H3S120E020

Part Number	Package	Marking
H3S120E020	TO-247-3L	H3S120E020

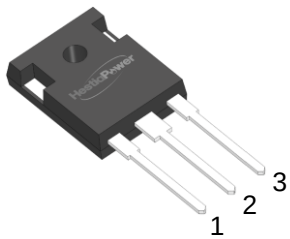
Product Summary

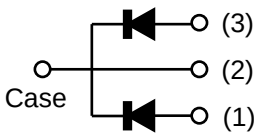
V_R	1200V
$I_{F(135/154^\circ C)}$	30A/20A**
Q_C	112nC**

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	31.5*/63**	A
		T_C= 135°C	15*/30**	
		T_C= 154°C	10*/20**	
Non-Repetitive Peak Forward Surge Current	I_{FSM}	T_C = 25°C, T_P = 10 ms, Half Sine Wave	119*	A
		T_C = 125°C, T_P = 10 ms, Half Sine Wave	104*	
		T_C = 25°C, T_P = 10 µs, Pulse	811*	
Repetitive Peak Forward Surge Current	I_{FRM}	T_C = 25°C, T_P = 10 ms Half Sine Wave, D = 0.1	100*	A
		T_C = 125°C, T_P = 10 ms Half Sine Wave, D = 0.1	89*	
Power Dissipation	P_D	T_C=25°C	136*	W
		T_C=125°C	45*	
I^2t value	$\int i^2dt$	T_C = 25°C, T_P = 10 ms	70*	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

*Per Leg **Whole Device

Electrical Characteristics (Per Leg) (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 = 10A, T_J = 25˚C		1.44	1.7	V
		I_F = 10A, T_J = 175˚C		1.9	2.1	V
Reverse Current	I_R	V_R = 1200V, T_J = 25˚C		5	200	µA
		V_R = 1200V, T_J = 175˚C		30	1000	µA
Total Capacitive Charge	Q_C	V_R = 800V, T_J = 25˚C		56		nC
Total Capacitance	C_j	V_R = 0.1V, T_J= 25˚C, f = 1 MHz V_R = 400V, T_J=25˚C, f = 1 MHz V_R = 800V, T_J=25˚C, f = 1 MHz		845 59 43		pF
Capacitance Stored Energy	E_C	V_R = 800V		22		µJ

*** Parameters are estimated

Thermal Resistance (Per Leg)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case	$R_{\theta,JC}$		1.1*		˚C/W
Thermal Resistance, Junction to Ambient	$R_{\theta,JA}$				˚C/W

Naming Rule

H3 S 120 E 020

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

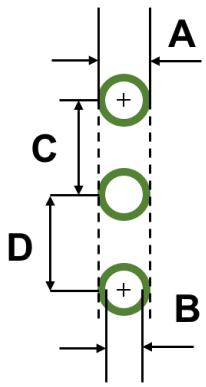
Package Type
E = TO-247-3L (Dual)

Typical Current Rating
012 = 12A 016 = 16A 020 = 20A 030 = 30A 040 = 40A

Recommended Solder Pad Layout

TO-247-3L

Parameter	Symbol	Typical	Unit
Length	A	3.048	mm
	B	2.032	
	C	5.436	
	D	5.436	



Typical Device Performance (Per Leg)

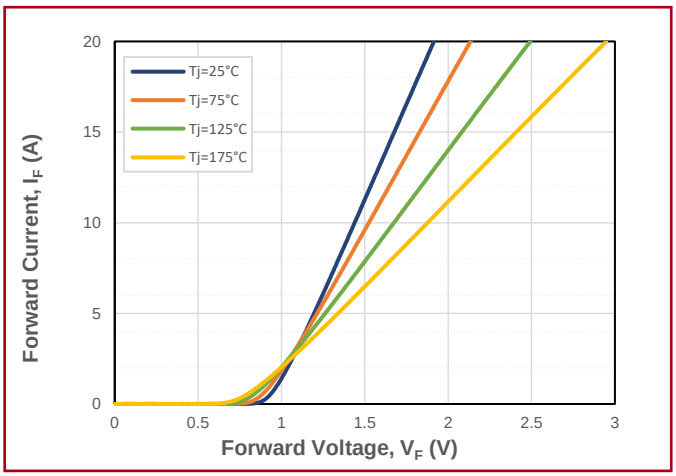


Fig.1 Forward Characteristics

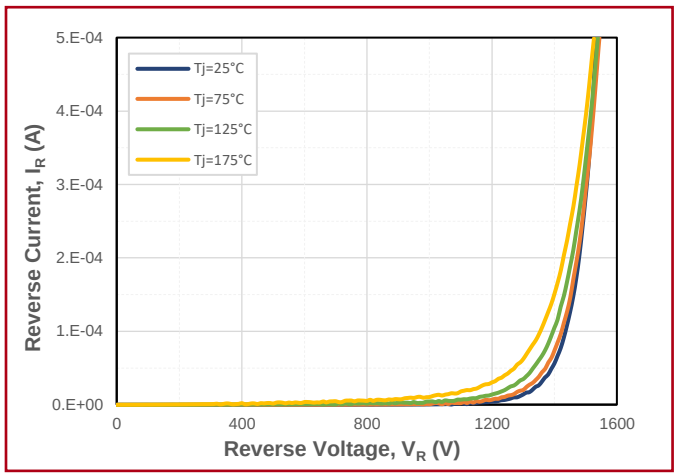


Fig.2 Reverse Characteristics

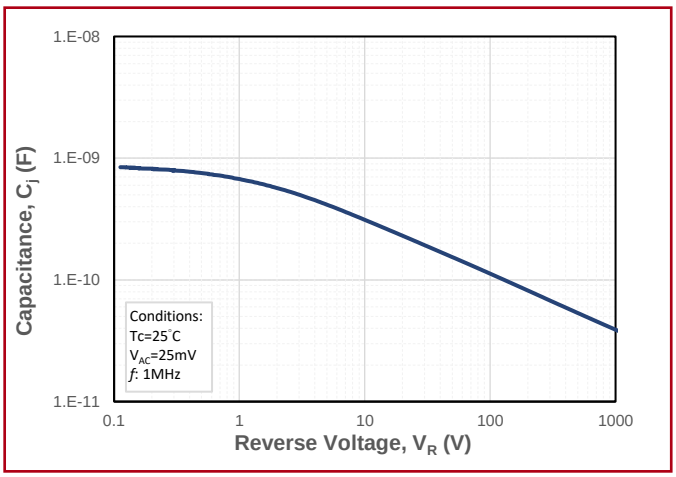


Fig.3 Junction Capacitance vs. Reverse Voltage

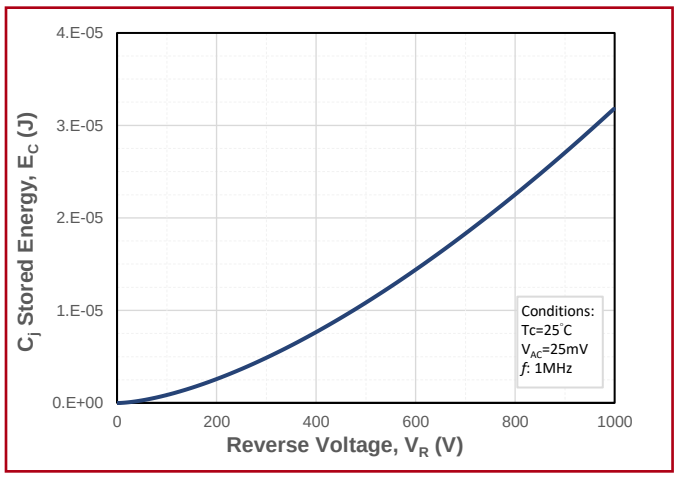


Fig.4 Capacitance Stored Energy

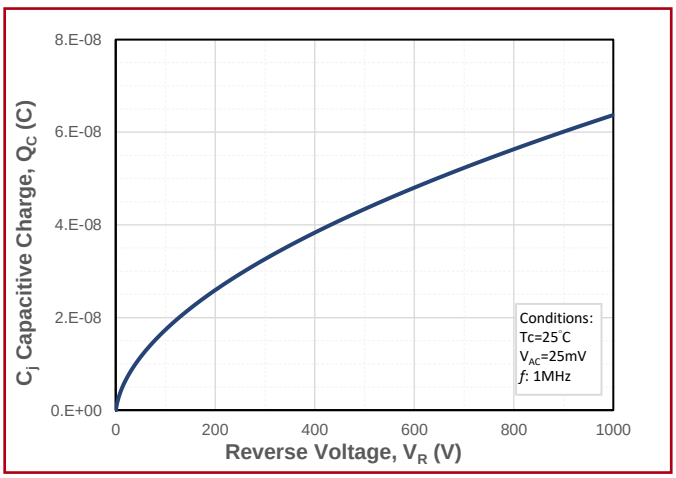


Fig.5 Recovery Charge vs. Reverse Voltage

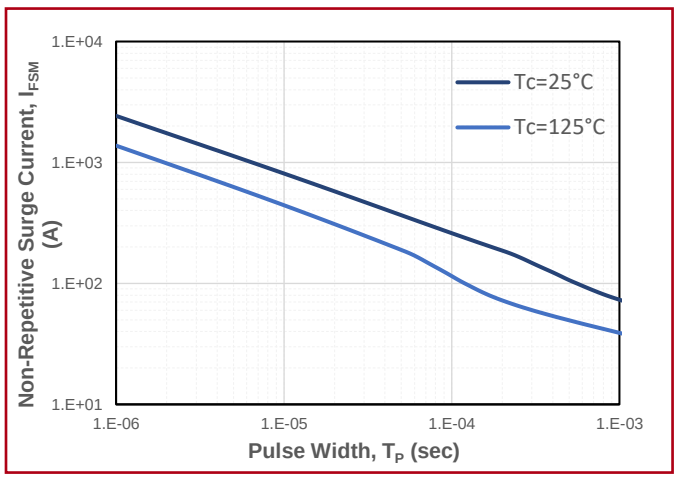


Fig.6 Non-Repetitive Peak Forward Surge Current (Pulse Mode)

Typical Device Performance (Per Leg)

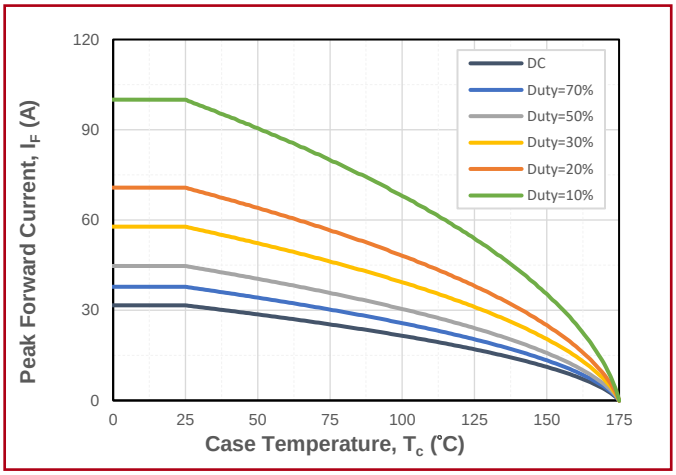


Fig.7 Maximum Forward Current Derating vs. Case Temperature

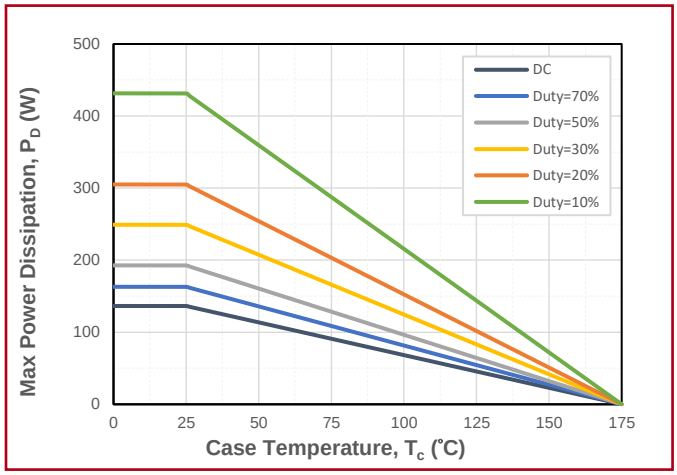


Fig.8 Maximum Power Dissipation Derating vs. Case Temperature

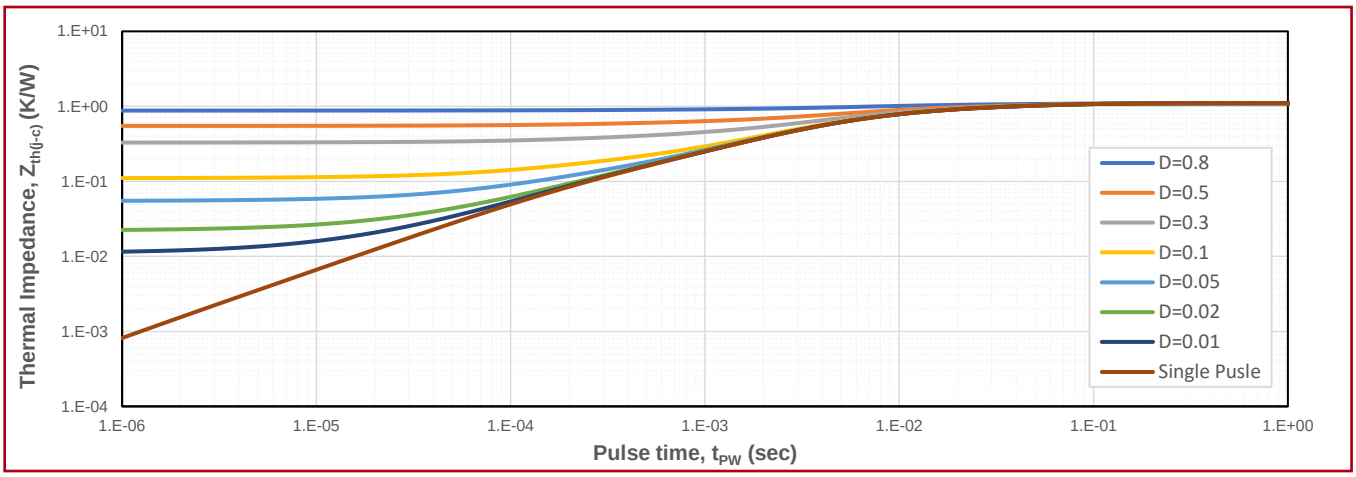
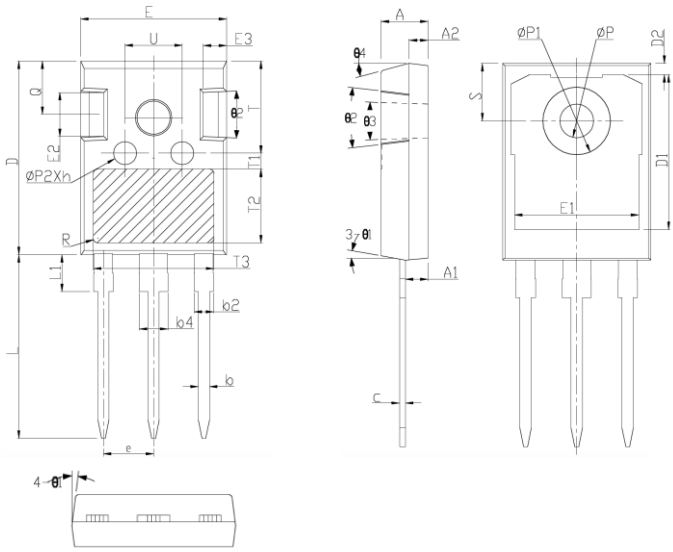


Fig.9 Transient Junction to Case Thermal Impedance

The information provided herein is subject to change without notice.

Package Dimensions (TO-247-3L)



NOTES:
1.All dimensions are in mm.
2.Tolerance: ±0.05mm.

Symbol	mm		
	Min.	Typ.	Max.
A	4.75	5.00	5.25
A1	2.16	2.41	2.66
A2	1.85	2.00	2.15
b	1.11	1.21	1.35
b2	1.90	2.01	2.25
b4	2.90	3.01	3.25
c	0.51	0.61	0.75
D	20.60	21.00	21.40
D1	16.15	16.55	16.95
D2	1.00	1.20	1.40
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.70	5.00	5.30
E3	2.25	2.50	2.75
e		5.44 BSC	
h	0.00	0.10	0.25
L	19.52	19.92	20.32
L1	-	-	4.30
ϕP	3.35	3.60	3.85
ϕP1	-	-	7.30
ϕP2	2.25	2.50	2.75
Q	5.50	5.80	6.10
S		6.15 BSC	
R		0.50 REF	
T	9.70	-	10.30
T1		1.65 REF	
T2		8.00 REF	
T3		12.80 REF	
U	5.90	-	6.50
Θ1	4°	7°	10°
Θ2	2°	5°	8°
Θ3	1°	-	2°
Θ4	10°	15°	20°