

M54566P/FP

7-UNIT 400mA DARLINGTON TRANSISTOR ARRAY

DESCRIPTION

M54566P and M54566FP are seven-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 ($I_{c(max)} = 400mA$)
- Active L-level input
- Wide operating temperature range ($T_a = -20$ to $+75^\circ C$)

APPLICATION

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

FUNCTION

The M54566 is produced by adding PNP transistors to M54222 inputs. Seven circuits having active L-level inputs are provided.

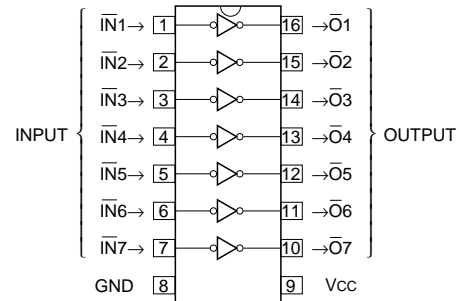
Resistance of $8k\Omega$ is provided between each input and PNP transistor base. The input emitters are connected to V_{cc} pin (pin 9). Output transistor emitters are all connected to the GND pin (pin 8).

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

These ICs are optimal for drivers that are driven with N-MOS IC output and absorb collector current.

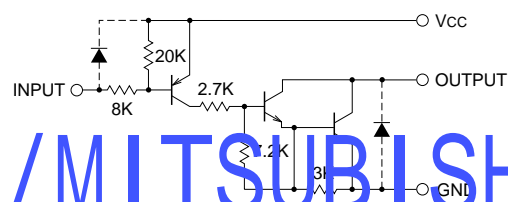
The M54566FP is enclosed in a molded small flat package, enabling space-saving design.

PIN CONFIGURATION



16P4(P)
Package type 16P2N-A(FP)

CIRCUIT DIAGRAM



The seven 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, $T_a = -20 \sim +75^\circ C$)

Symbol	Parameter	Conditions	Ratings	Unit
V_{cc}	Supply voltage		10	V
V_{CEO}	Collector-emitter voltage	Output, H	$-0.5 \sim +50$	V
I_C	Collector current	Current per circuit output, L	400	mA
V_i	Input voltage		$-0.5 \sim V_{cc}$	V
P_d	Power dissipation	$T_a = 25^\circ C$, when mounted on board	1.47(P)/1.00(FP)	W
T_{opr}	Operating temperature		$-20 \sim +75$	$^\circ C$
T_{stg}	Storage temperature		$-55 \sim +125$	$^\circ C$

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

Symbol	Parameter	Limits			Unit	
		min	typ	max		
V _{CC}	Supply voltage	4	5	8	V	
V _O	Output voltage	0	—	50	V	
I _C	Collector current (Current per 1 circuit when 7 circuits are coming on simultaneously)	V _{CC} = 5V, Duty Cycle P : no more than 10% FP : no more than 6%	0	—	350	mA
		V _{CC} = 5V, Duty Cycle P : no more than 30% FP : no more than 20%	0	—	200	
V _{IH}	"H" input voltage	V _{CC} -0.2	—	V _{CC}	V	
V _{IL}	"L" input voltage	0	—	V _{CC} -3	V	

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

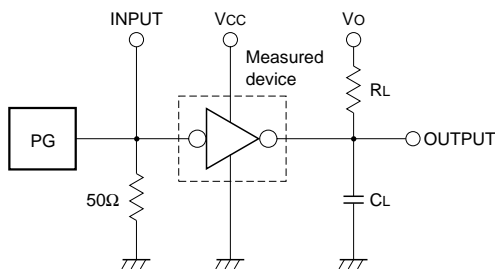
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ*	max	
V (BR) CEO	Collector-emitter breakdown voltage	I _{CEO} = 100μA	50	—	—	V
V _{CE} (sat)	Collector-emitter saturation voltage	V _I = V _{CC} -3V, I _C = 350mA	—	1.1	2.2	V
		V _I = V _{CC} -3V, I _C = 200mA	—	0.9	1.6	
I _I	Input current	V _I = V _{CC} -3.5V	—	-0.38	-0.58	mA
I _{CC}	Supply current (one circuit coming on)	V _{CC} = 5V, V _I = V _{CC} -3.5V	—	1.4	3.0	mA
hFE	DC amplification factor	V _{CE} = 4V, V _{CC} = 5V, I _C = 350mA, T _a = 25°C	2000	10000	—	—

* : 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.

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

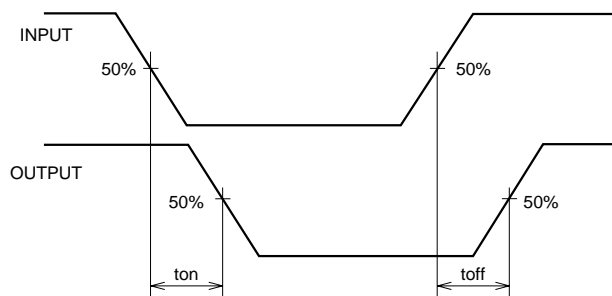
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
t _{on}	Turn-on time	C _L = 15pF (note 1)	—	95	—	ns
t _{off}	Turn-off time		—	2500	—	ns

NOTE 1 TEST CIRCUIT



- (1) Pulse generator (PG) characteristics : PRR = 1kHz, t_w = 10μs, t_r = 6ns, t_f = 6ns, Z_o = 50Ω, V_I = 1 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

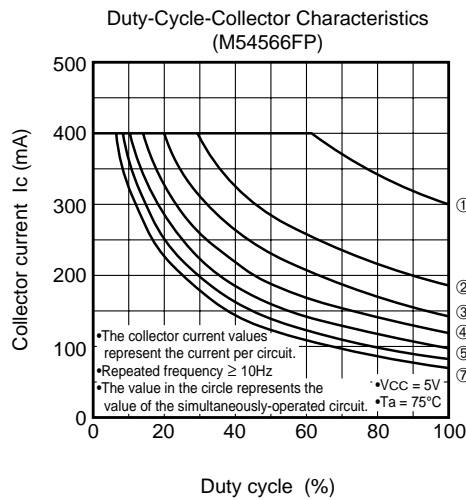
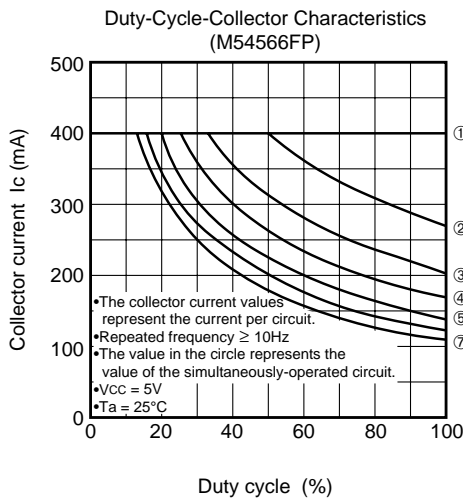
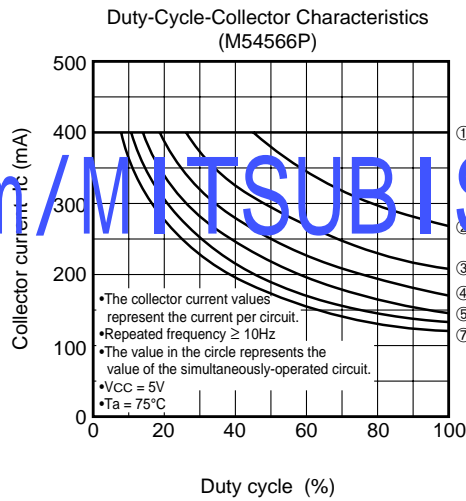
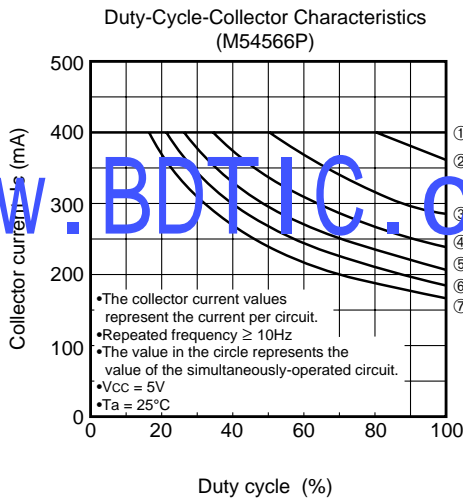
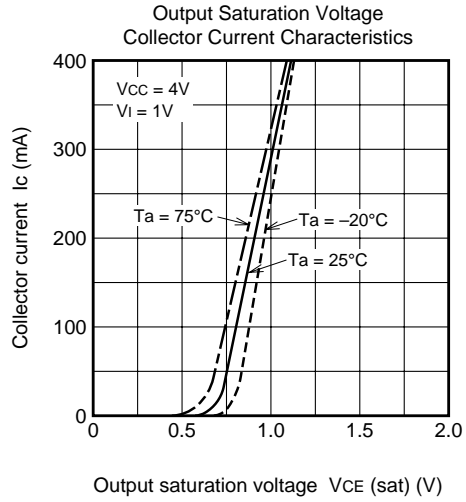
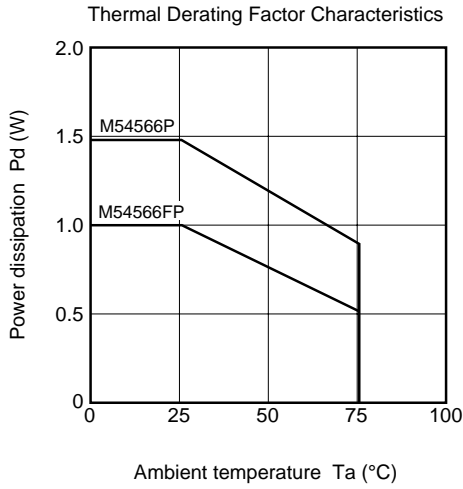
TIMING DIAGRAM



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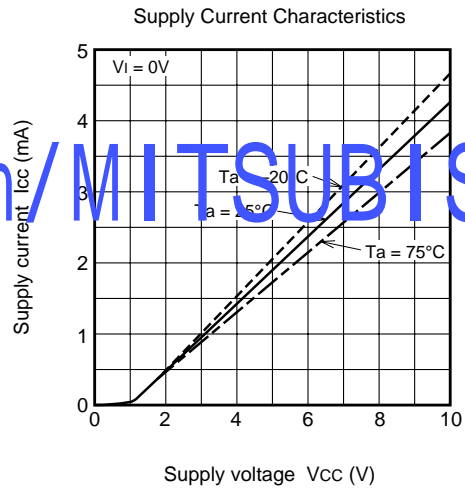
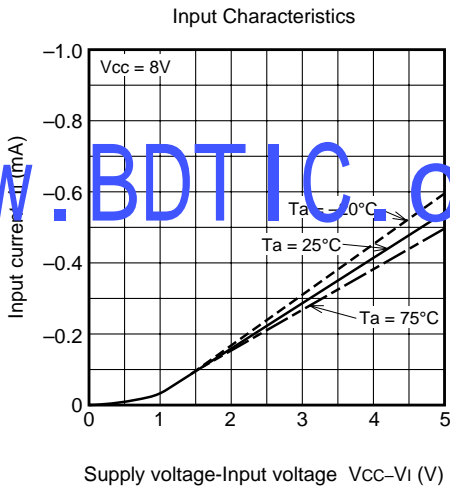
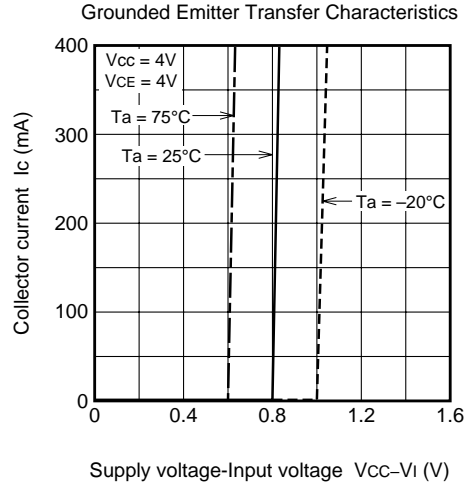
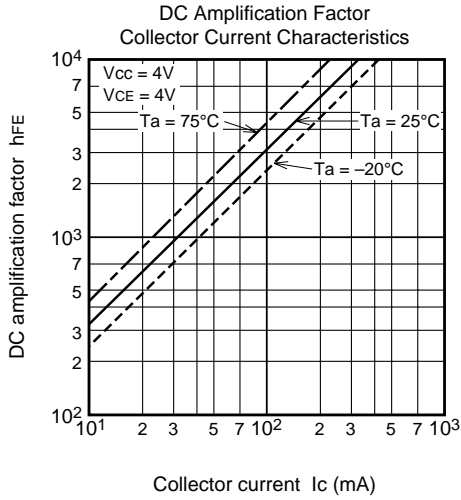
TYPICAL CHARACTERISTICS



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