

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 (Ta = -20~+75°C)

APPLICATION

Relay and printer driver, LED or incandescent display digit driver

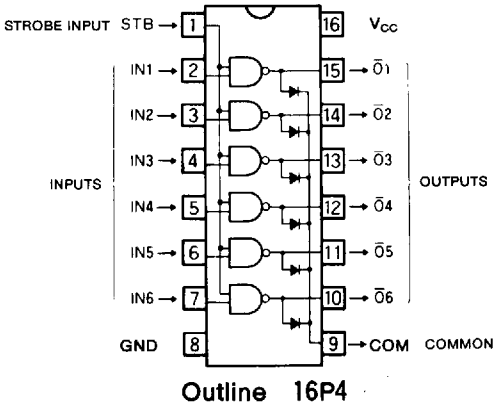
FUNCTION

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

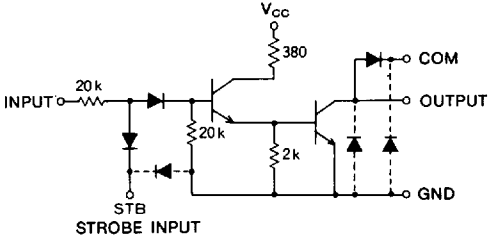
The power supply of the predrivers is connected to pin 16. All emitters and the substrate are connected together to pin 8. Each output has an integral diode for inductive load transient suppression and the cathodes of the diodes are connected to pin 9.

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

PIN CONFIGURATION (TOP VIEW)



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 (Ta = -25~+75°C, 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°C	1.47	W
T _{opr}	Operating temperature		-20~+75	°C
T _{stg}	Storage temperature		-55~+125	°C

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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	$I_{OL(LEAK)}=50\mu\text{A}$	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)

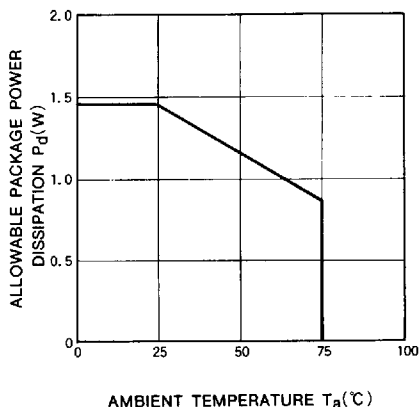
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ*	Max	
$V_{(BR)CEO}$	Output sustaining voltage	$V_{CC}=8\text{V}$, $V_I=18\text{V}$, $V_{K(STB)}=0.2\text{V}$ $I_{CEO}=100\mu\text{A}$	20			V
$V_{CE(sat)}$	Output saturation voltage	$V_I=7\text{V}$ $V_{K(STB)}=2.4\text{V}$		0.5	0.85	V
		$V_{CC}=6.5\text{V}$,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

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

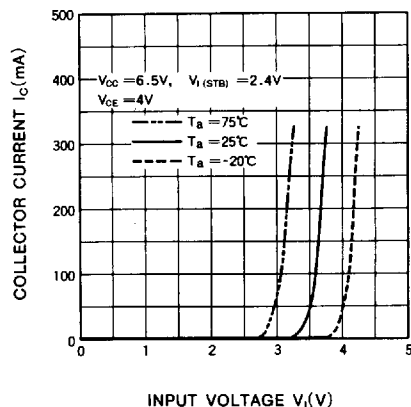
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TYPICAL CHARACTERISTICS

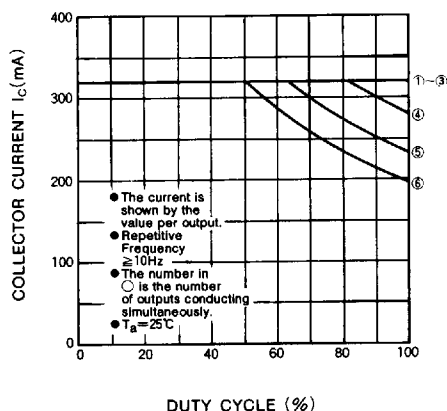
**ALLOWABLE AVERAGE
POWER DISSIPATION**



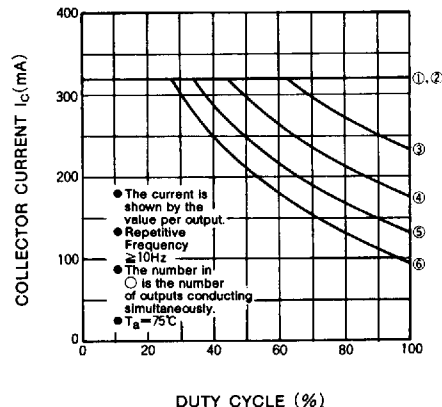
**OUTPUT CURRENT
CHARACTERISTICS**



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



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



**DC CURRENT GAIN
CHARACTERISTICS**

