



PLX TECHNOLOGY QUARTERLY MONITOR REPORT

RELIABILITY TEST

Q4, 2009: Rev. 1



PROCESS TECHNOLOGY MATRIX

FOUNDRY FAB

TSMC, Taiwan

Seiko Epson, Japan

NEC, Japan

PROCESS TECHNOLOGIES

0.09, 0.13, 0.18, 0.25, 0.35, 0.50 μm CMOS

0.35 and 0.6 μm , CMOS

0.15, 0.25, 0.35 μm CMOS

DIE RELIABILITY DATA OUTLINE

HTOL (IFR/EFR)

ASSEMBLY SUBCON

ASE, Kaohsiung

ASE, Malaysia

NEC, Japan

Seiko-Epson, Japan

STATS ChiPAC, Korea

STATS ChiPAC, Singapore

UTAC, Singapore

PACKAGE TECHNOLOGIES

EPQFP, PBGA, HSBGA, HFCBGA

PQFP, PBGA, HSBGA

PQFP, PBGA, FBGA

PQFP, PBGA

PBGA, HSBGA

PQFP

PQFP, EPQFP

PACKAGE RELIABILITY DATA OUTLINE

TCT

THBT/HAST

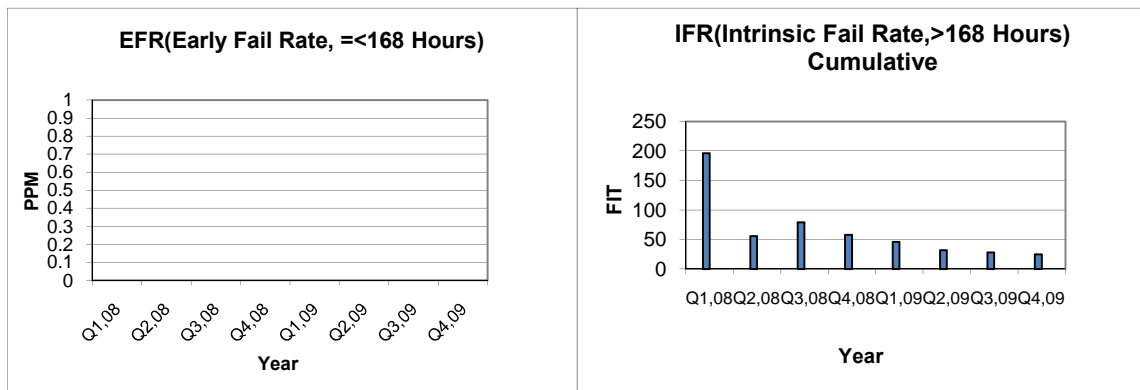
PCT



RELIABILITY HTOL DATA @125 °C

FOUNDRY: TSMC Taiwan, Process: 0.09 μm Low-K CMOS							
YEAR	EFR (Early Fail Rate, =< 168 Hours)			FITs @ 60% CL, 55C, Ea = 0.7eV			
	Sample	# Failure	PPM	Sample	Cum Dev	# Failure	FITs
Q1,08	120	0	0	120	60,000	0	196
Q2,08	120	0	0	120	210,000	0	56
Q3,08	120	0	0	120	330,000	1*	79
Q4,08	120	0	0	120	450,000	0	58
Q1,09	120	0	0	120	570,000	0	46
Q2,09	240	0	0	240	810,000	0	32
Q3,09	120	0	0	120	930,000	0	28
Q4,09	120	0	0	120	1,050,000	0	25

Note:
 *=1 unit damaged during failure analysis, root cause could not be determined, random failure.

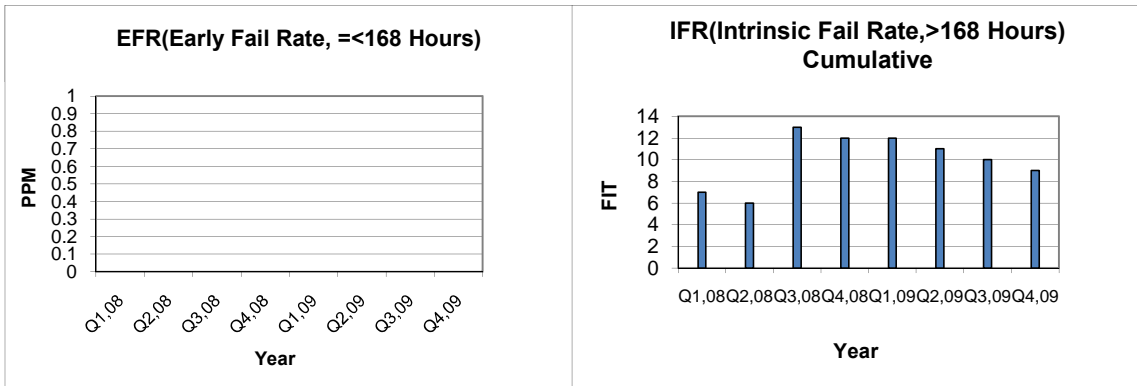




RELIABILITY HTOL DATA @125 °C

FOUNDRY: TSMC Taiwan, Process: 0.13 μm LVCMOS							
	EFR (Early Fail Rate, =< 168 Hours)			FITs @ 60% CL, 55C, Ea = 0.7eV			
YEAR	Sample	# Failure	PPM	Sample	Cum Dev	# Failure	FITs
2005	499	1*	0	499	359,500	0	25
2006	1200	0	0	1199	1,107,800	1**	11
Q1,07	360	0	0	360	1,467,800	0	8
Q2,07	240	0	0	240	1,607,960	0	7
Q4,07	120	0	0	120	1,727,960	0	7
Q1,08	120	0	0	120	1,787,960	0	7
Q2,08	120	0	0	120	1,847,960	0	6
Q3,08	120	0	0	119	1,966,960	1***	13
Q4,08	120	0	0	120	2,086,960	0	12
Q1,09	120	0	0	120	2,206,960	0	12
Q2,09	120	0	0	120	2,326,960	0	11
Q3,09	239	1****	0	239	2,565,960	0	10
Q4,09	240	0	0	240	2,805,960	0	9

Note:
 * = invalid reject at 168 hrs due to EOS
 ** = invalid reject due to mechanical damage after 1000 hrs
 ***=1 unit functional failure, root cause could not be determined, random failure.
 **** = invalid reject at 168 hrs due to Assy related stitch bond issue.

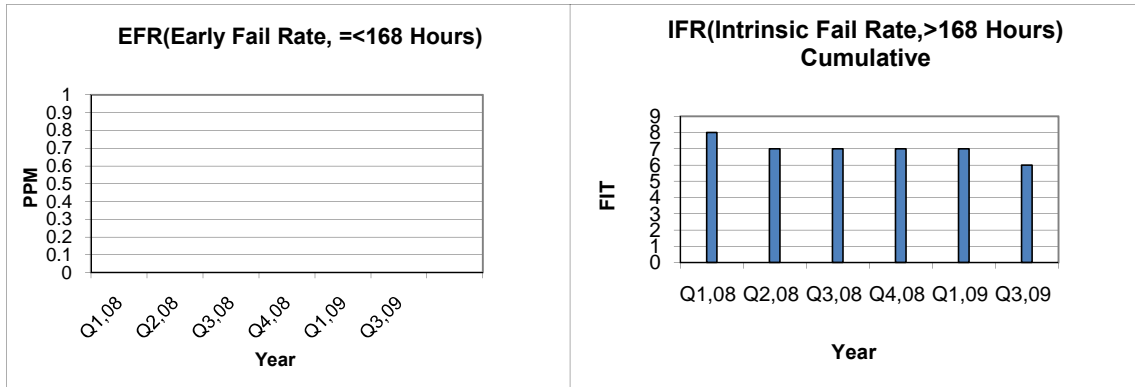




RELIABILITY HTOL DATA @125 °C

FOUNDRY: NEC Japan, Process: 0.15 μm CMOS							
YEAR	EFR (Early Fail Rate, =< 168 Hours)			FITs @ 60% CL, 55C, Ea = 0.7eV			
	Sample	# Failure	PPM	Sample	Cum Dev	# Failure	FITs
2000-2007	1366	0	0	1366	1366000	0	9
Q1,08	120	0	0	120	1486000	0	8
Q2,08	120	0	0	120	1606000	0	7
Q3,08	96	0	0	96	1654000	0	7
Q4,08	96	0	0	96	1702000	0	7
Q1,09	72	0	0	72	1774000	0	7
Q3,09	72	0	0	72	1846000	0	6

Note:

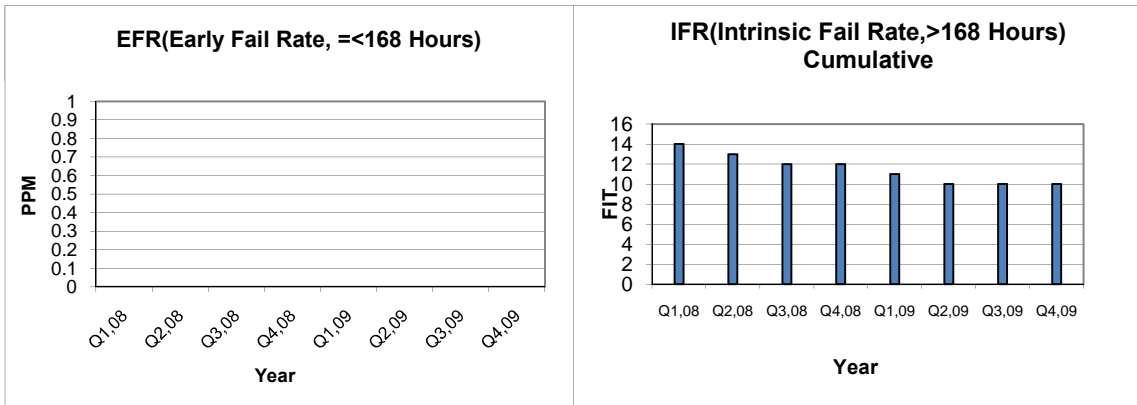




RELIABILITY HTOL DATA @125 °C

FOUNDRY: TSMC Taiwan, Process: 0.18 μm CMOS							
YEAR	EFR (Early Fail Rate, =< 168 Hours)			FITs @ 60% CL, 55C, Ea = 0.7eV			
	Sample	# Failure	PPM	Sample	Cum Dev	# Failure	FITs
2005	480	0	0	480	838,168	0	14
2006	480	0	0	479	1,314,668	1*	20
Q1,07	120	0	0	120	1,434,668	0	18
Q2,07	120	0	0	120	1,554,668	0	17
Q3,07	119	0	0	119	1,653,676	0	16
Q4,07	120	0	0	120	1,773,676	0	15
Q1,08	120	0	0	120	1,833,676	0	14
Q2,08	120	0	0	120	2,013,676	0	13
Q3,08	120	0	0	120	2,133,676	0	12
Q4,08	120	0	0	120	2,253,676	0	12
Q1,09	120	0	0	120	2,373,676	0	11
Q2,09	120	0	0	120	2,493,676	0	10
Q3,09	120	0	0	119	2,612,676	1**	10
Q4,09	120	0	0	120	2,732,676	0	10

Note: * = 1 unit functional failure, root cause could not be determined, random failure.
 ** = invalid reject at 500 hrs due to missing solder balls

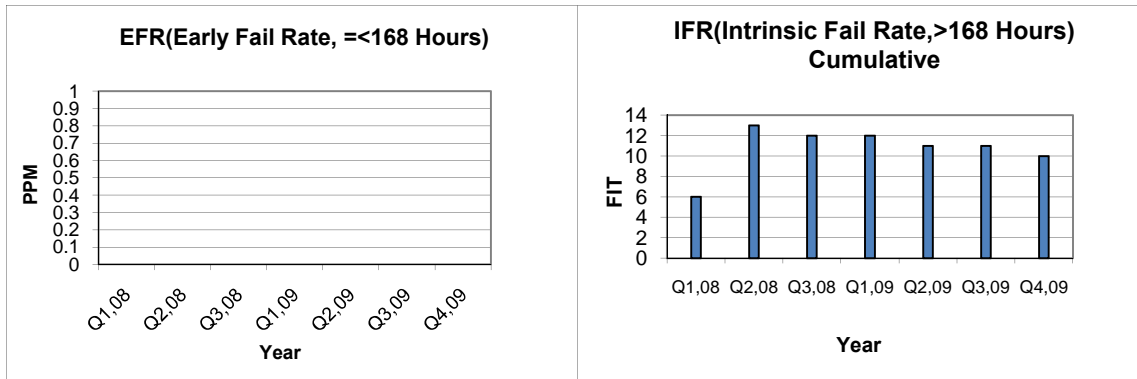




RELIABILITY HTOL DATA @125 °C

FOUNDRY: TSMC Taiwan, Process: 0.25 μm CMOS							
	EFR (Early Fail Rate, =< 168 Hours)			FITs @ 60% CL, 55C, Ea = 0.7eV			
YEAR	Sample	# Failure	PPM	Sample	Cum Dev	# Failure	FITs
2005	480	0	0	477	1,138,096	3*	10
2006	480	0	0	480	1,528,096	0	7
Q1,07	120	0	0	120	1,587,764	0	7
Q2,07	119	0	0	119	1,675,264	1*	7
Q3,07	120	0	0	111	1,786,246	9**	7
Q4,07	120	0	0	120	1,906,264	0	6
Q1,08	120	0	0	120	1,966,264	0	6
Q2,08	120	0	0	120	2,026,264	1***	13
Q3,08	100	0****	0	100	2,126,264	0****	12
Q1,09	100	0****	0	100	2,226,264	0****	12
Q2,09	100	0****	0	100	2,326,264	0****	11
Q3,09	100	0****	0	100	2,426,264	0****	11
Q4,09	100	0****	0	100	2,526,264	0****	10

Note: * = mechanical damage after 500 hrs
 ** = 9 mechanical damage after 1KH
 *** = 1 unit functional failure after 1000 hrs, root cause could not be determined, random failure.
 **** = TSMC Process HTOL Reliability Data.

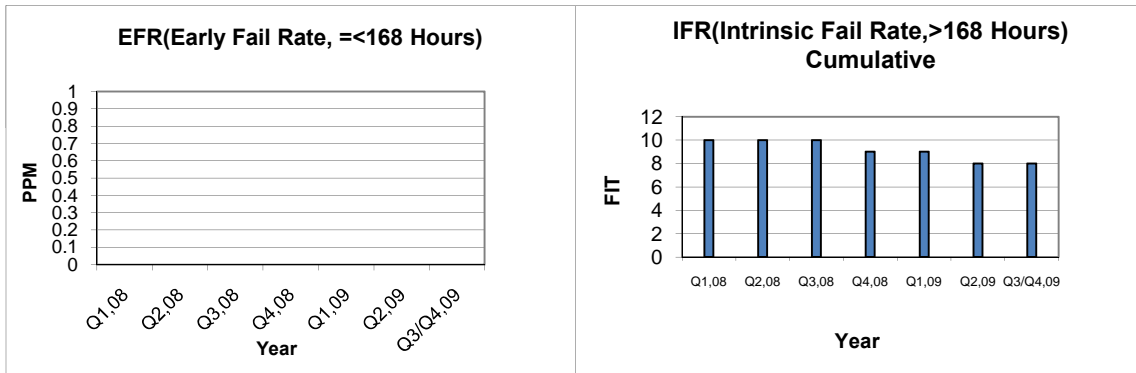




RELIABILITY HTOL DATA @125 °C

FOUNDRY: Seiko-Epson Japan, Process: 0.35 μm CMOS							
YEAR	EFR (Early Fail Rate, <= 168 Hours)			FITs @ 60% CL, 55C, Ea = 0.7eV			
	Sample	# Failure	PPM	Sample	Cum Dev	# Failure	FITs
2003	315	0	0	315	240,120	0	24
2004	450	0	0	450	734,230	0	16
2005	225	0	0	225	914,240	0	13
2006	225	0	0	225	1,071,240	0	11
Q1,07	45	0	0	45	1,093,740	0	11
Q2,07	66	0	0	66	1,104,740	0	11
Q1,08	44	0	0	44	1,126,740	0	10
Q2,08	132	0	0	132	1,214,740	0	10
Q3,08	22	0	0	22	1,225,740	0	10
Q4,08	44	0	0	44	1,269,740	0	9
Q1,09	135	0	0	135	1,337,240	0	9
Q2,09	135	0	0	135	1,404,740	0	8
Q3/Q4,09	135	0	0	135	1,539,740	0	8

Note:





RELIABILITY STRESS DATA

Temperature Cycle Test >=500 Cycles, -65/+150 °C					
YEAR	PKG	SAMPLE	500 cycles	FAILURE RATE	FINAL RESULT
	TYPE	SIZE		(%)	(PASS/FAIL)
Q1,08	H/FCBGA	45	0	0	PASS
Q2,08	H/FCBGA	45	0	0	PASS
Q3,08	H/FCBGA	90	0	0	PASS
Q4,08	H/FCBGA	90	0	0	PASS
Q1,09	H/FCBGA	180	0	0	PASS
Q2,09	H/FCBGA	135	0	0	PASS
Q3,09	H/FCBGA	180	0	0	PASS
Q4,09	H/FCBGA	149	0	0	PASS
Q1,08	HSBGA	135	0	0	PASS
Q2,08	HSBGA	120	0	0	PASS
Q3,08	HSBGA	120	0	0	PASS
Q4,08	HSBGA	90	0	0	PASS
Q1,09	HSBGA	270	0	0	PASS
Q2,09	HSBGA	270	0	0	PASS
Q3,09	HSBGA	255	0	0	PASS
Q4,09	HSBGA	114	0	0	PASS
2004	PBGA	993	0	0	PASS
2005	PBGA	1158	0	0	PASS
2006	PBGA	1347	0	0	PASS
Q1,07	PBGA	390	0	0	PASS
Q2,07	PBGA	270	0	0	PASS
Q3,07	PBGA	270	0	0	PASS
Q4,07	PBGA	405	0	0	PASS
Q1,08	PBGA	480	0	0	PASS
Q2,08	PBGA	525	0	0	PASS
Q3,08	PBGA	480	0	0	PASS
Q4,08	PBGA	300	0	0	PASS
Q1,09	PBGA	270	0	0	PASS
Q2,09	PBGA	210	0	0	PASS
Q3,09	PBGA	210	0	0	PASS
Q4,09	PBGA	242	0	0	PASS
2004	QFP	318	0	0	PASS
2005	QFP	428	0	0	PASS
2006	QFP	375	0	0	PASS
Q2,07	QFP	180	0	0	PASS
Q3,07	QFP	132	0	0	PASS
Q4,07	QFP	150	0	0	PASS
Q1,08	QFP	252	0	0	PASS
Q2,08	QFP	140	0	0	PASS
Q3,08	QFP	184	0	0	PASS
Q4,08	QFP	75	0	0	PASS
Q1,09	QFP	120	0	0	PASS
Q2,09	QFP	120	0	0	PASS
Q3,09	QFP	215	0	0	PASS
Q4,09	QFP	174	0	0	PASS

Note:

ASSEMBLY SUBCON
 ASE, Kaohsiung
 ASE, Malaysia
 NEC, Japan
 Seiko-Epson, Japan
 STATS ChiPAC, Korea
 STATS ChiPAC, Singapore
 UTAC, Singapore

PACKAGE TECHNOLOGIES
 EPQFP, PBGA, HSBGA, HFCBGA
 PQFP, PBGA, HSBGA
 PQFP, PBGA, FBGA
 PQFP, PBGA
 PBGA, HSBGA
 PQFP
 PQFP, EPQFP



RELIABILITY STRESS DATA

Temperature Humidity Test 85/85 or HAST				
YEAR	PKG TYPE	SAMPLE SIZE	FAILURE RATE (%)	FINAL RESULT (PASS/FAIL)
Q1,08	H/FCBGA	45	0	PASS
Q2,08	H/FCBGA	45	0	PASS
Q3,08	H/FCBGA	90	0	PASS
Q4,08	H/FCBGA	90	0	PASS
Q1,09	H/FCBGA	180	0	PASS
Q2,09	H/FCBGA	135	0	PASS
Q3,09	H/FCBGA	180	0	PASS
Q4,09	H/FCBGA	90	0	PASS
Q1,08	HSBGA	135	0	PASS
Q2,08	HSBGA	120	0	PASS
Q3,08	HSBGA	120	0	PASS
Q4,08	HSBGA	90	0	PASS
Q1,09	HSBGA	270	0	PASS
Q2,09	HSBGA	270	0	PASS
Q3,09	HSBGA	255	0	PASS
Q4,09	HSBGA	114	0	PASS
2004	PBGA	983	0	PASS
2005	PBGA	1114	0	PASS
2006	PBGA	1870	0	PASS
Q1,07	PBGA	90	0	PASS
Q2,07	PBGA	270	0	PASS
Q3,07	PBGA	360	0	PASS
Q4,07	PBGA	360	0	PASS
Q1,08	PBGA	480	0	PASS
Q2,08	PBGA	525	0	PASS
Q3,08	PBGA	480	0	PASS
Q4,08	PBGA	300	0	PASS
Q1,09	PBGA	270	0	PASS
Q2,09	PBGA	210	0	PASS
Q3,09	PBGA	210	0	PASS
Q4,09	PBGA	242	0	PASS
2004	QFP	245	0	PASS
2005	QFP	1324	0	PASS
2006	QFP	706	0	PASS
Q2,07	QFP	30	0	PASS
Q1,08	QFP	186	0	PASS
Q2,08	QFP	96	0	PASS
Q3,08	QFP	118	0	PASS
Q4,08	QFP	75	0	PASS
Q1,09	QFP	75	0	PASS
Q2,09	QFP	75	0	PASS
Q3,09	QFP	125	0	PASS
Q4,09	QFP	52	0	PASS

Note: Conditions for 85/85 are 1000 Hours, 85C, 85%RH.
HAST is an alternative stress with conditions of 96 Hours, 130C, 85%RH.

ASSEMBLY SUBCON
 ASE, Kaohsiung
 ASE, Malaysia
 NEC, Japan
 Seiko-Epson, Japan
 STATS ChiPAC, Korea
 STATS ChiPAC, Singapore
 UTAC, Singapore

PACKAGE TECHNOLOGIES
 EPQFP, PBGA, HSBGA, HFCBGA
 PQFP, PBGA, HSBGA
 PQFP, PBGA, FBGA
 PQFP, PBGA
 PBGA, HSBGA
 PQFP
 PQFP, EPQFP



RELIABILITY STRESS DATA

Pressure Cooker Test: 168 Hours, 121 °C/ 100% RH						
YEAR	PKG	SAMPLE	96 Hours	168 Hours	FAILURE RATE	FINAL RESULT
	TYPE	SIZE	(Ref)	(Accep)	(%)	(PASS/FAIL)
Q1,08	HSBGA	90	0	0	0	PASS
Q2,08	HSBGA	30	0	0	0	PASS
Q3,08	HSBGA	30	0	0	0	PASS
Q3,09	HSBGA	30	0	0	0	PASS
Q4,09	HSBGA	30	0	0	0	PASS
2004	PBGA	128	0	0	0	PASS
2005	PBGA	830	0	0	0	PASS
2006	PBGA	142	0	0	0	PASS
Q2,07	PBGA	30	0	0	0	PASS
Q1,08	PBGA	30	0	0	0	PASS
Q2,08	PBGA	30	0	0	0	PASS
Q3,08	PBGA	30	0	0	0	PASS
Q4,08	PBGA	30	0	0	0	PASS
Q1,09	PBGA	30	0	0	0	PASS
Q2,09	PBGA	30	0	0	0	PASS
Q3,09	PBGA	30	0	0	0	PASS
Q4,09	PBGA	30	0	0	0	PASS
2004	QFP	623	0	0	0	PASS
2005	QFP	980	0	0	0	PASS
2006	QFP	3794	0	0	0	PASS
Q1,07	QFP	150	0	0	0	PASS
Q2,07	QFP	360	0	0	0	PASS
Q3,07	QFP	390	0	0	0	PASS
Q4,07	QFP	495	0	0	0	PASS
Q1,08	QFP	120	0	0	0	PASS
Q2,08	QFP	140	0	0	0	PASS
Q3,08	QFP	184	0	0	0	PASS
Q4,08	QFP	30	0	0	0	PASS
Q1,09	QFP	30	0	0	0	PASS
Q2,09	QFP	30	0	0	0	PASS
Q3,09	QFP	125	0	0	0	PASS
Q3,09	QFP	152	0	0	0	PASS

Note:

ASSEMBLY SUBCON

ASE, Kaohsiung
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 STATS ChiPAC, Korea
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 UTAC, Singapore

PACKAGE TECHNOLOGIES

EPQFP, PBGA, HSBGA, HFCBGA
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