Integrated Device Technology, Inc.
2975 Stender Way, Santa Clara, CA - 95054

PRODUCT/PROCESS CHANGE NOTICE (PCN)

PCN #: **A-0408-01 REV.1** DATE: 10/22/2004
Product Affected: PQFP package family
(see attachment for affected part #s).

Date Effective: 11/17/2004

MEANS OF DISTINGUISHING CHANGED DEVICES:
- ☐ Product Mark
- ☒ Back Mark — Lot Number will have "N1" suffix
- ☐ Date Code
- ☐ Other

Contact: Geoffrey Cortes
Title: Manager, Corporate Quality & Reliability
Phone #: (408) 492-8321
Fax #: (408) 727-2328
E-mail: Geoffrey.Cortes@idt.com

Attachment: ☒ Yes ☐ No

Samples: See attachment

DESCRIPTION AND PURPOSE OF CHANGE:

- ☐ Die Technology
- ☐ Wafer Fabrication Process
- ☐ Assembly Process
- ☐ Equipment
- ☒ Material
- ☐ Testing
- ☐ Manufacturing Site
- ☐ Data Sheet
- ☐ Other

REV.1 Revised the material set information for PM64 package on page 1 of attachment. The PCN effective date will be the same as the original PCN.

IDT has qualified the PQFP package family using new mold compound material from Sumitomo and a new die attach material from Ablestik. This notification is to advise our customer of qualification and addition of new assembly materials. The new mold compound and die attach material can meet 260ºC peak reflow temperature requirements. Please see attachment for qualification data and additional details.

RELIABILITY/QUALIFICATION SUMMARY:

Please see attached reliability qualification data.

CUSTOMER ACKNOWLEDGMENT OF RECEIPT:

IDT records indicate that you require written notification of this change. Please use the acknowledgement below or E-Mail to grant approval or request additional information. If IDT does not receive acknowledgement within 30 days of this notice it will be assumed that this change is acceptable.
IDT reserves the right to ship either version manufactured after the process change effective date until the inventory on the earlier version has been depleted.

Customer: ____________________ ☐ ***Approval for shipments prior to effective date.***

Name/Date: ____________________ E-Mail Address: ____________________

Title: ____________________ Phone# /Fax# : ____________________

CUSTOMER COMMENTS: ____________________

IDT ACKNOWLEDGMENT OF RECEIPT:

RECD. BY: ____________________ DATE: ____________________

Integrated Device Technology, Inc.
2975 Stender Way, Santa Clara, CA - 95054

PRODUCT/PROCESS CHANGE NOTICE (PCN)

ATTACHMENT - PCN #: A-0408-01 REV.1

PCN Type: Assembly Material Change
Data Sheet Change: None
Detail Of Change:

IDT has qualified the PQFP package family using new mold compound material from Sumitomo and a new die attach material from Ablestik. The successful completion of this qualification has improved IDT's support of current and future production needs for components that can meet 260ºC peak reflow temperature requirements. There is no change in Moisture Sensitive Level (MSL). Products will be shipped at the existing MSL and each shipment is labeled with the correct MSL. Please refer to the label on each shipment for MSL information. Customer should not be adversely impacted by this change.

Description	Affected Package Types	Material	
		Existing	Add
Mold Compound Material	DB44, PM80/100/144/160/208, PX128, PU128/144	Sumitomo 6300 series	Sumitomo EME-G700 series
	DN52 / PM64	Sumitomo 6650RA	Sumitomo EME-G700 series
Die Attach Material	DB44, PM80/100/144/160/208, PX128, PU128/144	Ablestik 84-1MISR4	Ablestik 3230
	DN52 / PM64	Ablestik 8361J	Ablestik 2200

The affected products are as follow:

Industry Package	IDT Part No	Industry Package	IDT Part No	Industry Package	IDT Part No
PQFP 44	IDT728980DB	PQFP 64	IDT821054PQF	PQFP 144	IDT77V1253L25PGI
PQFP 44	IDT728981DB	PQFP 64	IDT821064PQF	PQFP 144	IDT77V1254L25PGI
PQFP 44	IDT728985DB	PQFP 100	IDT7290820PQF	PQFP 144	IDT77V1264L200PG
PQFP 44	IDT72V8980DB	PQFP 100	IDT72V70200PQF	PQFP 144	IDT77V1264L200PGI
PQFP 44	IDT72V8981DB	PQFP 100	IDT72V90823PQF		
PQFP 44	IDT72V8985DB	PQFP 128	IDT821068PX		
PQFP 44	IDT72V8988DB	PQFP 128	IDT82V2108PX		
PQFP 52	IDT821034DN	PQFP 144	IDT77V1253L25PG		

Note: For T & R (shipping method) "8" is added to the p/n and for industrial grade "I" is added to the part number.

Samples are not built ahead of the change and are limited to selective devices. Please contact your local filed sales representative for sample availability and additional information.

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PRODUCT/PROCESS CHANGE NOTICE (PCN)

ATTACHMENT - PCN #: A-0408-01 REV.1

Qualification Plan #: P02-11-11
Test Vehicle: IDT82V2108PX/IDT821034DN
Qualification Test Plan and Results:

Test Description	Test Method	Sample Size / # of Fails	Test Results Pkg - PX128 IDT82V2108PX	Test Results Pkg - DN52 IDT821034DN
* High Accelerated Stress Test (Biased, 130 °C/85% RH, 100 Hrs)	JESD22-A110-B	45/0	45/0	45/0
* Temperature Cycling (-65 °C to 150 °C, 500 cycle)	JESD22-A104-B	45/0	45/0	45/0
* Auto Clave (121 °C, 2 ATM, 168 Hrs)	JESD22-A102-C	45/0	45/0	45/0
Life Test (125 °C, 1000 Hrs)	JESD22-A108-B	77/0	77/0	77/0
High Temp Stabilization Bake (150 °C, 1000 Hrs)	JESD22-A103-B	77/0	77/0	77/0
Moisture Sensitivity Classification	J-STD-020B	90/0	90/0	90/0
Internal Visual Inspection	MIL-STD-883 Method - 2010	5/0	5/0	5/0
External Visual Inspection	JESD22-B101	25/0	25/0	25/0
X-ray Examination	MIL-STD-883 Method - 2015	45/0	45/0	45/0
Bond Pull Test	MIL-STD-883 Method - 2011	5/0	5/0	5/0
Lead Integrity Test	JESD22-B105C	3/0	3/0	3/0
Solderability Test	JESD22-B102-C J-STD-002	5/0	5/0	5/0
Bake & Ball Shear Strength	JESD22-B116	5/0	5/0	5/0
Physical Dimensions	JESD22-B100-B	5/0	5/0	5/0
Die Shear Strength	MIL-STD-883 Method - 2019	5/0	5/0	5/0

Notes: * Test requires moisture pre-conditioning sequence per JESD22-A113C.

SUMITOMO BAKELITE
SUMIKON®

EME-G700

MULTI-AROMATIC RESIN
Br/Sb FREE
FOR Pb FREE PKG
LOW WATER ABSORPTION

EME-G700

TYPICAL PROPERTIES:

ITEM	TEST METHOD	UNIT	VALUES
SPIRAL FLOW	SB-U-03-003	cm	110
GEL TIME (at 175°C)	SB-U-03-005	sec	30
THERMAL EXPANSION ∝1	SB-U-02-002	X 10^{-5} 1/°C	1.2
THERMAL EXPANSION ∝2	SB-U-02-002	X 10^{-5} 1/°C	4.9
Tg	SB-U-02-002	°C	130
THERMAL CONDUCTIVITY	SB-U-02-004	W/m •°C	88x 10^{-2}
FLEXURAL STRENGTH	SB-U-01-001	N/ mm^2	
(at 25°C)			170
(at 240°C)			21
FLEXURAL MODULUS	SB-U-01-002	X 10^2 N/mm^2	
(at 25°c)			190
(at 240°C)			6.0
SPECIFIC GRAVITY	SB-U-03-018	--------------	1.95
VOLUME RESISTIVITY (at 150°c)	SB-U-00-004	Ω - cm	1 x 10^{12}
UL FLAME CLASS	SB-U-03-003	UL-94	V-0
WATER ABSORPTION (boiling, 24 h)	SB-U-03-002	% weight gain	0.15
EXTRACTED Na^+	SB-U-04-043	ppm	1
EXTRACTED Cl^-	SB-U-04-043	ppm	5

TYPICAL, NOT GUARANTEED PROPERTIES

MOLDING AND POST MOLD CURE CONDITIONS:

	STANDARD	RANGE
TRANSFER PRESSURE	80 x10^5 Pa	70-120 x10^5 Pa
MOLD TEMPERATURE	180°C	175-185°C
CURE TIME (C or A)#	A/90 sec	70-120 sec
POST-MOLD CURE TEMP	175°C	170-180°C
POST-MOLD CURE TIME	6 h	4-8 h

#Conventional or Auto

rev. Feb.'03

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SUMITOMO BAKELITE CO., LTD.
Tennoz Parkside Building, 5-8 Higashi-Shinagawa, 2-Chome Shinagawa-ku, Tokyo 140, Japan

Ablestik
a National Starch & Chemical Company

ABLEBOND® 2200

SNAP CURE LOW STRESS DIE ATTACH ADHESIVE

DESCRIPTION

ABLEBOND® 2200 low stress die attach adhesive is designed for high reliability metal leadframe packaging applications. This adhesive, which is based on Ablestik's proprietary hybrid chemistry, features low modulus and increased hot wet die shear strength for improved JEDEC performance.

FEATURES

- Low stress
- Snap/spot cure
- Improved JEDEC performance
- Excellent hot/wet adhesion to metal leadframes
- Low moisture absoption
- Bondline thickness control
- Solvent-free

Typical Uncured Properties	*ABLEBOND 2200*	*Test Description*	*Test Method*
Filler Type	Silver		
Viscosity @ 25ºC	9000 cP	Brookfield CP51 @ 5 rpm	ATM-0018
Thixotropic Index	4.8	Viscosity @ 0.5/Viscosity @ 5 rpm	ATM-0089
Est Work Life @ 25ºC	24 hours	25% increase in viscosity @ RT	ATM-0087
Est Storage Life @ -40ºC	1 year		ATM-0068

Cure Process Data	*ABLEBOND 2200*	*Test Description*	*Test Method*
Weight Loss on Cure	1.7%	10 x 10 mm Si die on glass slide	ATM-0031
Recommended Cure Condition	Fast Oven Cure	30 minutes @ 175ºC	
Alternate Cure Condition	Hot Plate Spot Cure	30 seconds @ 200ºC	

Snap Cure Profile:

Zone Number	1	2	3	4	5	6	7	Time
Temp ºC	165	185	200	220	220	220	220	60 sec
N_2 Flow	10 liters/minute @ 150ºC							

PHYSIOCHEMICAL PROPERTIES - Post Cure		*ABLEBOND 2200*	*Test Description*	*Test Method*
Ionics	Chloride Sodium Potassium	< 5 ppm < 5 ppm < 5 ppm	Teflon flask, 5 gm sample/20-40 mesh, 50 gm DI water, 100ºC for 24 hours	ATM-0007
Water Extract Conductivity		26 μmhos/cm	Conductometer	ATM-0044
pH		4.8	pH meter	ATM-0002
Weight Loss @ 300ºC		1.4%	Thermogravimetric analysis	ATM-0073

The figures shown above are typical values only. If you need to write a specification, please request our current Standard Release Specification.

2200

PHYSIOCHEMICAL PROPERTIES - Post Cure	ABLEBOND 2200	Test Description	Test Method
Glass Transition Temperature	-15ºC	TMA penetration mode	ATM-0058
Coefficient of Thermal Expansion Below Tg Above Tg	 66 ppm/ºC 290 ppm/ºC	TMA expansion mode	ATM-0055
Dynamic Tensile Modulus @-65ºC @ 25ºC @ 150ºC @ 250ºC	 2600 MPa (370,000 psi) 170 MPa (24,000 psi) 81 MPa (12,000 psi) 120 MPa (17,000 psi)	Dynamic mechanical thermal analysis (DMTA) using <0.5mm thick sample	ATM-0112
Moisture Absorption @ Saturation	0.24%	Dynamic vapor sorption after 85ºC/85% RH exposure	ATM-0093

THERMAL/ELECTRICAL PROPERTIES - Post Cure	ABLEBOND 2200	Test Description	Test Method
Thermal Conductivity	2.0 W/mK	C-MATIC conductance tester	ATM-0017
Volume Resistivity	Oven Cured: 0.001 ohm-cm Snap Cured: 0.0005 ohm-cm	4-point probe	ATM-0020

MECHANICAL PROPERTIES - Post Cure	ABLEBOND 2200	Test Description	Test Method
Die Shear Strength @ 25ºC	7.0 kg_f/die	2 x 2mm (80 x 80 mil) Si die on Ag/Cu leadframe	ATM-0052
Die Shear Strength (kg_f/die) vs. Temperature	@25ºC: 12 @150ºC: 7.0 @200ºC: 6.2 @250ºC: 4.7	3 x 3 mm (120 x 120 mil) Si die on Ag/Cu leadframe	ATM-0052
Die Shear Strength (kg_f/die) after 85ºC/85% RH exposure for 168 hours	@25ºC: 16 @150ºC: 6.2 @200ºC: 6.2 @250ºC: 5.6	3 x 3 mm (120 x 120 mil) Si die on Ag/Cu leadframe	ATM-0052
Chip Warpage @ 25ºC vs. Chip Size	Post Cure: 15 µm + Wirebond (1 min @ 250ºC): 18 µm + Post Mold Bake (4 hrs @ 175ºC): 18 µm	12.7 x 12.7 x0.38mm (500 x 500 x 15 mil) Si die on 0.2mm (8 mil) thick Ag/Cu LF	ATM-0059

APPLICATION GUIDELINES

SHIPMENT

This Ablestik product is packed and shipped in dry ice at –80ºC. Inside every dry ice shipment of Ablestik's products is a small packet containing the ABLECUBE. This is a small blue cube which retains its shape at –40ºC. If the ABLECUBE is exposed to temperatures higher than –40ºC, the cube will melt.

Please check the state of the ABLECUBE to ensure the integrity of the shipment. If the ABLECUBE has melted upon Receiving inspection, place the entire shipment in a –40ºC freezer and contact your Ablestik Customer Service or Sales Representative.

UNPACKING

Transfer the syringes from the dry ice to a –40ºC freezer without ANY delays. Freeze-thaw voids will form in the syringes if the syringes are repeatedly thawed and refrozen.

STORAGE

This Ablestik product must be stored at –40ºC. The shelf life of the material is only valid when the material has been stored at the specified storage condition. Incorrect storage conditions will degrade the performance of the material in both handling (e.g. dispensing or screen printing) and final cured properties.

THAWING

Allow the container to reach room temperature before use. After removing from the freezer, set the syringes to stand vertically while thawing. Refer to the Syringe Thaw Time chart for the thaw time recommendation.

DO NOT open the container before contents reach ambient temperature. Any moisture that collects on the thawed container should be removed prior to opening the container.

DO NOT re-freeze. Once thawed to room temperature, the adhesive should not be re-frozen.

ADHESIVE APPLICATION

Thawed adhesive should be immediately placed on dispense equipment for use. If the adhesive is transferred to a final dispensing reservoir, care must be exercised to avoid entrapment of contaminants and/or air into the adhesive.

Adhesive must be completely used within the product's recommended work life of 24 hours.

Apply enough adhesive to achieve a 25-50 μm (1-2 mil) wet bondline thickness, dispensed with approximately 25% - 50% filleting on all sides of the die. Alternate dispense amounts may be used depending on the application requirements. Star or crossed shaped dispense patterns will yield fewer bondline voids than the matrix style of dispense pattern.

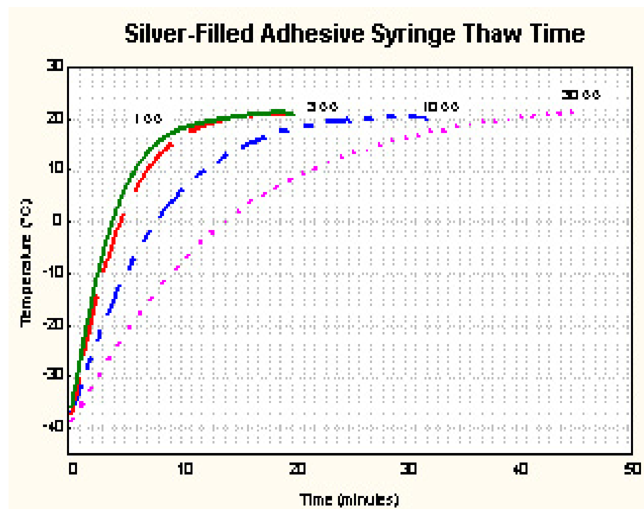
Contact your Ablestik Technical Service Department for detailed recommendation on adhesive application, including dispensing.

CURE

This adhesive can be cured in box or in-line ovens. The recommended box oven cure temperature for this adhesive is 175ºC.

AVAILABILITY

ABLEBOND® adhesives are packaged in syringes or jars per customer specification. Available package sizes range from 1cc to 30cc and 1 ounce to 1 pound. For details, refer to the Ablestik Standard Package Data Set or contact your Customer Service Representative.



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For a technical contact nearest you, visit
www.ablestik.com

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ABLEBOND® 3230

LOW STRESS CONDUCTIVE DIE ATTACH ADHESIVE

DESCRIPTION

ABLEBOND® 3230 low stress, electrically conductive die attach adhesive is designed for high reliability packaging applications. This electrically conductive adhesive offers improved JEDEC performance, fast oven cure, and excellent adhesion to copper. It can be used in various package sizes.

FEATURES

- Low stress
- Improved JEDEC performance
- Fast oven cure
- Excellent adhesion to copper

TYPICAL UNCURED PROPERTIES		TEST DESCRIPTION	TEST METHOD
Filler Type	Silver		
Viscosity @ 25°C	9,000 cps	Brookfield CP-51 @ 5 rpm	PT-42
Thixotropic Index	5.6	Viscosity @ 0.5/Viscosity @ 5 rpm	PT-61
Estimated Work Life @ 25°C	24 hours	25% increase in viscosity @ RT	PT-59
Estimated Storage Life @ -40°C	1 year		PT-13
CURE PROCESS DATA			
Weight Loss on cure	3.9%	10 x 10 mm Si die on glass slide	PT-80
Recommended Cure Condition	30 minute ramp to 175°C; hold at 175°C for 15 minutes		

Typical properties are not intended to be used as specification limits. If you need to write a specification, please request our Standard Release Specification.

07/01

PHYSIOCHEMICAL PROPERTIES - POST CURE			TEST DESCRIPTION	TEST METHOD
Ionics	Chloride	5 ppm	Teflon flask 5 gm sample/ 20-40 mesh 50 gm DI water 100°C for 24 hours	CT-13
	Sodium	5 ppm		
	Potassium	1 ppm		
Glass Transition Temperature (Tg)		37°C	TMA penetration mode	MT-14
Coefficient of Thermal Expansion			TMA expansion mode	MT-9
	Below Tg	80 ppm/°C		
	Above Tg	205 ppm/°C		
Dynamic Tensile Modulus			Dynamic mechanical thermal analysis using <0.5 mm thick sample	MT-12
	@ -65°C	3500 MPa (510 Kpsi)		
	@ 25°C	2900 MPa (430 Kpsi)		
	@ 150°C	69 MPa (10 Kpsi)		
	@ 250°C	90 MPa (13 Kpsi)		
Moisture Absorption @ Saturation		0.29%	Dynamic vapor sorption after 85°C/85% RH exposure	PT-65
THERMAL/ELECTRICAL PROPERTIES - POST CURE				
Thermal Conductivity		0.6 W/mK	Laser flash	PT-96
Volume Resistivity		0.05 ohm-cm	4-point probe	PT-46
MECHANICAL PROPERTIES - POST CURE				
Die Shear Strength @ 25°C		15 kg_f/die	2 x 2 mm Si die on Ag/Cu LF	MT-4

Typical properties are not intended to be used as specification limits. If you need to write a specification, please request our Standard Release Specification.

ABLEBOND® 3230

LOW STRESS CONDUCTIVE DIE ATTACH ADHESIVE

APPLICATION GUIDELINES

SHIPMENT
This Ablestik product is packed and shipped in dry ice at -80°C. Inside every dry ice shipment of Ablestik's products is a small packet containing the ABLECUBE. This is a small blue cube which retains its shape at -40°C. If the ABLECUBE is exposed to temperatures higher than -40°C, the cube will melt.

Please check the state of the ABLECUBE to ensure the integrity of the shipment. If the ABLECUBE has melted upon Receiving Inspection, place the entire shipment in a -40°C freezer and contact your Ablestik Customer Service or Sales Representative.

UNPACKING
Transfer the syringes from the dry ice to a -40°C freezer without ANY delays. Freeze-thaw voids will form in the syringes if the syringes are repeatedly thawed and refrozen.

STORAGE
This Ablestik product must be stored at -40°C. The shelf life of the material is only valid when the material has been stored at the specified storage condition. Incorrect storage conditions will degrade the performance of the material in both handling (e.g. dispensing or screen printing) and final cured properties.

THAWING
Allow the container to reach room temperature before use. After removing from the freezer, set the syringes to stand vertically while thawing. Refer to Syringe Thaw Time chart below for the thaw time recommendation.

DO NOT open the container before contents reach ambient temperature. Any moisture that collects on the thawed container should be removed prior to opening the container.

DO NOT re-freeze. Once thawed to room temperature, the adhesive should not be re-frozen.

ADHESIVE APPLICATION
Thawed adhesive should be immediately placed on dispense equipment for use. If the adhesive is transferred to a final dispensing reservoir, care must be exercised to avoid entrapment of contaminants and/or air into the adhesive. Adhesive must be completely used within the product's recommended work life of 24 hours.

Apply enough adhesive to achieve a 25-50 µm (1-2 mil) wet bondline thickness, dispensed with approximately 25% - 50% filleting on all sides of the die. Alternate dispense amounts may be used depending on the application requirements. Star or cross shaped dispense patterns will yield fewer bondline voids than the matrix style of dispense pattern.

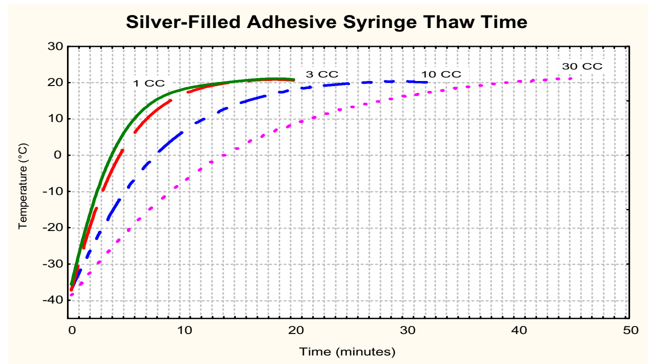
Contact Ablestik Technical Service Department for detailed recommendation on adhesive application, including dispensing.

CURE

This adhesive may be cured in box ovens. Refer to the recommended cure profile on this technical data sheet.

AVAILABILITY

Ablebond® adhesives are packaged in syringes or jars per customer specification. Available package sizes range from 1cc to 30cc and 1 ounce to 1 pound. For details, refer to the Ablestik Standard Package Data Set, or contact your Customer Service Representative.



CAUTION This product may cause skin irritation in sensitive persons. Avoid skin contact. If contact does occur, wash area immediately with soap and water. Please refer to Material Safety Data Sheet (OSHA) for more details.

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