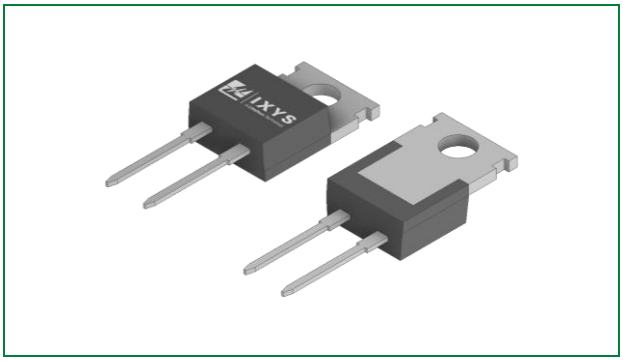
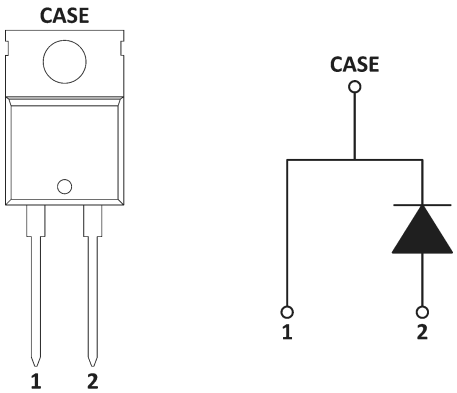
LSIC2SD065A10A
650 V, 10 A SiC Schottky Barrier Diode



Agency Approvals and Environmental

Environmental Approvals
RoHS HF

Circuit Diagram TO-220-2L



Product Summary

Characteristic	Value	Unit
V_{RRM}	650	V
I_F (T_C = 135 °C)	13	A
Q_C (V_R: 400 V)	31	nC

Description

This series of silicon carbide (SiC) Schottky diodes has negligible reverse recovery current, high surge capability, and a maximum operating junction temperature of 175 °C. These diodes series are ideal for applications where improvements in efficiency, reliability, and thermal management are desired.

Features

- AEC-Q101 qualified
- Positive temperature coefficient for safe operation and ease of paralleling
- 175 °C maximum operating junction temperature
- Excellent surge capability
- Extremely fast, temperature-independent switching behavior
- Dramatically reduced switching losses compared to Si bipolar diodes
- RoHS compliant, lead-free, and halogen-free

Applications

- Boost diodes in PFC or DC/DC stages
- Switch-mode power supplies
- Solar inverters
- Uninterruptable power supplies
- Industrial motor drives
- Battery Chargers
- High-speed Rectifier

1. Maximum Ratings

Characteristic	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	-	650	V
DC Blocking Voltage	V_R	T_J = 25 °C	650	V
Continuous Forward Current	I_F	T_C = 25 °C	28	A
		T_C = 135 °C	13	
		T_C = 148 °C	10	
Non-repetitive Forward Surge Current	I_{FSM}	T_C = 25 °C, t_p = 10 ms, Half sine pulse	48	A
I^2t	$\int I^2dt$	T_C = 25 °C, t_p = 10 ms, Half sine pulse	11.5	A^2s
Power Dissipation	P_{Tot}	T_C = 25 °C	100	W
		T_C = 110 °C	43	
Operating Junction Temperature	T_J	-	-55 to 175	°C
Storage Temperature	T_{STG}	-	-55 to 150	°C
Lead Temperature for Soldering	T_{SOLD}	-	260	°C
Mounting Torque	M_D	M3 or 6-32 screw	1.0	Nm
			8.8	In-lb

2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Maximum Thermal Resistance	$R_{th,JC,MAX}$	1.5	°C/W

3. Electrical Characteristics (T_J = 25 °C unless otherwise specified)

Characteristic	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Forward Voltage	V_F	I_F = 10 A, T_J = 25 °C	-	1.5	1.8	V
		I_F = 10 A, T_J = 175 °C	-	1.8	-	
Reverse Current	I_R	V_R = 650 V, T_J = 25 °C	-	<1	100	µA
		V_R = 650 V, T_J = 175 °C	-	20	-	
Capacitance	C	V_R = 1 V, f = 1 MHz	-	470	-	pF
		V_R = 200 V, f = 1 MHz	-	60	-	
		V_R = 400 V, f = 1 MHz	-	43	-	
Total Capacitive Charge	Q_C	V_R = 400 V, $Q_C = \int C(V)\,dV$	-	31	-	nC
Capacitive Stored Energy	E_C	V_R = 400 V	-	3.4	-	µJ

4. Performance Curves

Figure 1. Typical Forward Characteristics

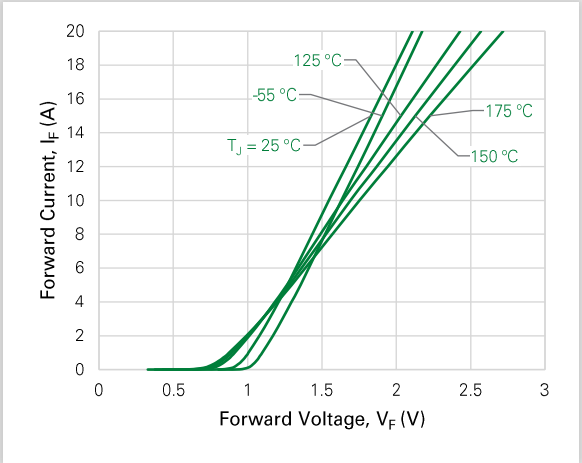


Figure 2. Typical Reverse Characteristics

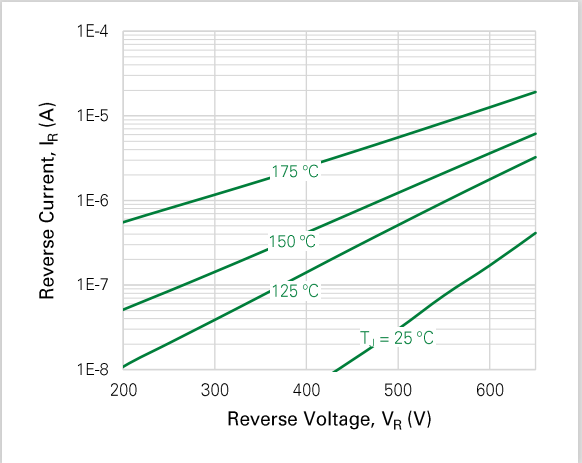


Figure 3. Power Derating

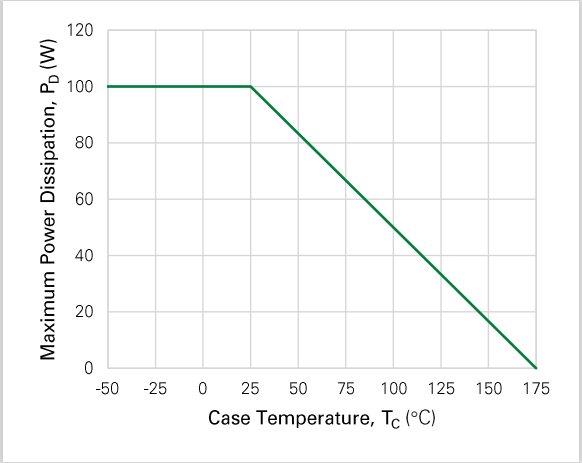


Figure 4. Current Derating

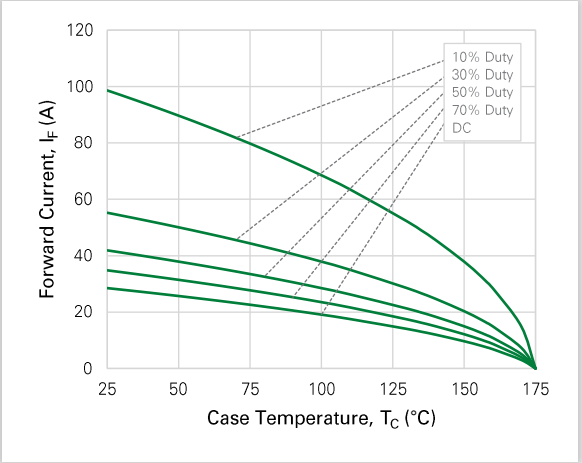


Figure 5. Capacitance vs. Reverse Voltage

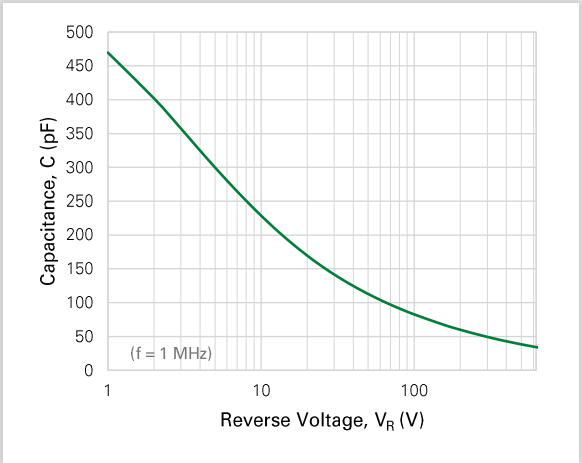


Figure 6. Capacitive Charge vs. Reverse Voltage

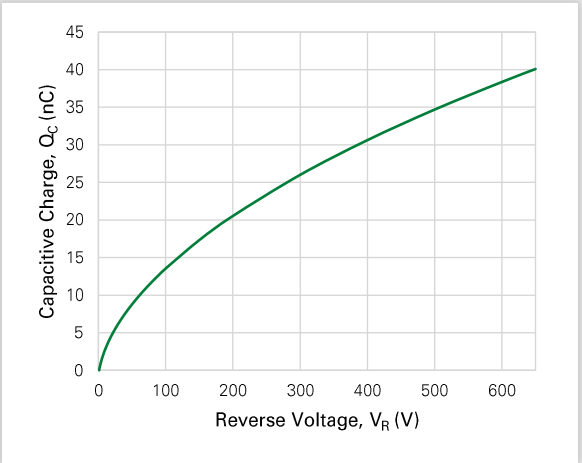


Figure 7. Stored Energy vs. Reverse Voltage

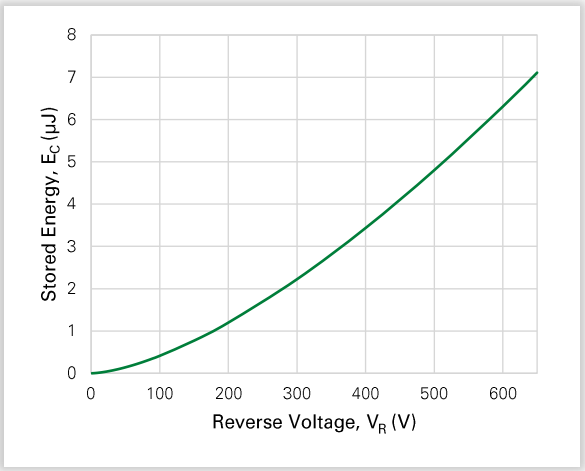
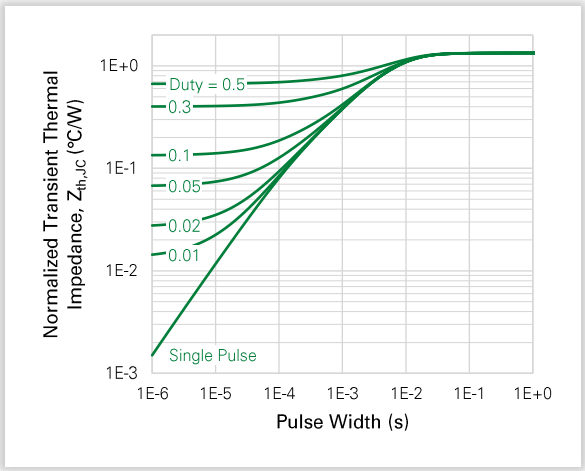
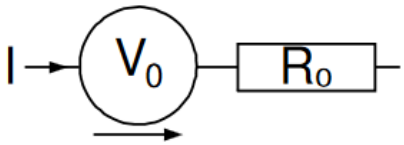


Figure 8. Transient Thermal Impedance



5. Diode V_F Model for Simulation



$$V_F(T_J) = V_0 + IR_0$$

$$V_0 = -1.14 \times 10^{-3} \cdot T_J + 1.01 \times 10^{0}$$

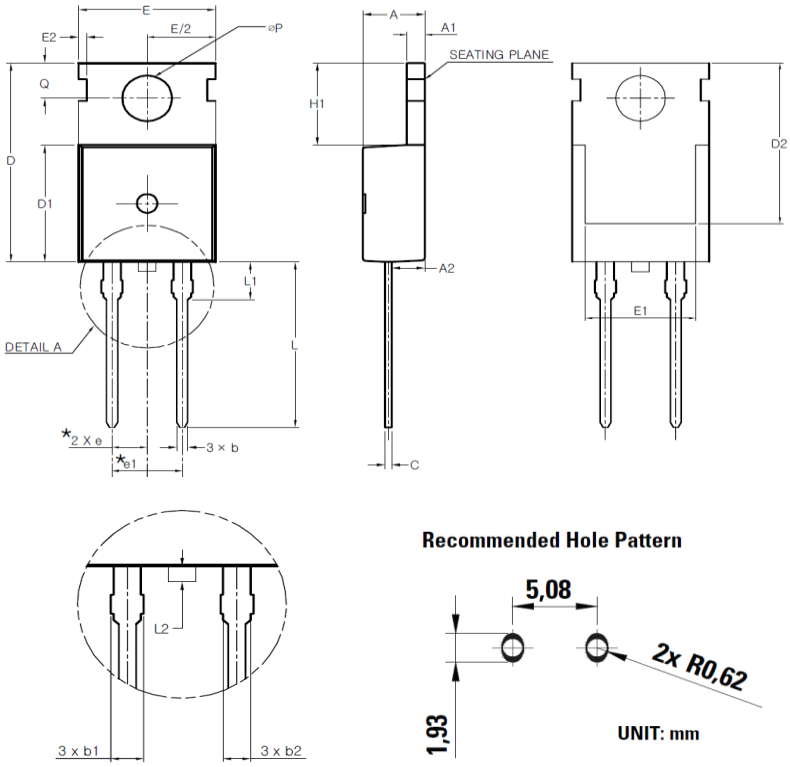
$$R_0 = 8.08 \times 10^{-7} \cdot T_J^2 + 9.46 \times 10^{-5} \cdot T_J + 5.34 \times 10^{-2}$$

Notes:

- T_J is junction temperature in °C
- Range valid from 25 °C to 175 °C
- Model represents performance of a typical part

6. Package Dimensions

TO-220-2L Package

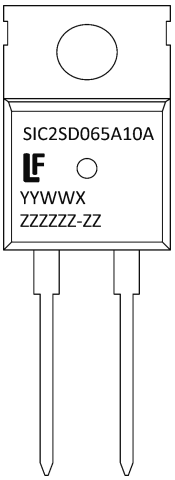


Symbol	Millimeters		
	Min	Nom	Max
A	4.30	4.50	4.70
A1	1.25	1.30	1.40
A2	2.20	2.40	2.60
b	0.70	0.80	0.90
b2	1.17	1.27	1.37
c	0.45	0.50	0.60
D	15.50	15.70	15.90
D1	9.00	9.20	9.40
D2		(12.70)	
E*	9.70	9.90	10.10
E1		(8.00)	
E2		(0.60)	
E3	9.70	9.90	10.10
e		2.54 BSC	
e1		5.08 BSC	
H1	6.30	6.50	6.70
L	12.88	13.08	13.28
L1		(3.00)	
L2	-	-	0.80
øP	3.50	3.60	3.70
Q	2.70	2.80	2.90

Notes:

1. These dimensions do not include protrusions of the mold.
2. The "( )" mark is the reference.
3. The "L2" symbol is a protrusion of the mold.

7. Part Numbering and Marking



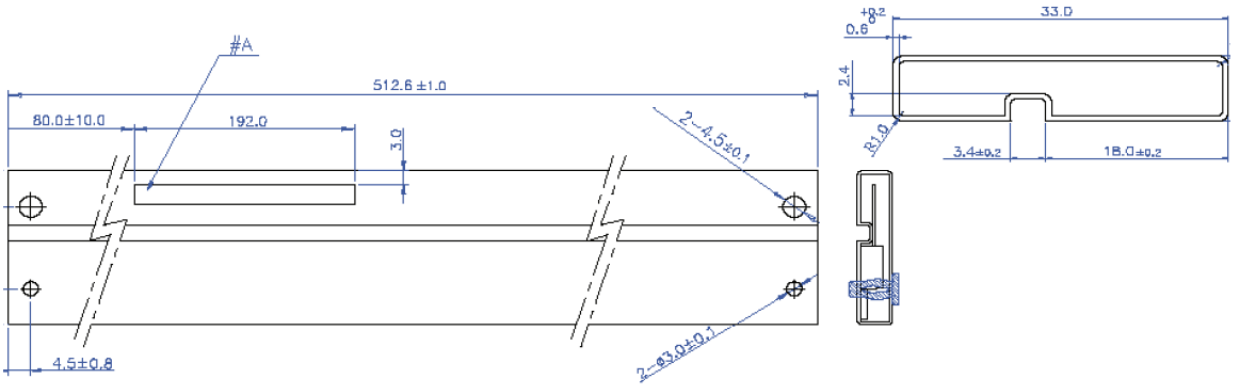
Sic	= SiC Diode
2	= Gen2
SD	= Schottky Diode
065	= Voltage Rating (650 V)
A	= TO-220 Package (2 Lead)
10	= Current Rating (10 A)
A	= AEC-Q101 Qualified
YY	= Year
WW	= Week
X	= Special Code
ZZZZZZ-ZZ	= Lot Number

8. Packing Options

Part Number	Marking	Packing Mode	M.O.Q.
LSIC2SD065A10A	SIC2SD065A10A	Tube (50 pcs)	1000

9. Packing Specifications

Tube for TO-220-2L



NOTE]

TUBE
- MATERIAL : PVC / PET (WITH ANTISTATIC COATING)
- COLOR : TRANSPARENCY, RED, YELLO
- MARKING #A : BLACK COLOR, LETTER STYLE : Arial
- Tube Surface Resistance :10^{8}~10^{11}Ω/square
- ESD (Electro Static Discharge) : less than 100 [volts], 6 Months
- CAMBAR : 1.5 MAX

PIN
- COLOR : GREEN (ONE PIN MUST BE INSERTED IN LEFT-SIDE OF "□ANTISTATIC~" AND ANOTHER PIN IS FREE.)

For additional information please visit www.Littelfuse.com/powersemi