# M54533P

## 6-UNIT 320mA TRANSISTOR ARRAY WITH CLAMP DIODE AND STROBE

## DESCRIPTION

The M54533P, 6-channel sink driver, consists of 12 NPN transistors to form high current gain driver pairs.

## FEATURES

- Output breakdown voltage to 20V
- High output sink current to 320mA
- Integral diode for transient suppression
- Strobe control input
- Wide input voltage range from −25V to +20V
- Wide operating temperature range ($T_a$ = −20~+75℃)

## APPLICATION

Relay and printer driver, LED or incandescent display digit driver

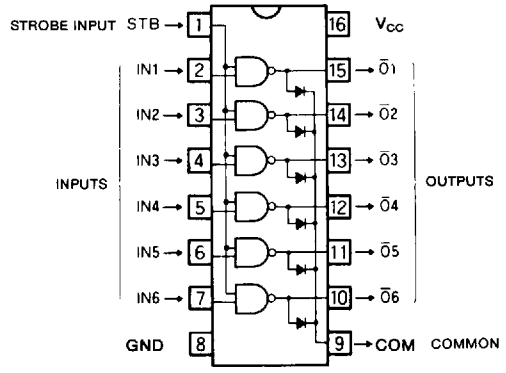
## FUNCTION

The M54533P uses a predriver stage. Each input has a diode and 20kΩ resistor in series to allow a negative voltage input. All input can be controlled simultaneously by a strobe input at pin 1 .

The power supply of the predrivers is connected to pin 16. All emitters and the substrate are connected together to pin 8 . Each output has an integral diode for inductive load transient suppression and the cathodes of the diodes are connected to pin 9 .

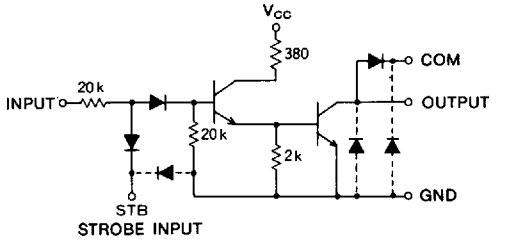
The outputs are capable of sinking 320mA and will withstand 20V in the OFF state.

## PIN CONFIGURATION (TOP VIEW)




Outline 16P4

## CIRCUIT SCHEMATIC




The diodes shown by broken line are parasite diodes and must not be used

Unit : Ω

## FUNCTIONAL TABLE

| IN | STB | OUT |
|---|---|---|
| L | L | H |
| H | L | H |
| L | H | H |
| H | H | L |

## ABSOLUTE MAXIMUM RATINGS ($T_a$=−25~+75℃, unless otherwise noted)

| Symbol | Parameter | Conditions | Ratings | Unit |
|---|---|---|---|---|
| $V_{CC}$ | Supply voltage | | 10 | V |
| $V_{CEO}$ | Output sustaining voltage | Transistor OFF | −0.5~+20 | V |
| $I_C$ | Collector current | Transistor ON | 350 | mA |
| $V_I$ | Input voltage | | 10 | V |
| $P_d$ | Power dissipation | $T_a$=25℃ | 1.47 | W |
| Topr | Operating temperature | | −20~+75 | ℃ |
| Tstg | Storage temperature | | −55~+125 | ℃ |



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### RECOMMENDED OPERATIONAL CONDITIONS ($T_a$=−20∼+75℃, unless otherwise noted)

| Symbol | Parameter | | Limits | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| $V_{CC}$ | Supply voltage | | 3 | | 8 | V |
| $V_O$ | Output voltage | | 0 | | 20 | V |
| $I_C$ | Collector current per channel | Percent duty cycle less than 25%, $V_{CC}$=6.5V | 0 | | 300 | mA |
| | | Percent duty cycle less than 65%, $V_{CC}$=6.5V | 0 | | 150 | |
| $V_{IH}$ | "H" Input voltage | $I_C$=300mA | 7 | | 18 | V |
| | | $I_C$=150mA | 5 | | 18 | |
| $V_{IL}$ | "L" Input voltage | $I_{O(leak)}$=50μA | 0 | | 1 | V |
| $V_{IH(STB)}$ | "H" Input voltage (strobe input) | | 2.4 | | 18 | V |
| $V_{IL(STB)}$ | "L" Input voltage (strobe input) | | 0 | | 0.2 | V |

### ELECTRICAL CHARACTERISTICS ($T_a$=−20∼+75℃, unless otherwise noted)

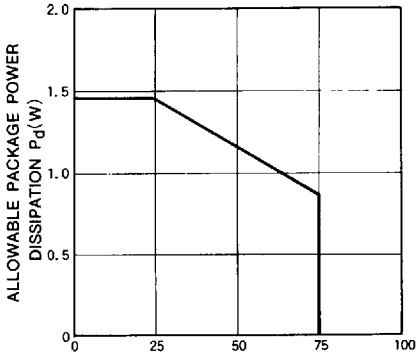
| Symbol | Parameter | Test conditions | | Limits | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ* | Max | |
| $V_{(BR)CEO}$ | Output sustaining voltage | $V_{CC}$=8V, $V_I$=18V, $V_{I(STB)}$=0.2V, $I_{CEO}$=100μA | | 20 | | | V |
| $V_{CE(sat)}$ | Output saturation voltage | $V_I$=7V, $V_{I(STB)}$=2.4V | $V_{CC}$=6.5V, $I_C$=250mA | | 0.5 | 0.85 | V |
| | | | $V_{CC}$=3V, $I_C$=120mA | | 0.3 | 0.5 | |
| $I_I$ | Input current | $V_{CC}$=8V, $V_I$=18V, $V_{I(STB)}$=2.4V | | | 0.8 | 1.8 | mA |
| $I_R$ | Input leakage current | $V_{CC}$=8V, $V_I$=−25V | | | | −20 | μA |
| $I_{I(STB)}$ | Strobe input current | $V_{CC}$=8V, $V_I$=18V (all input), $V_{I(STB)}$=0.2V | | | −4 | −10 | mA |
| $I_{R(STB)}$ | Strobe input leakage current | $V_{CC}$=8V, $V_I$=0V, $V_{I(STB)}$=20V | | | | 20 | μA |
| $V_{F(D)}$ | Clamp diode forward voltage | $I_{F(D)}$=320mA | | | 1.4 | 2.4 | V |
| $V_{R(D)}$ | Clamp diode reverse voltage | $I_{R(D)}$=100μA | | 20 | 40 | | V |
| $I_{CC}$ | Supply current | $V_{CC}$=8V, $V_I$=7V (all input), $V_{I(STB)}$=2.4V | | | 120 | 200 | mA |
| $h_{FE}$ | DC forward current gain | $V_{CE}$=4V, $V_{CC}$=6.5V, $I_C$=300mA, $T_a$=25℃, $V_{I(STB)}$=2.4V | | 1000 | 3000 | | — |

* : Typical values are at $T_a$=25℃.

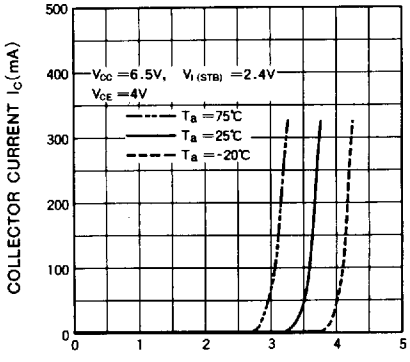
## 6-UNIT 320mA TRANSISTOR ARRAY WITH CLAMP DIODE AND STROBE

## TYPICAL CHARACTERISTICS

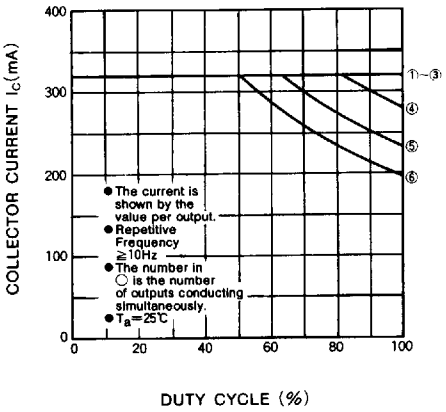
### ALLOWABLE AVERAGE POWER DISSIPATION




### OUTPUT CURRENT CHARACTERISTICS




### ALLOWABLE COLLECTOR CURRENT AS A FUNCTION OF DUTY CYCLE

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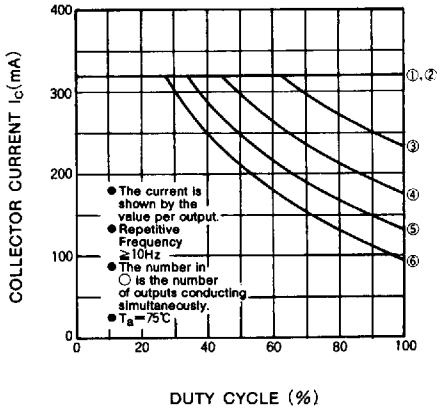
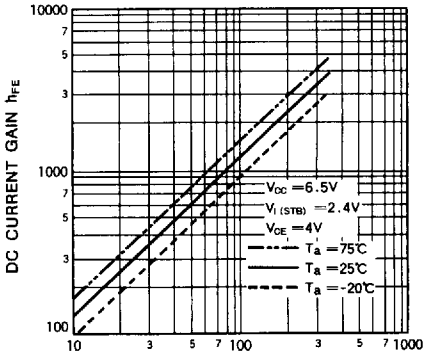



### DC CURRENT GAIN CHARACTERISTICS



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