M54583P/FP

8-UNIT 400mA DARLINGTON TRANSISTOR ARRAY

DESCRIPTION

M54583P and M54583FP are eight-circuit collector-current-synchronized Darlington transistor arrays. The circuits are made of PNP and NPN transistors. Both the semiconductor integrated circuits perform high-current driving with extremely low input-current supply.

FEATURES

- High breakdown voltage ($BV_{CEO} \geq 50V$)
- High-current driving (Ic(max) = 400mA)
- Active L-level input
- With input clamping diodes
- Wide operating temperature range (Ta = –20 to +75°C)

APPLICATION

Interfaces between microcomputers and high-voltage, high-current drive systems, drives of relays and printers, and MOS-bipolar logic IC interfaces

FUNCTION

The M54583 is produced by adding PNP transistors to M54523 inputs. Eight circuits having active L-level inputs are provided.

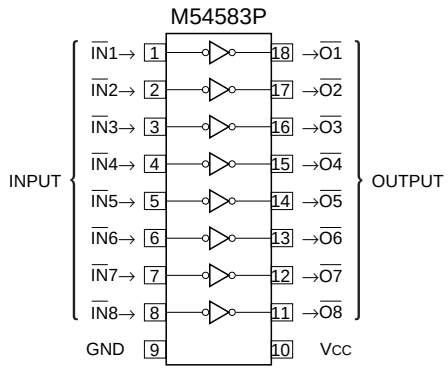
Resistance of 7kΩ and diode are provided in series between each input and PNP transistor base. The input diode is intended to prevent the flow of current from the input to the V_{CC}. Without this diode, the current flow from "H" input to the V_{CC} and the "L" input circuits is activated, in such case where one of the inputs of the 8 circuits is "H" and the others are "L" to save power consumption. The diode is inserted to prevent such misoperation.

This device is most suitable for a driver using NMOS IC output especially for the driver of current sink.

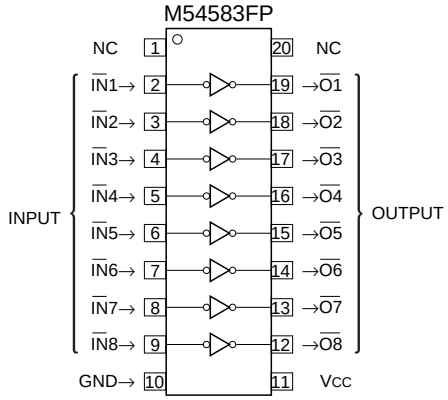
Collector current is 400mA maximum. Collector-emitter supply voltage is 50V.

The 54583FP is enclosed in a molded small flat package, enabling space saving design.

PIN CONFIGURATION (TOP VIEW)



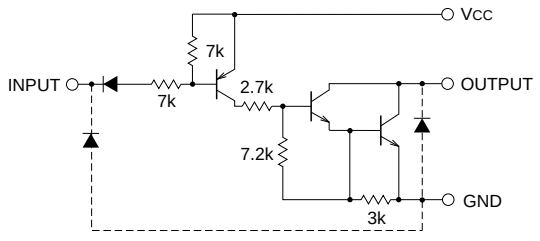
Outline 18P4G



Outline 20P2N-A

NC : No connection

CIRCUIT DIAGRAM (EACH CIRCUIT)



The eight circuits share the V_{CC} 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_{CC}	Supply voltage		10	V
V_{CEO}	Collector-emitter voltage	Output, H	–0.5 ~ +50	V
V_I	Input voltage		–0.5 ~ V_{CC}	V
I_C	Collector current	Current per circuit output, L	400	mA
P_d	Power dissipation	Ta = 25°C, when mounted on board	1.79/1.1	W
T_{opr}	Operating temperature		–20 ~ +75	°C
T_{stg}	Storage temperature		–55 ~ +125	°C

RECOMMENDED OPERATING CONDITIONS (Unless otherwise noted, Ta = –20 ~ +75°C)

Symbol	Parameter		Limits			Unit
			min	typ	max	
V_{CC}	Supply voltage		4	5	8	V
I_C	Collector current Per channel	V_{CC} = 5V, Duty Cycle P : no more than 10% FP : no more than 5%	0	—	350	mA
		V_{CC} = 5V, Duty Cycle P : no more than 34% FP : no more than 15%	0	—	200	
V_{IH}	"H" input voltage		V_{CC}–0.7	—	V_{CC}	V
V_{IL}	"L" input voltage		0	—	V_{CC}–3.6	V

ELECTRICAL CHARACTERISTICS (Unless otherwise noted, Ta = –20 ~ +75°C)

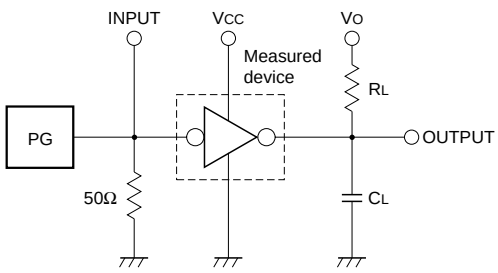
Symbol	Parameter	Test conditions		Limits			Unit
				min	typ*	max	
V (BR) CEO	Collector-emitter breakdown voltage	I_{CEO} = 100μA, V_{CC} = 8V		50	—	—	V
V_{CE} (sat)	Collector-emitter saturation voltage	V_I = V_{CC}–3.6V	I_C = 350mA	—	1.1	2.2	V
			I_C = 200mA	—	0.98	1.6	
I_I	Input current	V_I = V_{CC}–3.6V		—	–320	–600	μA
I_{CC}	Supply current (one circuit coming on)	V_{CC} = 5V, V_I = V_{CC}–3.6V		—	—	3	mA
h_{FE}	DC amplification factor	V_{CE} = 4V, V_{CC} = 5V, I_C = 350mA, Ta = 25°C		2000	10000	—	—

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

SWITCHING CHARACTERISTICS (Unless otherwise noted, Ta = 25°C)

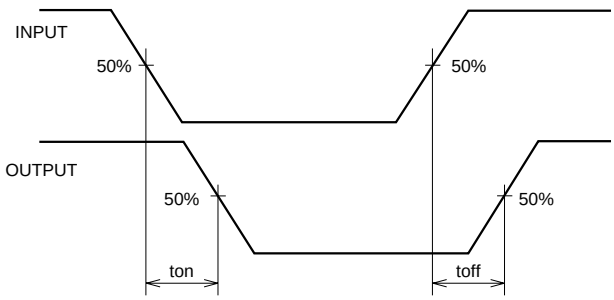
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
ton	Turn-on time	C_L = 15pF (note 1)	—	130	—	ns
toff	Turn-off time		—	3200	—	ns

NOTE 1 TEST CIRCUIT



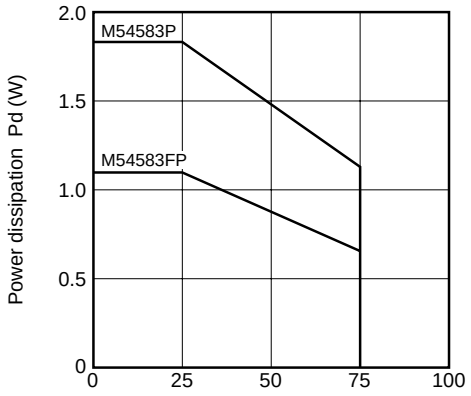
(1) Pulse generator (PG) characteristics : PRR = 1kHz, tw = 10μs, tr = 6ns, tf = 6ns, Z_O = 50Ω
V_I = 0.4 to 4V
(2) Input-output conditions : R_L = 30Ω, V_O = 10V, V_{CC} = 4V
(3) Electrostatic capacity C_L includes floating capacitance at connections and input capacitance at probes

TIMING DIAGRAM

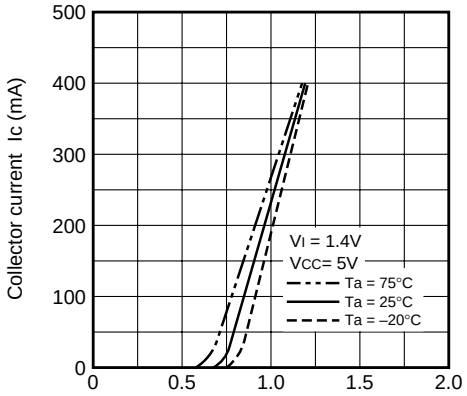


TYPICAL CHARACTERISTICS

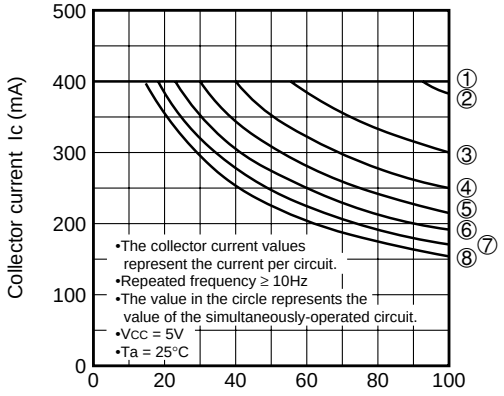
Thermal Derating Factor Characteristics



Output Saturation Voltage Collector Current Characteristics



Duty-Cycle-Collector Characteristics (M54583P)



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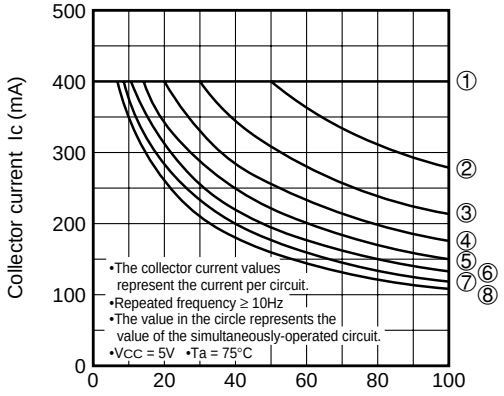
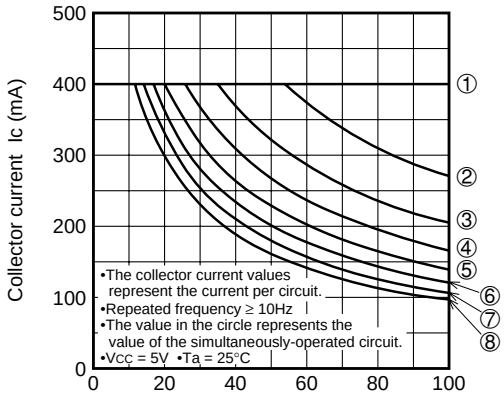
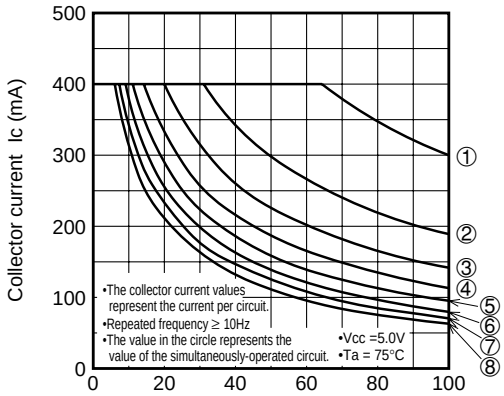


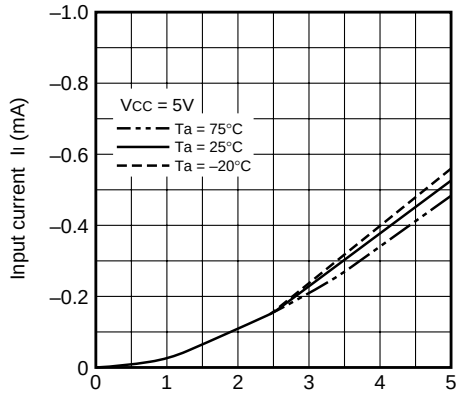
Duty-Cycle-Collector Characteristics (M54583FP)



Duty-Cycle-Collector Characteristics (M54583FP)

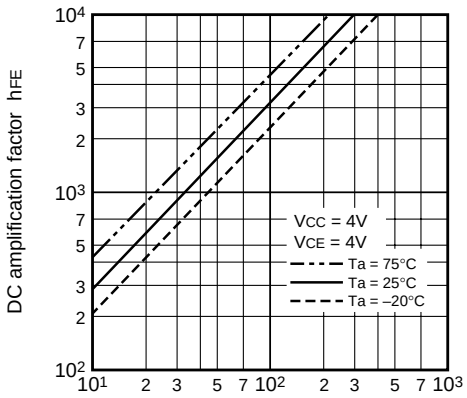


Input Characteristics



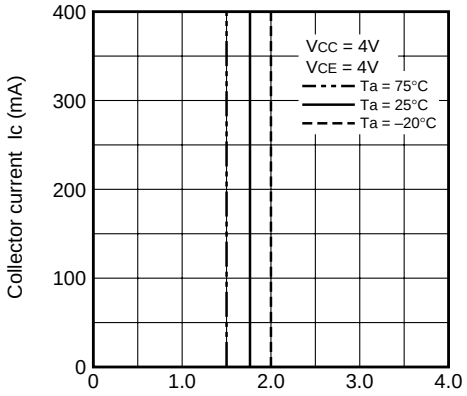
Supply voltage-Input voltage VCC–VI (V)

DC Amplification Factor Collector Current Characteristics



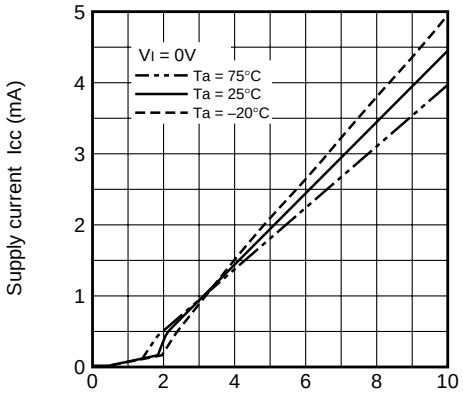
Collector current IC (mA)

Grounded Emitter Transfer Characteristics



Supply voltage-Input voltage VCC–VI (V)

Supply Current Characteristics



Supply voltage VCC (V)