



Promotion Materials (LED ILLUMINATION)

2010. FEB.



LED Market Segmentation

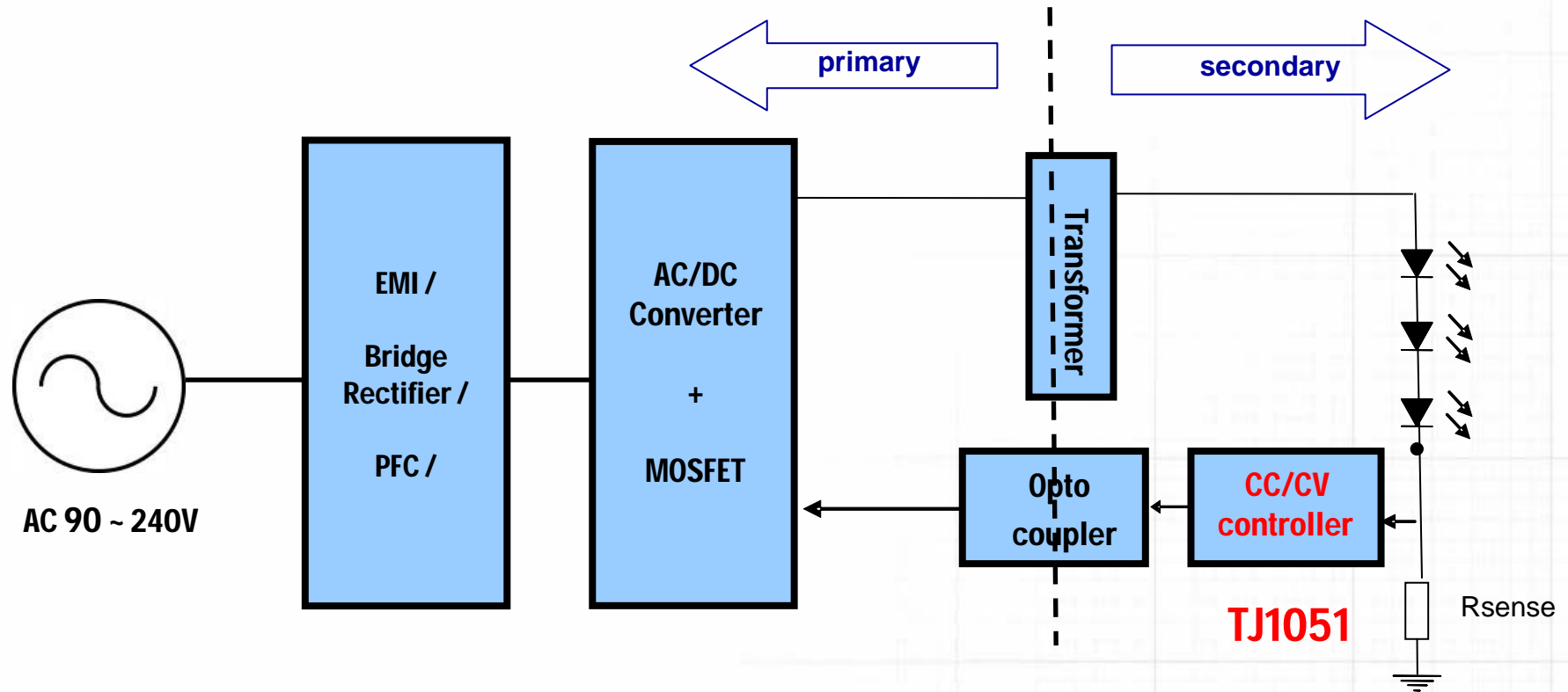
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Power Structure	Input Voltage Range	Application	HTC Suggested Items	Description
Isolated AC/DC	AC 110 ~ 220V	General Illumination	TJ1051SF6	Constant Current / Constant Voltage
(DC/DC) Buck	DC 12~40V	Automotive / Backlight	LM317 / LM29152	Constant Current Regulator
			TJ1509 / LM2596	Step-down Conversion
(DC/DC) Boost	DC 4.2V ~ 12V	Portable/ Battery Lighting	LM1937SF5 LM5171	Step-up Conversion
(DC/DC) Buck/Boost	DC 2.5V ~ 30V	Photo Voltaic / Dual Input	LM5171	SEPIC Conversion



Isolated AC/DC (1/2)

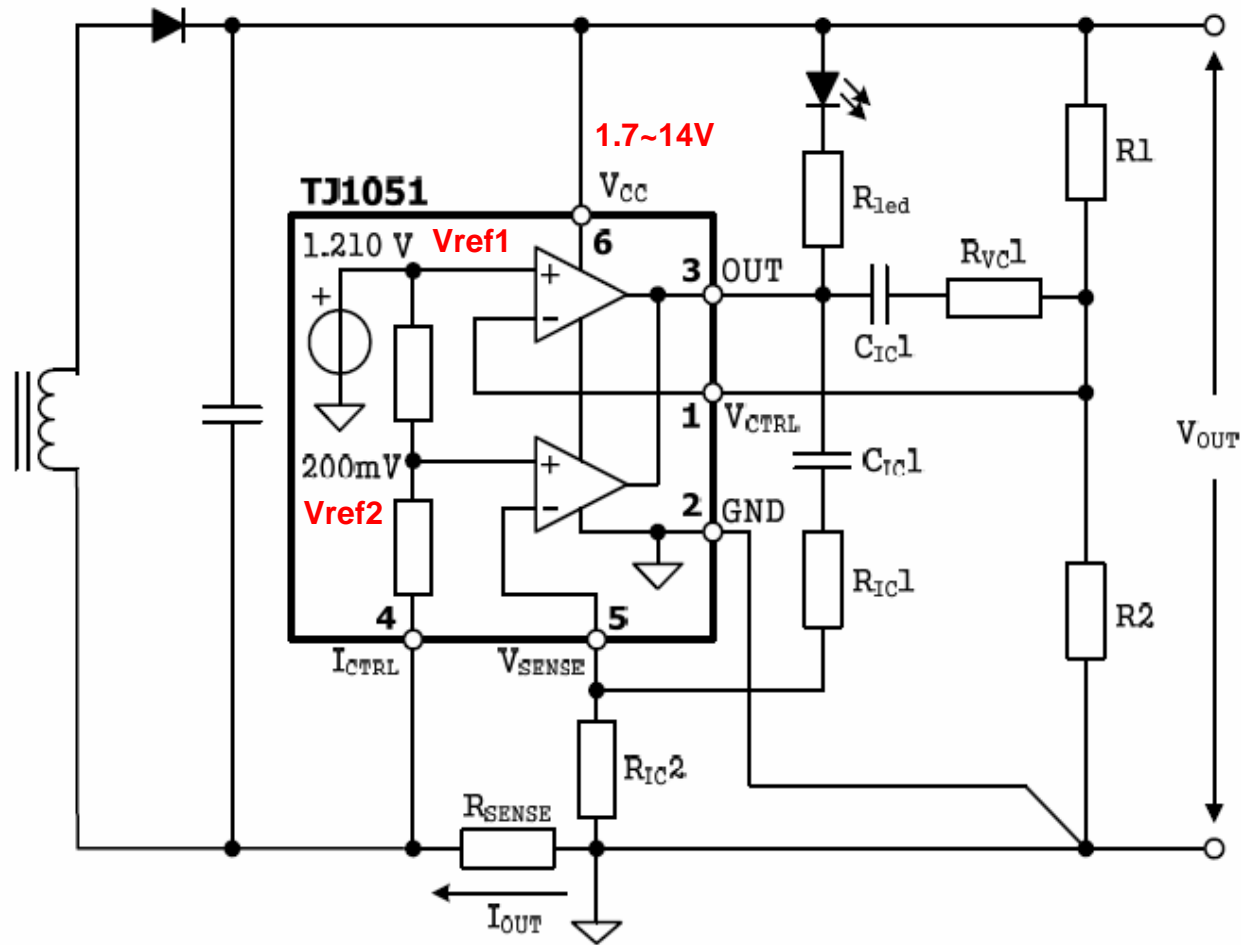
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For over than 3W LEDs, it is needed to use CC/CV controller for reliability and lighting stability.

Isolated AC/DC (2/2)

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CV Control = $1.21 * (1 + R1/R2)$

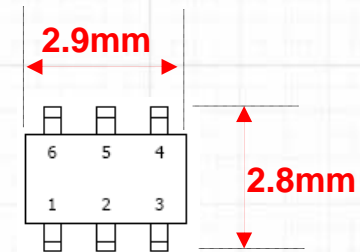
CC Control = $0.2 / R_{sense}$

TJ1051SF6

Integration of CC/CV
Compact Package Size
(SOT-23-6L)



SOT23-6

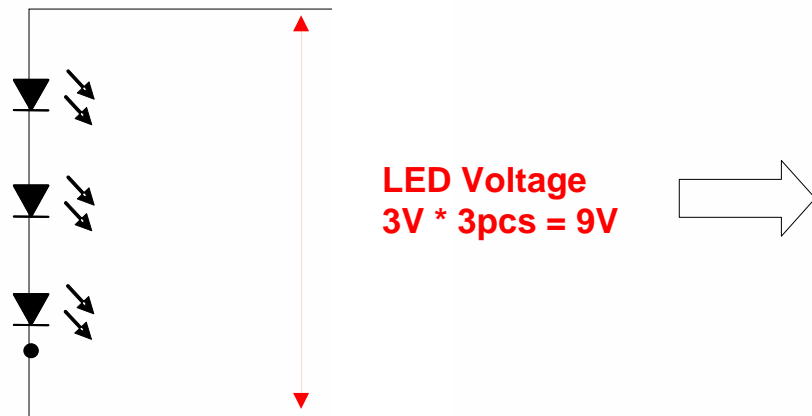


DC/DC Solution

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Input Voltage and LED Voltage	Topology	HTC Suggested Items
DC Input Voltage is slightly higher than LED Voltage	Constant Current	LM317L LM29152
DC Input Voltage is higher than LED Voltage	Step-down Conversion	TJ1509 LM2596
DC Input Voltage is lower than LED Voltage	Step-up Conversion	LM1937SF5 LM5171
DC Input Voltage is lower or higher than LED Voltage	SEPIC Conversion	LM5171

(Example)

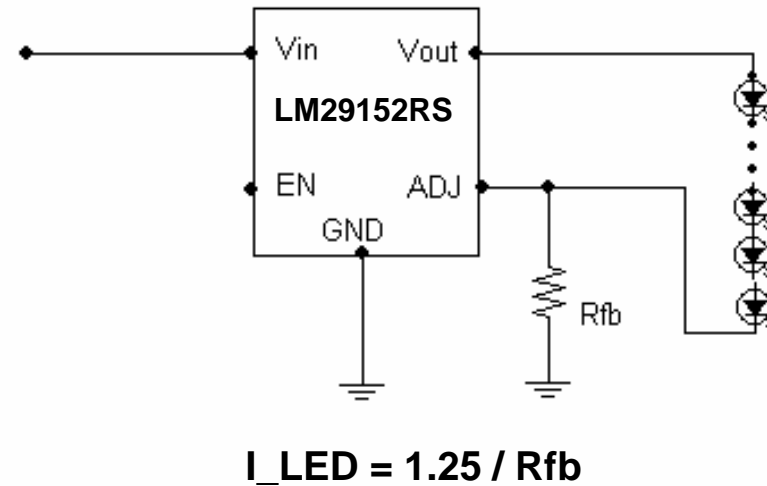
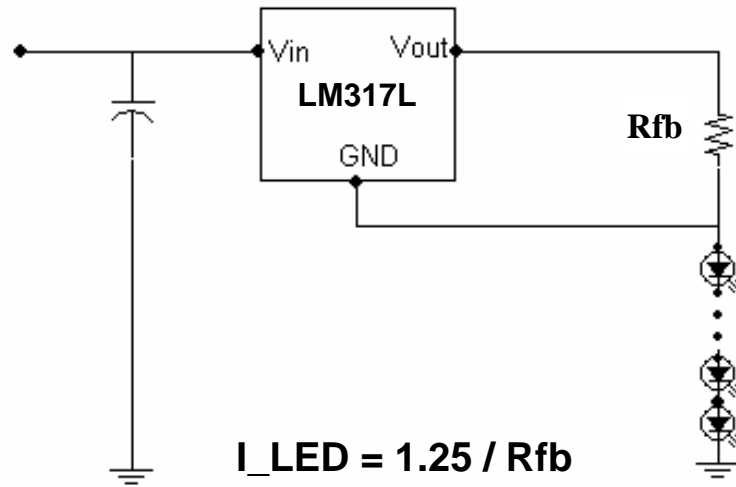


Input Voltage Range

15 ~ 45V	Step-down Conversion
12 ~ 15V	Constant Current
2.5 ~ 6V	Step-up Conversion
2.5 ~ 30V	SEPIC Conversion

Constant Current Regulator

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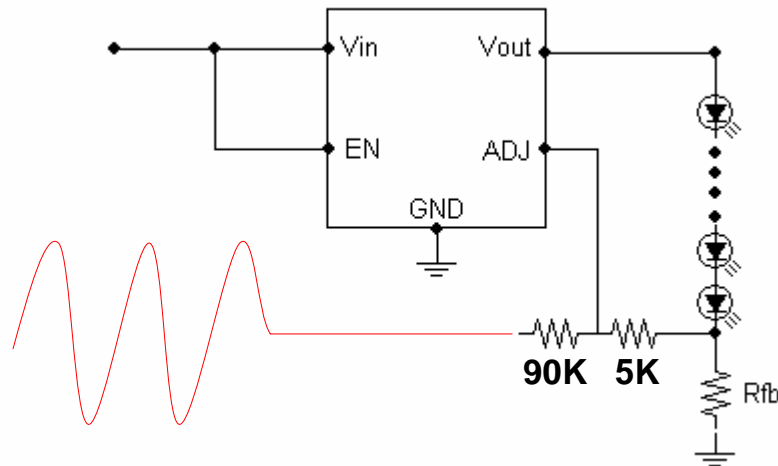
	Max Vin*	Min Vin	Max Output Current	PKG
LM317L	40V	V_LED + 3.25V	150mA	TO-92
LM29152RS	26V (peak 60V)	V_LED + 1.65V	1.5A	TO-252-5L

* It is needed to consider the thermal issue of IC.

Dimming Control Example

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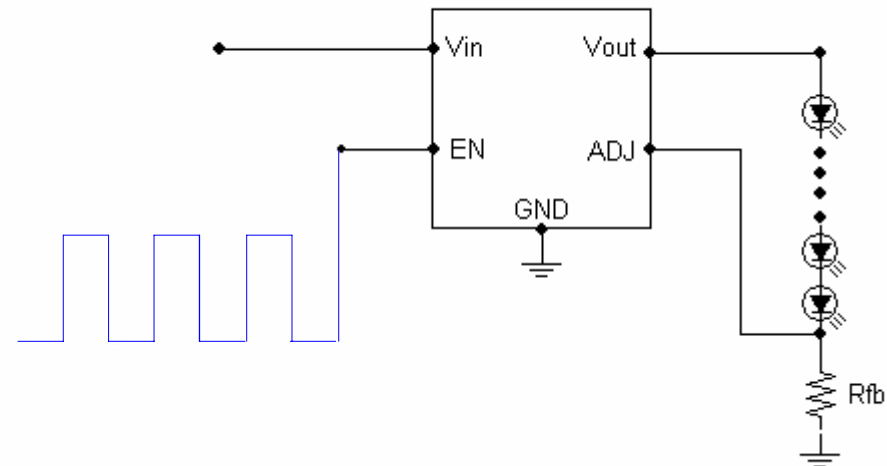
Analog Dimming (by DC Voltage)



Higher DC Voltage
=> Higher I_{LED}
=> More Brightness

Merit : Easy Control

Digital Dimming (by PWM)

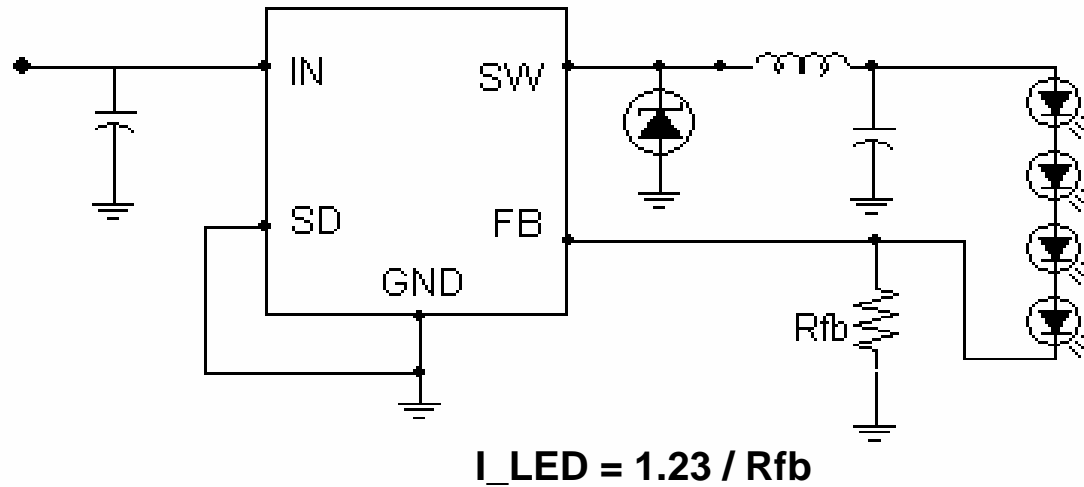


Longer PWM Duty
=> Longer LED Turn-on Time
=> More Brightness

Merit : Accurate Brightness Control

DC/DC – Step-down

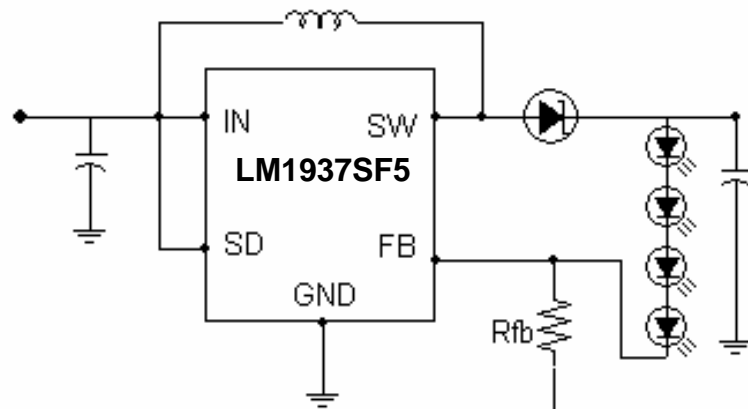
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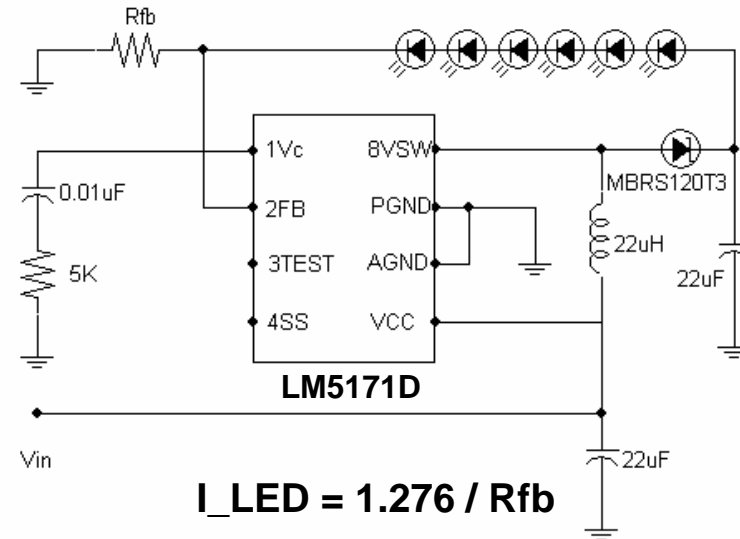
	Max Vin	Min Vin	Max Output Current	PKG
TJ1509AD-ADJ	24V	V_LED + 5V	2A	SOP-8
LM2596R-ADJ	45V	V_LED + 5V	3A	TO-263-5L

DC/DC Step-up

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$$I_{LED} = 0.095 / R_{fb}$$

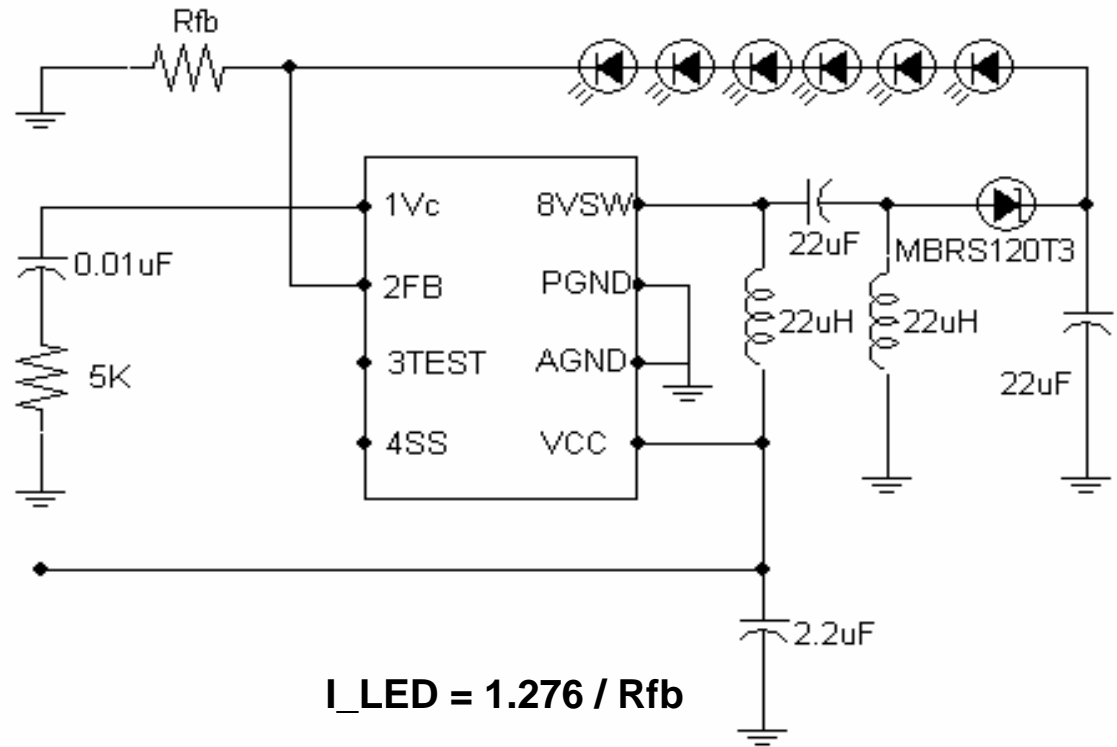


$$I_{LED} = 1.276 / R_{fb}$$

	Max Vin	Min Vin	Max Input Current	PKG
LM1937SF5	$V_{LED} - 3V$	2.5V	0.3A	SOT-23-5L
LM5171D	$V_{LED} - 3V$	2.5V	1.5A	SOP-8

DC/DC – Step-up/down

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	Max Vin	Min Vin	Max Current*	PKG
LM5171D	30V	2.5V	Less than 1.5A	SOP-8

* It is needed to consider input and output current limit.



Thanks