

# M54513P/FP

8-UNIT 50mA TRANSISTOR ARRAY

## DESCRIPTION

M54513P and M54513FP are eight-circuit 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

- High breakdown voltage ( $BV_{CEO} \geq 40V$ )
- Synchronizing current ( $I_c(\max) = 50mA$ )
- Wide operating temperature range ( $T_a = -20$  to  $+75^\circ C$ )

## APPLICATION

Driving of digit drives of indication elements (LEDs and lamps) with small signals

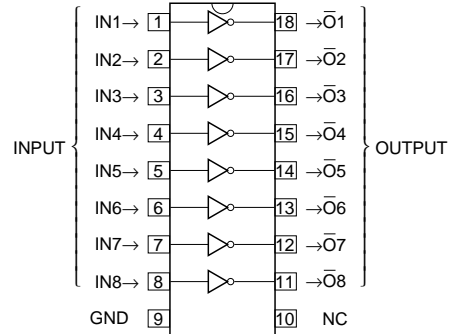
## FUNCTION

The M54513P and M54513FP each have eight circuits consisting of NPN transistors. These ICs have resistance of 2 k $\Omega$  at inputs and of 13.6k $\Omega$  between the base and emitter. The GND is used in common in each circuit.

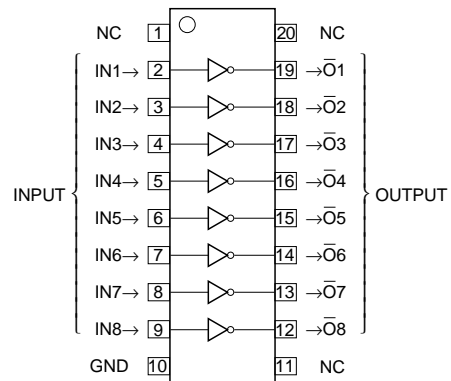
The transistors allow synchronous flow of 50mA collector current. A maximum of 40V voltage can be applied between the collector and emitter.

The M54513FP is enclosed in a molded small flat package, enabling space-saving design.

## PIN CONFIGURATION

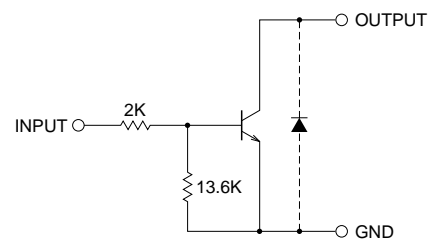


Package type 18P4G(P) NC : No connection



Package type 20P2N-A(FP) NC : No connection

## CIRCUIT DIAGRAM



The eight circuits share the GND.

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

Unit :  $\Omega$

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8-UNIT 50mA TRANSISTOR ARRAY

**ABSOLUTE MAXIMUM RATINGS** (Unless otherwise noted, Ta = -20 ~ +75°C)

Symbol	Parameter	Conditions	Ratings	Unit
V <sub>CEO</sub>	Collector-emitter voltage	Output, H	-0.5 ~ +40	V
I <sub>C</sub>	Collector current	Current per circuit output, L	50	mA
V <sub>I</sub>	Input voltage		-0.5 ~ +10	V
P <sub>d</sub>	Power dissipation	Ta = 25°C, when mounted on board	1.79(P)/1.10(FP)	W
T <sub>opr</sub>	Operating temperature		-20 ~ +75	°C
T <sub>stg</sub>	Storage temperature		-55 ~ +125	°C

**RECOMMENDED OPERATING CONDITIONS** (Unless otherwise noted, Ta = -20 ~ +75°C)

Symbol	Parameter	Limits			Unit
		min	typ	max	
V <sub>o</sub>	Output voltage	0	—	40	V
I <sub>C</sub>	Collector current	0	—	30	mA
V <sub>IH</sub>	"H" input voltage	2	—	8	V
V <sub>IL</sub>	"L" input voltage	0	—	0.2	V

**ELECTRICAL CHARACTERISTICS** (Unless otherwise noted, Ta = -20 ~ +75°C)

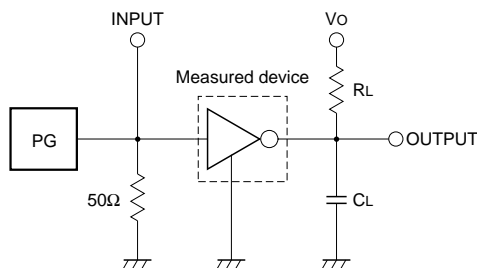
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ*	max	
V (BR) CEO	Collector-emitter breakdown voltage	I <sub>CEO</sub> = 100μA	40	—	—	V
V <sub>CE (sat)</sub>	Collector-emitter saturation voltage	V <sub>I</sub> = 2V, I <sub>C</sub> = 10mA V <sub>I</sub> = 2.5V, I <sub>C</sub> = 30mA	—	25 70	100 170	mV
I <sub>i</sub>	Input current	V <sub>I</sub> = 2.5V	—	0.85	1.7	mA
h <sub>FE</sub>	DC amplification factor	V <sub>CE</sub> = 4V, I <sub>C</sub> = 30mA, Ta = 25°C	80	200	—	—

\* : The typical values are those measured under ambient temperature (Ta) of 25°C. There is no guarantee that these values are obtained under any conditions.

**SWITCHING CHARACTERISTICS** (Unless otherwise noted, Ta = 25°C)

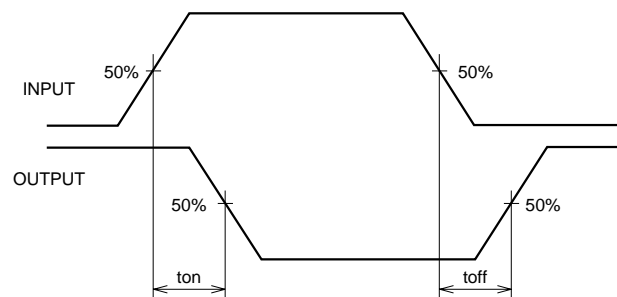
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
t <sub>on</sub>	Turn-on time	C <sub>L</sub> = 15pF (note 1)	—	65	—	ns
t <sub>off</sub>	Turn-off time		—	1200	—	ns

**NOTE 1 TEST CIRCUIT**



- (1) Pulse generator (PG) characteristics : PRR = 1kHz, tw = 10μs, tr = 6ns, tf = 6ns, ZO = 50Ω, VP = 2.5VP-P
- (2) Output conditions : RL = 300Ω, Vo = 10V
- (3) Electrostatic capacity CL includes floating capacitance at connections and input capacitance at probes

**TIMING DIAGRAM**



TYPICAL CHARACTERISTICS

