

XMC in Application – Multichannel DCDC LED Driver with XMC1

XMC Microcontrollers
October 2015



Learning objectives

- › Know how the XMC1000 microcontroller can be used to drive multichannel LED lamps

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Multichannel DCDC LED Driver with XMC1 Overview



- › This training slides showcase low cost yet high quality DCDC LED driver solutions for multichannel LED lamps such as RGB and RGBA, using an XMC1000 microcontroller.
- › This training slides complement the training slides entitled “Dimmable LED Current Control”, and cover the additional information for implementing a multichannel solution.
- › For fundamental information regarding the DCDC Continuous Conduction Mode (CCM) buck solution, please refer to the training slides entitled “Dimmable LED Current Control”.

Multichannel DCDC LED Driver with XMC1

Key Features



Target Application

- › Multichannel DCDC LED Driver

Key Features

- › Inverse-buck with peak current control
 - Fast LED current control for flicker-free light (switching speed up to 3MHz)
- › Modulation dimming for accurate dimming levels
- › High efficiency
- › Compact low cost design

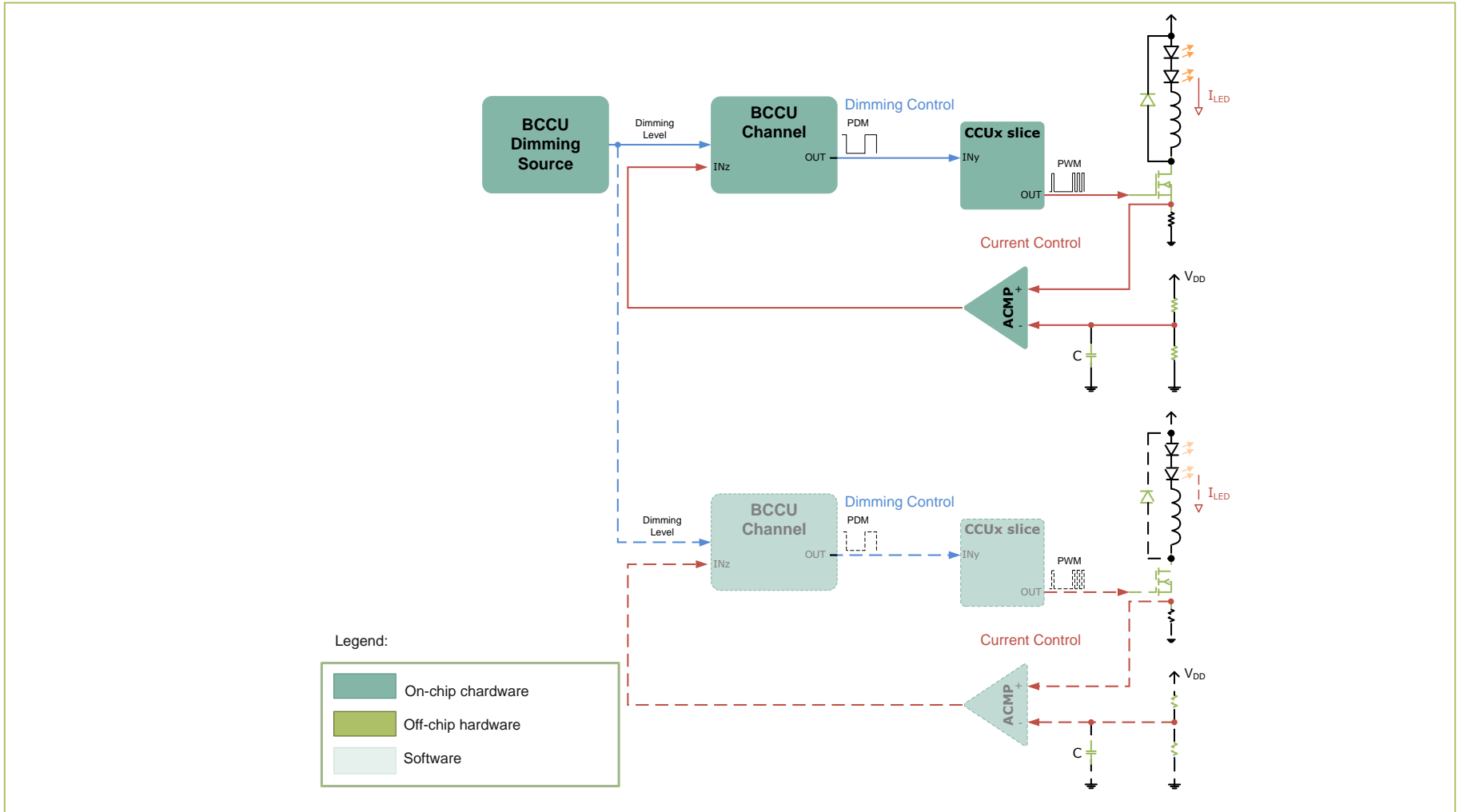
Multichannel DCDC LED Driver with XMC1 Specification



Specifications

- › Up to $48V_{DC}$ input voltage
- › Up to 700mA average output current
- › Up to 1A peak current

Multichannel DCDC LED Driver with XMC1 System Block Diagram



System Block Diagram: Multichannel DCDC LED Driver

Multichannel DCDC LED Driver with XMC1

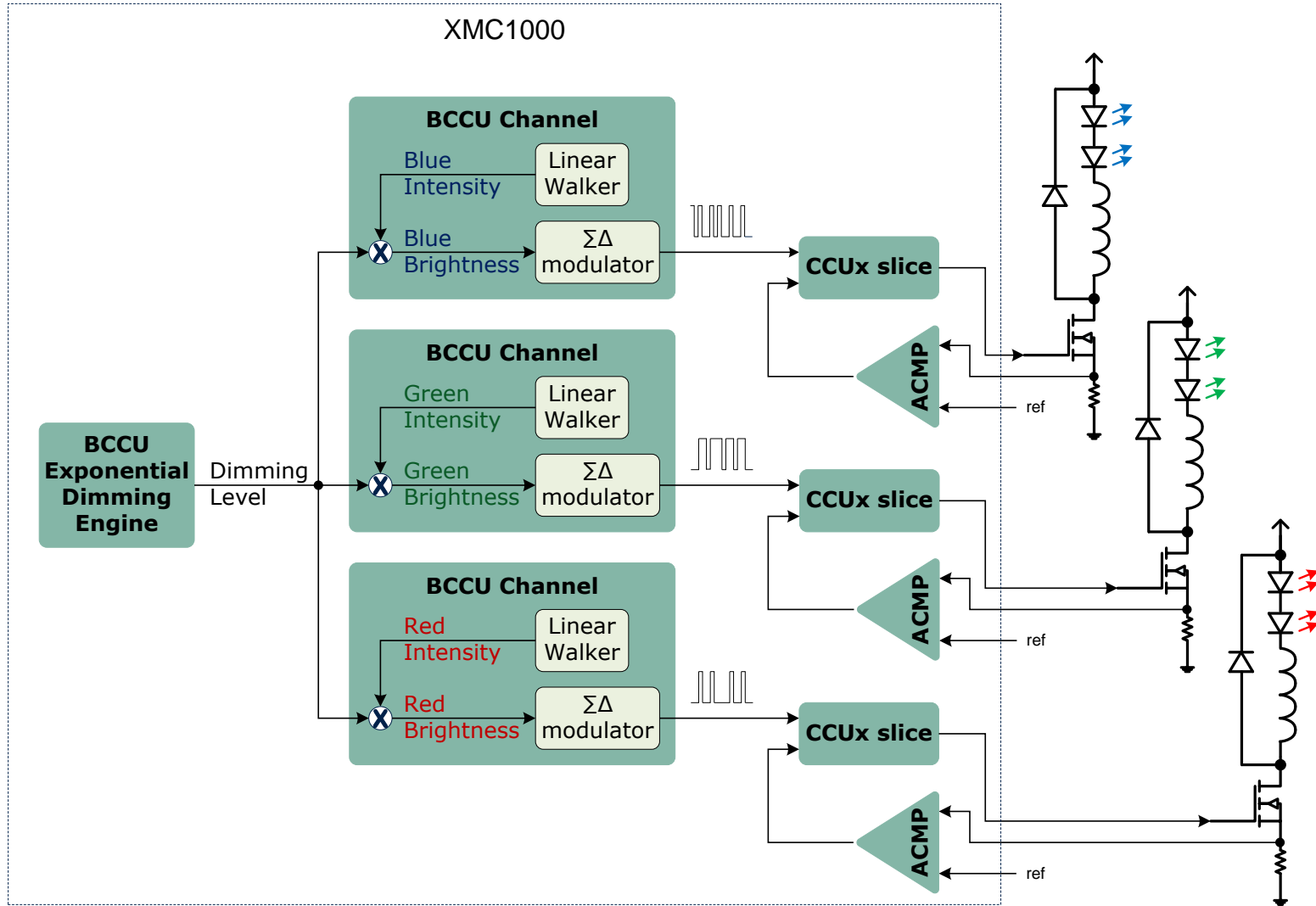
Highlight MCU Features



- › CCU4/8 PWM
 - Generate PWM signal for driving MOSFET
 - External stop function with ACMP for peak current control
 - Timer function for fixed current ripple off-time
 - External modulation function with BCCU for dimming control
- › ACMP
 - Peak current detection
 - Gating input signal for BCCU
- › BCCU
 - LED dimming control
 - Modulation signal for CCUx

Multichannel DCDC LED Driver with XMC1

Use Case 1: RGB Lamp (1/2)

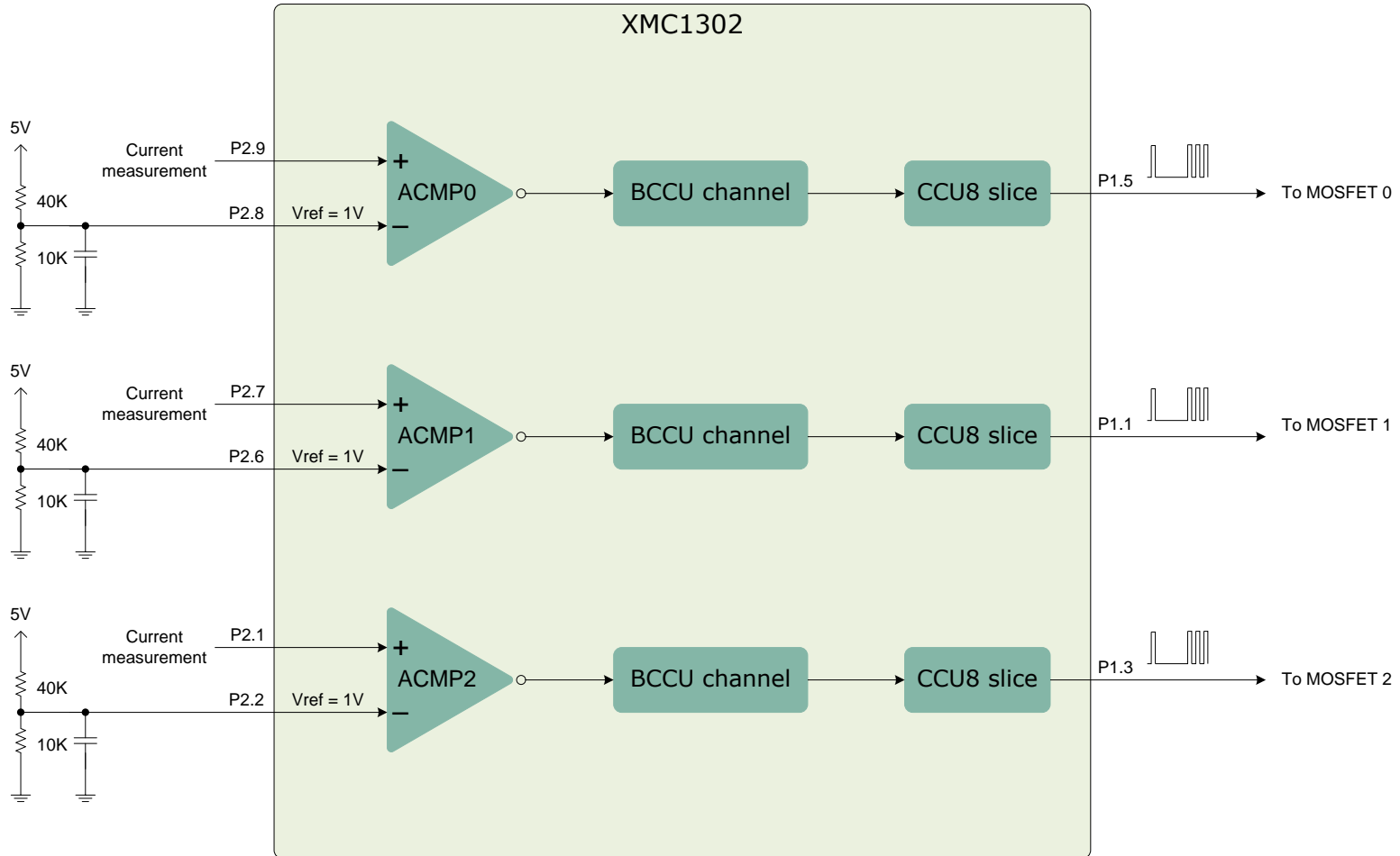


Multichannel DCDC LED Driver with XMC1

Use Case 1: RGB Lamp (2/2)

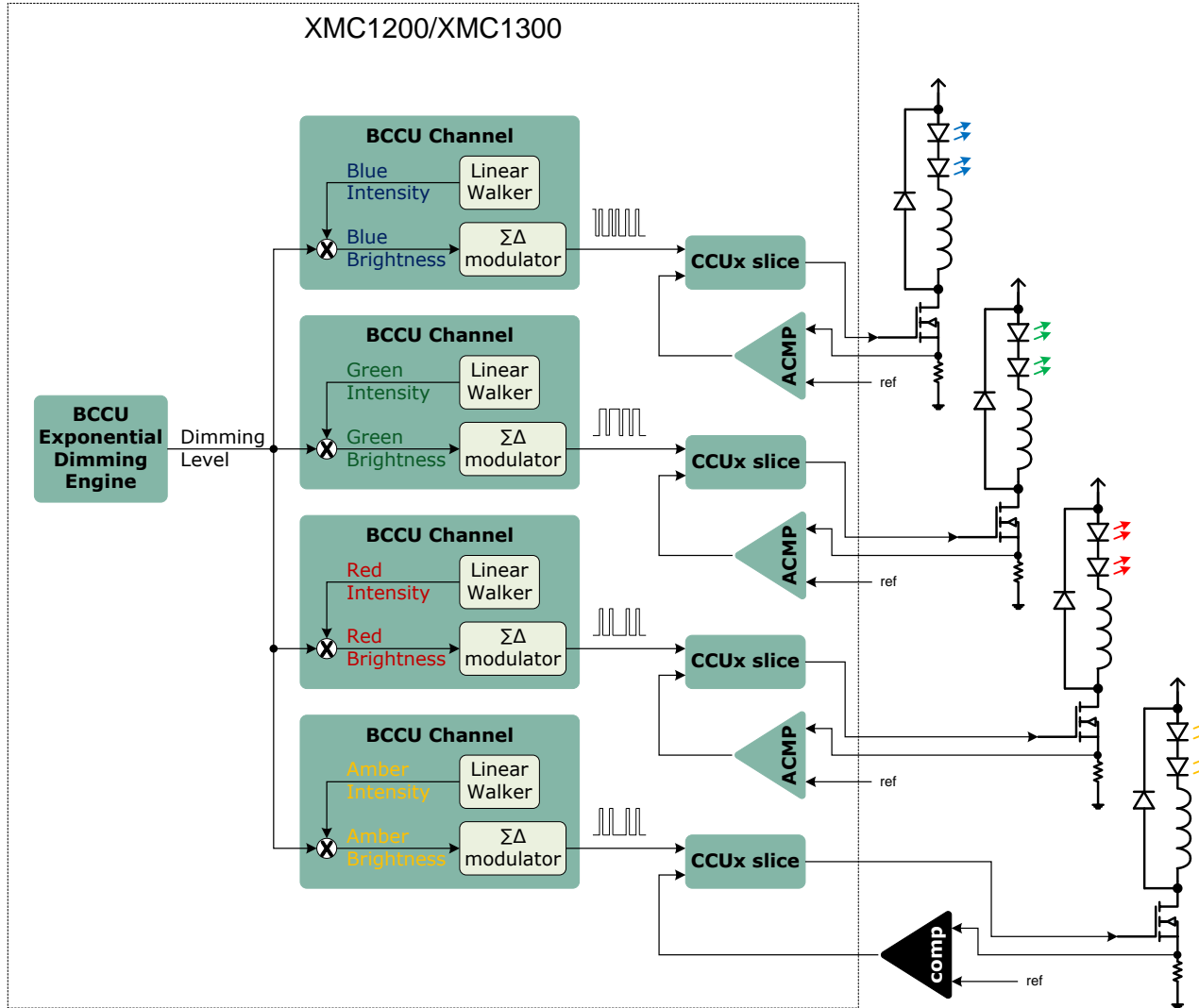


› Comparator reference



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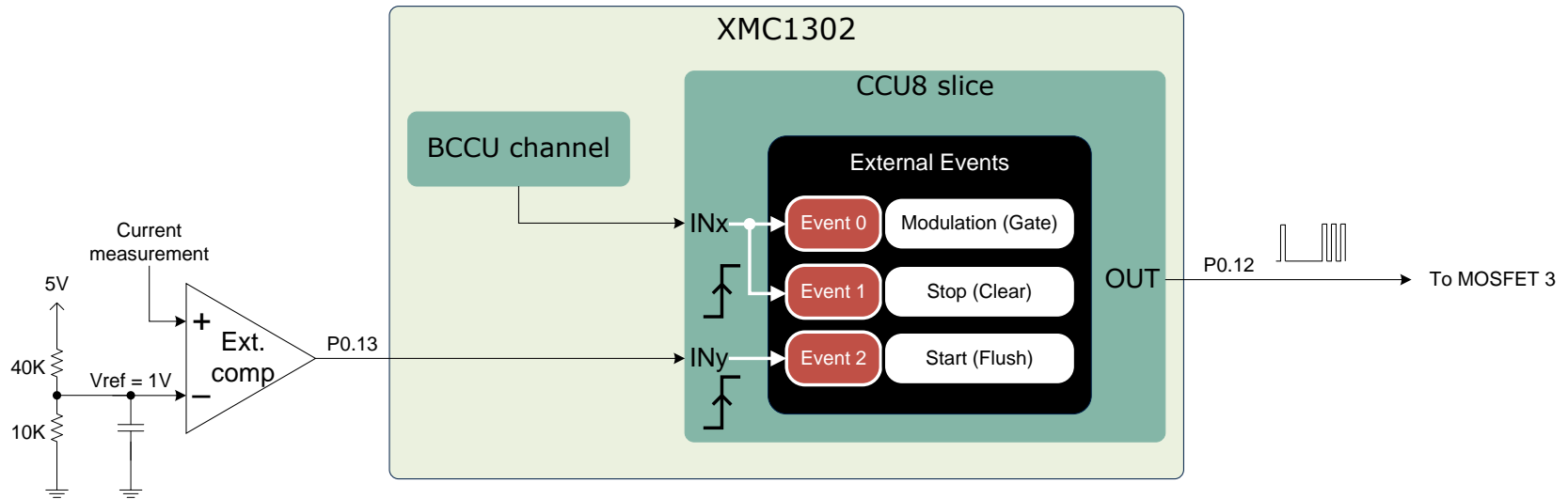
Use Case 2: RGBA Lamp (1/4)



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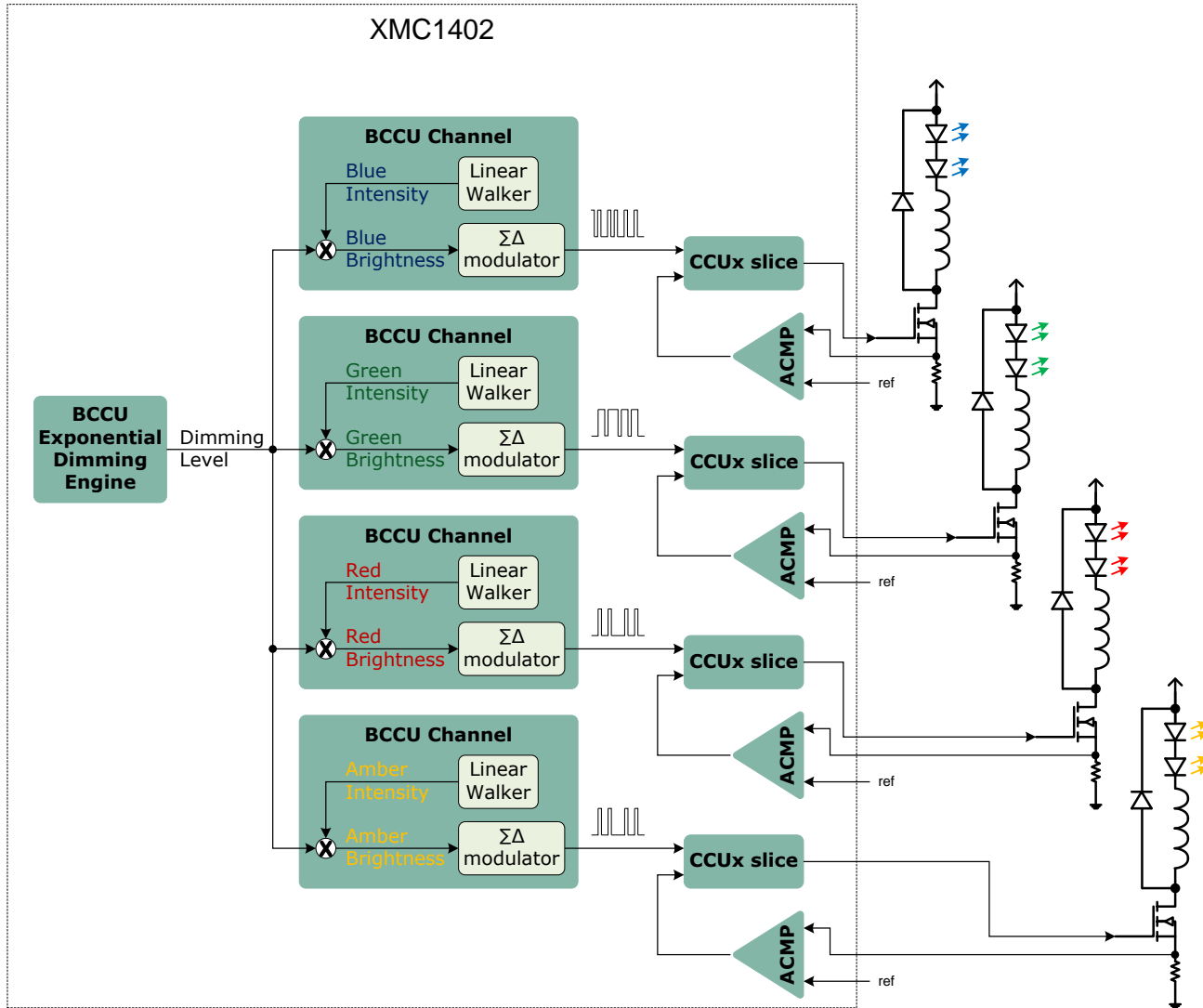
Use Case 2: RGBA Lamp (2/4)

- › External comparator for 4th channel onwards
- › Additional CCU8 Configuration
 - External Start Event
 - Trigger on rising edge
 - Flush timer



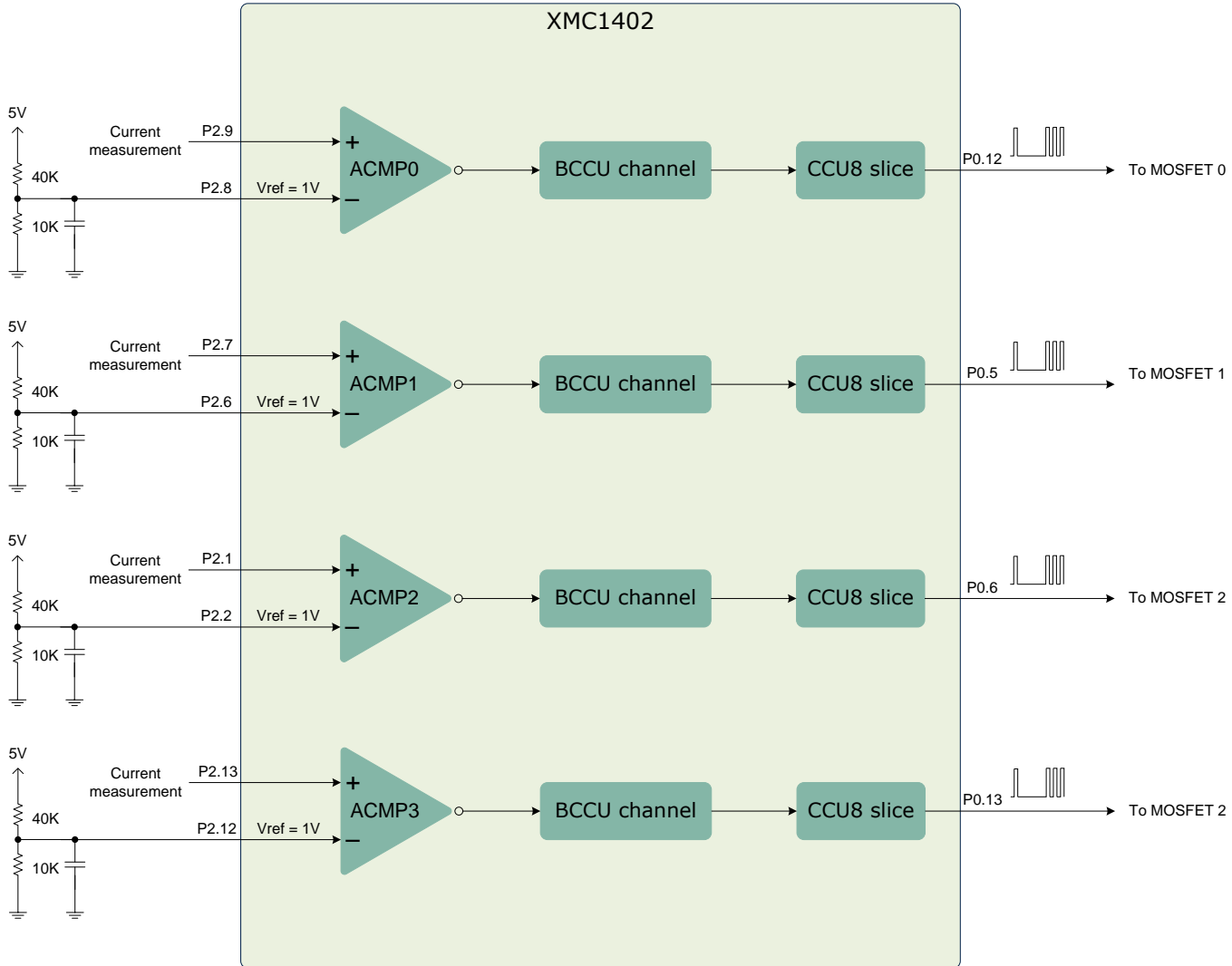
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Use Case 2: RGBA Lamp (3/4)



Multichannel DCDC LED Driver with XMC1

Use Case 2: RGBA Lamp (4/4)



Support material:

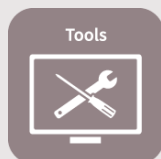
Collaterals and Brochures



- › Product Briefs
- › Selection Guides
- › Application Brochures
- › Presentations
- › Press Releases, Ads

› www.infineon.com/XMC

Technical Material



- › Application Notes
- › Technical Articles
- › Simulation Models
- › Datasheets, MCDS Files
- › PCB Design Data

› www.infineon.com/XMC

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› [DAVE™](#)

› [Software and Tool Ecosystem](#)

Videos



- › Technical Videos
- › Product Information Videos

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Glossary abbreviations

- › ACMP Analog Comparator
- › BCCU Brightness and Color Control Unit
- › CCM Continuous Conduction Mode
- › CCU Capture/Compare Unit
- › DAVE™ Free development IDE for XMC™
- › LED Light Emitting Diode
- › MOSFET Metal-oxide-semiconductor field-effect transistor
- › PDM Pulse-density Modulation
- › PWM Pulse Width Modulation

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