

Intersil's Lead-Free and Green Initiatives



December, 2003

Lead Free/Green Definitions & Drivers



• Definitions

- **Lead Free: Lead Content <0.1wt%**
- **Green: Halide Content and PDD & PBDE < 0.1wt%**
Sb, Pb, Hg, and Cr+6 < 1000 ppm
Cd < 5 ppm

• Drivers

- **Europe: European Commission's Environment Directive (WEEE Directive) emphasizes phase out, collection, recycling, bans the use of lead, and bans halogen flame retardants by July 1, 2006. Countries can shorten the time frame.**
- **Japan: Voluntary compliance with Water Pollution Law, Air Pollution Law, Labor Safety Health Law beginning 2002-2003. Companies allowed to devise their own plan and most seem to be on track for 2003.**
- **US: RCRA (Resource Conservation and Recovery Act) which implements mandatory take back after use (recycle). If lead removed no recycle required.**

Intersil & Industry Lead Free Initiatives



- **Intersil was Chairman of the industry's Lead Free Components Focus Group**
 - Companies participating included: Intersil, Texas Instruments, Amkor, Rockwell, ACI, Photocircuits, Kemet, MicroSemi, Fairchild, Visteon, ON Semiconductor and others
 - Work focused on evaluation of lead-free components and solders at the PCB assembly level
- **Intersil was Chairman of the JEDEC task group efforts on lead-free components**
- **Intersil is Co-Chairman of the Nemi Whisker Test Task Group**
- **Intersil participates in the Soldertec, NEMI, NCMS, IPC, HDPUG and JIEP lead-free efforts**

Intersil Lead Free Initiative



- **Intersil will support customer requests for lead free packaged products**
 - Lead Free products, offered as “Z” part numbers, are lead free but not necessarily Green
 - Lead free samples typically available within 6 weeks ARR
 - Qualifying specific customer requested products in CY02/03
 - Will have qualified all SOP, SOT, QFN, L/TQFP and BGA packages in Pb-free material sets by end of Q1CY'04
 - No generic plans to offer Pb-free PDIP, SIP, PSOP, PLCC or MQFP product but will consider special cases (28ld PLCC)
- **Not all customers want to change to Pb-free lead finish now**
 - High Temp solder reflow may reduce MSL rating by up to 2 levels
 - Dry bake & dry pack required at added cost
- **Intersil will continue to offer products in both SnPb (current) and Pb-free finishes based on customer demand**



Intersil Lead Free Materials



- Intersil has chosen 100% Matte Tin as the Lead-Free termination finish of choice for leadframe based packaging and Sn/Ag/Cu solder balls for all BGA based packaging
- Matte Tin rapidly becoming worldwide lead-free finish of choice
 - Fully compatible with both Pb-free and Pb based solders used at the customer PCB assembly level
 - Favorable cost and simplified processing compared to SnBi and NiPdAu alternative lead-free finishes
- Intersil has chosen special mold compounds and die attach epoxies for all lead-free surface mount packages. Some package styles may have a slight price adder for Lead Free material set.

Intersil Green Initiative

Intersil will support customer requests for green packaged products

- Green products are by definition lead free plus other requirements
- Green samples typically available within 6 weeks ARR
- Qualifying specific customer requested products in CY02/03
- Will have qualified all SOP, SOT, QFN and L/TQFP packages in Green material sets by Q1CY'04
- No generic plans for Green PDIP, SIP, PSOP, MQFP, PLCC or **BGA** packaged products(lack of demand) but will consider special cases
- Not all customers want to change to Green products now
 - Special Green material sets may have cost adders
- Intersil will continue to offer products in both standard and Green material sets based on customer demand
- Intersil has chosen halogen free (**green**) mold compounds and die attach epoxies for all Pb-free **lead frame based** surface mount packages. BGA packages may have significant price adder for GREEN laminate material set.



Intersil Lead Free Qual Devices

Style	Leads	Mkt P/N	Style	Leads	Mkt P/N	Style	Leads	Mkt P/N
BGA	192	ISL3871IK18	SOIC	8	HIP2101IR	QFN	32	HC55185ECP
	256	ISL3872IK18		8	HIP2100IR		32	ISL4238EIR
	256	ISL3880IK		8	ISL6207CB		32	ISL6405IR
	256	ISL3886IK		8	TA52607BR48		38	EL6295CL
SOT	5	ISL43110IH-T		14	HA4314BCB		56	ISL3684AIR
	5	EL2170CW-2		16	EL4583CS	LQFP	208	ISL3871
	8	EL7513IWT		16	EL2090CM	PLCC	28	HC55185ECM
SSOP	28	EL5324IRE		20	HIP6301CB			
msop	10	EL5421CY		24	HC5503PRCB			
qsop	16	EL6273DCU		28	ISL6551IB			
qsop	24	EL6274CU		28	HIN241IB			
qsop	28	ISL6225A	QFN	16	ISL3084IR			
tssop	28	EL5325IR		16	ISL3984IR			
ssop	28	HIN241CA		10	ISL6292 2CR3			
tssop	16	ISL6406IV		24	EL1528CL			
tssop	20	HIP6004BCV		24	ISL6413			
tssop	28	EL5427CR		32	EL6119CL			
tssop	28	EL5325IR		32	ISL6244CR			

43 qual lots 12-10 -03 26 done; 17 to go

- Complete
- Phase I: Priority customer requests
- Phase II: Additional customer requests
- Phase III: Additional generic quals required to cover pkg / tech families

Intersil Pb-Free Development Schedule



Updated 12/10/2003	Q4CY02			Q1CY03			Q2CY03			Q3CY03			Q4CY03			Q1CY04			Q2CY04		
	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
Japan Customers																					
Step 1: High Temp Reflow						■															
Step 2: Lead Free																					■
EU Mandate (Lead Free & Green)	(July 1, 2006)																				
Lead Free Product Qualifications																					
Phase I Priority Customer Quals	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Phase II Additional Customer Quals							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Phase III Additional Generic Pkg Quals													■	■	■	■	■	■	■	■	■
Phase IV Improved 260C MSL																					
A. Plasma cleaning							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
B. Die attach mat'l & bond line tkns							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C. Leadframe prep																					
D. Next gen mold compounds																					
E. Die passivation mat'ls																					
Decision to implement improvements																					
NEMI Whisker Test Method	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■