

Release Note for MBI1802/1804/ 1816

V1.01, April 2005

1. Add green product package.

V1.02, August 2005

1. General modifications for MBI1802/1804/1816

- a. Wording and typo corrections
- b. Add in a thermal sensor block on the Functional Diagram
- c. Provide operating junction temperature ($T_{j,max}$) on the Maximum Ratings Table
- d. Provide junction temperature threshold (T_X) in the Electrical Characteristics section
- e. Modify Thermal Protection (TP) temperature to 150°C
- f. Modify supply current in the Electrical Characteristics section

Supply Current	"OFF"	$I_{DD}(off) 1$	$R_{ext}=Open, \overline{OUT0} \sim \overline{OUT1} = Off$	-	5	9	mA
		$I_{DD}(off) 2$	$R_{ext}=2.4k\Omega, \overline{OUT0} \sim \overline{OUT1} = Off$	-	6	10	
		$I_{DD}(off) 3$	$R_{ext}=1.8k\Omega, \overline{OUT0} \sim \overline{OUT1} = Off$	-	8	12	
	"ON"	$I_{DD}(on) 1$	$R_{ext}=2.4k\Omega, \overline{OUT0} \sim \overline{OUT1} = On$	-	6	10	
		$I_{DD}(on) 2$	$R_{ext}=1.8k\Omega, \overline{OUT0} \sim \overline{OUT1} = On$	-	7	10	

- g. Modify the Switching Characteristics section

MBI1802

Characteristic		Symbol	Condition	Min.	Typ.	Max.	Unit
\overline{ERR} Output Voltage		V_{OL}	$I_{OL}=+1.0mA$	-	-	0.5	V
\overline{ERR} Turn On Impedance		$R_{DS,(ON),ERR}$	Refer to the "Test Circuit for Electrical Characteristics"	200	300	500	Ω
Propagation Delay Time ("L" to "H")	$\overline{OE} - \overline{OUTn}$	t_{PLH}	$V_{DD}= 5.0 V$ $V_{DS}= 1.0V$ $V_{IH}= V_{DD}$ $V_{IL}= GND$ $R_{ext}= 1630\Omega$ $(I_{OUTn}=360mA)$ $V_L= 4.0V$ $R_L= 8.684\Omega$ $C_L= 10 pF$	0.3	0.5	1	μs
Propagation Delay Time ("H" to "L")	$\overline{OE} - \overline{OUTn}$	t_{PHL}		0.3	0.5	1	μs
Pulse Width	\overline{OE}	$t_{w(OE)}$		1	-	-	μs
Output Rise Time of \overline{OUT} (turn off)		t_{or}		0.3	0.5	1	μs
Output Fall Time of \overline{OUT} (turn on)		t_{of}		0.3	0.5	1	μs

MBI1804

Characteristic		Symbol	Condition	Min.	Typ.	Max.	Unit
Propagation Delay Time (“L” to “H”)	$\overline{OE} - \overline{OUTn}$	t_{pLH}	$V_{DD} = 5.0\text{ V}$ $V_{DS} = 1.0\text{V}$ $V_{IH} = V_{DD}$ $V_{IL} = \text{GND}$ $R_{ext} = 1226\Omega$ $(I_{OUTn} = 240\text{mA})$ $V_L = 4.0\text{ V}$ $R_L = 11.896\Omega$ $C_L = 10\text{ pF}$	0.3	0.5	1	μs
Propagation Delay Time (“H” to “L”)	$\overline{OE} - \overline{OUTn}$	t_{pHL}		0.3	0.5	1	μs
Pulse Width	\overline{OE}	$t_{w(OE)}$		1	-	-	μs
Output Rise Time of \overline{OUT} (turn off)		t_{or}		1	0.3	0.5	1
Output Fall Time of \overline{OUT} (turn on)		t_{of}		1	0.3	0.5	1

MBI18016

Characteristic		Symbol	Condition	Min.	Typ.	Max.	Unit
Propagation Delay Time ("L" to "H")	$\overline{OE} - \overline{OUTn}$	t_{pLH}	$V_{DD} = 5.0\text{ V}$ $V_{DS} = 1.0\text{V}$ $V_{IH} = V_{DD}$ $V_{IL} = \text{GND}$ $R_{ext} = 1229\Omega$ $(I_{OUTn} = 60\text{mA})$ $V_L = 4.0\text{ V}$ $R_L = 44.62\ \Omega$ $C_L = 10\text{ pF}$	0.1	0.3	0.5	μs
Propagation Delay Time ("H" to "L")	$\overline{OE} - \overline{OUTn}$	t_{pHL}		0.05	0.1	0.2	μs
Pulse Width	\overline{OE}	$t_{w(OE)}$		1	-	-	μs
Output Rise Time of \overline{OUT} (turn off)		t_{or}		0.1	0.3	0.5	ns
Output Fall Time of \overline{OUT} (turn on)		t_{of}		0.1	0.3	0.5	ns

h. Provide application circuits in the Application Information

i. The formula of R_{ext} is changed. Please refer to the equation in the Setting Output Current section for details.

MBI1802

$$V_{R-EXT} = 1.24\text{ V} ;$$

$$R_{ext} = (V_{R-EXT} / I_{OUT}) \times 471 = (1.24\text{ V} / I_{OUT}) \times 471,$$

$$I_{OUT} = (V_{R-EXT} / R_{ext}) \times 471 = (1.24\text{ V} / R_{ext}) \times 471 \text{ within } \pm 6\% \text{ chip skew}$$

MBI1804

$$V_{R-EXT} = 1.24\text{ V} ;$$

$$R_{ext} = (V_{R-EXT} / I_{OUT}) \times 236 = (1.24\text{ V} / I_{OUT}) \times 236$$

$$I_{OUT} = (V_{R-EXT} / R_{ext}) \times 236 = (1.24\text{ V} / R_{ext}) \times 236 \text{ within } \pm 6\% \text{ chip skew}$$

MBI1816

$$V_{R-EXT} = 1.24\text{ V} ;$$

$$R_{ext} = (V_{R-EXT} / I_{OUT}) \times 59 = (1.24\text{ V} / I_{OUT}) \times 59,$$

$$I_{OUT} = (V_{R-EXT} / R_{ext}) \times 59 = (1.24\text{ V} / R_{ext}) \times 59 \text{ within } \pm 6\% \text{ chip skew}$$

2. Functional update for MBI1802 only

- a. QUAD pin is renamed Quarter pin (\overline{QT}). \overline{QT} pin definition is modified. \overline{QT} is changed to “low” active for 25% of the pre-set current.
- b. \overline{ERR} is changed to “low” active, when the temperature is over 150°C.
- c. Add in a pull-up resistor and an open drain on the Functional Diagram

3. For V1.02, device version code is updated from “A” to “B” .