

DALI 2.0 Dimming Chip KMD02

With ARM® Cortex®-M0 core running, Koolmesh developed KMD02 as microcontroller, which is based on Digital Addressable Lighting Interface (DALI) technology. Encoded with software, together with many system level peripheral functions, such as I/O Port, Timer, UART, PWM, ADC, have been incorporated into the KMD02 to reduce board space and system cost. These useful functions make the KMD02 powerful for a wide range of applications.

Additionally, KMD02 is equipped with ISP (In-System Programming) and ICP (In-Circuit Programming) functions, which allow the user to update program memory without removing the chip from the actual end product.



Standards

IEC62386-101:2018

IEC62386-102:2018

IEC62386-207:2018(LED module)

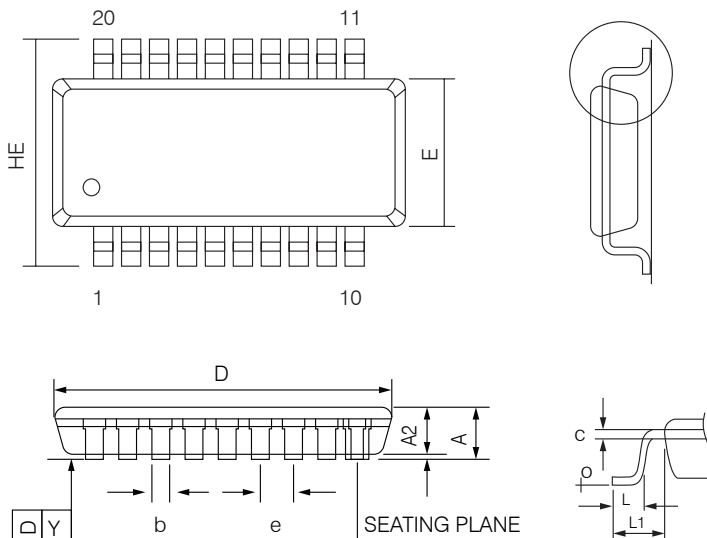
IEC62386-209:2011(color control)

Compatible with DT6/DT8 protocol

Product Features

- ARM® Cortex®-M0 core running up to 48 MHz
- One 24-bit system timer
- Supports low power Idle mode
- A single-cycle 32-bit hardware multiplier
- NVIC for the 32 interrupt inputs, each with 4-level of priority
- Supports Serial Wire Debug (SWD) interface and two watchpoints/four breakpoints
- Built-in LDO for wide operating voltage ranged: 2.1V to 5.5V
- Low power design with extended temperature range

Product Dimension (mm)



Symbol	Dimension(mm)		
	Min.	Nmd.	Max.
A	-	-	1.2
A1	0.05	-	0.15
A2	0.90	0.90	1.05
E	4.30	4.40	4.50
HE	6.4 BSC		
D	6.40	6.50	6.60
L	0.50	0.60	0.75
L1	1.00 REF		
b	0.19	-	0.30
e	0.65 BSC		
c	0.09	-	0.20
Y	0.10 BASIC		

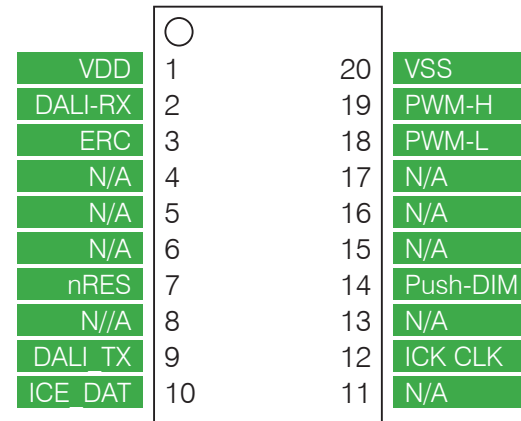
■ General Information

Conformity	IEC62386-101:2018; IEC62386-102:2018; IEC62386-207:2018; IEC62386-209:2018
Operating temperature	-40°C ~ +105°C
Package	20-pin TTSOP
Operating voltage	2.1-5.5V
Protection	DALI bus overload protection
Target application	DALI control gear (DALI version 2)

KMD02-DT6 (Signal device for DALI device type 6)

No.	Name	Type	Description
1	VDD	Power	Power supply for I/O ports and LDO source for internal PLL and digital function.
2	DALI_RX	I/O	DALI receiver
3	ERC	Input	LED fault detection Short circuit below 0.3V, open circuit above 2.5V Input voltage:0.3~2.5Vdc (normal mode), can not be disconnect
4	N/A		Reserved
5	N/A		Reserved
6	N/A		Reserved
7	nRES	I/O	Chip reset
8	N/A		Reserved
9	DALI_TX	I/O	DALI transmitter
10	ICE_DAT	I/O	Serial wired debugger data pin
11	N/A		Reserved
12	ICE_CLK	I/O	Serial wired debugger clock pin
13	N/A		Reserved
14	PUSH_DIM	Input	For push connecting
15	N/A		Reserved
16	N/A		Reserved
17	N/A		Reserved
18	PWM_L	I/O	PWM dimming output, 5V/5mA 1KHz (can be customized), active low level
19	PWM_H	I/O	PWM dimming output, 5V/5mA, 1KHz (can be customized), active high level
20	VSS	Power	Ground pin for digital circuit.

Pin Assignment



KMD02-DT6

KMD02-DT8 (Multi device for DALI device type 6 and type 8)

No.	Name	Type	Description
1	VDD	Power	Power supply for I/O ports and LDO source for internal PLL and digital function.
2	DALI_RX	I/O	DALI receiver
3	ERC_C	Input	LED fault detection for cool color. Short circuit below 0.3V, open circuit above 2.5V Input voltage:0.3~2.5Vdc (normal mode) can not be disconnect
4	ERC_W	Input	LED fault detection for warm color. Short circuit below 0.3V, open circuit above 2.5V Input voltage:0.3~2.5Vdc (normal mode), can not be disconnect
5	N/A		Reserved
6	N/A		Reserved
7	nRES	I/O	Chip reset
8	N/A		Reserved
9	DALI_TX	I/O	DALI transmitter
10	ICE_DAT	I/O	Serial wired debugger data pin
11	N/A		Reserved
12	ICE_CLK	I/O	Serial wired debugger clock pin
13	N/A		Reserved
14	PUSH_DIM	Input	For push connecting; press 3 times quickly with 1s to adjust CCT
15	N/A		Reserved
16	N/A		Reserved
17	N/A		Reserved
18	PWM_W	Output	PWM dimming output / warm color, 1KHz (can be customized), 5V/5mA
19	PWM_C	Output	PWM dimming output / cool color, 1KHz (can be customized), 5V/5mA
20	VSS	Power	Ground pin for digital circuit.

Pin Assignment

VDD	1	20	VSS
DALI-RX	2	19	PWM-C
ERC_C	3	18	PWM-W
ERC_W	4	17	N/A
N/A	5	16	N/A
N/A	6	15	N/A
nRES	7	14	Push-DIM
N/A	8	13	N/A
DALI TX	9	12	ICK CLK
ICE DAT	10	11	N/A

KMD02-DT8

DALI communication-block diagram

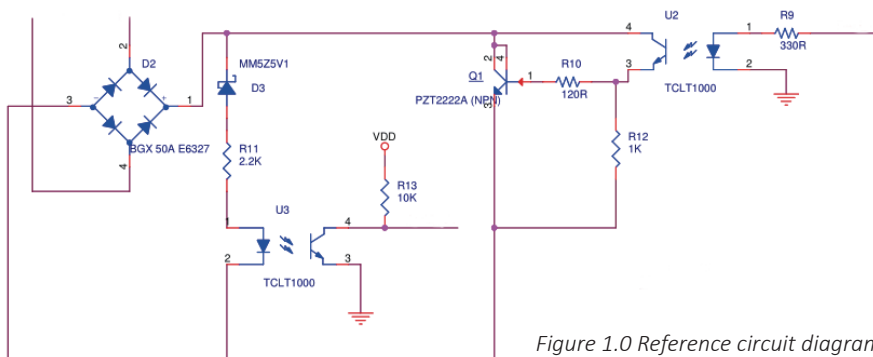


Figure 1.0 Reference circuit diagram for DALI interface

PUSH Function

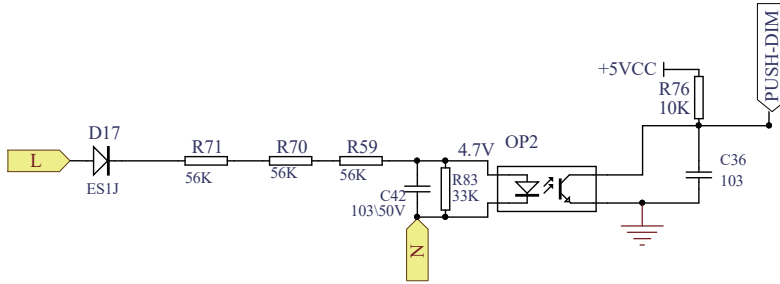


Figure 1.1 Reference circuit diagram for push interface

The Switch-Dim interface allows a simple dimming method using commercially available non-latching (momentary) wall switches. Figure 1.1 shows a simple diagram when push interface is used alone.

The default setting of push operation is as below:

Switch Action

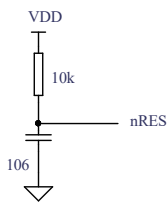
Short press: <1 second (Note: short press has to be longer than 0.1s, or it will be invalid.) to toggle light on/off.

Long press: >1 second to adjust brightness.

Press 3 times quickly: short press 3 times within 1 second to adjust color tuning.

RESET Function

The nRESET reset means to generate a reset signal by pulling low nRESET pin, which is an asynchronous reset input pin and can be used to reset system at any time. When the nRESET voltage is lower than $0.2 V_{DD}$ and the state keeps longer than 16.8 μs (glitch filter), chip will be reset. The nRESET reset will control the chip in reset state until the nRESET voltage rises above $0.7 V_{DD}$ and the state keeps longer than 36 μs (glitch filter). Figure 1.3 shows the nRESET reset waveform.



Reference circuit diagram for reset interface

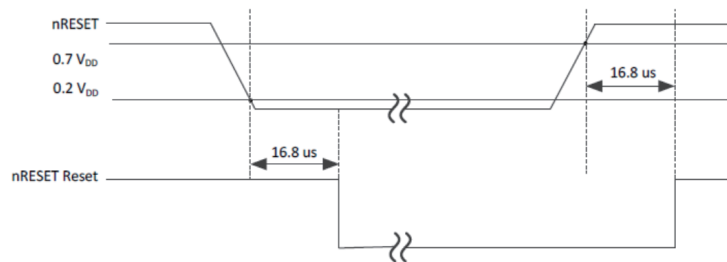


Figure 1.3 nRES Reset Waveform