

<TRANSISTOR ARRAY>

M54563FP

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

DESCRIPTION

M54563FP is an 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 ($I_o(\max) = -500mA$)
- 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.

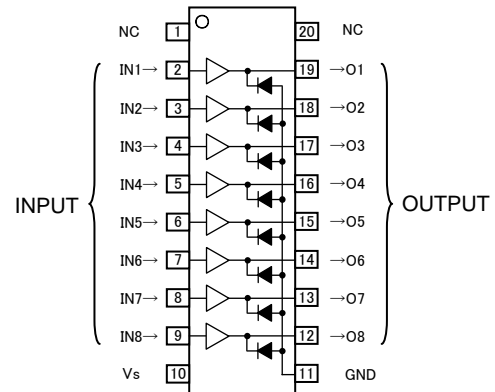
FUNCTION

The M54563FP 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. VS and GND are used commonly among the eight circuits.

The inputs have resistance of $3k\Omega$, and voltage of up to 10V is applicable. Output current is 500 mA maximum. Supply voltage VS is 50V maximum.

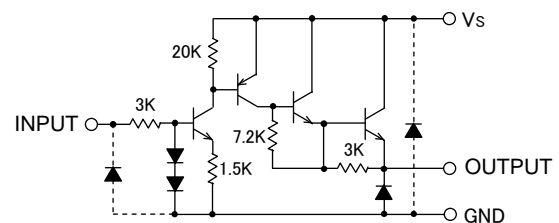
PIN CONFIGURATION



Package type 20P2N-A

NC : No connection

CIRCUIT DIAGRAM



The eight circuits share the VS and GND.

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

Unit : Ω

ABSOLUTE MAXIMUM RATINGS (Unless otherwise noted, $T_a = -20 \sim +75^\circ C$)

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
P_d	Power dissipation	$T_a = 25^\circ C$, when mounted on board	1.10	W
T_{opr}	Operating temperature		-20 ~ +75	$^\circ C$
T_{stg}	Storage temperature		-55 ~ +125	$^\circ C$

: Unused Input pins must be connected to GND.

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RECOMMENDED OPERATING (Unless otherwise noted, $T_a = -20 \sim +75^\circ\text{C}$)

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 5%	0	—	-350	mA
		Duty Cycle no more than 30%	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, $T_a = -20 \sim +75^\circ\text{C}$)

Symbol	Parameter	Test conditions	Limits			Unit
			min	typ*	max	
$I_{s(\text{leak})}$ #	Supply leak current	$V_s = 50\text{V}, V_I = 0.2\text{V}$	—	—	100	μA
$V_{CE(\text{sat})}$	Collector-emitter saturation voltage	$V_s = 10\text{V}, V_I = 2.4\text{V}, I_o = -350\text{mA}$	—	1.6	2.4	V
		$V_s = 10\text{V}, V_I = 2.4\text{V}, I_o = -100\text{mA}$	—	1.45	2.0	
I_i	Input current	$V_I = 5\text{V}$	—	0.6	1.0	mA
		$V_I = 25\text{V}$	—	3.0	5.0	
I_s	Supply current	$V_s = 50\text{V}, V_I = 3\text{V}$ (all input)	—	5.6	15.0	mA
V_F #	Clamping diode forward voltage	$I_F = -350\text{mA}$	—	-1.35	-2.4	V
I_R	Clamping diode reverse current	$V_R = 50\text{V}$	—	—	100	μA

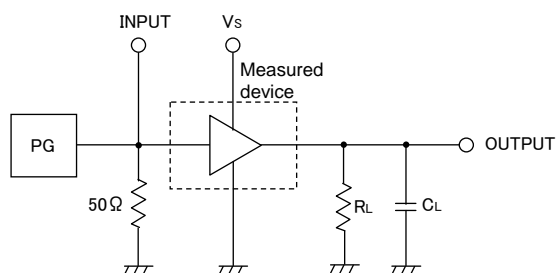
* : The typical values are those measured under ambient temperature (T_a) of 25°C . There is no guarantee that these values are obtained under any conditions.

: Unused Input pins must be connected to GND.

SWITCHING CHARACTERISTICS (Unless otherwise noted, $T_a = 25^\circ\text{C}$)

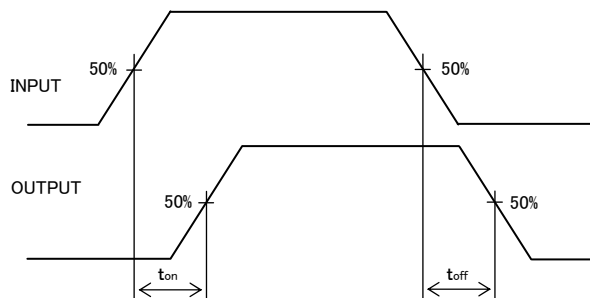
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
t_{on}	Turn-on time	$C_L = 15\text{pF}$ (note 1)	—	100	—	ns
t_{off}	Turn-off time		—	4800	—	ns

NOTE 1 TEST CIRCUIT



- (1) Pulse generator (PG) characteristics: PRR = 1kHz, $t_w = 10\text{ms}$, $t_r = 6\text{ns}$, $t_f = 6\text{ns}$, $Z_o = 50\Omega$, $V_I = 0$ to 2.4V
- (2) Input-output conditions : $R_L = 30\Omega$, $V_s = 10\text{V}$
- (3) Electrostatic capacity C_L includes floating capacitance at connections and input capacitance at probes

TIMING DIAGRAM

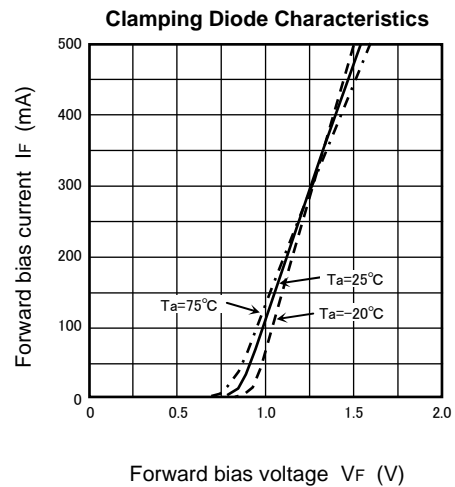
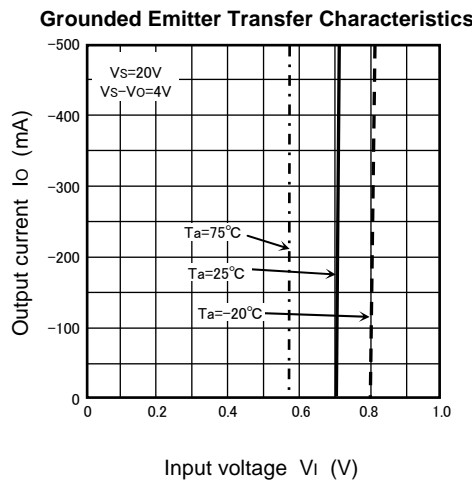
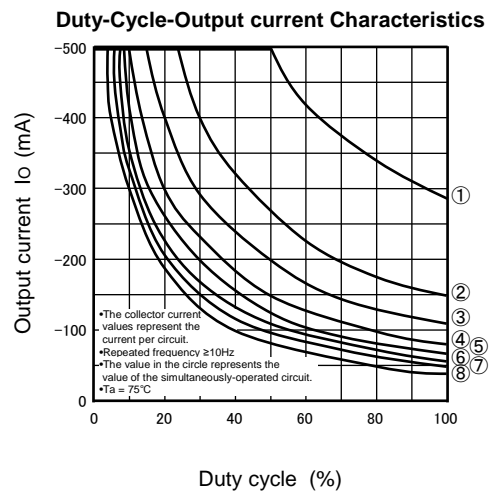
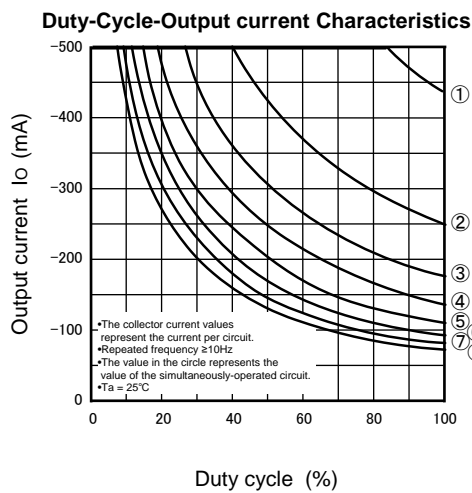
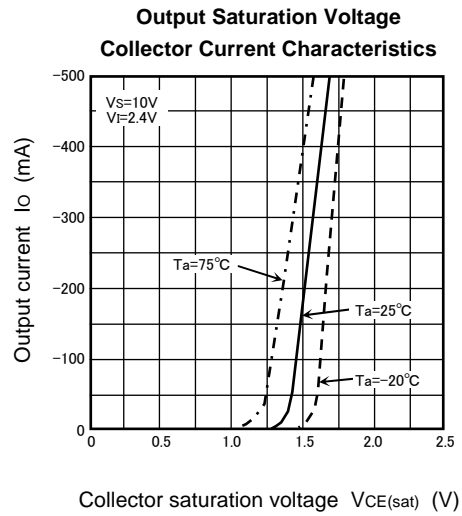
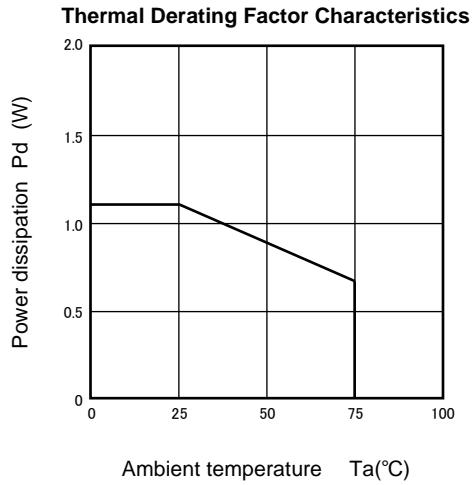


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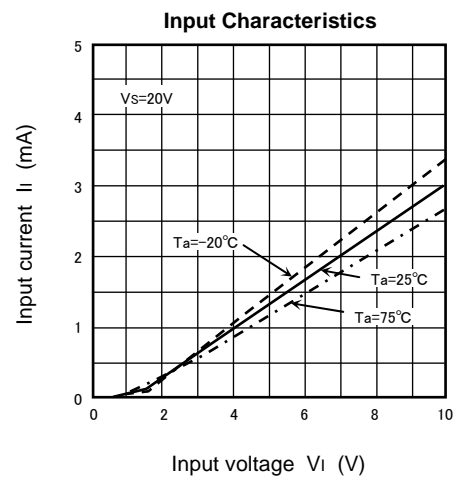
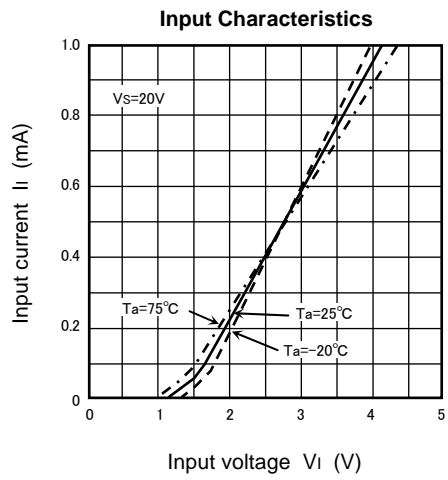
TYPICAL CHARACTERISTICS



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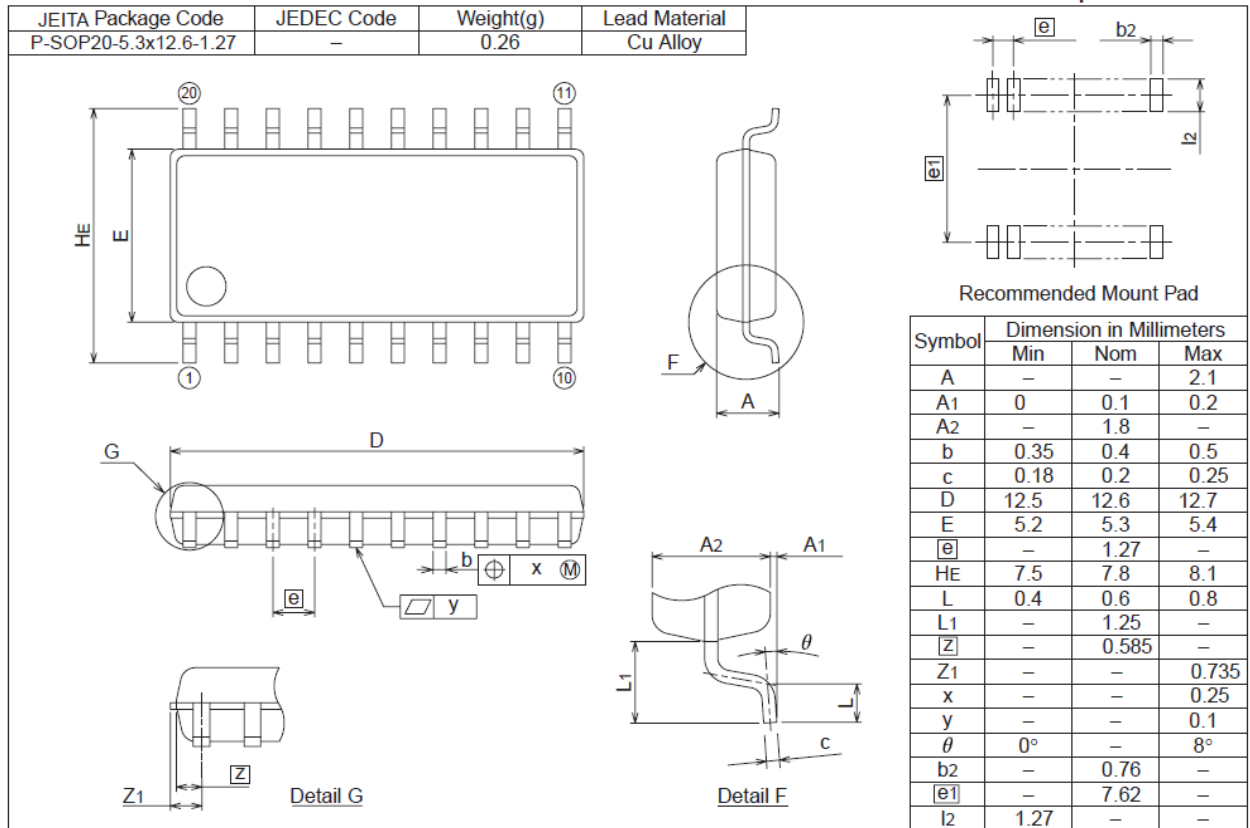
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PACKAGE OUTLINE

20P2N-A

JEITA Package Code	JEDEC Code	Weight(g)	Lead Material
P-SOP20-5.3x12.6-1.27	-	0.26	Cu Alloy

Plastic 20pin 300mil SOP



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