H3S120S002
H3S120K002

Product Summary

V_R	1200V
$I_{F(135/162^{\circ}C)}$	4A/2A
Q_C	18nC

Features

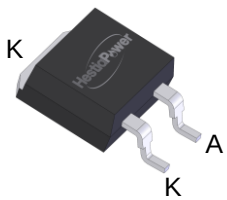
- Low Conduction and Switching Loss
- Zero Reverse Recovery
- Temperature Independent Switching Behavior
- Positive Temperature Coefficient Device
- High Surge Current Capability
- RoHS Compliant and Halogen Free
- Optimized for High Power Application
- AEC-Q101 Qualified

Circuit Diagram

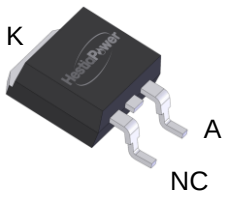
Benefits

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

TO-252-2L



TO-252-2L-1NC



Applications

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

Part Number	Package	Marking
H3S120S002	TO-252-2L	H3S120S002
H3S120K002	TO-252-2L-1NC	H3S120K002

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

Parameter	Symbol	Test Conditions	Value	Unit
Peak Repetitive Reverse Voltage	V_{RRM}	I_R = 100 μA	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	I_F	T_C = 25°C	8.5	A
		T_C = 135°C	4	
		T_C = 162°C	2	
Non-Repetitive Peak Forward Surge Current	I_{FSM}	T_C = 25°C, T_P = 10 ms, Half Sine Wave	32	A
		T_C = 125°C, T_P = 10 ms, Half Sine Wave	30	
		T_C = 25°C, T_P = 10 μs, Pulse	454	
Repetitive Peak Forward Surge Current	I_{FRM}	T_C = 25°C, T_P = 10 ms Half Sine Wave, D = 0.1	24	A
		T_C = 125°C, T_P = 10 ms Half Sine Wave, D = 0.1	20	
Power Dissipation	P_D	T_C = 25°C	41.7	W
		T_C = 125°C	13.9	
I^2t value	$\int i^2dt$	T_C = 25°C, T_P = 10 ms	5	A^2s
Junction & Storage Temperature	T_j , T_{stg}		-55 to 175	°C
Soldering Temperature	T_L		260	

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

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
DC Blocking Voltage	V_{DC}	I_R = 100 µA, T_J = 25˚C	> 1200			V
Forward Voltage	V_F	I_F = 2A, T_J = 25˚C		1.35	1.7	V
		I_F = 2A, T_J = 175˚C		1.8	2.1	V
Reverse Current	I_R	V_R = 1200V, T_J = 25˚C		1	50	µA
		V_R = 1200V, T_J = 175˚C		6	200	µA
Total Capacitive Charge	Q_C	V_R = 800V, T_J = 25˚C		18		nC
Total Capacitance	C_j	V_R = 0.1V, T_J=25˚C, f =1 MHz		204		pF
		V_R = 400V, T_J=25˚C, f =1 MHz		14		
		V_R = 800V, T_J=25˚C, f =1 MHz		10		
Capacitance Stored Energy	E_C	V_R = 800V		7		µJ

Thermal Resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case	$R_{\theta,JC}$		3.6		˚C/W
Thermal Resistance, Junction to Ambient	$R_{\theta,JA}$				˚C/W

Naming Rule

H3 S 120 S 002

Generation
H3 = 3rd Gen Discrete

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

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

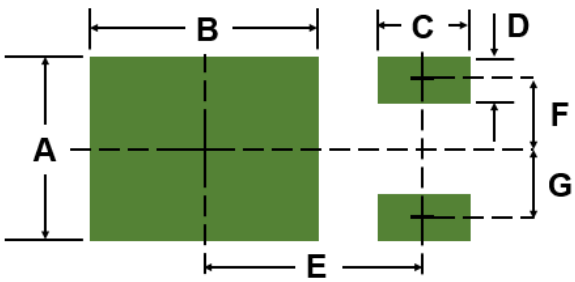
Package Type
S = TO-252-2L K = TO-252-2L-1NC

Typical Current Rating
002 = 2A 005 = 5A 006 = 6A 010 = 10A 012 = 12A 020 = 20A

Recommended Solder Pad Layout

TO-252-2L, TO-252-2L-1NC

Parameter	Symbol	Typical	Unit
Length	A	6.00	mm
	B	6.50	
	C	3.00	
	D	1.40	
	E	6.25	
	F	2.30	
	G	2.30	



Typical Device Performance

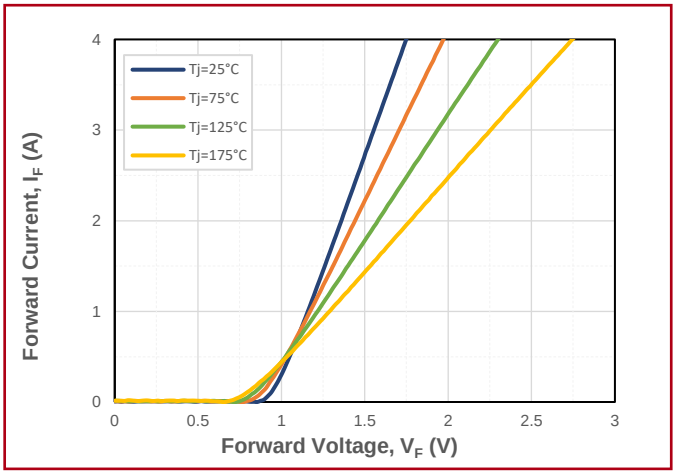


Fig.1 Forward Characteristics

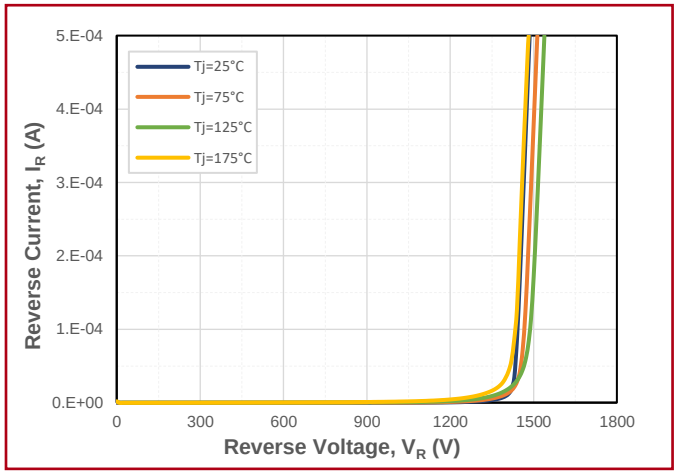


Fig.2 Reverse Characteristics

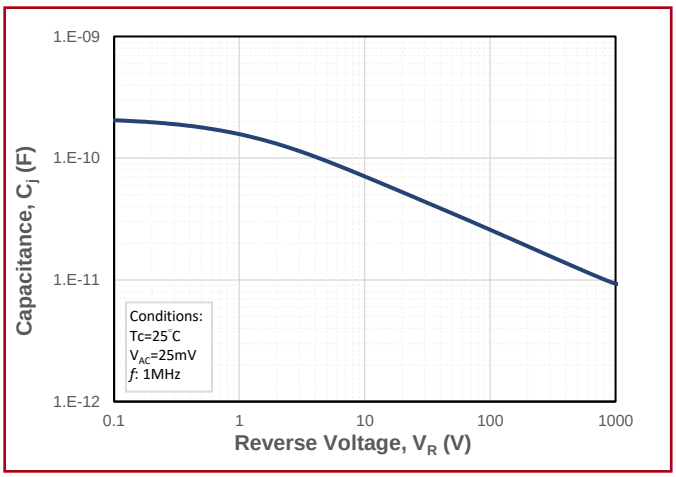


Fig.3 Junction Capacitance vs. Reverse Voltage

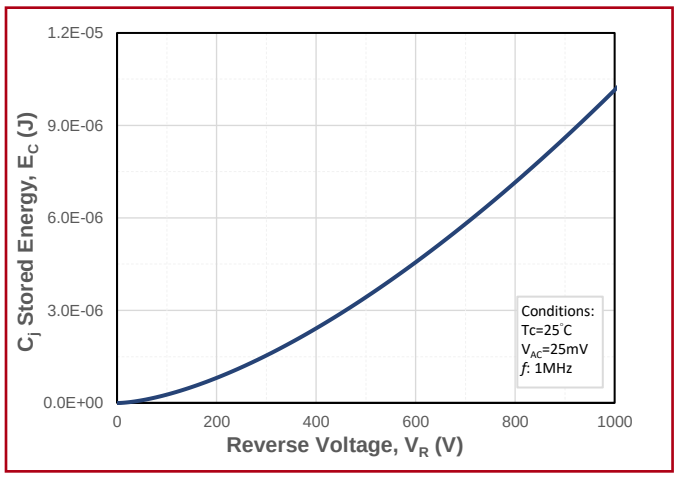


Fig.4 Capacitance Stored Energy

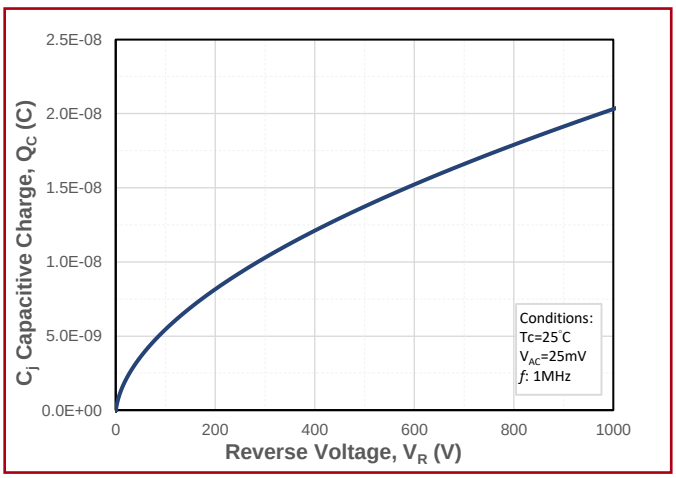


Fig.5 Recovery Charge vs. Reverse Voltage

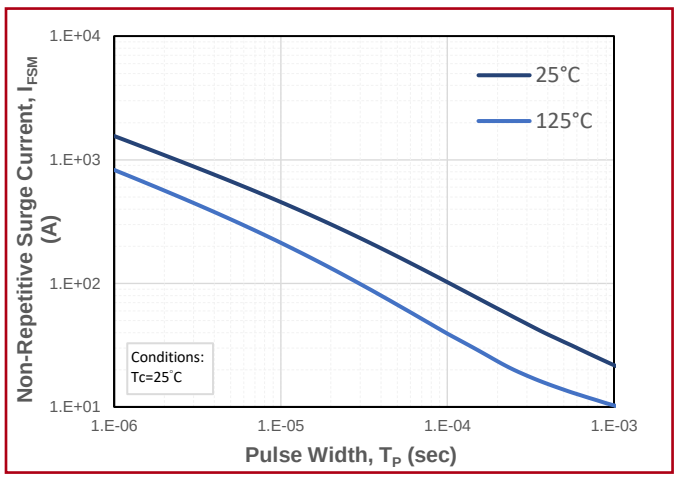


Fig.6 Non-Repetitive Peak Forward Surge Current (Pulse Mode)

Typical Device Performance

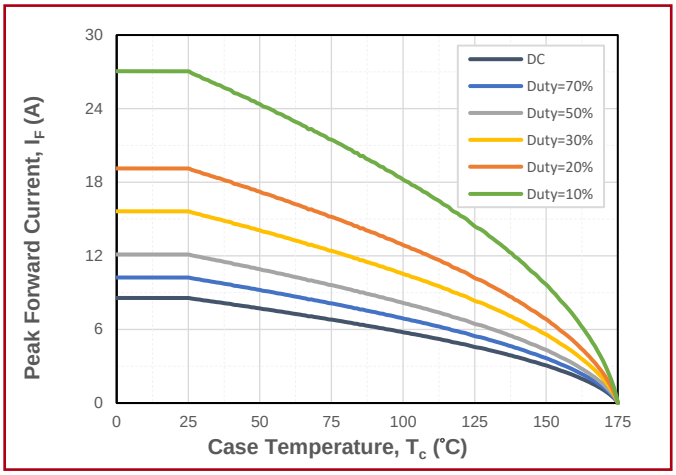


Fig.7 Maximum Forward Current Derating vs. Case Temperature

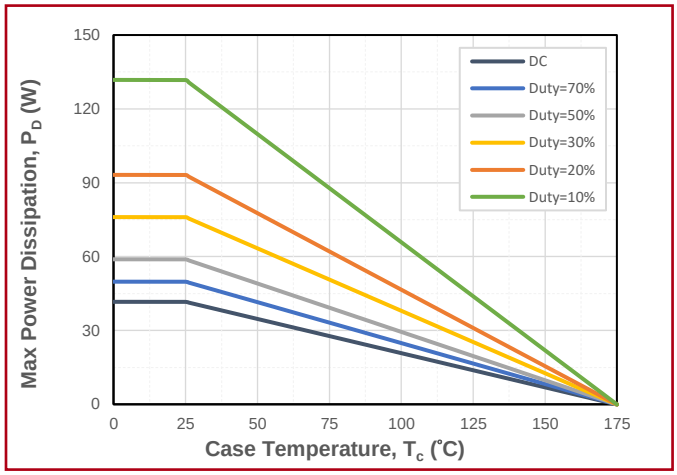


Fig.8 Maximum Power Dissipation Derating vs. Case Temperature

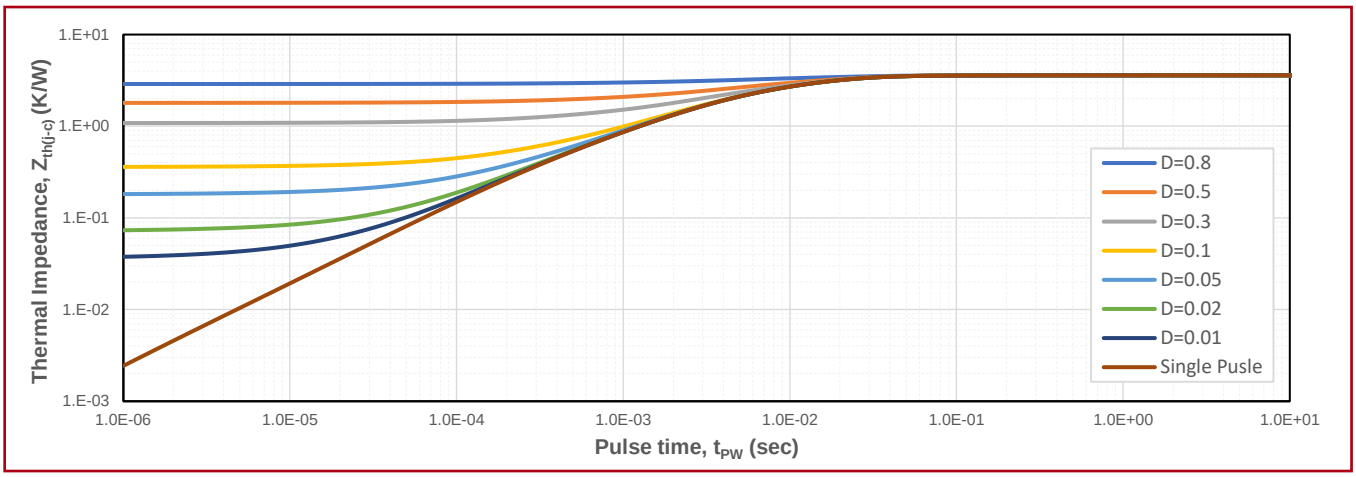
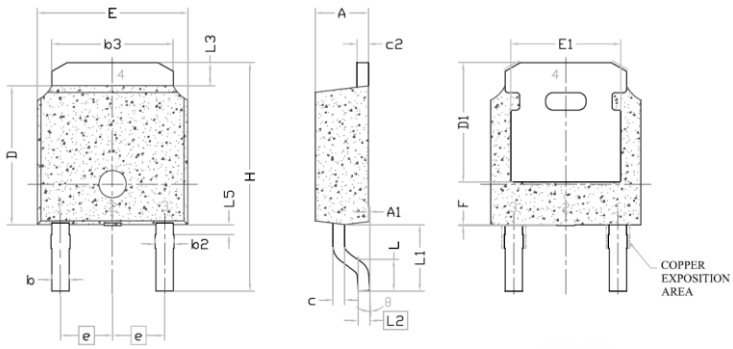


Fig.9 Transient Junction to Case Thermal Impedance

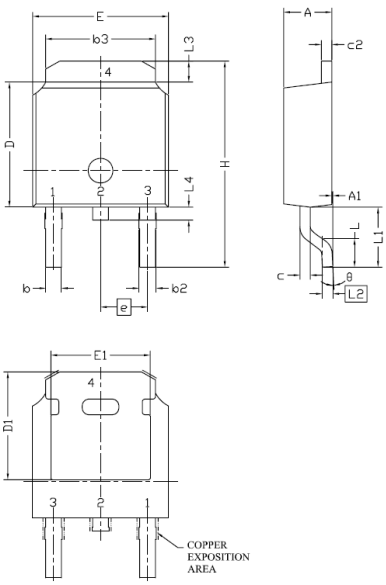
Package Dimensions (TO-252-2L)



Symbol	mm		
	Min.	Typ.	Max.
E	6.40	6.60	6.731
L	1.40	1.52	1.77
L1		2.743 REF	
L2		0.508 BSC	
L3	0.89	--	1.27
L5	--	--	--
D	6.00	6.10	6.223
H	9.40	10.00	10.40
b	0.64	0.76	0.88
b2	0.77	0.84	1.14
b3	5.21	5.34	5.46
e		2.286 BSC	
A	2.20	2.30	2.38
A1	0	--	0.127
c	0.46	0.50	0.60
c2	0.46	0.50	0.58
D1	5.21	--	--
E1	4.40	--	--
F	--	--	0.45
Θ	0°	--	10°

Note:
1. All Dimension Are In mm.
2. Package Body Sizes Exclude Mold Flash, Protrusion Or Gate Burrs. Mold Flash, Protrusion Or Gate Burrs Shall Not Exceed 0.10 mm Per Side.
3. Package Body Sizes Determined At The Outermost Extremes Of The Plastic Body Exclusive Of Mold Flash, Gate Burrs And Interlead Flash, But Including Any Mismatch Between The Top And Bottom Of The Plastic Body.
4. The Package Top May Be Smaller Than The Package Bottom.
5. Dimension "b" Does Not Include Dambar Protrusion. Allowable Dambar Protrusion Shall Be 0.10 mm Total In Excess Of "b" Dimension At Maximum Material Condition. The Dambar Cannot Be Located On The Lower Radius Of The Foot.

Package Dimensions (TO-252-2L-1NC)



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L3	0.89	--	1.27
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D	6.00	6.10	6.223
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b	0.64	0.76	0.88
b2	0.77	0.84	1.14
b3	5.21	5.34	5.46
e		2.286 BSC	
A	2.20	2.30	2.38
A1	0	--	0.127
c	0.46	0.50	0.60
c2	0.46	0.50	0.58
D1	5.21	--	--
E1	4.40	--	--
Θ	0°	--	10°

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