# 1200V 40A Silicon Carbide Schottky Diode
# AKCK2A040WHH

## Features:

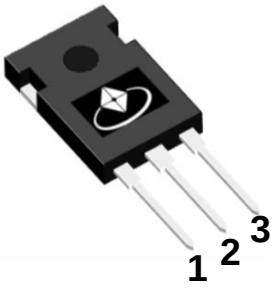
- No Reverse Recovery Current
- High Surge Current Capability
- High-Frequency Operation
- Temperature-Independent Switching
- High Non-reperitive Peak Forward Surge Current($I_{FSM}$)

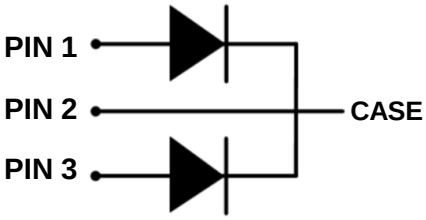
## Applications:

- PFC Boost Topology
- Free Wheeling Diodes in Inverter Stages
- AC/DC Converters
- Data Center

## Key Performance Parameters:(Leg/Device)

| Parameter | Value | Unit |
|---|---|---|
| $V_{RRM}$ | 1200 | V |
| $I_F$ | 20/40 | A |
| $Q_C$ | 110 | nC |
| $P_D$ | 330/660 | W |
| $T_J$ | 175 | °C |




## Ordering Information:

| Ordering Code | Package Type | Marking Code | Form | Packing |
|---|---|---|---|---|
| AKCK2A040WHH | TO-247-3L | CK2A040WHH | Tube | 600 per box |

## Thermal Characteristics

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case, Steady-State | * 0.45/** 0.23 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient, Steady-State | 40 | °C/W |

* Per Leg, ** Per Device

©ALKAIDSEMI TECHNOLOGIES

## Maximum Ratings ($T_A$ = 25°C unless otherwise noted)

| Symbol | Parameter | | Value | Units |
|---|---|---|---|---|
| $V_{RRM}$ | Repetitive Peak Reverse Voltage | | 1200 | V |
| $I_F$ | Continues Forward Current(Per Leg/Device) | $T_C$ = 25 °C | 98/196 | A |
| | | $T_C$ = 125 °C | 37/74 | A |
| | | $T_C$ = 155 °C | 20/40 | A |
| $I_{FRM}$ | Repetive Peak Forward Surge Current | $T_C$ = 25 °C, $t_p$ = 10 ms, Half Sine Wave | 120* | A |
| | | $T_C$ = 110 °C, $t_p$ = 10 ms, Half Sine Wave | 80* | A |
| $I_{FSM}$ | Non-Repetive Peak Forward Surge Current | $T_C$ = 25 °C, $t_p$ = 10 ms, Half Sine Wave | 190* | A |
| | | $T_C$ = 110 °C, $t_p$ = 10 ms, Half Sine Wave | 150* | A |
| $I_{F,max}$ | Non-Repetive Peak Forward Surge Current | $T_C$ = 25 °C, $t_p$ = 10 μs, Pulse | 1500* | A |
| | | $T_C$ = 110 °C, $t_p$ = 10 μs, Pulse | 1200* | A |
| dv/dt | Diode dv/dt | $V_R$ = 0~960V | 200 | V/ns |
| $\int i^2 dt$ | $i^2t$ value | $T_C$ = 25 °C, $t_p$ = 10 ms | 180* | A |
| | | $T_C$ = 110 °C, $t_p$ = 10 ms | 112* | A |
| $P_D$ | Power Dissipation(Per Leg/Device) | $T_C$ = 25 °C | 330/660 | W |
| | | $T_C$ = 110 °C | 140/280 | W |
| $T_J$, $T_{STG}$ | Operating and Storage Temperature Range | | -55 to +175 | °C |

* Per Leg, ** Per Device

## Electrical Characteristics ($T_J$ = 25°C unless otherwise noted)

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| $V_F$ | Forward Voltage | $I_F$ = 20 A, $T_J$ = 25 °C | - | 1.48 | 1.65 | V |
| | | $I_F$ = 20 A, $T_J$ = 175 °C | - | 2.3 | 3 | V |
| $I_R$ | Reverse Current | $V_R$ = 1200 V, $T_J$ = 25 °C | - | 10 | 200 | μA |
| | | $V_R$ = 1200 V, $T_J$ = 175 °C | - | 65 | 400 | μA |
| $Q_C$ | Total Capacitance Charge | $V_R$ = 800V, $I_F$ = 20 A $Q_C=\int_0^{V_R} C(V_R)dV(V_R)$ | - | 110 | - | nC |
| C | Total Capacitance | $V_R$ = 0 V, f = 1 MHz | - | 1140 | - | pF |
| | | $V_R$ = 400 V, f = 1 MHz | - | 105 | - | pF |
| | | $V_R$ = 800 V, f = 1 MHz | - | 80 | - | pF |
| $E_C$ | Capacitance Stored Energy | $V_R$ = 800 V | - | 32 | - | μJ |

**Notes:**

1. Contact ALKAIDSEMI sales for detail information

# Electrical Characteristics Diagrams (Per Leg)

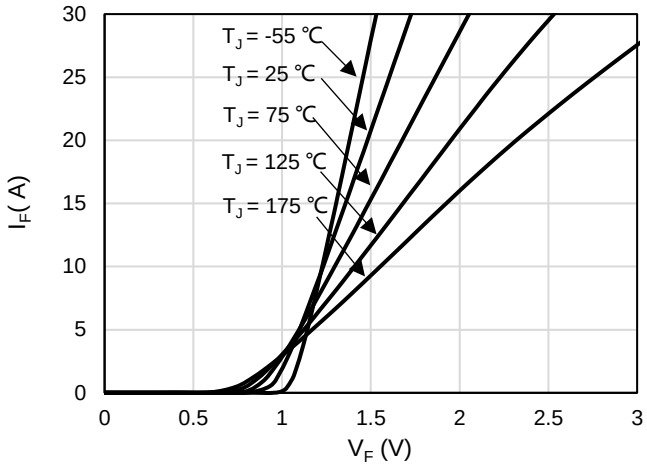



Figure 1: Forward Characteristics

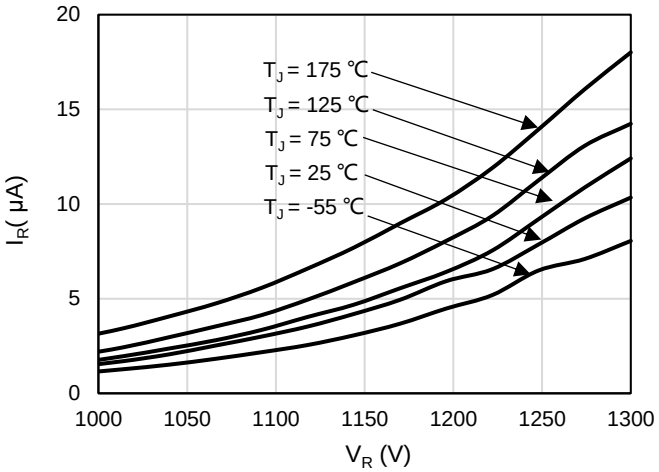



Figure 2: Reverse Characteristics

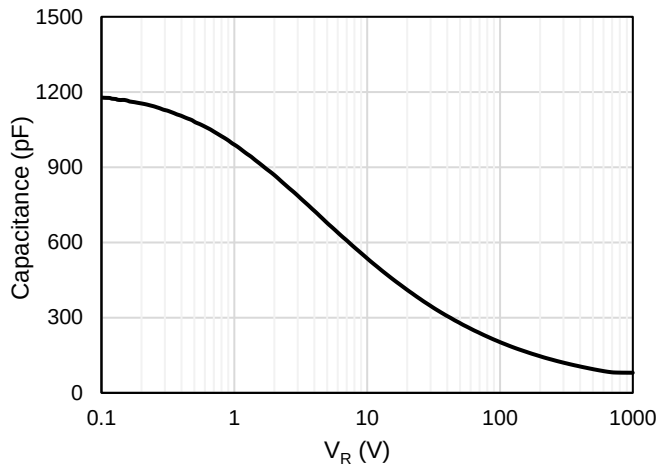



Figure 3: Capacitance Characteristics

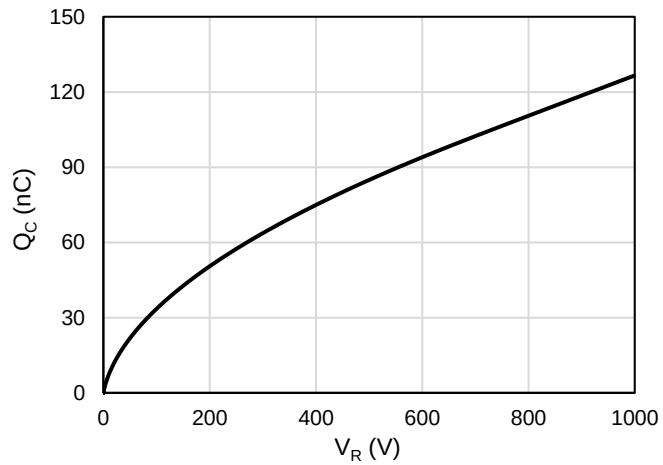



Figure 4: Total Capacitance Charge

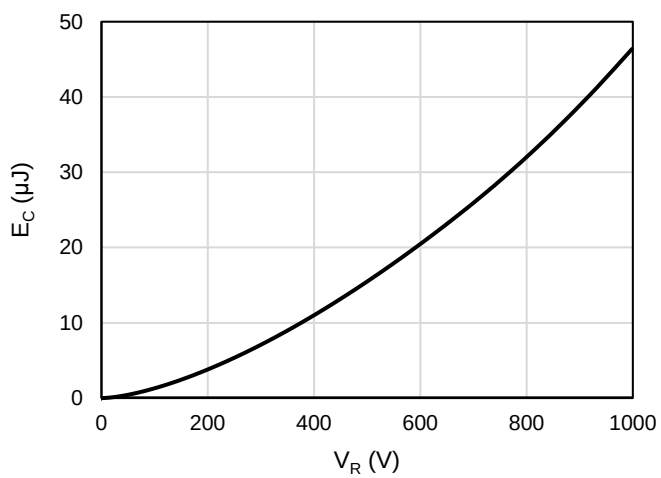



Figure 5: Capacitance Stored Energy

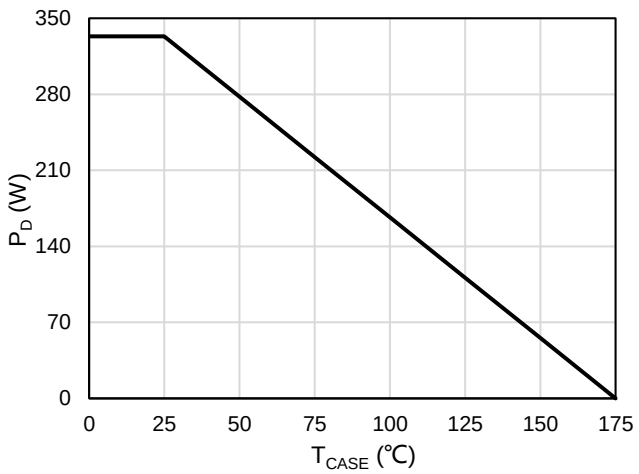



Figure 6: Power Derating

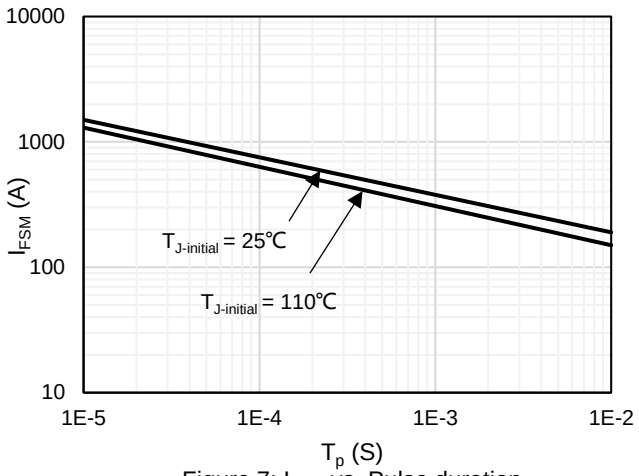



Figure 7: $I_{FSM}$ vs. Pulse duration

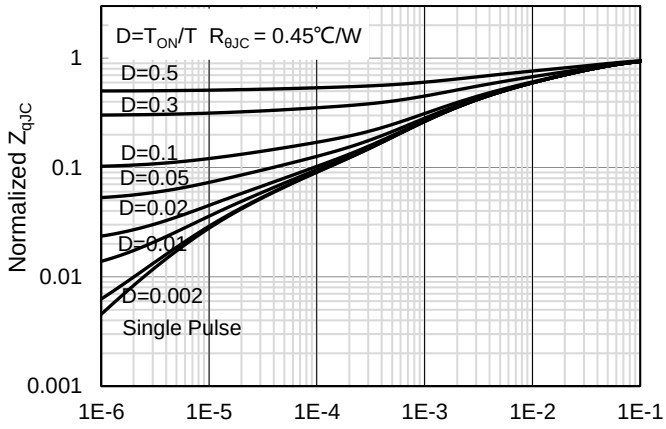
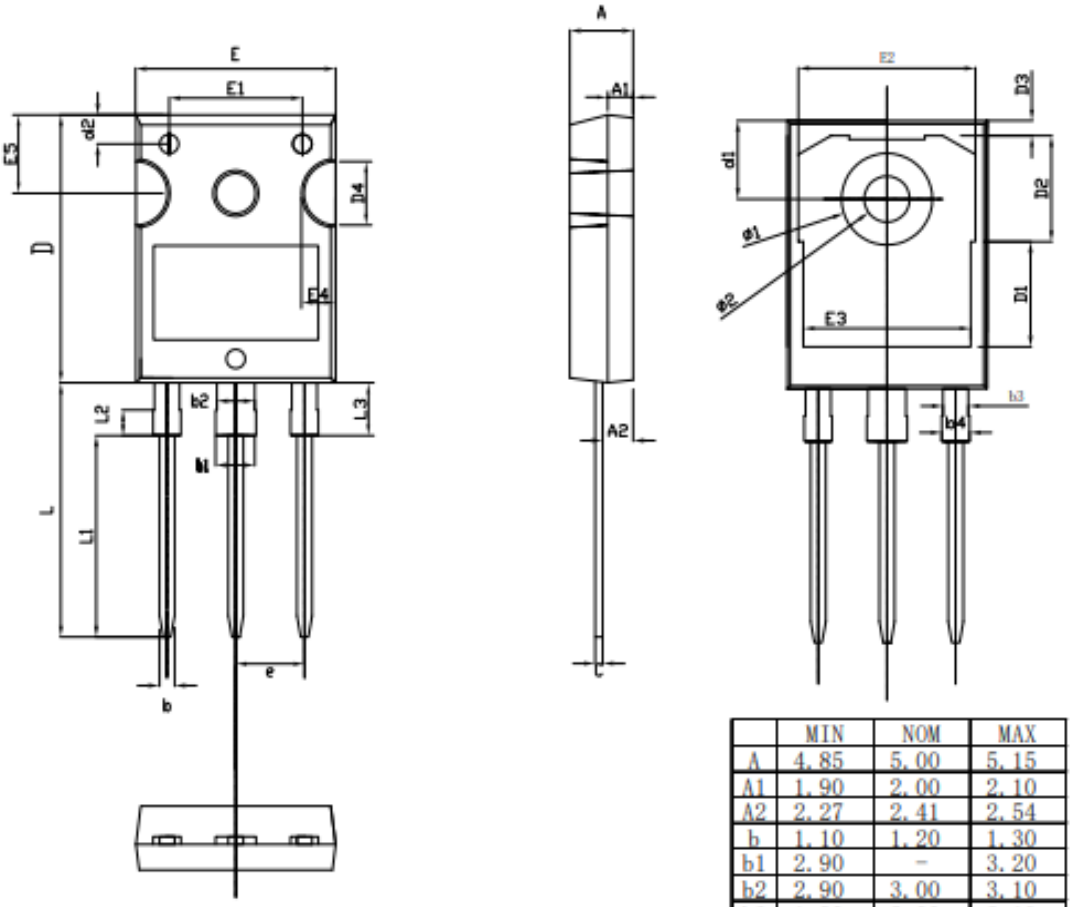



Figure 8: Normalized Maximum Transient Thermal Impedance

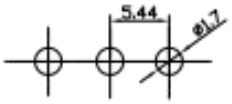
## Package Outlines

TO-247-3L PACKAGE OUTLINE




| | MIN | NOM | MAX |
|---|---|---|---|
| A | 4.85 | 5.00 | 5.15 |
| A1 | 1.90 | 2.00 | 2.10 |
| A2 | 2.27 | 2.41 | 2.54 |
| b | 1.10 | 1.20 | 1.30 |
| b1 | 2.90 | - | 3.20 |
| b2 | 2.90 | 3.00 | 3.10 |
| b3 | 1.90 | 2.00 | 2.10 |
| b4 | 2.00 | - | 2.20 |
| c | 0.55 | 0.60 | 0.68 |
| D | 20.80 | 21.00 | 21.10 |
| D1 | | 8.23 | |
| D2 | | 8.32 | |
| D3 | | 1.17 | |
| D4 | 3.68 | 4.90 | 5.10 |
| d1 | 6.04 | 6.15 | 6.30 |
| d2 | 2.20 | 2.30 | 2.40 |
| E | 15.70 | 15.80 | 16.00 |
| E1 | | 10.50 | |
| E2 | | 14.02 | |
| E3 | | 13.50 | |
| E4 | 2.20 | 2.40 | 2.60 |
| E5 | 5.49 | 5.80 | 6.00 |
| e | 5.34 | 5.44 | 5.54 |
| L | 19.72 | 19.92 | 20.12 |
| L1 | | 15.79 | |
| L2 | | 1.98 | |
| L3 | 4.00 | 4.10 | 4.47 |
| ⌀1 | 7.10 | 7.19 | 7.30 |
| ⌀2 | 3.50 | 3.60 | 3.70 |

RECOMMENDED LAND PATTERN




UNIT: mm

## Marking Information


Note:

CK2A040WHH = Product Name Code

XXXXXXX = Date Code

Contact ALKAIDSEMI sales for detail information

## Revision History

| Revision | Release Date | Remark |
|---|---|---|
| Rev.1.2 | 2022/7/18 | Initial Release |

## Disclaimer

The information given in this document describes the independent performance of the product, but similar performance is not guaranteed under other working conditions, and cannot be guaranteed when installed with other products or equipment. To achieve the required performance of the product in actual scenarios, the customer should conduct a complete application test to assess the functionality of the product.

Alkaidsemi assumes no responsibility for equipment failures result from using products at values that exceed the ratings, operating conditions, or other parameters listed in the product specifications.

The product described in this specification is not applicable for aerospace or other applications which requires high reliability. Customers using or selling these products for use in medical, life-saving, or life-sustaining applications do so at their own risk and agree to fully indemnify.

Due to product or technical improvements, the information described or contained herein may be changed without prior notice.