



## Features

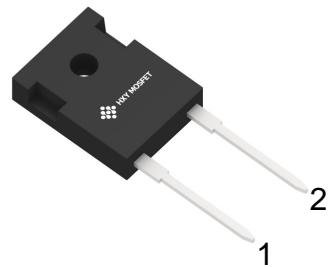
- Low Forward Voltage ( $V_F$ ) Drop with Positive Temperature Coefficient
- Zero Reverse Recovery Current / Forward Recovery Voltage
- Temperature-Independent Switching Behavior
- Increased Creepage / Clearance + HV-H3TRB Rugged

## Applications

- Battery Chargers
- Solar & Renewable Energy Power Conversion
- Industrial Power Supplies
- Boost Diodes in PFC & DC-DC



Part Number	Package	Qty(PCS)
S4D40120H	TO-247-2L	30



TO-247-2L



## Maximum Ratings ( $T_c = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit	Test Conditions	Note
Repetitive Peak Reverse Voltage	$V_{RRM}$	1200	V		
DC Blocking Voltage	$V_{DC}$	1200			
Continuous Forward Current	$I_F$	128	A	$T_j = 25^\circ\text{C}$	Fig. 3
		88		$T_j = 100^\circ\text{C}$	
		41		$T_j = 155^\circ\text{C}$	
Repetitive Peak Forward Surge Current	$I_{FRM}$	161	A	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms, Half Sine Pulse}$	Fig. 3
		91		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms, Half Sine Pulse}$	
Non-Repetitive Forward Surge Current	$I_{FSM}$	247		$T_c = 25^\circ\text{C}, t_p = 10\text{ ms, Half Sine Pulse}$	
		245		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms, Half Sine Pulse}$	
Power Dissipation	$P_{tot}$	667	W	$T_c = 25^\circ\text{C}$	Fig. 4
		289		$T_c = 110^\circ\text{C}$	
$i^2t$ Value	$\int i^2t$	305	$\text{A}^2\text{s}$	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}$	
		300		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}$	



## Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Units	Test Conditions	Note
Forward Voltage	$V_F$	1.5	1.8	V	$I_F = 40 \text{ A}, T_J = 25 \text{ }^\circ\text{C}$	Fig. 1
		2.2	3		$I_F = 40 \text{ A}, T_J = 175 \text{ }^\circ\text{C}$	
Reverse Current	$I_R$	45	300	$\mu\text{A}$	$V_R = 1200 \text{ V}, T_J = 25 \text{ }^\circ\text{C}$	Fig. 2
		75	500		$V_R = 1200 \text{ V}, T_J = 175 \text{ }^\circ\text{C}$	
Total Capacitive Charge	$Q_C$	167		nC	$V_R = 800 \text{ V}, T_J = 25 \text{ }^\circ\text{C}$	Fig. 5
Total Capacitance	C	2,809		pF	$V_R = 0 \text{ V}, T_J = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$	Fig. 6
		174			$V_R = 400 \text{ V}, T_J = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$	
		145			$V_R = 800 \text{ V}, T_J = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$	
Capacitance Stored Energy	$E_C$	36		$\mu\text{J}$	$V_R = 800 \text{ V}$	Fig. 7

Note:

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

## Thermal & Mechanical Characteristics

Parameter	Symbol	Value	Units	Note
Thermal Resistance, Junction to Case (Typ.)	$R_{\theta, JC}$	0.225	$^\circ\text{C} / \text{W}$	
Operating Junction & Storage Temperature	$T_J, T_{stg}$	-55 to +175	$^\circ\text{C}$	Fig. 8
Maximum Processing Temperature	$T_{PROC}$	325		10 min. Maximum

## Electrostatic Discharge (ESD) Classifications

Parameter	Symbol	Value
Human Body Model	HBM	Class 3B ( $\geq 8000 \text{ V}$ )
Charge Device Model	CDM	Class C3 ( $\geq 1000 \text{ V}$ )



## Typical Performance

Figure 1. Forward Characteristics

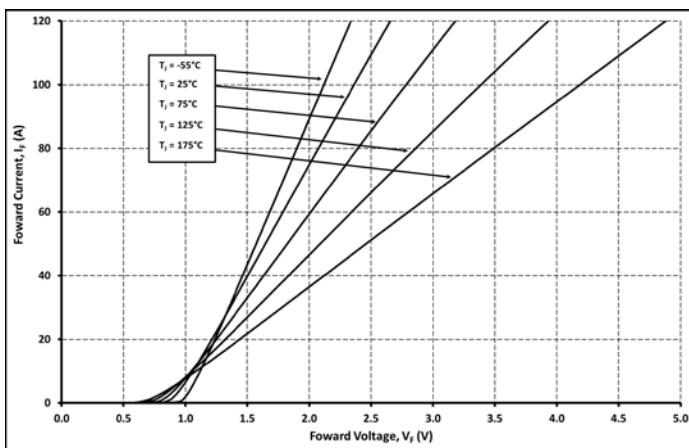


Figure 2. Reverse Characteristics

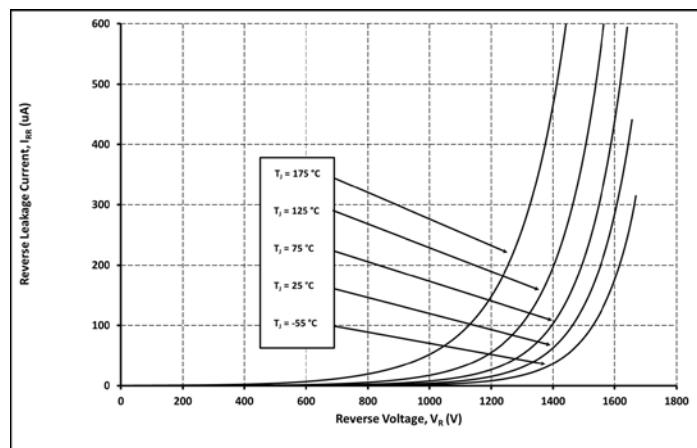


Figure 3. Current Derating

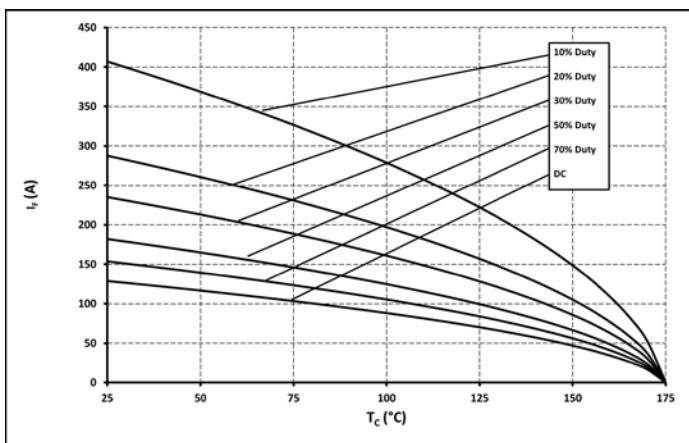


Figure 4. Power Derating

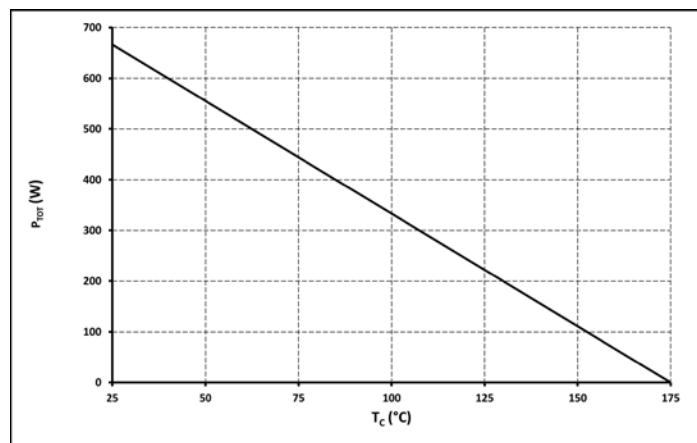


Figure 5. Total Capacitance Charge vs. Reverse Voltage

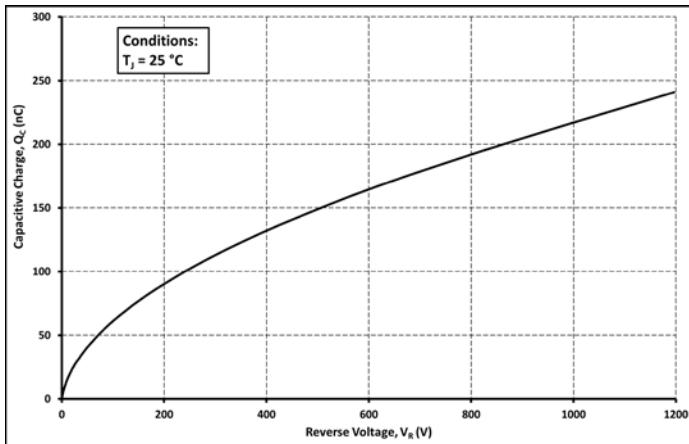
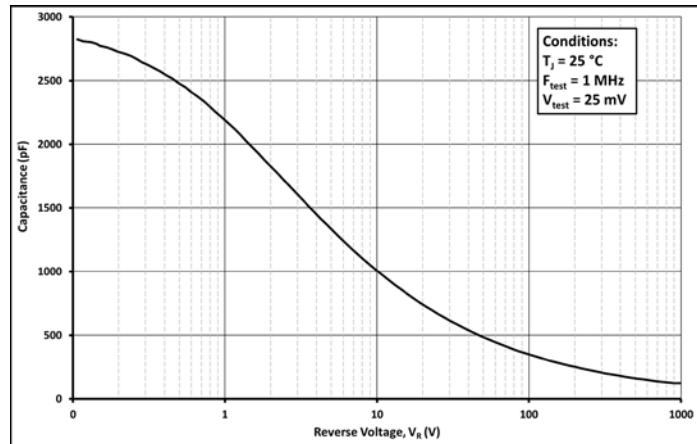


Figure 6. Capacitance vs. Reverse Voltage





## Typical Performance

Figure 7. Capacitance Stored Energy

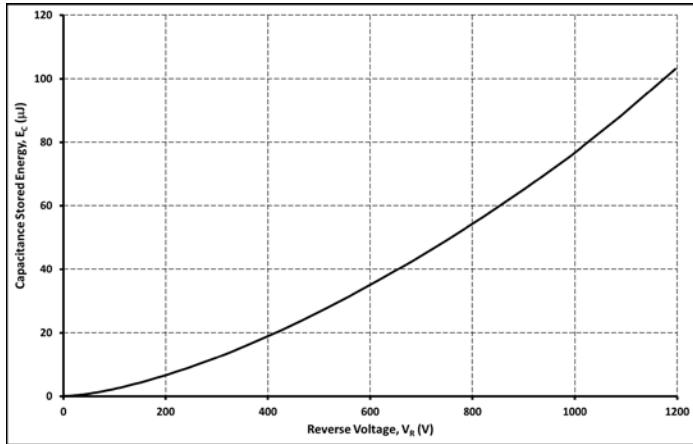
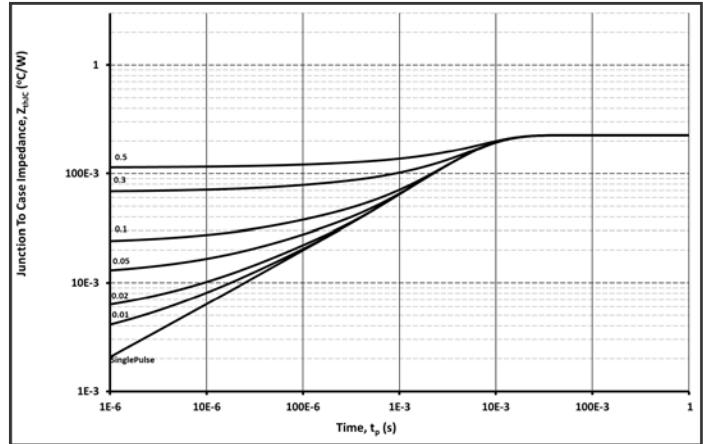


Figure 8. Transient Thermal Impedance

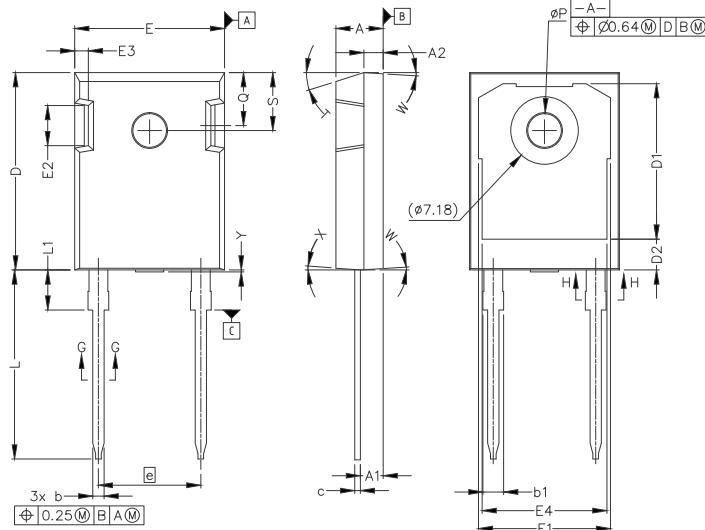




## Package Dimensions

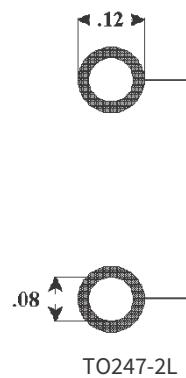
Package: TO-247-2L

All dimensions in mm.



SYM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.83	5.21	.190	.205
A1	2.29	2.54	.090	.100
A2	1.91	2.16	.075	.085
b'	1.07	1.28	.042	.050
b	1.07	1.33	.042	.052
b1	1.91	2.41	.075	.095
b2	1.91	2.16	.075	.085
c'	0.55	0.65	.022	.026
c	0.55	0.68	.022	.027
D	20.80	21.10	.819	.831
D1	16.25	17.35	.640	.683
D2	2.86	3.16	.112	.124
E	15.75	16.13	.620	.635
E1	13.10	14.15	.516	.557
E2	3.68	5.10	.145	.201
E3	1.00	1.90	.039	.075
E4	12.38	13.43	.487	.529
e	10.88	BSC	.428	BSC
L	19.81	20.32	.780	.800
L1	4.10	4.40	.161	.173
ØP	3.51	3.65	.138	.144
Q	5.49	6.00	.216	.236
S	6.04	6.30	.238	.248
T	17.5° REF.			
W	3.5° REF.			
X	4° REF.			
Y	0	0.50	0	0.020

## Recommended Solder Pad Layout



*all units are in inches*



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