



D-Pak

RoHS Compliance Document

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International Rectifier

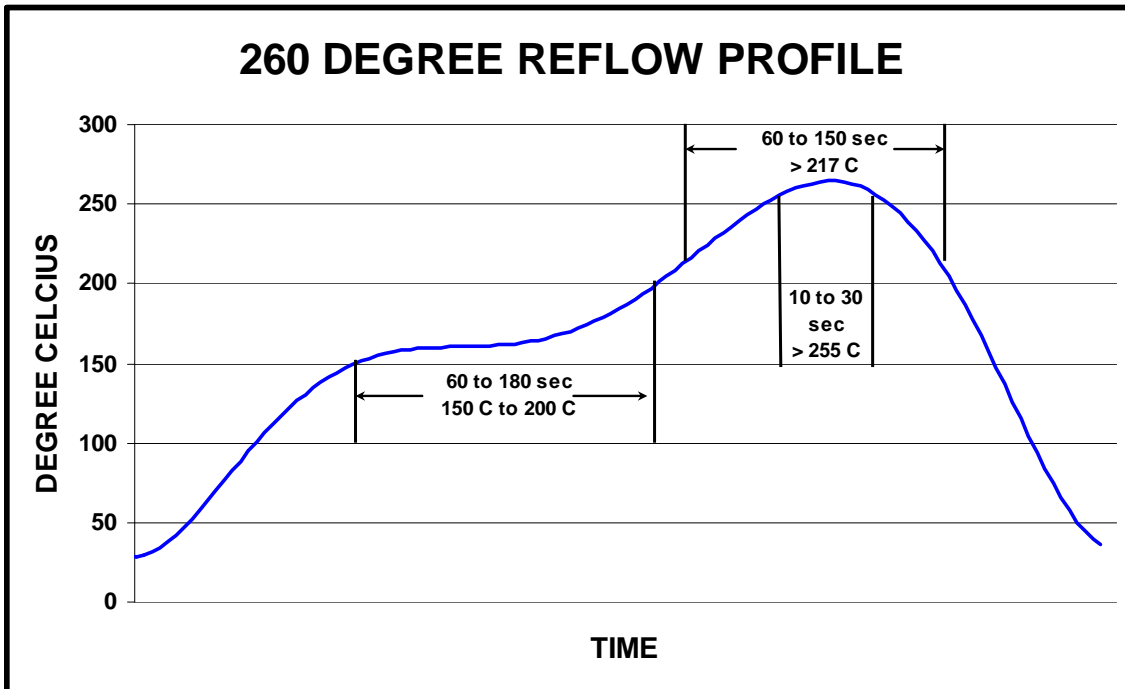
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D-pak BOM 1

Component	Material Name	Material Mass (g)	Element Name Composition	CAS #	Substance Mass (g)	Material Analysis Weight (%)	% of Total Weight
Chip	Silicon	0.00713	Si	7440-21-3	0.00713	100%	1.9%
Encapsulant	Epoxy Resin	0.11419	SiO2	7631-86-9	0.09136	80%	24.8%
			Epoxy	90598-46-2	0.01142	10%	3.1%
			Other	-	0.01141	10%	3.1%
Lead Frame	Copper	0.24040	Cu	7440-50-8	0.23992	99.8%	65.1%
			Sn	7440-31-5	0.00048	0.2%	0.1%
Die Attach	Soft Solder	0.00270	Pb	7439-92-1	0.00242	90%	0.7%
			In	7440-74-6	0.00014	5%	0.0%
			Ag	7440-22-4	0.00014	5%	0.0%
Wire bond	Aluminum	0.00080	Al	7429-90-5	0.00080	100%	0.2%
Lead Finish	Matte Tin over Nickel*	0.00320	Ni	7440-02-0	0.00050	16%	0.1%
			Sn	7440-31-5	0.00270	84%	0.7%
MSL1 at 260 C		Total Weight (g)		0.36842			

* Tin whisker mitigation strategy is nickel under-plate.



This part is compliant with EU Directive 2002/95/EC (RoHS) and does not contain lead, mercury, cadmium (0.01%), hexavalent chromium, PBB or PBDE in concentrations greater than 0.1%, except as permitted by Annex (7).

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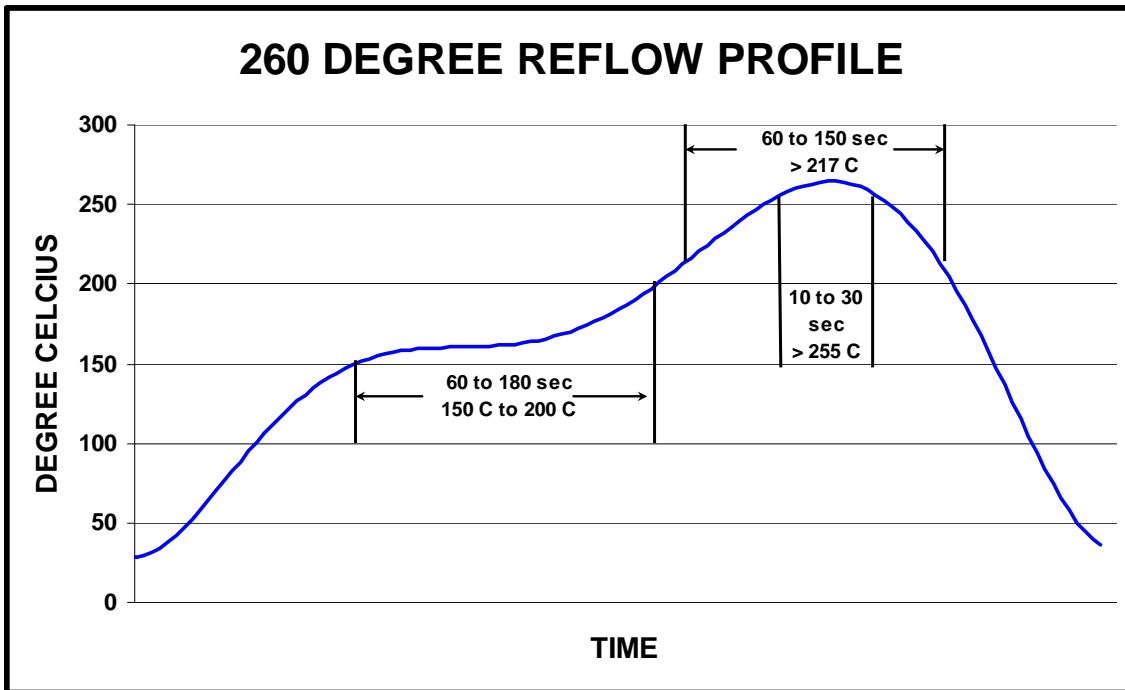
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D-pak BOM 2

Component	Material Name	Material Mass (g)	Element Name Composition	CAS #	Substance Mass (g)	Material Analysis Weight (%)	% of Total Weight
Chip	Silicon	0.00713	Si	7440-21-3	0.00713	100%	1.9%
Encapsulant	Epoxy Resin	0.11419	SiO2	7631-86-9	0.09136	80%	24.8%
			Epoxy	90598-46-2	0.01142	10%	3.1%
			Other	-	0.01141	10%	3.1%
Lead Frame	Copper	0.24040	Cu	7440-50-8	0.23992	99.8%	65.2%
			Sn	7440-31-5	0.00048	0.2%	0.1%
Die Attach	Soft Solder	0.00270	Pb	7439-92-1	0.00242	90%	0.7%
			In	7440-74-6	0.00014	5%	0.0%
			Ag	7440-22-4	0.00014	5%	0.0%
Wire bond	Aluminum	0.00080	Al	7429-90-5	0.00080	100%	0.2%
Lead Finish	Matte Tin*	0.00320	Sn	7440-31-5	0.00320	100%	0.9%
MSL1 at 260 C		Total Weight (g)			0.36842		

* Tin whisker mitigation strategy is 150 C, 1 hour anneal within 24 hours of tin plating.



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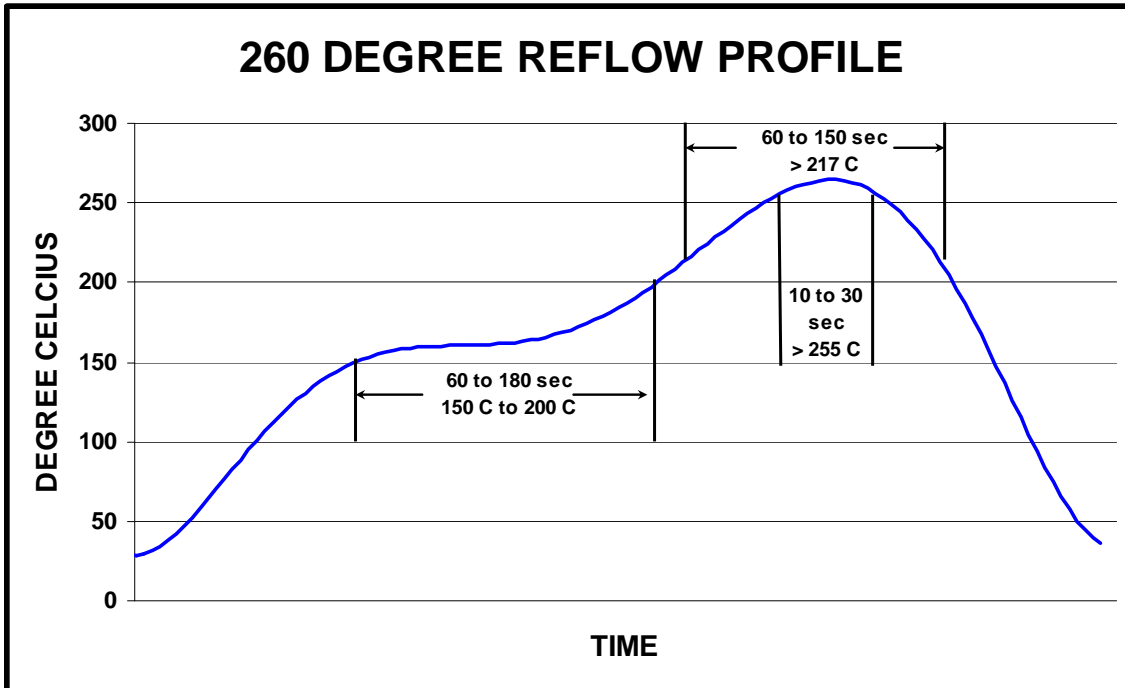
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D-pak BOM 3

Component	Material Name	Material Mass (g)	Element Name Composition	CAS #	Substance Mass (g)	Material Analysis Weight (%)	% of Total Weight
Chip	Silicon	0.00713	Si	7440-21-3	0.00713	100%	1.9%
Encapsulant	Epoxy Resin	0.11419	SiO2	7631-86-9	0.09136	80%	24.8%
			Epoxy	90598-46-2	0.01142	10%	3.1%
			Other	-	0.01141	10%	3.1%
Lead Frame	Copper	0.24040	Cu	7440-50-8	0.23992	99.8%	65.1%
			Sn	7440-31-5	0.00048	0.2%	0.1%
Die Attach	Soft Solder	0.00270	Pb	7439-92-1	0.00258	95.5%	0.7%
			Sn	7440-31-5	0.00005	2%	0.0%
			Ag	7440-22-4	0.00007	2.5%	0.0%
Wire bond	Aluminum	0.00080	Al	7429-90-5	0.00080	100%	0.2%
Lead Finish	Matte Tin	0.00320	Sn	7440-31-5	0.00320	100%	0.7%
MSL1 at 260 C			Total Weight (g)		0.36842		

* Tin whisker mitigation strategy is 150 C, 1 hour anneal within 24 hours of tin plating.



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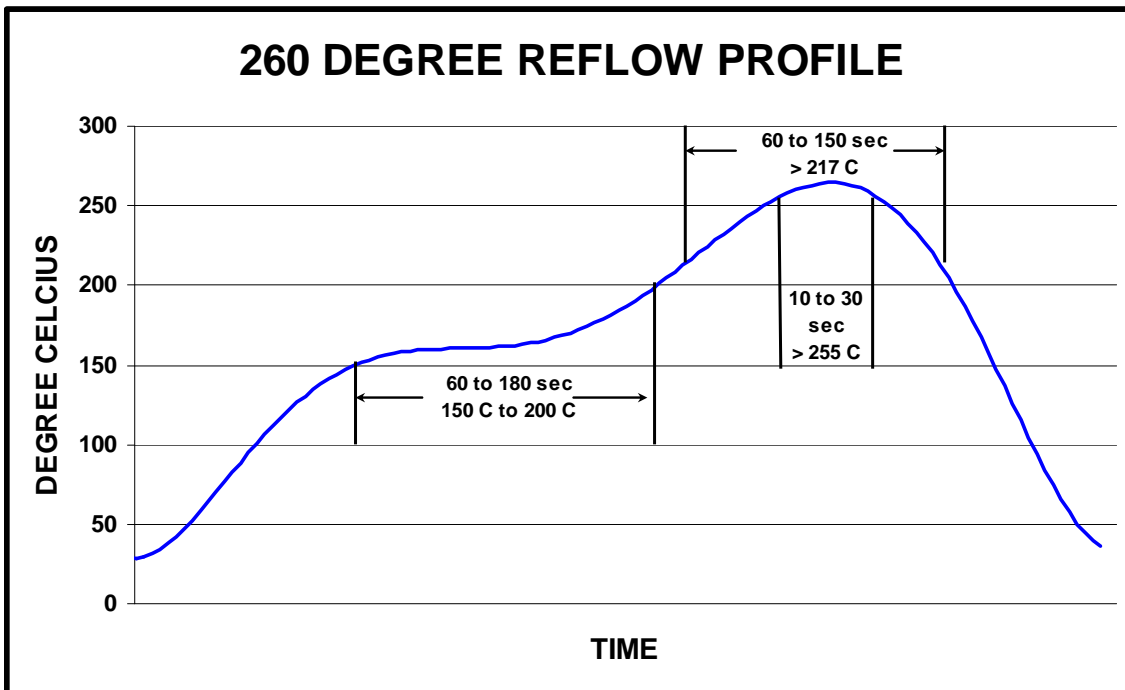
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D-pak BOM 4

Component	Material Name	Material Mass (g)	Element Name Composition	CAS #	Substance Mass (g)	Material Analysis Weight (%)	% of Total Weight
Chip	Silicon	0.00713	Si	7440-21-3	0.00713	100%	1.9%
Encapsulant	Epoxy Resin	0.11419	SiO2	7631-86-9	0.09136	80%	24.8%
			Epoxy	90598-46-2	0.01142	10%	3.1%
			Other	-	0.01141	10%	3.1%
Lead Frame	Copper	0.24040	Cu	7440-50-8	0.23992	99.8%	65.1%
			Sn	7440-31-5	0.00048	0.2%	0.1%
Die Attach	Soft Solder	0.00270	Pb	7439-92-1	0.00262	97%	0.7%
			Ag	7440-22-4	0.00008	3%	0.0%
Wire bond	Aluminum	0.00080	Al	7429-90-5	0.00080	100%	0.2%
Lead Finish	Matte Tin over Nickel*	0.00320	Ni	7440-02-0	0.00050	16%	0.1%
			Sn	7440-31-5	0.00270	84%	0.7%
MSL1 at 260 C		Total Weight (g)		0.36842			

* Tin whisker mitigation strategy is nickel under-plate.



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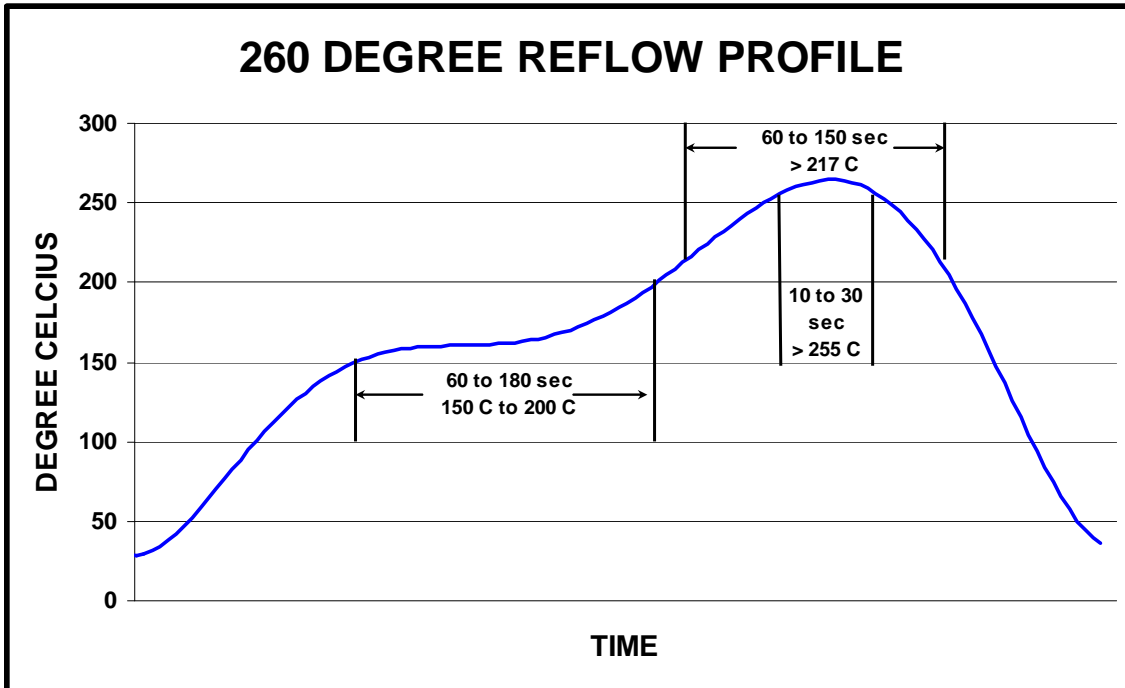
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D-pak BOM 5

Component	Material Name	Material Mass (g)	Element Name Composition	CAS #	Substance Mass (g)	Material Analysis Weight (%)	% of Total Weight
Chip	Silicon	0.00713	Si	7440-21-3	0.00713	100%	1.9%
Encapsulant	Epoxy Resin	0.11419	SiO2	7631-86-9	0.09136	80%	24.8%
			Epoxy	90598-46-2	0.01142	10%	3.1%
			Other	-	0.01141	10%	3.1%
Lead Frame	Copper	0.24040	Cu	7440-50-8	0.23992	99.8%	65.1%
			Sn	7440-31-5	0.00048	0.2%	0.1%
Die Attach	Soft Solder	0.00270	Pb	7439-92-1	0.00250	92.5%	0.7%
			Sn	7440-31-5	0.00013	5%	0.0%
			Ag	7440-22-4	0.00007	2.5%	0.0%
Wire bond	Aluminum	0.00080	Al	7429-90-5	0.00080	100%	0.2%
Lead Finish	Matte Tin	0.00320	Sn	7440-31-5	0.00320	100%	0.7%
MSL1 at 260 C			Total Weight (g)		0.36842		

* Tin whisker mitigation strategy is 150 C, 1 hour anneal within 24 hours of tin plating.



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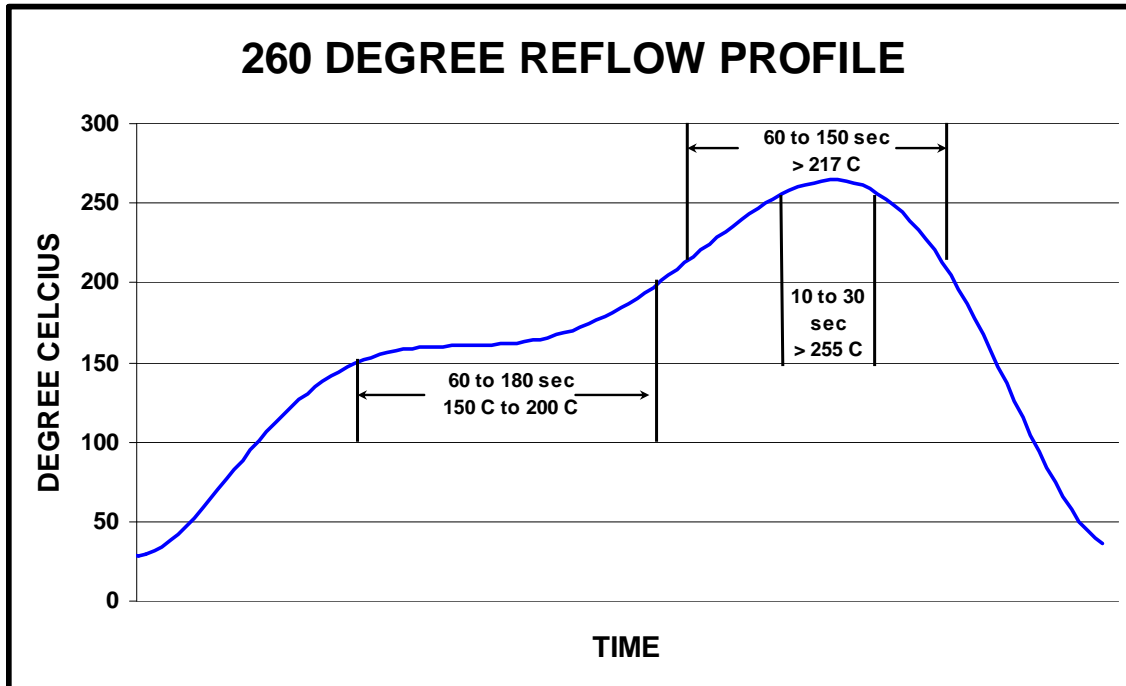
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D-pak BOM 6

Component	Material Name	Material Mass (g)	Element Name Composition	CAS #	Substance Mass (g)	Material Analysis Weight (%)	% of Total Weight
Chip	Silicon	0.00713	Si	7440-21-3	0.00713	100%	1.9%
Encapsulant	Epoxy Resin	0.11419	SiO2	7631-86-9	0.09136	80%	24.8%
			Epoxy	90598-46-2	0.01142	10%	3.1%
			Other	-	0.01141	10%	3.1%
Lead Frame	Copper	0.24040	Cu	7440-50-8	0.23992	99.8%	65.1%
			Sn	7440-31-5	0.00048	0.2%	0.1%
Die Attach	Soft Solder	0.00270	Pb	7439-92-1	0.00258	95.5%	0.7%
			Sn	7440-31-5	0.00005	2%	0.0%
			Ag	7440-22-4	0.00007	2.5%	0.0%
Wire bond	Aluminum	0.00080	Al	7429-90-5	0.00080	100%	0.2%
Lead Finish	Matte Tin over Nickel*	0.00320	Ni	7440-02-0	0.00050	16%	0.1%
			Sn	7440-31-5	0.00270	84%	0.7%
MSL1 at 260 C			Total Weight (g)		0.36842		

* Tin whisker mitigation strategy is 150 C, 1 hour anneal within 24 hours of tin plating.



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Test Definition	Test Conditions	Inspection Interval Class 1 and 2 Products	Total Duration Class 1 and 2 Products	Maximum Whisker Length (um)
Room Temperature Humidity Storage	30± 2°C/60± 3%RH	1000 hours	4000 hours	20
Temperature Humidity Unbiased	55± 3°C/85±3% RH	1000 hours	4000 hours	20
Temperature Cycling	-40 to 55°C to 80 to 95°C, air to air, 10 min soak, approx 3 cycles /hours	500 cycles	1500 cycles	45

Tin Whisker testing per JESD201, Environmental Acceptance Requirements for Tin Whisker Susceptibility of Tin and Tin Alloy Surface Finish

Tin Whisker Results (number of failing whiskers)

Test	1000 Hours	2000 Hours	3000 Hours	4000 Hours
Room Temperature Humidity Storage	0/60	0/60	0/60	0/60
Temperature Humidity Unbiased	0/60	0/60	0/60	0/60
Test	500 Cycles	1000 Cycles	1500 Cycles	
Temperature Cycling	0/60	0/60	0/60	