

12-Channel RGB LED Drivers with I²C Control

Features

- Drives up to 12 LEDs (4 RGBs)
- Multiplexed LED Current Driver Outputs
 - ▶ Only 4 PCB Traces to the LEDs
 - ▶ 20.8kHz MUX Frequency Prevents Audio Noise
- 14 Million Colors
 - ▶ LED Current: 125µA to 24mA in 125µA Steps
 - ▶ Night-Mode: 8µA to 1.5mA in 8µA Steps
 - ▶ 5% Max. Current Accuracy & Matching
- 12 Independent Exponential Fade-Engines
 - ▶ Ultra-Smooth 3072-Step (8µA) Fade Resolution
 - ▶ 3-bit Programmable Fade-Rate
- Flexible Pattern Generator with Watchdog Counter
- Optional AutoBreathe™ Mode (KTD2052B/D)
- Patented¹ BrightExtend™ Technology
 - ▶ Maintains Color-Accuracy and PSRR for Battery-Powered Applications with Low Vin
- Proprietary CoolExtend™ Technology
 - ▶ 2-bit Programmable Maximum Die-Temp
- 0.6µA Automatic Shutdown (Standby) Current
- 1MHz I²C Serial Interface
- 2.5V to 5.5V Operating Supply Voltage Range
- -40°C to +85°C Operating Temperature Range
- 8 pin UDFN 2x2mm (0.5mm pitch)

Applications

- AI Smart Speakers, Bluetooth / WiFi Loudspeakers
- Automotive Indicator and Ambiance Lighting
- IoT, Gaming, Toys, Indicator / Button Lighting

Brief Description

The KTD2052 is a fully programmable current regulator for up to four RGB LEDs (12 LEDs total). The device is ideally powered from a supply rail in the 3V to 5V nominal range. A 4-wire bus is multiplexed to reduce the pin-count and PCB traces to the LEDs. Each pin on the bus integrates a switch to the input voltage and a programmable low-dropout current sink regulator.

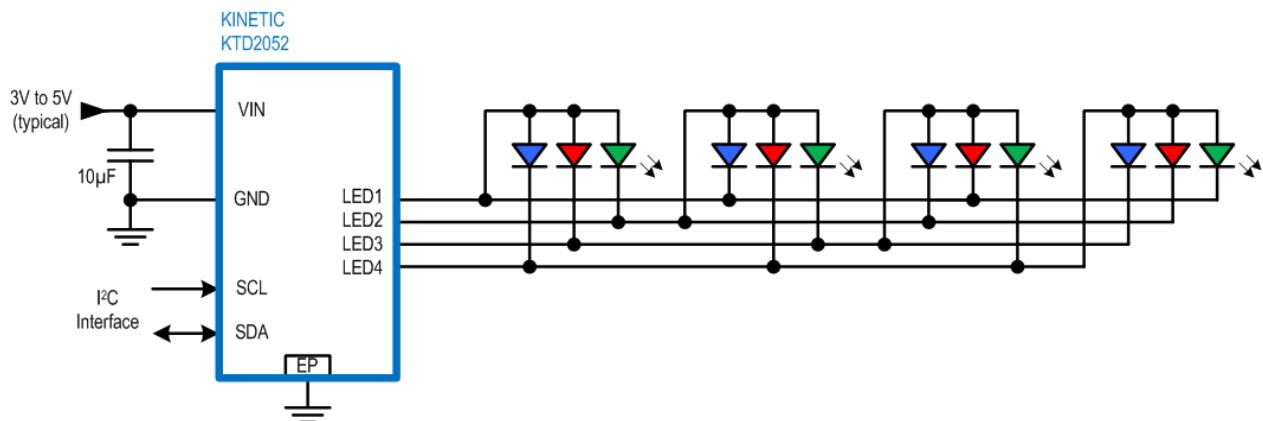
There are four versions: the KTD2052A/C are defaulted disabled at initial power-up, while the KTD2052B/D execute an AutoBreathe™ pattern by default at initial power-up or when reset. The KTD2052A/B use 0x74 7-bit I²C slave address, while the KTD2052C/D use 0x75. See the *Ordering Information* section.

The I²C control interface is used to set the on/off status and individual LED currents, as well as adjust the fade-rate. An internal flexible pattern generator with watchdog counter enables set-and-forget pattern executions, while more complex patterns may be executed from system firmware via the I²C interface.

BrightExtend™ optionally reduces dropout when the input voltage is too low for the forward voltage of the LEDs. Programmable CoolExtend™ prevents excessive heat when the input voltage, current settings, and ambient temperature are high.

The KTD2052 is packaged in RoHS and Green compliant 2mm x 2mm UDFN package.

Typical Application



1. US Patent 8,482,216 B1

Ordering Information

Part Number	AutoBreathe™	7-bit I ² C Slave Address	Marking ²	Operating Temperature	Package
KTD2052AEVAA-TR	No	0x74	PJYYZ	-40°C to +85°C	UDFN22-8
KTD2052BEVAA-TR	Yes	0x74	PPYYZ	-40°C to +85°C	UDFN22-8
KTD2052CEVAA-TR	No	0x75	QIYYZ	-40°C to +85°C	UDFN22-8
KTD2052DEVAA-TR	Yes	0x75	QJYYZ	-40°C to +85°C	UDFN22-8

2. "YYZ" is the date code and assembly code.

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