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LED Drivers for LCD Backlights

1ch Buck Type (Quasi-Resonant Control) White LED Driver for Large LCD

For SAMSUNG ELECTRONICS

SLC7015R

1.1 General Description

SLC7015R is a high efficiency driver for white LEDs and designed for large LCDs. SLC7015R is built-in a quasi-resonant control method DCDC converter that employ an array of LEDs as the light source. And owing to the external current setting resistance, a power supply design with a high degree of freedom can be achieved.

●Features

- Quasi-resonant switching mode
- Maximum frequency 400kHz
- VCC pin: under voltage protection
- SOURCE pin: Leading-Edge-Blanking function
- PWM and ADIM operating
- FAIL signal output

●Applications

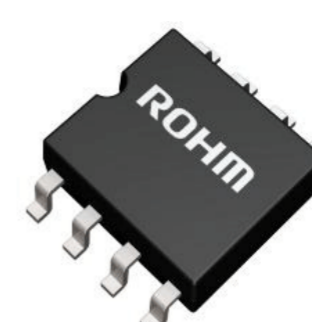
- TV, Computer Display
- Other LCD backlighting

●Key Specification

- Operating power supply voltage range: VCC: 9.0V to 35.0V
- Operating current: 700 μ A (typ.)
- Maximum frequency: 400kHz(typ.)
- Operating temperature range: -40deg. to +105deg.

1.2 Package

SOP8

W(Typ) x D(Typ) x H(Max)
5.00mm x 6.20mm x 1.71mm

1.3 Typical Application Circuit

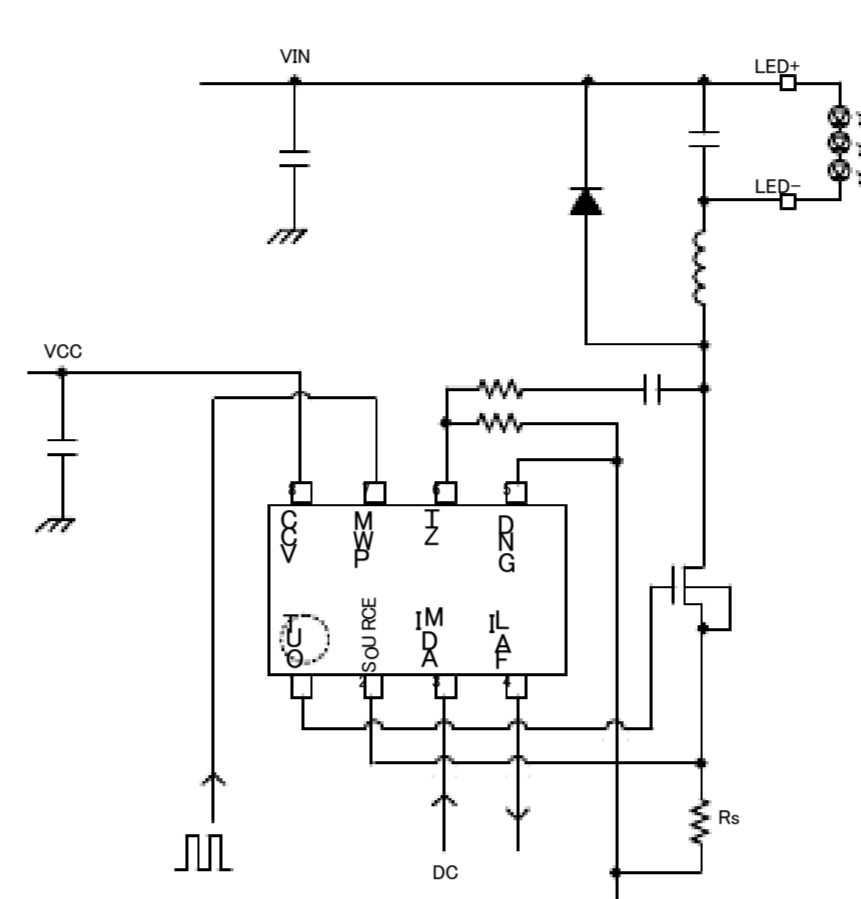


Figure 1. Typical Application Circuit

○Product structure : Silicon monolithic integrated circuit ○This product has no designed protection against radioactive rays
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1.4 Absolute Maximum Ratings (Ta = 25°C)

Item Symbol	Rating	Unit	Condition
Maximum Applying Voltage 1	Vmax1	-0.3 ~ 36	V VCC, ADIM, PWM, FAIL
Maximum Applying Voltage 2	Vmax2	-0.3 ~ 6.5	V SOURCE
Maximum Applying Voltage 3	Vmax3	-0.3 ~ 10.5	V ZT
Maximum Applying Voltage 4	Vmax4	-0.3 ~ 13.0	V OUT
Power Dissipation	Pd	689 ^(Note1) mW	
Operating Temperature Range	Topr	-40 ~ +105	°C
Storage Temperature Range	Tstr	-55 ~ +150	°C
Maximum Junction Temperature	Tjmax	150	°C

(Note1) Derating in done 5.5 mW/°C for operating above Ta \geq 25°C (Mount on 1-layer 74.2mm x 74.2mm x 1.6mm board)

1.5 Recommended Operating Conditions (Ta= 25°C)

Item Symbol	Rating	Unit	Condition
Supply Voltage 1	VCC	9.0~35.0	V VCC Voltage
ADIM Input Voltage	VADIM	0.45 ~ 2.0 ^(Note2)	V ADIM Voltage

(Note2) To use the whole range of the ADIM voltage range, it is recommended not to exceed maximum frequency and maximum ON time.

1.6 Pin Configuration

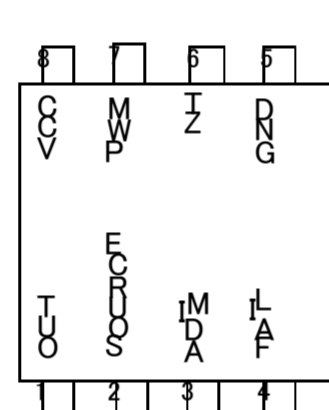


Figure 2. Pin Configuration

1.7 Marking Diagram and Physical Dimension

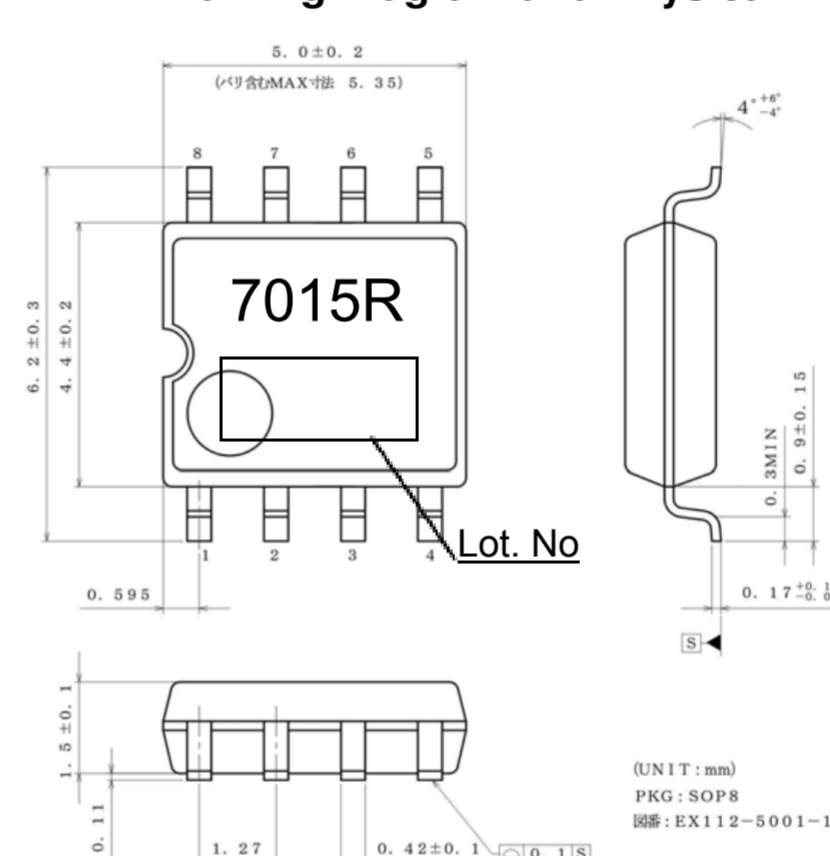


Figure 3. Marking Diagram and Physical Dimension

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1.8 Electrical Characteristics (Unless otherwise specified Ta=25°C, VCC=12V)

Parameter Symbol	Limit	Unit		Conditions		
		Min.	Typ.		Max.	
[Circuit Current]						
Circuit Current (ON)	I _{ON} 350	700	1000	μ A	PWM = L	
[VCC Pin Protection]						
VCC UVLO Voltage 1	V _{UVLO1}	6.5	7.5	8.5	V	VCC rising up
VCC UVLO Hysteresis	V _{UVLO3}	500	750	1000	mV	
[DC/DC Converter (Turn-on)]						
ZT Comparator Voltage 1	V _{ZT1}	60	100	140	mV	ZT falling down
ZT Comparator Voltage 2	V _{ZT2}	120	200	280	mV	ZT rising up
ZT Comparator Hysteresis	V _{ZTHYS}	-	100	-	mV	V _{ZTHYS} = V _{ZT1} - V _{ZT2}
ZT Trigger Time-out Time	T _{ZTOUT}	30 45 60			μ s	V _{SOURCE} = 0V
OUT pin High Level Voltage	V _{OUTH}	8.5	9.5	10.5	V	VCC > 12V
OUT pin High-side ON Resistance	R _{OUT_SRC}	-	50	100	Ω	
OUT pin Low-side ON Resistance	R _{OUT_SINK}	-	18	36	Ω	
[DC/DC Converter (turn-off)]						
Current Detection Voltage 1	V _{SOURCE1}	1.034 1.050 1.066	V			ADIM 1.5V
Current Detection Voltage 2	V _{SOURCE2}	1.383 1.400 1.417	V			ADIM 2.0V
Current Detection Clamp Voltage	V _{CLP}	1.393 1.415 1.436	V			ADIM 2.2V
Maximum Frequency	F _{MAX}	360 400 440			kHz	
Leading Edge Blank Time	T _{LEB}	-	0.25	-	μ s	
Turn-off Time	T _{OFF}	-	0.2	-	μ s	
Maximum ON Time	T _{max}	45 60 75			μ s	
[DC/DC Protection]						
SOURCE OVP Voltage	V _{SUROVP}	3.8	4.0	4.2	V	SOURCE sweep up
SOURCE OVP Hysteresis	V _{SURHYS}	100	200	400	mV	SOURCE sweep down
SOURCE OVP Mask Time	T _{SURMSK}	5	10	20	μ s	
[Dimming Control Block]						
PWM pin HIGH Voltage	V _{PWM_H}	1.5	-	35	V	PWM sweep up
PWM pin LOW Voltage	V _{PWM_L}	-0.3	-	0.8	V	PWM sweep down
PWM pin Pull-Down Resistance	R _{PWM}	180	300	420	k Ω	PWM = 3.0V
ADIM pin Leak Current	I _{ADIM}	-2	0	2	μ A	ADIM = 2.0V
[FAIL Block]						
FAIL pin Pull-Up Resistance at Latch off state	R _{LO}	-	3.0	6.0	k Ω	SOURCE = 5.0V

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