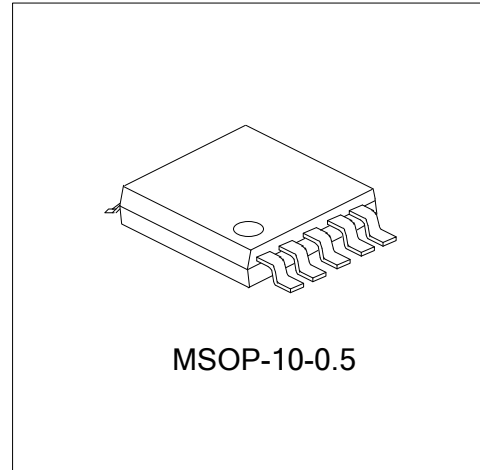


## HIGH VOLTAGE AND HIGH CURRENT DARLINGTON TRANSISTOR ARRAY

### DESCRIPTION

The WD2002 is a monolithic high voltage and high current darlington transistor arrays. It consists of four NPN darlington pairs that features high-voltage outputs with common-cathode clamp diode for switching inductive loads. The collector-current rating of a single darlington pair is 500mA. The darlington pairs may be parrlleled for higher current capability. Applications include relay drivers,hammer drivers, lamp drivers,display drivers(LED gas discharge),line drivers, and logic buffers.

The WD2002 has a 2.7kΩ series base resistor for each darlington pair for operation directly with TTL or 5V CMOS devices.



### FEATURES

- \* 500mA rated collector current(Single output)
- \* High-voltage outputs: 50V
- \* Inputs compatibale with various types of logic.
- \* Relay driver application

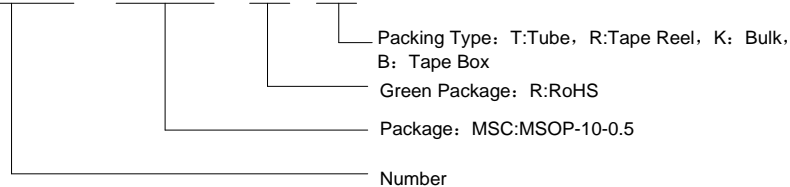
### TYPICAL APPLICATIONS

- \* Relay drive
- \* Indicator Drive
- \* Display Driver

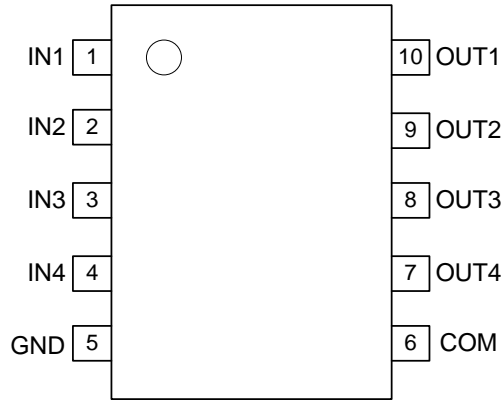
### ORDERING INFORMATION

Ordering Number	Package	Print Number	Free	Packing
WD2002-MSC-R-T	MSOP-10-0.5	WD2002	RoHS	Tube

### WD2002 - MSC - R - T



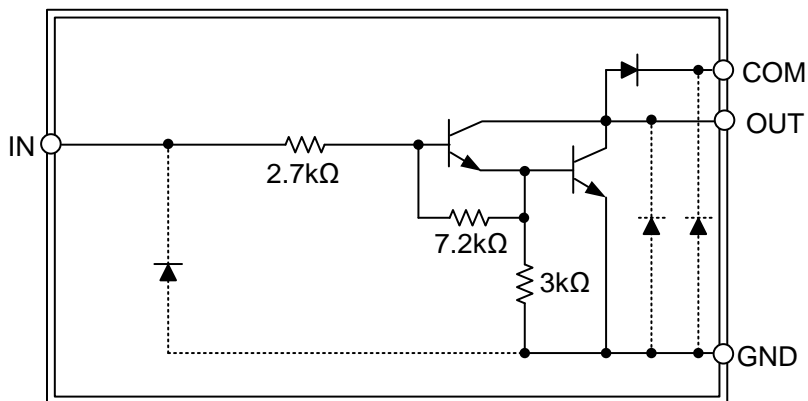
## LOGIC DIAGRAM



## PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION	PIN NO.	PIN NAME	DESCRIPTION
1	IN1	1 Channel Input Pin	6	COM	Clamp Diode
2	IN2	2 Channel Input Pin	7	OUT4	4 Channel Output Pin
3	IN3	3 Channel Input Pin	8	OUT3	3 Channel Output Pin
4	IN4	4 Channel Input Pin	9	OUT2	2 Channel Output Pin
5	GND	ground	10	OUT1	1 Channel Output Pin

## BLOCK DIAGRAM



Note: The input and output parasitic diodes cannot be used as clamp diodes.

### ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Value	Unit
Collector-Emitter Voltage	VCE	50	V
Input Voltage	VI	30	V
Peak Collector Current	Io	500	mA
Total Emitter-terminal	IOK	500	mA
Power Dissipation	Pd	0.6	W
Operating Temperature	Topr	-40~ +85	°C
Storage Temperature	Tstg	-65 ~ +150	°C

Note: 1. All voltage values are with respect to the emitter/substrate terminal E, unless otherwise noted.

2. On PCB

### ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise specified)

Characteristic	Test Figure	Symbol	Test Conditions	Min	Typ	Max	Units
On-state Input Voltage	6	VI(ON)	VCE=2V, Ic=200mA			2.4	V
			VCE=2V, Ic=250mA			2.7	
			VCE=2V, Ic=300mA			3	
Collector-Emitter Saturation Voltage	5	VCE(SAT)	II=250μA, Ic=100mA		0.9	1.1	V
			II=350μA, Ic=200mA		1	1.3	
			II=500μA, Ic=350mA		1.2	1.6	
Collector Cutoff Current	1	ICEX	VCE=50V, II=0			50	μA
	2		VCE=50V, II=0, Ta=70°C			100	
Clamp Forward Voltage	8	VF	IF=350mA		1.7	2	V
Off-state Input Current	3	II(OFF)	IC=500μA, Ta=70°C	50	65		μA
Input Current	4	II	VI=3.85V		0.95	1.35	mA
Clamp Reverse Current	7	IR	VR=50V			50	μA
			VR=50V, Ta=70°C			100	
Input Capacitance	--	CI	VI=0, f=1MHz		15	25	pF
Propagation delay time, low-to-high-level output	9	tPLH	VIH=3V, VOH=50V		0.25	1	μs
Propagation delay time, high-to-low-level output	9	tPHL	VIH=3V, VOH=50V		0.25	1	μs
High-level output Voltage after switching	10	VOH	Vs=50V, Io=300mA	Vs-20			mV

**TEST CIRCUITS**

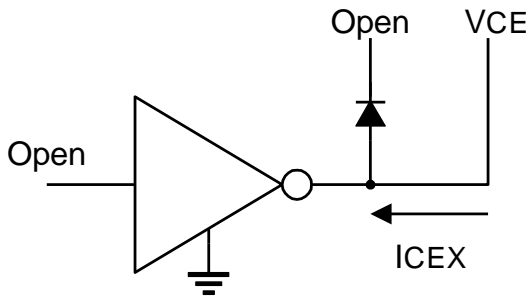


Figure 1 ICEX Test Circuit

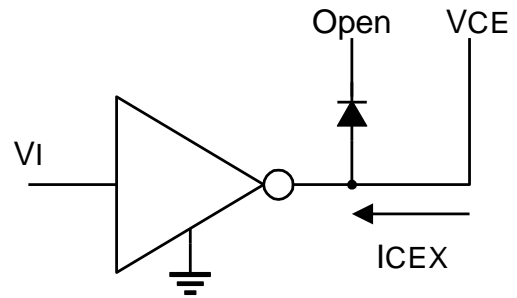


Figure 2 ICEX Test Circuit

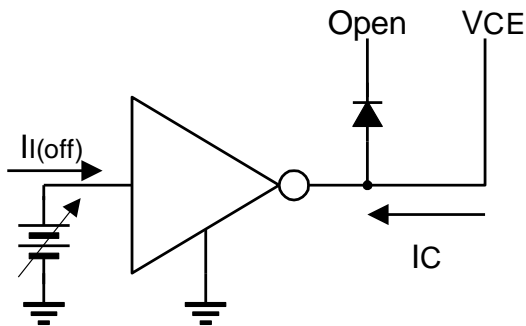


Figure 3 II(off) Test Circuit

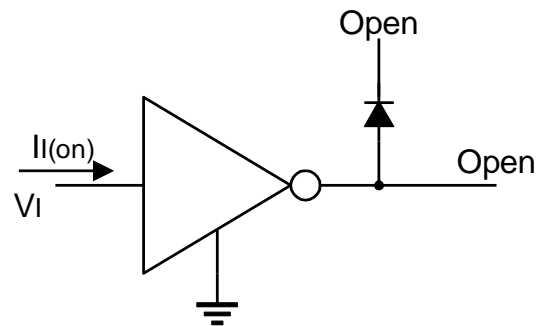
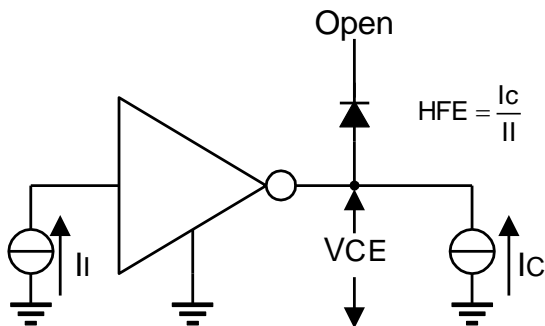


Figure 4 II(on) Test Circuit



Note: II is fixed for measuring VCE(sat), variable for measuring HFE.

Figure 5 HFE, VCE(sat) Test Circuit

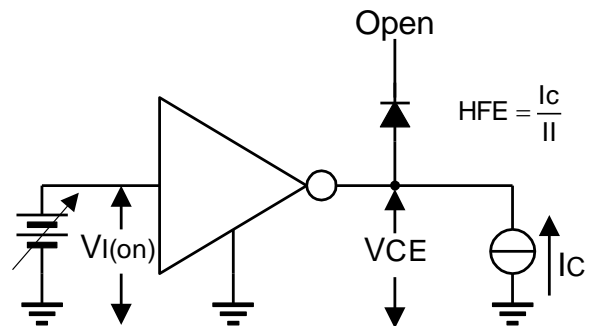


Figure 6 VI(on) Test Circuit

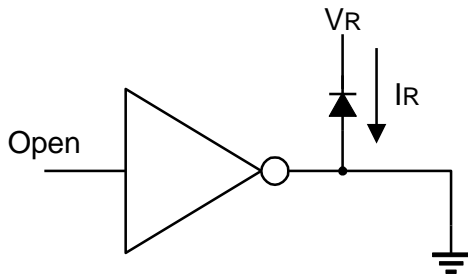


Figure 7 IR Test Circuit

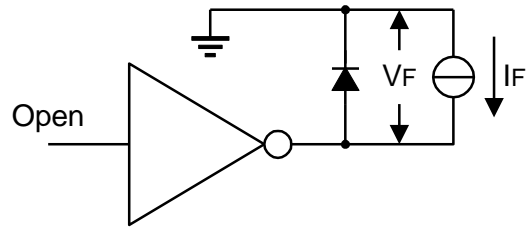


Figure 8 VF Test Circuit

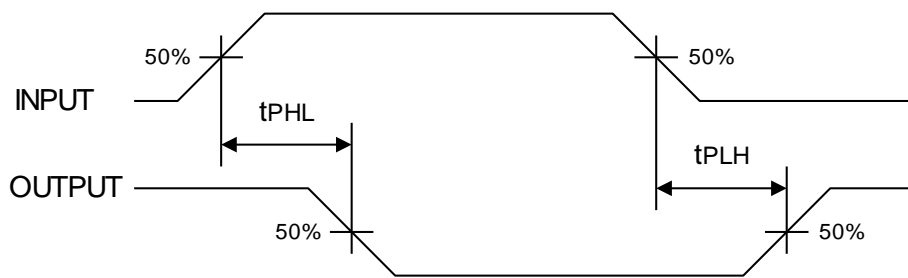
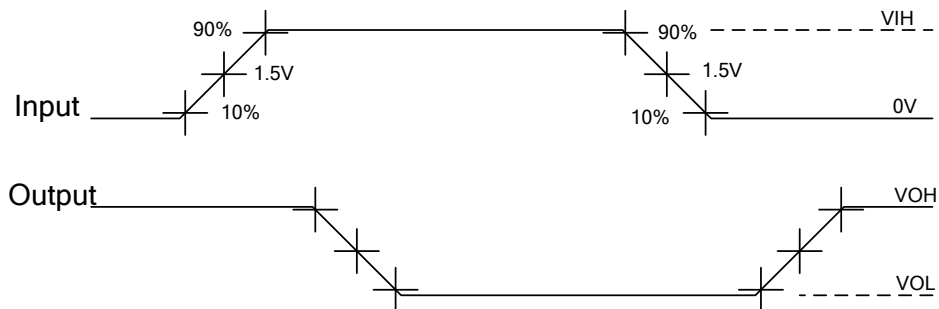
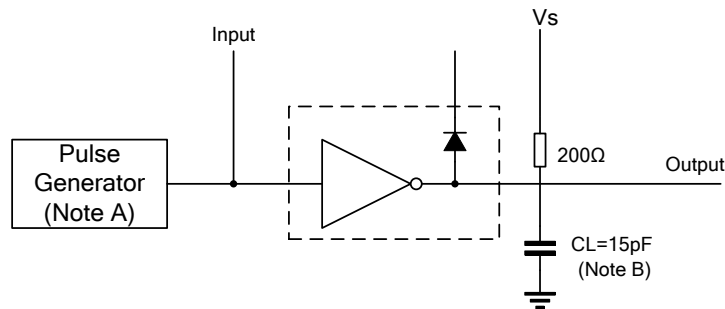


Figure 9. Propagation Delay Time Waveforms

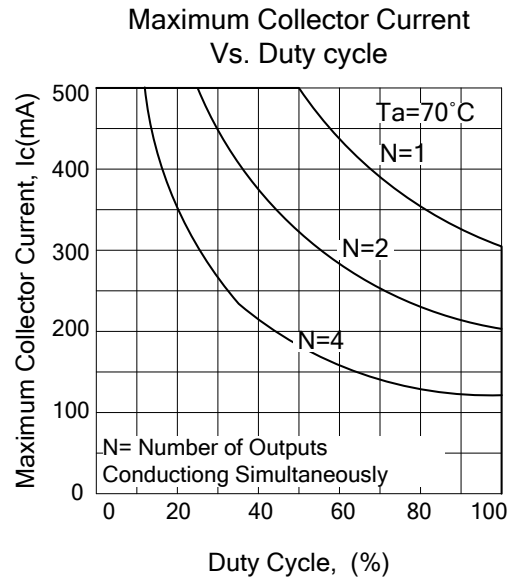
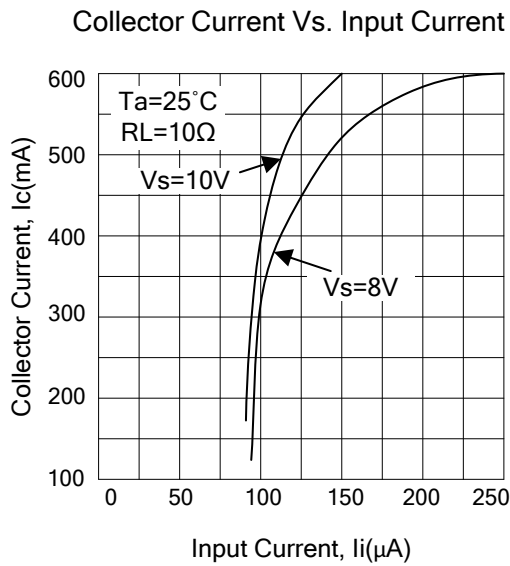
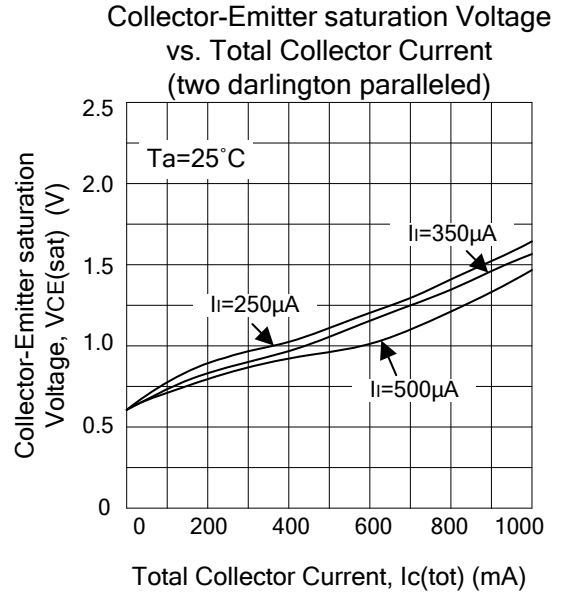
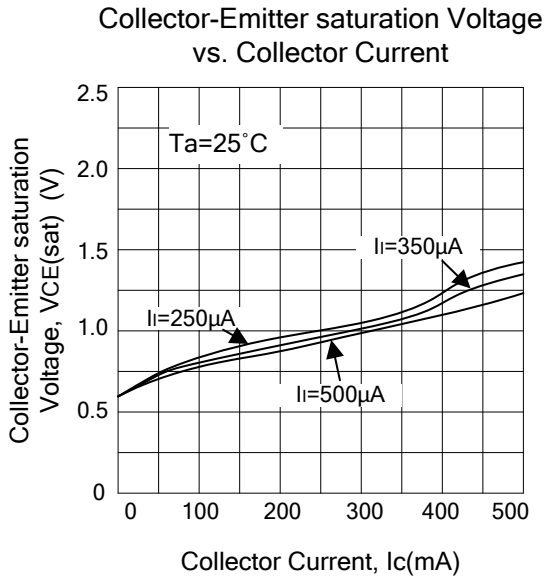


Note: A. The Pulse generator has the following characteristics: PRR=12.5kHz, Zo=50Ω

B. CL includes probe and jig capacitance.

Figure 10. Latch-up Test Circuit and Voltage Waveforms

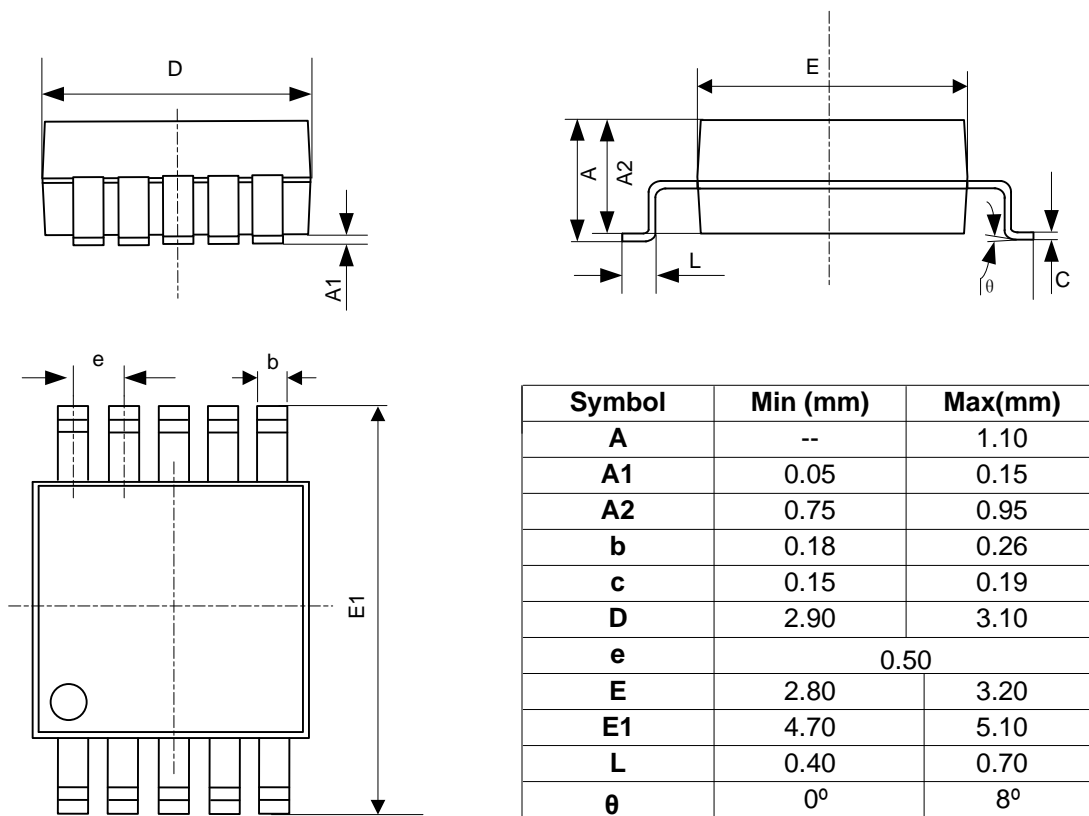
## TYPICAL PERFORMANCE CHARACTERISTICS



**PACKAGE OUTLINE**

**MSOP-10-0.5**

UNIT: mm



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