M54577P

7-UNIT 30mA TRANSISTOR ARRAY

DESCRIPTION

M54577P is seven-circuit transistor arrays. The circuits are made of NPN transistors. The semiconductor integrated circuits perform high-current driving with extremely low input-current supply.

FEATURES

- Medium breakdown voltage ($BV_{CEO} \geq 30V$)
- Output sink current ($I_{C(max)} = 30mA$)
- Driving available with MOS (PMOS, CMOS) IC output
- Low output saturation voltage ($V_{CE(sat)} = 0.35V$ at $I_C = 20mA$)
- Wide operating temperature range (Ta = –20 to +75°C)

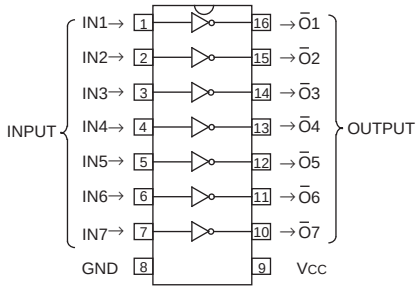
APPLICATION

Driving of digit drives of indication elements (LEDs and lamps)

FUNCTION

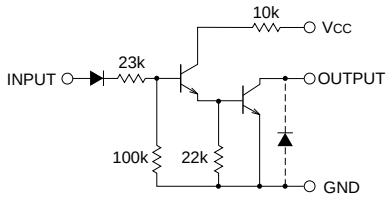
The M54577P has seven circuits consisting of NPN transistor. This I_C uses a predriver stage with a diode and 23kΩ resistor in series to input. The output transistor emitters are all connected to the GND pin (pin 8), and V_{CC} is connected to pin 9. The collector current are capable of sinking 30mA maximum. Collector-emitter supply voltage is 30V maximum. Collector-emitter saturation voltage is below 0.35V (I_C = 20mA) Drives active “H” input.

PIN CONFIGURATION



Package type 16P4(P)

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		13	V
V_{CEO}	Collector-emitter voltage	Output, H	–0.5 ~ +30	V
I_C	Collector current	Current per circuit output, L	30	mA
V_I	Input voltage		–20 ~ V_{CC}	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_{CC}	Supply voltage	4.5	5	13	V
I_C	Collector current (Current per 1 circuit)	0	10	20	mA
V_{IH}	"H" input voltage	3	—	V_{CC}	V
V_{IL}	"L" input voltage	0	—	1	V

ELECTRICAL CHARACTERISTICS (Unless otherwise noted, Ta = 25°C)

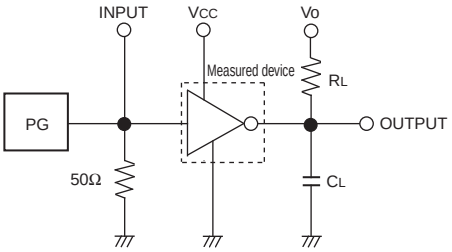
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ*	max	
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_{CEO} = 100μA	30	—	—	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_{CC} = 4.5V, V_I = 3V, I_C = 10mA	—	—	0.25	V
		V_{CC} = 6V, V_I = 3V, I_C = 20mA	—	—	0.35	
I_I	Input current	V_{CC} = 4.5V, V_I = 3V	30	—	90	μA
I_{CC}	Supply current (Only one time operation)	V_{CC} = 4.5V, V_I = 3V	—	0.4	0.9	mA
		V_{CC} = 13V, V_I = 3V	—	1.3	2.3	
h_{FE}	DC amplification factor	V_{CE} = 4V, V_{CC} = 4.5V, I_C = 20mA, Ta = 25°C	500	1200	—	—

* : 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)

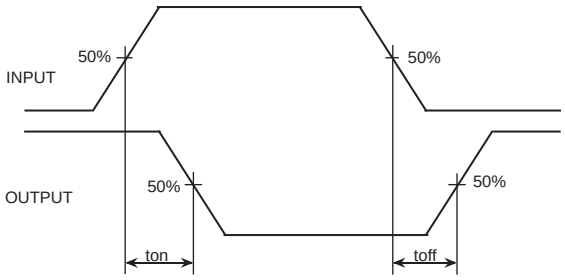
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
t_{on}	Turn-on time	C_L = 15pF (note 1)	—	210	—	ns
t_{off}	Turn-off time		—	3200	—	ns

NOTE 1 TEST CIRCUIT



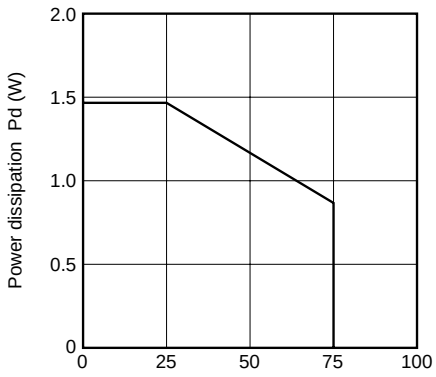
(1)Pulse generator (PG) characteristics : PRR=1kHz, tw = 10μs, tr = 6ns, tf = 6ns, Zo = 50Ω, V_P = $3V_{P-P}$
(2)Input-output conditions : R_L = 500Ω, Vo = 10V, V_{CC} = 6V
(3)Electrostatic capacity C_L includes floating capacitance at connections and input capacitance at probes

TIMING DIAGRAM

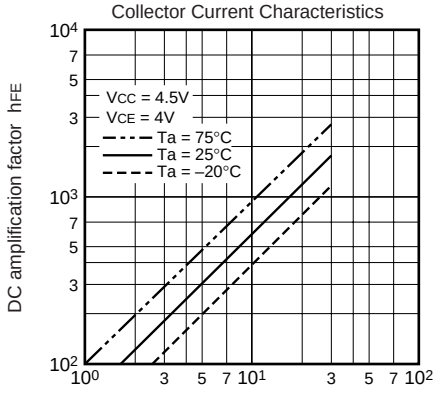


TYPICAL CHARACTERISTICS

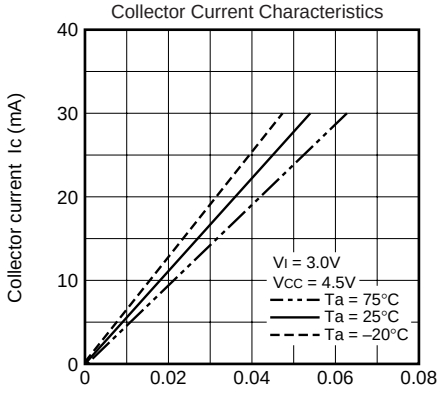
Thermal Derating Factor Characteristics



DC Amplification Factor
Collector Current Characteristics



Output Saturation Voltage
Collector Current Characteristics



Grounded Emitter Transfer Characteristics