M54514AP/AFP

7-UNIT 50mA TRANSISTOR ARRAY

DESCRIPTION

M54514AP and M54514AFP 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 ($BV_{CEO} \geq 20V$)
- Synchronizing current (Ic(max) = 50mA)
- Low output saturation voltage
- Wide operating temperature range (Ta = –20 to +75°C)

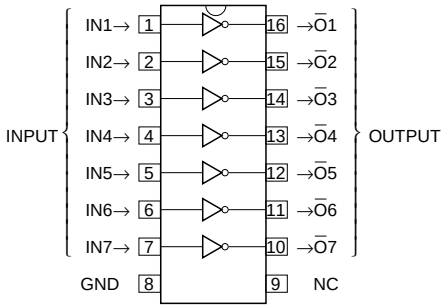
APPLICATION

Driving of digit drives of indication elements (LEDs and lamps) with small signals

FUNCTION

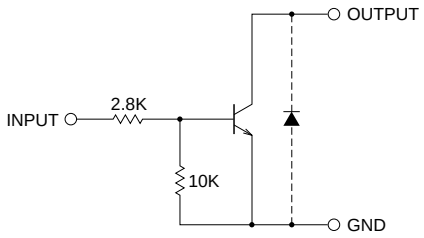
The M54514AP and M54514AFP each have seven circuits consisting of NPN transistors. The transistor emitters are all connected to the GND pin (pin 8).
The transistors allow synchronous flow of 50mA collector current. A maximum of 20V voltage can be applied between the collector and emitter.
The M54514FP 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 ~ +20	V
I_C	Collector current	Current per circuit output, L	50	mA
V_I	Input voltage		–0.5 ~ +10	V
P_d	Power dissipation	Ta = 25°C, when mounted on board	1.47(AP)/1.00(AFP)	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	—	20	V
I_C	Collector current	0	—	40	mA
V_{IH}	"H" input voltage	2.4	—	8	V
V_{IL}	"L" input voltage	0	—	0.2	V

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

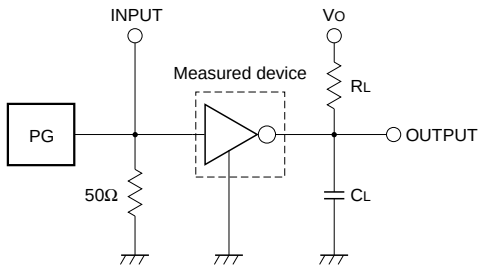
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ*	max	
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_{CEO} = 20μA	20	—	—	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_I = 2.4V, I_C = 20mA	—	0.04	0.17	V
		V_I = 2.4V, I_C = 40mA	—	0.08	0.23	
I_I	Input current	V_I = 2.4V	—	0.7	1.1	mA
h_{FE}	DC amplification factor	V_{CE} = 4V, I_C = 40mA, Ta = 25°C	80	200	—	—

* : 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)

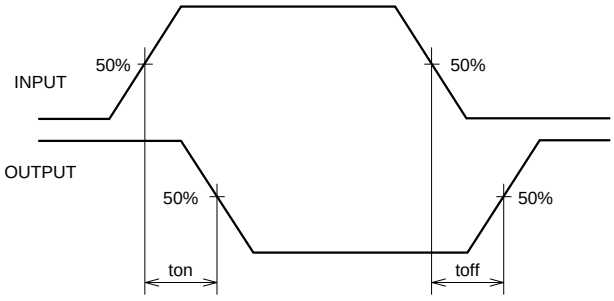
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
t_{on}	Turn-on time	C_L = 15pF (note 1)	—	85	—	ns
t_{off}	Turn-off time		—	460	—	ns

NOTE 1 TEST CIRCUIT



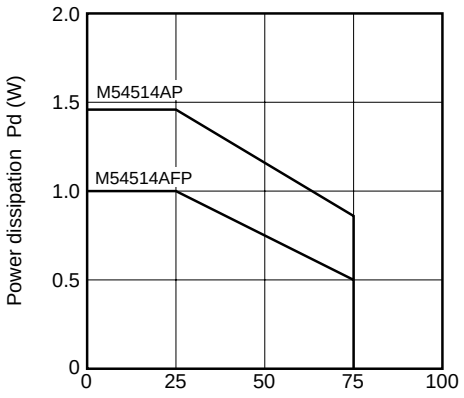
(1) Pulse generator (PG) characteristics : PRR = 1kHz, tw = 10μs, tr = 6ns, tf = 6ns, Z_O = 50Ω
V_P = 2.4V_{P-P}
(2) Output conditions : R_L = 250Ω, V_O = 10V
(3) Electrostatic capacity C_L includes floating capacitance at connections and input capacitance at probes

TIMING DIAGRAM

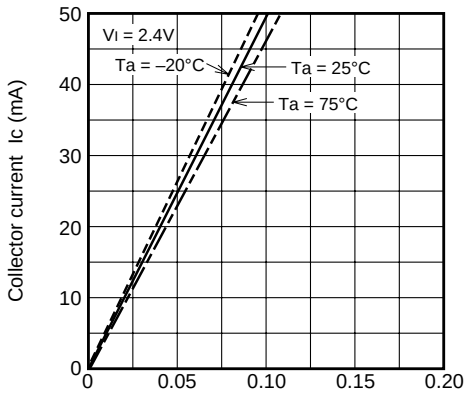


TYPICAL CHARACTERISTICS

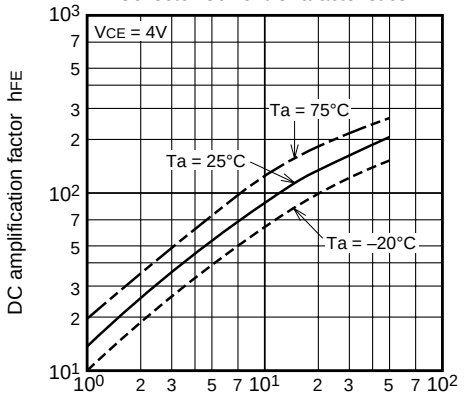
Thermal Derating Factor Characteristics



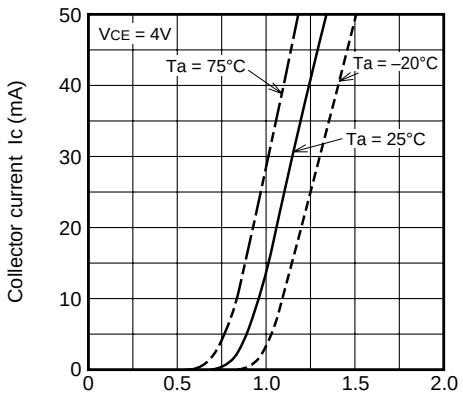
Output Saturation Voltage
Collector Current Characteristics



DC Amplification Factor
Collector Current Characteristics



Grounded Emitter Transfer Characteristics



Input Characteristics