

XC61C Notes on Use of an LED



An example of how an LED can be used with the XC61C series - lighting to indicate 'low batteries'.

Example 1

*Please be aware that LED brightness dispersion exists due to the fact that the current that flows through the internal transistor is dispersed.

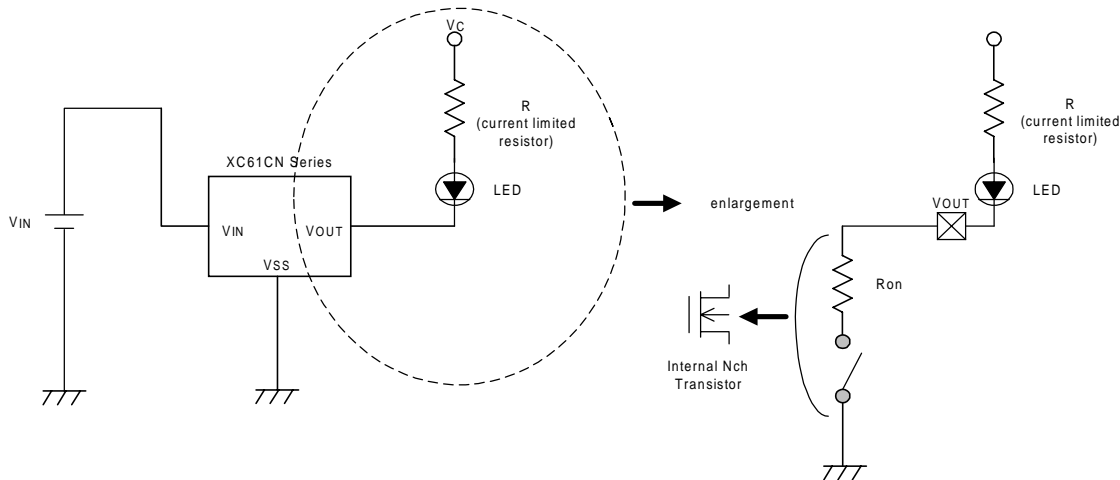


Diagram 1 : LED lighting when using VD

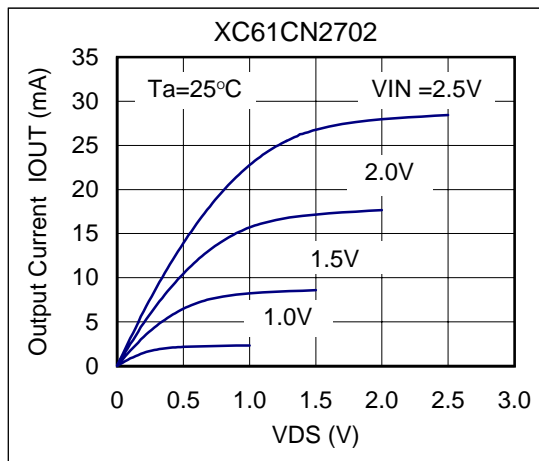


Diagram 2 : Nch driver output current vs. VDS

LED : Lighting Conditions (General LED use)
 VF=2.2 to 2.4V
 IF=20 to 25mA

Please note the following points :

1. A power supply for LED lighting use is required if detect voltage is lower than the VF voltage (refer to LED lighting conditions). As the LED drive current will become smaller should input voltage VIN fall, use a separate power supply (Vc) for resistor R.
2. Please ensure that the current that flows through the internal Nch transistor is larger than IF during detection.
 (By looking at the VIN=2.5V line in the graph above, it can be seen that in order to achieve a flow of more than 20mA through the internal Nch transistor, a value of VDS=0.8V would be required.)

The following shows the method of calculation for the value of Rpull in order to achieve the conditions mentioned :

Assuming Established Detect Voltage = 2.7V : Vc = 5V

Then from $R = (Vc - VDS - VF) / IOU$ where Vc=5V, VF=2.4V, VDS=0.8V and IOU=20mA

R = 90Ω

Example 2

(* Since the Power MOS' ON resistance is extremely small there is no dispersion of the LED's brightness)

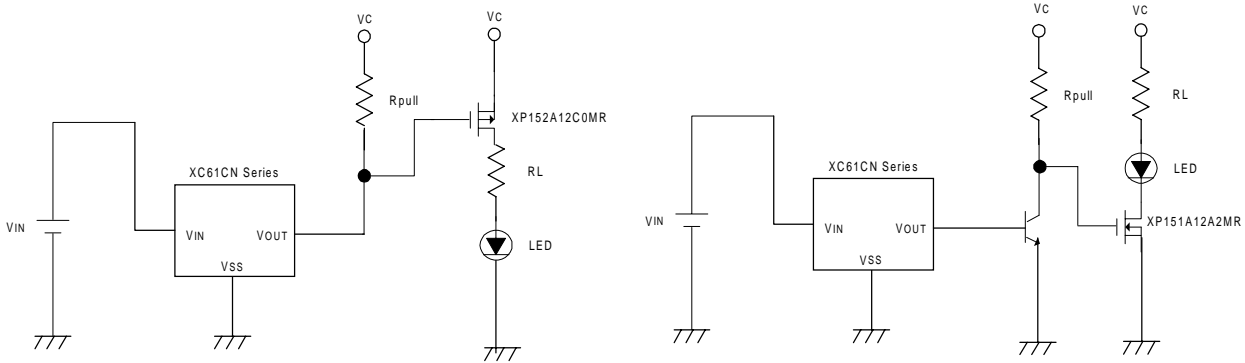


Diagram 3 : Pch Power MOS FET added to an Nch open drain device
(LED lights up during detection)

Diagram 4 : npn transistor and Nch Power MOS FET added to an Nch open drain device
(LED lights up during detection)

When selecting a Power MOS please select according to the gate voltage.

(In the case of diagrams 3 & 4 above, a Power MOS FET with an operating voltage of 2.5V has been selected since VD is a 2.7V device.)

The following shows the method of calculation for the value of RL :

Assuming Established Detect Voltage = 2.7V : Vc = 5V
Then from $RL = (Vc - VF) / I_{OUT}$ where Vc=5V, VF=2.4V and IOUT=20mA
 RL = 130Ω