The value of $R_{\Theta JC}$ is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=175°C.

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 $T_{J(MAX)}$ =175°C.

Typical Electrical and Thermal Characteristics

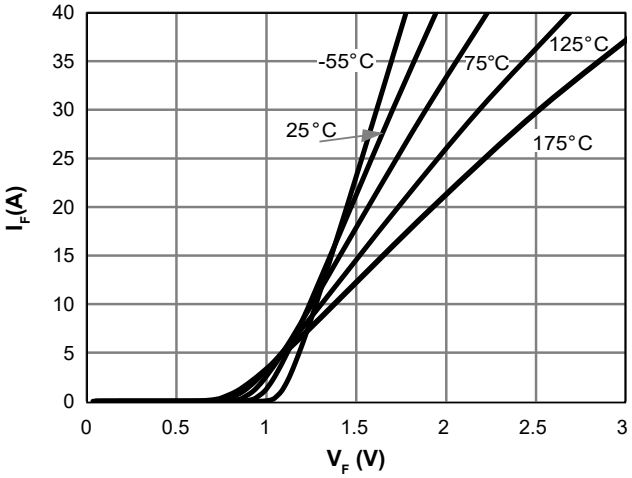


Figure 1. Forward Characteristics

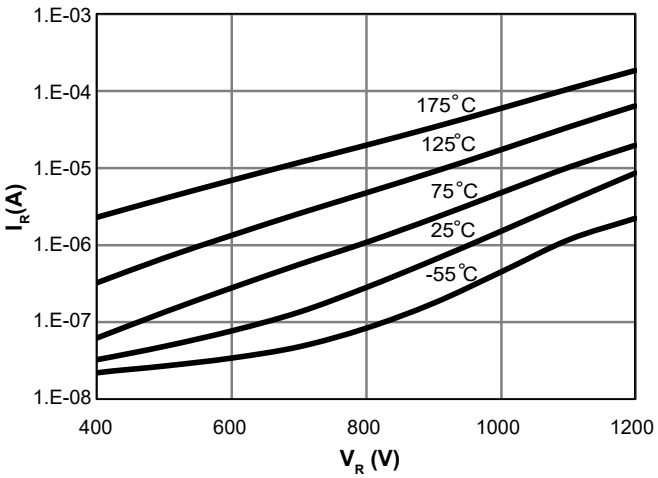


Figure 2. Reverse Characteristics

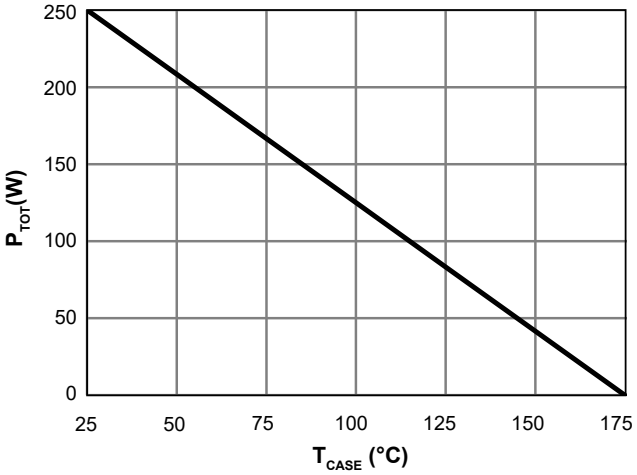


Figure 3. Power De-rating (Note C)

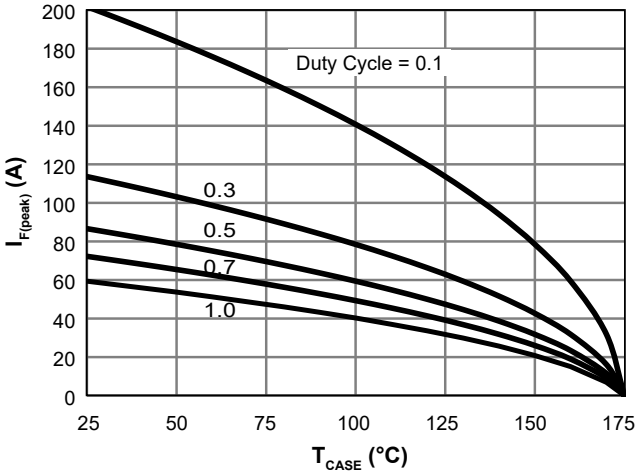


Figure 4. Current De-rating (Note C)

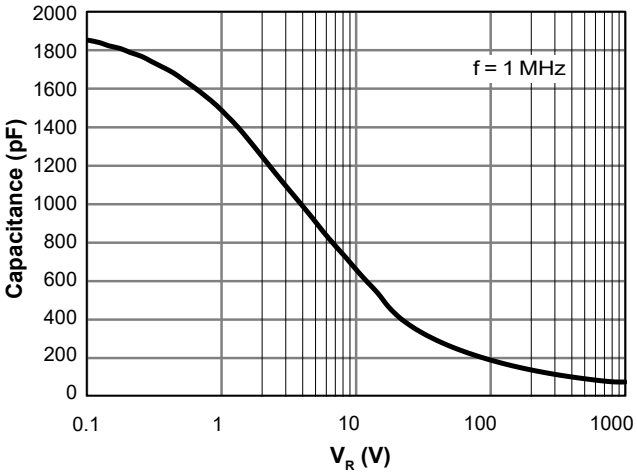


Figure 5. Capacitance Characteristics

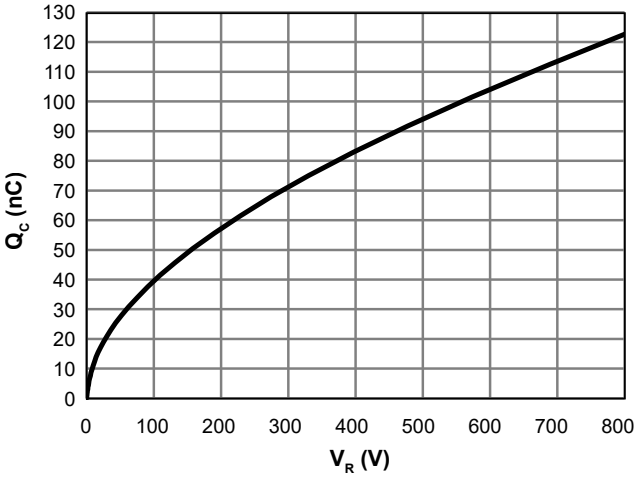


Figure 6. Total Capacitance Charge vs. Reverse Voltage

Typical Electrical and Thermal Characteristics

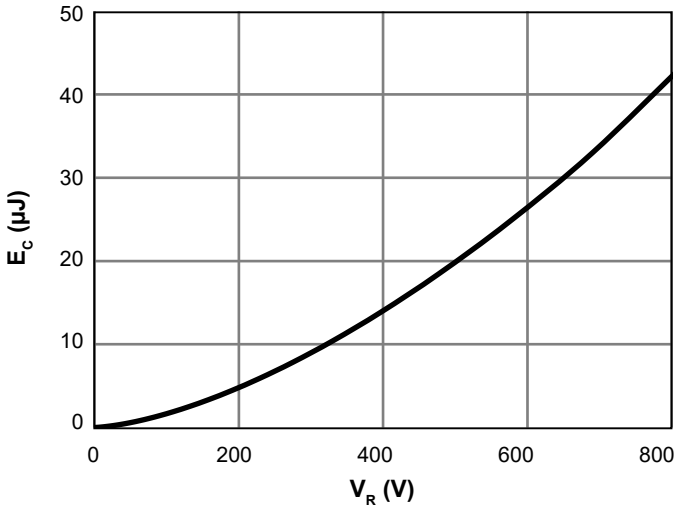


Figure 7. Total Capacitance Stored Energy vs. Reverse Voltage

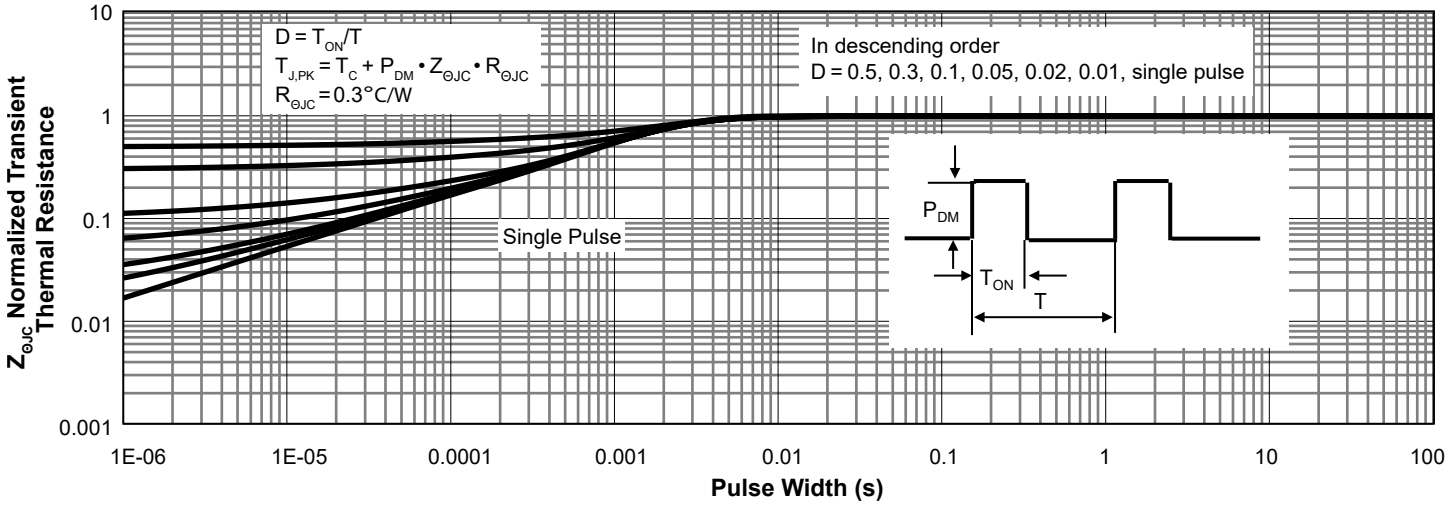
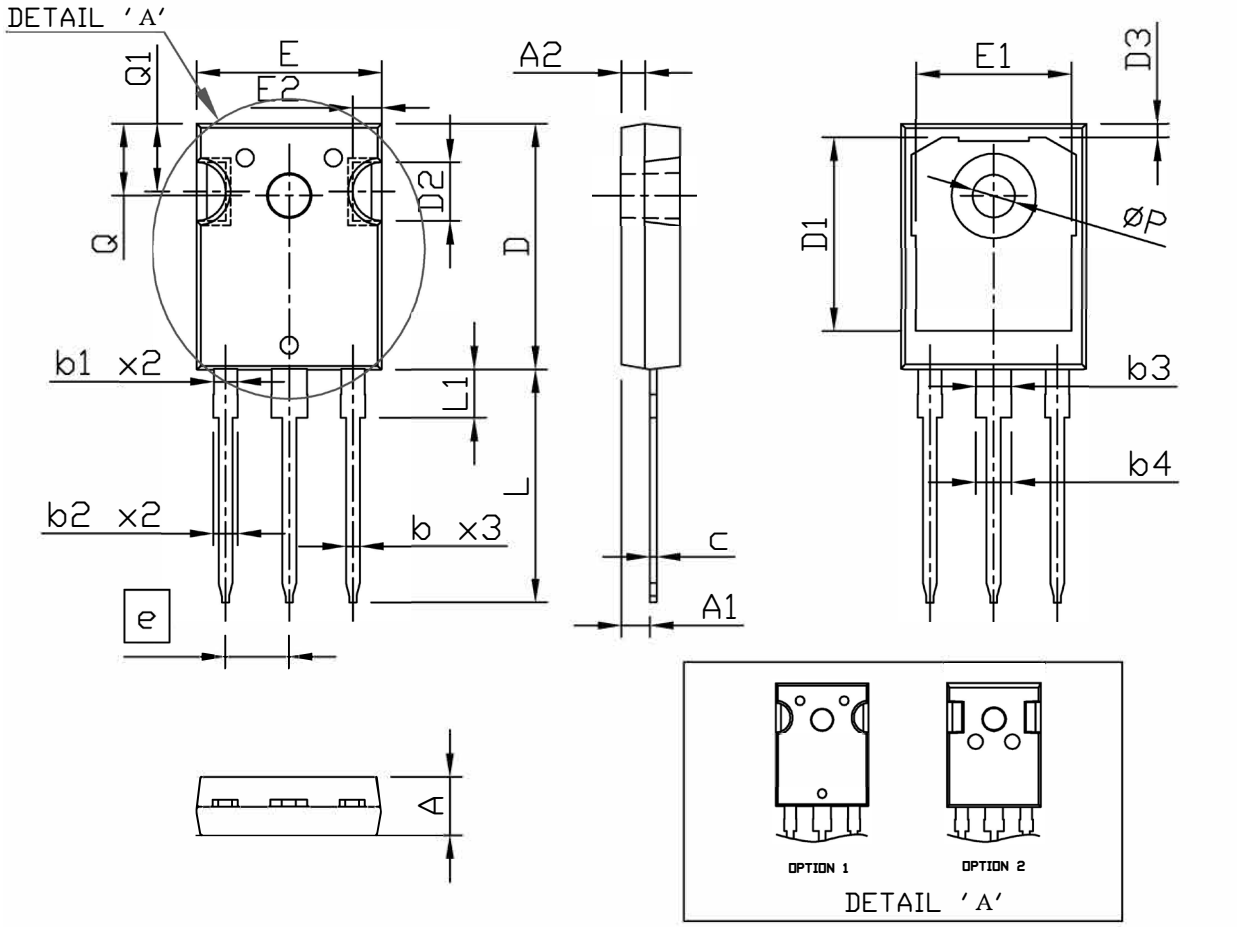
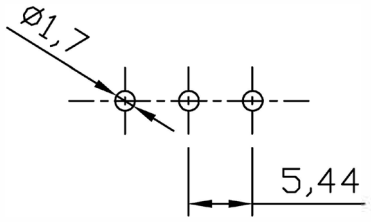


Figure 8. Normalized Maximum Transient Thermal Impedance for AOK40120XSD (Note C)

Package Dimensions, TO-247-3L



RECOMMENDED LAND PATTERN



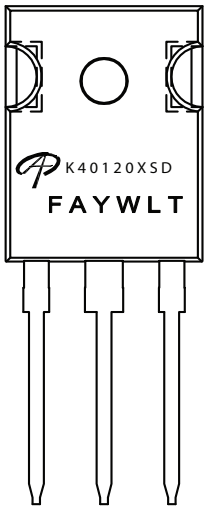
UNIT: mm

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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2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.