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PCN # 20040411

DESIGN/PROCESS CHANGE NOTIFICATION -- FINAL

This is to inform you that a design and/or process change will be made to the following product(s). This notification is for your information and concurrence.

If you require data or samples to qualify this change, please contact **Fairchild Semiconductor within 30 days of receipt of this notification.**

If you have any questions concerning this change, please contact:

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PCN Type: Lead Finish Composition

Effectivity

Expected 1st Device Shipment Date: 6/16/2004
Earliest Year/Work Week of Changed Product: 0425
(Note: Package marking may differ from this format)

Product ID (Description):

This PCN is in addition to PCN 20032701, Fairchild's general announcement of a conversion to lead-free plating. PCN 20032701 was limited to those products for which the only change is the plating material. In addition to a change to lead-free plating, the products associated with this new PCN will also include a change to the die attach epoxy and the mold compound, or plastic encapsulant.

This change will affect only those products manufactured in the 14-, 16-, 20-, 24-, 48-, and 56-lead TSSOP as well as Simflow 14-, and 16-lead SOIC at Fairchild's facility in Penang, Malaysia. These devices can be easily identified by (i) the change in year datecode from numeric indicator to alpha character as a designation of lead free products and (ii) the change in the first character of the die run code as a designation of pre-plated frame (ppf) assembly process.

Conversion to NiPdAu ppf will be conducted in phases, lead count by lead count. The manufacture of products with tin-lead plating will be completely discontinued as the conversion takes place. The schedule for conversion is as follows:

PACKAGE	CONVERSION DATE CODE	CONVERSION YYWW
14-lead TSSOP	44	0424
16-lead TSSOP	44	0424
20-lead TSSOP	45	0430
24-lead TSSOP	45	0430
48-lead TSSOP	45	0430
56-lead TSSOP	45	0430
14-lead SOIC	46	0436
16-lead SOIC	47	0442

This PCN is intended to be more specific for Low Pin Count TSSOP (14-,16-,20-,24-lead) . A revision PCN specifically for High Pin Count TSSOP (48-,56-lead) and Simflow SOIC 14- /16- Lead will be issued in subsequent series as and when qualification data is available.

See affected FSID below for a list of products in 14-,16-,20-,24-lead TSSOP that are specific to this notification.

Description of Change:

Existing tin-lead plating material will be converted to NiPdAu ppf (Nickel-Palladium with gold pre-plated). Changes will also be made to other package materials in order to ensure the package is capable of passing MSL Level 1 at 260 deg C. The material differences are as shown below:

(i) Low Pin Count TSSOP (14-,16-,20-,24 Lead)

MATERIAL	BEFORE CHANGE	AFTER CHANGE
Base lead frame material	Copper alloy (C7025)	Copper alloy (C7025)
Plating material (pre-plated)	Tin-lead (post plated)	Nickel-palladium, gold
Die attach epoxy	Poly 6 (Hitachi)	QMI519 (Henkel-Loctite)
Mold compound	KMC-289 (Shin-Etsu)	KMC288P (Shin-Etsu)

(ii) High Pin Count TSSOP (48-,56- Lead)

MATERIAL	BEFORE CHANGE	AFTER CHANGE
Base lead frame material	Copper alloy (C7025)	Copper alloy (C7025)
Plating material (pre-plated)	Tin-lead (post-plated)	Nickel-palladium, gold
Die attach epoxy	JM2000 (Ablestik)	QMI519 (Henkel-Loctite)
Mold compound	EME7351LS (Sumitomo)	KEG3000D (Kyocera)

Kyocera mold compound KEG3000D contains no flame retardant but utilize the high aromatic content of the resin and the high filler loading as flame retardant system, not Phosphorus.

(iii) Simflow SOIC 14-,16- Lead

MATERIAL	BEFORE CHANGE	AFTER CHANGE
Base lead frame material	Copper alloy (C194)	Copper alloy (C194)
Plating material (pre-plated)	Tin-lead (pre-plated)	Nickel-palladium, gold
Die attach epoxy	JM2000 (Ablestik)	QMI519 (Henkel-Loctite)
Mold compound	MG40F-2000(Henkel-Loctite)	GR828FC (Henkel-Loctite)

Effect of Change:

This change will not affect the form, fit or function of the products. The products will continue to meet all the existing visual, dimensional, electrical, quality, and reliability specifications.

Product identification and traceability will be maintained by use of the product date code. There may be a small number of mixed shipment containing both lead free and tin-lead products during the transition period as inventories of tin-lead products are depleted. However, the lead free and tin-lead products will not be mixed in the same reel within the same shipment.

Qualification:

Three separate batches of each for NiPdAu frames, Shin-Etsu KMC-288P mold compound and Henkel-Loctite QMI519 die attach epoxy, were evaluated to qualify the materials used in TSSOP 14/16/20/24 leads package assembled in Fairchild Semiconductor, Penang. All reliability stress test requirements for MSL level 1 at 260 degree C, have been successfully met and therefore, NiPdAu ppf assembly is qualified for production use.

Qual/REL Plan Numbers

Qual Results: FEP20040006

Test: Autoclave Test (ACLV)Preconditioning 260C Level 1							
Test Request	Device	Sbgrp	TP	Duration	Sample Size	Rejects	
REP200400058	74ABT652CMTC	A	1	96	77	0	
REP200400059	74ACT04MTC	A	1	96	77	0	
REP200400060	74LVTH125MTC	A	1	96	77	0	
REP200400061	RA3906T	A	1	96	77	0	
Test: High Temperature Storage test (bake) (HTSL)							
Test Request	Device	Sbgrp	TP	Duration	Sample Size	Rejects	
REP200400058	74ABT652CMTC	A	1	168	77	0	
REP200400058	74ABT652CMTC	A	2	1000	77	0	
REP200400059	74ACT04MTC	A	1	168	77	0	
REP200400059	74ACT04MTC	A	2	1000	77	0	
REP200400060	74LVTH125MTC	A	1	168	77	0	
REP200400060	74LVTH125MTC	A	2	1000	77	0	
REP200400061	RA3906T	A	1	168	77	0	
REP200400061	RA3906T	A	2	1000	77	0	
Test: Temperature Humidity Bias Test (THBT)Preconditioning 260C Level 1							
Test Request	Device	Sbgrp	TP	Duration	Sample Size	Rejects	
REP200400058	74ABT652CMTC	A	1	168	77	0	
REP200400058	74ABT652CMTC	A	2	1000	77	0	
REP200400059	74ACT04MTC	A	1	168	77	0	
REP200400059	74ACT04MTC	A	2	1000	77	0	
REP200400060	74LVTH125MTC	A	1	168	77	0	
REP200400060	74LVTH125MTC	A	2	1000	77	0	
REP200400061	RA3906T	A	1	168	77	0	
REP200400061	RA3906T	A	2	1000	77	0	
Test: Temperature Cycle (TMCL) Preconditioning 260C Level 1							

Test Request	Device	Sbgrp	TP	Duration	Sample Size	Rejects
REP200400058	74ABT652CMTC	A	1	500	77	0
REP200400059	74ACT04MTC	A	1	500	77	0
REP200400060	74LVTH125MTC	A	1	500	77	0
REP200400061	RA3906T	A	1	500	77	0

Pull Test Result (spec > 2.6g):

Test Request	Device	Sbgrp	Ave
REP200400058	74ABT652CMTC	A	8.06g
REP200400059	74ACT04MTC	A	8.03g
REP200400060	74LVTH125MTC	A	7.45g
REP200400061	RA3906T	A	7.72g

Ball Shear Result (spec > 15g):

Test Request	Device	Sbgrp	Ave
REP200400058	74ABT652CMTC	A	35.12g
REP200400059	74ACT04MTC	A	30.12g
REP200400060	74LVTH125MTC	A	27.99g
REP200400061	RA3906T	A	29.68g

Die Shear Result (spec > 0.4g):

Test Request	Device	Sbgrp	Ave
REP200400058	74ABT652CMTC	A	0.43g
REP200400059	74ACT04MTC	A	0.56g
REP200400060	74LVTH125MTC	A	0.96g
REP200400061	RA3906T	A	0.46g

Mold Void (MV), Wire Sweep (WS), Package Dimension (PD), Resistance to Solder Heat (RSDH):

Test Request	Device	Sbgrp	MV	WS	PD	RSDH
REP200400058	74ABT652CMTC	A	Pass	Ave 3.1%	Pass	0/5
REP200400059	74ACT04MTC	A	Pass	Ave 2.7%	Pass	0/5
REP200400060	74LVTH125MTC	A	Pass	Ave 2.4%	Pass	0/5
REP200400061	RA3906T	A	Pass	Ave 2.7%	Pass	0/5

Solderability Test:

Test Request	Device	Sbgrp	SnAgCu 245C	SnPb 245C
REP200400058	74ABT652CMTC	A	Pass	Pass
REP200400059	74ACT04MTC	A	Pass	Pass
REP200400060	74LVTH125MTC	A	Pass	Pass
REP200400061	RA3906T	A	Pass	Pass

Moisture Sensitivity Test, MSL:

Test Request	Device	Sbgrp	Peak Temp 260C Level 1
REP200400058	74ABT652CMTC	A	0/11
REP200400059	74ACT04MTC	A	0/11
REP200400060	74LVTH125MTC	A	0/11

REP200400061 RA3906T A 0/11

Gate Leakage Test:

Device	Package/Leads	+400 Volt	-400 Volt
74VHC02MTC	TSSOP 14	0/3	0/3
74LVX4245MTC	TSSOP 24	0/3	0/3

Conclusion

All the reliability tests completed with no failures. Therefore, NiPdAu lead free ppf for TSSOP LPC packages is qualified in FSPM.

Affected FSIDs

74ABT125CMTC	74ABT125CMTCX	74ABT126CMTC
74ABT126CMTCX	74ABT2240CMTC	74ABT2240CMTCX
74ABT2244CMTC	74ABT2244CMTCX	74ABT240CMTC
74ABT240CMTCX	74ABT241CMTC	74ABT241CMTCX
74ABT244CMTC	74ABT244CMTCX	74ABT245CMTC
74ABT245CMTCX	74ABT2541CMTC	74ABT2541CMTCX
74ABT273CMTC	74ABT273CMTCX	74ABT2952CMTC
74ABT2952CMTCX	74ABT373CMTC	74ABT373CMTCX
74ABT374CMTC	74ABT374CMTCX	74ABT377CMTC
74ABT377CMTCX	74ABT541CMTC	74ABT541CMTCX
74ABT543CMTC	74ABT543CMTCX	74ABT573CMTC
74ABT573CMTCX	74ABT574CMTC	74ABT574CMTCX
74ABT646CMTC	74ABT646CMTCX	74ABT652CMTC
74ABT652CMTCX	74AC00MTC	74AC00MTCX
74AC02MTC	74AC02MTCX	74AC04MTC
74AC04MTCX	74AC08MTC	74AC08MTCX
74AC109MTC	74AC109MTCX	74AC10MTC
74AC10MTCX	74AC11MTC	74AC11MTCX
74AC125MTC	74AC125MTCX	74AC138MTC
74AC138MTCX	74AC139MTC	74AC139MTCX
74AC14MTC	74AC14MTCX	74AC151MTC
74AC151MTCX	74AC153MTC	74AC153MTCX
74AC157MTC	74AC157MTCX	74AC161MTC
74AC161MTCX	74AC163MTC	74AC163MTCX
74AC169MTC	74AC169MTCX	74AC174MTC
74AC174MTCX	74AC175MTC	74AC175MTCX
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74AC20MTCX	74AC240MTC	74AC240MTCX
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74AC244MTCX	74AC245MTC	74AC245MTCX
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74AC377MTCX	74AC521MTC	74AC521MTCX
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74AC574MTC	74AC574MTCX	74AC74MTC
74AC74MTCX	74AC86MTC	74AC86MTCX
74ACQ573MTC	74ACQ573MTCX	74ACT00MTC
74ACT00MTCX	74ACT02MTC	74ACT02MTCX
74ACT04MTC	74ACT04MTCX	74ACT08MTC
74ACT08MTCX	74ACT109MTC	74ACT109MTCX
74ACT10MTC	74ACT10MTCX	74ACT125MTC
74ACT125MTCX	74ACT1284MTC	74ACT1284MTCX
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74VHCT244AMTC
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74VHCT374AMTC
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FAN5609MTCX
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FIN1032MTC
FIN1047MTCX
FIN1102MTC
FIN1104MTCX
FIN1532MTC
FM3540CMT14X
FM3560MT20X
FM3570MT20
FM3580MT20X
FMS72510MTC
FSAV330MTCX
FST3126MTC
FST32253MTCX
FST3245MTC
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FST3345MTC
FST3383MTCX
FST6800MTC
FSTD3125MTCX
FSTU3253MTC
FSTU3257MTCX
FSTU6800MTC
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GTL P6C817MTC
GTL P8T306MTCX
MM74HC00MTC
MM74HC02MTCX
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MM74HC123AMTCX
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74VHCT08AMTC
74VHCT138AMTCX
74VHCT240AMTC
74VHCT244AMTCX
74VHCT373AMTC
74VHCT374AMTCX
74VHCT541AMTC
74VHCT573AMTCX
74VHCT74AMTC
74VHCU04MTCX
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FAN5066MTCX
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FAN5232MTC
FAN5233MTCX
FAN5235MTC
FAN5242MTCX
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FIN1031MTC
FIN1032MTCX
FIN1048MTC
FIN1102MTCX
FIN1531MTC
FIN1532MTCX
FM3540SMT14
FM3565MT20
FM3570MT20X
FMS72509MTC
FMS72510MTCX
FST3125MTC
FST3126MTCX
FST3244MTC
FST3245MTCX
FST3257MTC
FST3345MTCX
FST3384MTC
FST6800MTCX
FSTU3125MTC
FSTU3253MTCX
FSTU3384MTC
FSTU6800MTCX
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GTL P6C817MTCX
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74VHC86MTCX
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74VHCT74AMTCX
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FAN5232MTCX
FAN5234MTC
FAN5235MTCX
FAN5609MTC
FIN1019MTCX
FIN1022MTC
FIN1031MTCX
FIN1047MTC
FIN1048MTCX
FIN1104MTC
FIN1531MTCX
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FM3580MT20
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FSAV330MTC
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FST32253MTC
FST3244MTCX
FST3253MTC
FST3257MTCX
FST3383MTC
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