■GENERAL DESCRIPTION

White LED lamps are commonly used as backlights in the small color displays of many portable appliances such as cellular phones, PDAs, and digital cameras. Such applications with a backlight color display have a function that enables users to adjust display brightness as necessary according to the ambient light where they are being used. The XC9801/02 series ICs can drive multiple white LED lamps in combination only with three externally connected capacitors. The brightness of a white LED lamp can be controlled by inputting pulse-width modulation (PWM) signals to the Chip Enable (CE) pin. The XC9801/02 series ICs are effective in reducing the mounting area and cost, both of which are important considerations in portable equipment using white LED lamps.

■OPERATIONAL EXPLANATION

The XC9801/02 series IC is set to operate intermittently as PWM signals of 1 kHz to 10 kHz are input to the CE pin to control the duty cycle. The narrower the PWM-signal duty cycle, the less brightly the white LED lamps illuminate, and the wider the duty cycle, the brighter they appear. The white LED lamps appear steadily illuminated to the human eye because the rapidity of IC operation allows the illumination to persist. While operating intermittently, the IC enables brightness adjustment, maintaining sufficient current to keep the white LED lamps illuminated steadily. The maximum amperage of the forward current of the white LED lamps is controlled by the resistances inserted in series in the lamps (R1, R2, R3 and R4).

■FEATURES

❍Ceramic capacitor compatible

❍The brightness of LED lamps can be controlled by controlling the CE pin by PWM.

❍The lamp control by PWM restricts the input power.

❍Have few external components.

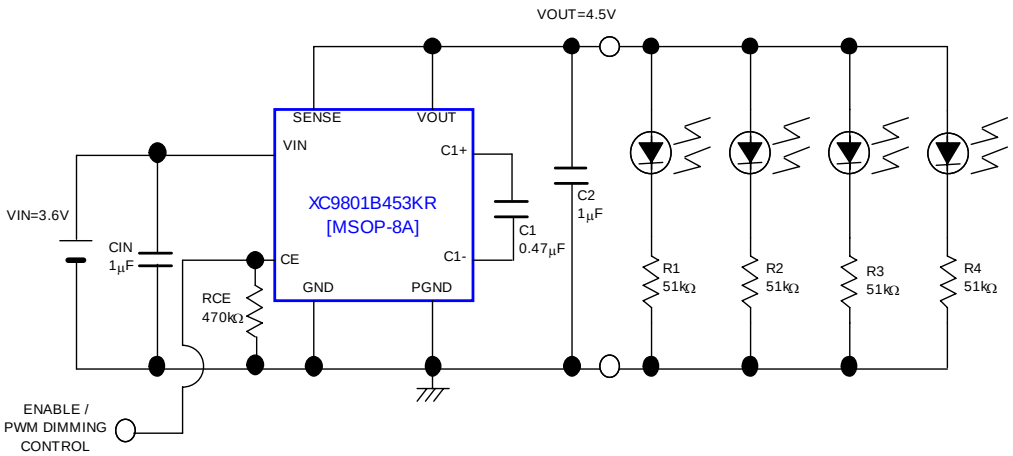
❍Stand-by Current : 2.0μA (MAX.)

Chart 1

DUTY (%)	INPUT CURRENT IIN (mA)	
	CE : 1kHz	CE : 10kHz
10	13.7	-
30	45.7	-
40	63.6	34.7
50	80	47.1
70	115	84.3
100	173	173

Condition : The circuit below and components constant

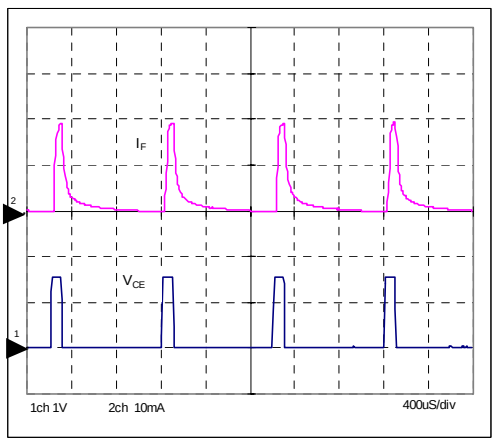
■TYPICAL APPLICATION CIRCUIT



■WAVE FORMS

1. IF and VCE Wave Form

Conditions : CE = 1kHz input, Duty : 10%



2. IF and VCE Wave Form

Conditions : CE = 1kHz input, Duty : 50%