

Release Note for MBI5168/ 5169/5170/5171

VA.00, August 2004

1. Add Tables for Switching Characteristics and Electrical Characteristics at $V_{DD} = 3.3V$.
2. The minimum value for "High level" Input Voltage is modified as $0.7V_{DD}$ (from $0.8V_{DD}$).
3. Propagation Delay Time at $V_{DD} = 5.0V$ is modified. See the below table. The previous values are **in red**.

Characteristic		Symbol	Condition	Min.	Typ.	Max.	Unit
Propagation Delay Time ("L" to "H")	CLK - \overline{OUTn}	t_{pLH1}	Test Circuit for Switching Characteristics $V_{DD} = 5.0 V$ $V_{DS} = 0.8 V$ $V_{IH} = V_{DD}$ $V_{IL} = GND$ $R_{ext} = 372 \Omega$ $V_L = 4.0 V$ $R_L = 64 \Omega$ $C_L = 10 pF$	-	100 (50)	150 (100)	ns
	LE - \overline{OUTn}	t_{pLH2}		-	100 (50)	150 (100)	ns
	\overline{OE} - \overline{OUTn}	t_{pLH3}		-	100 (20)	150 (100)	ns
	CLK - SDO	t_{pLH}		20 (15)	25	30 (-)	ns
Propagation Delay Time ("H" to "L")	CLK - \overline{OUTn}	t_{pHL1}		-	100	150	ns
	LE - \overline{OUTn}	t_{pHL2}		-	100	150	ns
	\overline{OE} - \overline{OUTn}	t_{pHL3}		-	100	150	ns
	CLK - SDO	t_{pHL}		20 (15)	25	30 (-)	ns
Pulse Width	CLK	$t_{w(CLK)}$		20	-	-	ns
	LE	$t_{w(L)}$		20	-	-	ns
	\overline{OE} (@ $I_{out} < 60mA$)	$t_{w(OE)}$		200	-	-	ns
Output Rise Time of Vout (turn off)		t_{or}		-	120 (40)	150 (120)	ns
Output Fall Time of Vout (turn on)		t_{of}		-	200 (70)	250 (200)	ns

The below description is only for MBI5170/5171 Datasheet VA.00

- A. Current Gain Range is changed **from 0.5~1.984 to 1/12~0.992**.
- B. Configuration Code is changed **from 7 bits to 8 bits**.
- C. The power-on default code of Bit 0 is changed **from "don't care" to 1**.
- D. The min. V_{DD} for **MBI5170 V0.3 is 4.5V, but 3.0V for MBI5170 V0.4**.
- E. Users do not need to change the value of the external resistor. To keep the same current, users just need to program different gain code.

The addendum is a comparison table between the old and the latest Current Gain. For Your Reference.

Items	MBI5170/ 5171(V0.3)	MBI5170/ 5171(VA.00)
Current Gain Range	Min : Max = 0.5 : 1.984 ~ 1:4	Min : Max = 1/12 : 0.992 ~ 1:12
Configuration Code	7 bits → {HC, CC[0:5]}	8 bits → {CM, HC, CC[0:5]}
Step Number	128 steps	256 steps
Formula	$G = (1 + HC) \times (1 + D/64)/2$ $V_{REXT} = 1.25V / 2 \times G$ $I_{OUT} = V_{REXT} / R_{EXT} \times 15$ $= (1.25V/R_{EXT} \times 15) \times \mathbf{G/2}$	$VG = (1 + HC) \times (1 + D/64)/4$ $CG = VG \times 3^{(CM-1)}$ $V_{REXT} = 1.25V \times VG$ $I_{OUT} = V_{REXT}/R_{EXT} \times 15 \times 3^{(CM-1)}$ $= (1.25V/R_{EXT} \times 15) \times \mathbf{CG}$
Power-on default code	Bit 0 =Don't Care; Bit 1~ 7 = 1	Bit 0 =1; Bit 1~7 = 1
Power-on Default Value	$G = 127/64 = 1.984$ $HC = 1; D = 63$ $V_{R-EXT} = 1.24V$	$VG = 127/128 = 0.992, CG = 0.992$ $CM=1; HC = 1; D = 63$ $V_{R-EXT} = 1.24V$
Power-on Default I_{OUT}	$(1.24 / R_{ext}) \times 15$	$(1.24 / R_{ext}) \times 15$
Bit skew improvement @ $I_{OUT} < 40mA$		Much Improved @ CM=0
Vdd operation range	4.5(min), 5.0(typ), 5.5(max)	3.0(min) , 5.0(typ), 5.5(max)
In Summary	Besides Vdd range, MBI5170(V0.3) is equivalent to MBI5170(VA.00) with CM=1	

VA.01, August 2004

1. Modify a number error in a formulation of MBI5170/5171 Datasheet:

$VG = (1+0) \cdot (1+0/64)/4 = 1/2 = 0.5$; and $CG = 0.5 \rightarrow VG = (1+1) \cdot (1+0/64)/4 = 1/2 = 0.5$; and $CG = 0.5$

VA.02, March 2005

1. Provide information for “Pb-free & Green” Package
2. Modify the supply current(Idd) in the table of “Electrical Characteristics” (3.3V, 5.0V)
3. Update product ordering information