

RENESAS TECHNICAL UPDATE

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Product Category	MPU/MCU		Document No.	TN-RA*-A0135A/E	Rev.	1.00
Title	Changes the Data Transfer Rate of the CANFD		Information Category	Technical Notification		
Applicable Product	RA6T2, RA6E2, RA4E2, RA6T3, RA4T1 Group	Lot No.	Reference Document	Refer table at the end of this document		
		All				

This document describes the changes regarding the data transfer rate for communications of the CANFD module in the user's manuals: hardware for the applicable products stated above.

1. "CANFD module specifications" table is changed.

Before correction

Table 28.1 CANFD module specifications for RA6T2

Parameter	Specifications	
Communication	CAN functionality conforms to CANFD ISO 11898-1 (2015)	
Protocol engine version	RS-CANFD_PE V3.0	
Data transfer rate	CANFD ¹	Up to 1 Mbps for arbitration phase and up to 5 Mbps for data phase
	Classical CAN	Up to 1 Mbps
Operation frequency Peripheral clock	60 MHz (PCLKB) RAM clock: 120 MHz (PCLKA)	
Data Link Layer (DLL) clock	Max ≤ 40 MHz	
(Omitted)		
TrustZone Filter	One security attribution can be set	

Note 1. The CANFD mode is available only for CANFD supported product.

Table 28.1 CANFD module specifications for RA6E2, RA4E2

Table 27.1 CANFD module specifications for RA6T3

Table 26.1 CANFD module specifications for RA4T1

Parameter	Specifications	
Communication	CAN functionality conforms to CANFD ISO 11898-1 (2015)	
Protocol engine version	RS-CANFD_PE V3.0	
Data transfer rate	CANFD	Up to 1 Mbps for arbitration phase and up to 5 Mbps for data phase
	Classical CAN	Up to 1 Mbps
Operation frequency Peripheral clock	60 MHz (PCLKB) RAM clock: 120 MHz (PCLKA)	
Data Link Layer (DLL) clock	Max ≤ 40 MHz	
(Omitted)		
TrustZone Filter	One security attribution can be set	

After correction

Table 28.1 CANFD module specifications for RA6T2

Parameter	Specifications
Communication	CAN functionality conforms to CANFD ISO 11898-1 (2015)
Protocol engine version	RS-CANFD_PE V3.0
Data transfer rate	CANFD ^{*1, *2} Up to 1 Mbps for arbitration phase and up to 8 Mbps for data phase
	Classical CAN Up to 1 Mbps
Operation frequency Peripheral clock	60 MHz (PCLKB) RAM clock: 120 MHz (PCLKA)
Data Link Layer (DLL) clock	Max ≤ 40 MHz
(Omitted)	
TrustZone Filter	One security attribution can be set

Note 1. The CANFD mode is available only for CANFD supported product.

Note 2. The maximum reliable communication bit-rate depends on board-design and environmental factors. Sufficient evaluation is recommended on actual target hardware.

Table 28.1 CANFD module specifications for RA6E2, RA4E2

Table 27.1 CANFD module specifications for RA6T3

Table 26.1 CANFD module specifications for RA4T1

Parameter	Specifications
Communication	CAN functionality conforms to CANFD ISO 11898-1 (2015)
Protocol engine version	RS-CANFD_PE V3.0
Data transfer rate	CANFD ^{*1} Up to 1 Mbps for arbitration phase and up to 8 Mbps for data phase
	Classical CAN Up to 1 Mbps
Operation frequency Peripheral clock	60 MHz (PCLKB) RAM clock: 120 MHz (PCLKA)
Data Link Layer (DLL) clock	Max ≤ 40 MHz
(Omitted)	
TrustZone Filter	One security attribution can be set

Note 1. The maximum reliable communication bit-rate depends on board-design and environmental factors. Sufficient evaluation is recommended on actual target hardware.

2. “Clock restriction” table is changed.

Before correction

Table 28.2 Clock restriction for RA6T2, RA6E2, RA4E2

Table 27.2 Clock restriction for RA6T3

Table 26.2 Clock restriction for RA4T1

	Baud rate	PCLKB
CANFD	1 Mbps Nominal 5 Mbps Data	PCLKB ≥ 40 MHz
	500 Kbps Nominal 5 Mbps Data	PCLKB ≥ 32 MHz
Classical CAN	1 Mbps Data	PCLKB ≥ 32 MHz

After correction

Table 28.2 Clock restriction for RA6T2, RA6E2, RA4E2

Table 27.2 Clock restriction for RA6T3

Table 26.2 Clock restriction for RA4T1

	Baud rate	PCLKB
CANFD	1 Mbps Nominal 8 Mbps Data^{*1}	PCLKB ≥ 40 MHz
	500 Kbps Nominal 5 Mbps Data	PCLKB ≥ 32 MHz
Classical CAN	1 Mbps Data	PCLKB ≥ 32 MHz

Note 1. The maximum reliable communication bit-rate depends on board-design and environmental factors. Sufficient evaluation is recommended on actual target hardware.

3. "Bit timing examples" table is corrected.

Before correction

Table 28.20 Bit timing examples for RA6T2, RA6E2, RA4E2

Table 27.20 Bit timing examples for RA6T3

Table 26.20 Bit timing examples for RA4T1

1 bit	Set value (TQ)				Sample point*1 (%)
	SS	TSEG1	TSEG2	SJW	
5TQ	1	2	2	1	60.00
8TQ	1	4	3	1	62.50
	1	5	2	1	75.00
(omitted)					
24TQ	1	15	8	1	66.66
	1	16	7	1	70.83
50TQ	1	39	10	4	80.00

Note 1. Sample point (in case of 75%)

After correction

Table 28.20 Bit timing examples for RA6T2, RA6E2, RA4E2

Table 27.20 Bit timing examples for RA6T3

Table 26.20 Bit timing examples for RA4T1

1 bit	Set value (TQ)				Sample point (%)
	SS	TSEG1	TSEG2	SJW	
5TQ	1	2	2	1	60.00
8TQ	1	4	3	1	62.50
	1	5	2	1	75.00
(omitted)					
24TQ	1	15	8	1	66.66
	1	16	7	1	70.83
50TQ	1	39	10	4	80.00

~~Note 1. Sample point (in case of 75%)~~

4. The description of "Transmitter Delay Compensation" is changed.

Before correction

28.4.1.5 Transmitter Delay Compensation for RA6T2, RA6E2, RA4E2

27.4.1.5 Transmitter Delay Compensation for RA6T3

26.4.1.5 Transmitter Delay Compensation for RA4T1

This chapter is not valid for classical CAN.

When a high baud rate is used such as 5 Mbps for the data phase, the transmitter delay can become greater than TSEG1.

After correction

28.4.1.5 Transmitter Delay Compensation for RA6T2, RA6E2, RA4E2

27.4.1.5 Transmitter Delay Compensation for RA6T3

26.4.1.5 Transmitter Delay Compensation for RA4T1

This chapter is not valid for classical CAN.

When a high baud rate is used such as **5 to 8 Mbps** for the data phase, the transmitter delay can become greater than TSEG1.

5. "CANFD interface timing" table and "CANFD interface condition" figure are changed.

Before correction

Table 46.33 CANFD interface timing for RA6T2

Table 45.36 CANFD interface timing for RA6E2

Table 44.35 CANFD interface timing for RA4E2

Table 42.34 CANFD interface timing for RA6T3

Table 41.34 CANFD interface timing for RA4T1

Parameter	Symbol	CAN		CAN-FD		Unit	Test conditions
		Min	Max	Min	Max		
Internal delay time	t_{node}	—	100	—	75	ns	Figure 46.49 for RA6T2 Figure 45.59 for RA6E2 Figure 44.57 for RA4E2 Figure 42.52 for RA6T3 Figure 41.52 for RA4T1
Transmission rate		—	1	—	5	Mbps	

Note: $t_{node} = t_{output} + t_{input}$

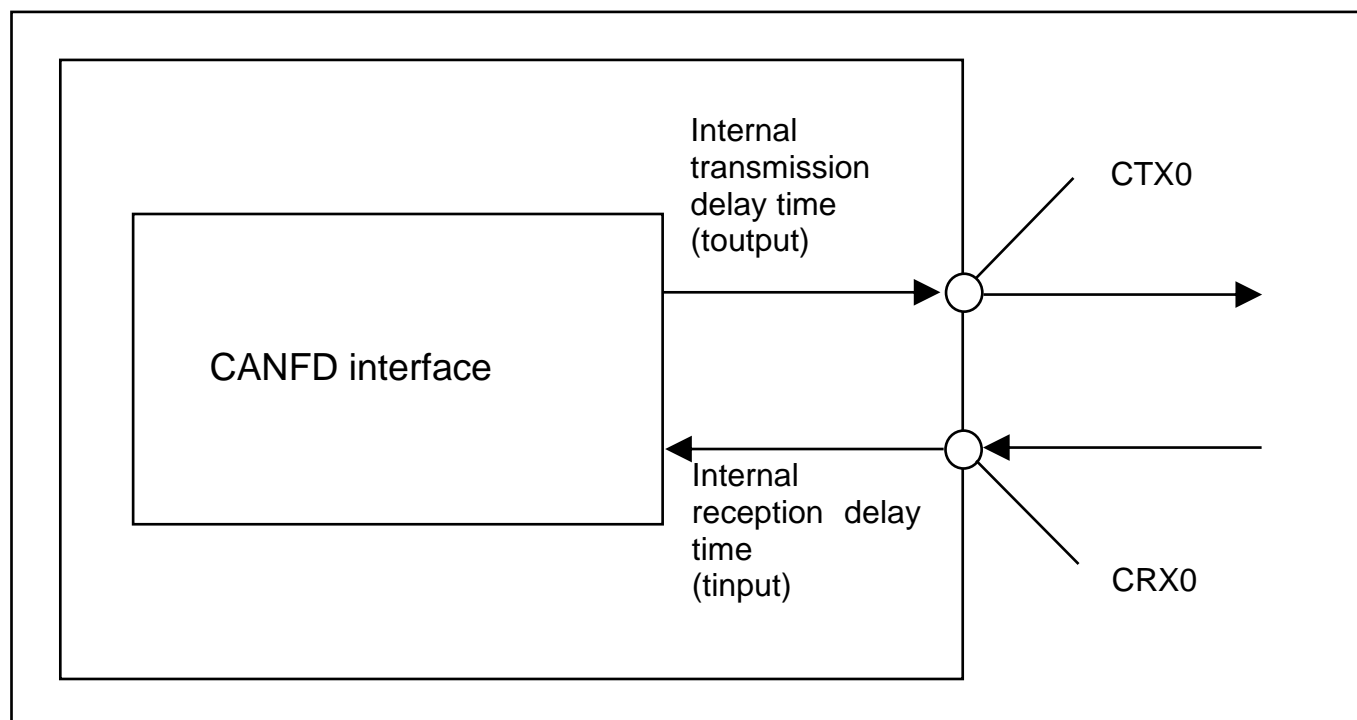


Figure 46.49 CANFD interface condition for RA6T2

Figure 45.59 CANFD interface condition for RA6E2

Figure 44.57 CANFD interface condition for RA4E2

Figure 42.52 CANFD interface condition for RA6T3

Figure 41.52 CANFD interface condition for RA4T1

After correction

Table 46.33 CANFD interface timing for RA6T2

Table 45.36 CANFD interface timing for RA6E2

Table 44.35 CANFD interface timing for RA4E2

Table 42.34 CANFD interface timing for RA6T3

Table 41.34 CANFD interface timing for RA4T1

Parameter	Symbol	CAN		CAN-FD		Unit	Test conditions
		Min	Max	Min	Max		
Internal delay time	t_{node}	—	100	—	75	ns	Figure 46.49 for RA6T2 Figure 45.59 for RA6E2 Figure 44.57 for RA4E2 Figure 42.52 for RA6T3 Figure 41.52 for RA4T1
Transmission rate	=	—	4	—	5	Mbps	=

Note: $t_{node} = t_{d(CTX)} + t_{d(CRX)}$

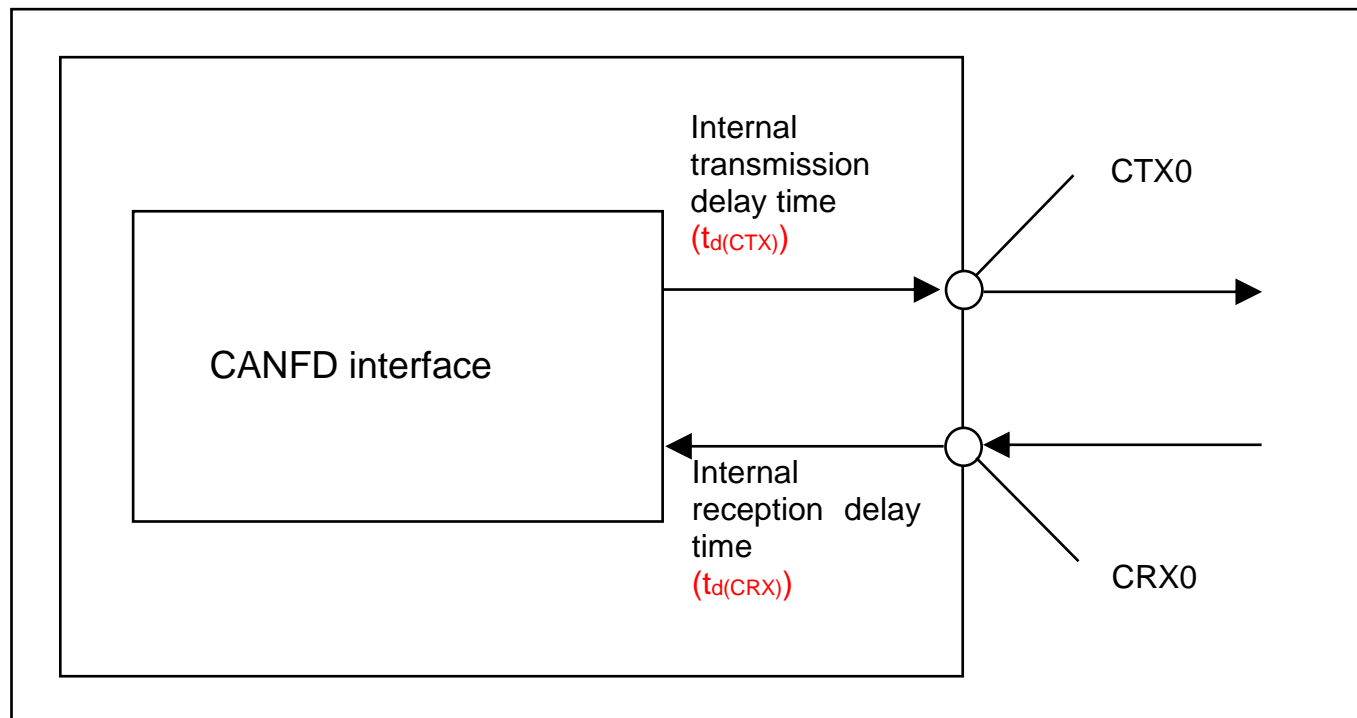


Figure 46.49 CANFD interface condition for RA6T2
 Figure 45.59 CANFD interface condition for RA6E2
 Figure 44.57 CANFD interface condition for RA4E2
 Figure 42.52 CANFD interface condition for RA6T3
 Figure 41.52 CANFD interface condition for RA4T1

Reference Document Table.

Product	Document name
RA4E2 Group	Renesas RA4E2 Group User's Manual: Hardware Rev. 1.30
RA4T1 Group	Renesas RA4T1 Group User's Manual: Hardware Rev. 1.20
RA6E2 Group	Renesas RA6E2 Group User's Manual: Hardware Rev. 1.30
RA6T2 Group	Renesas RA6T2 Group User's Manual: Hardware Rev. 1.40
RA6T3 Group	Renesas RA6T3 Group User's Manual: Hardware Rev. 1.20