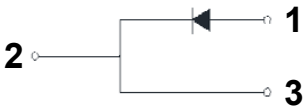
HMSC015SDA120K

Silicon Carbide Schottky Diode

Features

- 1.2kV Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching
- Extremely Fast Switching
- Positive Temperature Coefficient on V_F

TO-220C-2L



Benefits

- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

Applications

- Switch Mode Power Supplies (SMPS)
- Boost diodes in PFC or DC/DC stages
- Free Wheeling Diodes in Inverter stages
- AC/DC converters

Part Number	Package	Qty(PCS)
HMSC015SDA120K	TO-220C-2L	50

Maximum Ratings (T_C=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit	Test Conditions	Notes
Repetitive Peak Reverse Voltage	V_{RRM}	1200	V		
DC Blocking Voltage	V_{DC}	1200			
Continuous Forward Current	I_F	43.5	A	T_J = 25 °C	Fig. 3
		21		T_J= 135 °C	
		15		T_J = 152.5 °C	
Repetitive Peak Forward Surge Current	I_{FRM}	68		T_C = 25 °C, t_p = 10 ms, Half Sine Wave	
		44		T_C = 110 °C, t_p = 10 ms, Half Sine Wave	
Non-Repetitive Forward Surge Current	I_{FSM}	100		T_C = 25 °C, t_p = 10 ms, Half Sine Wave	Fig. 8
		85		T_C = 110 °C,t_p = 10 ms, Half Sine Wave	
Non-Repetitive Peak Forward Surge Current	$I_{F,Max}$	900		T_C = 25 °C, t_p = 10 µs, Pulse	
		750		T_C = 110°C, t_p = 10 µs, Pulse	
Power Dissipation	P_{tot}	214	W	T_J = 25 °C	Fig. 4
		93		T_J = 110 °C	
i²t Value	∫i²t	50	A^2s	T_C = 25 °C, t_p = 10 ms	
		36		T_C = 110°C, t_p = 10 ms	

Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Unit	Test Conditions	Notes
Forward Voltage	V_F	1.6	1.8	V	I_F = 15 A, T_j = 25 °C	Fig. 1
		2.2	3		I_F = 15 A, T_j = 175 °C	
Reverse Current	I_R	35	200	μA	V_R = 1200 V, T_j = 25 °C	Fig. 2
		120	300		V_R = 1200 V, T_j = 175 °C	
Total Capacitive Charge	Q_C	77.5		nC	V_R = 800 V, T_j = 25 °C	Fig. 5
Total Capacitance	C	1200		pF	V_R = 0 V, T_j = 25 °C, f = 1 MHz	Fig. 6
		70			V_R = 400 V, T_j = 25 °C, f = 1 MHz	
		50			V_R = 800 V, T_j = 25 °C, f = 1 MHz	
Capacitance Stored Energy	E_C	22		μJ	V_R = 800 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)	$R_{\theta, JC (TYP)}$	0.7	°C / W	
Junction Temperature	T_j	-55 to +175	°C	
Case & Storage Temperature	T_c	-55 to +175		
TO-220-2L Mounfting Torque	-	1	Nm	M3 Screw
		8.8	lbf-in	6-32 Screw

Electrostatic Discharge (ESD) Classifications

Parameter	Symbol	Notes
Human Body Model	HBM	Class 3B (≥ 8000 V)
Charge Device Model	CDM	Class C3 (≥ 1000 V)

Typical Performance

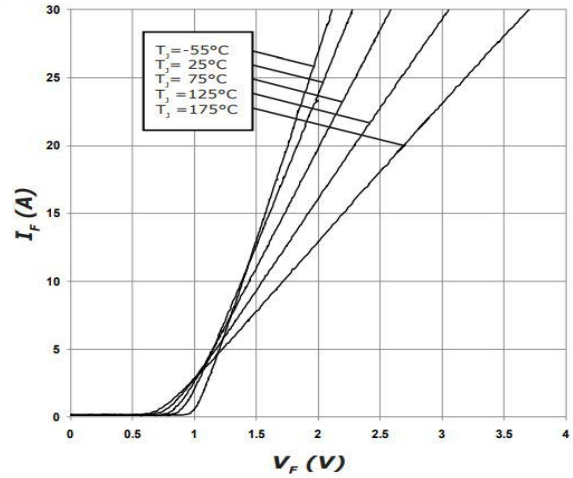


Figure 1

Forward Characteristics

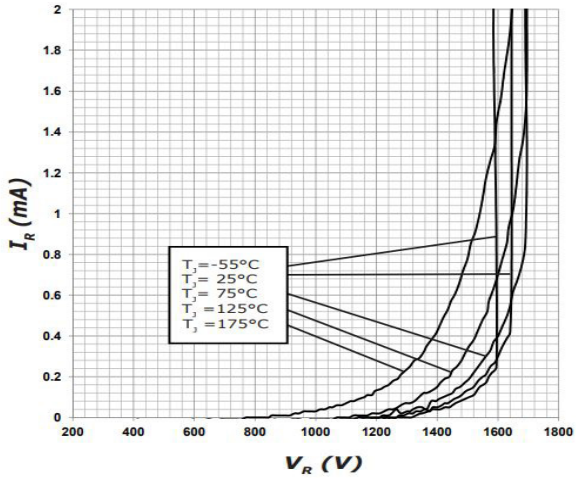


Figure 2

Reverse Characteristics

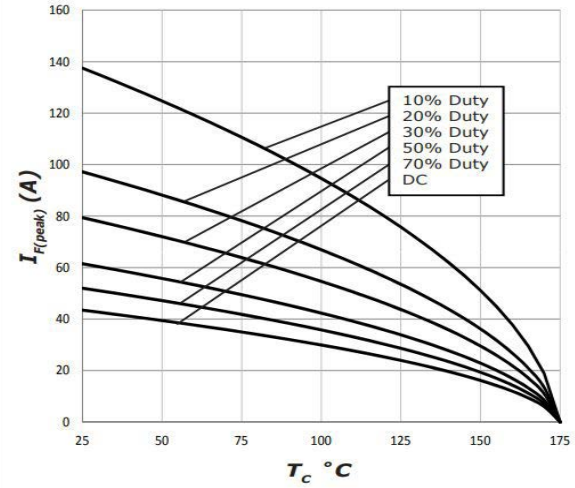


Figure 3

Current Derating

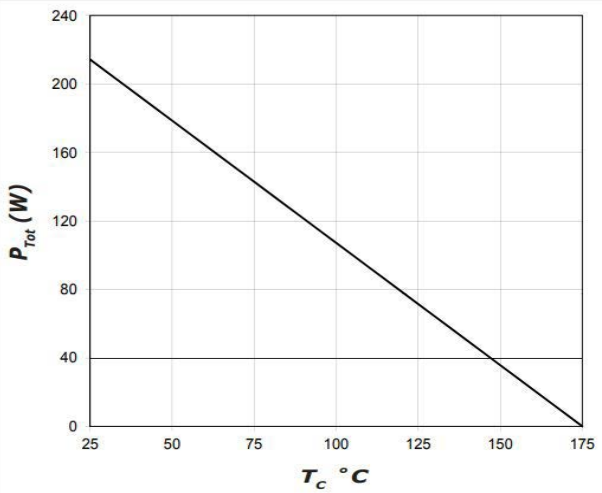


Figure 4

Power Derating

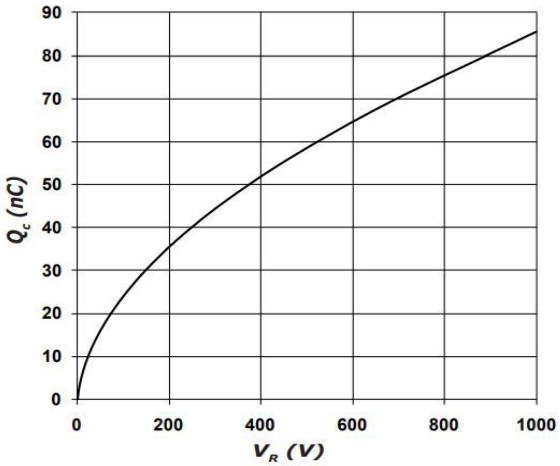


Figure 5

Total Capacitance vs. Reverse Voltage

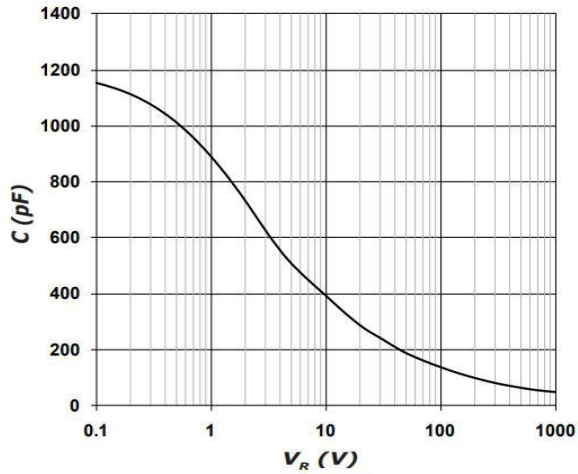


Figure 6

Capacitace vs. Reverse Voltage

Typical Performance

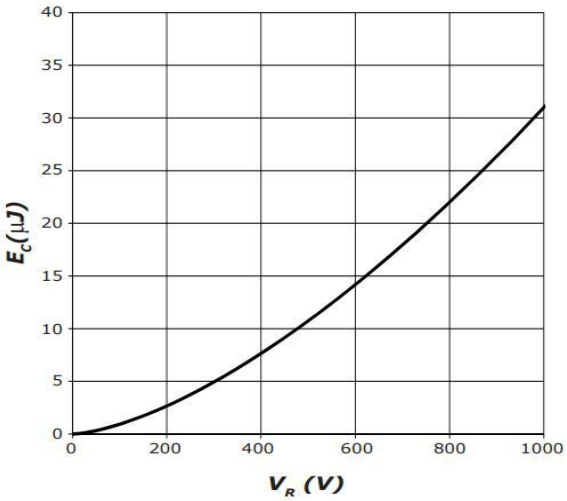


Figure 7

Capacitance Stored Energy

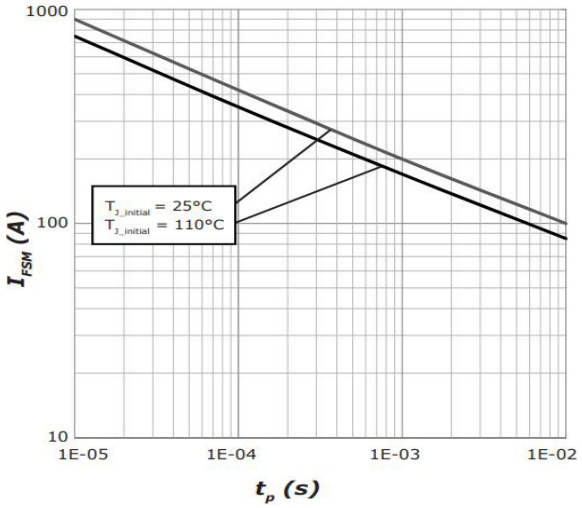


Figure 8

Non-Repetitive Peak Forward Surge Current versus Pulse Duration (sinusoidal waveform)

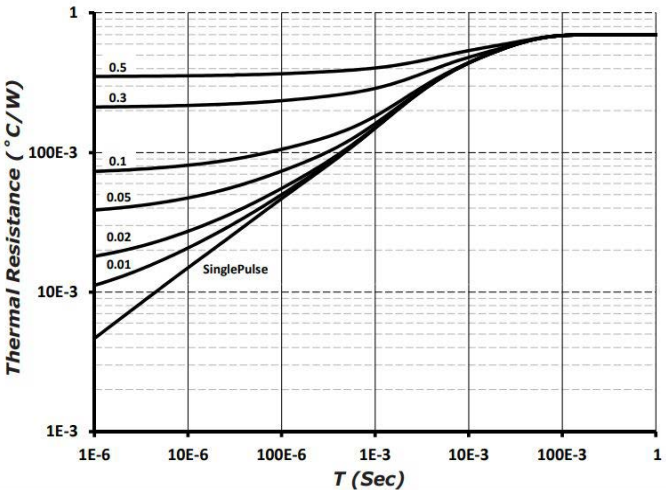
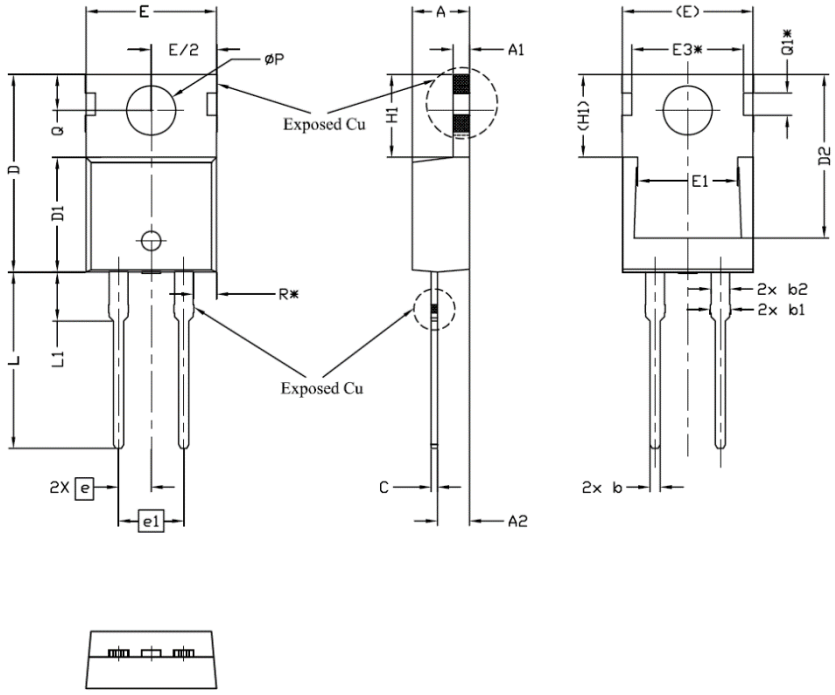


Figure 9

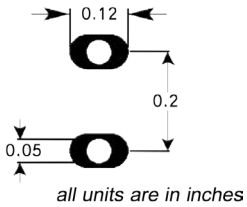
Transient Thermal Impedance

Package Information
TO-220C-2L



SYMBOL	DIMENSIONS			NOTES
	MIN.	NOM.	MAX.	
A	4.24	4.44	4.64	
A1	1.15	1.27	1.40	
A2	2.30	2.48	2.70	
b	0.70	0.80	0.90	
b1	1.20	1.55	1.75	
b2	1.20	1.45	1.70	
c	0.40	0.50	0.60	
D	14.70	15.37	16.00	4
D1	8.82	8.92	9.02	
D2	12.43	12.73	12.83	5
E	9.96	10.16	10.36	4,5
E1	6.86	7.77	8.89	5
E3*	8.70REF.			
e	2.54BSC			
e1	5.08BSC			
H1	6.30	6.45	6.60	5,6
L	13.47	13.72	13.97	
L1	3.60	3.80	4.00	
ØP	3.75	3.84	3.93	
Q	2.60	2.80	3.00	
Q1*	1.73REF.			
R*	1.82REF.			

Recommended Solder Pad Layout



all units are in inches

TO-220C-2L

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