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Cypress Semiconductor Product Qualification Report

QTP# 102201 VERSION*B
September, 2014

72 Meg High Density Programmable FIFO Family 65nm (LL65P-18R) Technology, UMC Fab 12A	
CYFB0072V33L/CYFB0072V18L	72 Mbit Programmable FIFOs (Frame Buffers)
CYF0072V33L/CYF0072V18L	72 Mbit Programmable FIFOs
CYF0018V18L/CYF0018V33L	18 Mbit Programmable FIFOs
CYF0036V18L/CYF0036V33L	36 Mbit Programmable FIFOs
CYF1018V18L/CYF1018V33L	18 Mbit Programmable 2-Queue FIFOs
CYF1036V18L/CYF1036V33L	36 Mbit Programmable 2-Queue FIFOs
CYF1072V18L/CYF1072V33L	72 Mbit Programmable 2-Queue FIFOs
CYF2018V18L/CYF2018V33L	18 Mbit Programmable Multi-Queue FIFOs
CYF2036V18L/CYF2036V33L	36 Mbit Programmable Multi-Queue FIFOs
CYF2072V18L/CYF2072V33L	72 Mbit Programmable Multi-Queue FIFOs
CYF0072V15L	72 Mbit Programmable FIFOs with IO LVCMOS 1.5
CYF0072V25L	72 Mbit Programmable FIFOs with IO LVCMOS 2.5
CYF1072V15L	72 Mbit Programmable 2-Queue FIFOs with IO LVCMOS 1.5
CYF1072V25L	72 Mbit Programmable 2-Queue FIFOs with IO LVCMOS 2.5
CYF2072V15L	72 Mbit Programmable Multi-Queue FIFOs with IO LVCMOS 1.5
CYF2072V25L	72 Mbit Programmable Multi-Queue FIFOs with IO LVCMOS 2.5

FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT
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QUALIFICATION HISTORY

Qual Report	Description of Qualification Purpose	Date Comp
091706	Qualification of 65nm (LL65) Technology at UMC Fab 12A and New Device CY7C1553K Base Die Product Family	Aug 2009
093202	Qualification of UMC 65nm Process Improvement	Nov 2009
102201	Qualification of 72M High Density Programmable FIFO Device using LL65P-18R Technology Fabricated in UMC Fab	Aug 2011
130905	Qualification of 72M High Density Programmable FIFO Device at ASE-Taiwan (G)	Nov 2013

PRODUCT DESCRIPTION (for qualification)	
Qualification Purpose:	Qualify CYF0072V33L HD FIFO Device Family, UMC Fab 12A 65nm (LL65P-18R) Technology
Marketing Part #:	CYF0072V33L, etc.
Device Description:	1.8V Commercial and Industrial available in 209-Ball FBGA (14 x 22 x 1.89 mm)
Cypress Division:	Cypress Semiconductor Corporation –Memory Products Division
Overall Die (or Mask) REV Level (pre-requisite for qualification):	Rev. K
What ID markings on Die:	7C1553K

TECHNOLOGY/FAB PROCESS DESCRIPTION – LL65P-18R			
Number of Metal Layers:	5+RDL	Metal Composition:	Metal 1: Cu 0.18um Metal 2: Cu 0.22um Metal 3: Cu 0.22um Metal 4: Cu 0.36um Metal 5: Cu 1.25um Metal 6 (RDL): Al 1.2um
Passivation Type and Materials:	0.4um Oxide / 0.5um Nitride		
Free Phosphorus contents in top glass layer(%):	0 %		
Number of Transistors in Device	~600M		
Number of Logic Gates in Device	~300M		
Generic Process Technology/Design Rule (μ-drawn):	CMOS, 65nm		
Gate Oxide Material/Thickness (MOS):	19.5A		
Name/Location of Die Fab (prime) Facility:	UMC Fab 12		
Die Fab Line ID/Wafer Process ID:	L65LL		

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY SITE FACILITY
209-Ball FBGA	Amkor-Korea (GQ), ASE-Taiwan (G)

Note: Package Qualification details upon request

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	BW209D
Package Outline, Type, or Name:	209-Ball Thin Ball Grid Array (FBGA)
Mold Compound Name/Manufacturer:	GE-100LFCS/ Nitto
Mold Compound Flammability Rating:	UL94, V-0
Oxygen Rating Index:	N/A
Substrate Material:	BT resin
Lead Finish, Composition / Thickness:	SAC405
Die Backside Preparation Method/Metallization:	Grinding
Die Separation Method:	Saw
Die Attach Supplier:	Hitachi
Die Attach Material:	FH-9011-20
Die Attach Method:	Film
Bond Diagram Designation:	001-57611
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au, 1.0 mil
Thermal Resistance Theta JA °C/W:	59.06 C/W
Package Cross Section Yes/No:	Yes
Assembly Process Flow:	49-10996
Name/Location of Assembly (prime) facility:	Amkor Korea (GQ)
MSL Level	3
Reflow Temperature	260C

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	CML-R

Note: Please contact a Cypress Representative for other packages availability

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT

Stress/Test	Test Condition (Temp/Bias)	Result P/F
High Temperature Operating Life Early Failure Rate	Dynamic Operating Condition, Boost Regulated at Core 1.45V, External 2.05V, 125°C, JESD22-A108	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Boost Regulated at Core 1.45V, External 2.05V, 125°C /150°C, JESD22-A108	P
Pre/Post LFR AC/DC Char	AC/DC Critical Parameter Char at LFR 80hrs, 500hrs & 1000hrs	P
High Temperature Steady State Life	Static Operating Condition, Vcc Max= 2.25V, 150°C JESD22-A108	P
Low Temperature Operating Life	Dynamic Operating Condition, Vcc = 2.25V, -30°C JESD22-A108	P
High Accelerated Saturation Test (HAST)	JESD22-A110: 110°C, 2.05V/1.64V/3.6V, 85%RH 130°C, 2.25V, 85%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30°C /60%RH+ Reflow, 260°C +0, -5°C	P
Temperature Humidity Bias Test (THB)	JESD22-A101: 85°C, 85%RH, 2.25V Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30°C /60%RH+ Reflow, 260°C +0, -5°C	P
Temperature Cycle	MIL-STD-883, Method 1010, Condition B, -55°C to 125°C MIL-STD-883, Method 1010, Condition C, -65 to 150°C Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30°C /60%RH+ Reflow, 260°C +0, -5°C	P
Pressure Cooker	JESD22-A102: 121 C, 100%RH, 15 PSIG Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30°C /60%RH+ Reflow, 260°C +0, -5°C	P
High Temperature Storage	JESD22-A103: 150 C, no bias	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,000V/2,200V JEDEC EIA/JESD22-A114	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	200V, 500V, JESD22-C101	P
Electrostatic Discharge Machine Model (ESD-MM)	200V, JESD22-A115	P
Soft Error (Alpha Particle)	JESD89	P
Soft Error (Neutron/Proton)	JESD89	P
Current Density	Meets the Technology Device Level Reliability Specifications	P
Age Bond Strength	200°C, 4HRS MIL-STD-883, Method 883-2011	P
Acoustic Microscopy	J-STD-020 Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30°C /60%RH+ Reflow, 260°C +0, -5°C	P
Dynamic Latch-up	JESD78	P
Static Latch-up	125°C, ± 100mA, ± 140mA, ± 200mA 25°C, ± 100mA JESD78	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Thermal AF ³	Failure Rate
High Temperature Operating Life Early Failure Rate	1,503 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life ^{1,2} Long Term Failure Rate (150°C)	89,000 DHRs	0	0.7	170	12 FIT
High Temperature Operating Life ^{1,2} Long Term Failure Rate (125°C)	1,075,256 DHRs	0	0.7	55	

Note:

1. PPM is calculated using the QTP#102201 EFR Data only
2. FIT Rate is calculated using the QTP#091706 and QTP#102201 LFR data.

¹ Assuming an ambient temperature of 55°C and a junction temperature rise of 15°C.

² Chi-squared 60% estimations used to calculate the failure rate..

³ Thermal Acceleration Factor is calculated from the Arrhenius equation

$$AF = \exp \left[\frac{E_A}{k} \left[\frac{1}{T_2} - \frac{1}{T_1} \right] \right]$$

where:

E_A =The Activation Energy of the defect mechanism.

k = Boltzmann's constant = 8.62x10⁻⁵ eV/Kelvin.

T₁ is the junction temperature of the device under stress and T₂ is the junction temperature of the device at use conditions.

Reliability Test Data

QTP #: 102201

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC, MSL3							
7C451472AO	8938000	611024080	Korea-GQ	COMP	15	0	
CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	COMP	15	0	
CYF0072V33L(7C4S1472AO)	8021003	611106298	Korea-GQ	COMP	15	0	
STRESS: AGE BOND STRENGTH							
7C451472AO	8938000	611024080	Korea-GQ	COMP	3	0	
CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	COMP	3	0	
CYF0072V33L(7C4S1472AO)	8021003	611106298	Korea-GQ	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JEDEC EIA/JESD22-A114, 2,000V							
7C451472AO	8938000	611024080	Korea-GQ	COMP	7	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JEDEC EIA/JESD22-A114, 2,200V							
7C451472AO	8938000	611024080	Korea-GQ	COMP	7	0	
CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	COMP	6	0	
STRESS: ESD-CHARGE DEVICE MODEL, 200V							
7C451472AO	8938000	611024080	Korea-GQ	COMP	9	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
7C451472AO	8938000	611024080	Korea-GQ	COMP	6	0	
CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	COMP	9	0	
STRESS: HI-ACCEL SATURATION TEST, 110C, 85%RH, 2.05V/1.64V/3.6V, PRE COND 192 HR 30C/60%RH, MSL3							
7C451472AO	8938000	611024080	Korea-GQ	264	77	0	
CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	264	72	0	
STRESS: HIGH TEMPERATURE STORAGE, PLASTIC, 150C							
CYF0072V33L(7C4S1472AO)	8011010	611041953	Korea-GQ	500	80	0	
CYF0072V33L(7C4S1472AO)	8011010	611041953	Korea-GQ	1000	80	0	
CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	500	77	0	
CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	1000	77	0	
CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	1500	77	0	

Reliability Test Data

QTP #: 102201

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp Rej	Failure Mechanism
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STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 2.05V

CYF0072V33L(7C4S1472AO)	8011010	611041953	Korea-GQ	96	480	0
CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	96	494	0
CYF0072V33L(7C4S1472AO)	8021003	611106298	Korea-GQ	96	470	0
CYF0072V33L(7C4S1472AO)	8021003	611106300	Korea-GQ	96	59	0

STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 125C, 2.05V

CYF0072V33L(7C4S1472AO)	8011010	611041953	Korea-GQ	168	241	0
CYF0072V33L(7C4S1472AO)	8011010	611041953	Korea-GQ	1000	241	0
CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	168	178	0
CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	1000	177	0
CYF0072V33L(7C4S1472AO)	8021003	611106298	Korea-GQ	168	178	0
CYF0072V33L(7C4S1472AO)	8021003	611106298	Korea-GQ	1000	177	0

STRESS: PRESSURE COOKER TEST, 121C, 100%RH, 15 Psig, PRE COND 192 HR 30C/60%RH, MSL3

7C451472AO	8938000	611024080	Korea-GQ	168	79	0
7C451472AO	8938000	611024080	Korea-GQ	288	79	0
CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	168	75	0
CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	288	72	0

STRESS: STATIC LATCH-UP TESTING, 125C, 2.85V, 2.37V, 5.4V +/-100mA

7C451472AO	8938000	611024080	Korea-GQ	COMP	6	0
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STRESS: STATIC LATCH-UP TESTING, 125C, 3.14V, 2.6V1, 5.94V, +/-140mA

CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	COMP	6	0
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STRESS: TEMPERATURE CYCLE COND. B -55C TO 125C, PRE COND 192 HRS 30C/60%RH, MSL3

7C451472AO	8938000	611024080	Korea-GQ	500	79	0
7C451472AO	8938000	611024080	Korea-GQ	1000	78	0
CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	500	75	0
CYF0072V33L(7C4S1472AO)	8021000	611106299	Korea-GQ	1000	74	0
CYF0072V33L(7C4S1472AO)	8021003	611106298	Korea-GQ	500	77	0
CYF0072V33L(7C4S1472AO)	8021003	611106298	Korea-GQ	1000	77	0

Reliability Test Data

QTP #: 091706

<i>Device</i>	<i>Fab Lot #</i>	<i>Assy Lot #</i>	<i>Ass Loc</i>	<i>Duration</i>	<i>Samp Rej</i>	<i>Failure Mechanism</i>
STRESS: ACOUSTIC, MSL3						
CY7C1514KV18 (7C1553K)	8842022	610851583	TAIWN-G	COMP	15	0
CY7C1514KV18 (7C1553K)	8844020	610854240	TAIWN-G	COMP	15	0
CY7C1514KV18 (7C1553K)	8844022	610906896	TAIWN-G	COMP	15	0
STRESS: AGE BOND STRENGTH						
CY7C1514KV18 (7C1553K)	8842022	610851583	TAIWN-G	COMP	5	0
CY7C1514KV18 (7C1553K)	8844020	610854240	TAIWN-G	COMP	5	0
CY7C1514KV18 (7C1553K)	8844022	610906896	TAIWN-G	COMP	5	0
STRESS: DYNAMIC LATCH-UP						
CY7C1470V33 (7C1470A)	4321389	610417278	CML-R	COMP	3	0
STRESS: ESD-HUMAN BODY CIRCUIT PER JEDEC EIA/JESD22-A114, 2,200V						
CY7C1514KV18 (7C1553K)	8842022	610852338	TAIWN-G	COMP	8	0
CY7C1514KV18 (7C1553K)	8844020	610854240	TAIWN-G	COMP	8	0
CY7C1514KV18 (7C1553K)	8844022	610906896	TAIWN-G	COMP	8	0
CY7C1514KV18 (7C1553K)	8844021	610908348	TAIWN-G	COMP	8	0
STRESS: ESD-CHARGE DEVICE MODEL, 500V						
CY7C1514KV18 (7C1553K)	8842022	610852338	TAIWN-G	COMP	9	0
CY7C1514KV18 (7C1553K)	8844020	610854240	TAIWN-G	COMP	9	0
CY7C1514KV18 (7C1553K)	8844022	610906896	TAIWN-G	COMP	9	0
STRESS: ESD-MACHINE MODEL, 200V						
CY7C1514KV18 (7C1553K)	8842022	610852338	TAIWN-G	COMP	5	0
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 2.25V, PRE COND 192 HR 30C/60%RH, MSL3						
CY7C1514KV18 (7C1553K)	8844020	610854240	TAIWN-G	128	78	0
CY7C1514KV18 (7C1553K)	8844022	610906896	TAIWN-G	128	77	0
STRESS: HIGH TEMPERATURE STORAGE, PLASTIC, 150C						
CY7C1514KV18 (7C1553K)	8844020	610851583	TAIWN-G	1000	70	0
STRESS: HIGH TEMP STEADY STATE LIFE TEST, 150C, 2.25V, Vcc Max						
CY7C1514KV18 (7C1553K)	8844020	610854240	TAIWN-G	336	77	0

Reliability Test Data

QTP #: 091706

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
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STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, BOOST REGULATED AT CORE 1.45V, EXTERNAL 2.05V

CY7C15631KV18 (7C1553K)	8908001	610920385	TAIWN-G	96	2367	0	
CY7C15631KV18 (7C1553K)	8912000	610920386	TAIWN-G	96	2217	0	
CY7C15631KV18 (7C1553K)	8910015	610920548	TAIWN-G	96	1321	0	

STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, BOOST REGULATED AT CORE 1.45V, EXTERNAL 2.05V

CY7C1514KV18 (7C1553K)	8844021	610908348	TAIWN-G	500	178	0	
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STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 125C, BOOST REGULATED AT CORE 1.45V, EXTERNAL 2.05V

CY7C1514KV18 (7C1553K)	8844020	610854240	TAIWN-G	1000	178	0	
CY7C1514KV18 (7C1553K)	8844022	610906896	TAIWN-G	1000	178	0	

STRESS: LOW TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, -30C, 2.25V Vcc

CY7C1514KV18 (7C1553K)	8842022	610852338	TAIWN-G	500	45	0	
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STRESS: PRESSURE COOKER TEST, 121C, 100%RH, 15 Psig, PRE COND 192 HR 30C/60%RH, MSL3

CY7C1514KV18 (7C1553K)	8842022	610851583	TAIWN-G	168	76	0	
CY7C1514KV18 (7C1553K)	8844020	610854240	TAIWN-G	168	78	0	
CY7C1514KV18 (7C1553K)	8844022	610906896	TAIWN-G	168	77	0	

STRESS: Pre-/ Post HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE CHAR

CY7C1514KV18 (7C1553K)	8844020	610854240	TAIWN-G	COMP	10	0	
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STRESS: STATIC LATCH-UP TESTING, 125C, 3.42V, +/-240mA

CY7C1514KV18 (7C1553K)	8844020	610854680	TAIWN-G	COMP	9	0	
CY7C1514KV18 (7C1553K)	8844022	610906896	TAIWN-G	COMP	9	0	
CY7C1514KV18 (7C1553K)	8844021	610908348	TAIWN-G	COMP	9	0	
CY7C15631KV18 (7C1553K)	8911000	610922436	TAIWN-G	COMP	9	0	

STRESS: TEMPERATURE CYCLE COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3

CY7C1514KV18 (7C1553K)	8842022	610851583	TAIWN-G	1000	77	0	
CY7C1514KV18 (7C1553K)	8844020	610854240	TAIWN-G	1000	78	0	
CY7C1514KV18 (7C1553K)	8844022	610906896	TAIWN-G	1000	77	0	

Reliability Test Data

QTP #: 091706

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp Rej	Failure Mechanism
STRESS: STRESS: TEMPRATURE HUMIDITY TEST, 85C, 85%RH, 2.25V, PRE COND 192 HR 30C/60%RH, MSL3						
CY7C1514KV18 (7C1553K)	8842022	610851583	TAIWN-G	1000	77	0
STRESS: SER – ALPHA PARTICLE, 3-TEPM, 3-VOLTAGE, @ 85C, Vcc Nom						
CY7C1514KV18 (7C1553K)	8842022	610851583	TAIWN-G	COMP	3	0
STRESS: X-SECTION/STEM XY AUDIT						
CY7C1514KV18 (7C1553K)	8842022	610851583	TAIWN-G	COMP	1WF	

Reliability Test Data

QTP #: 093202

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp Rej	Failure Mechanism
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STRESS: ESD-HUMAN BODY CIRCUIT PER JEDEC EIA/JESD22-A114, 2,200V

CY7C15631KV18 (7C1553K)	8911000	610922435	TAIWN-G	COMP	8	0
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STRESS: HIGH TEMPERATURE STORAGE, PLASTIC, 150C

CY7C15631KV18 (7C1553K)	8911000	610922435	TAIWN-G	1000	80	0
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STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, BOOST REGULATED AT CORE 1.45V, EXTERNAL 2.05V

CY7C15631KV18 (7C1553K)	8912000	610921675	TAIWN-G	96	596	0
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CY7C15631KV18 (7C1553K)	8910015	610921676	TAIWN-G	96	711	0
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CY7C15631KV18 (7C1553K)	8911000	610922435	TAIWN-G	96	1795	0
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STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 125C, BOOST REGULATED AT CORE 1.45V, EXTERNAL 2.05V

CY7C15631KV18 (7C1553K)	8912000	610921675	TAIWN-G	168	190	0
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CY7C15631KV18 (7C1553K)	8911000	610922435	TAIWN-G	500	184	0
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Reliability Test Data

QTP #: 130905

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp Rej	Failure Mechanism
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STRESS: ESD-HUMAN BODY CIRCUIT PER JEDEC EIA/JESD22-A114, 2,200V

CYF0072V33L (7C4S1472A)	8222000	611240710	TAIWN-G	COMP	8	0
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STRESS: STATIC LATCH-UP, 100mA, 25°C

CYF0072V33L (7C4S1472A)	8222000	611240710	TAIWN-G	COMP	6	0
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STRESS: ESD-CHARGE DEVICE MODEL, 500V

CYF0072V33L (7C4S1472A)	8222000	611240710	TAIWN-G	COMP	9	0
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Document History Page

Document Title: QTP 102201: 72 MEG HIGH DENSITY PROGRAMMABLE FIFO FAMILY (CYF0072V33L), 65NM (LL65P-18R) TECHNOLOGY, UMC FAB 12A
Document Number: 001-72248

Rev.	ECN No.	Orig. of Change	Description of Change
**	3349360	NSR	Initial spec release.
*A	4196963	JYF	Added CYFB0072V33L and CYFB0072V18L in the device coverage; Template alignment & addition of 72M HD FIFO qualification data at ASE-Taiwan (QTP# 130905).
*B	4502469	JYF	Sunset review: Updated QTP title page for template alignment.

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