DIO8241JT
Adaptive 100/120Hz Current Ripple Remover
Max Input Current ≤ 60mA

Features

- Regulator for adaptive 100/120Hz current ripple remove

- Built-in zener diode for input voltage clamping

- Built-in 100V power MOSFET

- Programmable amplitude LED current ripple

- Programmable maximum cathode voltage of LED

- Programmable maximum LED current

- Optimized for TRIAC dimming

- SOT23-3 and SOT23-5 packages

Applications

- LED lighting

Descriptions

DIO8241JT is a regulator for driving internal NMOSFET to remove the 100/120Hz LED string current ripple on AC/DC power.

Patented control strategies are optimized for remover current ripple. Nover circuit design makes a lower BOM and high cost-effective for flickerless filament.

Ordering Information

Order Part Number	Top Marking		T_A	Package	
DIO8241JTST3	1020 1YWX2	Green	-40 to 125°C	SOT23-3	Tape & Reel, 3000
DIO8241JTST5	1020 1YWX2	Green	-40 to 125°C	SOT23-5	Tape & Reel, 3000

DIO8241JT

Pin Assignment

SOT23-5

VC	1	⭘		5	NC
GND	2				
NC	3			4	LEDN

SOT23-3

VC	1			
			3	LEDN
GND	2			

Figure 1 Top View

Pin Descriptions

Name	Description
GND	Power Ground
NC	No Connection
VC	LED Current Ripple Programming
LEDN	Connect to the Cathode of LED string

DIO8241JT

Absolute Maximum Ratings

Stresses beyond those listed under "Absolute Maximum Rating" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maxim rating conditions for extended periods may affect device reliability.

Parameter		Rating	Unit
LEDN		100	V
VC		-0.3 to 6	V
Junction Temperature		150	°C
Lead Temperature		260	°C
Storage Temperature		-65 to 150	°C
Thermal Resistance / θ_{JA}	SOT23-3	220	°C/W
	SOT23-5	220	
Thermal Resistance / θ_{JC}	SOT23-3	130	°C/W
	SOT23-5	130	

Recommend Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended Operating conditions are specified to ensure optimal performance to the datasheet specifications. DIOO does not Recommend exceeding them or designing to Absolute Maximum Ratings.

Parameter		Rating	Unit
LEDN		< 100	V
Junction Temperature (T_J)		125	°C
Under point VLEDN		0.8~1.2	V
Power consumption	SOT23-3	< 250	mW

DIO8241JT

Electrical Characteristics

Typical value: Vcc=3.6V, T_A = 25°C, unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_{ST}	Start-up Current				1	uA
V_{REF}	LEDN Compare Voltage			12		V
I_{CLMT}	LED Current Limit				60	mA
R_{DSON}	MOS Rdson			16		Ω
BV	Breakdown Voltage		100			V

Specifications subject to change without notice.

Typical Performance Characteristics

C_{VC}=1µF, C_{EC}=8.2µF, unless otherwise specified.
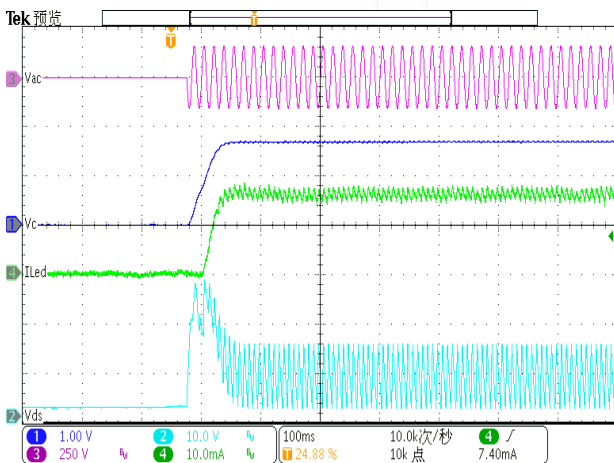
LED Current Ripple without DIO8241JT
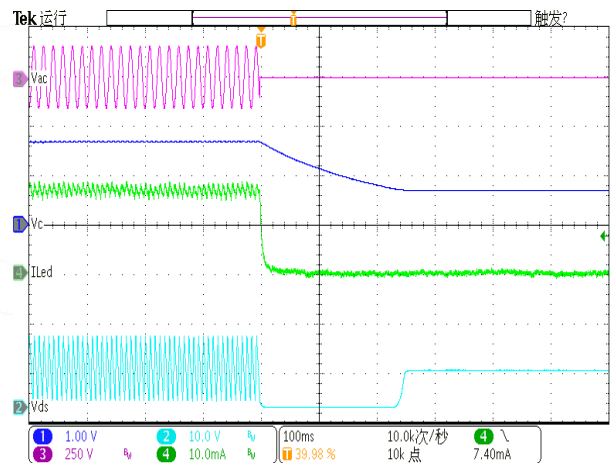(V_{AC}=220V, V_{LED}=250V, I_{LED}=15mA)
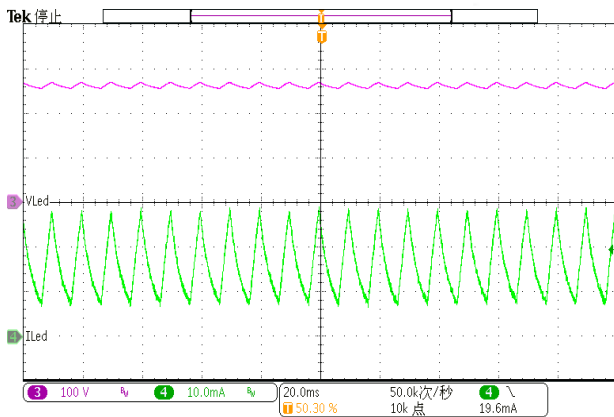
LED Current Ripple with DIO8241JT
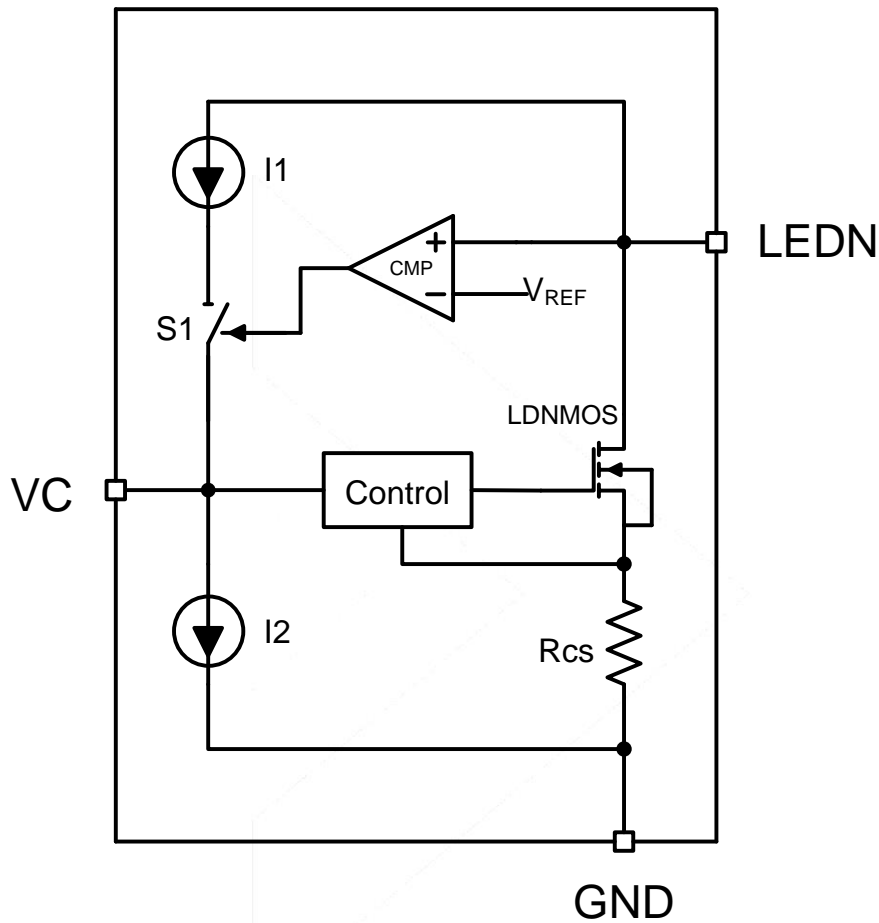(V_{AC}=220V, V_{LED}=250V, I_{LED}=15mA)
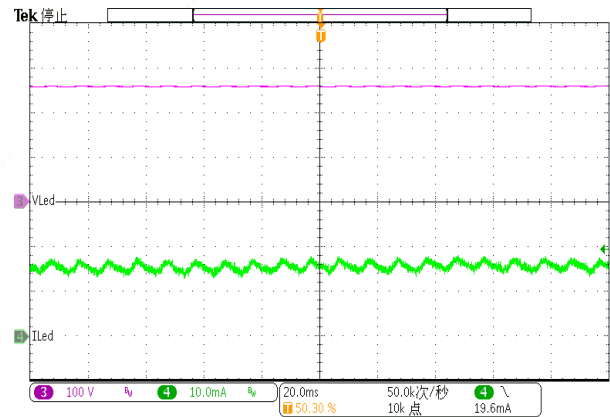
AC Source Power ON
(V_{AC}=120V, V_{LED}=125V, I_{LED}=15mA)

AC Source Power OFF
(V_{AC}=120V, V_{LED}=125V, I_{LED}=15mA)

Adaptive 100/120Hz Current Ripple Remover Max Input Current ≤ 60mA

Block Diagram

Function Description

DIO8241JT is designed for driving one LED string and removing the 100/120Hz LED current ripple.

Theory of Operation

The LED string and DIO8241JT are both supplied by an AC/DC current source. The drain of internal NMOSFET is connected to the cathode of LED string. A sensing resistor Rcs is connected between the source of NMOSFET and GND. DIO8241JT drives NMOSFET to transfer the LED current ripple to voltage ripple on NMOSFET, and ensures the constant voltage across LED string and the constant current flow through LED string. The scalable adaptive function of DIO8241JT can regulate the cathode voltage of LED string to minimum to improve the efficiency of the system.

Current Ripple Removing

The capacitor C_C between VC and GND is an integral capacitor.　DIO8241JT transform the voltage on Cc to a reference voltage. The current regulator regulates LED current via negative feedback control.

C_C should be large enough in order to remove the current ripple of the LED string. However, too large capacitor may slow down the dynamic response.

DIO8241JT

Adaptive Regulation

DIO8241JT controls the voltage on C_C by monitoring the operation state of built-in N-MOSFET. The efficiency of system is relatively low when N-MOSFET always works in the saturation region. DIO8241JT detects it and charges C_C to raise the V_{VC} and I_{LED}, then the output voltage of power supply is reduced, and the voltage drop on N-MOSFET decreases.

Conversely, when N-MOSFET is working in the linear region, LED current regulation loop is open. DIO8241JT detects it and discharges C_C to reduce the V_{VC} and I_{LED}, then the output voltage of power supply is raised, and the LED current regulation loop is closed.
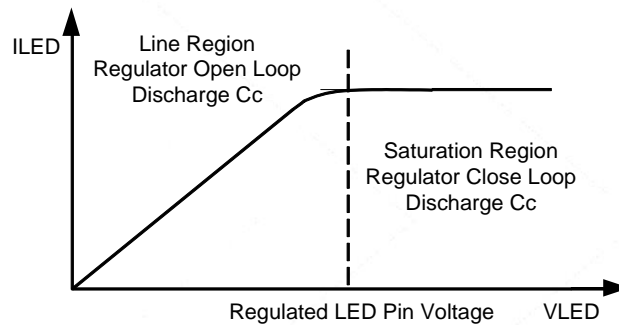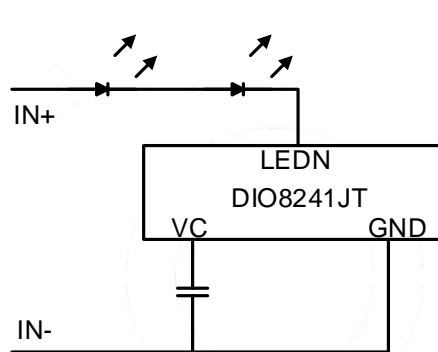

PCB Design Guideline

1. DIO8241JT should be placed far away from the power devices for better thermal performance.

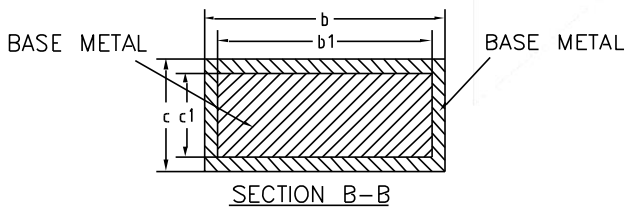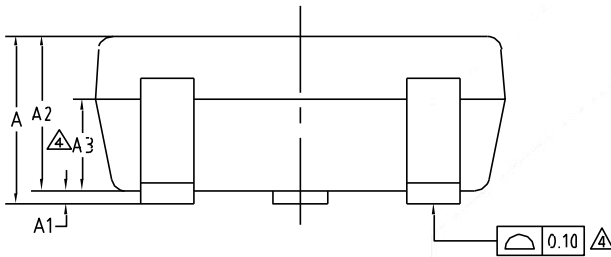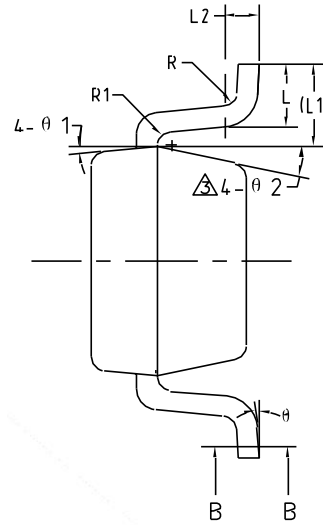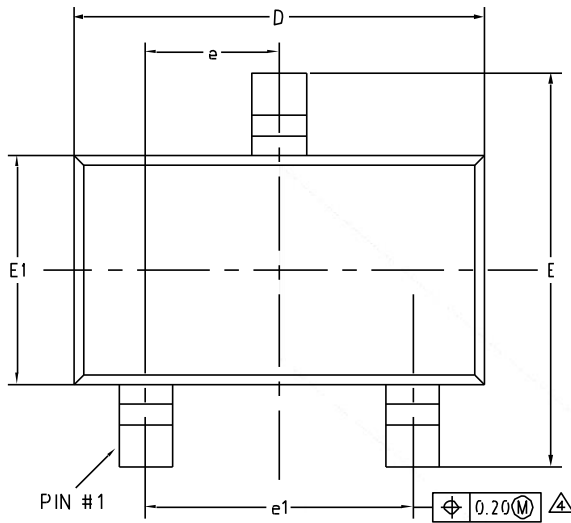2. The area of LED current loop should be as small as possible.

Application Information

DIO8241JT design guide:

1. The value of the capacitor between VC and GND can determine the final amplitude of the current ripple. It should be large enough in order to remove the current ripple of the LED string. However, too large capacitor may low down the dynamic response.
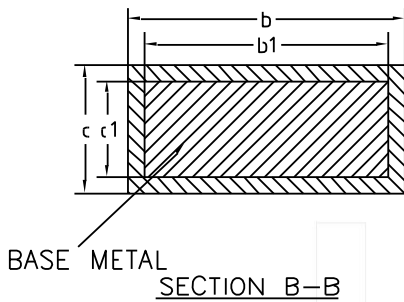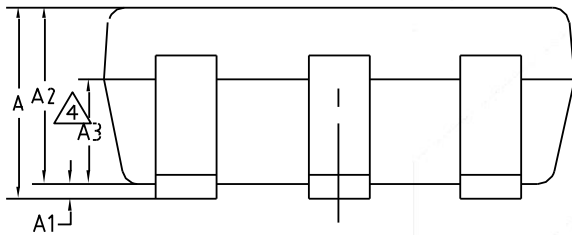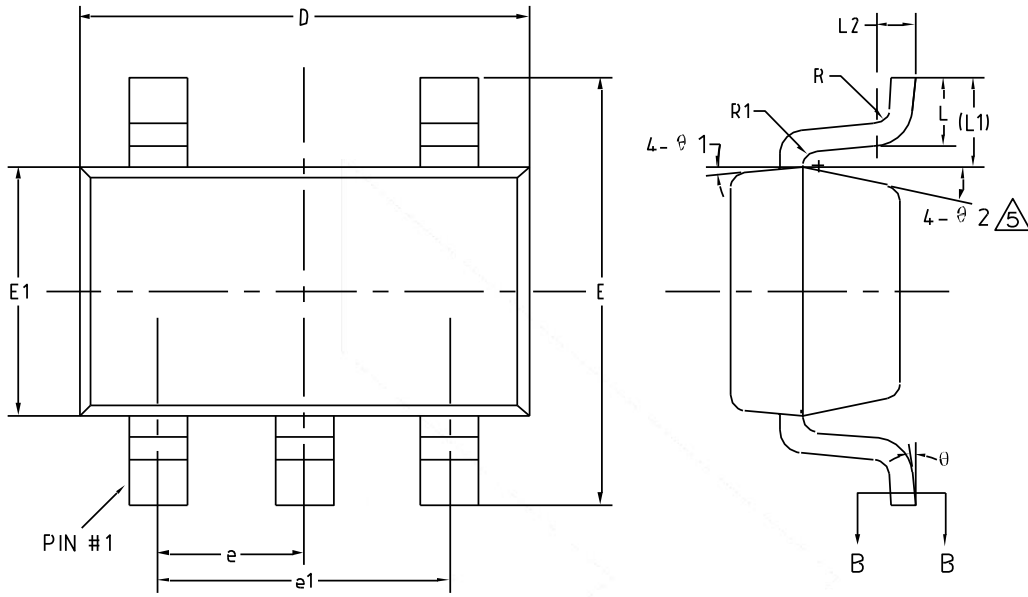
Physical Dimensions: SOT23-3

Adaptive 100/120Hz Current Ripple Remover Max Input Current ≤ 60mA

COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)			
Symbol	MIN	NOM	MAX
A	-	-	1.25
A1	0	-	0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.36	-	0.50
b1	0.36	0.38	0.45
c	0.14	-	0.20
c1	0.14	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.59REF		
L2	0.25BSC		
R	0.05	-	-
R1	0.05	-	0.20
Θ	0°	-	8°
Θ1	3°	5°	7°
Θ2	6°	-	14°

Physical Dimensions: SOT23-5

Adaptive 100/120Hz Current Ripple Remover Max Input Current ≤ 60mA

PIN #1

BASE METAL

SECTION B-B

COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)			
Symbol	**MIN**	**NOM**	**MAX**
A	-	-	1.25
A1	0	-	0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.36	-	0.50
b1	0.36	0.38	0.45
c	0.14	-	0.20
c1	0.14	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.59REF		
L2	0.25BSC		
R	0.10	-	-
R1	0.10	-	0.20
Θ	0°	-	8°
Θ1	3°	5°	7°
Θ2	6°	-	14°

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CONTACT US

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