



## **D2-Pak**

# **RoHS Compliance Document**

Contents:

1. Composition
2. Solder Reflow
3. Tin Whisker Report



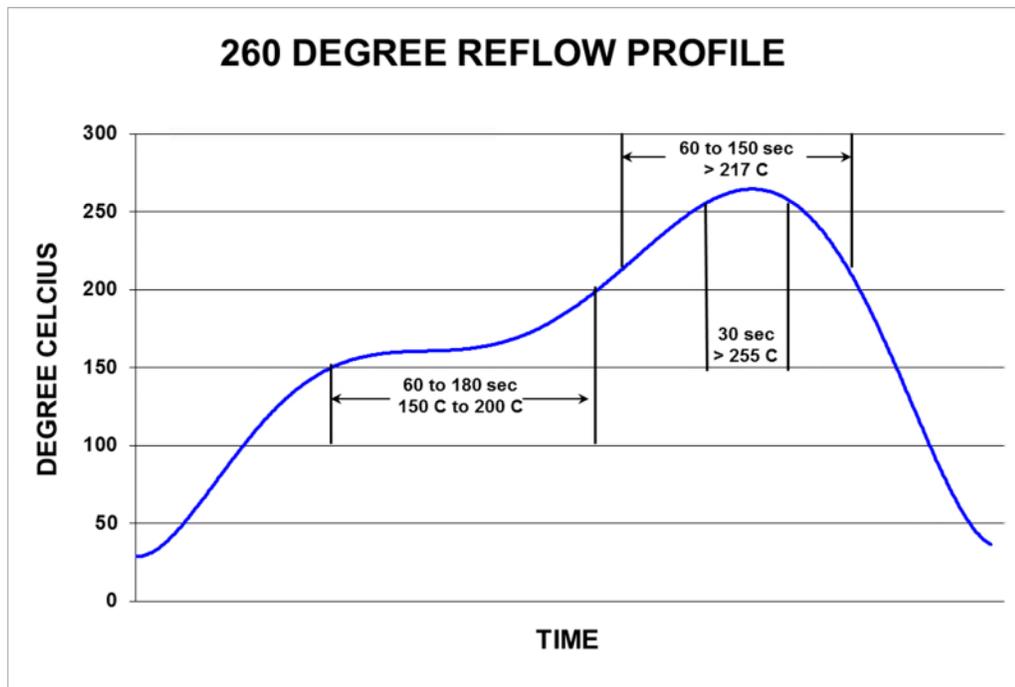
**D2-pak (3 or 5 Lead) BOM 1**

Component	Material Name	Material Mass (g)	Element Name Composition	CAS #	Substance Mass (g)	Material Analysis Weight (%)	% of Total Weight
Chip	Silicon	0.01900	Si	7440-21-3	0.01900	100%	1.3%
Encapsulant	Epoxy Resin	0.52800	SiO <sub>2</sub>	7631-86-9	0.46992	89%	31.0%
			Epoxy Resin	90598-46-2	0.05808	11%	3.8%
Lead Frame	Copper	0.94840	Cu	7440-50-8	0.94745	100%	62.4%
			Sn	7440-31-5	0.00095	0%	0.1%
Die Attach	Soft Solder	0.01200	Pb	7439-92-1	0.01080	90%	0.8%
			In	7440-74-6	0.00060	5%	0.0%
			Ag	7440-22-4	0.00060	5%	0.0%
Wire Bond	Aluminum	0.00660	Al	7429-90-5	0.00660	100%	0.4%
Lead Finish	Matte Tin over Nickel*	0.00320	Sn	7440-31-5	0.00275	86%	0.2%
			Ni	7440-02-0	0.00045	14%	0.0%

Total Weight  
(g)

**1.51720**

\*Tin whisker mitigation strategy is nickel under-plate.



This part is compliant with EU Directive 2011/65/EU (RoHS Directive) 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 III. Further part complies with 3 reflow cycles per JEDEC J-STD-020



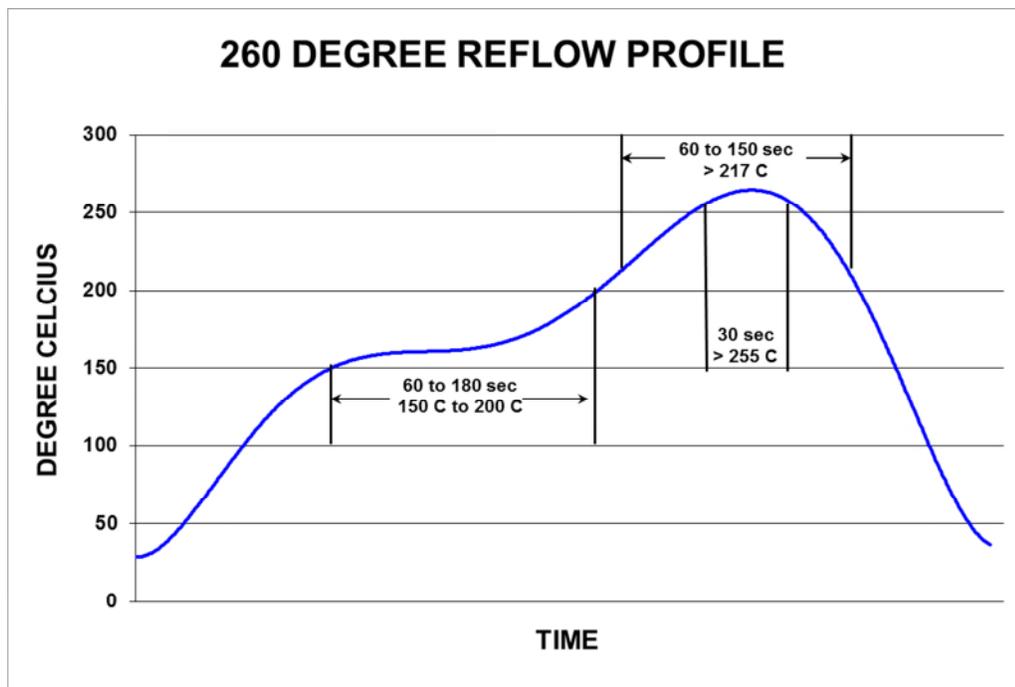
**D2-pak (3 or 5 Lead) BOM 2**

Component	Material Name	Material Mass (g)	Element Name Composition	CAS #	Substance Mass (g)	Material Analysis Weight (%)	% of Total Weight
Chip	Silicon	0.01900	Si	7440-21-3	0.01900	100%	1.3%
Encapsulant	Epoxy Resin	0.52800	SiO <sub>2</sub>	7631-86-9	0.46992	89%	31.0%
			Epoxy Resin	90598-46-2	0.05808	11%	3.8%
Lead Frame	Copper	0.94840	Cu	7440-50-8	0.94745	100%	62.4%
			Sn	7440-31-5	0.00095	0%	0.1%
Die Attach	Soft Soldier	0.01200	Pb	7439-92-1	0.01146	95.5%	0.8%
			Sn	7440-31-5	0.00024	2%	0.0%
			Ag	7440-22-4	0.00030	2.5%	0.0%
Wire Bond	Aluminum	0.00660	Al	7429-90-5	0.00660	100%	0.4%
Lead Finish	Matte Tin over Nickel*	0.00320	Sn	7440-31-5	0.00275	86%	0.2%
			Ni	7440-02-0	0.00045	14%	0.0%

Total Weight  
(g)

**1.51720**

\*Tin whisker mitigation strategy is nickel under-plate.



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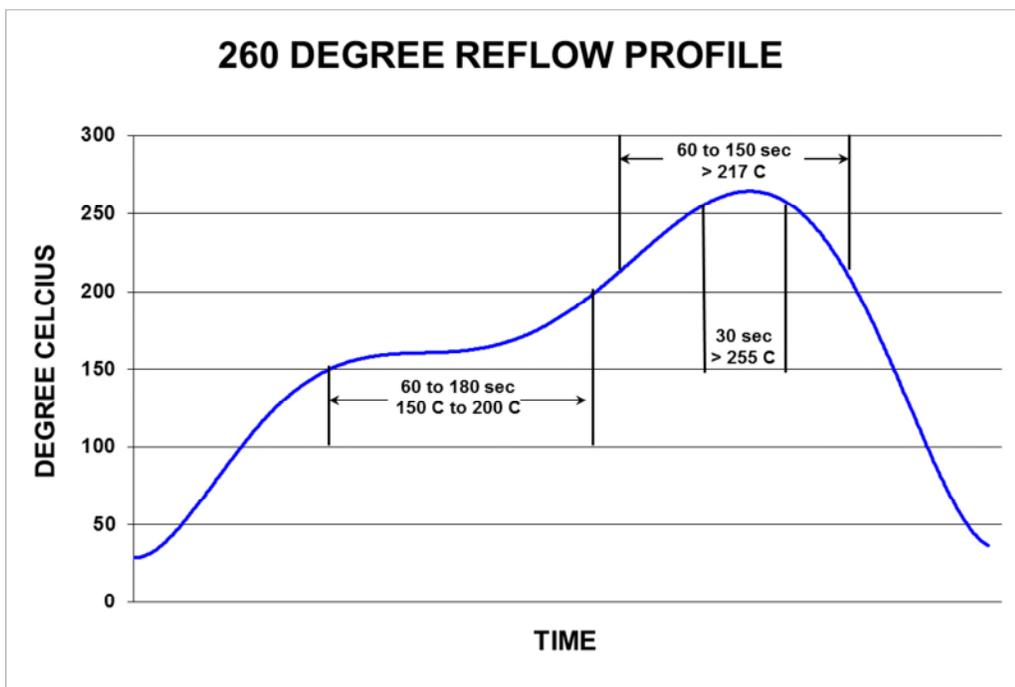


**D2-pak (3 or 5 Lead) BOM 3**

Component	Material Name	Material Mass (g)	Element Name Composition	CAS #	Substance Mass (g)	Material Analysis Weight (%)	% of Total Weight
Chip	Silicon	0.01900	Si	7440-21-3	0.01900	100%	1.3%
Encapsulant	Epoxy Resin	0.52800	SiO <sub>2</sub>	7631-86-9	0.46992	89%	31.0%
			Epoxy	90598-46-2	0.05808	11%	3.8%
Lead Frame	Copper	0.94840	Cu	7440-50-8	0.94745	100%	62.4%
			Sn	7440-31-5	0.00095	0%	0.1%
Die Attach	Soft Soldier	0.01200	Pb	7439-92-1	0.01146	95.5%	0.8%
			Sn	7440-31-5	0.00024	2%	0.0%
			Ag	7440-22-4	0.00030	2.5%	0.0%
Wire Bond	Aluminum	0.00660	Al	7429-90-5	0.00660	100%	0.4%
Lead Finish	Matte Tin*	0.00320	Sn	7440-31-5	0.00320	86%	0.2%

Total Weight (g) **1.51720**

\*Tin whisker mitigation strategy is 150 °C anneal for 1 hour within 24 hours of plating.



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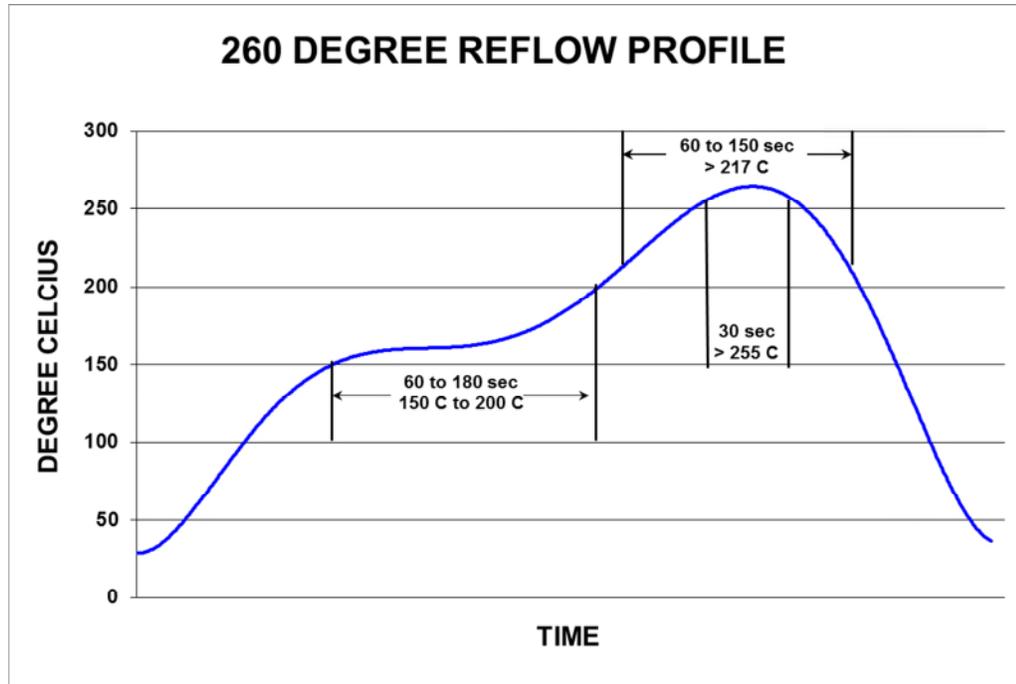
**D2-pak (7 Lead) BOM 1**

Component	Material Name	Material Mass (g)	Element Name Composition	CAS #	Substance Mass (g)	Material Analysis Weight (%)	% of Total Weight
Chip	Silicon	0.01900	Si	7440-21-3	0.01900	100%	1.3%
Encapsulant	Epoxy Resin	0.52800	SiO <sub>2</sub>	7631-86-9	0.46992	89%	31.0%
			Epoxy	90598-46-2	0.05808	11%	3.8%
Lead Frame	Copper	1.04324	Cu	7440-50-8	1.04219	100%	62.4%
			Sn	7440-31-5	0.00105	0%	0.1%
Die Attach	Soft Soldier	0.01200	Pb	7439-92-1	0.01080	90%	0.7%
			In	7440-74-6	0.00060	5%	0.0%
			Ag	7440-22-4	0.00060	5%	0.0%
Wire Bond	Aluminum	0.00660	Al	7429-90-5	0.00660	100%	0.4%
Lead Finish	Matte Tin Over Nickel*	0.00320	Sn	7440-31-5	0.00275	86%	0.2%
			Ni	7440-02-0	0.00045	14%	0.0%

Total Weight  
(g)

**1.61204**

\*Tin whisker mitigation strategy is nickel under-plate.



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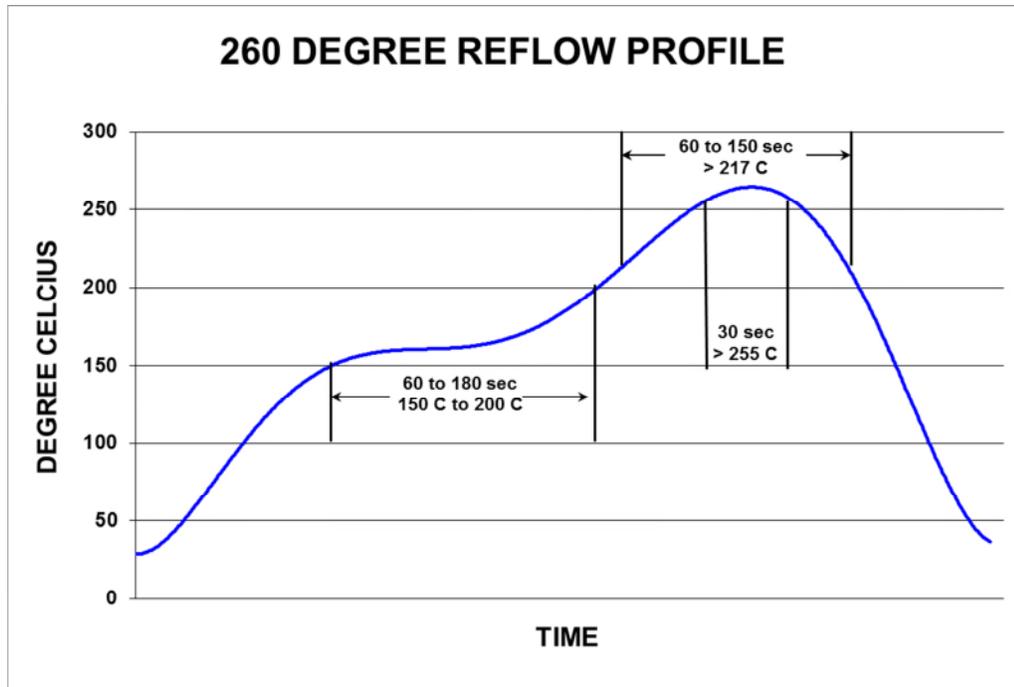


**D2-pak (7 Lead) BOM 2**

Component	Material Name	Material Mass (g)	Element Name Composition	CAS #	Substance Mass (g)	Material Analysis Weight (%)	% of Total Weight
Chip	Silicon	0.01900	Si	7440-21-3	0.01900	100%	1.3%
Encapsulant	Epoxy Resin	0.52800	SiO <sub>2</sub>	7631-86-9	0.46992	89%	31.0%
			Epoxy	90598-46-2	0.05808	11%	3.8%
Lead Frame	Copper	1.04324	Cu	7440-50-8	1.04219	100%	62.4%
			Sn	7440-31-5	0.00105	0%	0.1%
Die Attach	Soft Soldier	0.01200	Pb	7439-92-1	0.01146	95.5%	0.7%
			Sn	7440-74-6	0.00024	2%	0.0%
			Ag	7440-22-4	0.00030	2.5%	0.0%
Wire Bond	Aluminum	0.00660	Al	7429-90-5	0.00660	100%	0.4%
Lead Finish	Matte Tin Over Nickel*	0.00320	Sn	7440-31-5	0.00275	86%	0.2%
			Ni	7440-02-0	0.00045	14%	0.0%

Total Weight  
(g) **1.61204**

\*Tin whisker mitigation strategy is nickel under-plate.



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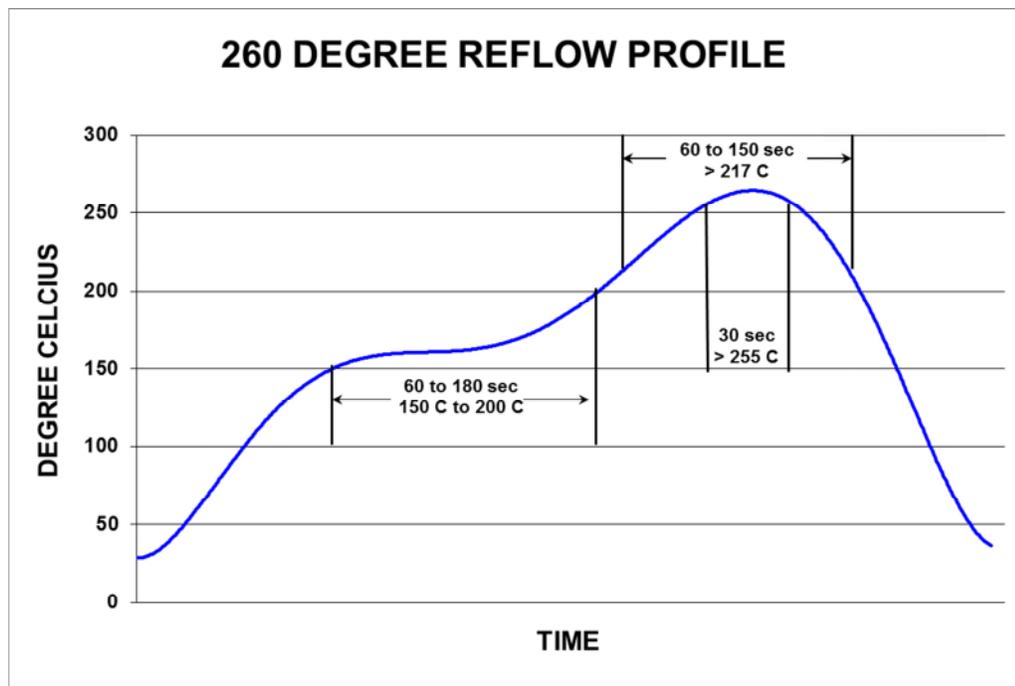
**D2-pak (Long Lead) BOM 1**

Component	Material Name	Material Mass (g)	Element Name Composition	CAS #	Substance Mass (g)	Material Analysis Weight (%)	% of Total Weight
Chip	Silicon	0.01900	Si	7440-21-3	0.01900	100%	1.3%
Encapsulant	Epoxy Resin	0.52800	SiO <sub>2</sub>	7631-86-9	0.46992	89%	31.0%
			Epoxy	90598-46-2	0.05808	11%	3.8%
Lead Frame	Copper	1.04324	Cu	7440-50-8	0.99482	100%	62.4%
			Sn	7440-31-5	0.00100	0%	0.1%
Die Attach	Soft Soldier	0.01200	Pb	7439-92-1	0.01080	95.5%	0.7%
			Sn	7440-74-6	0.00060	2%	0.0%
			Ag	7440-22-4	0.00060	2.5%	0.0%
Wire Bond	Aluminum	0.00660	Al	7429-90-5	0.00660	100%	0.4%
Lead Finish	Matte Tin Over Nickel*	0.00320	Sn	7440-31-5	0.00550	86%	0.2%
			Ni	7440-02-0	0.00090	14%	0.0%

Total Weight  
(g)

**1.56782**

\*Tin whisker mitigation strategy is nickel under-plate.



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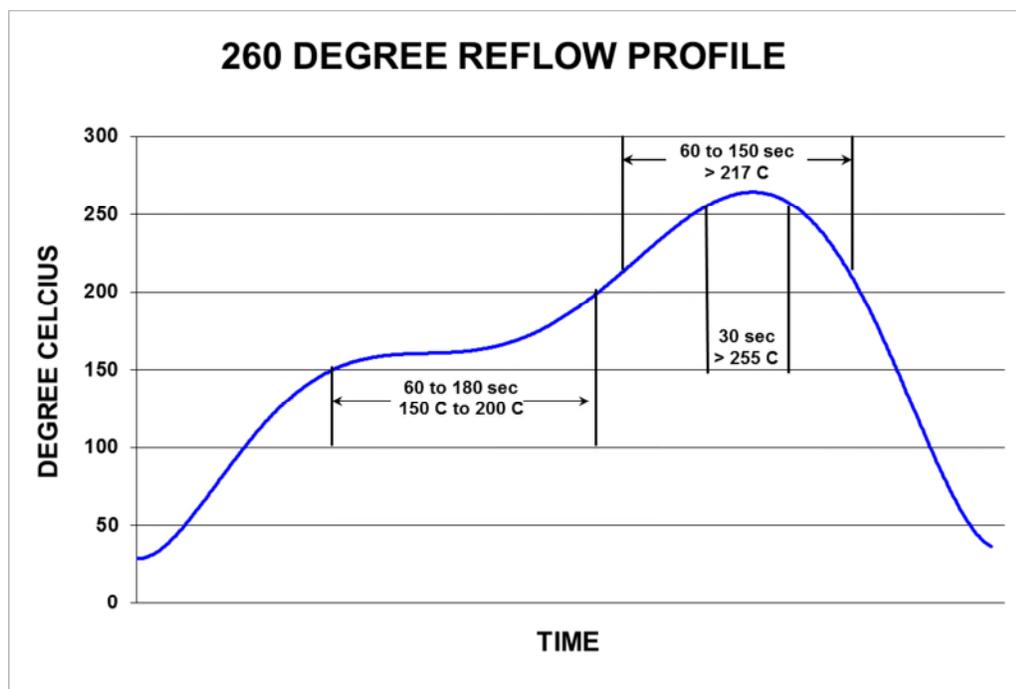
**D2-pak (Long Lead) BOM 2**

Component	Material Name	Material Mass (g)	Element Name Composition	CAS #	Substance Mass (g)	Material Analysis Weight (%)	% of Total Weight
Chip	Silicon	0.01900	Si	7440-21-3	0.01900	100%	1.3%
Encapsulant	Epoxy Resin	0.52800	SiO <sub>2</sub>	7631-86-9	0.46992	89%	31.0%
			Epoxy	90598-46-2	0.05808	11%	3.8%
Lead Frame	Copper	0.99582	Cu	7440-50-8	0.99482	100%	62.4%
			Sn	7440-31-5	0.00100	0%	0.1%
Die Attach	Soft Soldier	0.01200	Pb	7439-92-1	0.01146	95.5%	0.8%
			Sn	7440-74-6	0.00024	2%	0.0%
			Ag	7440-22-4	0.00030	2.5%	0.0%
Wire Bond	Aluminum	0.00660	Al	7429-90-5	0.00660	100%	0.4%
Lead Finish	Matte Tin Over Nickel*	0.00640	Sn	7440-31-5	0.00550	86%	0.2%
			Ni	7440-02-0	0.00090	14%	0.0%

Total Weight  
(g)

**1.56782**

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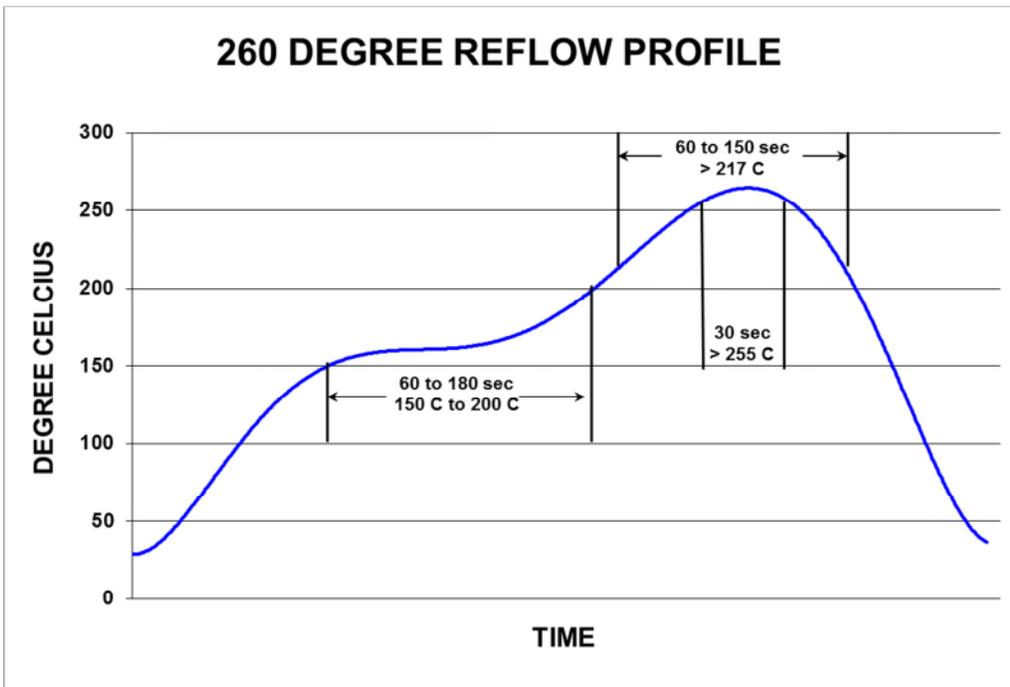


**D2-pak (Long Lead) BOM 3**

Component	Material Name	Material Mass (g)	Element Name Composition	CAS #	Substance Mass (g)	Material Analysis Weight (%)	% of Total Weight
Chip	Silicon	0.01900	Si	7440-21-3	0.01900	100%	1.3%
Encapsulant	Epoxy Resin	0.52800	SiO <sub>2</sub>	7631-86-9	0.46992	89%	31.0%
			Epoxy	90598-46-2	0.05808	11%	3.8%
Lead Frame	Copper	0.99582	Cu	7440-50-8	0.99482	100%	62.4%
			Sn	7440-31-5	0.00100	0%	0.1%
Die Attach	Soft Soldier	0.01200	Pb	7439-92-1	0.01146	95.5%	0.8%
			Sn	7440-74-6	0.00024	2%	0.0%
			Ag	7440-22-4	0.00030	2.5%	0.0%
Wire Bond	Aluminum	0.00660	Al	7429-90-5	0.00660	100%	0.4%
Lead Finish	Matte Tin*	0.00640	Sn	7440-31-5	0.00640	100%	0.2%

Total Weight (g) **1.56782**

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**D2-pak**

Test Definition	Test Conditions	Inspection Interval Class 1 and 2 Products	Total Duration Class 1 and 2 Products	Maximum Whisker Length (µm)
Room Temperature Humidity	30± 2°C/60± 3% RH	1000 hours	4000 hours	20
Temperature Humidity Unbiase	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	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	0/60	0/60	0/60	0/60
Test	500 Cycles	1000 Cycles	1500 Cycles	
Temperature Cycling	0/60	0/60	0/60	