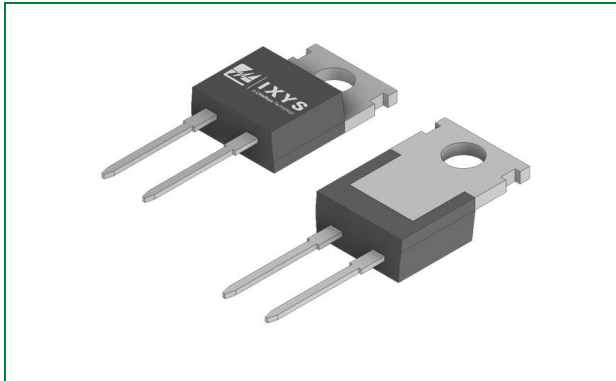


LSIC2SD120A20A  
1200 V, 20 A SiC Schottky Barrier Diode

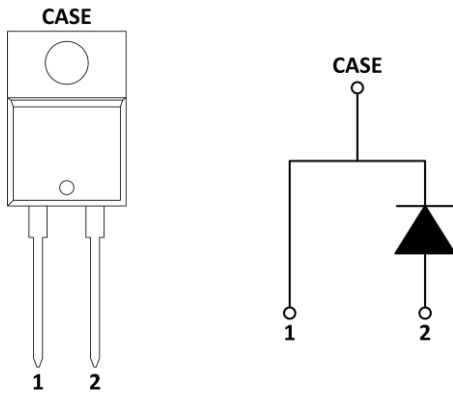


Agency Approvals and Environmental

Environmental Approvals



Circuit Diagram TO-220-2L



Product Summary

Characteristic	Value	Unit
$V_{RRM}$	1200	V
$I_F (T_C \leq 135^\circ\text{C})$	26	A
$Q_C (V_R: 0 - 800\text{ V})$	125	nC

Features

- 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

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### 1. Maximum Ratings

Characteristic	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	$V_{RRM}$	-	1200	V
DC Blocking Voltage	$V_R$	-	1200	V
Continuous Forward Current	$I_F$	$T_C = 25\text{ }^\circ\text{C}$	55	A
		$T_C = 135\text{ }^\circ\text{C}$	26	
		$T_C = 149\text{ }^\circ\text{C}$	20	
Non-repetitive Forward Surge Current	$I_{FSM}$	$T_C = 25\text{ }^\circ\text{C}$ , $t_p = 10\text{ ms}$ , Half sine pulse	145	A
$I^2t$	$\int I^2 dt$	$T_C = 25\text{ }^\circ\text{C}$ , $t_p = 10\text{ ms}$ , Half sine pulse	105	A <sup>2</sup> s
Power Dissipation	$P_{Tot}$	$T_C = 25\text{ }^\circ\text{C}$	250	W
		$T_C = 110\text{ }^\circ\text{C}$	108	
Operating Junction Temperature	$T_J$	-	-55 to 175	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-	-55 to 150	$^\circ\text{C}$
Lead Temperature for Soldering	$T_{SOLD}$	-	260	$^\circ\text{C}$
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	$R_{thJC, max}$	0.6	$^\circ\text{C/W}$

### 3. Electrical Characteristics ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)

Characteristic	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Forward Voltage	$V_F$	$I_F = 20\text{ A}$ , $T_J = 25\text{ }^\circ\text{C}$	-	1.5	1.8	V
		$I_F = 20\text{ A}$ , $T_J = 175\text{ }^\circ\text{C}$	-	2.1	-	
Reverse Current	$I_R$	$V_R = 1200\text{ V}$ , $T_J = 25\text{ }^\circ\text{C}$	-	<1	100	$\mu\text{A}$
		$V_R = 1200\text{ V}$ , $T_J = 175\text{ }^\circ\text{C}$	-	8	-	
Total Capacitance	C	$V_R = 1\text{ V}$ , $f = 1\text{ MHz}$	-	1310	-	pF
		$V_R = 400\text{ V}$ , $f = 1\text{ MHz}$	-	120	-	
		$V_R = 800\text{ V}$ , $f = 1\text{ MHz}$	-	86	-	
Total Capacitive Charge	$Q_C$	$V_R = 800\text{ V}$ , $Q_C = \int C(V) dV$	-	125	-	nC
Capacitance Stored Energy	$E_C$	$V_R = 800\text{ V}$	-	28	-	$\mu\text{J}$

4. Performance Curves

Figure 1. Typical Forward Characteristics

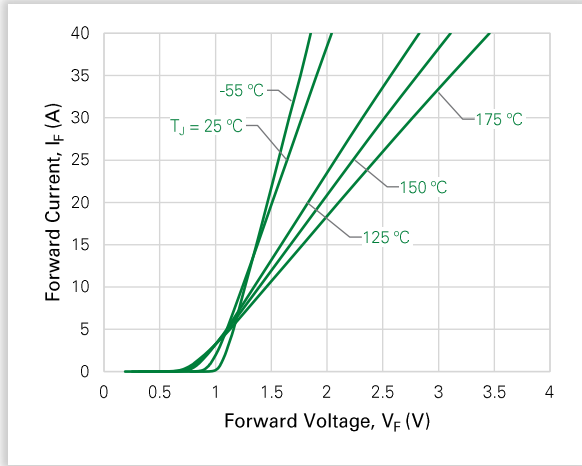


Figure 2. Typical Reverse Characteristics

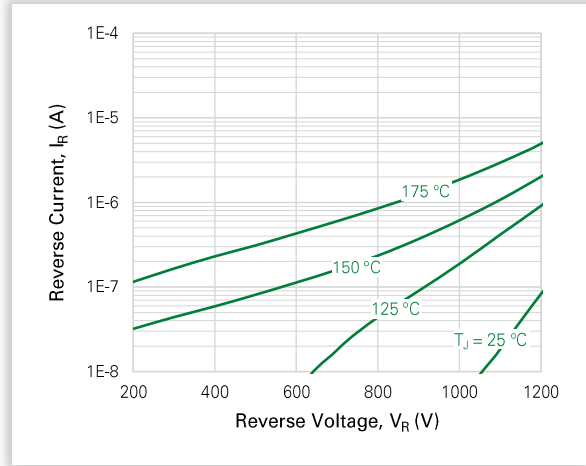


Figure 3. Power Derating

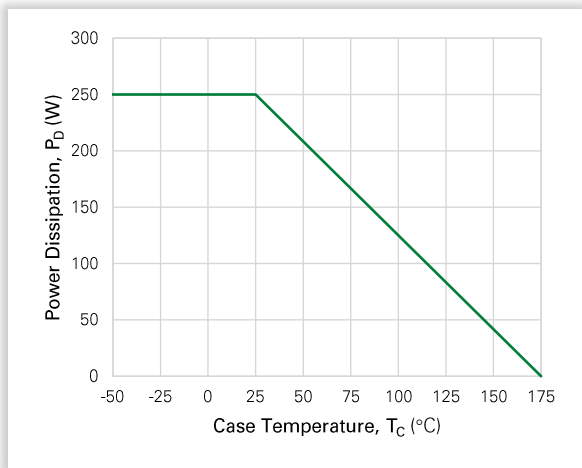


Figure 4. Current Derating

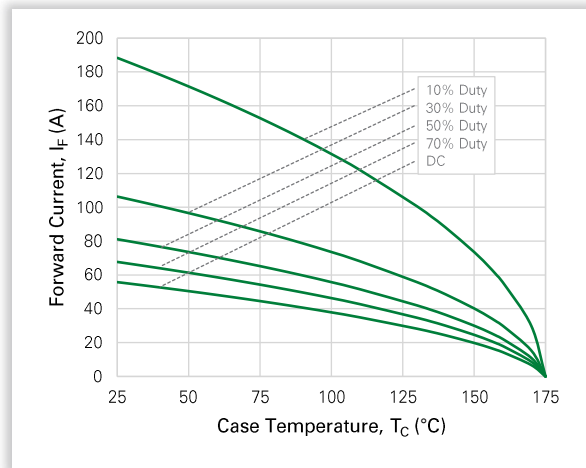


Figure 5. Capacitance vs. Reverse Voltage

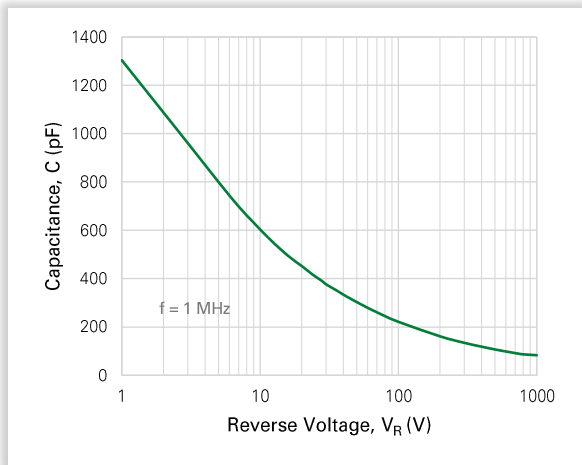


Figure 6. Capacitive Charge vs. Reverse Voltage

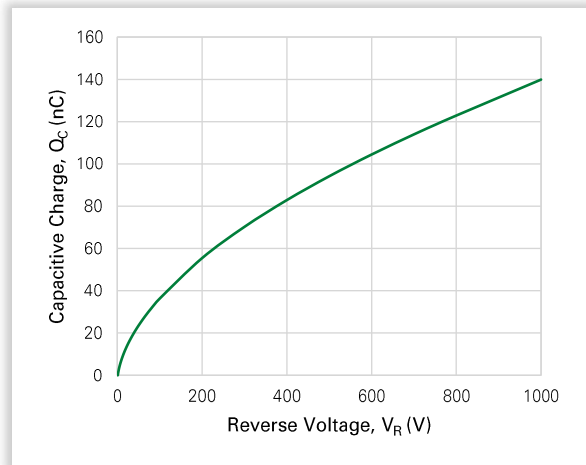


Figure 7. Stored Energy vs. Reverse Voltage

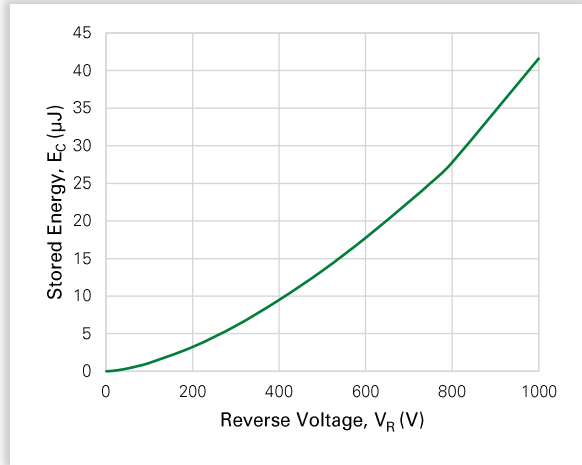
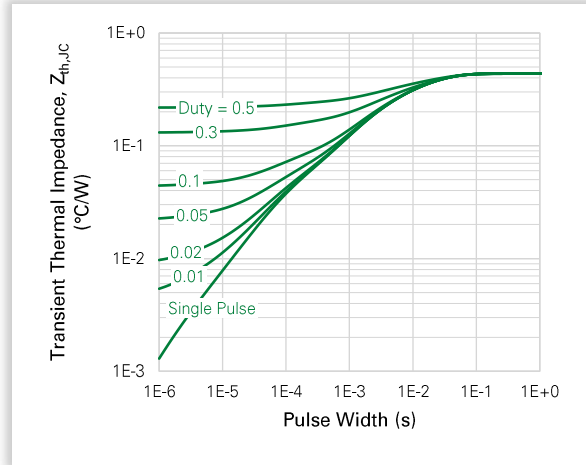
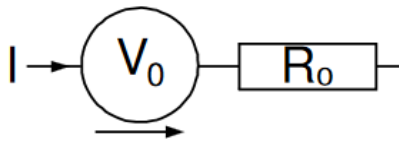


Figure 8. Transient Thermal Impedance



### 5. Diode V<sub>F</sub> Model for Simulation



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

$$V_0 = -1.30 \times 10^{-3} \cdot T_J + 1.01 \times 10^0$$

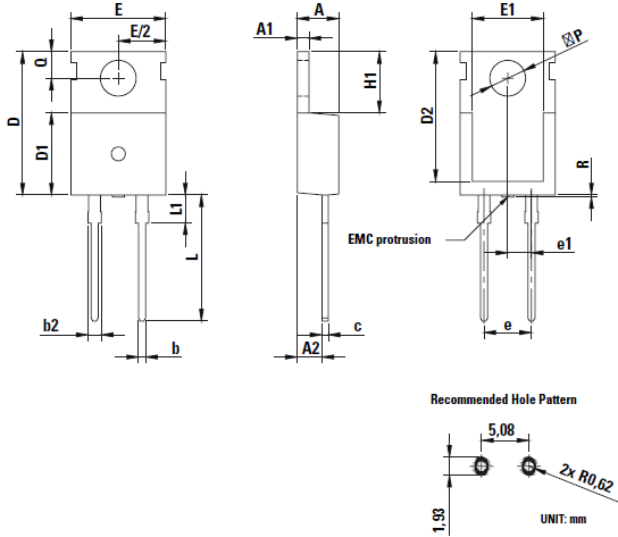
$$R_0 = 8.15 \times 10^{-7} \cdot T_J^2 + 1.03 \times 10^{-4} \cdot T_J + 2.36 \times 10^{-2}$$

Notes:

- T<sub>J</sub> is junction temperature in °C
- Range valid from 25 °C to 175 °C
- Model represents performance of a typical part

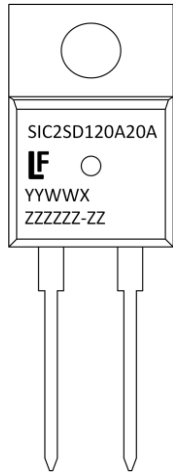
### 6. Package Dimensions

TO-220-2L Package



Symbol	Millimeters		
	Min	Nom	Max
A	4.30	4.45	4.70
A1	1.14	1.27	1.40
A2	2.20	-	2.74
b	0.69	-	0.90
b2	1.17	-	1.62
c	0.36	-	0.60
D	14.90	-	15.90
D1	8.62	-	9.40
D2	12.50	-	12.95
E	9.70	10.18	10.36
E1	7.57	7.61	8.30
e1	-	2.54	-
e	5.03	5.08	5.13
H1	6.30	6.55	6.80
L	12.88	13.50	14.00
L1	2.39	-	3.25
øP	3.50	3.84	3.96
Q	2.65	-	3.05
R	-	-	0.25

### 7. Part Numbering and Marking



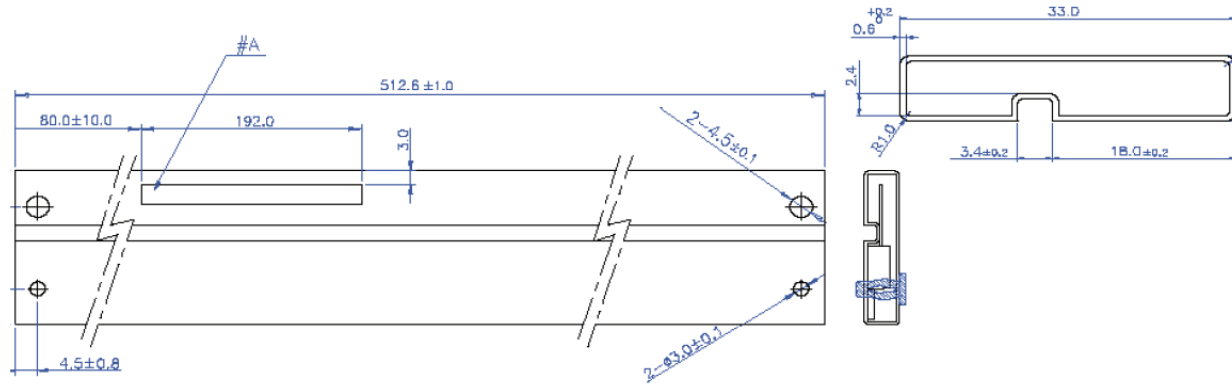
- Sic = SiC Diode
- 2 = Gen2
- SD = Schottky Diode
- 120 = Voltage Rating (1200 V)
- A = TO-220-2L
- 20 = Current Rating (20 A)
- A = -
- YY = Year
- WW = Week
- X = Special Code
- ZZZZZZ-ZZ = Lot Number

### 8. Packing Options

Part Number	Marking	Packing Mode	M.O.Q.
LSIC2SD120A20A	SIC2SD120A20A	Tube (50 pcs)	1000

### 9. Packing Specifications

Tube for TO-220-2L



**NOTE ]**

- TUBE
  - MATERIAL : PVC / PET (WITH ANTISTATIC COATING)
  - COLOR : TRANSPARENCY, RED, YELLOW
  - MARKING #A : BLACK COLOR, LETTER STYLE : Arial
  - Tube Surface Resistance :  $10^9 \sim 10^{11} \Omega$ /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](http://www.Littelfuse.com/powersemi)

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