3Pin Dice Form

NU501-1713

Single Channel Constant Current Regulator

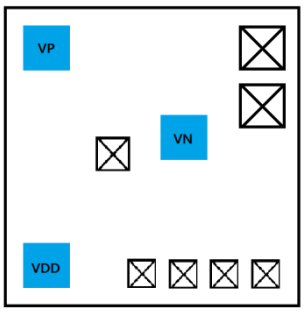
Features

- The most easy used linear constant current LED driver
- 2.6~24V wide supply voltage range supports self-power structure in lighting application
- 20~120mA constant current regulator
- Minimized 0.3~1Voutputdropout voltage
- Fastresponse time, support power supply PWM dimming function
- Less than 0.1%/V line/load regulation
- 125~160°C junction temperature current ramp down thermal protect
- -40~85℃ operating temperature

Dice information

Chip Size: x*y = 525um * 535um

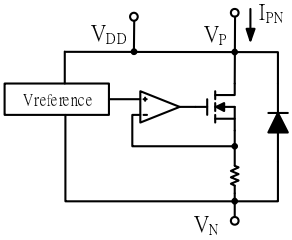
Coordinate	X	Y	Pad size
VP	59.72	458.9	80 * 80 (um)
VN	330.58	302.76	
VDD	68.03	76.11	



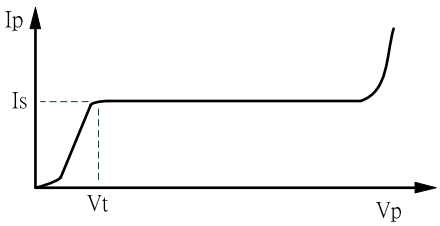
Applications

- Constant Current LED (CCLED)
- Constant Current Light Engine

Block Diagramand Ideal IV characteristic



IV curve



Maximum Ratings (T = 25°C)

Characteristic	Symbol	Rating	Unit
Supply voltage	V_{DD}	-0.3~28	V
Output voltage	V_{PN}	-0.3~28	V
Operating temperature	T_{OPR}	-40~+85	°C
Storage temperature	T_{STG}	-55~+150	°C

Protection

HBM ±8KV ESDsensitivity test passed. MIL-STD classification 3B.
Latch up positive/negative I 400mA test passed.

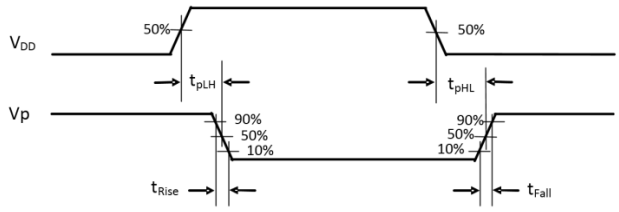
Electrical Characteristics and Recommended Operating Conditions

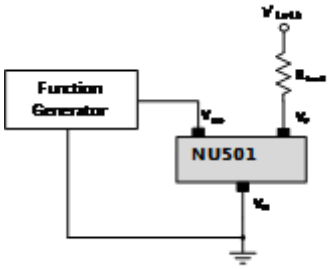
Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Working voltage	V_{PNmax}	I_{PN}= I_S	-	-	24	V
Output current	I_S	Spec.	10	-	120	mA
Output current skew	I_{Skew}	I_S	-	±0.1	-	%
Line/Load regulation	%/V_P	0.3V > V_{PN}> 24V	-	±0.1	-	%/V

Switching Characteristics (T = 25˚C)

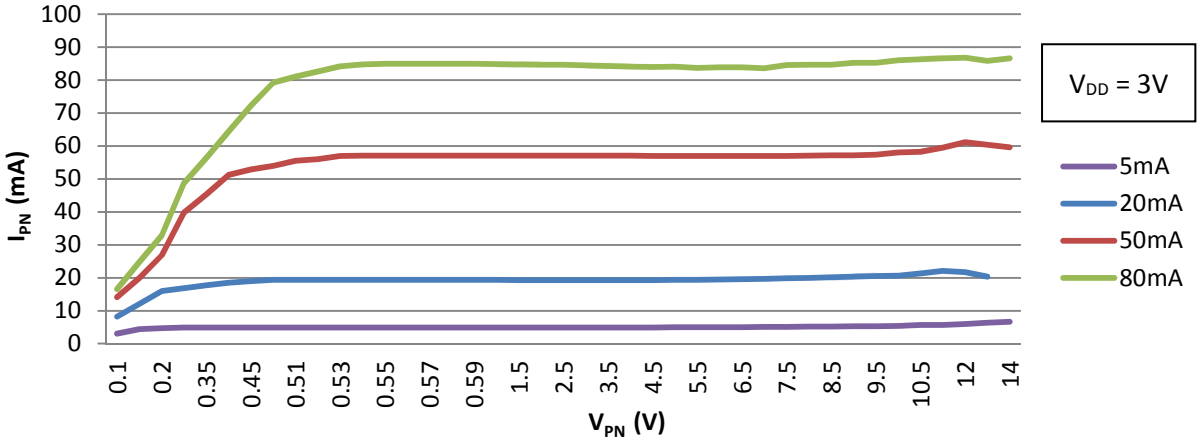
Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Propagation Delay Time $V_{DD}$from "L" to "H"	t_{pLH}	V_{PN}=1V, V_{DD} = 0V →5V	-	2.2	-	uS
Output current rising time	t_{Rise}	V_{PN}=1V, V_{DD} = 0V →5V	-	1.8	2	uS
Propagation Delay Time $V_{DD}$from "H" to "L"	t_{pHL}	V_{PN}=1V, V_{DD} = 5V→0V	-	500	-	nS
Output current falling time	t_{Fall}	V_{PN}=1V, V_{DD} = 5V→0V	-	80	120	nS

Timing Waveform



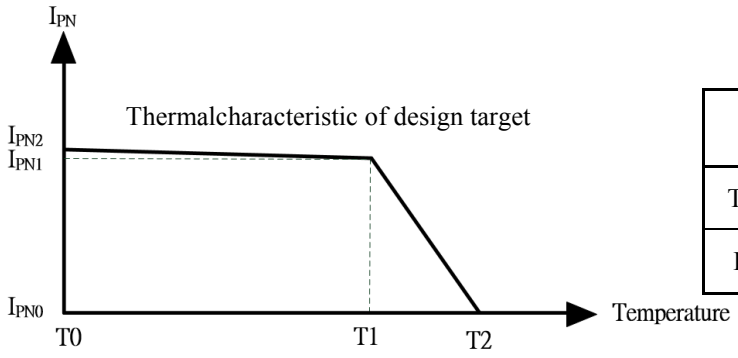


I/V curve

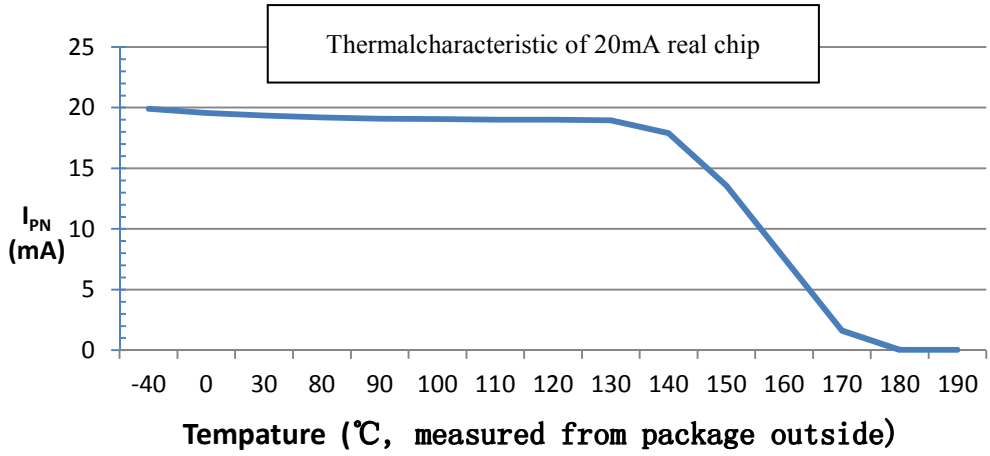


Thermal protection

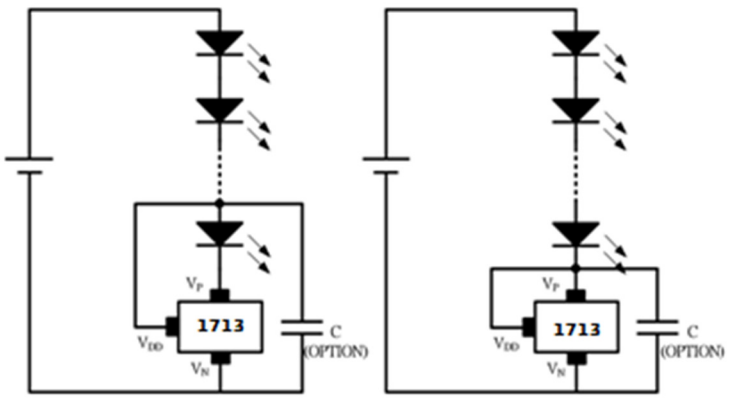
When junction temperature is more than thermal protection temperature (~125°C), the output current of NU501 will start to decrease to lower down the power dissipation on chip.If the junction temperature reach 160°C, the output current will almost shut down. The output current will restore in the same way when the temperature decrease. Whole serieschips with different output current have the same thermal characteristics.



State	Normal (T0 ↔ T1)	Thermal protect (T1 ↔ T2)	Unit
Temperature	-40↔125	125 ↔ 160	°C
I_{PN}variation	-0.8	-28	%/10°C



Application Circuits



Low dropout application
V_{PN_Min} = 0.3V(20mA)

Normal application
V_{PN_Min} = 2.7V(20mA)

Special Optical Restrictions

The output current of NU501-1713 will drift when NU502-1713 bare die is exposure to the strong light. NU502-1713 bare die should be covered by non-transparent material or mechanical structure to isolate the light.

Restrictions on product use

- NUMEN Tech. reserves the rightto update these specifications in the future.
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