

Product Summary

H4S090G040

Part Number	Package	Marking
H4S090G040	TO-247-2L	H4S090G040

V_R	900V
$I_{F(135/147^\circ C)}$	50A/40A
Q_C	183nC



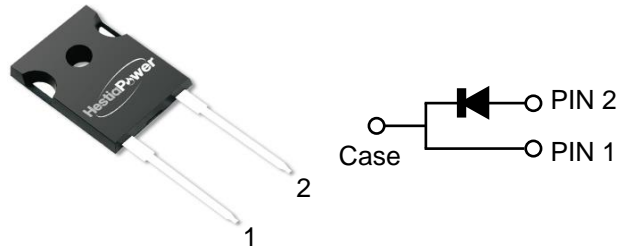
Features

- 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

Benefits

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

Circuit Diagram



Applications

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

Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Value	Unit
Peak Repetitive Reverse Voltage	V_{RRM}	$T_J = 25^\circ C$	900	V
Peak Reverse Surge Voltage	V_{RSM}	$T_J = 25^\circ C$	900	V
DC Blocking Voltage	V_R	$T_J = 25^\circ C$	900	V
Continuous Forward Current	I_F	$T_C = 25^\circ C$	106	A
		$T_C = 135^\circ C$	50	
		$T_C = 147^\circ C$	40	
Non-Repetitive Peak Forward Surge Current	I_{FSM}	$T_C = 25^\circ C, T_p = 10 \text{ ms, Half Sine Wave}$	290	A
		$T_C = 125^\circ C, T_p = 10 \text{ ms, Half Sine Wave}$	>200*	
		$T_C = 25^\circ C, T_p = 10 \mu s, \text{ Pulse}$	3489	
Repetitive Peak Forward Surge Current	I_{FRM}	$T_C = 25^\circ C, T_p = 10 \text{ ms, Half Sine Wave, } D = 0.1$	222	A
		$T_C = 125^\circ C, T_p = 10 \text{ ms, Half Sine Wave, } D = 0.1$	>200*	
Power Dissipation	P_D	$T_C = 25^\circ C$	395	W
		$T_C = 125^\circ C$	132	
I^2t value	$\int i^2 dt$	$T_C = 25^\circ C, T_p = 10 \text{ ms}$	420	A^2s
Junction & Storage Temperature	T_J, T_{stg}		-55 to 175	$^\circ C$
Soldering Temperature	T_L		260	
Mounting Torque	M_D	M3 or 6-32 screw	1.0	Nm

* Due to limitation of the equipment.

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	> 900			V
Forward Voltage	V _F	I _F = 40A, T _J = 25°C		1.42	1.65	V
		I _F = 40A, T _J = 175°C		1.85	2.1	V
Reverse Current	I _R	V _R = 900V, T _J = 25°C		0.1	80	μA
		V _R = 900V, T _J = 175°C		40		μA
Total Capacitive Charge	Q _C	V _R = 600V, T _J = 25°C		183		nC
Total Capacitance	C _J	V _R = 0.1V, T _J = 25°C, f = 1 MHz		2946		
		V _R = 300V, T _J = 25°C, f = 1 MHz		232		pF
		V _R = 600V, T _J = 25°C, f = 1 MHz		169		
Capacitance Stored Energy	E _C	V _R = 600V		55		μJ

Thermal Resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case	R _{θJC}		0.38		°C/W

Naming Rule

H4 S 090 G 040

Generation

H4 = 4th Gen Discrete

Device Type

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

Breakdown Voltage

065 = 650V 090 = 900V 120 = 1200V 170 = 1700V

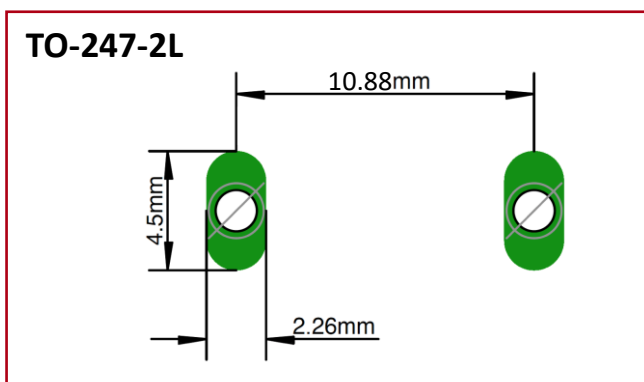
Package

A = TO-220-2L F = TO-247-3L G = TO-247-2L

Typical Current Rating

010 = 10A 020 = 20A 030 = 30A 040 = 40A

Recommended Solder Pad Layout



Typical Device Performance

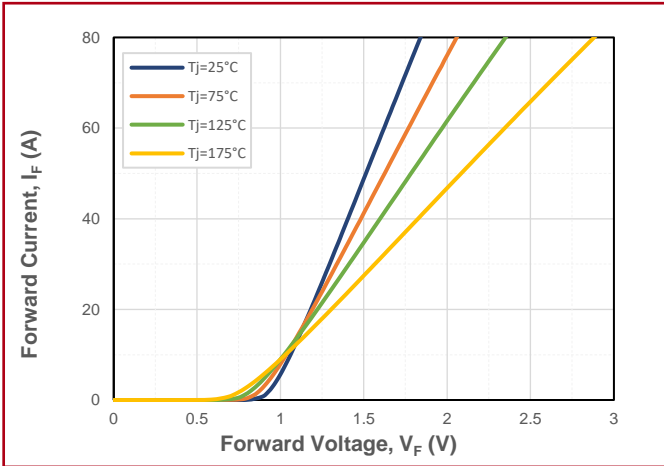


Fig.1 Forward Characteristics

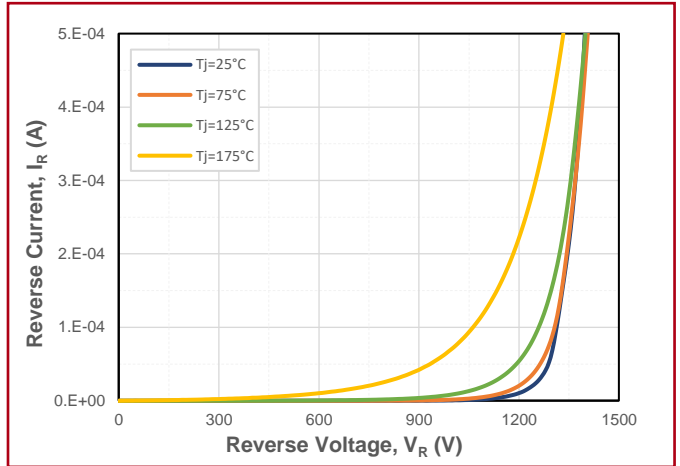


Fig.2 Reverse Characteristics

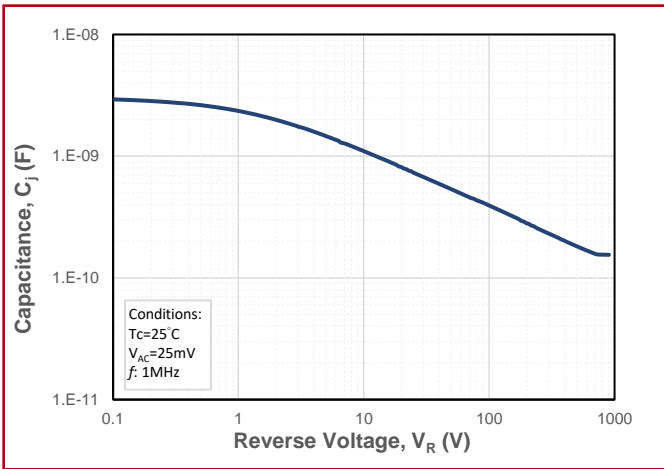


Fig.3 Junction Capacitance vs. Reverse Voltage

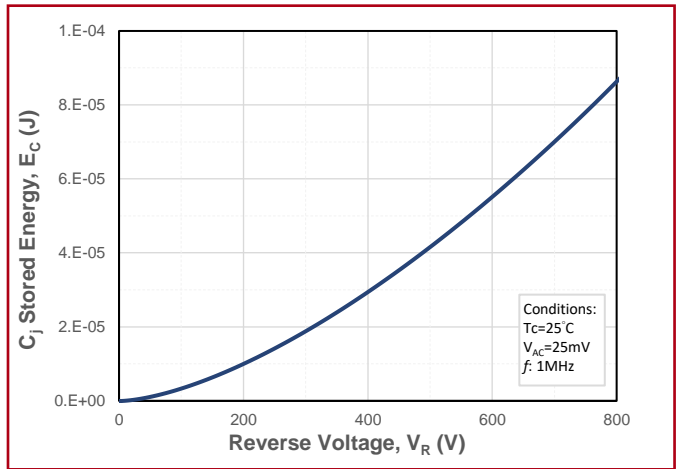


Fig.4 Capacitance Stored Energy

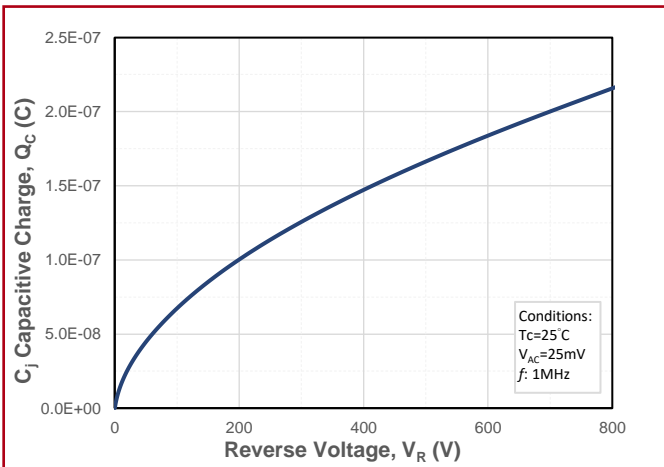


Fig.5 Recovery Charge vs. Reverse Voltage

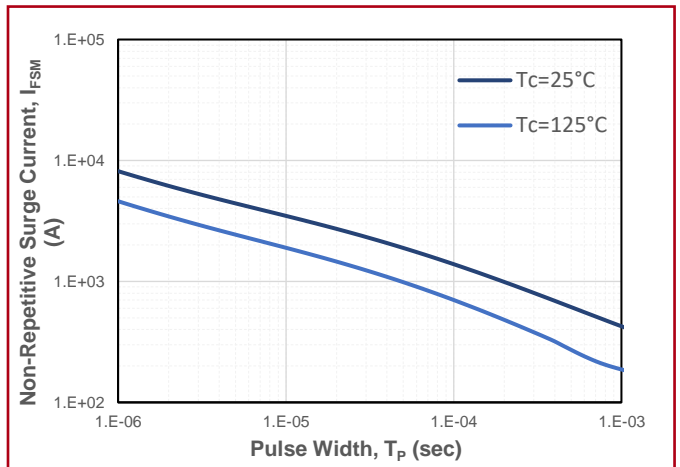


Fig.6 Non-Repetitive Peak Forward Surge Current (Pulse Mode)

Typical Device Performance

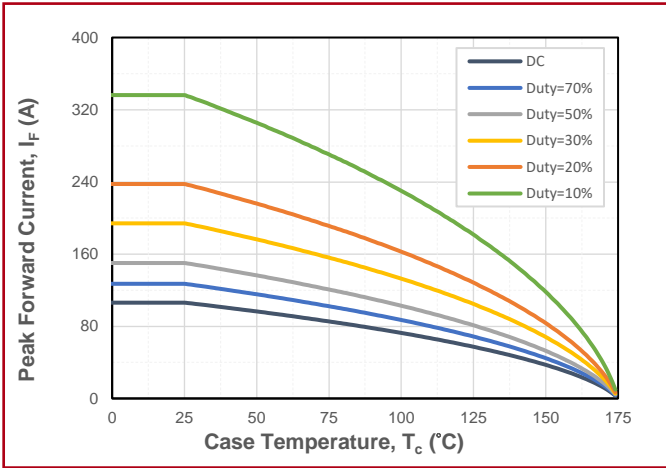


Fig.7 Maximum Forward Current Derating vs. Case Temperature

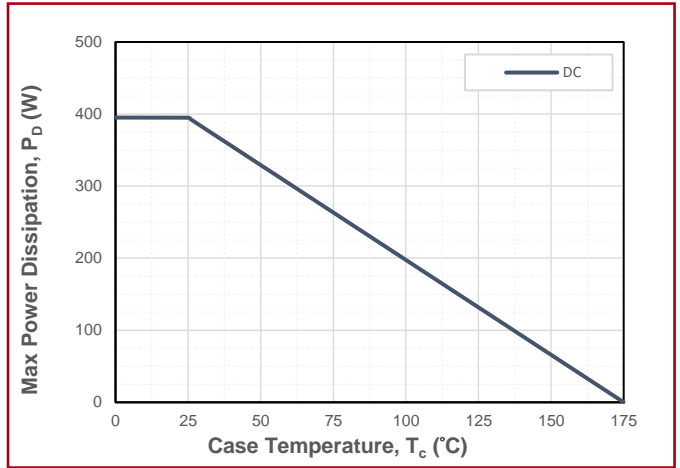


Fig.8 Maximum Power Dissipation Derating vs. Case Temperature

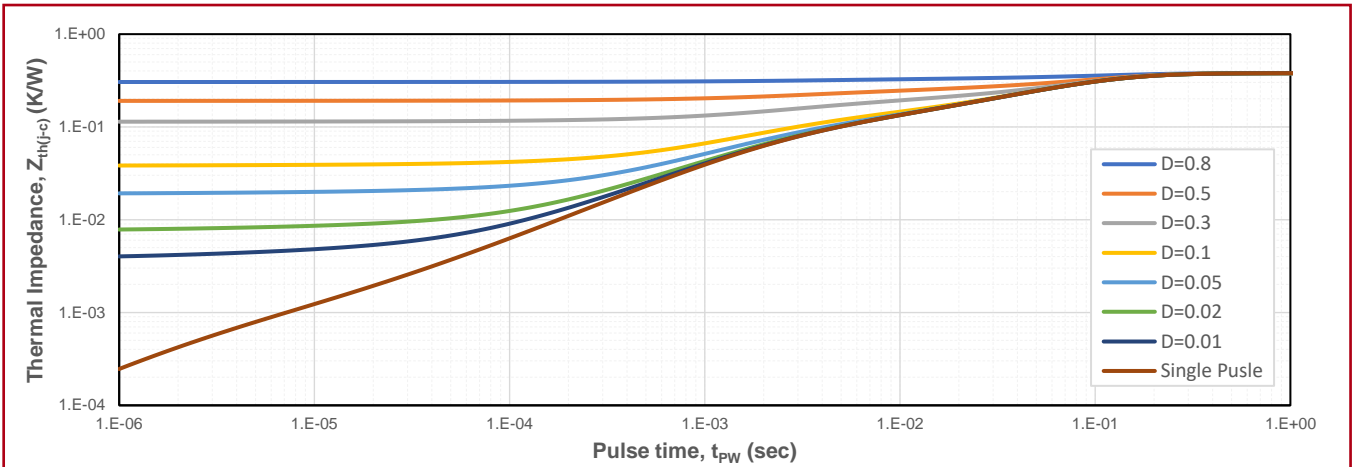
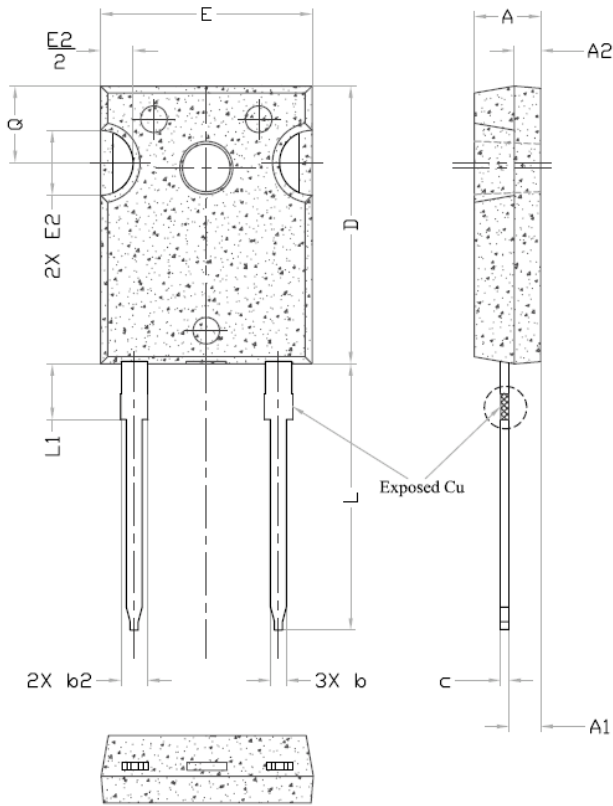


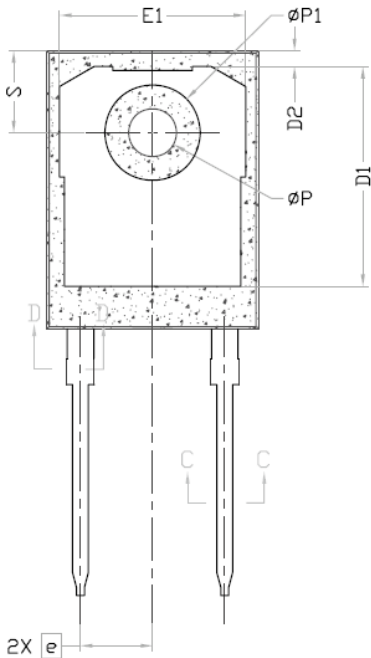
Fig.9 Transient Junction to Case Thermal Impedance

The information provided herein is subject to change without notice.

Package Dimensions (TO-247-2L)

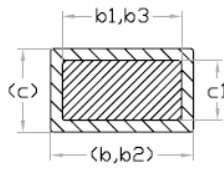


Symbol	mm			Note
	Min.	Typ.	Max.	
A	4.83	5.02	5.21	
A1	2.29	2.41	2.55	
A2	1.50	2.00	2.49	
b	1.12	1.20	1.33	
b1	1.12	1.20	1.28	
b2	1.91	2.00	2.39	6
b3	1.91	2.00	2.34	
c	0.55	0.60	0.69	6
c1	0.55	0.60	0.65	
D	20.80	20.95	21.10	4
D1	16.25	16.55	17.65	5
D2	0.51	1.19	1.35	
E	15.75	15.94	16.13	4
E1	13.46	14.02	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
$\phi P1$	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. ϕP 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