

## 8-channel Darlington current driver

(Functional equivalent of TD62083AFN, TD62084AFN Toshiba)

The WŠPĞ ĘH0D, WŠPĞ ĘH0N, WŠPĞ Ę0D, WŠPĞ Ę0N are 8-channel current driver, consisting of eight Darlington transistors.

Transistors, having high-voltage outputs with high-current load are coupled in common-cathode circuit for commutation of inductive load.

Collector current of one Darlington pair not exceed 500 mA. Darlington pairs can be bridged to increase current.

The WŠPĞ ĘH0D, WŠPĞ ĘH0N, WŠPĞ Ę0D, WŠPĞ Ę0N are purposed in different devices: relays, lamps, displays (LED & gas discharge cells), telecommunication lines and logic devices.

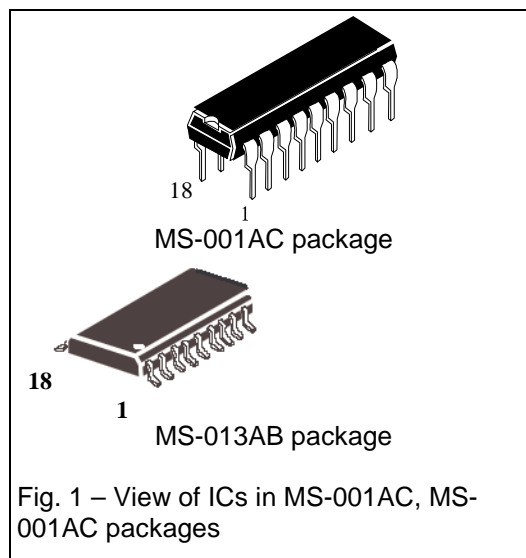


Fig. 1 – View of ICs in MS-001AC, MS-001AC packages

### Main features:

- The WŠPĞ ĘH0D, WŠPĞ ĘH0D are realized in 18-pin SO - package MS-013AB, WŠPĞ Ę0N, WŠPĞ Ę0N – in 18-pin DIP – package MS-001AC;
- High output sustaining voltage up to 50 V;
- One channel output current up to 500 mA;

Allowable value of electrostatic potential 2000V

Table 1 – Electric circuitry difference of ICs

IC marking	Input resistor, kΩ	Applicable with ICs
WŠPĞ ĘH0D, WŠPĞ ĘH0N	2,7	TTL, 5 V CMOS
WŠPĞ Ę0D, WŠPĞ Ę0N	10,5	6 ÷ 15 V P-MOS, CMOS

**Table 2 – Package pins and contact pad description**

Contact pad number	Pin number (MS-013AB, MS-001AC packages)	Symbol	Description
01	01	IN 1	Input
02	02	IN 2	Input
03	03	IN 3	Input
04	04	IN 4	Input
05	05	IN 5	Input
06	06	IN 6	Input
07	07	IN 7	Input
08	08	IN 8	Input
09	09	GND	Common pin (ground)
10	10	COM	Control pin
11	11	$\overline{\text{OUT 8}}$	Output
12	12	$\overline{\text{OUT 7}}$	Output
13	13	$\overline{\text{OUT 6}}$	Output
14	14	$\overline{\text{OUT 5}}$	Output
15	15	$\overline{\text{OUT 4}}$	Output
16	16	$\overline{\text{OUT 3}}$	Output
17	17	$\overline{\text{OUT 2}}$	Output
18	18	$\overline{\text{OUT 1}}$	Output

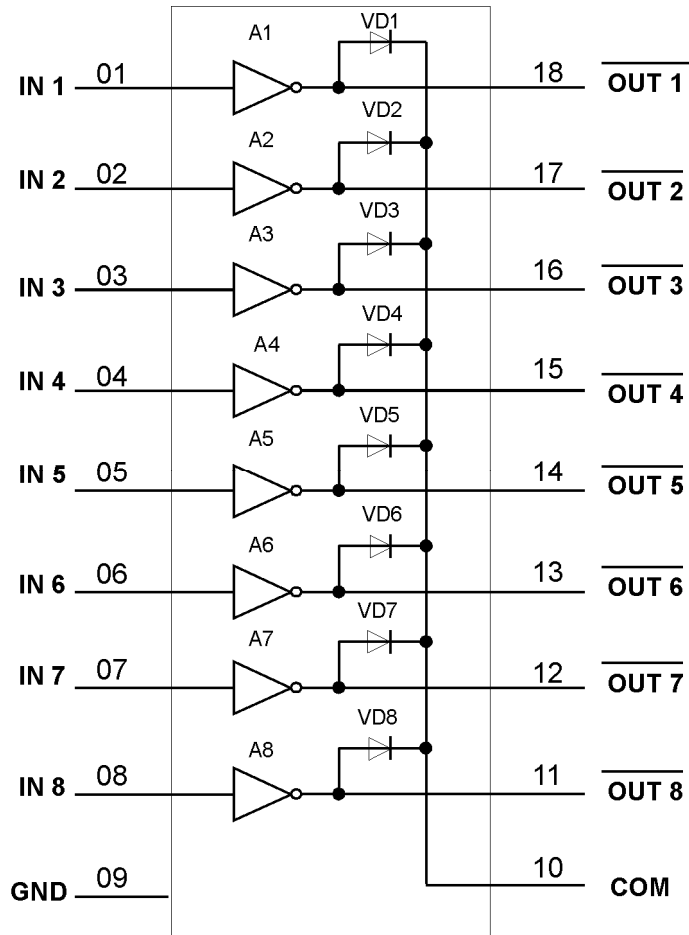
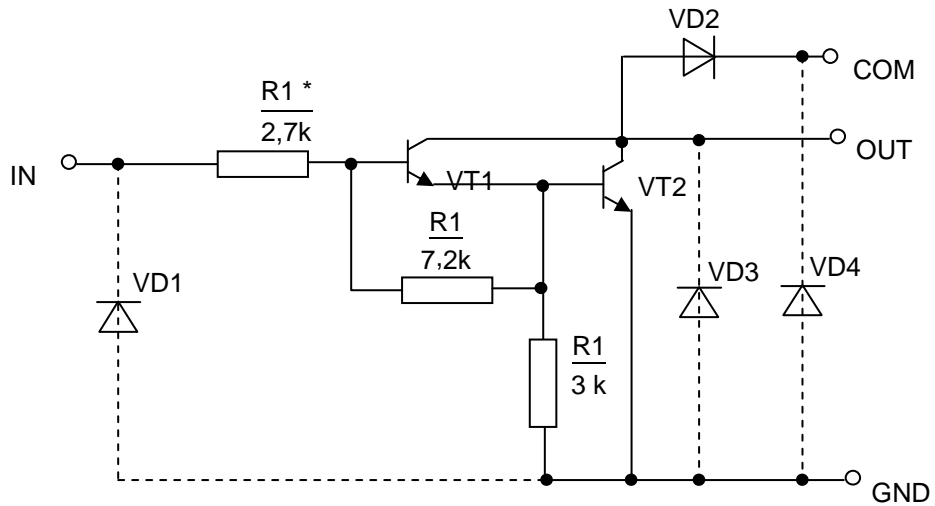


Fig 2 – Electric block diagram



\* For ICs VŠPĜ Ė 0D, VŠPĜ Ė 0N - 10,5 kΩ.

Fig. 3 – Electrical scheme of one Darlington cascade of I 0B&, \$' 5D,  
 I 0B&, \$' 5N, I 0B&, \$( 5D, I 0B&, \$( 5N

**Table 3 –Maximum ratings**

Symbol	Parameter	Norm		Unit
		Min	Max	
$V_{CE(SUS)}$	Output sustaining voltage	-0,5	50	V
$I_{OUT}$	Output current (one channel)	-	500*	mA
$V_{IN}$	Input voltage	-0,5	30	V
$V_R$	Clamp pin diode reverse voltage	-	50	V
$I_F$	Clamp pin diode forward current	-	500	mA
$T_{stg}$	Storage temperature	-60	150	°C
$P_D$	Power dissipation	-	0,4	W

\*On PCB with dimensions 50 × 50 × 1,6 mm, 40% Cu

**Table 4 – Recommended operation modes**

Symbol	Parameter		Norm		Unit
			Min	Max	
$V_{CE(SUS)}$	Output sustaining voltage		0	50	V
$I_{OUT}$	Output current (one channel)		-	350	mA
	8 channels at $T_{pw} = 25$ ms, $T_a = 85$ °C,	Output pulse duration 10%	-	260*	
	$T_j = 120$ °C	Output pulse duration 50%	-	90*	
$V_{IN}$	Input voltage		0	30	V
$V_R$	Clamp diode reverse voltage		-	50	V
$I_F$	Clamp pin diode forward current		-	400	mA

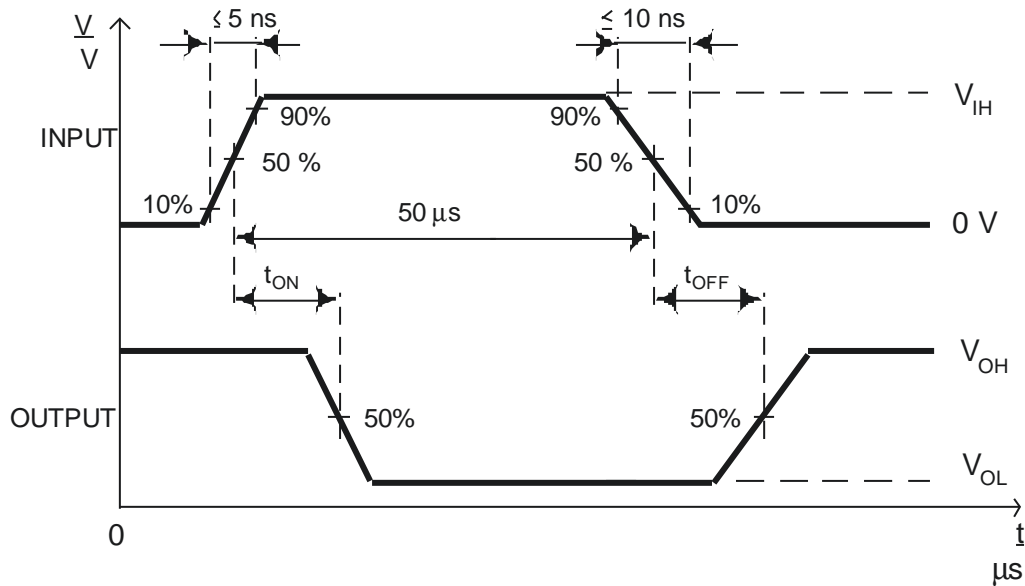
\*On PCB with dimensions 50 × 50 × 1,6 mm, 40% Cu

Table 5 – Electric parameters of ICs

Symbol	Parameter	Measurement mode	Norm		Ambient, temperature °C	Unit
			Min	Max		
$V_{IN(ON)}$	Input voltage  WŠPĞ Ę ĘHĖD, WŠPĞ Ę ĘHĖN WŠPĞ Ę ĘD, WŠPĞ Ę ĘN	$I_{OUT} = 200 \text{ mA}$ $V_{CE} = 2 \text{ V}$	-	<u>2,4</u> 2,9	<u>25±10</u> -40 85	V
		$I_{OUT} = 250 \text{ mA}$ $V_{CE} = 2 \text{ V}$	-	<u>2,7</u> 3,24		
		$I_{OUT} = 300 \text{ mA}$ $V_{CE} = 2 \text{ V}$	-	<u>3,0</u> 3,6		
		$I_{OUT} = 125 \text{ mA}$ $V_{CE} = 2 \text{ V}$	-	<u>5,0</u> 6,0		
		$I_{OUT} = 200 \text{ mA}$ $V_{CE} = 2 \text{ V}$	-	<u>6,0</u> 7,2		
		$I_{OUT} = 275 \text{ mA}$ $V_{CE} = 2 \text{ V}$	-	<u>7,0</u> 8,4		
		$I_{OUT} = 350 \text{ mA}$ $V_{CE} = 2 \text{ V}$	-	<u>8,0</u> 9,6		
$h_{FE}$	DC current transfer ratio	$I_{OUT} = 350 \text{ mA}$ $V_{GCE} = 2 \text{ V}$	1000	-	25±10 -40 85	-
$V_{CE(sat)}$	Output saturation voltage	$I_{OUT} = 100 \text{ mA}$ $I_{IN} = 250 \text{ }\mu\text{A}$	-	<u>1,1</u> 1,32	<u>25±10</u> -40 85	V
		$I_{OUT} = 200 \text{ mA}$ $I_{IN} = 350 \text{ mKA}\mu\text{A}$	-	<u>1,3</u> 1,56		
		$I_{OUT} = 350 \text{ mA}$ $I_{IN} = 500 \text{ }\mu\text{A}$	-	<u>1,6</u> 1,92		
$I_{CEX}$	Output leakage current WŠPĞ Ę ĘHĖD, WŠPĞ Ę ĘHĖN WŠPĞ Ę ĘD, WŠPĞ Ę ĘN	$V_{CE} = 50 \text{ V}$ $V_{IN} = 0 \text{ V}$	-	<u>50</u> 100	25±10 -40 85	$\mu\text{A}$
		$V_{CE} = 50 \text{ V}$ $V_{IN} = 1 \text{ V}$	-	<u>500</u> 600		
$V_F$	Clamp diode forward voltage	$I_F = 350 \text{ mA}$	-	<u>2,0</u> 2,4	25±10 -40 85	V
		$I_F = 400 \text{ mA}$	-	<u>3,0</u> 3,6		
$I_{IN(OFF)}$	Input current	$V_{CE} = 50 \text{ V}$ $I_{OUT} = 500 \text{ }\mu\text{A}$	50	-	85	$\mu\text{A}$
$I_{IN(ON)}$	Input current WŠPĞ Ę ĘHĖD, WŠPĞ Ę ĘHĖN WŠPĞ Ę ĘD, WŠPĞ Ę ĘN	$V_{IN} = 3,85 \text{ V}$	-	<u>1,35</u> 1,62	<u>25±10</u> -40 85	mA
		$V_{IN} = 5 \text{ V}$	-	<u>0,5</u> 0,6		
		$V_{IN} = 12 \text{ V}$	-	<u>1,45</u> 1,74		
$I_R$	Clamp diode reverse current	$V_R = 50 \text{ V}$	-	<u>50</u> 100	25±10 -40 85	$\mu\text{A}$

Table 6 – Typical electric parameters at Ta = 25 °C

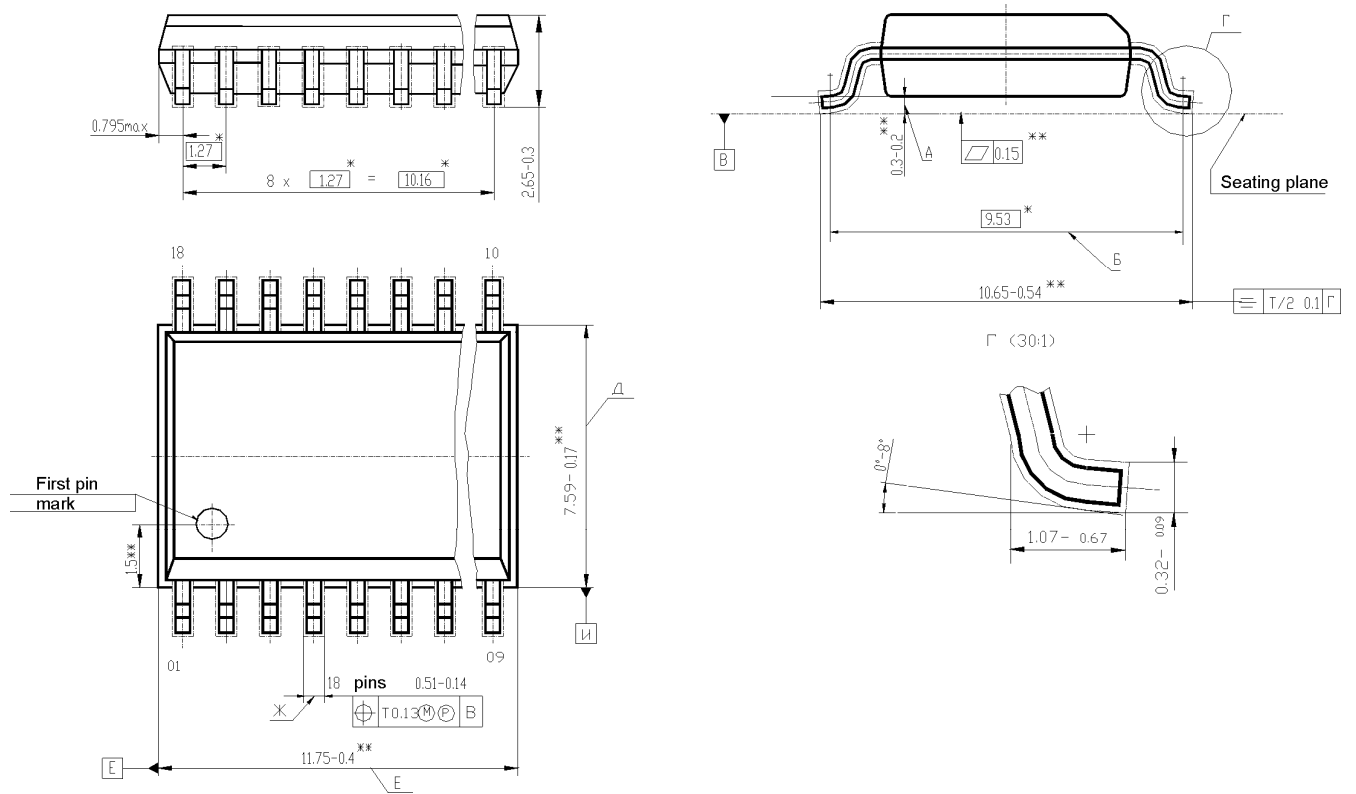
Symbol	Parameter	Measurement mode	Typical value	Unit
t <sub>ON</sub>	Turn -ON delay	R <sub>L</sub> = 125 Ω, V <sub>OUT</sub> = 50 V	0,1	μs
t <sub>OFF</sub>	Turn-OFF delay		0,2	μs
C <sub>IN</sub>	Input capacity	-	15	pF



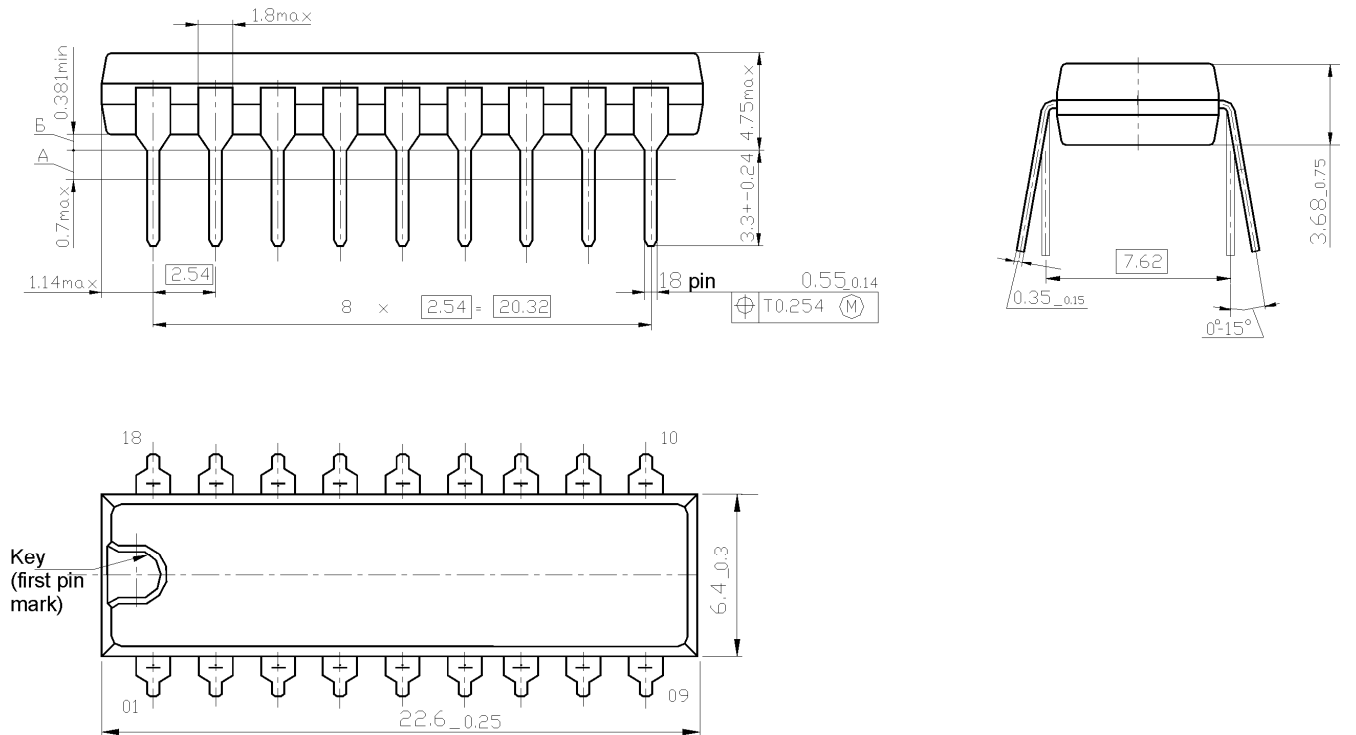
Note - V<sub>IH</sub> = 3 V for WSPG10D, WSPG10N and V<sub>IH</sub> = 8 V for WSPG10D, WSPG10N.

Pulse width 50 μs, ratio (duty cycle) 100% • t<sub>w</sub> / T = 10% ( t<sub>w</sub> – pulse width, μs; T – period , μs)

Fig. 4 – Time diagram of I<sup>2</sup>C, SPI, UART, CAN, RS485, I<sup>2</sup>S, I<sup>2</sup>L at measurement of signal delay at turn -ON t<sub>ON</sub> and turn-OFF switching t<sub>OFF</sub>



**Fig. 5 MS-013AB package outline drawing**



**Fig 6 -MS-001AC package outline drawing**