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RENESAS TECHNICAL UPDATE

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Product Category	Application Specific Standard Product		Document No.	TN-USB-A0005A/E	Rev.	1.00
Title	Notification for additional restriction on usage of SMBus Interface of USB Power Delivery Controller (R9A02G011, R9J02G012)		Information Category	Technical Notification		
Applicable Product	R9A02G011GNP#AC0, R9A02G011GBG#AC0, R9J02G012xxxGBG#AC0	Lot No.	Reference Document	R9A02G011 User's Manual (R19UH0102EJ0230) R9J02G012 User's Manual (R19UH0107EJ0230) R9A02G011/R9J02G012 Application Note (R19AN0062EJ0150)		

Some restrictions need to be placed on the behavior of the hardware to avoid the following issue.

1. Issue overview

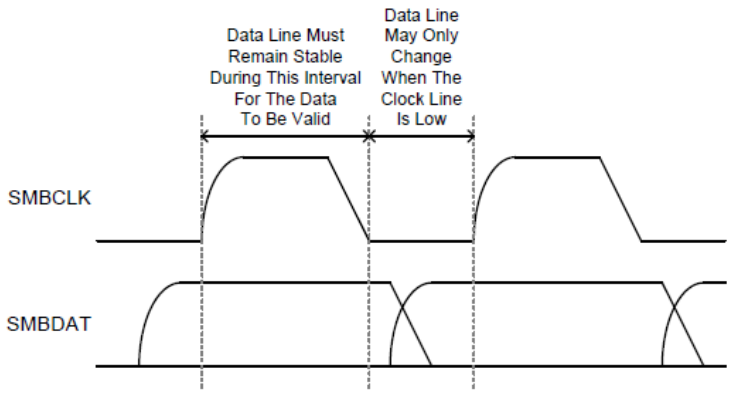
When SMBus master reads the R9A02G011/R9J02G012's SMBus Slave Port and the master's ACK response to the R9A02G011/R9J02G012's Read Data takes more than 43μs, next Read Data will be corrupted to 0xFF. The issue will happen with any SMBus clock speed of Word or Block Read transaction.

2. Issue details

The issue will happen during Word or Block Read transaction. The R9A02G011/R9J02G012 has a function to count a length of SCL low period. But it misunderstands it receives the NACK when the SCL low period is longer than 43μs and terminates the Read Transaction.

The SCL is kept low at that point and the SDA may be invalid. So that the R9A02G011/R9J02G012 as I2C/SMBus slave shall not sample the SDA at that point and shall not determine if it receives ACK or NACK.

Note that the SMBus specification has timeout definition of SCL low period, but it is min. 25ms to max. 35ms. The I2C specification does not have such timeout so that SCL low can be infinite.



SMBus Data validity (System Management Bus (SMBus) Specification V3.2, Fig. 10)

3. Restriction / workaround

   I. When SMBus master performs Word Read or Block Read, SMBus master shall respond ACK/NACK within 40μs for each read data.

   II. Modify the SMBus slave ALTER register from Read Clear to Write Clear so that when the bug occurs, the SMBus master will discard the erroneous data and re-read the register.

4. Revision update

Renesas plans to update User's Manual and Application Note at April 2024.