

MITSUBISHI (DGT L LOGIC)

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 $+20\text{V}$
- Wide operating temperature range ($T_a = -20 \sim +75^\circ\text{C}$)

APPLICATION

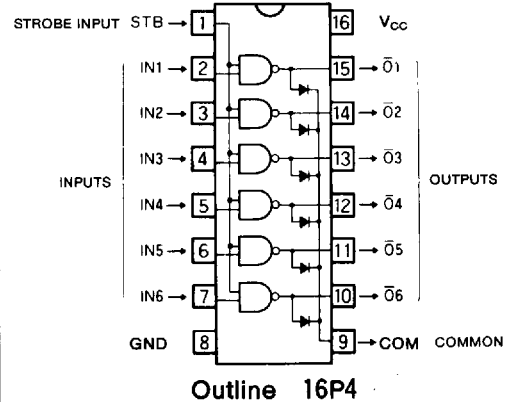
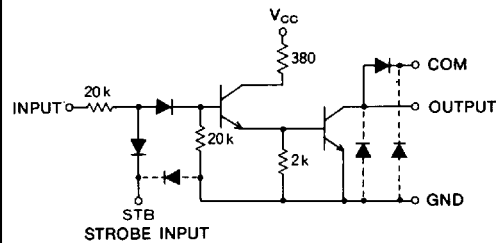
Relay and printer driver, LED or incandescent display digit driver

FUNCTION

The M54533P uses a predriver stage. Each input has a diode and $20\text{k}\Omega$ 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)**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 ($T_a = -25 \sim +75^\circ\text{C}$, unless otherwise noted)

| Symbol | Parameter | Conditions | Ratings | Unit |
|-----------|---------------------------|--------------------------|-----------------|------------------|
| V_{CC} | Supply voltage | | 10 | V |
| V_{CEO} | Output sustaining voltage | Transistor OFF | $-0.5 \sim +20$ | V |
| I_C | Collector current | Transistor ON | 350 | mA |
| V_i | Input voltage | | 10 | V |
| P_d | Power dissipation | $T_a = 25^\circ\text{C}$ | 1.47 | W |
| T_{opr} | Operating temperature | | $-20 \sim +75$ | $^\circ\text{C}$ |
| T_{stg} | Storage temperature | | $-55 \sim +125$ | $^\circ\text{C}$ |

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

RECOMMENDED OPERATIONAL CONDITIONS ($T_a = -20 \sim +75^\circ\text{C}$, 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%, $V_{CC}=6.5\text{V}$ | 0 | | 300 | mA |
| | | Percent duty cycle less than 65%, $V_{CC}=6.5\text{V}$ | 0 | | 150 | |
| V_{IH} | "H" Input voltage | $I_C=300\text{mA}$ | 7 | | 18 | V |
| | | $I_C=150\text{mA}$ | 5 | | 18 | |
| V_{IL} | "L" Input voltage | $I_{O(leak)}=50\mu\text{A}$ | 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 |

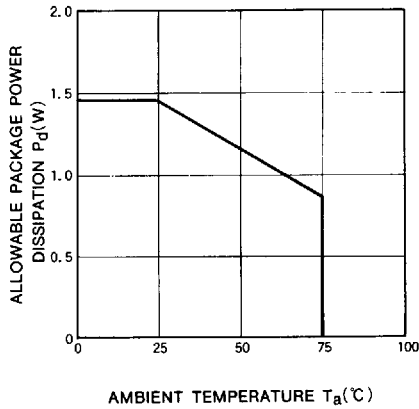
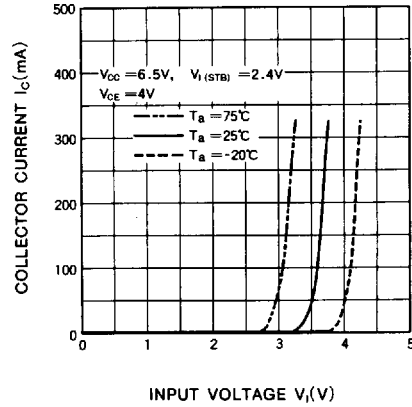
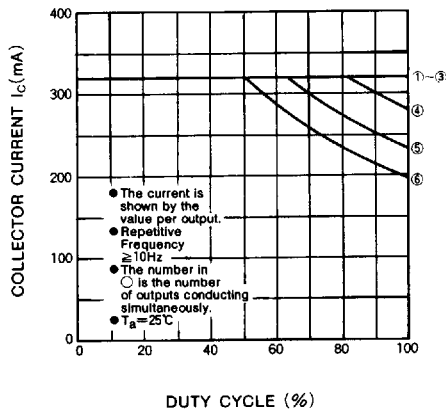
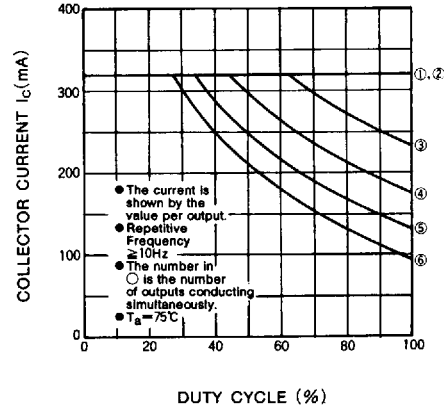
ELECTRICAL CHARACTERISTICS ($T_a = -20 \sim +75^\circ\text{C}$, unless otherwise noted)

| Symbol | Parameter | Test conditions | Limits | | | Unit |
|---------------|------------------------------|---|--------|------|------|---------------|
| | | | Min | Typ* | Max | |
| $V_{(BR)CEO}$ | Output sustaining voltage | $V_{CC}=8\text{V}$, $V_I=18\text{V}$, $V_{I(STB)}=0.2\text{V}$ $I_{CEO}=100\mu\text{A}$ | 20 | | | V |
| $V_{CE(sat)}$ | Output saturation voltage | $V_I=7\text{V}$ $V_{I(STB)}=2.4\text{V}$ | | 0.5 | 0.85 | V |
| | | $V_{CC}=6.5\text{V}$, $I_C=250\text{mA}$ $V_{CC}=3\text{V}$, $I_C=120\text{mA}$ | | 0.3 | 0.5 | |
| I_I | Input current | $V_{CC}=8\text{V}$, $V_I=18\text{V}$, $V_{I(STB)}=2.4\text{V}$ | | 0.8 | 1.8 | mA |
| I_R | Input leakage current | $V_{CC}=8\text{V}$, $V_I=-25\text{V}$ | | | -20 | μA |
| $I_{I(STB)}$ | Strobe input current | $V_{CC}=8\text{V}$, $V_I=18\text{V}$ (all input), $V_{I(STB)}=0.2\text{V}$ | | -4 | -10 | mA |
| $I_{R(STB)}$ | Strobe input leakage current | $V_{CC}=8\text{V}$, $V_I=0\text{V}$, $V_{I(STB)}=20\text{V}$ | | | 20 | μA |
| $V_{F(D)}$ | Clamp diode forward voltage | $I_{RD1}=320\text{mA}$ | | 1.4 | 2.4 | V |
| $V_{R(D)}$ | Clamp diode reverse voltage | $I_{RD1}=100\mu\text{A}$ | 20 | 40 | | V |
| I_{CC} | Supply current | $V_{CC}=8\text{V}$, $V_I=7\text{V}$ (all input) $V_{I(STB)}=2.4\text{V}$ | | 120 | 200 | mA |
| β_{FE} | DC forward current gain | $V_{CE}=4\text{V}$, $V_{CC}=6.5\text{V}$, $I_C=300\text{mA}$, $T_a=25^\circ\text{C}$ $V_{I(STB)}=2.4\text{V}$ | 1000 | 3000 | | — |

* : Typical values are at $T_a=25^\circ\text{C}$.

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TYPICAL CHARACTERISTICS

ALLOWABLE AVERAGE
POWER DISSIPATIONOUTPUT CURRENT
CHARACTERISTICSALLOWABLE COLLECTOR CURRENT
AS A FUNCTION OF DUTY CYCLEALLOWABLE COLLECTOR CURRENT
AS A FUNCTION OF DUTY CYCLEDC CURRENT GAIN
CHARACTERISTICS