



Raffar
Technology Corp.

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RT771LVR

3-channel constant current PWM IC

2018/03

Version: 1.0 (Preliminary)

Description

RT771LVR is a 3-channels 12 bit/ 15 bit PWM-embedded constant current LED driver. The constant current outputs can be set from 5 ~ 27 mA without any external resistors. With setting 7-bit programmable current adjustment ratio and 6-bit global brightness control, the RT771LVR can be easily to tuning up exactly white balance for RGB lighting control. RT771LVR built-in 32 scrambled segments PWM output which can be given a high refresh rate performance. In additional, RT771LVR has a particular function which can enable over-heat protection and report the IC running thermal information to system.

Features

Operating supply voltage :

3.3V ~ 5.5V

Max. output voltage : 17 V

Constant current output : 5mA ~ 27mA

12/15-bit PWM grayscale control

7-bit color adjustment ratio

6-bit global brightness control

Thermal detection and reporting

Range : -40 °C ~ +160 °C

LED open detection and reporting

Over-heat protection

Output current accuracy

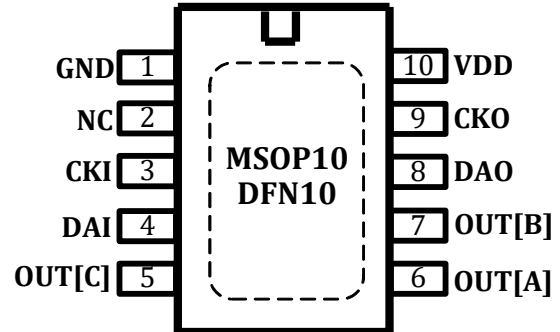
Chip to chip : ±3% (Typical)

Multi-channel driver cascading connection with RT77X series

Application

LED decorative lighting

Pin Assignment

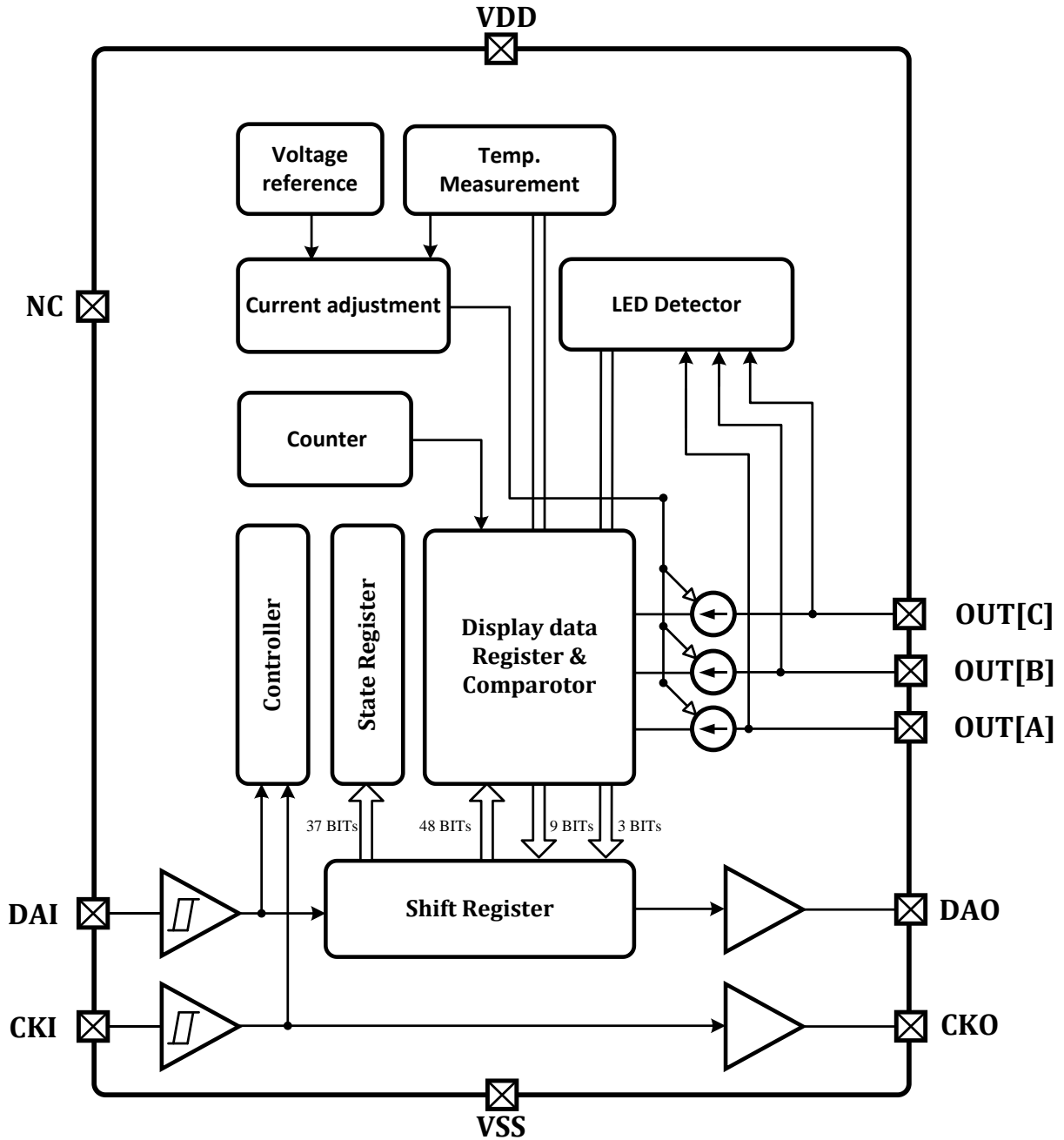


Pin No.	Pin Name	Description
1	GND	Ground terminal
2	NC	No Connection
3	CKI	Clock signal input
4	DAI	Serial data input
5	OUT[C]	Current output[C]
6	OUT[A]	Current output[A]
7	OUT[B]	Current output[B]
8	DAO	Serial data output
9	CKO	Clock signal output
10	VDD	Supply voltage

Order Information

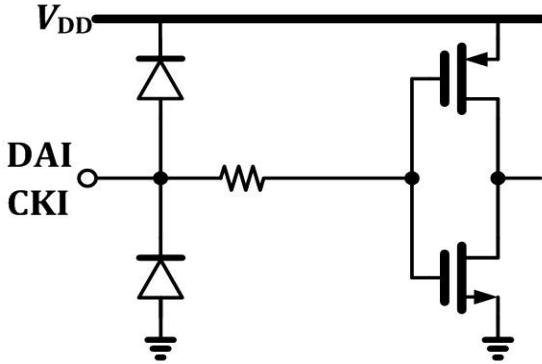
No.	Part No.	Package
1	RT771LVRMS	MSOP-10
2	RT771LVRDN	DFN-10
3	RT771LVRBD	Bare Die

Block Diagram

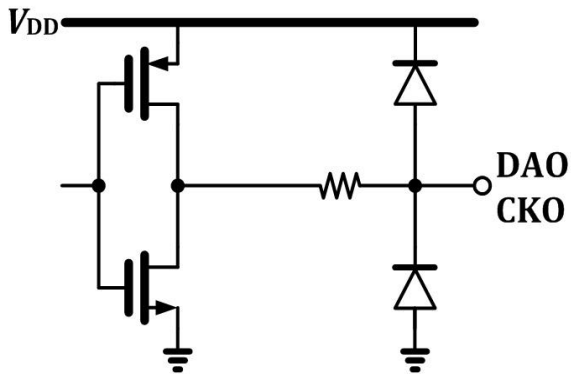


Input/ Output Equivalent Circuits

DAI / CKI Terminal



DAO / CKO Terminal



Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply Voltage	V_{DDL}	3.3 ~ 5.5	V
Input Voltage (all pins)	V_{IN}	-0.4 ~ 5.0	V
Output Current (OUT[A, B, C])	I_{OUT}	27	mA
Output Voltage (OUT[A, B, C])	V_{OUT}	-0.3 ~ 17	V
Clock Frequency	f_{DCK}	12	MHz
GND Terminal Current	I_{GND}	250	mA
Power Dissipation (on 4-layer PCB)	P_D	1.1 (MSOP-10 · $T_a = 25\text{ }^\circ\text{C}$)	W
Thermal Resistance (on 4-layer PCB)	$R_{th(j-a)}$	55.1 (MSOP-10)	$^\circ\text{C/W}$
Operating Temperature	T_{opr}	-40 ~ 85	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 ~ 150	$^\circ\text{C}$

Recommended Operating Condition

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage	V_{DDL}	—	3.3	—	5.5	V
Output Voltage (OUT[A, B, C])	V_{OUT}	Output turned off	—	—	17	V
		Output turned on* ¹	1	—	2.5	V
Output Current (OUT[A, B, C]/DAO/CKO)	I_{OUT}	OUT[A, B, C]	5	—	27	mA
	I_{OH}	$V_{OH} = 4.7 - 0.2\text{ V}$	—	-2.0	—	
	I_{OL}	$V_{OL} = 0.2\text{ V}$	—	2.0	—	
Input Voltage (DAI/ CKI/ DAO/ CKO)	V_{IH}	V_{DD} = 3.3 V ~ 5.0 V	3.5	—	5.0	V
	V_{IL}		0	—	1.5	

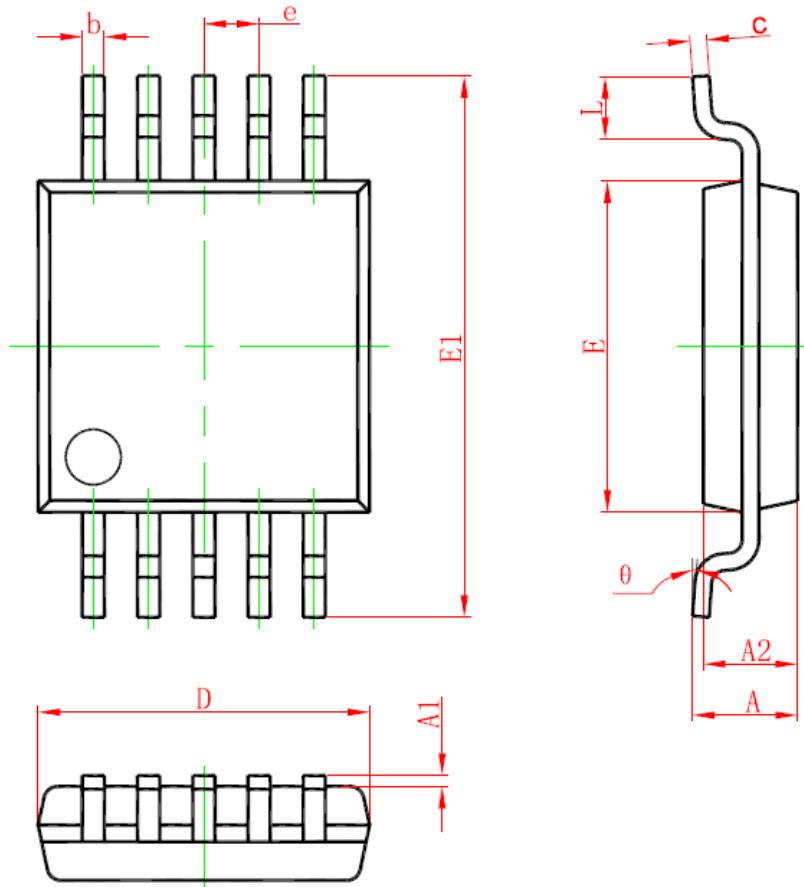
*¹Note: power dissipation is limited by package type and the temperature of the operating environment.

DC Electrical Characteristics ($V_{DD} = 5.0\text{ V}$)

Characteristics	Symbol	Condition	Min.	Typ.	Max.	Unit	
Supply Voltage	V_{DDH}	—	4.5	5.0	5.5	V	
Output Voltage	V_{OUT}	OUT[A,B,C]	—	—	17	V	
Output Leakage Current	I_{LEAK}	$V_{OUT} = 24\text{ V}$	—	—	1	μA	
Input Voltage	High Level	Logic Signal	V_{IH}	3.5	—	5.0	V
	Low Level		V_{IL}	0	—	1.5	
Output Current Skew	Chip-to-Chip	I_{OSC}	$V_{OUT} = 1.0\text{ V}$ $R_{INT} = 2763\ \Omega$ Gain = 0.7384 $I_{out} = 20.02\text{mA}$	—	± 3.0	—	%
Output Current Regulation	Output Voltage	$\%/\Delta V_{OUT}$	$R_{INT} = 2763\ \Omega$ $V_{OUT} = 1\text{ V} \sim 3\text{ V}$	—	—	± 0.1	%/V
	Supply Voltage	$\%/\Delta V_{DD}$	$R_{INT} = 2763\ \Omega$ $V_{DD} = 4.5 \sim 5.5\text{ V}$	—	—	± 1	
LED Open Detection Voltage	$V_{LOD,TH}$	—	—	0.2V	—	V	
Supply Voltage Current	I_{DD_ON1}	$R_{INT} = 2763\ \Omega$ OUT[A, B, C] on	—	2.7	3.7	mA	

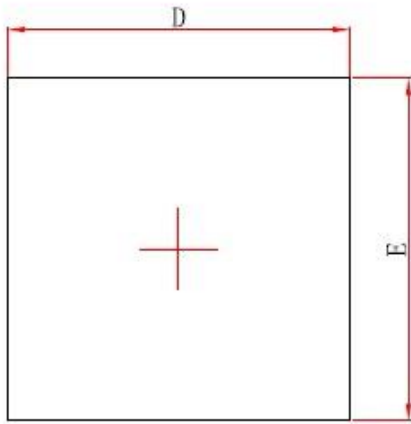
Package Outline Dimension

MSOP-10 Dimension (120 mil)

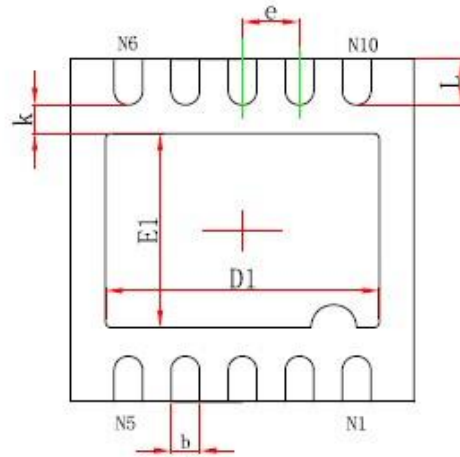


Symbol	Millimeters (mm)		Inches (in)	
	Min.	Max.	Min.	Max.
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.180	0.280	0.007	0.011
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.500(BSC)		0.020(BSC)	
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°

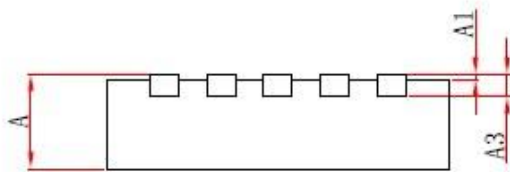
DFN-10 Dimension (120 mil)



Top View



Bottom View



Side View

Symbol	Millimeters (mm)		Inches (in)	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF		0.008REF	
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
D1	2.300	2.500	0.091	0.098
E1	1.600	1.800	0.063	0.071
k	0.200MIN		0.008MIN	
b	0.180	0.300	0.007	0.012
e	0.500TYP		0.020TYP	
L	0.300	0.500	0.012	0.020

Note

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