

M54562P/FP

8-UNIT 500mA SOURCE TYPE DARLINGTON TRANSISTOR ARRAY WITH CLAMP DIODE

DESCRIPTION

M54562P and M54562FP are eight-circuit output-sourcing Darlington transistor arrays. The circuits are made of PNP and NPN transistors. Both the semiconductor integrated circuits perform high-current driving with extremely low input-current supply.

FEATURES

- High breakdown voltage ($BV_{CEO} \geq 50V$)
- High-current driving ($I_{o(max)} = -500mA$)
- With output clamping diodes
- Driving available with PMOS IC output of 6 ~ 16V or with TTL output
- Wide operating temperature range ($T_a = -20$ to $+75^\circ C$)
- Output current-sourcing type

APPLICATION

Drives of relays, printers, LEDs, fluorescent display tubes and lamps, and interfaces between MOS-bipolar logic systems and relays, solenoids, or small motors

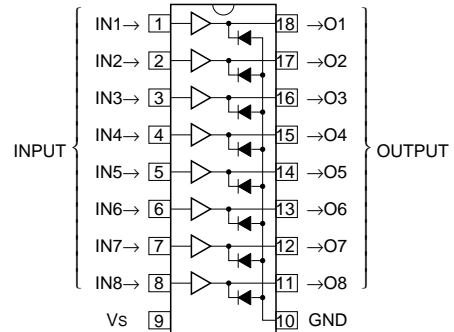
FUNCTION

The M54562P and M54562FP each have eight circuits, which are made of input inverters and current-sourcing outputs. The outputs are made of PNP transistors and NPN Darlington transistors. The PNP transistor base current is constant. A spike-killer clamping diode is provided between each output and GND. V_s and GND are used commonly among the eight circuits.

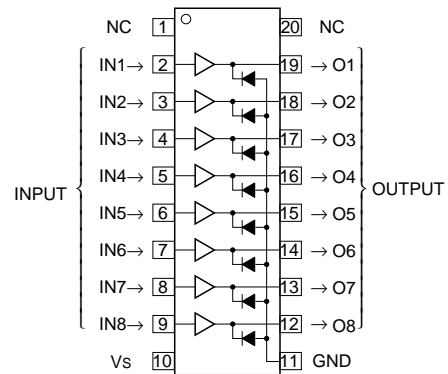
The inputs have resistance of $8.5k\Omega$, and voltage of up to 30V is applicable. Output current is 500mA maximum. Supply voltage V_s is 50V maximum.

The M54562FP is enclosed in a molded small flat package, enabling space-saving design.

PIN CONFIGURATION



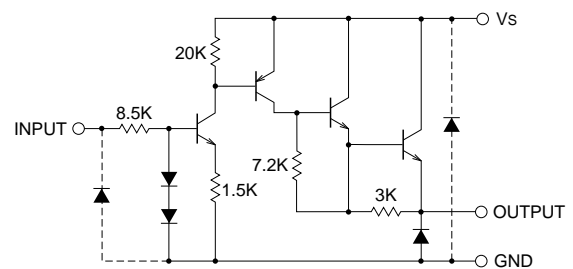
Package type 18P4G(P)



Package type 20P2N-A(FP)

NC : No connection

CIRCUIT DIAGRAM



The eight circuits share the V_s and GND.

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

Unit : Ω

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

| Symbol | Parameter | Conditions | Ratings | Unit |
|--------------------|--------------------------------|----------------------------------|------------------|------|
| V _{CEO} # | Collector-emitter voltage | Output, L | -0.5 ~ +50 | V |
| V _S | Supply voltage | | 50 | V |
| V _I | Input voltage | | -0.5 ~ +30 | V |
| I _O | Output current | Current per circuit output, H | -500 | mA |
| I _F | Clamping diode forward current | | -500 | mA |
| V _R # | Clamping diode reverse voltage | | 50 | V |
| P _d | Power dissipation | Ta = 25°C, when mounted on board | 1.79(P)/1.10(FP) | W |
| T _{opr} | Operating temperature | | -20 ~ +75 | °C |
| T _{stg} | Storage temperature | | -55 ~ +125 | °C |

: Unused I/O pins must be connected to GND.

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

| Symbol | Parameter | Limits | | | Unit | |
|-----------------|--|---|-----|-----|------|----|
| | | min | typ | max | | |
| V _S | Supply voltage | 0 | — | 50 | V | |
| I _O | Output current (Current per 1 circuit when 8 circuits are coming on simultaneously) | Duty Cycle P : no more than 8% FP : no more than 5% | 0 | — | -350 | mA |
| | | Duty Cycle P : no more than 55% FP : no more than 30% | 0 | — | -100 | |
| V _{IH} | "H" input voltage | 2.4 | 5 | 30 | V | |
| V _{IL} | "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 | |
| I _S (leak) # | Supply leak current | V _S = 50V, V _I = 0.2V | — | — | 100 | μA |
| V _{CE} (sat) | Collector-emitter saturation voltage | V _S = 10V, V _I = 2.4V, I _O = -350mA | — | 1.75 | 2.4 | V |
| | | V _S = 10V, V _I = 2.4V, I _O = -100mA | — | 1.50 | 2.0 | |
| I _I | Input current | V _I = 5V | — | 0.48 | 0.75 | mA |
| | | V _I = 25V | — | 2.8 | 4.7 | |
| I _S | Supply current | V _S = 50V, V _I = 5V (all input) | — | 5.6 | 15.0 | mA |
| V _F | Clamping diode forward voltage | I _F = -350mA | — | -1.2 | -2.4 | V |
| I _R # | Clamping diode reverse current | V _R = 50V | — | — | 100 | μA |

* : 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.

: Unused I/O pins must be connected to GND.

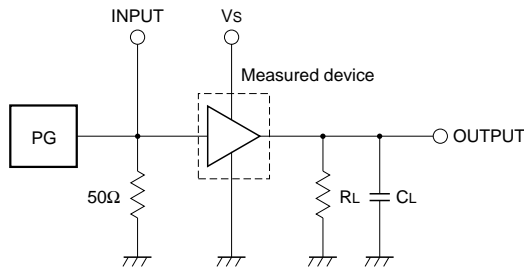
SWITCHING CHARACTERISTICS (Unless otherwise noted, Ta = 25°C)

| Symbol | Parameter | Test conditions | Limits | | | Unit |
|------------------|---------------|--------------------------------|--------|------|-----|------|
| | | | min | typ | max | |
| t _{on} | Turn-on time | C _L = 15pF (note 1) | — | 110 | — | ns |
| t _{off} | Turn-off time | | — | 5200 | — | ns |

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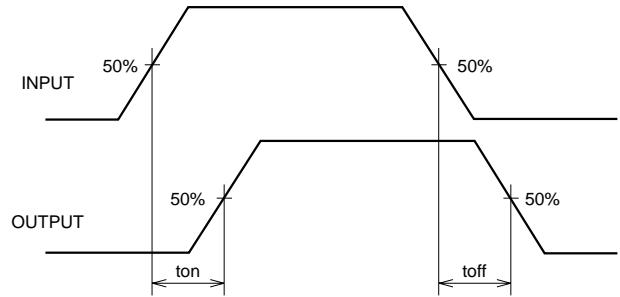
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NOTE 1 TEST CIRCUIT

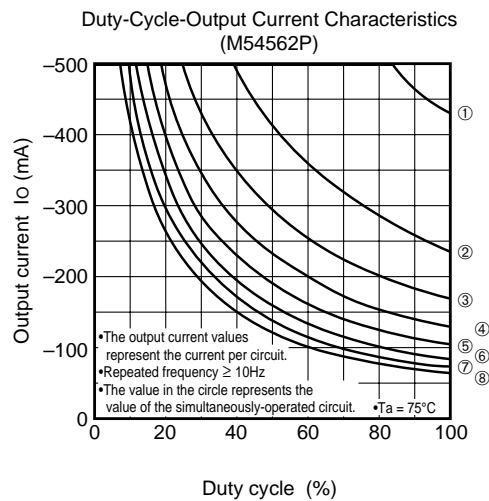
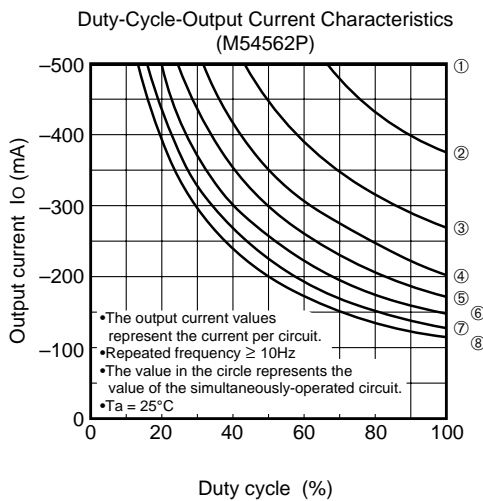
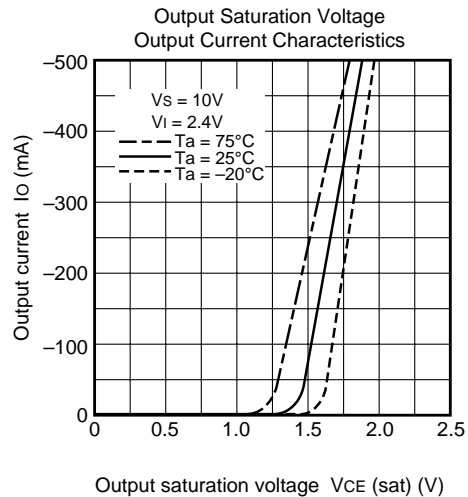
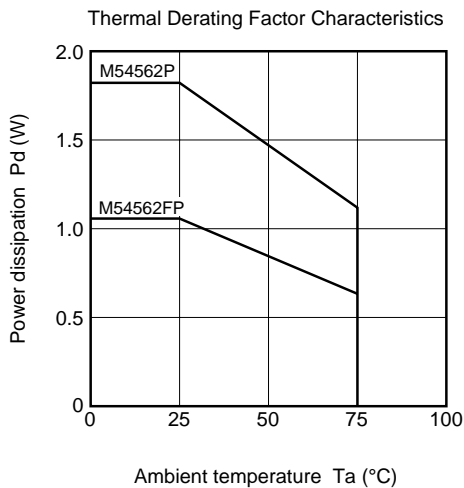


- (1) Pulse generator (PG) characteristics : PRR = 1kHz,
 $t_w = 10\mu s$, $t_r = 6ns$, $t_f = 6ns$, $Z_o = 50\Omega$
 $V_i = 0$ to $2.4V$
- (2) Input-output conditions : $R_L = 30\Omega$, $V_s = 10V$
- (3) Electrostatic capacity C_L includes floating capacitance at connections and input capacitance at probes

TIMING DIAGRAM



TYPICAL CHARACTERISTICS



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