HSTPSC30H12CWL

Silicon Carbide Schottky Diode

Features

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

Benefits

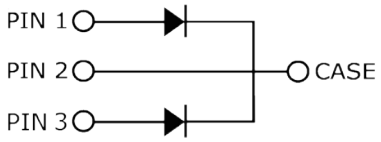
- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

Applications

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

TO-247
(TO-247LL-3)

Package



Part Number	Package	Qty(PCS)
HSTPSC30H12CWL	TO-247(TO-247LL-3)	30

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

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V		
V_{RSM}	Surge Peak Reverse Voltage	1300	V		
V_R	DC Peak Reverse Voltage	1200	V		
I_F	Continuous Forward Current (Per Leg/Device)	44/88 21.5/43 15/30	A	T_C=25˚C T_C=135˚C T_C=152˚C	Fig. 3
I_{FRM}	Repetitive Peak Forward Surge Current	68* 44*	A	T_C=25˚C, t_P=10 ms, Half Sine Pulse T_C=110˚C, t_P=10 ms, Half Sine Pulse	
I_{FSM}	Non-Repetitive Forward Surge Current	100* 85*	A	T_C=25˚C, t_P=10 ms, Half Sine Pulse T_C=110˚C, t_P=10 ms, Half Sine Pulse	Fig. 8
$I_{F,Max}$	Non-Repetitive Peak Forward Current	900* 750*	A	T_C=25˚C, t_P=10 ms, Pulse T_C=110˚C, t_P=10 ms, Pulse	Fig. 8
P_{tot}	Power Dissipation (Per Leg/Device)	220/440 95/190	W	T_C=25˚C T_C=110˚C	Fig. 4
dV/dt	Diode dV/dt ruggedness	200	V/ns	V_R=0-960V	
$\int i^2dt$	i^2t value	50* 36*	A^2s	T_C=25˚C, t_P=10 ms T_C=110˚C, t_P=10 ms	
T_J	Operating Junction Range	-55 to +175	˚C		
T_{stg}	Storage Temperature Range	-55 to +135	˚C		
	TO-247 Mounting Torque	1 8.8	Nm lbf-in	M3 Screw 6-32 Screw	

* Per Leg, ** Per Device

Electrical Characteristics (Per Leg)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.6 2.3	1.8 3	V	I_F = 15 A T_J=25°C I_F = 15 A T_J=175°C	Fig. 1
I_R	Reverse Current	35 120	200 300	μA	V_R = 1200 V T_J=25°C V_R = 1200 V T_J=175°C	Fig. 2
Q_C	Total Capacitive Charge	77.5		nC	V_R = 800 V, I_F = 15A di/dt = 200 A/μs T_J = 25°C	Fig. 5
C	Total Capacitance	1200 70 50		pF	V_R = 0 V, T_J = 25°C, f = 1 MHz V_R = 400 V, T_J = 25°C, f = 1 MHz V_R = 800 V, T_J = 25°C, f = 1 MHz	Fig. 6
E_C	Capacitance Stored Energy	22.1		μJ	V_R = 800 V	Fig. 7

Note:This is a majority carrier diode, so there is no reverse recovery charge.

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.34** 0.68*	°C/W	Fig. 9

** Per Device, * Per Leg

Typical Performance (Per Leg)

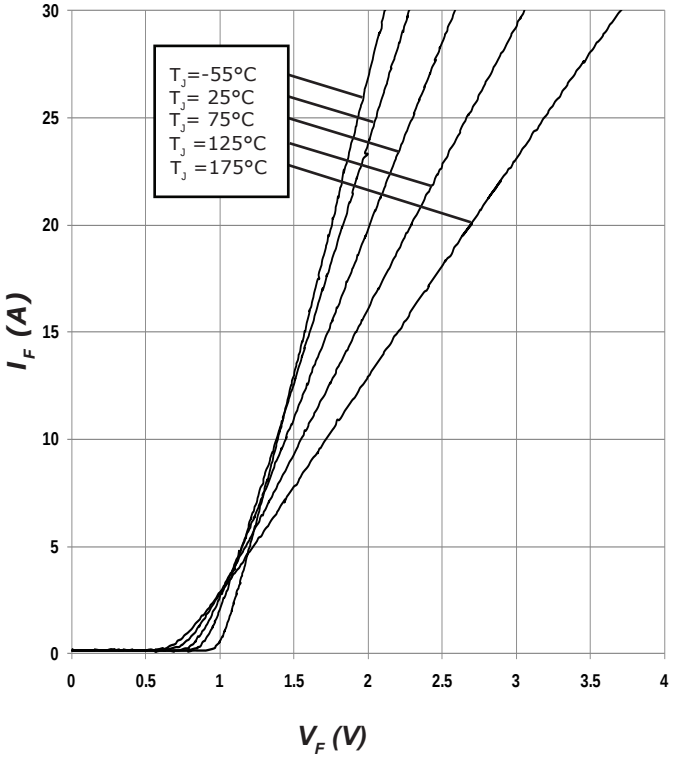


Figure 1. Forward Characteristics

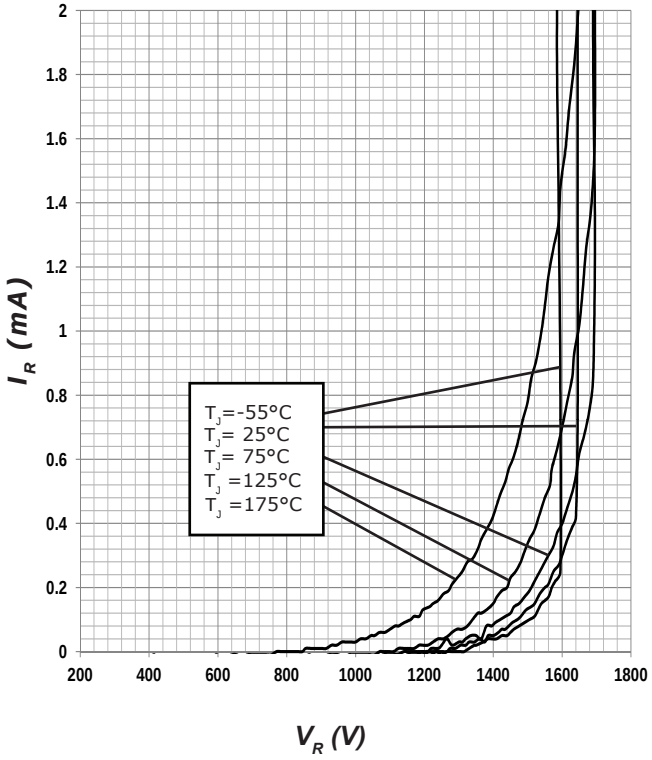


Figure 2. Reverse Characteristics

Typical Performance (Per Leg)

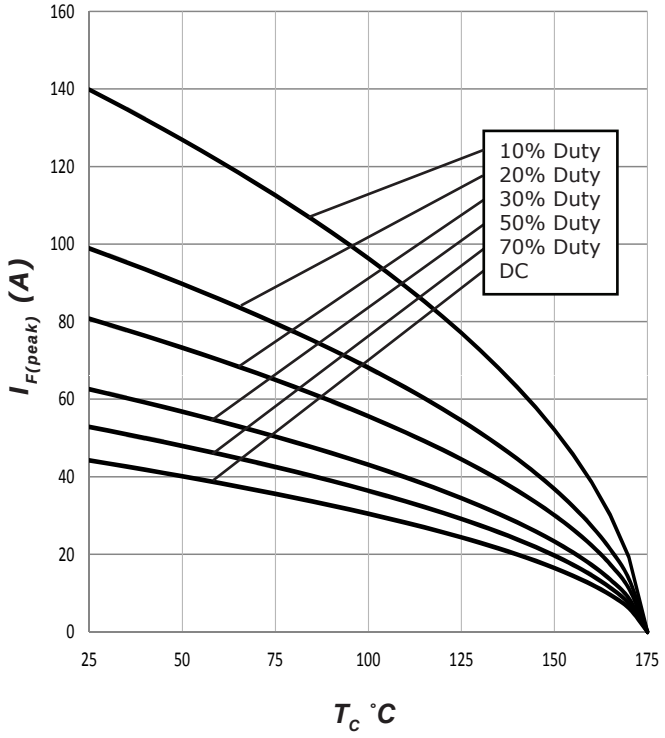


Figure 3. Current Derating

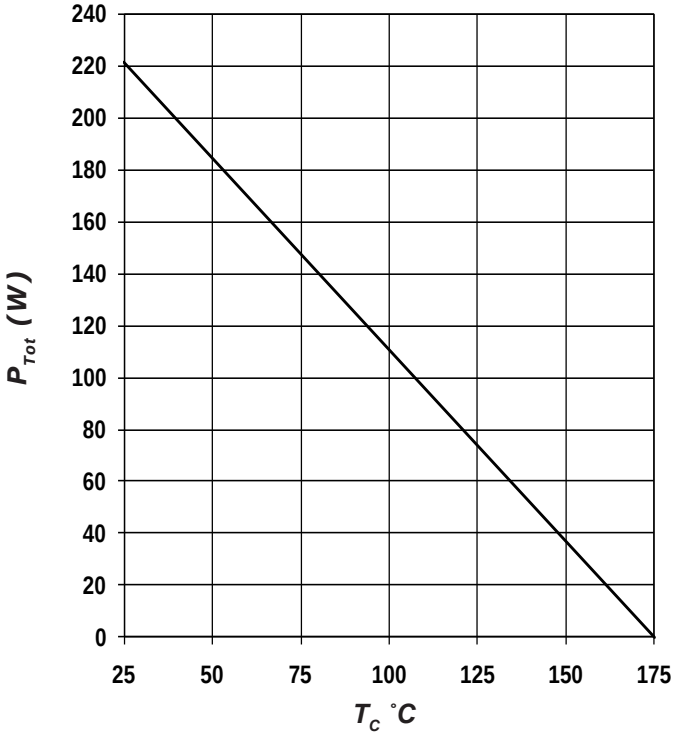


Figure 4. Power Derating

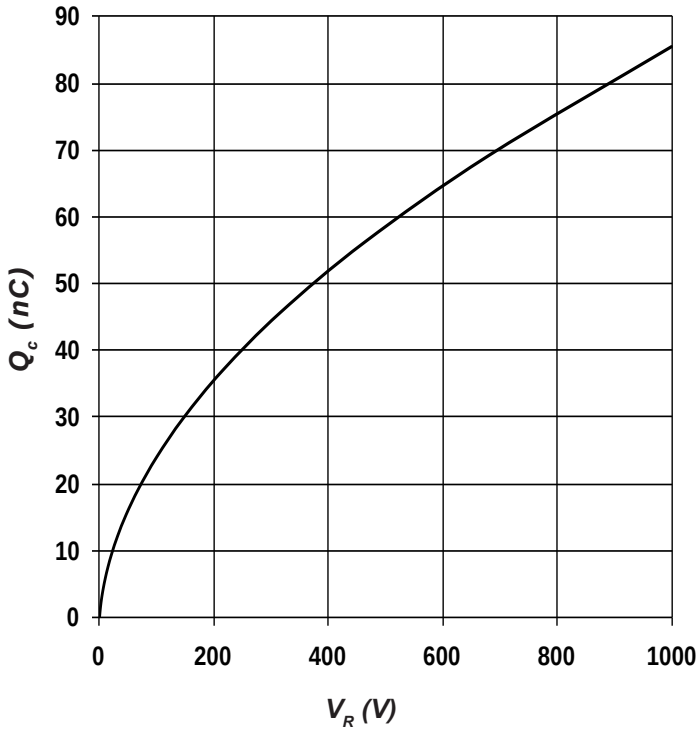


Figure 5. Recovery Charge vs. Reverse Voltage

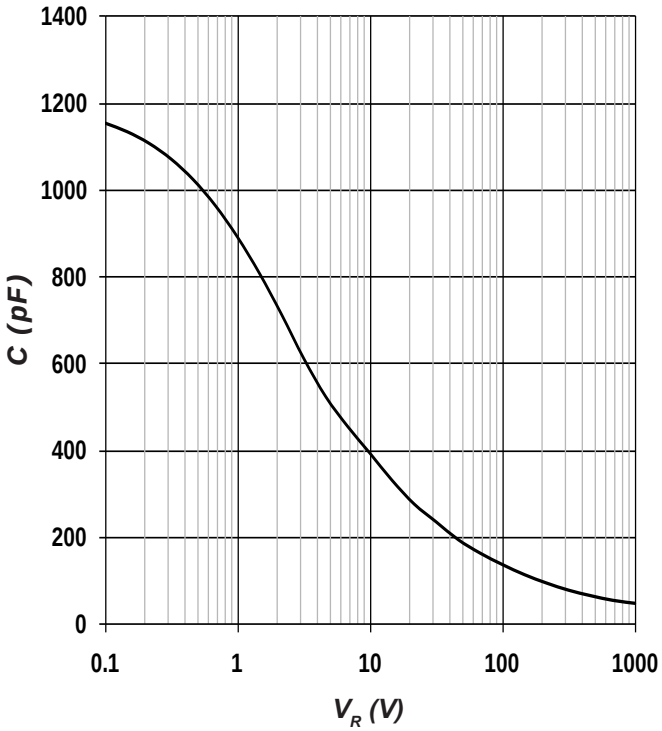


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

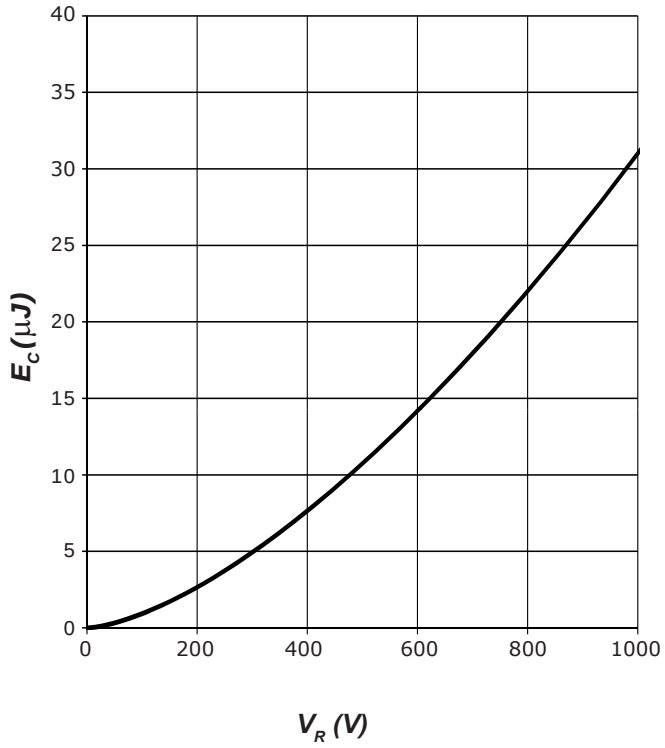


Figure 7. Typical Capacitance Stored Energy, per leg

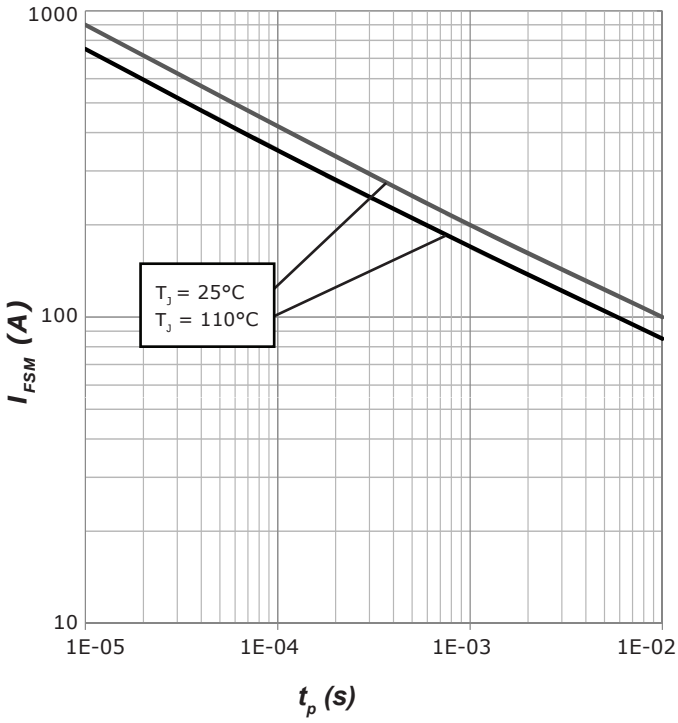


Figure 8. Non-Repetitive Peak Forward Surge Current versus Pulse Duration (sinusoidal waveform), per leg

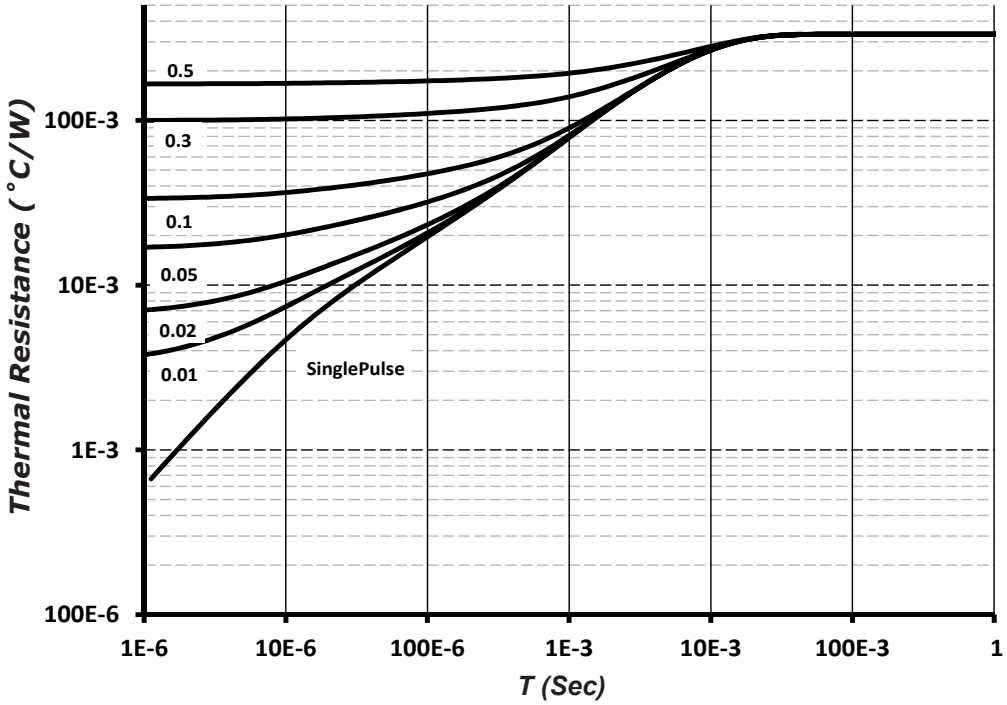
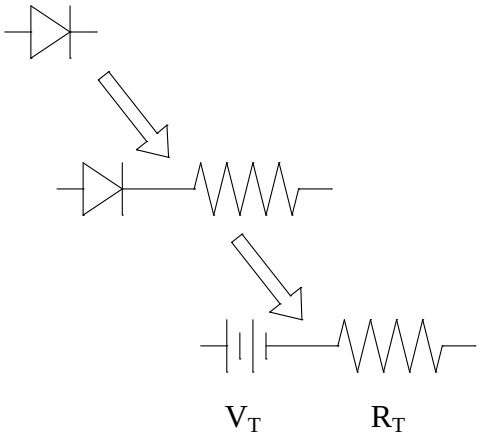


Figure 9. Device Transient Thermal Impedance

Diode Model



$$Vf_T = V_T + If * R_T$$

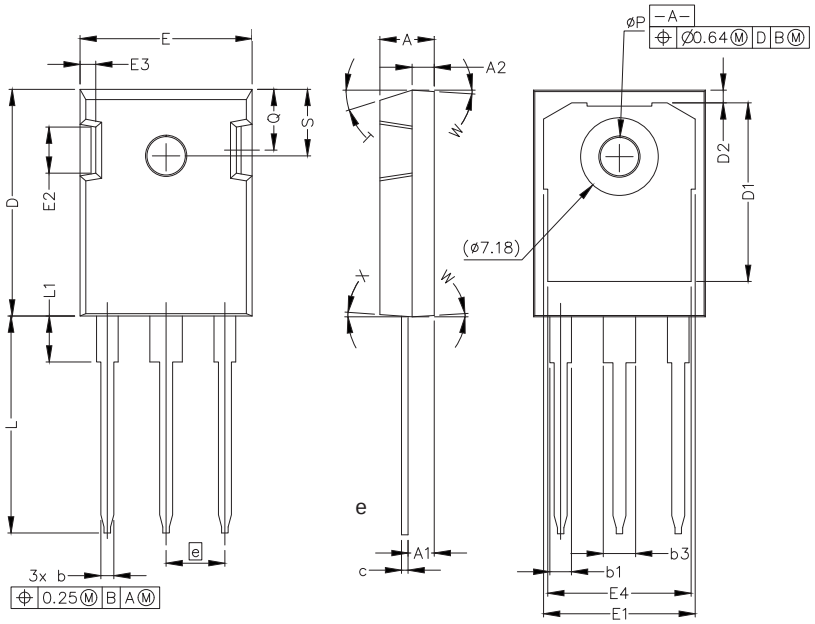
$$V_T = 0.97 + (T_j * -2.12*10^{-3})$$

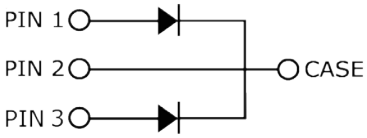
$$R_T = 0.031 + (T_j * 3.92*10^{-4})$$

Note: T_j = Diode Junction Temperature In Degrees Celsius, valid from 25°C to 175°C

Package Dimensions

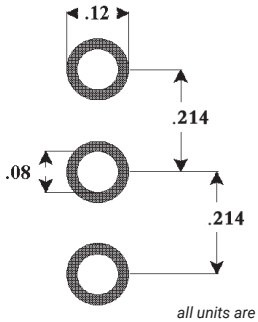
Package TO-247(TO-247LL-3)





POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.042	.052	1.07	1.33
b1	.075	.095	1.91	2.41
b3	.113	.133	2.87	3.38
c	.022	.027	0.55	0.68
D	.819	.831	20.80	21.10
D1	.640	.695	16.25	17.65
D2	.037	.049	0.95	1.25
E	.620	.635	15.75	16.13
E1	.516	.557	13.10	14.15
E2	.145	.201	3.68	5.10
E3	.039	.075	1.00	1.90
E4	.487	.529	12.38	13.43
e	.214 BSC		5.44 BSC	
L	.780	.800	19.81	20.32
L1	.161	.173	4.10	4.40
N	3			
ØP	.138	.144	3.51	3.65
Q	.216	.236	5.49	6.00
S	.238	.248	6.04	6.30
T	17.5° REF			
W	3.5° REF			
X	4° REF			

Recommended Solder Pad Layout



all units are in inches

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