

Single Channel Constant Current Regulator

Features

- The most easy used linear constant current LED driver
- Strong bond pad design
- V_{DD} 7~60V supply voltage
- 60V output breakdown voltage
- 5~200mA constant current regulator
- Less than -0.05%/V line/load regulation
- $I_{PN} \leq 20mA$ 65~85 °C junction temperature current ramp down thermal protect
- $I_{PN} \geq 150mA$ 135~165 °C junction temperature current ramp down thermal protect
- -40~110°C operating temperature

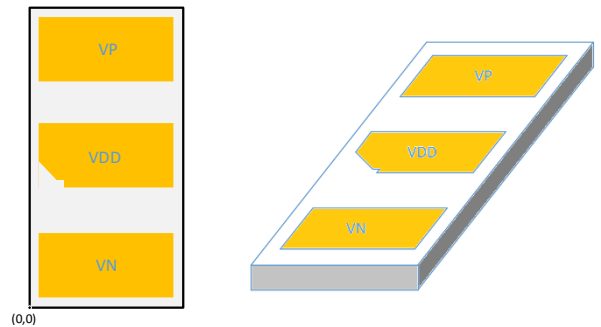
Applications

- Constant current LED (CCLED)
- Constant current COB light engine

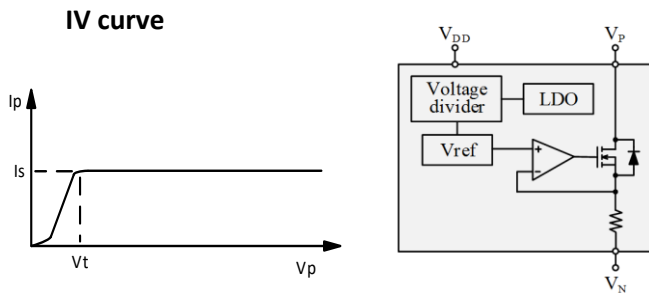
Dice information

Chip Size: $x*y = 425um * 745um$

Coordinate	X	Y	Pad size
VP	213	645	379 * 152
VDD	213	371	
VN	213	96	



Block Diagram and Ideal IV characteristic



Ordering information

Part number: NU520-XXXXY

Example:

- NU520-150W: 150mA type W for wire bound application
- NU520-150G: 150mA type G for flip chip application

- PS.1. NU520 type G is designed for flip chip application and can't be used for wire bound application, vice-versa for W type.
2. Before you issue your P.O., please contact your agent or NUMEN technology to make sure the type of output current is available. Numen will irregular update the new current type.
3. Output current now available:
20mA, 150mA, 200mA

Maximum Ratings (T = 25°C)

Characteristic	Symbol	Rating	Unit
Output breakdown voltage (Output off)	V_{PN}	-0.2 ~ 60	V
V_{DD} supply voltage	V_{DD}	-0.2 ~ 80	V
Operating temperature	T_{OPR}	-40~+110	°C
Storage temperature	T_{STG}	-55~+150	°C

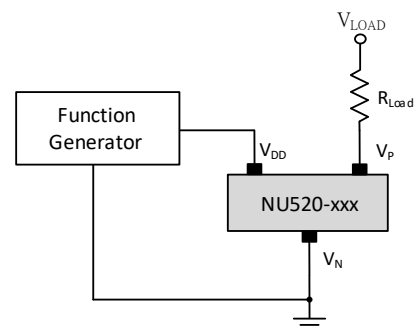
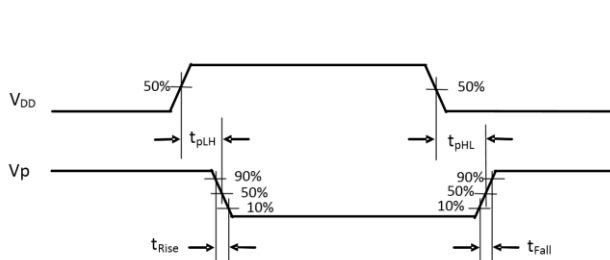
Electrical Characteristics and Recommended Operating Conditions

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit	
Max. working voltage	V_{PNmax}	$I_{PN} = I_S$	Continuous	-	-	30	V
			Short time	-	-	60	V
Supply voltage	V_{DD}	$I_{PN} = I_S$	$I_{PN} \geq 150mA$	7	-	60	V
			$I_{PN} \leq 20mA$	3.5	-	60	
Supply current	I_{DD}	$7V \leq V_{DD} \leq 40V$		-	0.16	0.22	mA
		$40V < V_{DD} \leq 60V$		-	-	2.2	
Minimum dropout voltage	V_{PN}	$V_{DD} > 7V$	$I_{PN} = 200mA$	-	1	-	V
			$I_{PN} = 150mA$	-	0.8	-	
			$I_{PN} = 20mA$	-	0.3	-	
Output current	I_S	Spec.	-	10~200	-	mA	
Output current skew	I_{skew}	I_S	-	2	3.5	%	
Thermal regulation	%/100°C	Output enabled, Junction temp. < 130°C	-	-2.5	-	%	
Output ramp down temperature	T_1	Output enabled	$I_{PN} \leq 20mA$	-	65	-	°C
			$I_{PN} \geq 150mA$	-	140	-	
Shutdown temperature	T_2	$I_{OPT} < 0.1 * I_S$	$I_{PN} \leq 20mA$	-	85	-	°C
			$I_{PN} \geq 150mA$	-	170	-	
Line/Load regulation	%/V _P	$60V > V_{PN} > 1.5V$	-	-	-0.05	%/V	

Switching Characteristics (T = 25°C)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Propagation Delay Time V_{DD} from "L" to "H"	t_{pLH}	$V_{PN}=1.5V, V_{DD} = 0V \rightarrow 7V$	-	1.3	-	us
Output current rising time	t_{rise}	$V_{PN}= 1.5V, V_{DD} = 0V \rightarrow 7V$	-	9	-	
Propagation Delay Time V_{DD} from "H" to "L"	t_{pHL}	$V_{PN}=1.5V, V_{DD} = 7V \rightarrow 0V$	-	100	-	ns
Output current falling time	t_{fall}	$V_{PN}= 1.5V, V_{DD} = 7V \rightarrow 0V$	-	150	-	

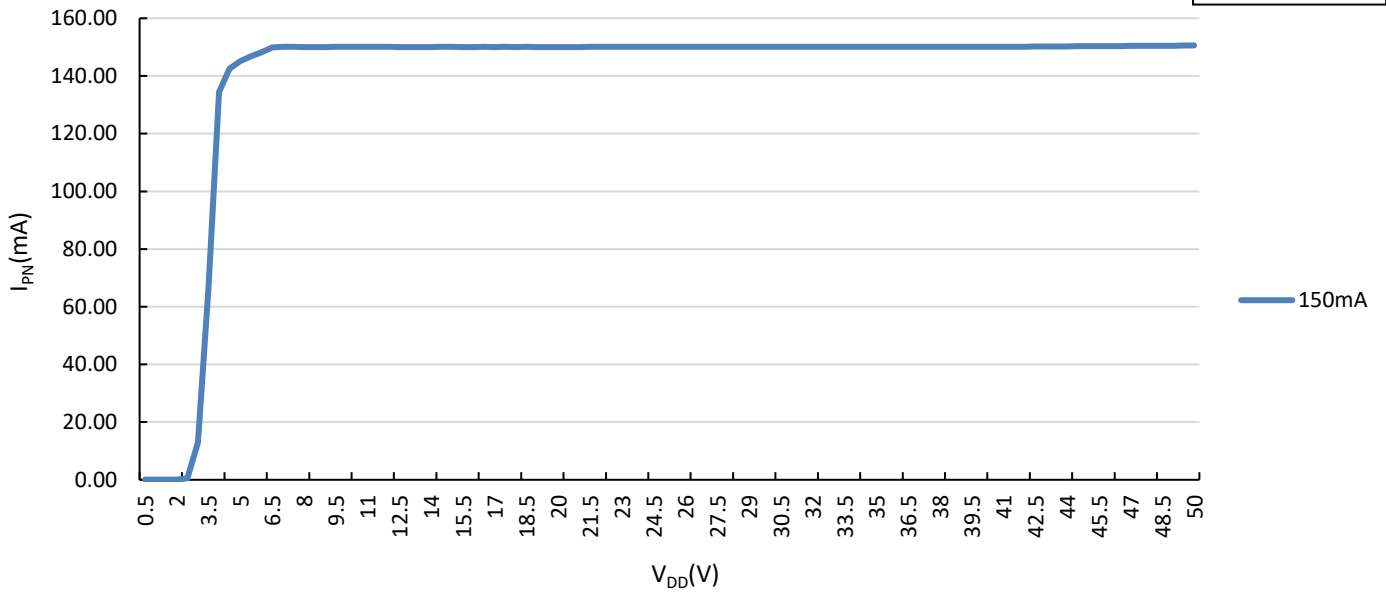
Timing Waveform



I/V curve

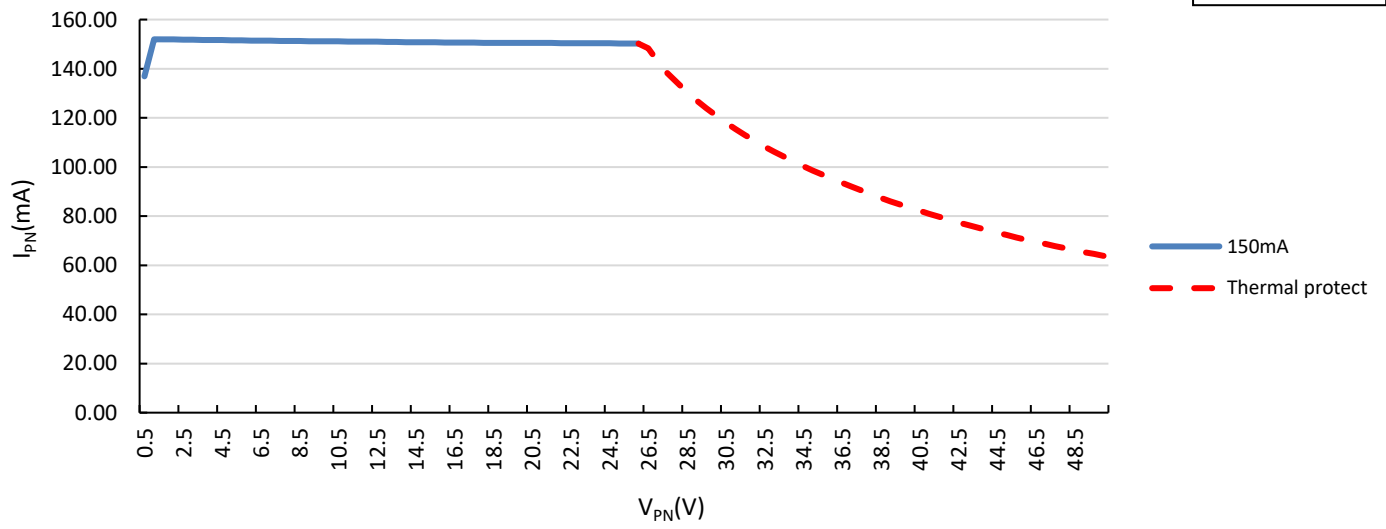
Line regulation

$V_{PN} = 1.5V$



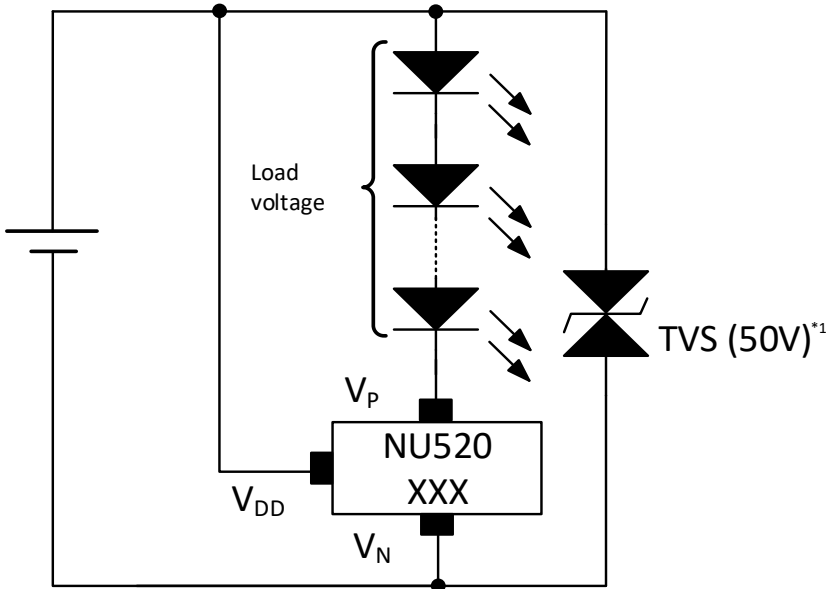
Load regulation

$V_{DD} = 7V$

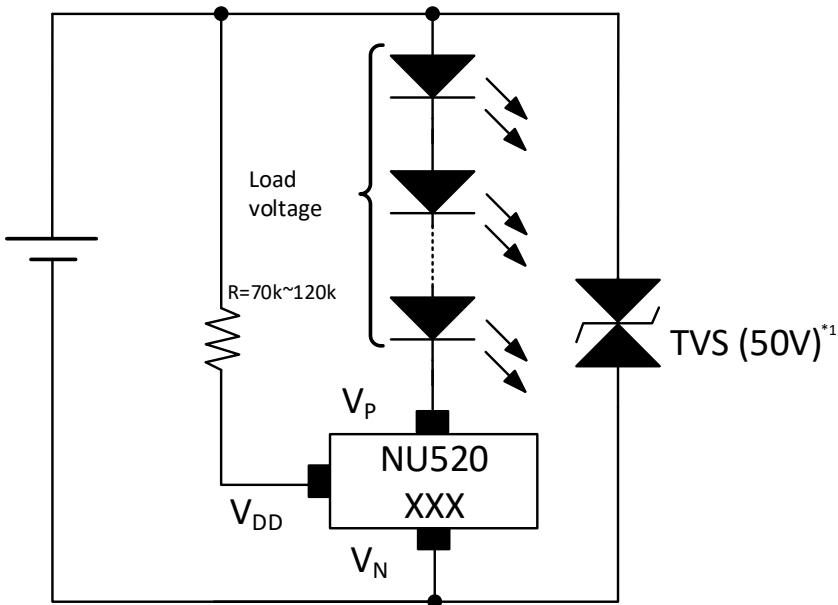


Application Circuits

- DC power general lighting < 20V



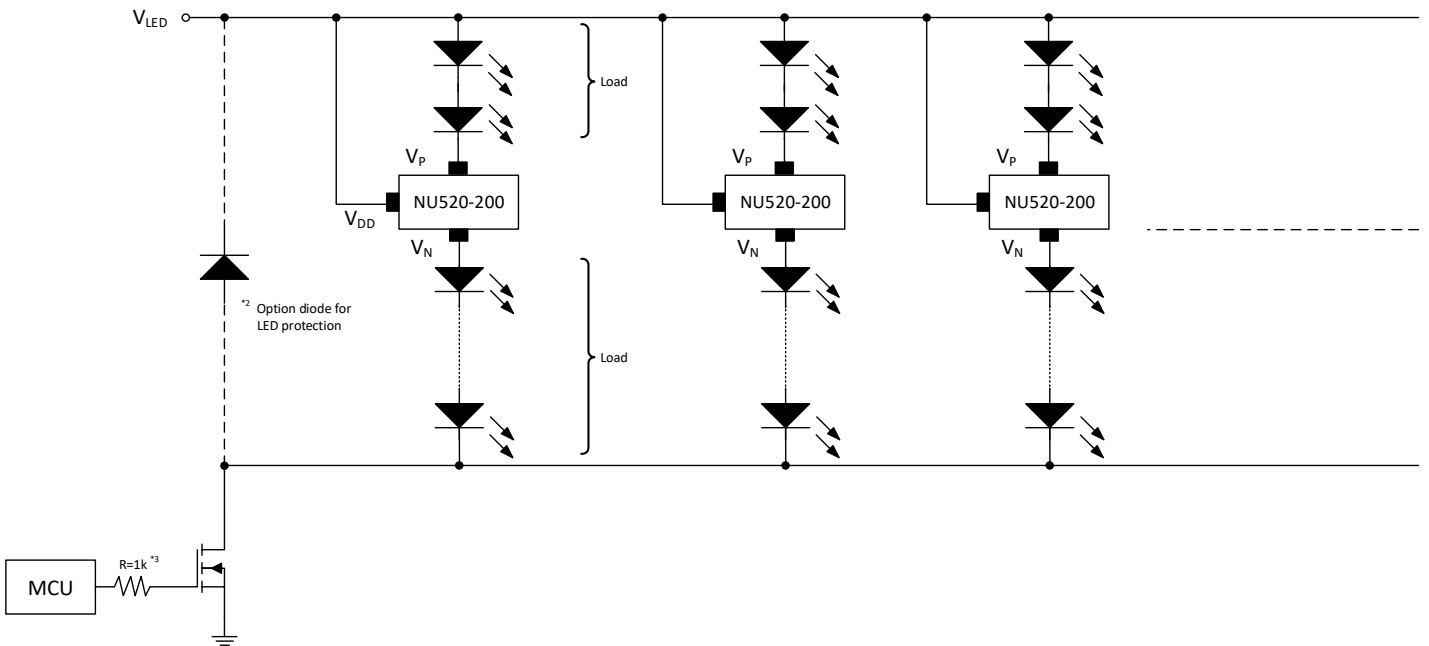
- DC power general lighting $\geq 20V$



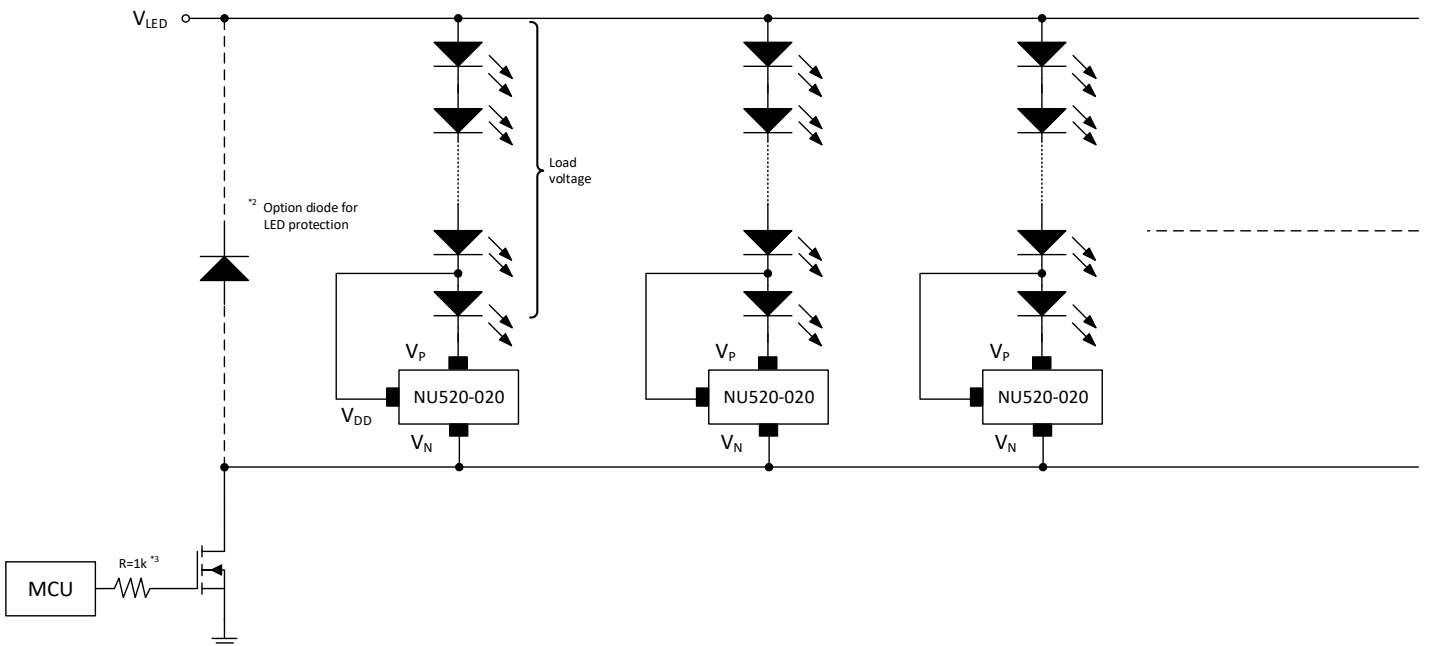
*1: In vehicle or some environment that power supply may have high voltage induced, TVS is recommended to be used.

● LED strip dimming application

Example 1:



Example 2:



*2: LED protection diode for high speed dimming. Suggest to add one protection diode every certain distance.

*3: Power voltage transition slow down resistor for noise reduction.

Special Optical Restrictions

The output current of NU520-xxx maybe will drift slightly when NU520-xxx bare die is exposure to the strong light. It would be better if NU520-xxx bare die is covered by non-transparent material or mechanical structure to isolate the light.

Restrictions on product use

- NUMEN Tech. reserves the right to update these specifications in the future.
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