M54563WP

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

DESCRIPTION

M54563WP is eight-circuit output-sourcing darlington transistor array. The circuits are made of PNP and NPN transistors. This semiconductor integrated circuit performs high current driving with extremely low input-current supply.

FEATURES

- High breakdown voltage ($BV_{CEO} \geq 50V$)
- High-current driving (Io(max) = –500mA)
- With clamping diodes
- Driving available with PMOS IC output of 6 ~ 16V or with TTL output
- Output current-sourcing type

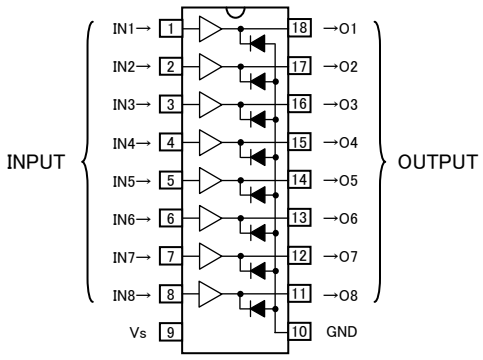
APPLICATIONS

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

FUNCTION

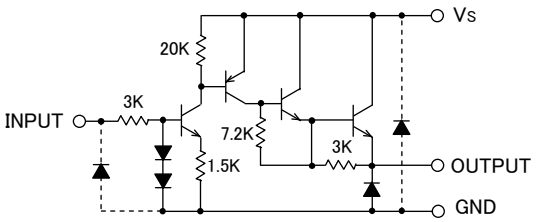
The M54563WP each have eight circuits, which are made of input inverters and current-sourcing outputs.
The outputs are made of PNP transistors and NPN Darlington transistors. The PNP transistor base current is constant. A clamping diode is provided between each output and GND. V_S and GND are used commonly among the eight circuits.
The inputs have resistance of 3kΩ, and voltage of up to 10V is applicable. Output current is 500 mA maximum. Supply voltage V_S is 50V maximum.

PIN CONFIGURATION



Package type 18P4X

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

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 ~ +10	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
Pd	Power dissipation	Ta = 25°C, when mounted on board	1.79	W
Topr	Operating temperature		–20 ~ +75	°C
Tstg	Storage temperature		–55 ~ +125	°C

: Unused Input pins must be connected to GND.

RECOMMENDED OPERATING (Unless otherwise noted, Ta = –20 ~ +75℃)

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 no more than 8%	0	—	–350	mA
		Duty Cycle no more than 55%	0	—	–100	
V_{IH}	"H" input voltage		2.4	—	10	V
V_{IL}	"L" input voltage		0	—	0.2	V

ELECTRICAL CHARACTERISTICS (Unless otherwise noted, Ta = －20～＋75℃)

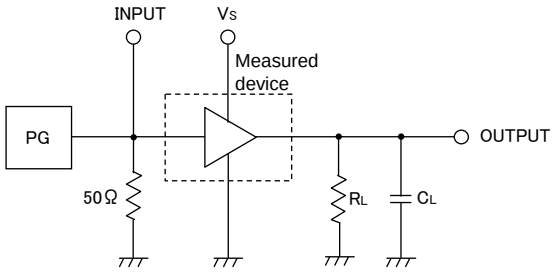
Symbol	Parameter	Test conditions		Limits			Unit
				min	typ *	max	
$I_{S(leak)}$ #	Supply leak current	V_S = 50V, V_I = 0.2V		—	—	100	μA
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_S = 10V, V_I = 2.4V	I_O = – 350mA	—	1.6	2.4	V
			I_O = – 100mA	—	1.45	2.0	
I_I	Input current	V_I = 3V		—	0.6	1.0	mA
		V_I = 10V		—	3.0	5.0	
I_S	Supply current	V_S = 50V, V_I = 3V(all input)		—	5.6	15.0	mA
V_F	Clamping diode forward voltage	I_F = – 350mA		—	– 1.35	– 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℃. There is no guarantee that these values are obtained under any conditions.
: Unused Input pins must be connected to GND.

SWITCHING CHARACTERISTICS (Unless otherwise noted, Ta = 25℃)

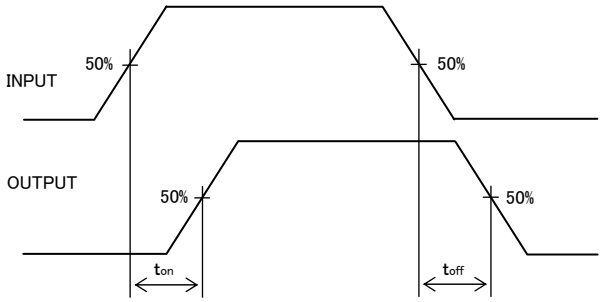
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
ton	Turn-on time	C_L = 15pF (note 1)	—	100	—	ns
toff	Turn-off time		—	4800	—	ns

NOTE 1 TEST CIRCUIT



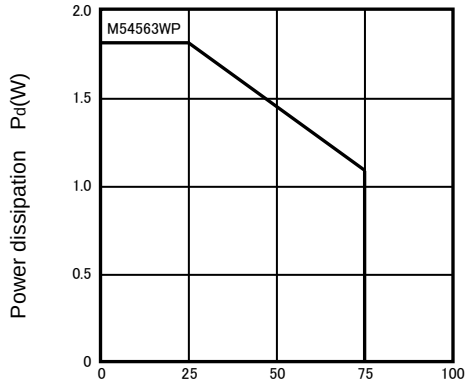
(1) Pulse generator (PG) characteristics: PRR = 1kHz, tw = 10μs, tr = 6ns, tf = 6ns, Z_O = 50Ω, V_I = 0 to 2.4V
(2) Input-output conditions : R_L = 30Ω, V_S = 10V
(3) Electrostatic capacity CL includes floating capacitance at connections and input capacitance at probes

TIMING DIAGRAM

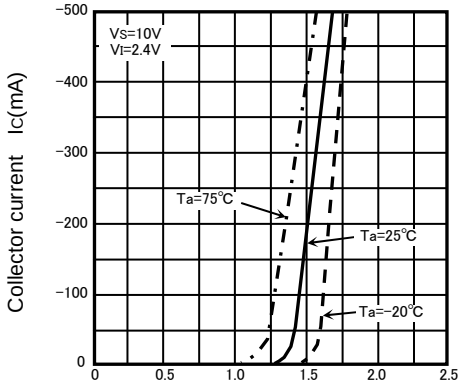


TYPICAL CHARACTERISTICS

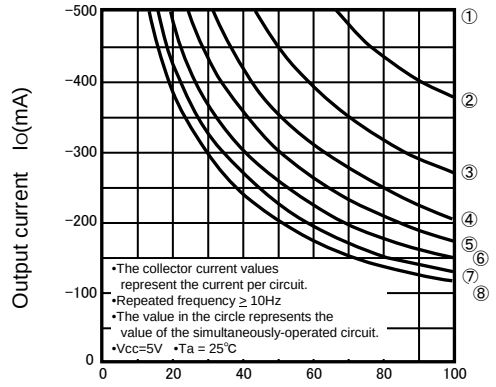
Thermal Derating Factor Characteristics



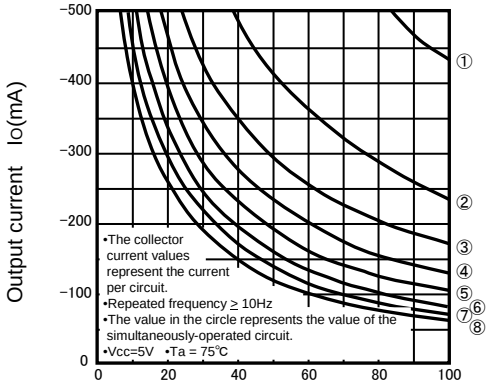
Output Saturation Voltage
Output Current Characteristics



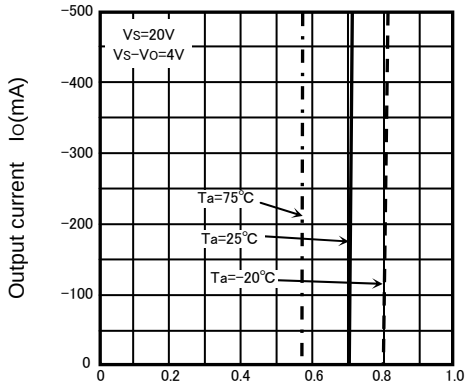
Duty-Cycle-Output current Characteristics



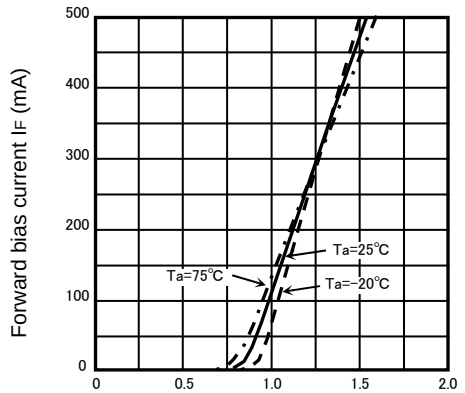
Duty-Cycle-Output current Characteristics



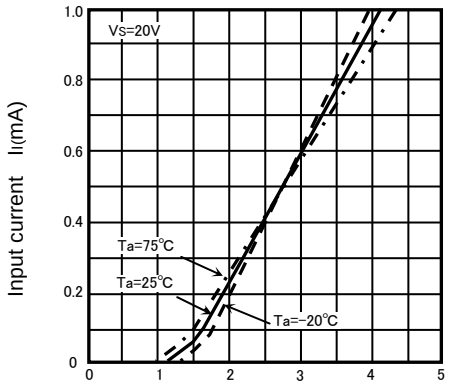
Grounded Emitter Transfer Characteristics



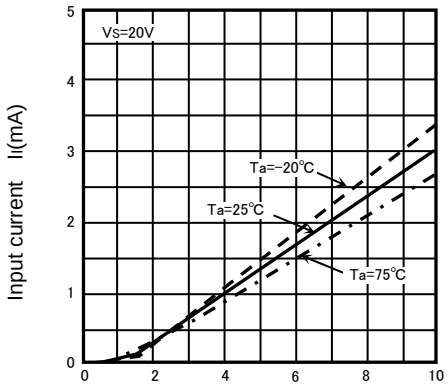
Clamping Diode Characteristics



Input Current Characteristics



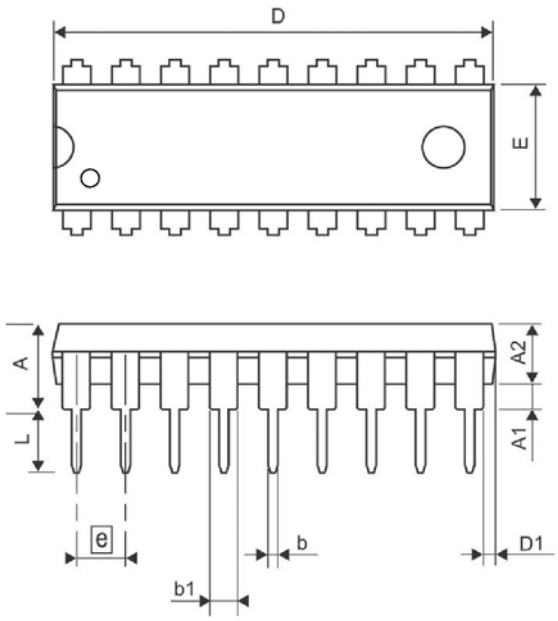
Input Current Characteristics

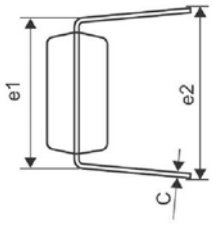


PACKAGE OUTLINE

18P4X Plastic 18pin 300mil DIP

JEITA Package Code	JEDEC Code	Weight(g)	Lead Material
P-DIP18-6.5x22.96-2.54	–	1.27	Cu Alloy





Symbol	Dimension in Milimeters		
	Min	Nom	Max
A	–	–	4.57
A1	0.38	–	–
A2	–	3.30	–
b	0.36	0.46	0.56
b1	1.27	1.52	1.78
C	0.20	0.25	0.33
D	22.71	22.96	23.11
D1	0.43	0.56	0.69
E	6.40	6.5	6.65
e	–	2.54	–
e1	–	7.62	–
e2	8.38	–	9.65
L	3.18	–	–