

# M54516P

5-UNIT 500mA DARLINGTON TRANSISTOR ARRAY

## DESCRIPTION

M54516P is five-circuit Darlington transistor arrays. The circuits are made of NPN transistors. Both the semiconductor integrated circuits perform high-current driving with extremely low input-current supply.

## FEATURES

- Medium breakdown voltage ( $BV_{CEO} \geq 25V$ )
- High-current driving ( $I_c(\max) = 500mA$ )
- Driving available with PMOS IC output
- Wide operating temperature range ( $T_a = -20$  to  $+75^\circ C$ )

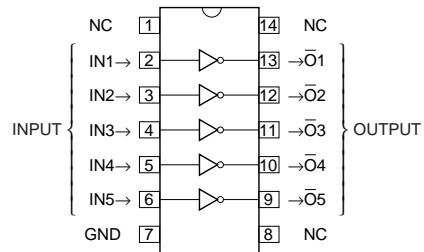
## APPLICATION

Drives of relays and printers, digit drives of indication elements (LEDs and lamps), and MOS-bipolar logic IC interfaces

## FUNCTION

The M54516P has five circuits consisting of NPN Darlington transistors. These ICs have resistance of  $20k\Omega$  between input transistor bases and input pins. The output transistor emitters are all connected to the GND pin (pin 7). Collector current is 500mA maximum. Collector-emitter supply voltage is 25V maximum.

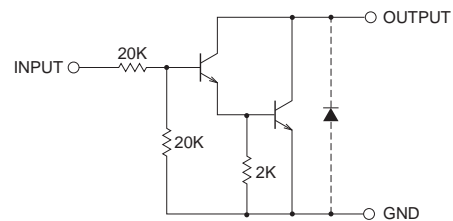
## PIN CONFIGURATION



Package type 14P4(P)

NC : No connection

## CIRCUIT DIAGRAM



The five circuits share the GND.

The diode, indicated with the dotted line, is parasitic, and cannot be used.

Unit :  $\Omega$

## ABSOLUTE MAXIMUM RATINGS (Unless otherwise noted, $T_a = -20 \sim +75^\circ C$ )

Symbol	Parameter	Conditions	Ratings	Unit
$V_{CEO}$	Collector-emitter voltage	Output, H	$-0.5 \sim +25$	V
$I_c$	Collector current	Current per circuit output, L	500	mA
$V_i$	Input voltage		$-0.5 \sim +25$	V
$P_d$	Power dissipation	$T_a = 25^\circ C$ , when mounted on board	1.47	W
$T_{opr}$	Operating temperature		$-20 \sim +75$	$^\circ C$
$T_{stg}$	Storage temperature		$-55 \sim +125$	$^\circ C$

**RECOMMENDED OPERATING CONDITIONS** (Unless otherwise noted,  $T_a = -20 \sim +75^\circ\text{C}$ )

Symbol	Parameter	Limits			Unit	
		min	typ	max		
$V_O$	Output voltage	0	—	25	V	
$I_C$	Collector current (Current per 1 circuit when 7 circuits are coming on simultaneously)	Duty Cycle no more than 10%	0	—	400	mA
		Duty Cycle no more than 55%	0	—	200	
$V_{IH}$	"H" input voltage	$I_C \leq 400\text{mA}$	8	—	20	V
		$I_C \leq 200\text{mA}$	5	—		
$V_{IL}$	"L" input voltage		0	—	0.5	V

**ELECTRICAL CHARACTERISTICS** (Unless otherwise noted,  $T_a = -20 \sim +75^\circ\text{C}$ )

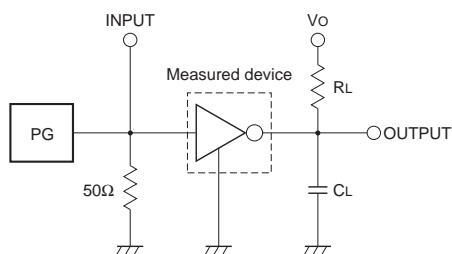
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ*	max	
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	$I_{CEO} = 100\mu\text{A}$	25	—	—	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	$V_I = 8\text{V}, I_C = 400\text{mA}$	—	1.15	2.2	V
		$V_I = 5\text{V}, I_C = 200\text{mA}$	—	0.9	1.4	
$I_I$	Input current	$V_I = 17\text{V}$	0.3	0.8	1.8	mA
$h_{FE}$	DC amplification factor	$V_{CE} = 4\text{V}, I_C = 400\text{mA}, T_a = 25^\circ\text{C}$	1000	4000	—	—

\* : The typical values are those measured under ambient temperature ( $T_a$ ) of  $25^\circ\text{C}$ . There is no guarantee that these values are obtained under any conditions.

**SWITCHING CHARACTERISTICS** (Unless otherwise noted,  $T_a = 25^\circ\text{C}$ )

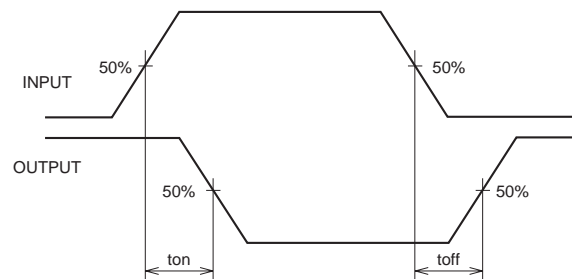
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
$t_{on}$	Turn-on time	$C_L = 15\text{pF}$ (note 1)	—	40	—	ns
$t_{off}$	Turn-off time		—	500	—	ns

**NOTE 1 TEST CIRCUIT**



- (1) Pulse generator (PG) characteristics : PRR = 1kHz,  
 $t_w = 10\mu\text{s}$ ,  $t_r = 6\text{ns}$ ,  $t_f = 6\text{ns}$ ,  $Z_0 = 50\Omega$   
 $V_P = 8\text{V}_{P-P}$
- (2) Input-output conditions :  $R_L = 25\Omega$ ,  $V_O = 10\text{V}$
- (3) Electrostatic capacity  $C_L$  includes floating capacitance at connections and input capacitance at probes

**TIMING DIAGRAM**



TYPICAL CHARACTERISTICS

