H4S120J040

Part Number	Package	Marking
H4S120J040	TO-247-2L	H4S120J040

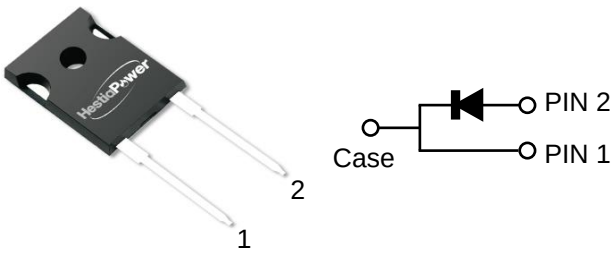
Product Summary

V_R	1200V
$I_{F(135/147^{\circ}C)}$	50A/40A
Q_C	234nC

Features

- Low Conduction and Switching Loss
- Zero Reverse Recovery
- Temperature Independent Switching Behavior
- Positive Temperature Coefficient Device
- High Surge Current Capability
- RoHS Compliant and Halogen Free
- Optimized for High Power Application
- AEC-Q101 Qualified

Circuit Diagram



Benefits

- Higher System Efficiency
- Increase Parallel Device Convenience
- Enable High Temperature Application
- Allow High Frequency Operation
- Realize Compact and Lightweight Systems
- High Reliability

Applications

- Switching Mode Power Supply
- PFC
- UPS
- Motor Drives
- Flywheel diode in Power Inverters
- Solar/Wind Renewable Energy

Absolute Maximum Ratings (T_c = 25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Value	Unit
Peak Repetitive Reverse Voltage	V_{RRM}	T_J = 25°C	1200	V
Peak Reverse Surge Voltage	V_{RSM}	T_J = 25°C	1200	V
DC Blocking Voltage	V_R	T_J = 25°C	1200	V
Continuous Forward Current (Per Leg/Per Device)	I_F	T_C= 25°C	104	A
		T_C= 135°C	50	
		T_C= 147°C	40	
Non-Repetitive Peak Forward Surge Current	I_{FSM}	T_C = 25°C, T_P = 10 ms, Half Sine Wave	290	A
		T_C = 125°C, T_P = 10 ms, Half Sine Wave	258	
		T_C = 25°C, T_P = 10 µs, Pulse	3206	
Repetitive Peak Forward Surge Current	I_{FRM}	T_C = 25°C, T_P = 10 ms Half Sine Wave, D = 0.1	228	A
		T_C = 125°C, T_P = 10 ms Half Sine Wave, D = 0.1	186	
Power Dissipation	P_D	T_C=25°C	428	W
		T_C=125°C	142	
I^2t value	$\int i^2dt$	T_C = 25°C, T_P = 10 ms	420	A^2s
Junction & Storage Temperature	T_j , T_{stg}		-55 to 175	°C
Soldering Temperature	T_L		260	
Mounting Torque	M_D	M3 or 6-32 screw	1.0	Nm

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Electrical Characteristics (T_c = 25˚C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
DC Blocking Voltage	V_{DC}	I_R = 500 µA, T_J = 25˚C	> 1200			V
Forward Voltage	V_F	I_F = 40A, T_J = 25˚C		1.45	1.7	V
		I_F = 40A, T_J = 175˚C		2.0	2.3	V
Reverse Current	I_R	V_R = 1200V, T_J = 25˚C		4	200	µA
		V_R = 1200V, T_J = 175˚C		200		µA
Total Capacitive Charge	Q_C	V_R = 800V, T_J = 25˚C		235		nC
Total Capacitance	C_j	V_R = 0.1V, T_J=25˚C, f =1 MHz		816		pF
		V_R = 400V, T_J=25˚C, f =1 MHz		55		
		V_R = 800V, T_J=25˚C, f =1 MHz		40		
Capacitance Stored Energy	E_C	V_R = 800V		188		µJ

Thermal Resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case	$R_{\theta,JC}$		0.35	0.43	˚C/W

Naming Rule

H4 S 120 J 040

Generation
H4 = 4th Gen Discrete

Device Type
S = JBS diode (High Power) D = JBS diode (High Speed)

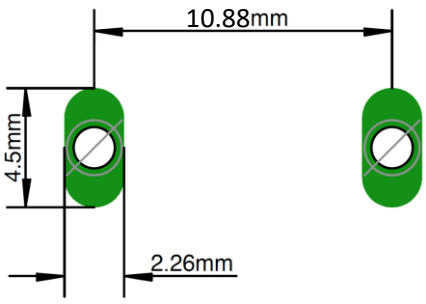
Breakdown Voltage
065 = 650V 120 = 1200V 170 = 1700V

Package Type
J = TO-247-2L A = TO-220-2L T = TO-263-2L

Typical Current Rating
002 = 2A 005 = 5A 010 = 10A 012 = 12A 040 = 40A

Recommended Solder Pad Layout

TO-247-2L



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Typical Device Performance

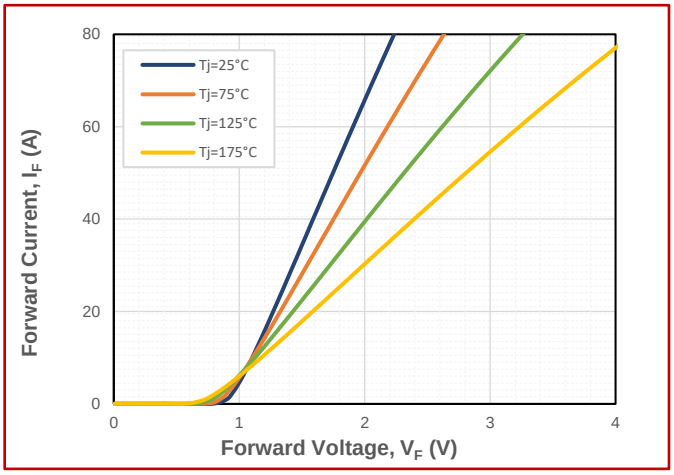

Fig.1 Forward Characteristics

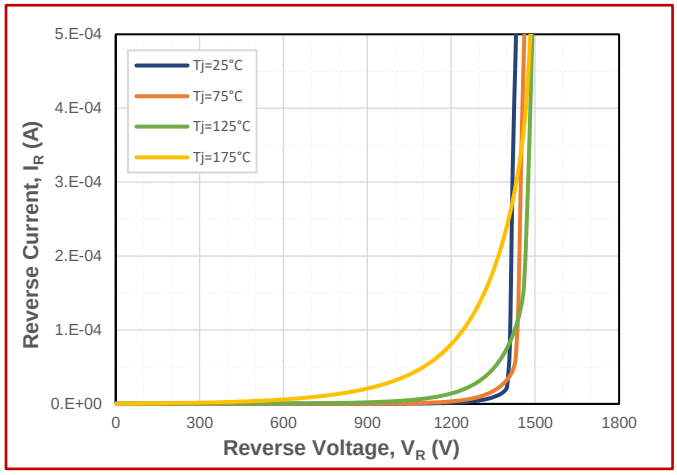

Fig.2 Reverse Characteristics

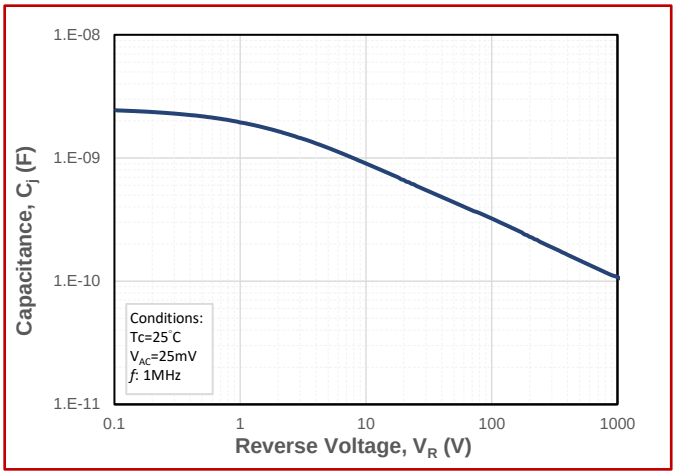

Fig.3 Junction Capacitance vs. Reverse Voltage

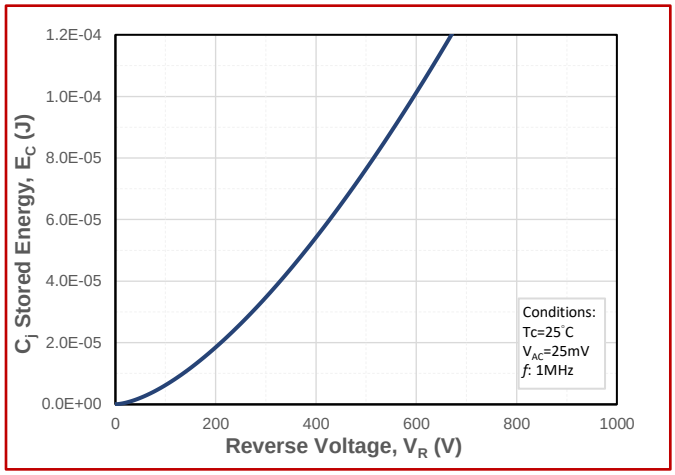

Fig.4 Capacitance Stored Energy

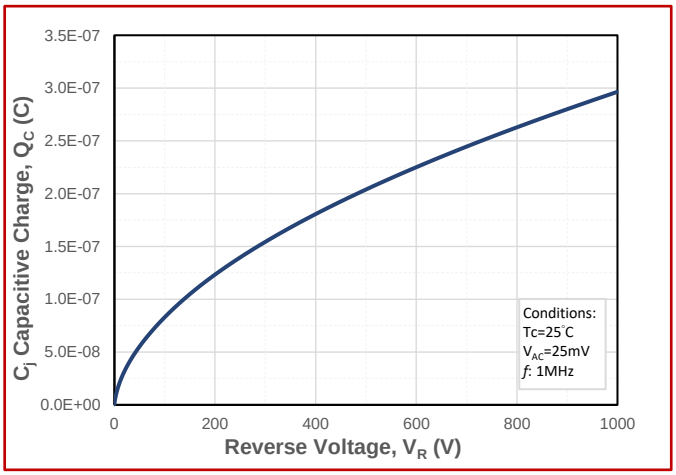

Fig.5 Recovery Charge vs. Reverse Voltage

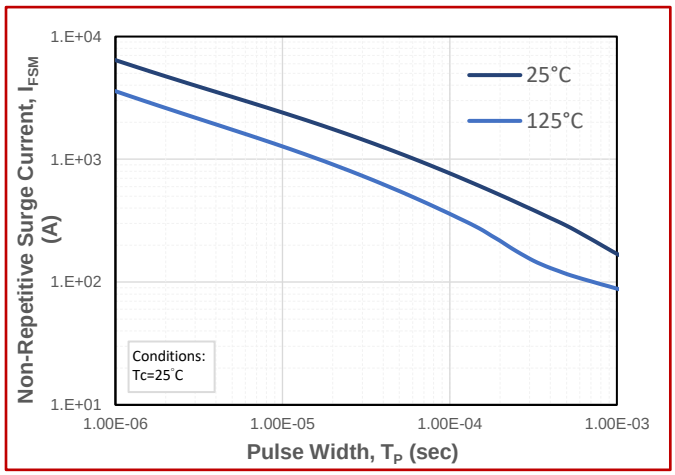

Fig.6 Non-Repetitive Peak Forward Surge Current (Pulse Mode)

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Typical Device Performance

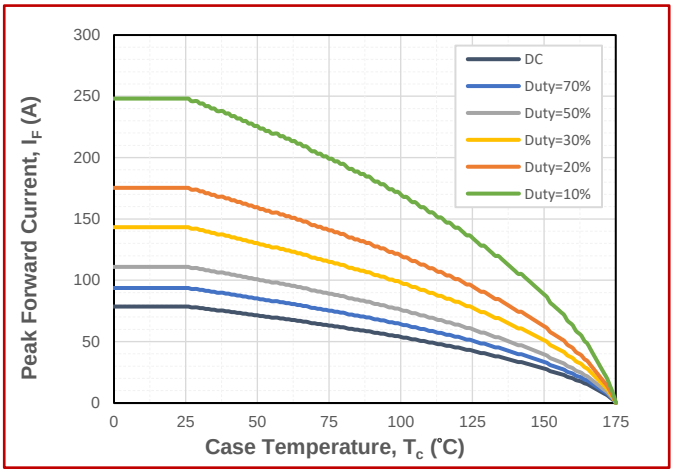

Fig.7 Maximum Forward Current Derating vs. Case Temperature

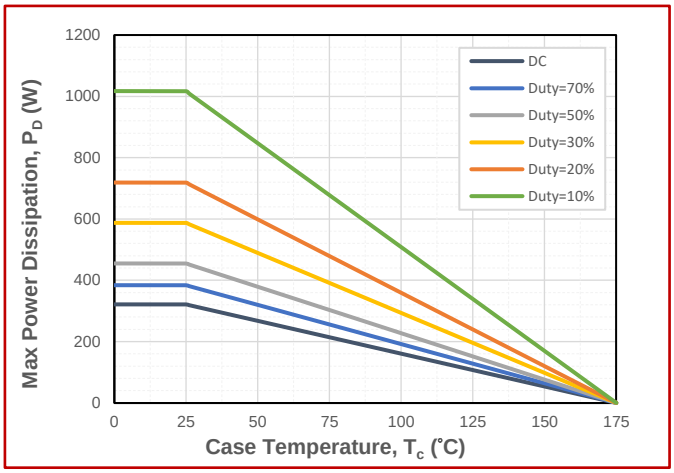

Fig.8 Maximum Power Dissipation Derating vs. Case Temperature

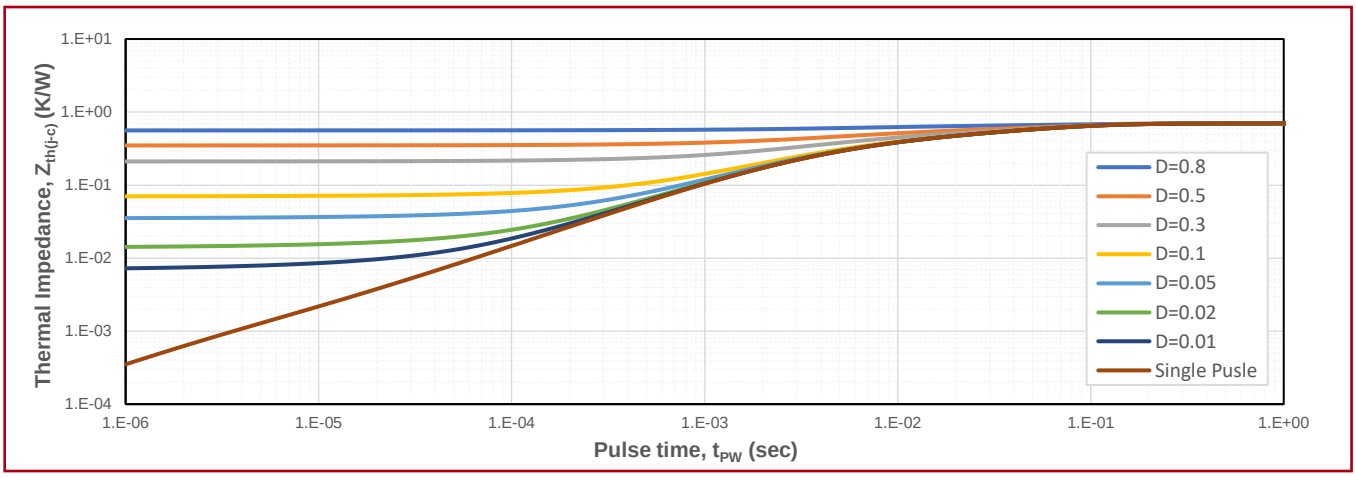

Fig.9 Transient Junction to Case Thermal Impedance

The information provided herein is subject to change without notice.

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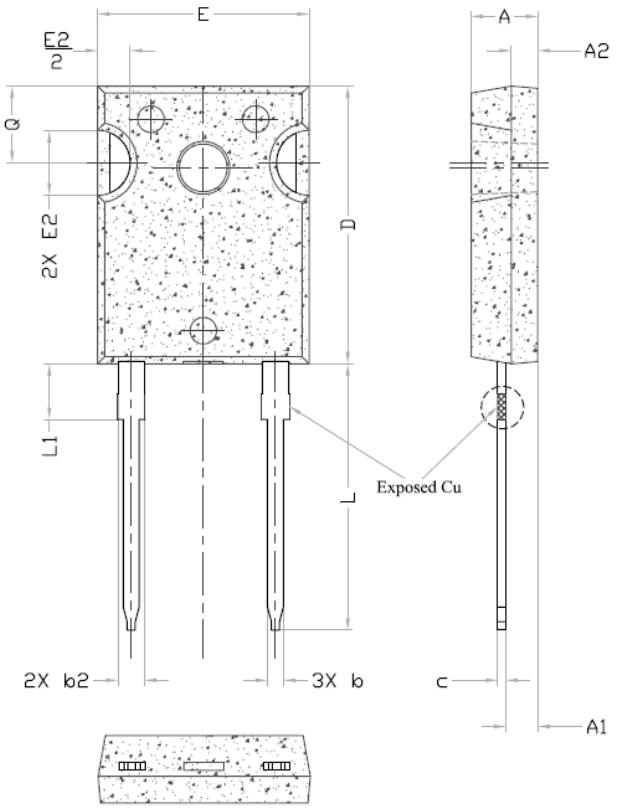
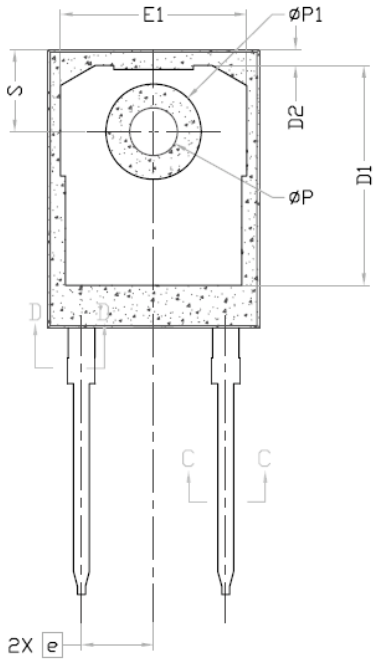
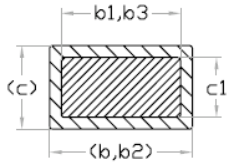
Package Dimensions (TO-247-2L)



Symbol	mm			
	Min.	Typ.	Max.	Note
A	4.83	5.02	5.21	
A1	2.29	2.41	2.55	
A2	1.50	2.00	2.49	
b	1.12	1.20	1.33	
b1	1.12	1.20	1.28	
b2	1.91	2.00	2.39	6
b3	1.91	2.00	2.34	
c	0.55	0.60	0.69	6
c1	0.55	0.60	0.65	
D	20.80	20.95	21.10	4
D1	16.25	16.55	17.65	5
D2	0.51	1.19	1.35	
E	15.75	15.94	16.13	4
E1	13.46	14.02	14.16	5
E2	4.32	4.91	5.49	3
e		5.44 BSC		
L	19.81	20.07	20.32	
L1	4.10	4.19	4.40	6
ϕP	3.56	3.61	3.65	7
ϕP1		7.19 REF.		
Q	5.39	5.79	6.20	
S	6.04	6.17	6.30	



Note:
1. Package Reference: JEDEC TO247, Variation AD.
2. All Dimensions Are In mm.
3. Slot Required, Notch May Be Rounded
4. Dimension D & E Do Not Include Mold Flash. Mold Flash Shall Not Exceed 0.127mm Pre Side. These Dimensions Are Measured At The Outermost Extreme Of The Plastic Body.
5. Thermal Pad Contour Optional Within Dimension D1 & E1.
6. Lead Finish Uncontrolled In L1.
7. ØP To Have A Maximum Draft Angle Of 1.5° To The Top Of The Part With A Maximum Hole Diameter Of 3.91mm.
8. Dimension "b2" And "b4" Does Not Include Dambar Protrusion. Allowable Dambar Protrusion Shall Be 0.10mm Total In Excess Of "b2" And "b4" Dimension At Maximum Material Condition.



Section C–C,D–D

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