Integrated Device Technology, Inc.
6024 Silver Creek Valley Road, San Jose, CA 95138

PRODUCT/PROCESS CHANGE NOTICE (PCN)

PCN #: **A1108-04** DATE: **1-Sep-2011**
Product Affected: **Refer to Attachment II**

Date Effective: **1-Oct-2011**

MEANS OF DISTINGUISHING CHANGED DEVICES:
- ☐ Product Mark
- ☐ Back Mark
- ☐ Date Code
- ■ Other

Assembly lot marked on the device provides traceability to the substrate core material type

Contact: PS Tow
Title: Director, Corporate Quality & Reliability
Phone #: (408) 284-8206
Fax #: (408) 284-1450
E-mail: PStow@idt.com

Attachment: ■ Yes ☐ No

Samples: Please contact your local sales representative for sample request and availability.

DESCRIPTION AND PURPOSE OF CHANGE:

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

This notification is to advise our customers that IDT is converting substrate core material E-679FGBR and plug-in material IR1 to core material E-679FGR and plug-in material, IR6P ; as the substrate supplier has stopped the production of existing core material and plug-in material.

There is no change to the moisture perfromance of these packages.

Attachment I details the change.
Attachment II lists the affected part numbers.

RELIABILITY/QUALIFICATION SUMMARY:

There is no impact with regards to the package performance or reliability. 1 of 2

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 #: _____

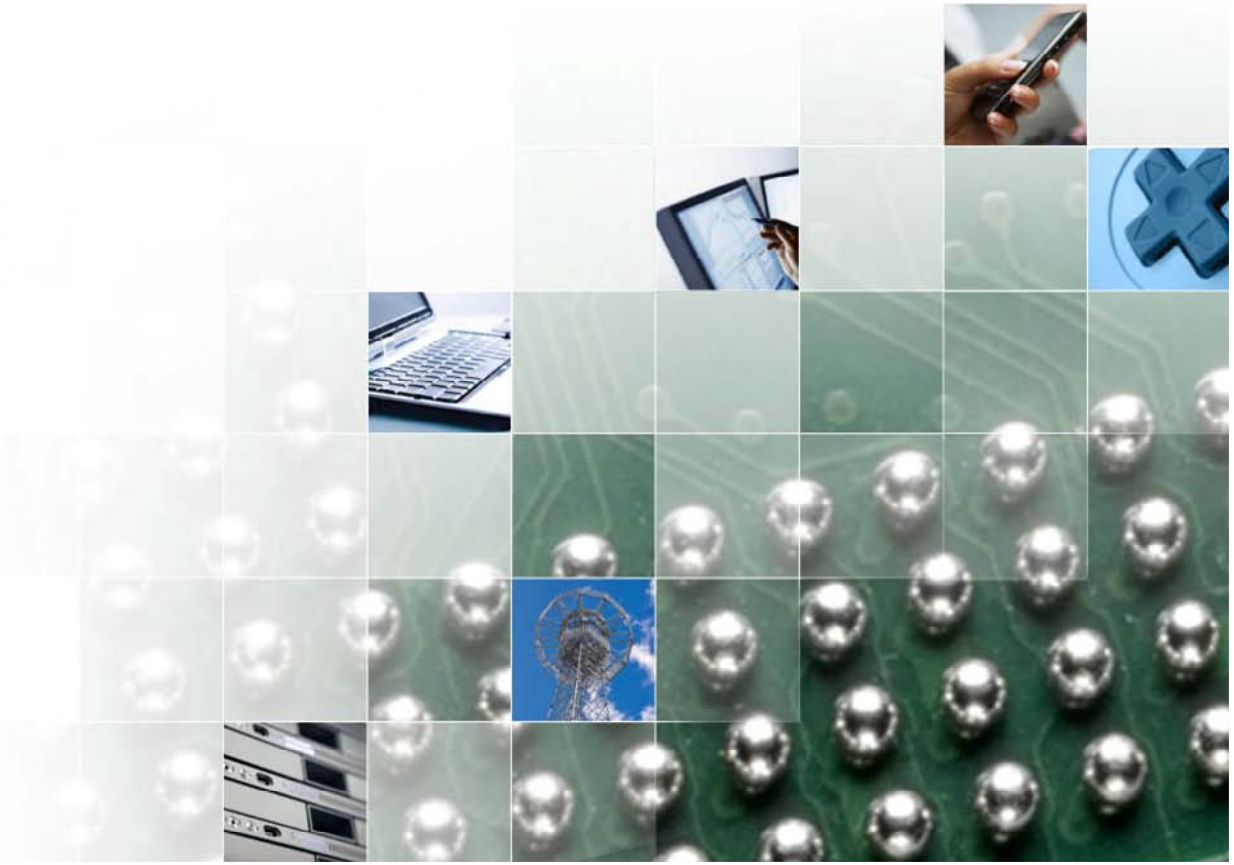
CUSTOMER COMMENTS: _____

IDT ACKNOWLEDGMENT OF RECEIPT:

RECD. BY: _____ DATE: _____

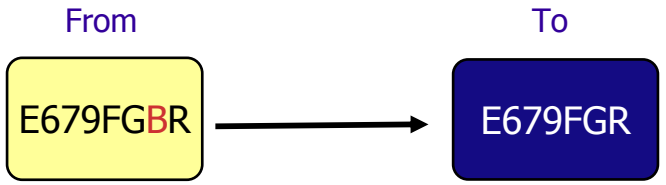
PCN A1108-04

The Change of AMB Substrate Material

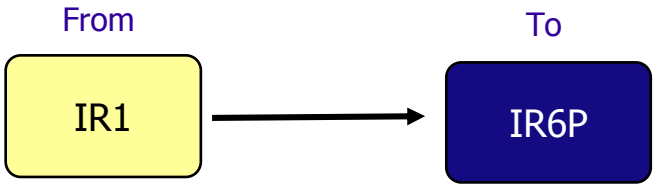


Background

- IDT was notified by the AMB substrate supplier that the current BT core and plug-in material have been stopped for production due to material consolidation to maximize factory utilization.
- Thus this will allow them to continue to service their customers without further disruption in material deliveries.
- The new material types have same performance and manufactured by the same material supplier.
- One of the planned change is to consolidate the BT core from Hitachi E679FGR and E679FGBR to E679FGR.



- The other change is to consolidate the plug–in material from IR6P and IR1 to IR6P.



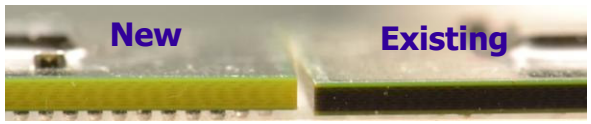
- This applies to some flip chip BGA's only. All above material are not new to IDT and have been used in production for multiple packages over many years. The replacement materials have been fully qualified by IDT from multiple packages.

E679FGR & FGBR data sheet

The same

Item	unit		Hitachi		
Type			E-679FG	E-679FGBR	E-679FGR
Properties			Halogen Free	Halogen Free	Halogen Free
Advantage			High Elastic Modulus, Low CTE	High Stiffness, High Elastic Modulus, Low Water Absorption	High Stiffness, High Elastic Modulus, Low Water Absorption
Thickness					
Tg	TMA(℃)		160-170	172	172
	DMA(℃)		190-200	190-200	190-200
CTE, α 1x-	TMA(ppm/℃)		13	15-17	15-17
CTE, α 1y-			15	15-17	15-17
CTE, α 1z-			25-35	29	29
CTE, α 2x-			13	11-12	11-12
CTE, α 2y-			15	11-12	11-12
CTE, α 2z-			130-180	142	142
Tensile Strength	MPa		290	200-300	200-300
Peel Strength	KN/m	35 um	1.1-1.2		
		18 um	1.0-1.1	1.15	1.15
		12 um		0.81	0.81
Resistivity	Volume (MΩ-cm)		$1x10^{10}$		
	Surface (MΩ)		$1x10^{9}$		
Water Absorption	23℃/24h		0.04-0.06		
Thermal Conductivity	W/mK		0.81	0.81	0.81
Insulation resistance	MΩ		$1x10^{8}$		
Poisson's Ratio	-		0.2	0.2-0.21	0.2-0.21

The only difference is the color of the core when viewed from the substrate side.



E679FGR (clear)

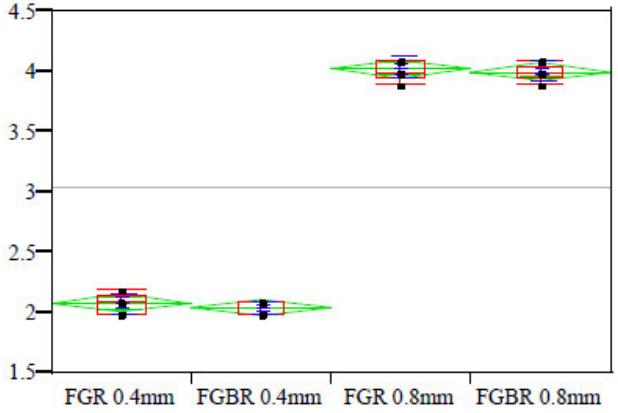
E679FGBR (black)

Material Characteristics (BT Core)

SPC,SQC(Warpage 1)

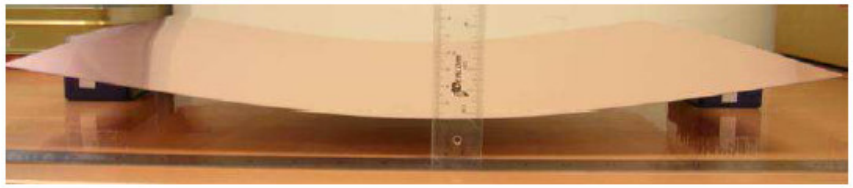
E-679 FGR & FGBR(0.4mm & 0.8mm)

Sample size : 5pnls/leg

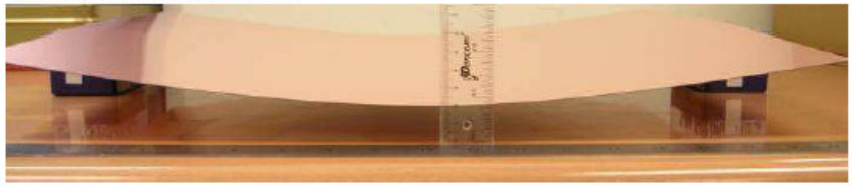


Level	Min	Max	Avg	Sigma
FGR 0.4mm	2.00	2.20	2.08	0.08
FGBR 0.4mm	2.00	2.10	2.04	0.05
FGR 0.8mm	3.90	4.10	4.02	0.08
FGBR 0.8mm	3.90	4.10	4.00	0.07

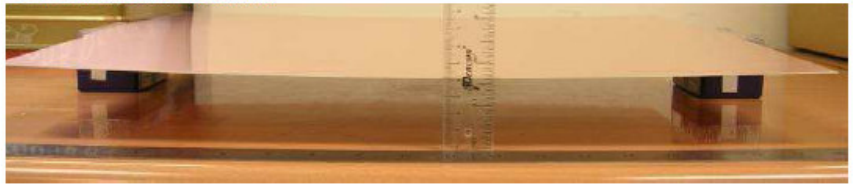
E-679 FGR 0.4mm



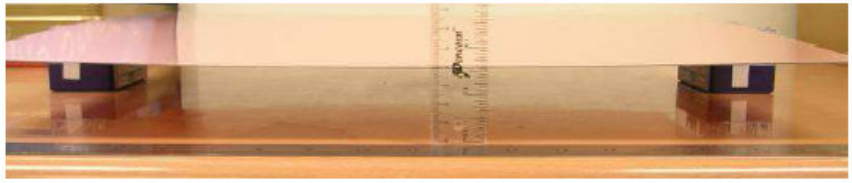
E-679 FGBR 0.4mm



E-679 FGR 0.8mm



E-679 FGBR 0.8mm



Material characteristic is the same.

Material Property (Plug-In Material)

Item		Unit	Unimicron target	IR1	IR-6P
Viscosity		Pa.s/25oC	-	30-40	30-40
Tg(TMA)		oC	≧ 160	133	168
CTE	α 1	ppm/oC	-	53	39
	α 2		<100	133	105
Young's module	25	Mpa	<6,000	4,500	5,200
	100		-	2,900	4,300
	150		-	560	2,600
	200		-	250	870
	250		-	180	660
Water absorption	JIS C6481	%	≦ 0.2	0.22	0.16
Filler Size	Avg.	um	<4	4-5	2-3
	Max.		<20	22.5	15
Lid Cu layer peeling strength		g/cm2	≧400	400	670

IR6P is a new generation material. It will eventually replace IR1.

Reliability Test Result (BT Core)

P/N	L/N	Test serial numbers	Pre. LIII	PCT		THB		HTST		TCT		TST		Thermal Stress	HAST+Bias 3.5V				HAST+Bias 5.5V			
				96 hr	168 hr	500 hr	1000 hr	500 hr	1000 hr	500 X	1000 X	300 X	500 X		55 hr	80 hr	100 hr	200 hr	55 hr	80 hr	100 hr	200 hr
3T260114A	38520001 38490149	QT09-01-0072 RT08-12-1681	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	-	-	-	-
30910R49A	38280053	EOL08-07-1064 QT08-08-0728 QT08-12-1188	PASS	-	-	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	-	-	-	-	PASS	PASS	PASS	PASS
3U260331A	38500007	QT09-02-0128	PASS	-	-	PASS	PASS	PASS	PASS	PASS	PASS	-	-	PASS	PASS	PASS	PASS	PASS	-	-	-	-
3U290294A	38260056	EOL08-10-1444 QT08-07-0696 RT08-10-1259	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
33000U40A	38310269	EOL08-08-1210 QT08-10-0994 RT08-08-0994	PASS	-	-	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	-	-	-	-
3K000823A	38190097	EOL08-05-0690 RT08-05-0528 RT08-05-0557	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
33000V71A	39060065	EOL09-02-0120 QT09-04-0243 RT09-02-0160	PASS	-	-	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	-	-	-	-

Reliability tests passed

Reliability Test Result (Plug-In Material)

Resin	Drill Diameter (mm)	Baking Temp (deg C) at time (min)	PCS	Solder Dip Test	TCT 500X	TCT 1000X	TCT 2000X	TCT 3000X
					Pre-condition 85C / 60%RH Level II TCT: -65C to 150C			
IR6P	0.15	Pre-cure 150C 10min Post cure 193C, 30 min	4 holes/unit 10 units each test	Pass	Pass	Pass	Pass	Pass
		80C 10 min, 100C 10min, 150C 30 min		Pass	Pass	Pass	Pass	Pass
IR6P	0.20	Pre-cure 150C 10min Post cure 193C, 30 min	4 holes/unit 10 units each test	Pass	Pass	Pass	Pass	Pass
		80C 10 min, 100C 10min, 150C 30 min		Pass	Pass	Pass	Pass	Pass
IR6P	0.35	Pre-cure 150C 10min Post cure 193C, 30 min	4 holes/unit 10 units each test	Pass	Pass	Pass	Pass	Pass
		80C 10 min, 100C 10min, 150C 30 min		Pass	Pass	Pass	Pass	Pass

Reliability Test Result (IDT Internal Data)

Test Description	Test Method (Latest Specs in effect)	Number of Lots	Test Results (SS/Rej)
Temperature Cycling * (Cond B, 700 cycles)	JESD22-A104	7	175/ 0
Unbiased HAST * (130°C, 85%RH, 100hours)	JESD22-A118	7	175/ 0
High Temperature Stabilization Bake (150°C, 1000hours)	JESD22-A103	7	175/ 0
Moisture Sensitivity Classification, L4	J-STD-020	6	150/ 0

Note: * Test requires moisture pre-conditioning sequence as per JESD22-A113

Conclusion

- This is not new material to IDT. IDT has many products currently qualified using this material.
- The data demonstrates there is no difference in the performance of the materials versus the material being replaced.
- The proposed change helps assure continued supply by consolidation with higher volume standard materials.
- The PCN will be effective on 1-October-2011.

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PRODUCT/PROCESS CHANGE NOTICE (PCN)

ATTACHMENT II - PCN #: A1108-04

Affected Part Number

Part Number	Part Number	Part Number	Part Number
AMB0482C1RJ	AMB0582C1RJ	AMB0680L4RJ	AMB0780L4RJ
AMB0482C1RJ8	AMB0582C1RJ8	AMB0680L4RJ8	AMB0780L4RJ8