

Report No. MCR-22-0476 June 30,2022

# RENESAS SEMICONDUCTOR RELIABILITY REPORT

- GROUP : USB3.0 Host Controller
- DEVICE : UPD720202K8-XXX-BAA-A
- APPLICATION : Consumer

Quality Assurance Div. Renesas Electronics Corporation



MCR-22-0476

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MCR-22-0476

Table.1 Reliability test result

Test Items	Reference	Test Conditions	Results Failure/Size	N.B.
High Temperature Operating Life (HTOL)	JESD22-A108	Ta=125 ℃, Vccmax, 1000 hrs	0/22	
High Temperature Storage Life (HTSL)	JESD22-A103	Ta=150 ℃, 1000 hrs	0/22	
Temperature Humidity bias (THB)(*1)	JESD22-A101	Ta=85 ℃, RH=85 %, Vccmax, 1000 hrs	0/22	
Temperature Cycling (TC)(*1)	JESD22-A104	Ta=-65 $^\circ$ to 150 $^\circ$ C , 300 cycles	0/22	
Latch-Up (LU)	JESD78	Pulse Current Injection, I=+/-100 mA	0/3	
Electrostatic discharge (ESD-HBM)	JS-001	1.5 kΩ, 100 pF, +/-1000 V, 1 time	0/3	
Solderability (SD)	J-STD-002	245 ℃, 5 s, Solder coverage ≥95 %	0/5	
Resistance to Soldering Heat (PC)	JESD22-A113, J-STD-020	MSL3(Moisture Sensitivity Level 3)	0/22	

\*1) With preconditioning per JESD22-A113, MSL

·It is tested to confirm that all the samples are satisfied with an individual product specification.

Note :

Basically qualification tests were performed using a representative product with the same wafer process and the same package structure .



The failure rate of the device in an actual use condition can be estimated by the below procedure.

### • Equation for the failure rate estimation ( $\lambda$ )

 $\lambda = \lambda b \times \pi T$  (FIT)

(1) Unique failure rate ( $\lambda$ b)

λb= 10.34 FIT

Unique failure rate at Ta=55  $^{\circ}$ C using 60  $^{\circ}$  confidence level.

②Temperature term ( $\pi$ T)

 $\pi$  T=exp{11600×Ea×(1/(273+55)-1/(273+Ta))}

Ea: Activation energy (eV)

Ta : Ambient temperature ( $^{\circ}$ C)

πΤ	<sup>-</sup> sim	plified c	hart as	Ea=0.6	eV								
T (१	a C)	40	50	55	60	65	70	75	80	85	90	100	110
π	Т	0.36	0.72	1	1.38	1.87	2.53	3.39	4.49	5.92	7.74	12.94	21.06

## •MTTF ( Mean Time To Failure )

 $MTTF = 1/\lambda$ 



#### Table.2 Product list

MCR-	22-	047	<b>'</b> 6

1    USB3.0 Host Controller    UPD720202K8-701-BAA-A    PVQN0048KJ-A    51      3    UD720202K8-711-BAA-A    PVQN0048KJ-A    52	mber Package code
2      USBALD Hear Controller      UPD720202K8-711-BAA-A      PVQN0048KJ-A      52      53      53        3      -      -      53      -      -      53      -      -      -      53      -      -      -      53      -      -      -      53      -      -      -      55      -      -      -      55      -      -      -      -      -      57      - </td <td></td>	
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