



# Flash EEPROM Emulation Write / Read Time

for TraveoII series

Automotive Software Jan. 22<sup>th</sup>, 2020



# FEE Write Time

## [Pre-condition]

- 1 block data(data size is 64 bytes) exists.
- FeeCallCycle, FlsCallCycle = 0 (no interval)
- One sector size for FEE is 4096byte.

<Data Sheet>

4 byte write

MCU Clock = 160 Mhz  
(typ) (worst)  
30 us 60 us

## [Typical write]

- Data copy =  $64/304 * 100 = 21 \text{ us}$
- fls\_compare =  $64/128 * 40 = 20 \text{ us}$
- Flash write =  $(64+16+4)/4 * 30 = 630 \text{ us}$
- Product spec time =  $5+20+20 = 45 \text{ us}$

Result = 716 us

## [Worst write]

- Data copy =  $64/304 * 100 = 21 \text{ us}$
- fls\_compare =  $64/128 * 40 = 20 \text{ us}$
- Flash write =  $(64+16+4)/4 * 60 = 1260 \text{ us}$
- Product spec time =  $5+20+20 = 45 \text{ us}$

Result = 1346 us

## [TREND (writing byte and time) ]

|            | Typ duration<br>(us) | Worst duration<br>(us) |
|------------|----------------------|------------------------|
| 4 (byte)   | 228                  | 408                    |
| 8 (byte)   | 261                  | 471                    |
| 16 (byte)  | 325                  | 595                    |
| 32 (byte)  | 456                  | 846                    |
| 64 (byte)  | 716                  | 1346                   |
| 128 (byte) | 1237                 | 2347                   |
| 256 (byte) | 2279                 | 4349                   |
| 512 (byte) | 4363                 | 8353                   |

# FEE Read Time

## [Pre-condition]

- 10 block data(data size of all block is 64 bytes) exists.
- One sector size for FEE is 4096byte.

< “Typical” and “Worst” define as the following states.>

- Typical : normal read operation.
- Worst : read operation after Fee\_Cancel was executed in recycling.

## [Typical read]

- fee\_read = 5 us
- product spec mainfunction = 10 us
- copy data by fls =  $64/128 * 40$  us

**\*Result = 35 us**

## [Worst read]

- fee\_read = 5 us
- search block =  $10 * 10$  us
- copy data by FLS =  $64/128 * 40$  us

**\*Result = 125 us**

## [TREND (reading byte and time ) ]

|            | Typ duration<br>(us) | Worst duration<br>(us) |
|------------|----------------------|------------------------|
| 4 (byte)   | 16                   | 106                    |
| 8 (byte)   | 18                   | 108                    |
| 16 (byte)  | 20                   | 110                    |
| 32 (byte)  | 25                   | 115                    |
| 64 (byte)  | 35                   | 125                    |
| 128 (byte) | 55                   | 145                    |
| 256 (byte) | 95                   | 185                    |
| 512 (byte) | 175                  | 265                    |



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