M54537P/FP

7-UNIT 350mA TRANSISTOR ARRAY

DESCRIPTION

M54537P and M54537FP are seven-circuit 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 ($BV_{CEO} \geq 20V$)
- High-current driving (Ic(max) = 350mA)
- Driving available with PMOS IC output
- Low collector-emitter saturation voltage ($V_{CE(sat)}$ is 0.5V when I_C is 250mA)
- Wide operating temperature range (Ta = –20 to +75°C)

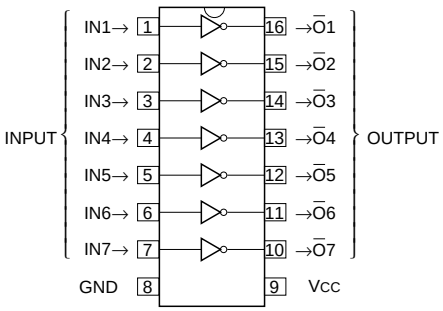
APPLICATION

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

FUNCTION

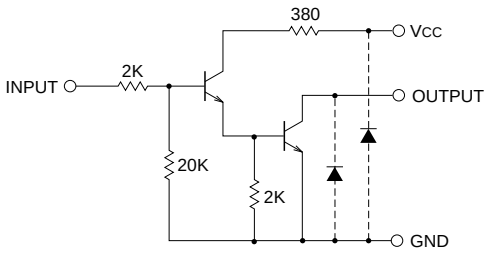
The M54537P and M54537FP each have seven circuits consisting of NPN transistors. Resistance of 2kΩ is connected to the inputs. The output transistor emitters are connected to the GND pin (pin 8). V_{CC} is connected to pin 9.
The collector current is 350 mA maximum. Collector-emitter supply voltage is 20V maximum.
The collector-emitter saturation voltage is as low as 0.5 V or even lower, when I_C is 250mA.
The M54537FP 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, Ta = –20 ~ +75°C)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage		10	V
V_{CEO}	Collector-emitter voltage	Output, H	–0.5 ~ +20	V
I_C	Collector current	Current per circuit output, L	350	mA
V_I	Input voltage		–0.5 ~ +10	V
Pd	Power dissipation	Ta = 25°C, when mounted on board	1.47(P)/1.00(FP)	W
Topr	Operating temperature		–20 ~ +75	°C
Tstg	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_{CC}	Supply voltage		3	—	8	V
V_O	Output voltage		0	—	20	V
I_C	Collector current (Current per 1 circuit when 7 circuits are coming on simultaneously)	V_{CC} = 6.5V, Duty Cycle P : no more than 40% FP : no more than 25%	0	—	250	mA
		V_{CC} = 6.5V, Duty Cycle P : no more than 60% FP : no more than 40%	0	—	150	
V_{IH}	"H" input voltage		3	—	6	V
V_{IL}	"L" input voltage		0	—	0.3	V

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

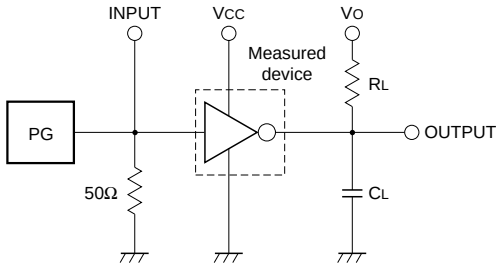
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ*	max	
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	V_{CC} = 8V, I_{CEO} = 100μA	20	—	—	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_I = 3V, V_{CC} = 6.5V, I_C = 250mA	—	0.28	0.5	V
		V_I = 3V, V_{CC} = 3V, I_C = 150mA	—	0.17	0.35	
I_I	Input current	V_{CC} = 8V, V_I = 3.2V	—	0.7	1.5	mA
		V_{CC} = 8V, V_I = 8V	—	2.9	5.6	
I_{CC}	Supply current (one circuit coming on)	V_{CC} = 8V, V_I = 3.2V	—	17	27	mA
h_{FE}	DC amplification factor	V_{CE} = 4V, V_{CC} = 6.5V, I_C = 250mA, Ta = 25°C	1000	7000	—	—

* : 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)

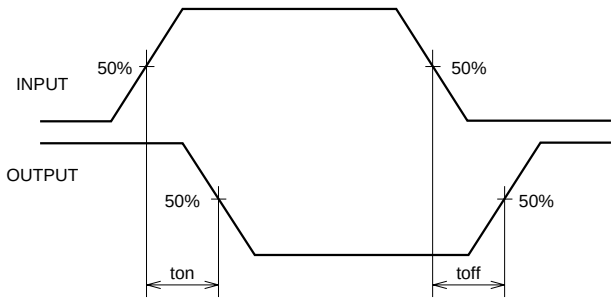
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
t_{on}	Turn-on time	C_L = 15pF (note 1)	—	15	—	ns
t_{off}	Turn-off time		—	840	—	ns

NOTE 1 TEST CIRCUIT



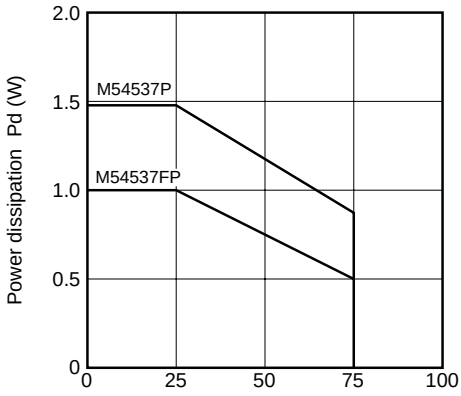
(1) Pulse generator (PG) characteristics : PRR = 1kHz, tw = 10μs, tr = 6ns, tf = 6ns, Z_O = 50Ω
V_P = $3V_{P-P}$
(2) Input-output conditions : R_L = 40Ω, V_O = 10V, V_{CC} = 6.5V
(3) Electrostatic capacity C_L includes floating capacitance at connections and input capacitance at probes

TIMING DIAGRAM

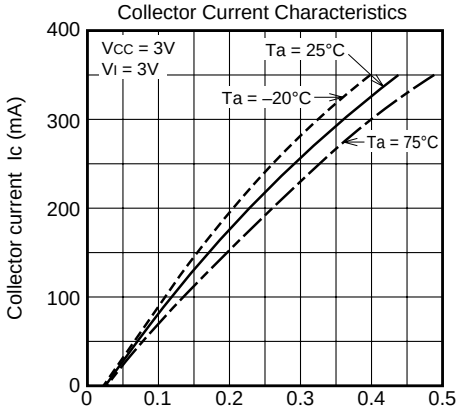


TYPICAL CHARACTERISTICS

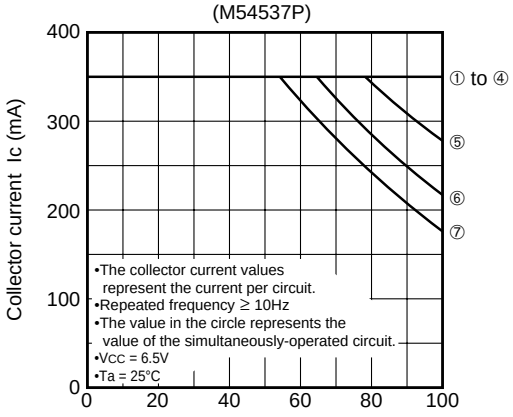
Thermal Derating Factor Characteristics



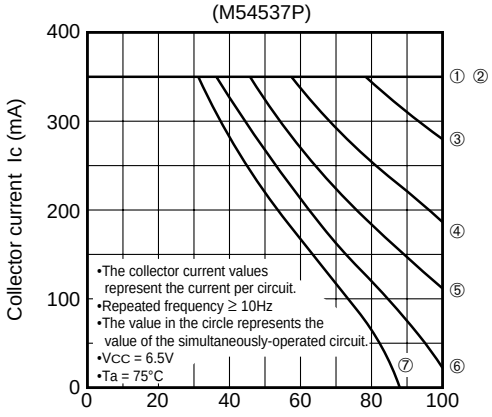
Output Saturation Voltage
Collector Current Characteristics



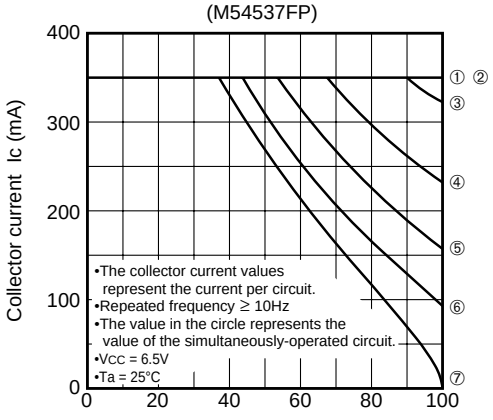
Duty-Cycle-Collector Characteristics
(M54537P)



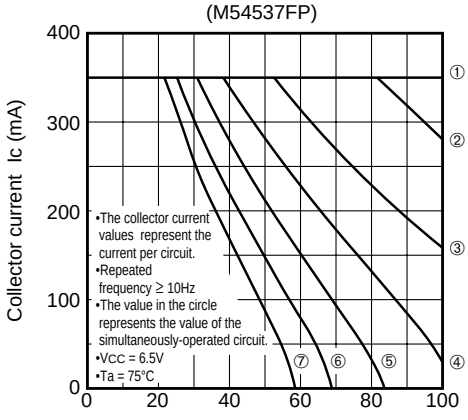
Duty-Cycle-Collector Characteristics
(M54537P)



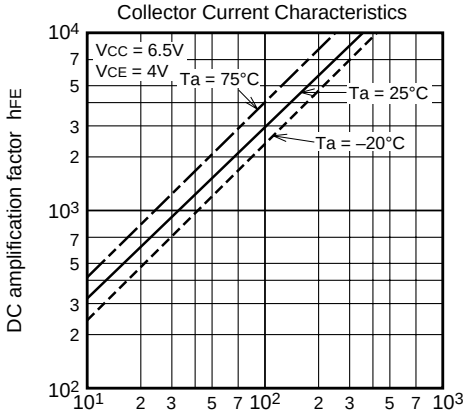
Duty-Cycle-Collector Characteristics
(M54537FP)



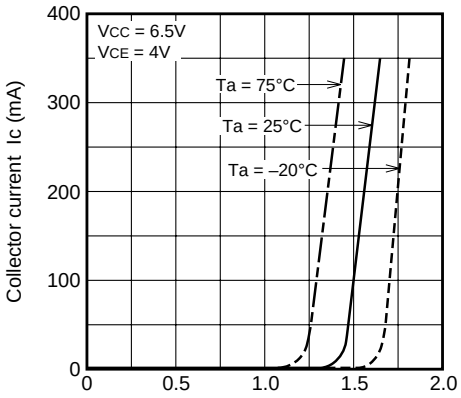
Duty-Cycle-Collector Characteristics
(M54537FP)



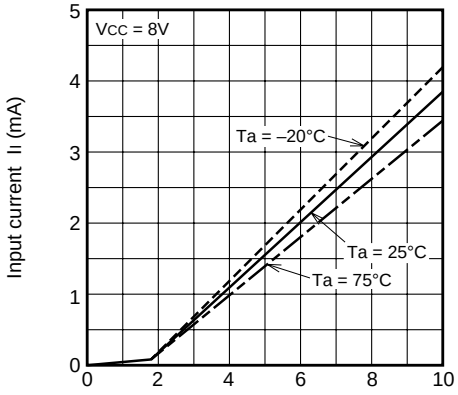
DC Amplification Factor
Collector Current Characteristics



Grounded Emitter Transfer Characteristics



Input Characteristics



Supply Current Characteristics