POWEREX

M54585KP

8-UNIT 500mA DARLINGTON TRANSISTOR-ARRAY WITH CLAMP DIODE

DESCRIPTION

M54585KP is eight-circuit Darlington transistor arrays with clamping diodes. 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 ($BV_{CEO} \geq 50V$)
- High-current driving ($I_{C(max)}$ = 500mA)
- With clamping diodes
- Driving available with TTL output or with PMOS IC output
- With shrink small outline package

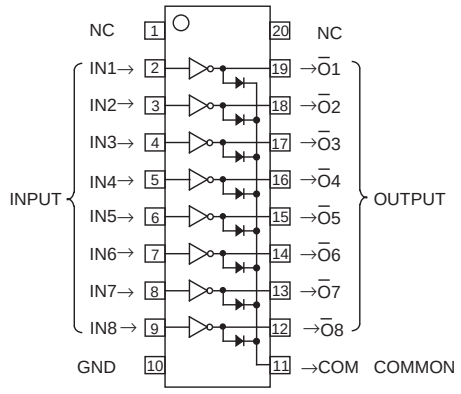
APPLICATION

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

FUNCTION

The M54585KP has eight circuits, which are NPN Darlington transistors. Input transistors have resistance of 2.7kΩ between the base and input pin. A spike-killer clamping diode is provided between each output pin and GND. Output transistor emitters are all connected to the GND pin.
Collector current is 500mA maximum. The maximum collector-emitter voltage is 50V.

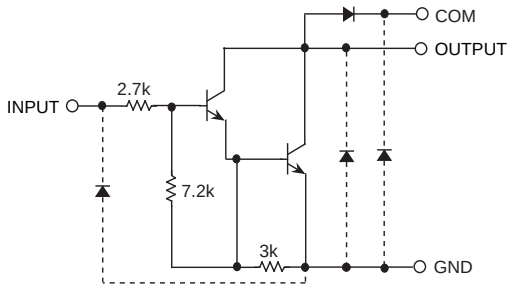
PIN CONFIGURATION



NC : No connection

Package type 20P2E-A

CIRCUIT DIAGRAM



The eight circuits share the COM 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_{CEO}	Collector-emitter voltage	Output, H	–0.5 ~ +50	V
I_C	Collector current	Current per circuit output, L	500	mA
V_I	Input voltage		–0.5 ~ +30	V
I_F	Clamping diode forward current		500	mA
V_R	Clamping diode reverse voltage		50	V
P_d	Power dissipation	Ta = 25°C, when mounted on board	0.68	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	—	50	V
I_C	Collector current (Current per 1 circuit when 8 circuits are coming on simultaneously)	Duty Cycle ≤ 10%	0	—	200	mA
		Duty Cycle ≤ 50%	0	—	70	
V_{IH}	"H" input voltage	I_C ≤ 400mA	3.85	—	30	V
		I_C ≤ 200mA	3.4	—	30	V
V_{IL}	"L" input voltage		0	—	0.6	V

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

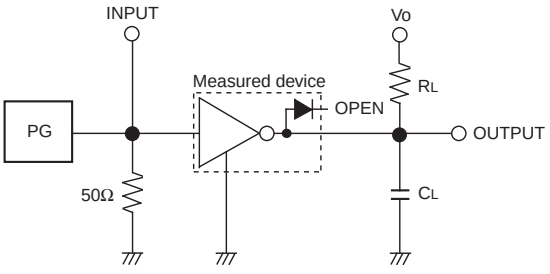
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ*	max	
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_{CEO} = 100μA	50	—	—	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_I = 3.85V, I_C = 400mA	—	1.3	2.4	V
		V_I = 3.4V, I_C = 200mA	—	1.0	1.6	
I_I	Input current	I_I = 3.85V	—	0.95	1.8	mA
		V_I = 25V	—	8.7	18	
V_F	Clamping diode forward voltage	I_F = 400mA	—	1.5	2.4	V
I_R	Clamping diode reverse current	V_R = 50V	—	—	100	μA
h_{FE}	DC amplification factor	V_{CE} = 4V, I_C = 350mA, Ta = 25°C	1000	2500	—	—

∗ : 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)

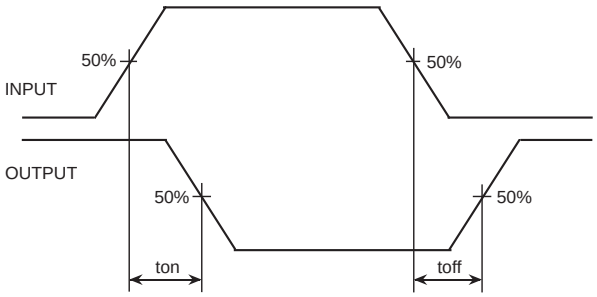
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
t_{on}	Turn-on time	C_L = 15pF (note 1)	—	12	—	ns
t_{off}	Turn-off time		—	240	—	ns

NOTE 1 TEST CIRCUIT



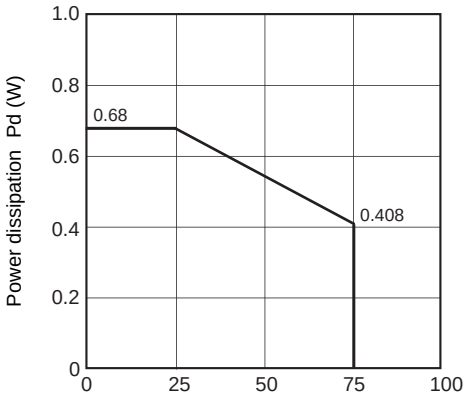
(1)Pulse generator (PG) characteristics : PRR = 1kHz, tw = 10μs, tr = 6ns, tf = 6ns, Zo = 50Ω, V_I = 3.85V
(2)Input-output conditions : R_L = 25Ω, Vo = 10V
(3)Electrostatic capacity C_L includes floating capacitance at connections and input capacitance at probes

TIMING DIAGRAM

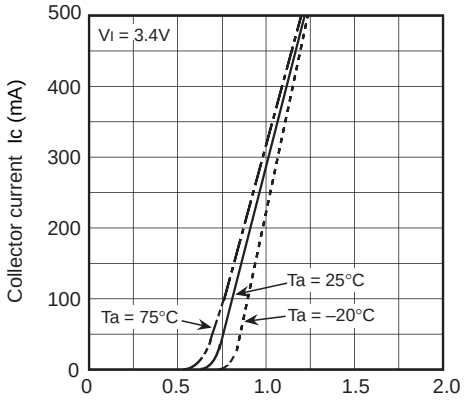


TYPICAL CHARACTERISTICS

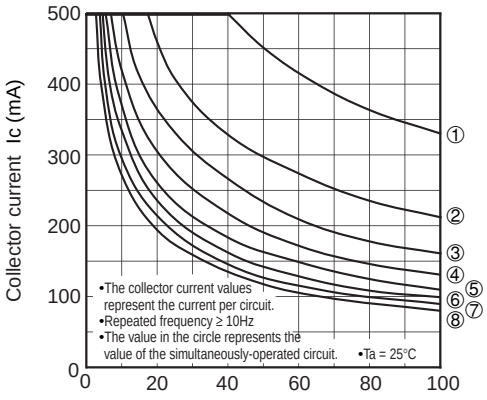
Thermal Derating Factor Characteristics



Output Saturation Voltage
Collector Current Characteristics



Duty Cycle-Collector Characteristics



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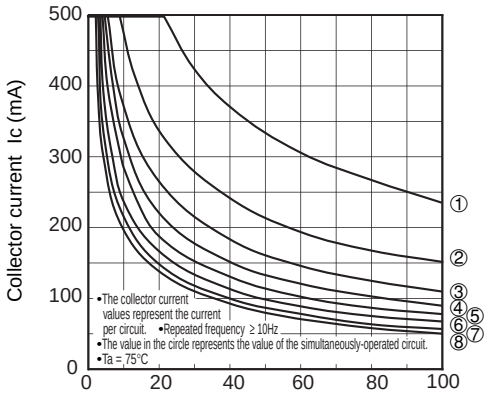
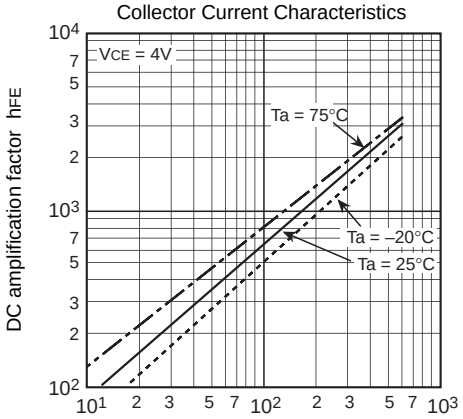
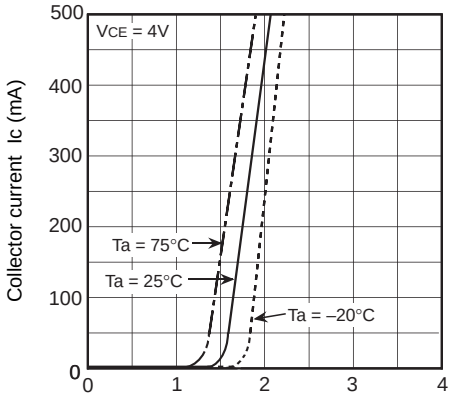


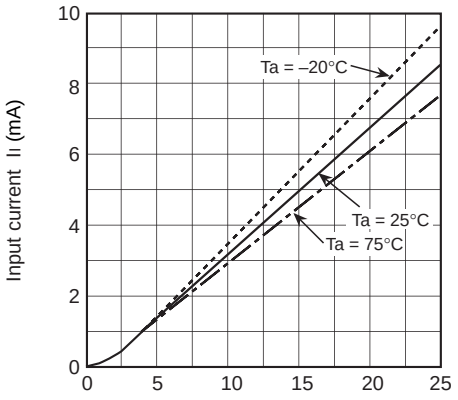
DC Amplification Factor
Collector Current Characteristics



Grounded Emitter Transfer Characteristics



Input Characteristics



Clamping Diode Characteristics