# M54566WP

7-UNIT 400mA DARLINGTON TRANSISTOR ARRAY

## DESCRIPTION

M54566WP are seven-circuit collector-current synchronized 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 (BVCEO≥ 50V)
- High-current driving (Ic(max) = 400mA)
- Active L-level input

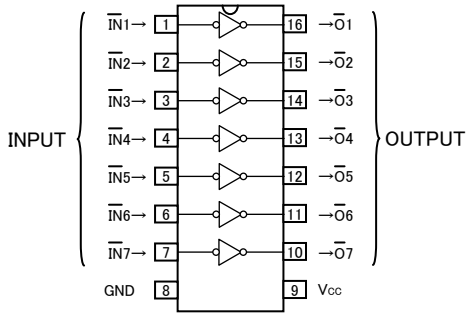
## APPLICATION

Interfaces between microcomputers and high-voltage, highcurrent
drive systems, drives of relays and printers, and
MOS-bipolar logic IC interfaces

## FUNCTION

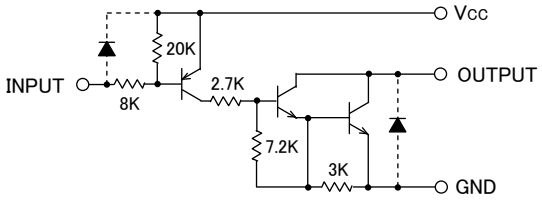
The M54566 is produced by adding PNP transistors to M54522 inputs. Seven circuits having active L-level inputs are provided.
Resistance of 8kW is provided between each input and PNP transistor base. The input emitters are connected to Vcc pin (pin 9). Output transistor emitters are all connected to the GND pin (pin 8).
Collector current is 400mA maximum. Collector-emitter supply voltage is 50V maximum.
These ICs are optimal for drivers that are driven with N-MOS IC output and absorb collector current.

## PIN CONFIGURATION




Package type 16P4X

## CIRCUIT DIAGRAM




The seven circuits share the Vcc and GND.

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

Unit: Ω

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

| Symbol | Parameter | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Vcc | Supply voltage | | 10 | V |
| VCEO | Collector-emitter voltage | Output, H | −0.5 ～ +50 | V |
| Ic | Collector current | Current per circuit output, L | 400 | mA |
| VI | Input voltage | | −0.5 ～ Vcc | V |
| Pd | Power dissipation | Ta = 25°C, when mounted on board | 1.47 | W |
| Topr | Operating temperature | | −20 ～ +75 | °C |
| Tstg | Storage temperature | | −55 ～ +125 | °C |

## RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter | | Limits | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| $V_{CC}$ | Supply voltage | | 4 | 5 | 8 | V |
| $V_O$ | Output voltage | | 0 | — | 50 | V |
| $I_C$ | Collector current (Current per 1 circuit when 7 circuits are coming on simultaneously) | $V_{CC}$=5V Duty Cycle no more than 10% | 0 | — | 350 | mA |
| | | $V_{CC}$=5V Duty Cycle no more than 30% | 0 | — | 200 | |
| $V_{IH}$ | "H" input voltage | | $V_{CC}$−0.2 | — | $V_{CC}$ | V |
| $V_{IL}$ | "L" input voltage | | 0 | — | $V_{CC}$−3 | V |

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

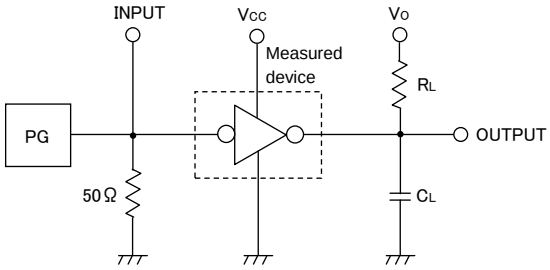
| Symbol | Parameter | Test conditions | Limits | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ * | max | |
| $V_{(BR)CEO}$ | Collector-emitter breakdown voltage | $I_{CEO}$ = 100 μA | 50 | — | — | V |
| $V_{CE(sat)}$ | Collector-emitter saturation voltage | $V_I$ = $V_{CC}$ − 3V, $I_C$ = 350mA | — | 1.1 | 2.2 | V |
| | | $V_I$ = $V_{CC}$ − 3V, $I_C$ = 200mA | — | 0.9 | 1.6 | |
| $I_I$ | Input current | $V_I$ = $V_{CC}$ − 3.5V | — | −0.3 | −0.58 | mA |
| $I_{CC}$ | Supply current (one circuit coming on) | $V_{CC}$=5V, $V_I$=$V_{CC}$−3.5V | — | 1.4 | 3.0 | mA |
| $h_{FE}$ | DC amplification factor | $V_{CE}$ = 4V, $V_{CC}$=5V, $I_C$ = 350mA, Ta = 25°C | 2000 | 10000 | — | — |

*: 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)

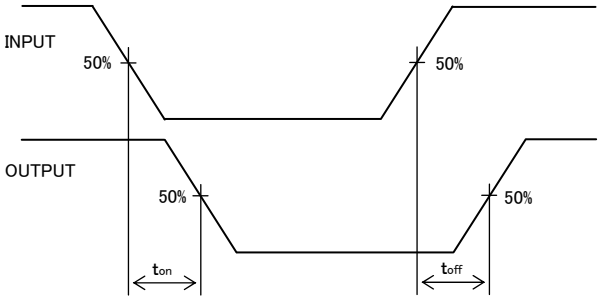
| Symbol | Parameter | Test conditions | Limits | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| $t_{on}$ | Turn-on time | $C_L$ = 15pF (note 1) | — | 95 | — | ns |
| $t_{off}$ | Turn-off time | | — | 2500 | — | ns |

## NOTE 1 TEST CIRCUIT



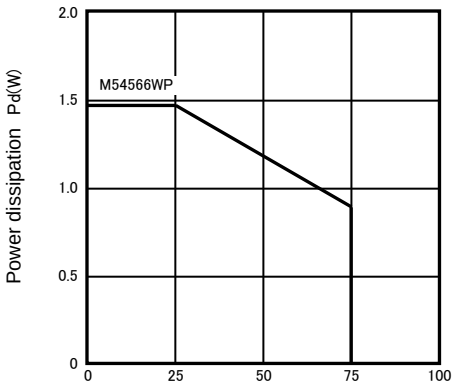

(1) Pulse generator (PG) characteristics: PRR = 1kHz, tw = 10μs, tr = 6ns, tf = 6ns, $Z_O$ = 50Ω, $V_I$ = 1 to 4V
(2) Input-output conditions : $R_L$ = 30Ω, $V_O$ = 10V, $V_{CC}$ = 4V
(3) Electrostatic capacity $C_L$ includes floating capacitance at connections and input capacitance at probes

## TIMING DIAGRAM

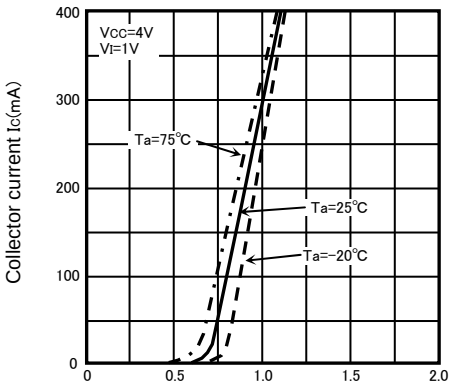


## TYPICAL CHARACTERISTICS

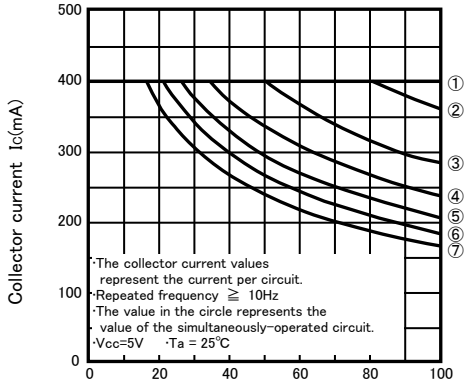
Thermal Derating Factor Characteristics



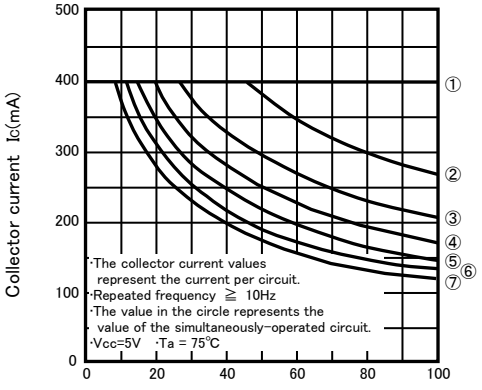

Output Saturation Voltage



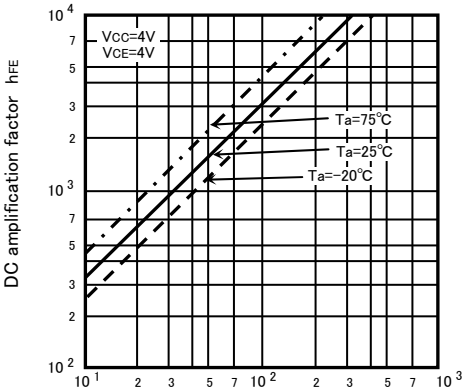

Duty-Cycle-Collector Characteristics



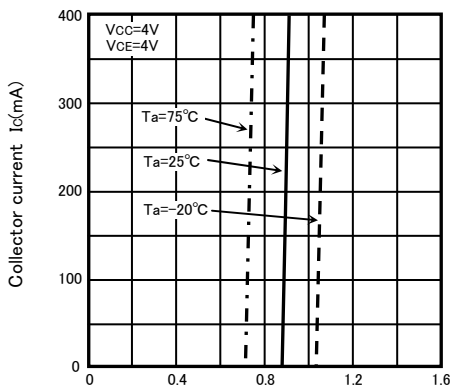

Duty-Cycle-Collector Characteristics



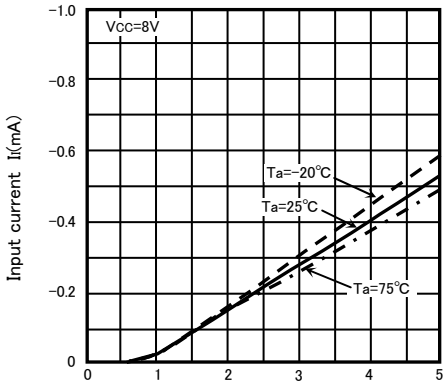

DC Amplification Factor
Collector Current Characteristics




Grounded Emitter Transfer Characteristics

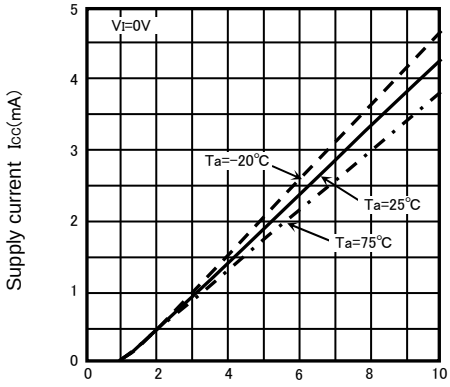


Input Characteristics




Supply voltage-Input voltage VCC-VI(V)

Supply Current Characteristics




Supply Voltage VCC(V)