M54519P/FP

7-UNIT 400mA DARLINGTON TRANSISTOR ARRAY

DESCRIPTION

M54519P and M54519FP are seven-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

- High breakdown voltage ($BV_{CEO} \geq 40V$)
- High-current driving (Ic(max) = 400mA)
- Driving available with PMOS IC output
- Wide operating temperature range (Ta = –20 to +75°C)

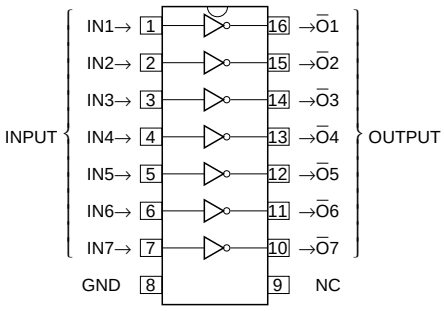
APPLICATION

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

FUNCTION

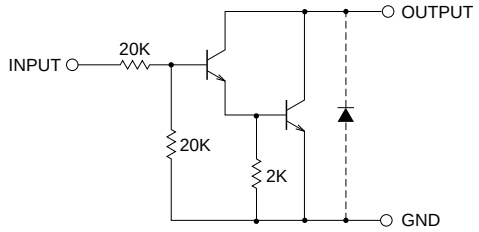
The M54519P and M54519FP each have seven circuits consisting of NPN Darlington transistors. These ICs have resistance of 20kΩ between input transistor bases and input pins. The output transistor emitters are all connected to the GND pin (pin 8).
Collector current is 400mA maximum. Collector-emitter supply voltage is 40V maximum.
The M54519FP is enclosed in a molded small flat package, enabling space-saving design.

PIN CONFIGURATION



Package type 16P4(P) 16P2N-A(FP) NC : No connection

CIRCUIT DIAGRAM



The seven 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 ~ +40	V
I_C	Collector current	Current per circuit output, L	400	mA
V_I	Input voltage		–0.5 ~ +40	V
P_d	Power dissipation	Ta = 25°C, when mounted on board	1.47(P)/1.00(FP)	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	—	40	V
I_C	Collector current (Current per 1 circuit when 7 circuits are coming on simultaneously)	Duty Cycle P : no more than 8% FP : no more than 6%	0	—	400	mA
		Duty Cycle P : no more than 30% FP : no more than 25%	0	—	200	
V_{IH}	"H" input voltage	$I_C \leq$ 400mA	8	—	30	V
		$I_C \leq$ 200mA	5	—		
V_{IL}	"L" input voltage		0	—	0.5	V

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

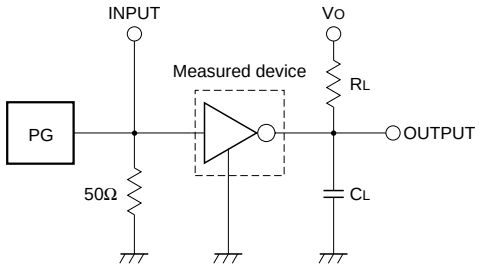
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ*	max	
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_{CEO} = 100μA	40	—	—	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_I = 8V, I_C = 400mA	—	1.3	2.4	V
		V_I = 5V, I_C = 200mA	—	1.0	1.6	
I_I	Input current	V_I = 17V	0.3	0.8	1.8	mA
h_{FE}	DC amplification factor	V_{CE} = 4V, I_C = 400mA, Ta = 25°C	1000	6000	—	—

* : 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)

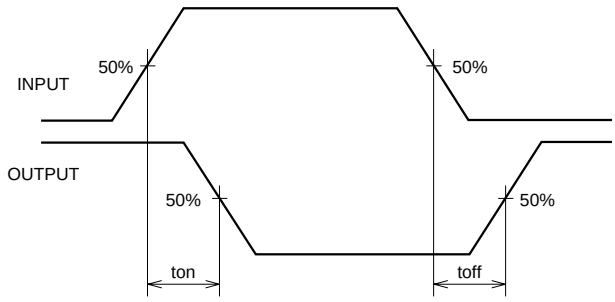
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
ton	Turn-on time	C_L = 15pF (note 1)	—	40	—	ns
toff	Turn-off time		—	400	—	ns

NOTE 1 TEST CIRCUIT



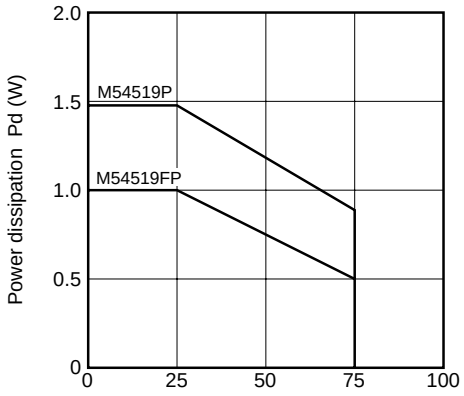
(1) Pulse generator (PG) characteristics : PRR = 1kHz, tw = 10μs, tr = 6ns, tf = 6ns, Z_O = 50Ω
V_P = $8V_{P-P}$
(2) Input-output conditions : R_L = 25Ω, V_O = 10V
(3) Electrostatic capacity C_L includes floating capacitance at connections and input capacitance at probes

TIMING DIAGRAM

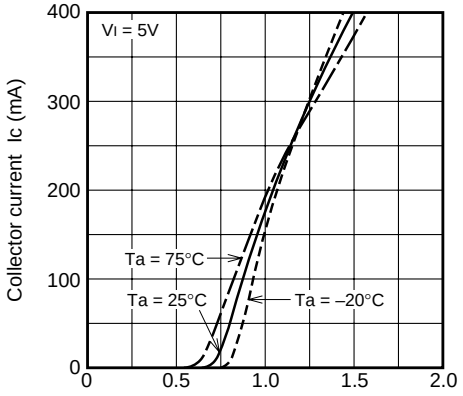


TYPICAL CHARACTERISTICS

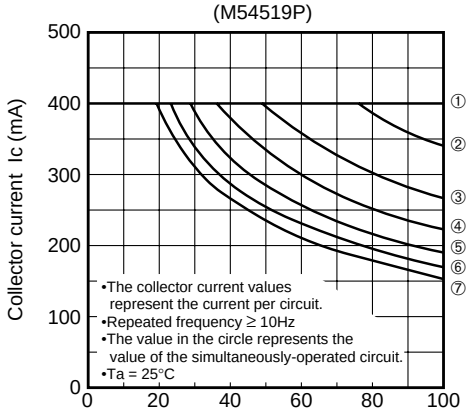
Thermal Derating Factor Characteristics



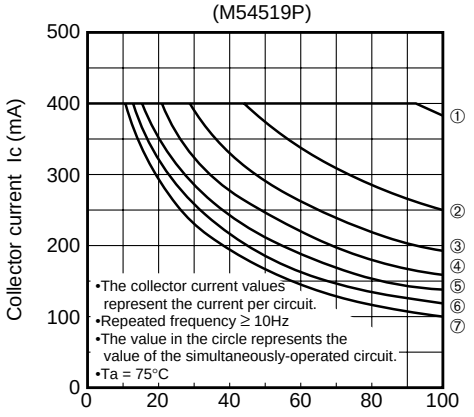
Output Saturation Voltage
Collector Current Characteristics



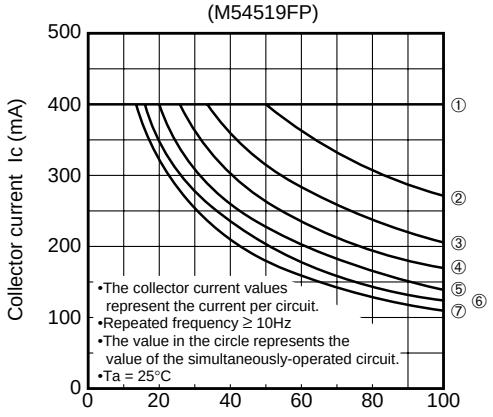
Duty-Cycle-Collector Characteristics
(M54519P)



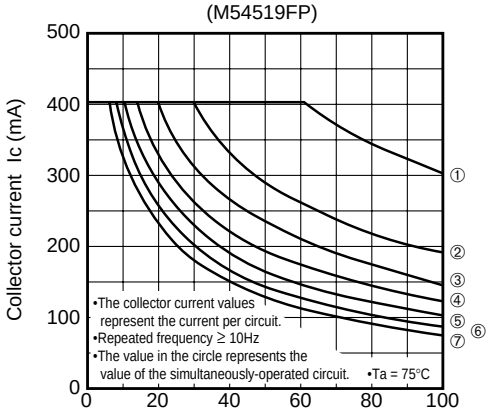
Duty-Cycle-Collector Characteristics
(M54519P)



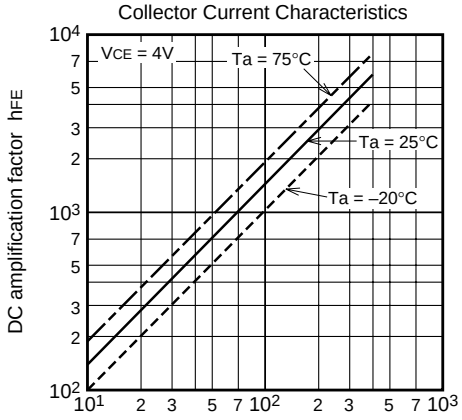
Duty-Cycle-Collector Characteristics
(M54519FP)



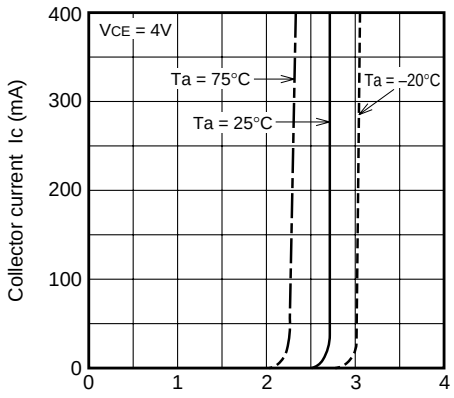
Duty-Cycle-Collector Characteristics
(M54519FP)



DC Amplification Factor
Collector Current Characteristics



Grounded Emitter Transfer Characteristics



Input Characteristics