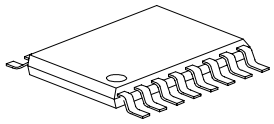
3-Channel Driver for RGB LED Cluster

Features

- 3 constant current channels for RGB LED cluster
- Output current invariant to load voltage change: 5V~ 12V
- Constant output current range: 3~ 60mA
- Output buffers for CLK, SDI, LE, and $\overline{OE}$
- Output current accuracy:
  between channels: < ±5% (max.), and
  between ICs: < ±5% (max.)
- Built-in voltage regulator for 5~ 12V supply voltage
- 5 MHz clock frequency

MBI6010CP



SSOP16-150-0.64 Weight：0.07g

Applications

- Ground/Wall indicator
- Architectural lighting
- Entertainment lighting
- City beautification
- Landscape lighting
- Signage/sign board

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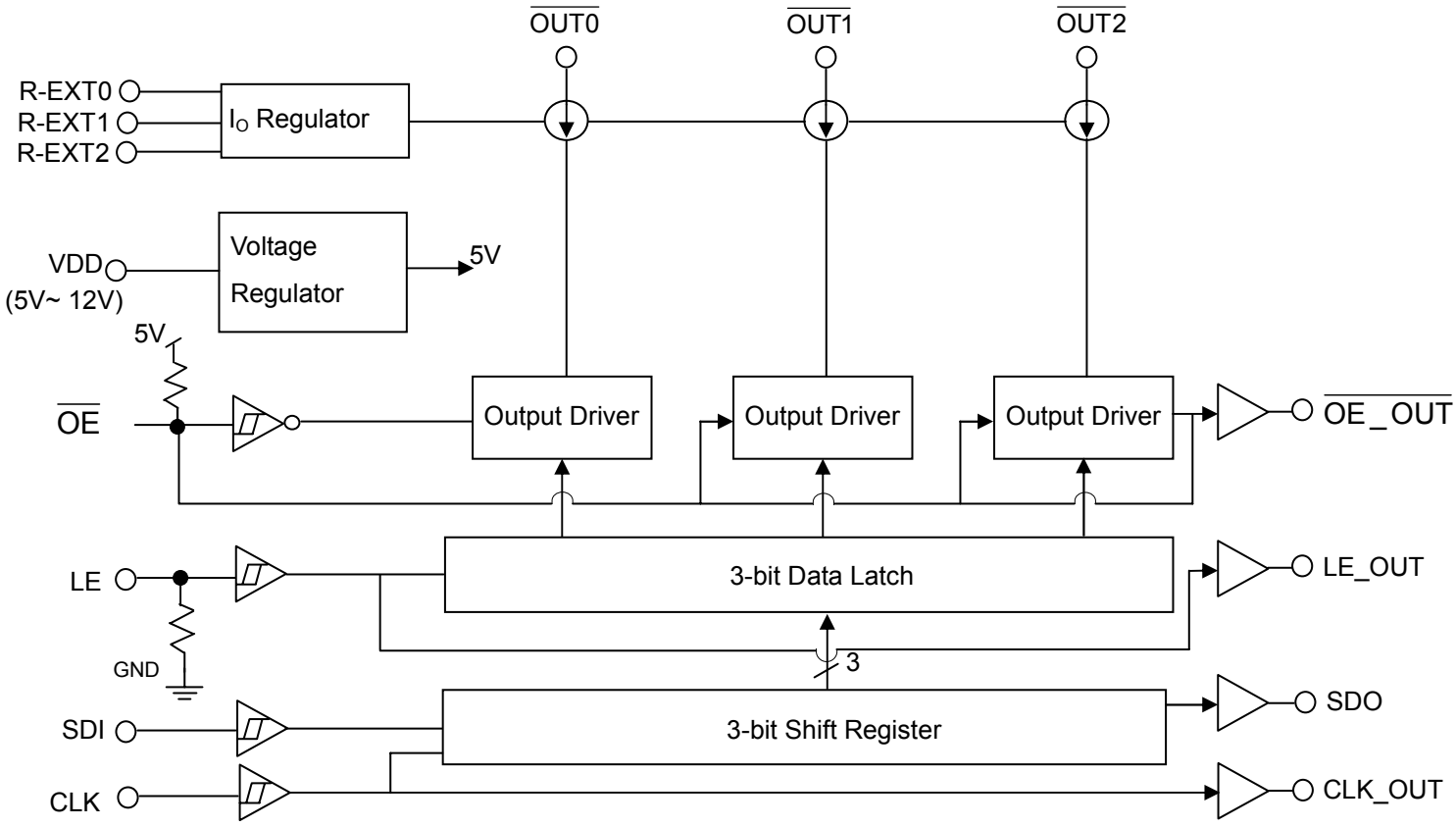
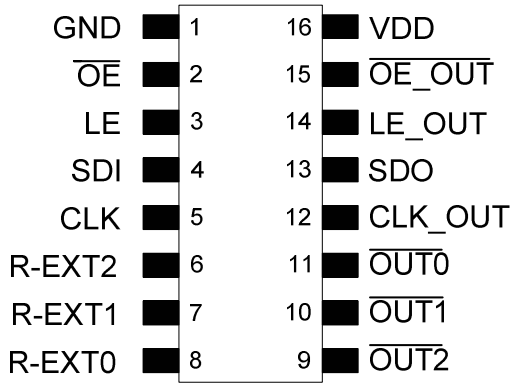
Block Diagram



Terminal Description

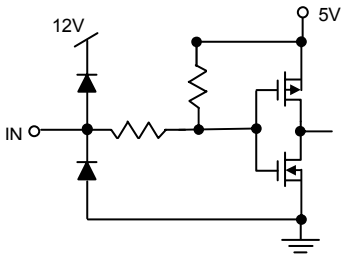
Pin No.	Pin Name	Function
1	GND	Ground terminal for control logic and current sink
2, 15	$\overline{OE}$, $\overline{OE\_OUT}$	Output enable terminal When(active)low, the output drivers are enabled; when high, all output drivers are turned OFF (blanked)
3, 14	LE, LE_OUT	Data strobe input terminal Serial data is transferred to the output latch when LE is high. The data is latched when LE goes low.
4	SDI	Serial-data input to the shift register
5, 12	CLK, CLK_OUT	Clock input terminal for data shift on rising edge
6~ 8	R-EXT0, R-EXT1, R-EXT2	Input terminal used to connect an external resistor for setting up output current for all output channels
9~ 11	$\overline{OUT0}$ ~ $\overline{OUT2}$	Constant current output terminal
13	SDO	Serial-data output to the following SDI of next driver IC
16	VDD	5- 12V supply voltage terminal

Pin Configuration

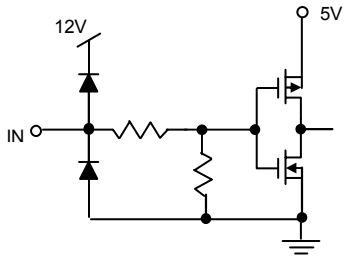


Equivalent Circuits of Inputs and Outputs

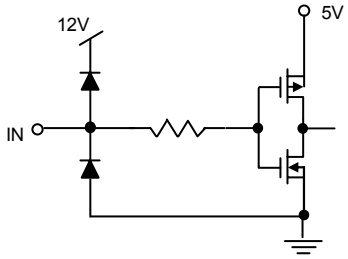
$\overline{OE}$ terminal



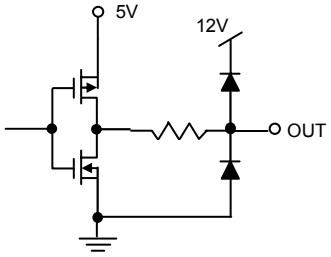
LE terminal



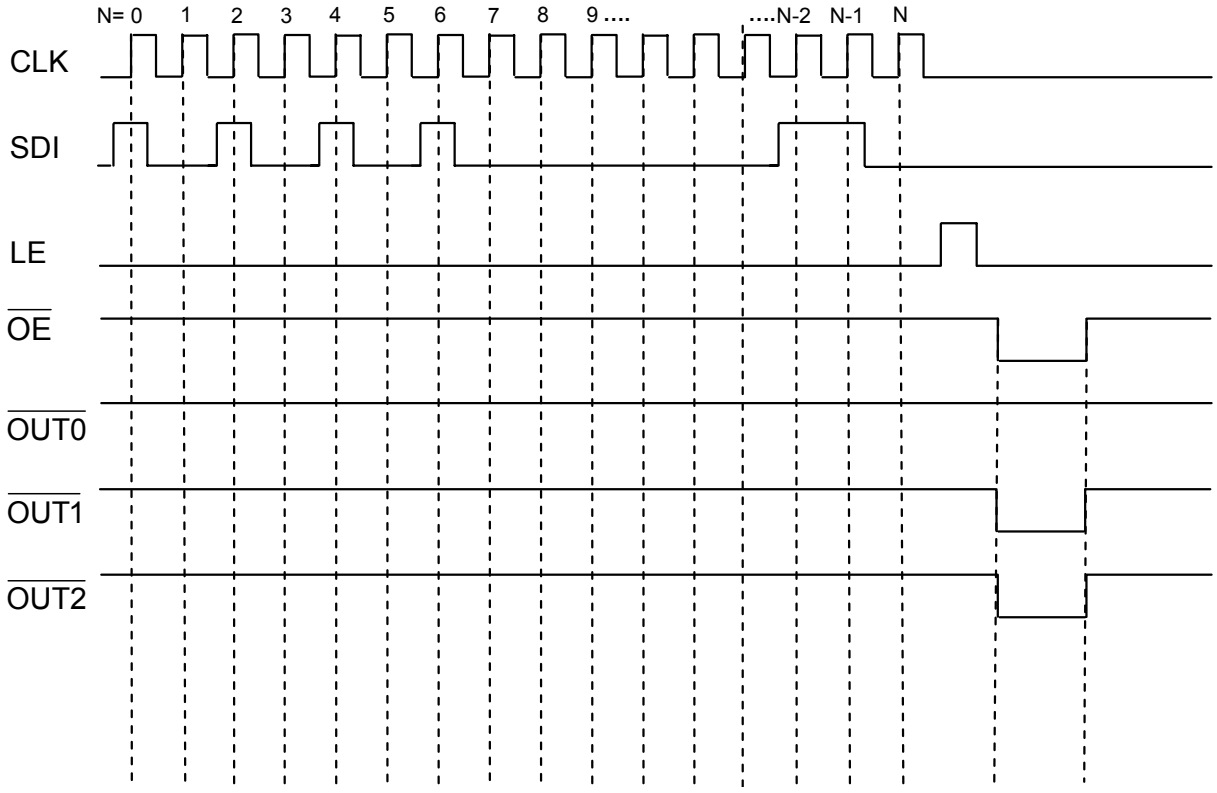
CLK, SDI terminal



SDO terminal



Timing Diagram



Maximum Ratings

Characteristic	Symbol	Rating	Unit
Supply Voltage	V_{DD}	5~12	V
Input Voltage	V_{IN}	-0.4~V_{DD} + 0.4	V
Output Current	I_{OUT}	+60	mA
Output Voltage	V_{DS}	-0.5~+12.0	V
GND Terminal Current	I_{GND}	180	mA
Operating Temperature	T_{opr}	-40~+85	°C
Storage Temperature	T_{stg}	-55~+150	°C

Electrical Characteristics

Characteristic		Symbol	Condition		Min.	Typ.	Max.	Unit
Supply Voltage		V_{DD}	-		4.5	-	12	V
Output Voltage		V_{DS}	$\overline{OUT0}$ ~ $\overline{OUT2}$		-	-	17.0	V
Output Current		I_{OUT}	DC Test Circuit		3	-	60	mA
		I_{OH}	SDO, LE_OUT, OE_OUT, CLK_OUT		-	-	TBD	mA
		I_{OL}	SDO, LE_OUT, OE_OUT, CLK_OUT		-	-	TBD	mA
Input Voltage	"H" level	V_{IH}	Ta = -40~85ºC		0.8V_{DD}	-	V_{DD}	V
	"L" level	V_{IL}	Ta = -40~85ºC		GND	-	0.3V_{DD}	V
Output Leakage Current		I_{OH}	V_{OH}=17.0V		-	-	0.5	μA
Output Voltage	SDO, LE_OUT, OE_OUT, CLK_OUT	V_{OL}	I_{OL}=+1.0mA		-	-	0.4	V
		V_{OH}	I_{OH}=-1.0mA		4.6	-	-	V
Output Current 1		I_{OUT1}	V_{DS}=0.6V	R_{ext}=TBD	-	26.25	-	mA
Current Skew		dI_{OUT1}	I_{OL}=26.25mA V_{DS}=0.6V	R_{ext}=TBD	-	-	±5	%
Output Current 2		I_{OUT2}	V_{DS}=0.8V	R_{ext}=TBD	-	52.5	-	mA
Current Skew		dI_{OUT2}	I_{OL}=52.5mA V_{DS}=0.8V	R_{ext}=TBD	-	-	±5	%
Output Current vs. Output Voltage Regulation		$\%/dV_{DS}$	V_{DS} within 1.0V and 3.0V		-	±0.1	-	% / V
Output Current vs. Supply Voltage Regulation		$\%/dV_{DD}$	V_{DD} within 4.5V and 12V		-	±1	-	% / V
Pull-up Resistor		R_{IN}(up)	$\overline{OE}$		250	500	800	KΩ
Pull-down Resistor		R_{IN}(down)	LE		250	500	800	KΩ