

# E6D16065A

E-Series Automotive  
650 V, 16 A Silicon Carbide Schottky Diode

## Description

With the performance advantages of a Silicon Carbide (SiC) Schottky Barrier diode, power electronics systems can expect to meet higher efficiency standards than Si-based solutions, while also reaching higher frequencies and power densities. SiC diodes can be easily paralleled to meet various application demands, without concern of thermal runaway. In combination with the reduced cooling requirements and improved thermal performance of SiC products, SiC diodes are able to provide lower overall system costs in a variety of diverse applications.



Tab - CASE



Part Number	Package	Marking
E6D16065A	TO-220-2	E6D16065A

## Features

- Low Forward Voltage ( $V_F$ ) Drop with Positive Temperature Coefficient
- Zero Reverse Recovery Current / Forward Recovery Voltage
- Temperature-Independent Switching Behavior
- Automotive Qualified (AEC Q101) and PPAP Capable

## Typical Applications

- Interleaved or Bridgless PFC
- DC/DC On Board Battery Chargers
- Boost for PFC & DC-DC Stages
- AC/DC On Board Chargers
- PFC Output Rectification

## Maximum Ratings ( $T_c = 25^\circ\text{C}$ Unless Otherwise Specified)

Parameter	Symbol	Value	Unit	Test Conditions	Notes
Repetitive Peak Reverse Voltage	$V_{RRM}$	650	V		
Surge Peak Reverse Voltage	$V_{RSM}$	650			
DC Blocking Voltage	$V_{DC}$	650			
Continuous Forward Current	$I_F$	54	A	$T_c = 25^\circ\text{C}$	Fig. 3
		27		$T_c = 125^\circ\text{C}$	
		17		$T_c = 150^\circ\text{C}$	
Repetitive Peak Forward Surge Current	$I_{FRM}$	66	A	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
		37		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
Non-Repetitive Forward Surge Current	$I_{FSM}$	123	A	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
		105		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
Power Dissipation	$P_{tot}$	143	W	$T_c = 25^\circ\text{C}$	Fig. 4
		62		$T_c = 110^\circ\text{C}$	
$i^2t$ value	$\int i^2 dt$	76	$\text{A}^2\text{s}$	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}$	
		55		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}$	

Electrical Characteristics

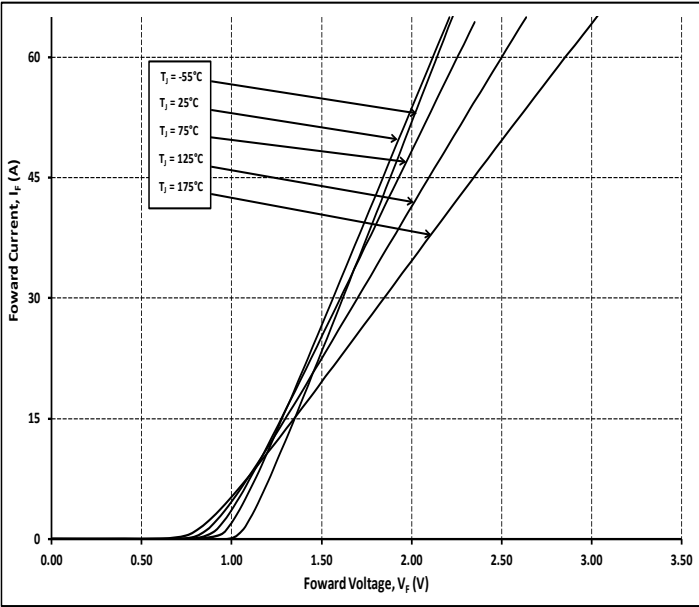
Parameter	Symbol	Typ.	Max.	Unit	Test Conditions	Notes
Forward Voltage	$V_F$	1.3	1.5	V	$I_F = 16\text{ A}, T_j = 25\text{ }^{\circ}\text{C}$	Fig. 1
		1.4	1.6		$I_F = 16\text{ A}, T_j = 175\text{ }^{\circ}\text{C}$	
Reverse Current	$I_R$	5	50	$\mu\text{A}$	$V_R = 650\text{ V}, T_j = 25\text{ }^{\circ}\text{C}$	Fig. 2
		20	250		$V_R = 650\text{ V}, T_j = 175\text{ }^{\circ}\text{C}$	
Total Capacitive Charge	$Q_C$	54.5		nC	$V_R = 400\text{ V}, T_j = 25\text{ }^{\circ}\text{C}$	Fig. 5
Total Capacitance	C	1026		pF	$V_R = 0\text{ V}, T_j = 25\text{ }^{\circ}\text{C}, f = 1\text{ MHz}$	Fig. 6
		104			$V_R = 200\text{ V}, T_j = 25\text{ }^{\circ}\text{C}, f = 1\text{ MHz}$	
		80			$V_R = 400\text{ V}, T_j = 25\text{ }^{\circ}\text{C}, f = 1\text{ MHz}$	
Capacitance Stored Energy	$E_C$	8.1		$\mu\text{J}$	$V_R = 400\text{ V}$	Fig. 7

Notes:  
SiC Schottky Diodes are majority carrier devices, so there is no reverse recovery charge.

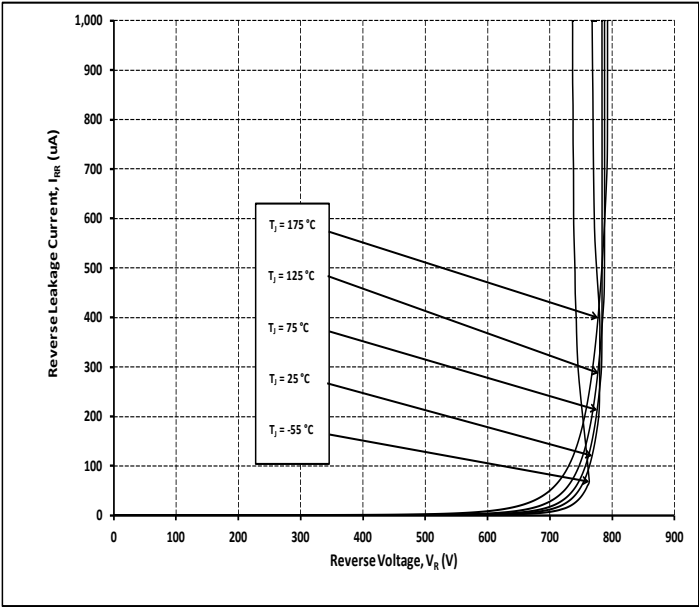
Thermal & Mechanical Characteristics

Parameter	Symbol	Value	Unit	Notes
Thermal Resistance, Junction to Case (Typical)	$R_{\theta, JC (TYP)}$	0.81	$^{\circ}\text{C} / \text{W}$	
Thermal Resistance, Junction to Case (Max)	$R_{\theta, JC (MAX)}$	1.05	$^{\circ}\text{C} / \text{W}$	
Junction Temperature	$T_j$	-55 to +175	$^{\circ}\text{C}$	
Case & Storage Temperature	$T_c$	-55 to +175		
TO-220 Mounting Torque	-	1	Nm	M3 Screw
		8.8	lbf-in	6-32 Screw

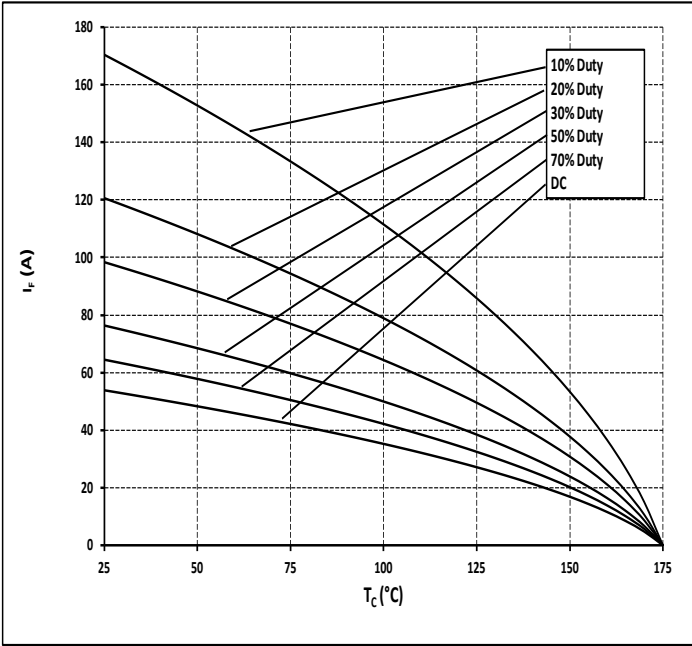
Typical Performance



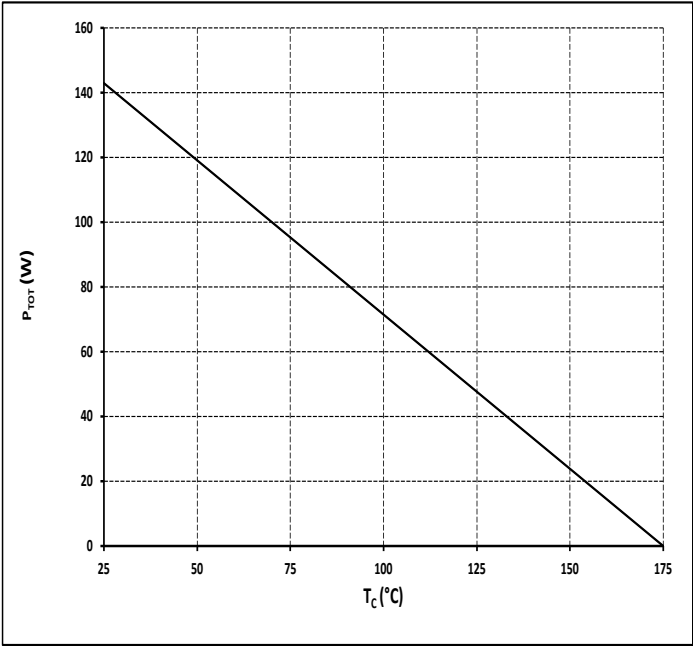
**Figure 1**  
Forward Characteristics



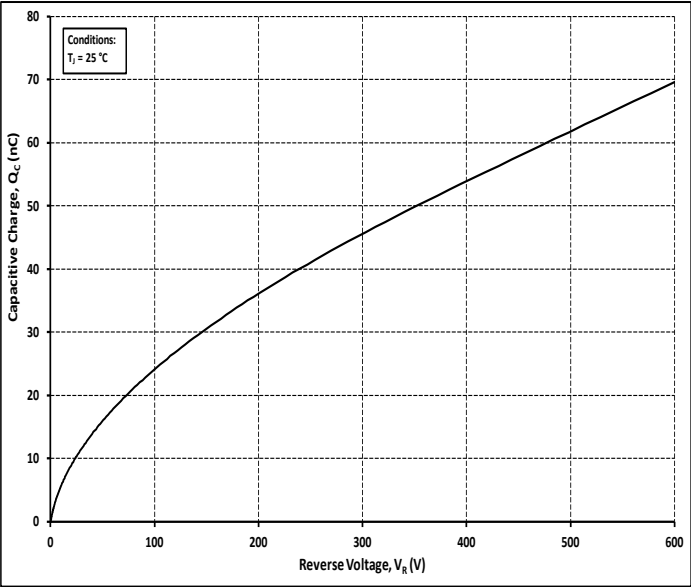
**Figure 2**  
Reverse Characteristics



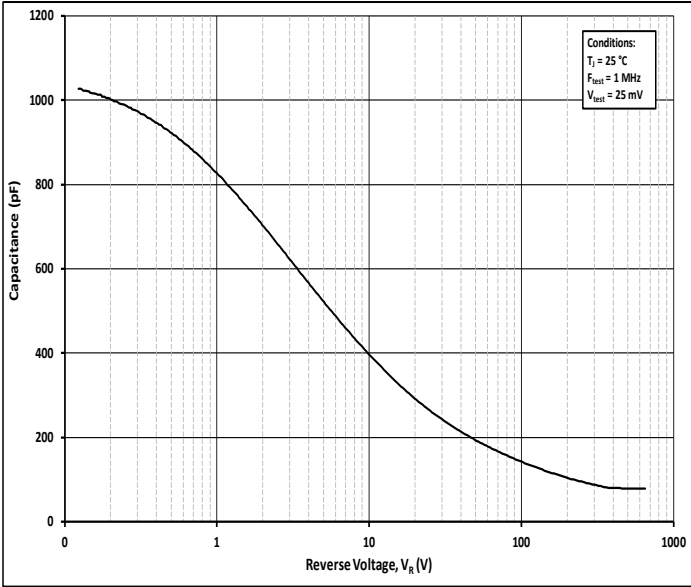
**Figure 3**  
Current Derating



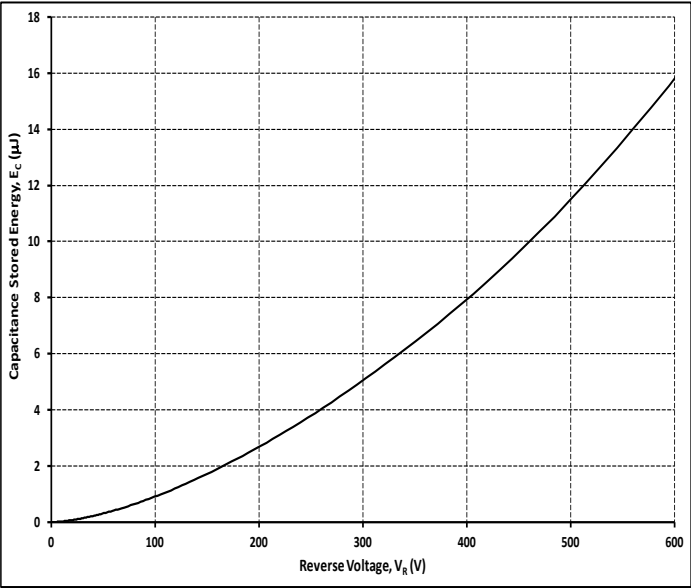
**Figure 4**  
Power Derating



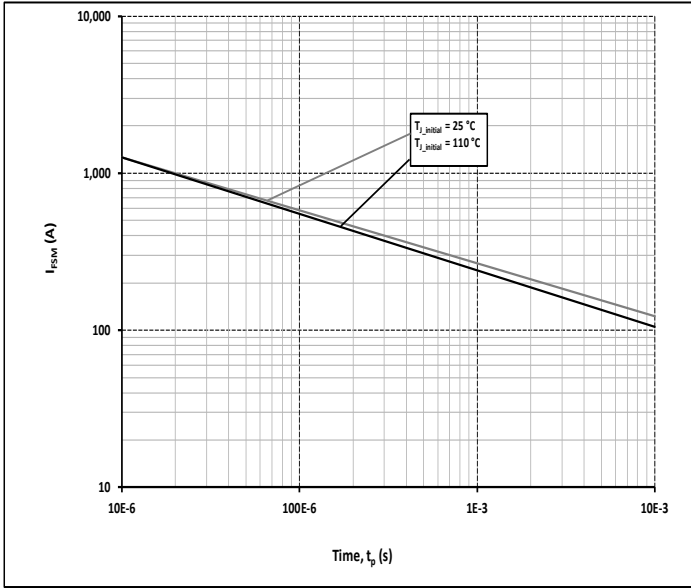
**Figure 5**  
Total Capacitance vs. Reverse Voltage



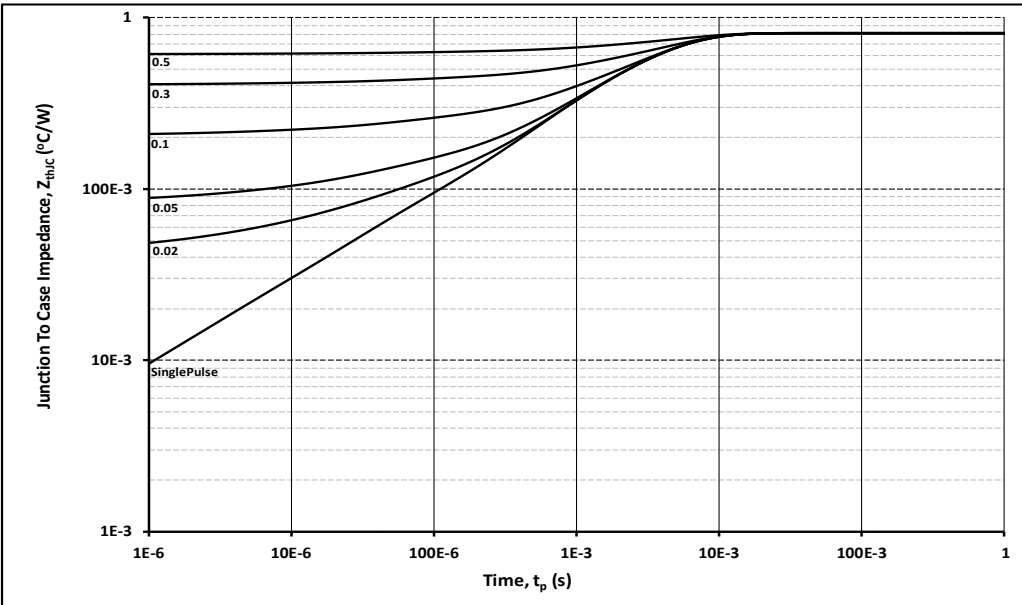
**Figure 6**  
Capacitance vs. Reverse Voltage



**Figure 7**  
Capacitance Stored Energy



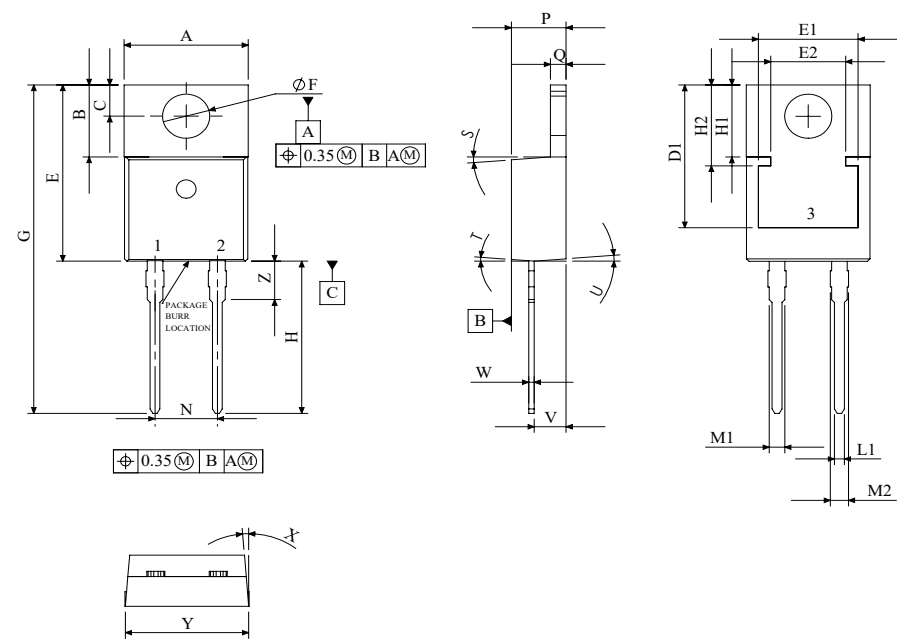
**Figure 8**  
Non Repetitive Peak Forward Surge Current  
versus Pulse Duration (sine wave)



**Figure 9**  
Transient Thermal Impedance

Package Dimensions & Pin-Out

Package: TO-220-2



SYMBOL	MIN (mm)	MAX (mm)
A	9.67	10.41
B	5.96	6.48
C	2.54	3.05
D1	12.45 REF	
E	14.98	15.62
E1	8.12 REF	
E2	6.10 REF	
F	3.63	3.89
G	28.06	29.13
H	12.70	13.97
H1	6.22 REF	
H2	7.04 REF	
L1	0.63	0.91
M1	1.14	1.40
M2	1.14	1.77
N	4.95	5.21
P	4.19	4.70
Q	1.21	1.37
S	3°	6°
T	3°	6°
U	3°	6°
V	2.38	2.79
W	0.35	0.64
X	3°	5.5°
Y	9.77	10.41
Z	3.30	3.81

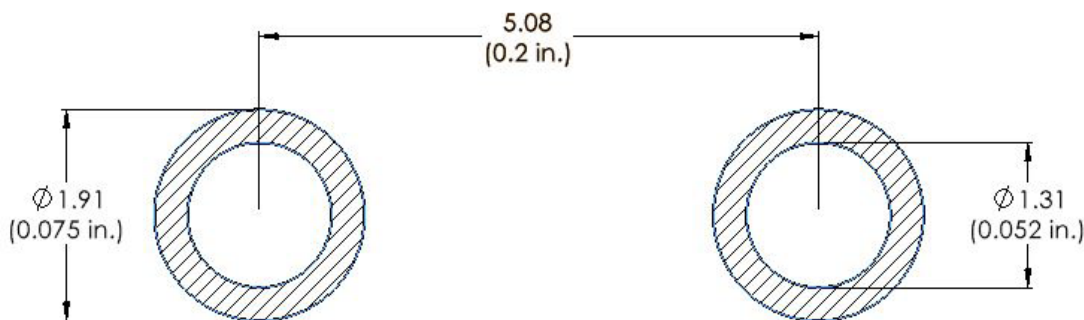
1	CATHODE
2	ANODE
3	CATHODE

- NOTE
1. ALL METAL SURFACES ARE TIN PLATED (MATTE), EXCEPT AREA OF CUT.
  2. DIMENSIONING & TOLERANCING CONFORM TO ASME Y14.5M-1994.
  3. ALL DIMENSIONS ARE LISTED IN MILLIMETERS. ANGLES ARE IN DEGREES.
  4. PACKAGE BURR FLASH SIZE (0.5 mm) IS NOT INCLUDED IN THE DIMENSIONS



Recommended Solder Pad Layout

Primary dimensions shown in mm.



Product Ordering Information

Order Number	Packing Type
E6D16065A	Tube



Revision History

Document Version	Date of Release	Description of Changes
1	January 2024	Initial Release
2	February - 2025	Legal disclaimer, updated POD



## Notes & Disclaimer

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