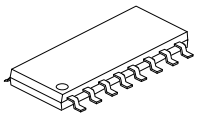
HIGH VOLTAGE HIGH CURRENT DARLINGTON ARRAY



SOP-16

■ DESCRIPTION

The UTC **ULN2012** is high-voltage, high-current Darlington transistor arrays. Each consists of seven NPN Darlington pairs that feature high-voltage outputs with common-cathode clamp diodes for switching inductive loads. The collector-current rating of a single Darlington pair is 600mA. All units feature integral clamp diodes for switching inductive loads. Applications include relay, hammer, lamp and display (LED) drivers.

The UTC **ULN2012** is intended for use with 14 to 25V PMOS logic. Each input has a series Zener diode and current limiting resistor. The Zener diode also provides excellent noise immunity for this device.

■ FEATURES

* PMOS Compatible Inputs
* Output Current to 600mA
* Output Voltage to 50V
* Transient-Protected Outputs

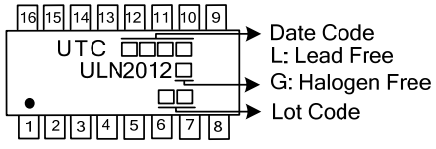
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULN2012L-S16-R	ULN2012G-S16-R	SOP-16	Tape Reel

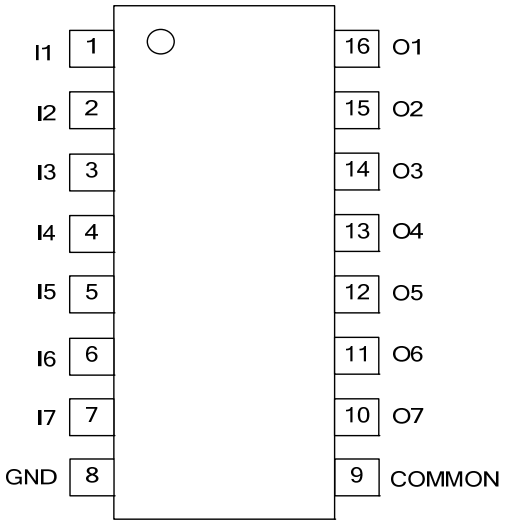
ULN2012G-S16-R
- (1)Packing Type
- (2)Package Type
- (3)Green Package

(1) R: Tape Reel
(2) S16: SOP-16
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



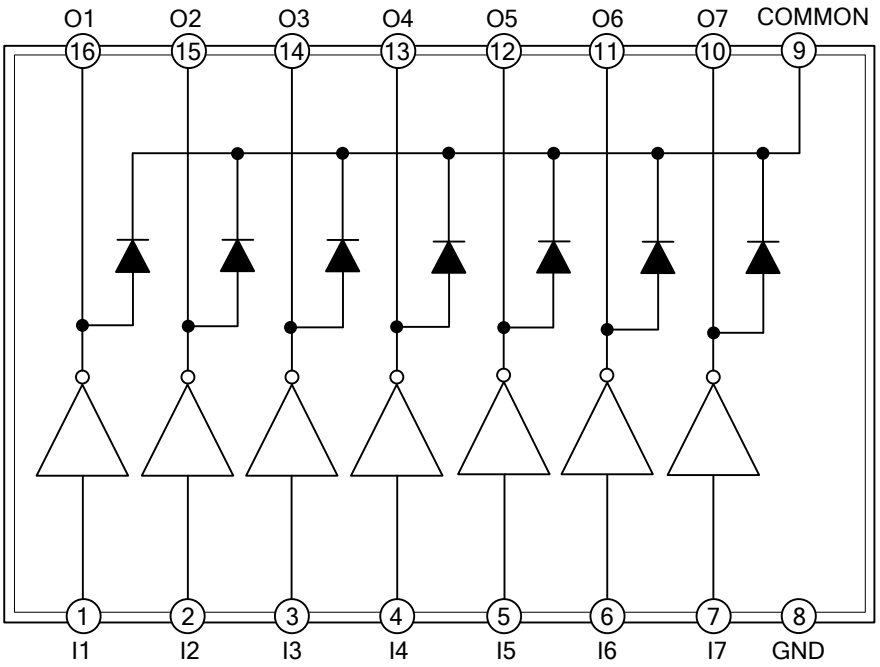
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	I1	1 Channel Input Pin
2	I2	2 Channel Input Pin
3	I3	3 Channel Input Pin
4	I4	4 Channel Input Pin
5	I5	5 Channel Input Pin
6	I6	6 Channel Input Pin
7	I7	7 Channel Input Pin
8	GND	Ground
9	COMMON	Clamp Diode
10	O7	7 Channel Output Pin
11	O6	6 Channel Output Pin
12	O5	5 Channel Output Pin
13	O4	4 Channel Output Pin
14	O3	3 Channel Output Pin
15	O2	2 Channel Output Pin
16	O1	1 Channel Output Pin

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Output Sustaining Voltage	V_{OUT}	-0.5 ~ 50	V
Input Voltage	V_{IN}	-0.5 ~ 30	V
Clamp Diode Reverse Voltage	V_R	50	V
Output Current	I_{OUT}	600	mA /ch
Clamp Diode Forward Current	I_F	600	mA
Power Dissipation	P_D	1.25 (Note 2)	W
Junction Temperature	T_J	+125	°C
Operating Temperature	T_{OPR}	-40 ~ +85	°C
Storage Temperature	T_{STG}	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. On PCB (Test Board: JEDEC 2s2p)

■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CIRCUIT	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Leakage Current	I_{CEX}	1	V_{CE} =50V, V_{IN}=6.0V			50	μA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	2	I_{OUT} =200mA, I_{IN} =350μA		1.1	1.3	V
			I_{OUT} =350mA, I_{IN} =500μA		1.3	1.6	V
			I_{OUT} =500mA, I_{IN}=600μA		1.7	1.9	V
Input Current (Output On)	$I_{IN\ (ON)}$	3	V_{IN}=17V		0.82	1.25	mA
Input Current (Output Off)	$I_{IN\ (OFF)}$	4	I_C=500μA	50	65		μA
Input Voltage (Output On)	$V_{IN(ON)}$	5	V_{CE}=2V, I_C=500mA			17	V
Clamp Diode Reverse Current	I_R	6	V_R=50V, T_A=25°C			50	μA
			V_R=50V, T_A=85°C			100	μA
Clamp Diode Forward Voltage	V_F	7	I_F=350mA		1.7	2.0	V
			I_F=500mA		2.1	2.5	V
Input Capacitance	C_{IN}				15	25	pF
Turn-On Delay	t_{ON}	8	0.5E_{in} to 0.5 E_{out}		0.45		μs
Turn-Off Delay	t_{OFF}	8	0.5E_{in} to 0.5 E_{out}		0.2		μs

■ TEST CIRCUIT

Components in the test circuits are used only to obtain and confirm the device characteristics. These components and circuits are not guaranteed to prevent malfunction or failure from occurring in the application equipment.

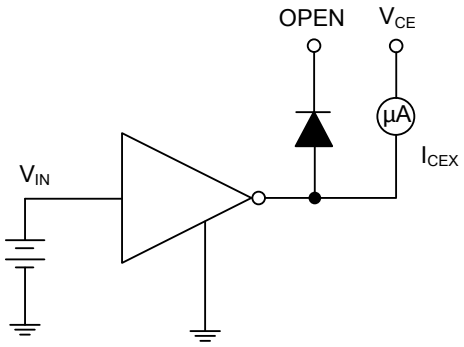


Figure 1

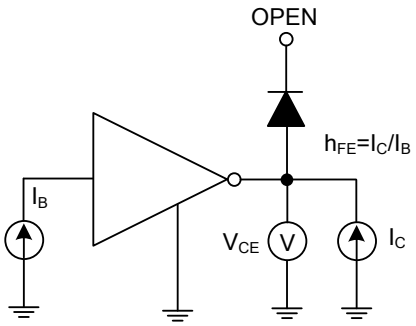


Figure 2

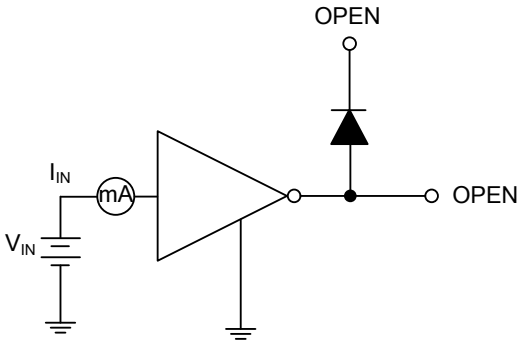


Figure 3

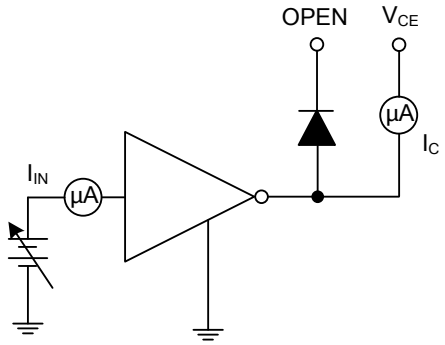


Figure 4

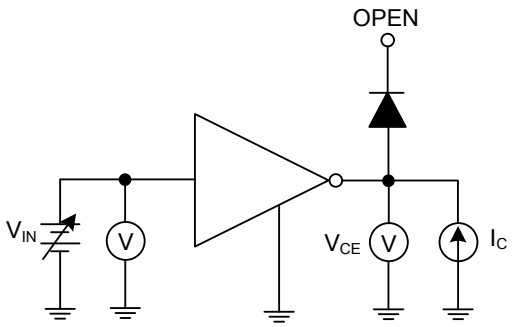


Figure 5

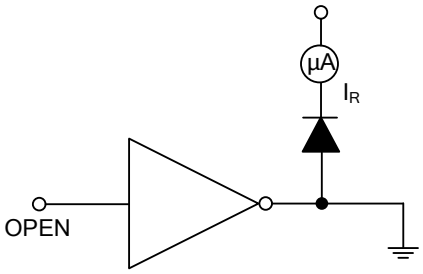


Figure 6

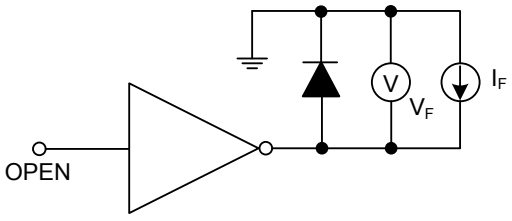


Figure 7

■ TEST CIRCUIT (Cont.)

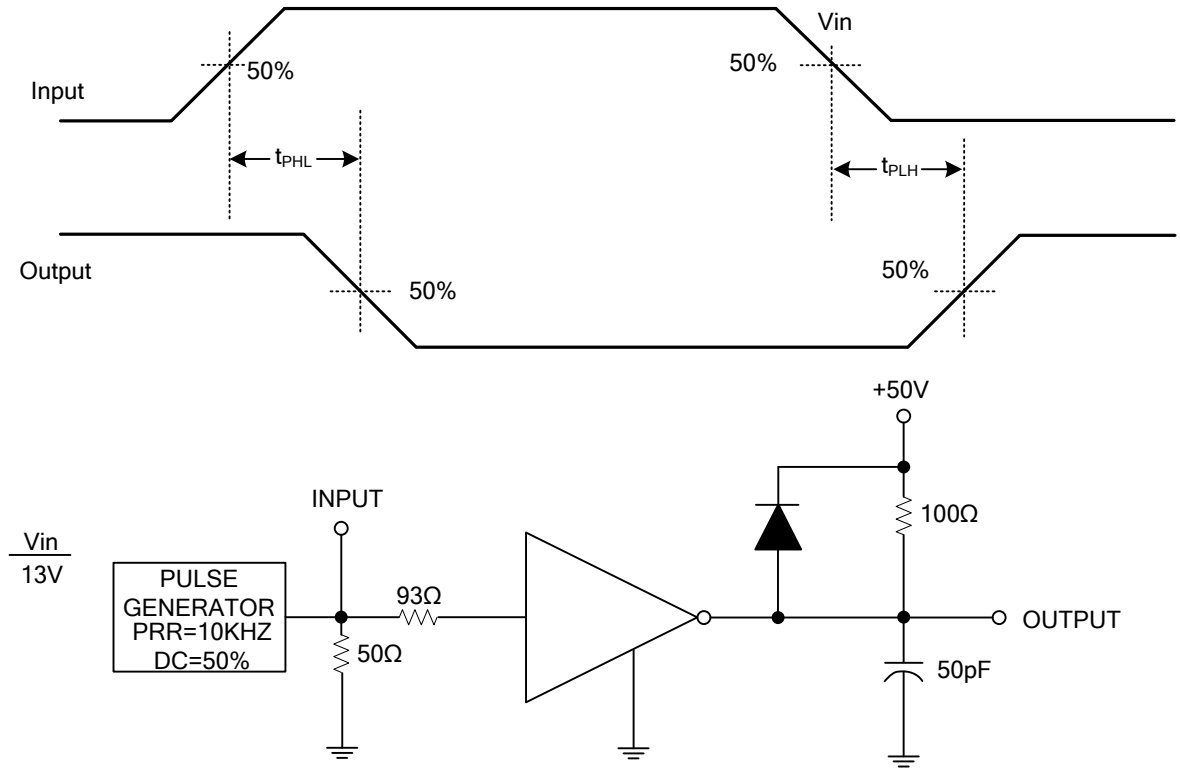


Figure 8

■ TYPICAL APPLICATION CIRCUIT