M54516P

5-UNIT 500mA DARLINGTON TRANSISTOR ARRAY

DESCRIPTION

M54516P is five-circuit Darlington transistor arrays. The circuits are made of NPN transistors. Both the semiconductor integrated circuits perform high-current driving with extremely low input-current supply.

FEATURES

- Medium breakdown voltage ($BV_{CEO} \geq 25V$)
- High-current driving (Ic(max) = 500mA)
- Driving available with PMOS IC output
- Wide operating temperature range (Ta = –20 to +75°C)

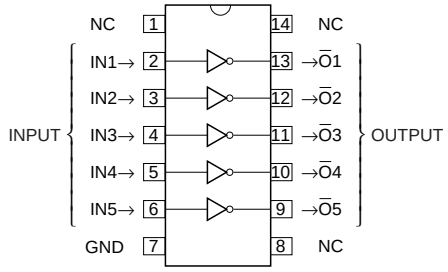
APPLICATION

Drives of relays and printers, digit drives of indication elements (LEDs and lamps), and MOS-bipolar logic IC interfaces

FUNCTION

The M54516P has five circuits consisting of NPN Darlington transistors. These ICs have resistance of 20kΩ between input transistor bases and input pins. The output transistor emitters are all connected to the GND pin (pin 7).
Collector current is 500mA maximum. Collector-emitter supply voltage is 25V maximum.

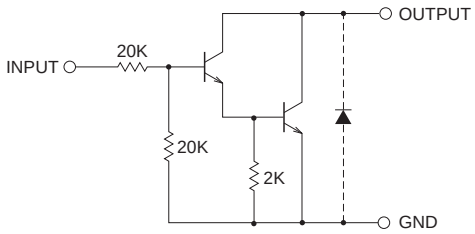
PIN CONFIGURATION



Package type 14P4(P)

NC : No connection

CIRCUIT DIAGRAM



The five circuits share the 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, H	–0.5 ~ +25	V
I_C	Collector current	Current per circuit output, L	500	mA
V_I	Input voltage		–0.5 ~ +25	V
P_d	Power dissipation	Ta = 25°C, when mounted on board	1.47	W
T_{opr}	Operating temperature		–20 ~ +75	°C
T_{stg}	Storage temperature		–55 ~ +125	°C

MITSUBISHI ELECTRIC

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

Symbol	Parameter		Limits			Unit
			min	typ	max	
V_O	Output voltage		0	—	25	V
I_C	Collector current (Current per 1 circuit when 7 circuits are coming on simultaneously)	Duty Cycle no more than 10%	0	—	400	mA
		Duty Cycle no more than 55%	0	—	200	
V_{IH}	"H" input voltage	$I_C \leq 400mA$	8	—	20	V
		$I_C \leq 200mA$	5	—		
V_{IL}	"L" input voltage		0	—	0.5	V

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

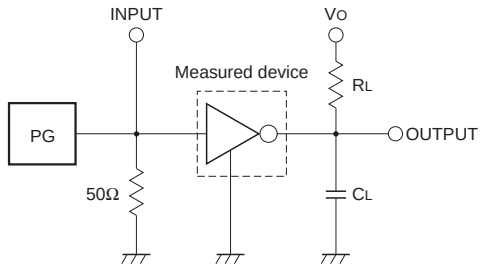
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ*	max	
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_{CEO} = 100μA	25	—	—	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_I = 8V, I_C = 400mA	—	1.15	2.2	V
		V_I = 5V, I_C = 200mA	—	0.9	1.4	
I_I	Input current	V_I = 17V	0.3	0.8	1.8	mA
h_{FE}	DC amplification factor	V_{CE} = 4V, I_C = 400mA, Ta = 25°C	1000	4000	—	—

* : 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)

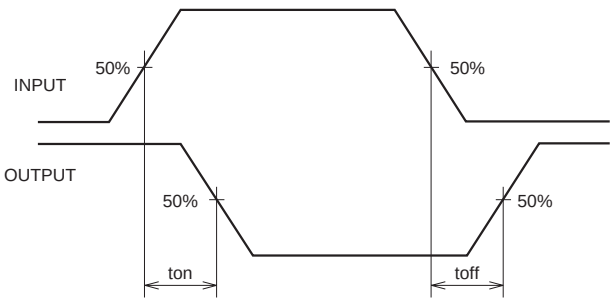
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
t_{on}	Turn-on time	C_L = 15pF (note 1)	—	40	—	ns
t_{off}	Turn-off time		—	500	—	ns

NOTE 1 TEST CIRCUIT



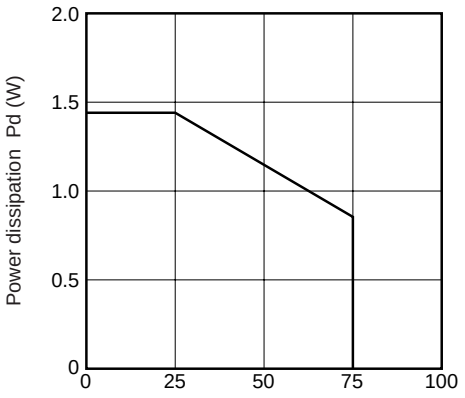
(1) Pulse generator (PG) characteristics : PRR = 1kHz, tw = 10μs, tr = 6ns, tf = 6ns, Z_O = 50Ω
V_P = $8V_{P-P}$
(2) Input-output conditions : R_L = 25Ω, V_O = 10V
(3) Electrostatic capacity C_L includes floating capacitance at connections and input capacitance at probes

TIMING DIAGRAM

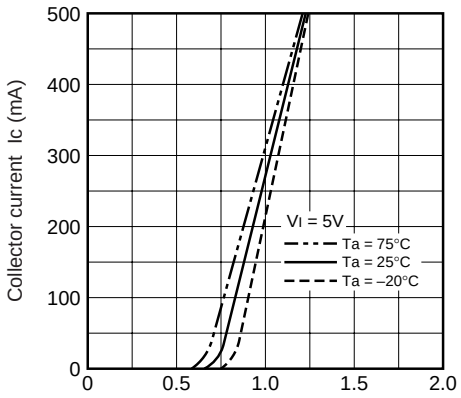


TYPICAL CHARACTERISTICS

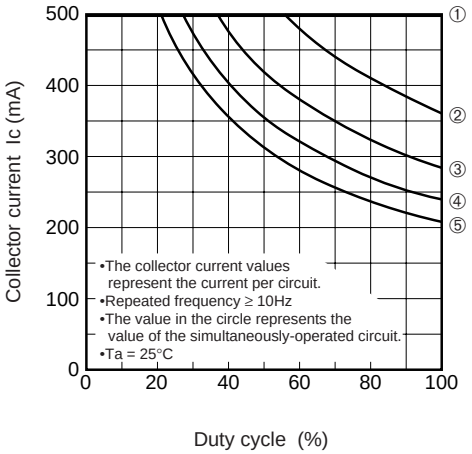
Thermal Derating Factor Characteristics



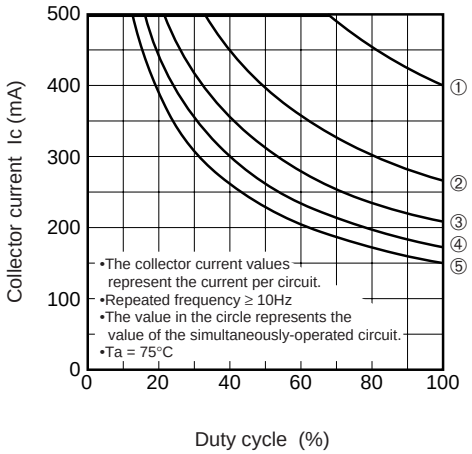
Output Saturation Voltage
Collector Current Characteristics



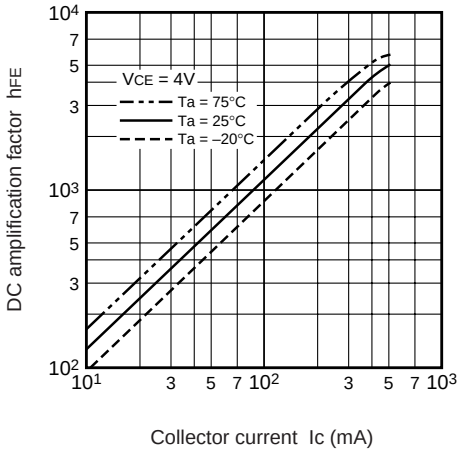
Duty-Cycle-Collector Characteristics



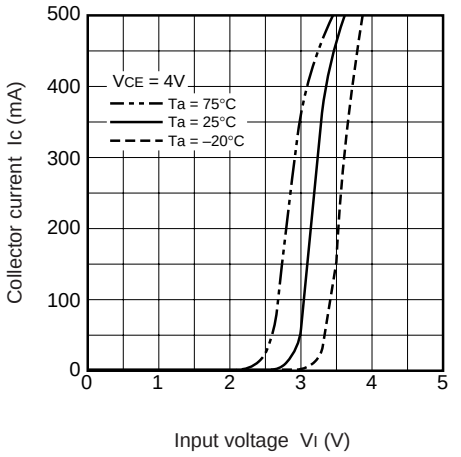
Duty-Cycle-Collector Characteristics



DC Amplification Factor
Collector Current Characteristics



Grounded Emitter Transfer Characteristics



Input Characteristics