RTD2795QT-NQ-CG

MULTI-FUNCTION DISPLAY CONTROLLER

DATASHEET

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USING THIS DOCUMENT

This document is intended for the software engineer's reference and provides detailed programming information.

Though every effort has been made to ensure that this document is current and accurate, more information may have become available subsequent to the production of this guide.

REVISION HISTORY

Revision	Release Date	Summary
1.0	2021/14/29	First release.

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1. General Description

The Realtek RTD2795QT-NQ-CG monitor controller combines an analog RGB input interface, multiple HDMI 2.0 compliant digital input interfaces with HDCP1.4/HDCP2.2, multiple DP1.2 digital input interfaces with HDCP1.4/HDCP2.2. The embedded MCU is based on an industrial standard 8051 core with external serial flash.

The RTD2795QT-NQ-CG is suitable for multiple market segments and display applications, such as monitor, All in One PC, and embedded applications.

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2. Features

General

- RTD2795QT-NQ-CG supports input format up to 4096x2160 @ 60Hz
- RTD2795UT -CG supports one analog RGB input and four multiple-digital-interface combo inputs
- Support multiple panel interfaces like V-by-1, and eDP
- Zoom scaling up and down
- Embedded one MCU with SPI flash controller.
- It contains 4 ADCs in key pad application
- Require only one crystal to generate all timing.
- Programmable internal low-voltage-reset (LVR)
- High resolution 6 channels PWM output, and wide range selectable PWM frequency.

Crystal

- Support 14.318MHz crystal type

Analog RGB Input Interface

- 1 Analog input supported
- Integrated 8-bit triple-channel 210MHz ADC/PLL
- Embedded programmable Schmitt trigger of HSYNC
- Support Sync-On-Green (SOG) and various kinds of composite sync modes
- On-chip high-performance hybrid PLLs
- High resolution true 64 phase ADC PLL
- YPbPr support up to HDTV 1080p resolution

Ultra-High Speed Receiver

- RTD2795QT-NQ-CG supports 2 ports of Ultra-High Speed Receiver can support DisplayPort1.4 for HDR capable.
- In DisplayPort mode, three link layer speed HBR2 (5.4GHz), HBR (2.7GHz), RBR (1.62GHz) are supported
- In DisplayPort mode, 6-bit, 8-bit, 10-bit, and 12-bit color depth transport is supported
- In DisplayPort mode, High-Bandwidth Digital Content Protection (HDCP 1.4/HDCP2.2) is supported
- In DisplayPort mode, DisplayPort audio is allowed to transmit to I2S/SPDIF output
- RTD2795QT-NQ-CG supports 2 ports of Ultra-High Speed Receiver can support HDMI2.0 and combo DVI
- In HDMI mode, the latest HDMI2.0 (6GHz) is supported
- In HDMI mode, data enable only mode is supported
- In HDMI mode, 6-bit, 8-bit, 10-bit, and 12-bit color depth transport is supported
- In HDMI mode, High-Bandwidth Digital Content Protection (HDCP 1.4/HDCP2.2) is supported

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- In HDMI mode, HDMI audio is allowed to transmit to I2S/SPDIF output
- In DVI mode, Digital Content Protection (HDCP 1.4) is supported

Embedded MCU

- Industrial standard 8051 core with external serial flash
- Low speed ADC for various application
- I2C Master or Slave hardware supported

Auto Detection /Auto Calibration

- Input format detection
- Compatibility with standard VESA mode and support user-defined mode
- Smart engine for Phase/Image position/Color calibration

Audio

- Output: IIS , SPDIF
- Embedded Audio DAC
- Embedded headphone amp

Scaling

- Fully programmable zoom ratios
- Independent horizontal/vertical scaling
- Advanced zoom algorithm provides high image quality
- Sharpness/Smooth filter enhancement
- Support non-linear scaling from 4:3 to 16:9 or 16:9 to 4:3

Color Processor

- True 12-bit color processing engine
- Programmable 14-bit gamma support
- Programmable 12-bit 3D gamma support
- xvYCC supported
- Adobe/sRGB compliance
- Advanced dithering logic for the fewer panel color depth enhancement
- Dynamic overshoot-smear canceling engine
- Brightness and contrast control
- Peaking/Coring function for video sharpness
- Support UltraVivid III function to enhance image quality with minimal artificial effect on productivity applications
- Panel Uniformity (Brightness and color uniformity)
- Support 17x17x17 3D Gamma LUT

VividColorTM

- Independent color management (ICM)
- Dynamic contrast control (DCC)
- 2nd generation of Precise color mapping (PCM)
- Content adaptive backlight control (CABC)
- Support ADC Noise Reduction

Output Interface

- Support 8-bit / 10-bit output through either V-by-1 and eDP

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- Supports 8-lane V-by-One or 8-lane eDP (HBR) with the output format up to 4k2k (4096x2160 @ 60Hz).
- Support 4-lane eDP (HBR2) with the output format up to 4096x2160 @ 60Hz.
- Flexible data pair swapping for easier system design.
- Fixed Last Line output for perfect panel capability

Embedded OSD

- Embedded 36K SRAM dynamically stores OSD command and fonts
- Support multi-color RAM font, 1, 2 and 4-bit per pixel
- 64 color palette
- Maximum 26 window with alpha-blending /
- gradient / gradient target color / gradient reversed color/ dynamic fade-in/fade-out, bordering/ shadow
- Rotate 90,180,270 degree
- Independent row shadowing/bordering
- Programmable blinking effects for each character
- OSD-made internal pattern generator for factory mode
- Support 12x18 ~ 4x18 proportional font
- Hardware decompression for OSD font
- Support OSD scrolling
- Support 2 independent font based OSD

Frame Buufer Support

- LiveShow™ Function, High-performance RTC (response time compensation).
- Frame Rate Control Function
- Embedded frame buffer

Power Supply

- 3.3V / 1.8V / 1.1V power supply

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3. System Applications

- Display System on Motherboard, Monitor
- Display System for All in One PCs and embedded applications

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4. Pin Assignments

LQFP216



Figure 1. Pin Diagram of LQFP216

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5. Pin Assignments Table

LQFP216 Pin Table

(I/O Legend: A = Analog, I = Input, O = Output, P = Power, G = Ground)

Table 1. Signals Pin Assignment

Pin Name	I/O	Pin #	Description	Note
HDMI_HPD / eCBUS3 / GPIO	IO	1	MHL Cbus / MCU_GPIO / HDMI Hot-plug	5V Tolerance when power off
RX_33V	AP	2	GDI 3.3V Power	(3.3V)
RXCP_3	AI	3	TMDS Differential Signal Input	
RXCN_3	AI	4	TMDS Differential Signal Input	
RX2P_3 / MHLP	AI	5	TMDS Differential Signal Input	
RX2N_3 / MHLN	AI	6	TMDS Differential Signal Input	
TMDS_GND	AG	7	TMDS Ground	
RX1P_3	AI	8	TMDS Differential Signal Input	
RX1N_3	AI	9	TMDS Differential Signal Input	
TMDS_GND	AG	10	TMDS Ground	
RX0P_3	AI	11	TMDS Differential Signal Input	
RX0N_3	AI	12	TMDS Differential Signal Input	
GDI_11V	AP	13	TMDS Differential Signal Input	(1.1V)
HDMI_HPD / eCBUS2/ GPIO	IO	14	MHL Cbus / MCU_GPIO / HDMI Hot-plug	5V Tolerance when power off
RX_33V	AP	15	GDI 3.3V Power	(3.3V)
RXCP_2	AI	16	TMDS Differential Signal Input	
RXCN_2	AI	17	TMDS Differential Signal Input	
RX2P_2 / MHLP	AI	18	TMDS Differential Signal Input	
RX2N_2 / MHLN	AI	19	TMDS Differential Signal Input	
TMDS_GND	AG	20	TMDS Ground	
RX1P_2	AI	21	TMDS Differential Signal Input	
RX1N_2	AI	22	TMDS Differential Signal Input	
TMDS_GND	AG	23	TMDS Ground	
RX0P_2	AI	24	TMDS Differential Signal Input	
RX0N_2	AI	25	TMDS Differential Signal Input	
GDI_11V	AP	26	GDI 1.1V Power	(1.1V)
RX_33V	AP	27	GDI 3.3V Power	(3.3V)
LANE0P_1	AI	28	DP Differential Signal Input	
LANE0N_1	AI	29	DP Differential Signal Input	
DP_GND	AG	30	DP Ground	
LANE1P_1	AI	31	DP Differential Signal Input	
LANE1N_1	AI	32	DP Differential Signal Input	

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DP_GND	AG	33	DP Ground	
LANE2P_1	AI	34	DP Differential Signal Input	
LANE2N_1	AI	35	DP Differential Signal Input	
DP_GND	AG	36	DP Ground	
LANE3P_1	AI	37	DP Differential Signal Input	
LANE3N_1	AI	38	DP Differential Signal Input	
DP_GND	AG	39	DP Ground	
GDI_11V	AP	40	GDI 1.1V Power	(1.1V)
LANE0P_0	AI	41	DP Differential Signal Input	
LANE0N_0	AI	42	DP Differential Signal Input	
DP_GND	AG	43	DP Ground	
LANE1P_0	AI	44	DP Differential Signal Input	
LANE1N_0	AI	45	DP Differential Signal Input	
DP_GND	AG	46	DP Ground	
LANE2P_0	AI	47	DP Differential Signal Input	
LANE2N_0	AI	48	DP Differential Signal Input	
DP_GND	AG	49	DP Ground	
LANE3P_0	AI	50	DP Differential Signal Input	
LANE3N_0	AI	51	DP Differential Signal Input	
DP_GND	AG	52	DP Ground	
GDI_11V	AP	53	GDI 1.1V Power	(1.1V)
ADC_VDD33	AP	54	ADC 3.3V Power	(3.3V)
AVS	AI	55	ADC Vertical Sync Input	5V Tolerance when power off
AHS	AI	56	ADC Horizontal Sync Input	5V Tolerance when power off
B-	AI	57	Negatice Blue analog input (Pb-)	3.3V Tolerance
B+	AI	58	Positive Blue analog input (Pb+)	3.3V Tolerance
G-	AI	59	Negatice Green analog input (Y-)	3.3V Tolerance
G+	AI	60	Positive Green analog input (Y+)	3.3V Tolerance
SOG	AI	61	Sync-On-Green	3.3V Tolerance
R-	AI	62	Negative RED analog input (Pr-)	3.3V Tolerance
R+	AI	63	Positive RED analog input (Pr+)	3.3V Tolerance
ADC_GND	AG	64	ADC Ground	
DDCSCL_VGA /	IO	65	DDC VGA (Open drain I/O) /	5V Tolerance

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GPIO			MCU GPIO	when power off
DDCSDA_VGA / GPIO	IO	66	DDC VGA (Open drain I/O) / MCU GPIO	5V Tolerance when power off
TCON[1] / GPIO / Test4b	IO	67	TCON / MCU_GPIO / Test4b	5V Tolerance when power off
TCON[3] / GPIO / Test4b	IO	68	TCON / MCU_GPIO / Test4b	5V Tolerance when power off
TCON[0] / GPIO / Test4b	IO	69	TCON / MCU_GPIO / Test4b	5V Tolerance when power off
TCON[8] / GPIO / Test4b	IO	70	TCON / MCU_GPIO / Test4b	5V Tolerance when power off
DPTX_HPD / TCON[4] / GPIO	IO	71	DPTX_HPD / TCON / GPIO	5V Tolerance when power off
PVCC	DP	72	Pad Power	(3.3V)
VCCK_ON	DP	73	Core Power	(1.1V)
AUXP0 / GPIO	IO	74	DPRX AUX-CH / MCU GPIO	5V Tolerance when power off
AUXN0 / GPIO	IO	75	DPRX AUX-CH / MCU GPIO	5V Tolerance when power off
AUXP1 / GPIO	IO	76	DPRX AUX-CH / MCU GPIO	5V Tolerance when power off
AUXN1 / GPIO	IO	77	DPRX AUX-CH / MCU GPIO	5V Tolerance when power off
NC		78	NC	
NC		79	NC	
DPTX_VDD11	AP	80	DPTX 1.1V Power	
NC		81	NC	
NC		82	NC	
DPTX_VDD33	AP	83	DPTX 3.3V Power	
NC		84	NC	
NC		85	NC	
DPTX_VDD11	AP	86	DPTX 1.1V Power	
NC		87	NC	
NC		88	NC	

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XI	AI	89	Crystal Input	3.3V Tolerance
XO	AO	90	Crystal Output	3.3V Tolerance
NC		91	NC	
NC		92	NC	
PVCC	DP	93	Pad Power	(3.3V)
A-ADC0/ INT0 / GPIO / Test4b	AI O	94	5bits MCU ADC Input / MCU EXINT / MCU GPIO / Test4b	3.3 V tolerance when using ADC Input; 5V Tolerance power on when using GPIO
A-ADC1 / INT1 / GPIO / Test4b	AI O	95	5bits MCU ADC Input / MCU EXINT / MCU GPIO / Test4b	3.3 V tolerance when using ADC Input; 5V Tolerance power on when using GPIO
TCON[9] / A-ADC2 / GPIO / Test4b	AI O	96	TCON / 5bits MCU ADC Input / MCU GPIO / Test4b	3.3 V tolerance when using ADC Input; 5V Tolerance power on when using GPIO
TCON[10] / A-ADC3 / GPIO / Test4b	AI O	97	TCON / 5bits MCU ADC Input / MCU GPIO / Test4b	3.3 V tolerance when using ADC Input; 5V Tolerance power on when using GPIO
DDR2IO_V18	AP	98	DDR2 1.8V Power	(1.8V)
DDR2IO_V18	AP	99	DDR2 1.8V Power	(1.8V)
VCCK_OFF	DP	100	Core Power	(1.1V)
DDR2IO_V18	AP	101	DDR2 1.8V Power	(1.8V)
DDR2IO_VSS	AG	102	DDR2 IO Ground	
DDR2_PPL_V33	AP	103	DDR PLL 3.3V Power	(3.3V)

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VCCK_OFF	DP	104	Core Power	(1.1V)
DDR2IO_V18	AP	105	DDR2 1.8V Power	(1.8V)
VCCK_OFF	DP	106	Core Power	(1.1V)
DDR2IO_V18	AP	107	DDR2 1.8V Power	(1.8V)
PGND	DG	108	Pad Ground	
AUDIO_HOUTL / SD2 / SPDIF2 / GPIO	AI O	109	AUDIO_HOUTL / I2S / SPDIF / MCU GPIO	3.3V Tolerance
AUDIO_HOUTR / SD3 / SPDIF3 / GPIO	AI O	110	AUDIO_HOUTL / I2S / SPDIF / MCU GPIO	3.3V Tolerance
AUDIO_HP_GND	AG	111	AUDIO HP Ground	
AUDIO_HP_AVDD33	AP	112	AUDIO HP 3.3V Power	(3.3V)
LINE_INL / WS / GPIO	AI O	113	LINE_INL / I2S / MCU GPIO	3.3V Tolerance
LINE_INR / SCK / GPIO	AI O	114	LINE_INR / I2S / MCU GPIO	3.3V Tolerance
AUDIO_REF / MCK / GPIO	AI O	115	AUDIO_REF / I2S / MCU GPIO	3.3V Tolerance
AUDIO_SOUTL / SD0 / SPDIF0 / GPIO	AI O	116	AUDIO_SOUTL / I2S / SPDIF / MCU GPIO	3.3V Tolerance
AUDIO_SOUTR / SD1 / SPDIF1 / GPIO	AI O	117	AUDIO_SOUTR / I2S / SPDIF / MCU GPIO	3.3V Tolerance
AUDIO_DAC_GND	AG	118	Audio DAC Ground	
AUDIO_VDD33	AP	119	Audio DAC 3.3V Power	(3.3V)
DPTX_LANE_N<7>_2/ VTX_TX7N	AO	120	eDPTX / VbyOne	3.3V Tolerance
DPTX_LANE_P<7>_2/ VTX_TX7P	AO	121	eDPTX / VbyOne	3.3V Tolerance
DPTX_VDD11	AP	122	DPTX 1.1V Power	(1.1V)
DPTX_LANE_N<6>_2/ VTX_TX6N	AO	123	eDPTX / VbyOne	3.3V Tolerance
DPTX_LANE_P<6>_2 / VTX_TX6P	AO	124	eDPTX / VbyOne	3.3V Tolerance
DPTX_LANE_N<5>_2 / VTX_TX5N	AO	125	eDPTX / VbyOne	3.3V Tolerance
DPTX_LANE_P<5>_2 / VTX_TX5P	AO	126	eDPTX / VbyOne	3.3V Tolerance
DPTX_VDD11	AP	127	DPTX 1.1V Power	(1.1V)
DPTX_LANE_N<4>_2 / VTX_TX4N	AO	128	eDPTX / VbyOne	3.3V Tolerance

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DPTX_LANE_P<4>_2/ VTX_TX4P	AO	129	eDPTX / VbyOne	3.3V Tolerance
DPTX_VDD33	AP	130	DPTX 3.3V Power	(3.3V)
DPTX_LANE_N<3>_1 / VTX_TX3N	AO	131	eDPTX / VbyOne	3.3V Tolerance
DPTX_LANE_P<3>_1 / VTX_TX3P	AO	132	eDPTX / VbyOne	3.3V Tolerance
DPTX_VDD11	AP	133	DPTX 1.1V Power	(1.1V)
DPTX_LANE_N<2>_1 / VTX_TX2N	AO	134	eDPTX / VbyOne	3.3V Tolerance
DPTX_LANE_P<2>_1 / VTX_TX2P	AO	135	eDPTX / VbyOne	3.3V Tolerance
DPTX_LANE_N<1>_1 / VTX_TX1N	AO	136	eDPTX / VbyOne	3.3V Tolerance
DPTX_LANE_P<1>_1 / VTX_TX1P	AO	137	eDPTX / VbyOne	3.3V Tolerance
DPTX_VDD11	AP	138	DPTX 1.1V Power	(1.1V)
DPTX_LANE_N<0>_1 / VTX_TX0N	AO	139	eDPTX / VbyOne	3.3V Tolerance
DPTX_LANE_P<0>_1 / VTX_TX0P	AO	140	eDPTX / VbyOne	3.3V Tolerance
PVCC	DP	141	Pad Power	(3.3V)
VCCK_OFF	DP	142	Core Power	(1.1V)
eDPTX_AUX_CH_P_2 / GPIO	IO	143	eDPTX_AUX / MCU GPIO	5V Tolerance when power off
eDPTX_AUX_CH_N_2 / GPIO	IO	144	eDPTX_AUX / MCU GPIO	5V Tolerance when power off
eDPTX_HPD2 / VTX_PLL_LOCK / GPIO	IO	145	eDPTX_HPD / MCU GPIO	5V Tolerance when power off
eDPTX_AUX_CH_P_1 / GPIO	IO	146	eDPTX_AUX / MCU GPIO	5V Tolerance when power off
eDPTX_AUX_CH_N_1 / GPIO	IO	147	eDPTX_AUX / MCU GPIO	5V Tolerance when power off
eDPTX_HPD1/ VTX_PLL_HPD / GPIO	IO	148	eDPTX_HPD / MCU GPIO	5V Tolerance when power off
GPIO / IICSCL_1 / TCON[2]	IO	149	TCON / MCU_GPIO / IIC BUS	5V Tolerance when power off
GPIO / IICSDA_1	IO	150	PWM / MCU_GPIO / IIC BUS	5V Tolerance

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/ PWM1				when power off
GPIO / PWM2 / Tcon[3]	IO	151	PWM / TCON / MCU_GPIO	5V Tolerance when power off
GPIO / PWM5 / TCON[2] / Test4b	IO	152	PWM / TCON / MCU_GPIO / Test4b	5V Tolerance when power off
USB_SPI_CLK / CLKO / GPIO / T0	IO	153	SPI Serial Clock / CLKO / MCU GPIO / Timer	5V Tolerance when power off
USB_SPI_SI /INT0/ GPIO / T1	IO	154	SPI Serial Data Input / MCU EXINT / MCU GPIO / Timer	5V Tolerance when power off
USB_SPI_SO/ INT1 / GPIO / T2	IO	155	SPI Serial Data Output / MCU EXINT / MCU GPIO / Timer	5V Tolerance when power off
USB_SPI_CEB0 / IRQB / GPIO / DVS	IO	156	SPI Chip Enable / IRQB / MCU GPIO / DVS	5V Tolerance when power off
USB_SPI_CEB1 / T2EX / GPIO	IO	157	SPI Chip Enable / T2EX / MCU GPIO	5V Tolerance when power off
WS / TCON[12] / GPIO / Test4b	IO	158	I2S / TCON / MCU GPIO / Test4b	5V Tolerance when power off
SCK / TCON[13] / GPIO / Test4b	IO	159	I2S / TCON / MCU GPIO / Test4b	5V Tolerance when power off
MCK / GPIO / Test4b	IO	160	I2S / MCU GPIO / Test4b	5V Tolerance when power off
SPDIF0 / SD0 / GPIO / PWM0	IO	161	PWM / SPDIF / I2S / MCU GPIO	5V Tolerance when power off
PVCC	DP	162	Pad Power	(3.3V)
GPIO / TCON[5] / SPDIF1 / SD1	IO	163	TCON / SPDIF / I2S / MCU GPIO	5V Tolerance when power off
GPIO / Cryclk / TCON[1] / SPDIF2 / SD2	IO	164	TCON / SPDIF / I2S / MCU GPIO	5V Tolerance when power off
GPIO / TCON[6] / SPDIF3 / SD3	IO	165	TCON / SPDIF / I2S / MCU GPIO	5V Tolerance when power off

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PWM3 / GPIO / IVS / TCON[8]	IO	166	TCON / PWM / MCU GPIO	5V Tolerance when power off
DDR2IO_V18	AP	167	DDR2 1.8V Power	(1.8V)
DDR2IO_V18	AP	168	DDR2 1.8V Power	(1.8V)
VCCK_OFF	DP	169	Core Power	(1.1V)
DDR2IO_V18	AP	170	DDR2 1.8V Power	(1.8V)
DDR2IO_VSS	AG	171	DDR2 IO Ground	
DDR2_PPL_V33	AP	172	DDR PLL 3.3V Power	(3.3V)
VCCK_OFF	DP	173	Core Power	(1.1V)
DDR2IO_V18	AP	174	DDR2 1.8V Power	(1.8V)
VCCK_OFF	DP	175	Core Power	(1.1V)
DDR2IO_V18	AP	176	DDR2 1.8V Power	(1.8V)
PVCC	IO	177	Pad Power	(3.3V)
VCCK_ON	IO	178	Core Power	(1.1V)
GPIO / DHS / Test4b	IO	179	MCU GPIO / Test4b	5V Tolerance when power off
GPIO / DENA / Test4b	IO	180	MCU GPIO / Test4b	5V Tolerance when power off
GPIO / DCLK / Test4b	IO	181	MCU GPIO / Test4b	5V Tolerance when power off
DDR2IO_V18	AP	182	DDR2 1.8V Power	(1.8V)
PGND / DDR2IO_VSS	AG	183	DDR2 IO Ground	
GPIO / CLKO / TCON[11] / PWM0	IO	184	TCON / PWM / MCU GPIO	5V Tolerance when power off
PWM1 / GPIO / IENA / TCON[7]	IO	185	TCON / PWM / MCU GPIO	5V Tolerance when power off
SPI_CLK	IO	186	SPI flash serial clock	3.3V Tolerance
SPI_SI	IO	187	SPI flash serial Data Input	3.3V Tolerance
SPI_SO	IO	188	SPI flash serial Data Output	3.3V Tolerance
SPI_CEB	IO	189	SPI flash Chip Enable	3.3V Tolerance
FLASH_WP / GPIO	IO	190	FLASH Write Protect / MCU GPIO	5V Tolerance when power off

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RESETB	I	191	Chip reset bar	Low active; 5V tolerance even when power-off
VCCK_ON	DP	192	Core Power	(1.1V)
GPIO / Test4b	IO	193	MCU GPIO / Test4b	5V Tolerance power on
PWM2 / TCON[6] / IR_RECEIVER / GPIO	IO	194	PWM / TCON / IR Receiver / MCU GPIO	5V Tolerance when power off
PWM4 / TCON[7] / GPIO / pwm_out	IO	195	PWM / TCON / PWM OUT / MCU GPIO	5V Tolerance when power off
TCON[5] / GPIO / Test4b	IO	196	TCON / MCU GPIO / Test4b	5V Tolerance when power off
TCON[4]] / GPIO / Test4b	IO	197	TCON / MCU GPIO / Test4b	5V Tolerance when power off
GPIO / IHS / Test4b	IO	198	MCU GPIO / Test4b	5V Tolerance when power off
PWM5 / GPIO / pwm_in	IO	199	PWM / PWM IN / MCU GPIO	5V Tolerance when power off
IICSCL_2 / PWM4 / TCON[11] / GPIO	IO	200	PWM / TCON / IIC BUS / MCU GPIO	5V Tolerance when power off
IICSDA_2 / PWM3 / TCON[0] / GPIO	IO	201	PWM / TCON / IIC BUS / MCU GPIO	5V Tolerance when power off
INT0 / UART_TX /GPIO / Test4b	IO	202	MCU EXINT / UART TX / MCU GPIO / Test4b	5V Tolerance when power off
INT1/ UART_RX / GPIO / Test4b	IO	203	MCU EXINT / UART RX / MCU GPIO / Test4b	5V Tolerance when power off
TCON[13] / GPIO / Test4b	IO	204	TCON / MCU GPIO / Test4b	5V Tolerance when power off
PVCC	DP	205	Pad Power	(3.3V)
TCON[12] / GPIO / Test4b	IO	206	TCON / MCU GPIO / Test4b	5V Tolerance when power off
TCON[10] / GPIO	IO	207	TCON / MCU GPIO / Test4b	5V Tolerance

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/ Test4b				when power off
TCON[9] / GPIO / Test4b	IO	208	TCON / MCU GPIO / Test4b	5V Tolerance when power off
EEWD / GPIO	IO	209	MCU GPIO	5V Tolerance when power off
EEI2CSCL / GPIO	IO	210	EEprome IIC BUS / MCU GPIO	5V Tolerance when power off
EEI2CSDA / GPIO	IO	211	EEprome IIC BUS / MCU GPIO	5V Tolerance when power off
DDCSCL2 / GPIO	IO	212	DDC Channel (Open drain I/O) / MCU GPIO	5V Tolerance when power off
DDCSDA2 / GPIO	IO	213	DDC Channel (Open drain I/O) / MCU GPIO	5V Tolerance when power off
DDCSCL3 / GPIO	IO	214	DDC Channel (Open drain I/O) / MCU GPIO	5V Tolerance when power off
DDCSDA3 / GPIO	IO	215	DDC Channel (Open drain I/O) / MCU GPIO	5V Tolerance when power off
TMDS REXT	AI	216	Impedance Match Resistor	12K ohm Reference to GND

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6. Electrical Specifications

Electrical Specifications

LQFP216 DC Characteristics (RTD2795QT-NQ-CG Series)

6.1. Recommended Operating Conditions

Table 2. Recommended Operating Conditions of LQFP216

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Voltage on Input (5V tolerance)	V_{IN}	-1		5	V
Supply Voltage	PVCC	3.14	3.30	3.47	V
DDR Voltage	DDR2_V18	1.7	1.8	1.9	V
Core Power On Voltage	VCCK_ON	1.05	1.1	1.15	V
Core Power Off Voltage	VCCK_OFF	1.05	1.1	1.15	V
Electrostatic Discharge	V_{ESD}			±2.5	kV
Latch-Up	I_{LA}			±100	mA
Ambient Operating Temperature	T_A	0		70	ºC
Storage Temperature (plastic)	T_{STG}	-55		110	ºC
Thermal Resistance (Junction to Air)	θ_{JA}		26.0		ºC/W
Thermal Resistance (Junction to Case)	θ_{JC}		9.9		ºC/W
Junction Acceptable Temperature	T_j			125	ºC

6.2. Absolute Maximum Ratings

Table 3. Absolute Maximum Ratings of LQFP216

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Supply Voltage	PVCC			3.6	V
	DDR2_V18			1.98	V
	VCCK_ON			1.21	V
	VCCK_OFF			1.21	V
Storage Temperature (plastic)	T_{STG}			150	ºC
Junction Acceptable Temperature	T_j			125	ºC

Note : Operation under the absolute maximum ratings does not imply well-functioning. Long-term stress to the absolute maximum ratings would probably affect the device reliability or further cause permanent damage.

6.3. Reset Period

Table 4. Reset Period of LQFP216

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Reset Pulse Period	Trst-en[1]	1120			ns
Power-on-Reset Period	Tpor-rst[2]	145	146.5	148	ms

1. 16 * Xtal_cycle(1/14.3Mhz)
2. 65536*16*2*Xtal_cycle(1/14.3Mhz)

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7. Mechanical Specifications

Low Profile Plastic Quad Flat Package 216 Leads

24x24mm^2 Outline

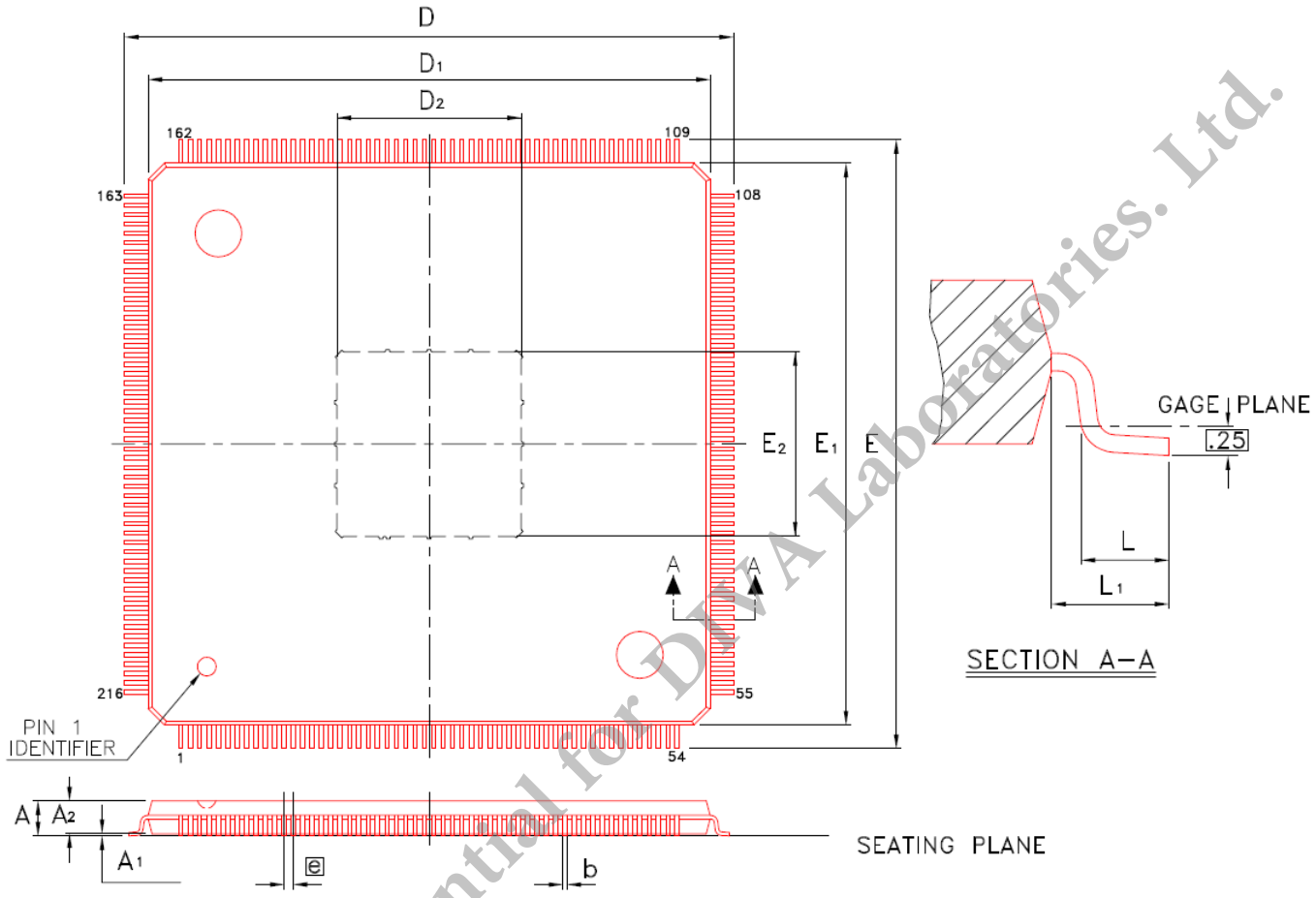

Figure 2. Mechanical Specification of LQFP216 Leads

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Symbol	Dimension in mm			Dimension in inch		
	Min	Nom	Max	Min	Nom	Max
A	—	—	1.60	—	—	0.063
A1	0.05	—	0.15	0.002	—	0.006
A2	1.35	1.40	1.45	0.053	0.055	0.057
b	0.13	0.18	0.23	0.005	0.007	0.009
D/E	26.00 BSC			1.024 BSC		
D1/E1	24.00 BSC			0.945 BSC		
D2/E2	6.25	6.50	6.75	0.246	0.256	0.266
e	0.40 BSC			0.016 BSC		
L	0.45	0.60	0.75	0.018	0.024	0.030
L1	1.00 REF			0.039 REF		

Notes：

1. CONTROLLING DIMENSION：MILLIMETER(mm).
2. REFERENCE DOCUMENTL：JEDEC MS-26.

Table 5. Mechanical Specification of LQFP216 Leads

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8. Ordering Information

Table 6. Ordering Information

Part No.	Max. Resolution	Input : VGA	Input : DP1.2 HBR2	Input : HDMI2.0/DVI	Output : Vx1/eDP HBR (x8)	Output : eDP HBR2 (x4)	FRC	OD	PKG
RTD2795QT-NQ-CG	4096x2160 @ 60Hz	●	2 Ports	2 Ports	●	●	●	●	LQFP216

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