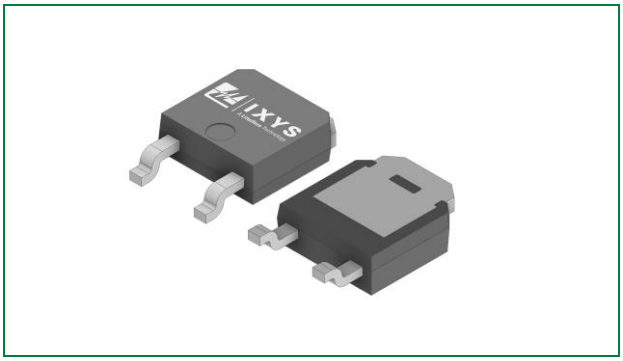
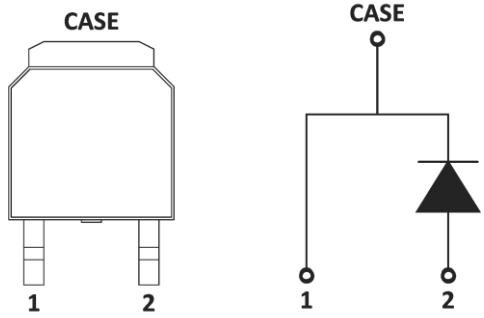
LSIC2SD065C06A
650 V, 6 A SiC Schottky Barrier Diode



Agency Approvals and Environmental

Environmental Approvals
RoHS HF

Circuit Diagram TO-252-2L



Product Summary

Characteristic	Value	Unit
V_{RRM}	650	V
I_F ($T_C \leq 135$ °C)	8.5	A
Q_C (V_R: 0 - 400 V)	20	nC

Features

- AEC-Q101 Qualified
- MSL 1 Rated
- 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	-	650	V
Continuous Forward Current	I_F	T_C = 25 °C	18.5	A
		T_C = 135 °C	8.5	
		T_C = 152 °C	6	
Non-repetitive Forward Surge Current	I_{FSM}	T_C = 25 °C, t_p = 10 ms, Half sine pulse	32	A
I^2t	$\int I^2dt$	T_C = 25 °C, t_p = 10 ms, Half sine pulse	5	A^2s
Power Dissipation	P_{Tot}	T_C = 25 °C	75	W
		T_C = 110 °C	32	
Operating Junction Temperature	T_J	-	-55 to 175	°C
Storage Temperature	T_{STG}	-	-55 to 150	°C
Lead Temperature for Soldering (MSL 1 rated)	T_{SOLD}	-	260	°C

2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Maximum Thermal Resistance	$R_{th,JC,\ max}$	2.0	°C/W

3. Electrical Characteristics

Characteristic	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Forward Voltage	V_F	I_F = 6 A, T_J = 25 °C	-	1.5	1.8	V
		I_F = 6 A, T_J = 175 °C	-	1.9	-	
Reverse Current	I_R	V_R = 650 V, T_J = 25 °C	-	<1	100	µA
		V_R = 650 V, T_J = 175 °C	-	13	-	
Capacitance	C	V_R = 1 V, f = 1 MHz	-	300	-	pF
		V_R = 200 V, f = 1 MHz	-	39	-	
		V_R = 400 V, f = 1 MHz	-	28	-	
Total Capacitive Charge	Q_C	V_R = 400 V, $Q_C = \int C(V)\,dV$	-	20	-	nC
Capacitance Stored Energy	E_C	V_R = 400 V	-	2.2	-	µJ

4. Performance Curves

Figure 1. Typical Forward Characteristics

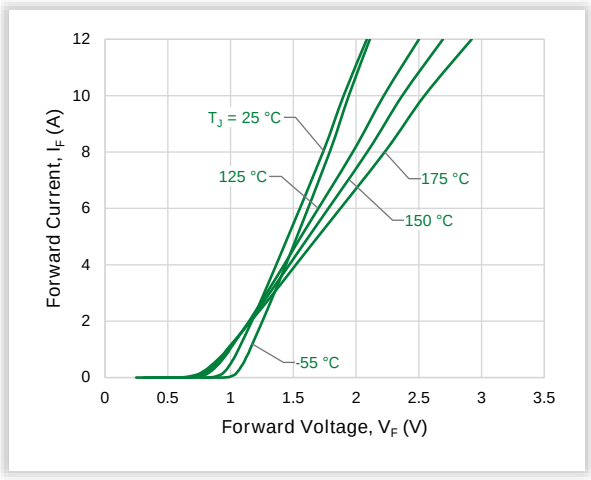


Figure 2. Typical Reverse Characteristics

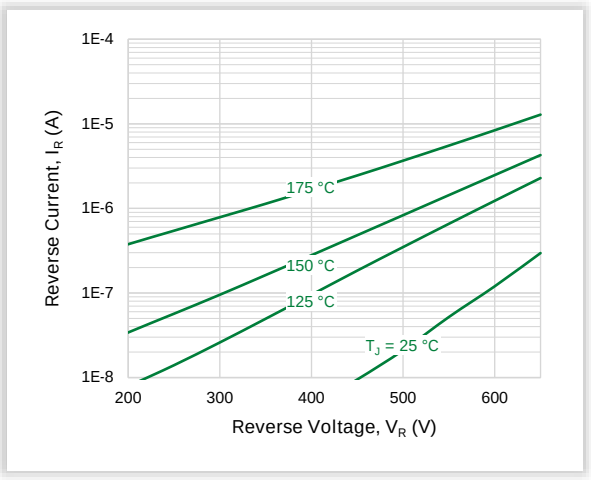


Figure 3. Power Derating

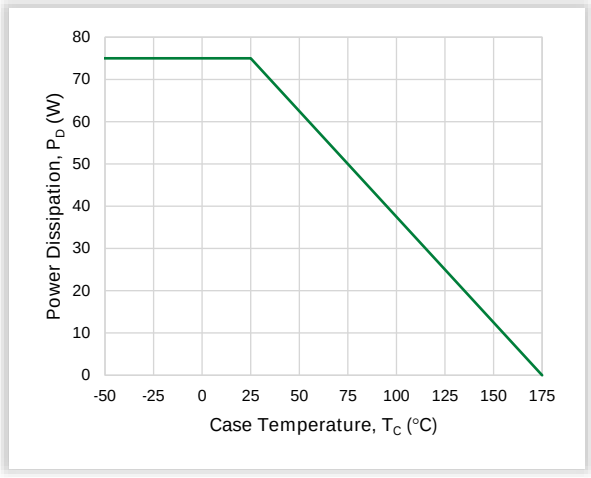


Figure 4. Current Derating

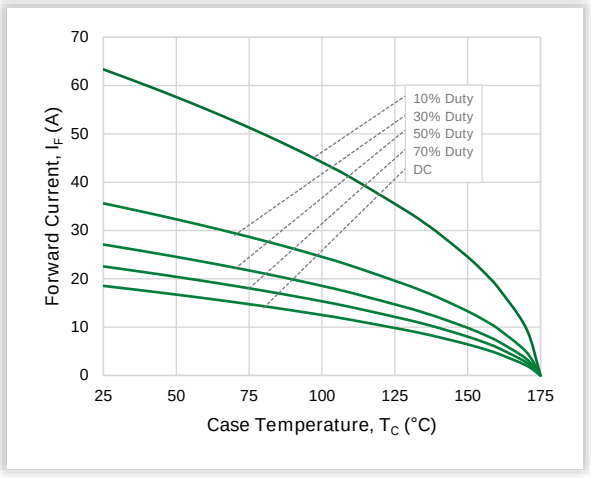


Figure 5. Capacitance vs. Reverse Voltage

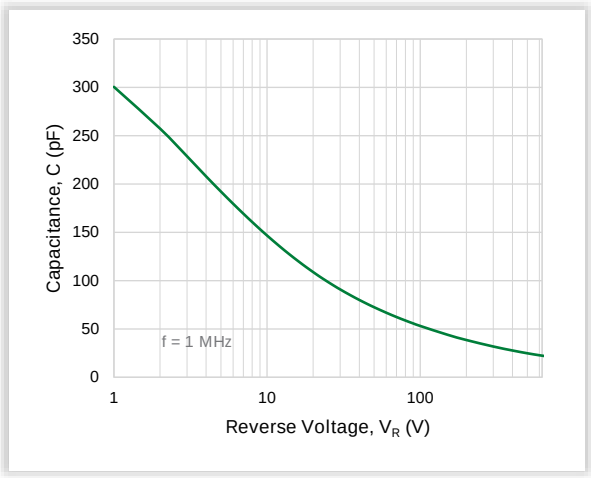


Figure 6. Capacitive Charge vs. Reverse Voltage

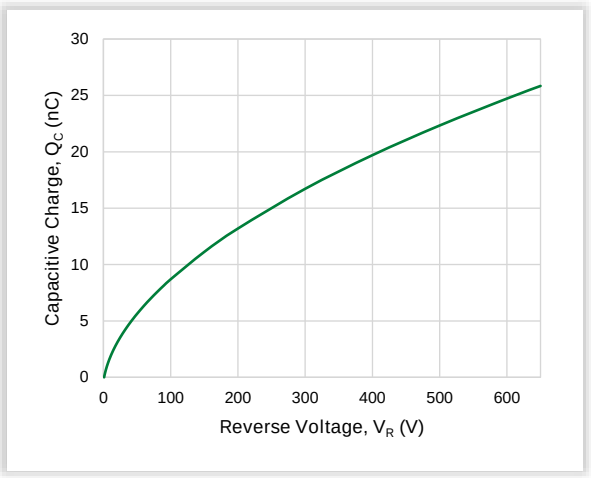


Figure 7. Stored Energy vs. Reverse Voltage

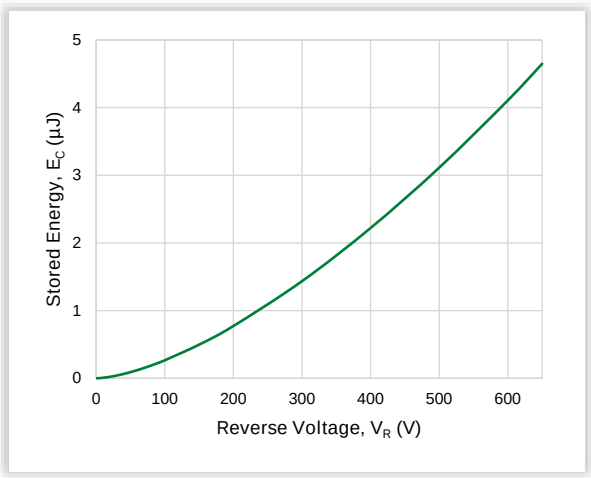
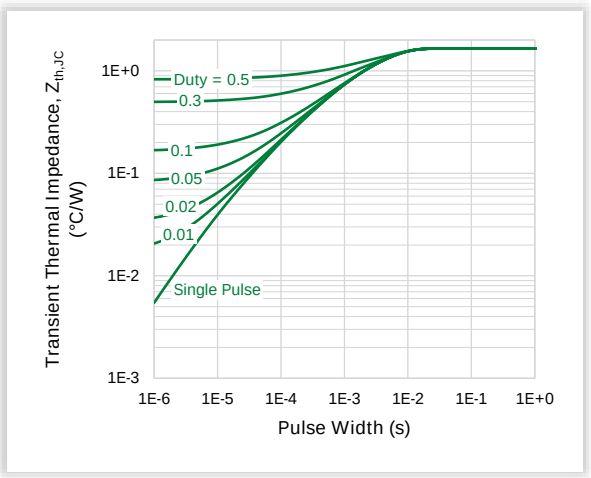
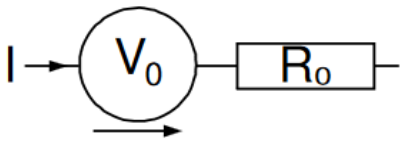


Figure 8. Transient Thermal Impedance



5. V_F Model for Simulations

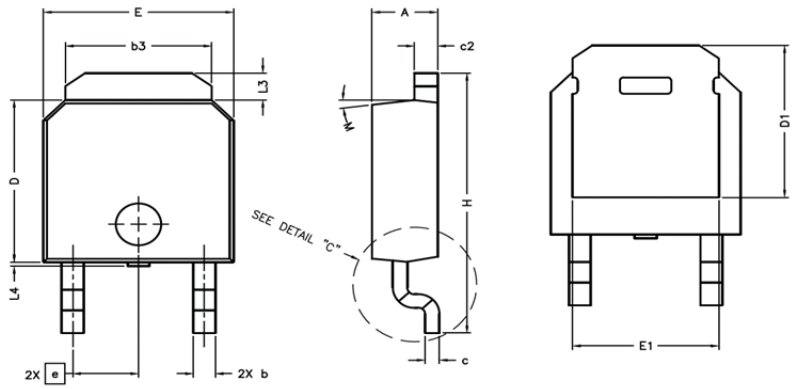


$$V_F(T_J) = V_0 + IR_0$$
$$V_0 = -1.22 \times 10^{-3} \cdot T_J + 1.04 \times 10^{0}$$
$$R_0 = 2.36 \times 10^{-6} \cdot T_J^2 + 8.79 \times 10^{-5} \cdot T_J + 8.62 \times 10^{-2}$$

Notes:

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

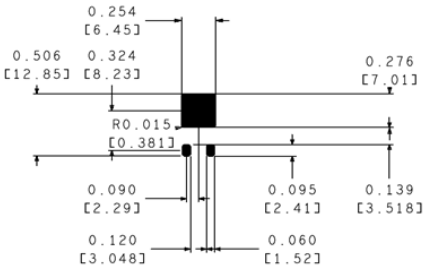
6. Package Dimensions



NOTE:
1. L4 – MAXIMUM PLASTIC PROTRUSION.
2. L2 – REFERENCE FOR FOOT LENGTH MEASUREMENT.
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS B3, L3, D1, AND E1
4. PACKAGE OUTLINE D AND E EXCLUSIVE OF ANY MOLD FLASHES DIMENSIONS.
5. PACKAGE OUTLINE D AND E EXCLUSIVE OF ANY BURR DIMENSIONS.
6. FOR SINGLE–GAUGE LEADFRAME.

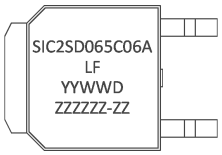
Symbol	Millimeters	
	Min	Max
A	2.159	2.413
A1	-	0.127
b	0.635	1.067
b3	4.953	5.461
c	0.457	0.610
c2	-	0.889
(c2)	0.457	0.610
D	5.969	6.223
D1	5.207	5.715
E	6.350	6.731
E1	4.318	5.207
e	2.29 REF.	
H	9.398	10.414
L	1.016	1.778
L2	0.25 REF.	
L3	0.889	1.270
L4	0.000	0.152
M	15°	
P	-	5°

Recommended Solder Pattern Layout



UNIT: Inch [mm]

7. Part Numbering and Marking



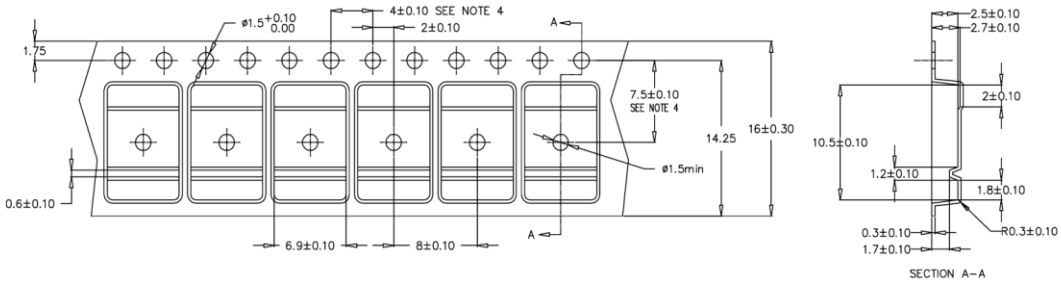
Sic	= SiC Diode
2	= Gen2
SD	= Schottky Diode
065	= Voltage Rating (650 V)
C	= TO-252-2L
06	= Current Rating (6 A)
A	= AEC-Q101 Qualified
YY	= Year
WW	= Week
D	= Special Code (fixed)
ZZZZZZ-ZZ	= Lot Number

8. Packing Options

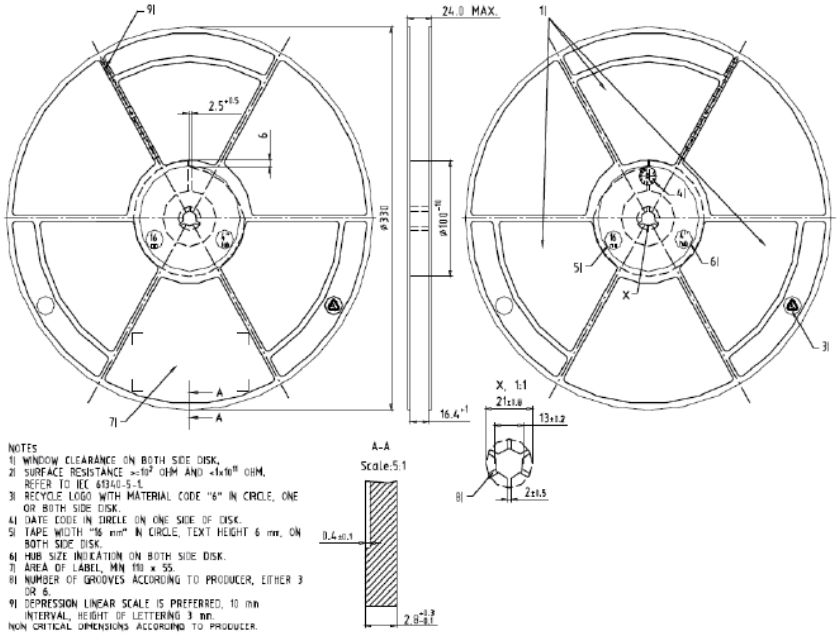
Part Number	Marking	Packing Mode	M.O.Q.
LSIC2SD065C06A	SIC2SD065C06A	Tape and Reel	2500

9. Packing Specifications

Carrier Tape and Reel Specification TO-252-2L



1. Material: Black Conductive Polysterene
2. 10 sprocket hole pitch cumulative tolerance ± 0.20
3. Camber not to exceed 1 mm in 100 mm.
4. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.
5. Device orientation: TRL (leads perpendicular to the sprocket)
6. General tolerance is ± 0.10 mm unless otherwise specified.



NOTES
1) WINDOW CLEARANCE ON BOTH SIDE DISK.
2) SURFACE RESISTANCE >=10² OHM AND <1x10¹¹ OHM. REFER TO IEC 61340-5-1.
3) RECYCLE LOGO WITH MATERIAL CODE "6" IN CIRCLE, ONE OR BOTH SIDE DISK.
4) DATE CODE IN CIRCLE ON ONE SIDE OF DISK.
5) TAPE WIDTH "16 mm" IN CIRCLE, TEXT HEIGHT 6 mm, ON BOTH SIDE DISK.
6) HUB SIZE INDICATION ON BOTH SIDE DISK.
7) AREA OF LABEL, MIN 110 x 55.
8) NUMBER OF GROOVES ACCORDING TO PRODUCER, EITHER 3 OR 6.
9) DEPRESSION LINEAR SCALE IS PREFERRED, 10 mm INTERVAL, HEIGHT OF LETTERING 3 mm.
NON CRITICAL DIMENSIONS ACCORDING TO PRODUCER.

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