



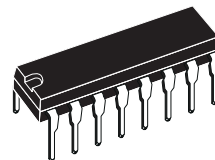
ULN2065B - ULN2067B  
ULN2069B - ULN2071B  
ULN2075B - ULN2077B

## 80 V - 1.5 A QUAD DARLINGTON SWITCHES

- OUTPUT CURRENT TO 1.5 A EACH DARLINGTON
- MINIMUM BREAKDOWN 80 V
- SUSTAINING VOLTAGE AT LEAST 50 V
- INTEGRAL SUPPRESSION DIODES (ULN2065B, ULN2067B, ULN2069B and ULN2071B)
- ISOLATED DARLINGTON PINOUT (ULN2075B and ULN2077B)
- VERSIONS COMPATIBLE WITH ALL POPULAR LOGIC FAMILIES

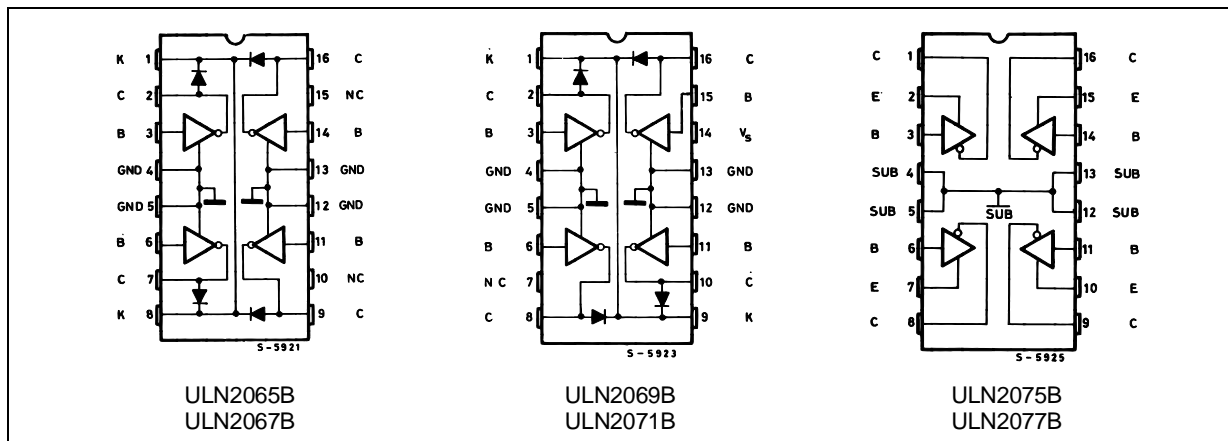
### DESCRIPTION

Designed to interface logic to a wide variety of high current, high voltage loads, these devices each contain four NPN darlington switches delivering up to 1.5 A with a specified minimum breakdown of 80 V and a sustaining voltage of 50 V. The ULN2065B, ULN2067B, ULN2069B and ULN2071B contain integral suppression diodes for inductive loads and have common emitters; the ULN2075B and ULN2077B feature isolated darlington pinouts and are intended for applications such as emitter follower configurations. Inputs of the ULN2065B, ULN2069B and ULN2075B are compatible with popular 5 V logic families and the ULN2067B, ULN2071B and ULN2077B are compatible with 6-15 VCMOS and PMOS. The ULN2069B and ULN2071B include a predriver stage to provide extragain, reducing the load on control logic.



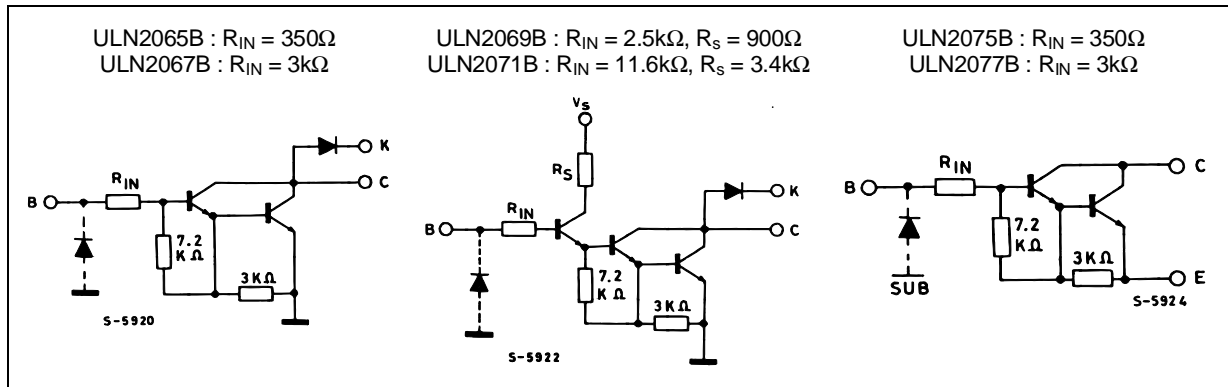
POWERDIP  
12 + 2 + 2

### PIN CONNECTIONS AND ORDER CODES



# ULN2065B-ULN2067B-ULN2069B-ULN2071B-ULN2075B-ULN2077B

## SCHEMATIC DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CEX}$	Output Voltage	80	V
$V_{CE(sus)}$	Output Sustaining Voltage	50	V
$I_O$	Output Current	1.75	A
$V_i$	Input Voltage	for ULN2075B – 2077B for ULN2067B – 2071B for ULN2065B – 2069B	60 30 15 V V V
$I_i$	Input Current	25	mA
$V_s$	Supply Voltage	for ULN2069B for ULN2071B	10 20 V V
$P_{tot}$	Power Dissipation	at $T_{pins} = 90^\circ C$ at $T_{amb} = 70^\circ C$	4.3 1 W W
$T_{amb}$	Operating Ambient Temperature Range	- 20 to 85	$^\circ C$
$T_{stg}$	Storage Temperature	- 55 to 150	$^\circ C$

## ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25^\circ C$ unless otherwise specified )

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit	Fig.
$I_{CEX}$	Output Leakage Current	$V_{CE} = 80V$ $T_{amb} = 25^\circ C$ $T_{amb} = 70^\circ C$			100 500	$\mu A$ $\mu A$	1
$V_{CE(sus)}$	Collector-emitter Sustaining Voltage	$I_C = 100mA$ , $V_i = 0.4V$	50			V	2
$V_{CE(sat)}$	Collector-emitter Saturation Voltage	$I_C = 500mA$ $I_B = 625\mu A$ $I_C = 750mA$ $I_B = 935\mu A$ $I_C = 1A$ $I_B = 1.25mA$ $I_C = 1.25A$ $I_B = 2mA$ $I_C = 1.5A$ $I_B = 2.25mA$			1.1 1.2 1.3 1.4 1.5	V V V V V	3 3 3 3 3
$I_{i(on)}$	Input Current	for ULN2065B and ULN2075B $V_i = 2.4V$ $V_i = 3.75V$ for ULN2067B and ULN2077B $V_i = 5V$ $V_i = 12V$ for ULN2069B $V_i = 2.75V$ $V_i = 3.75V$ for ULN2071B $V_i = 5V$ $V_i = 12V$	1.4 3.3 0.6 1.7		4.3 9.6 1.8 5.2 5.5 10 4 12.5	mA mA mA mA mA mA mA mA	4 4 4 4 4 4 4 4

**ULN2065B-ULN2067B-ULN2069B-ULN2071B-ULN2075B-ULN2077B**

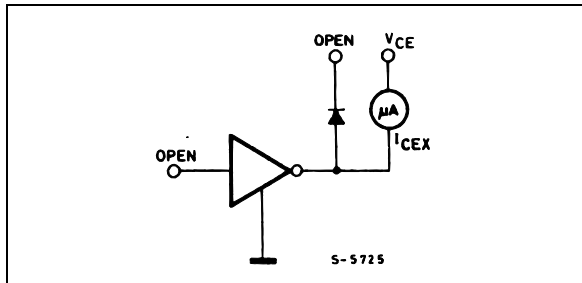
**ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25^{\circ}\text{C}$  unless otherwise specified ) (continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit	Fig.
$V_{i(on)}$	Input Voltage	$V_{CE} = 2\text{V}, I_C = 1\text{A}$ ULN2065B, ULN2075B ULN2067B, ULN2077B			2	V	5
					6.5	V	5
		$V_{CE} = 2\text{V}, I_C = 1.5\text{A}$ ULN2065B, ULN2075B ULN2067B, ULN2077B ULN2069B ULN2071B			2.5	V	5
					10	V	5
					2.75	V	5
		5	V	5			
$I_s$	Supply Current	for ULN2069B $I_C = 500\text{mA}, V_i = 2.75\text{V}$			6	mA	8
		for ULN2071B $I_C = 500\text{mA}, V_i = 5\text{V}$			4.5	mA	8
$t_{PLH}$	Turn-on Delay Time	$0.5 V_i$ to $0.5 V_o$			1	$\mu\text{s}$	
$t_{PHL}$	Turn-off Delay Time	$0.5 V_i$ to $0.5 V_o$			1.5	$\mu\text{s}$	
$I_R$	Clamp Diode Leakage Current	for ULN2065B-ULN2067B and ULN2069B-ULN2071B $V_R = 80\text{V}$ $T_{amb} = 25^{\circ}\text{C}$ $T_{amb} = 70^{\circ}\text{C}$			50	$\mu\text{A}$	6
					100	$\mu\text{A}$	
$V_F$	Clamp Diode Forward Voltage	for ULN2065B-ULN2067B and ULN2069B-ULN2071B $I_F = 1\text{A}$ $I_F = 1.5\text{A}$			1.75	V	7
					2	V	

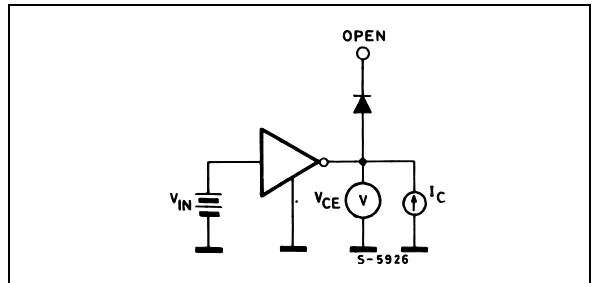
- Notes :**
1. Input voltage is with reference to the substrate (no connection to any other pins) for the ULN2075B and ULN2077B reference is ground for all other types.
  2. Input current may be limited by maximum allowable input voltage.

**TEST CIRCUITS**

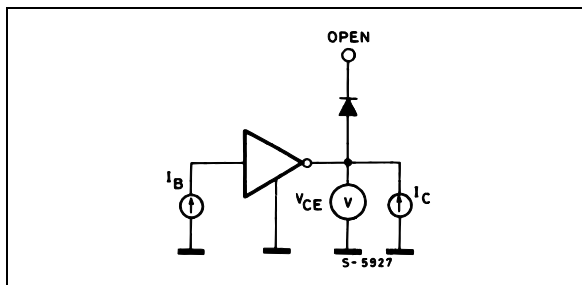
**Figure 1.**



**Figure 2.**



**Figure 3.**



**Figure 4.**

