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M63836FP/KP

PRELIMINARY
Notice: This is not a final specification.
Some parametric limits are subject to change.

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

DESCRIPTION

The M63836FP/KP 8-channel sinkdriver, consists of 8 PNP and 16 NPN transistors connected to from eight high current gain driver pairs.

FEATURES

- High breakdown voltage ($BV_{CEO} \geq 50V$)
- High-current driving ($I_{C(max)}$ = 500mA)
- 3V micro computer compatible input
- "L" active level input
- With input diode
- With clamping diodes
- Wide operating temperature range (Ta = –40 to +85°C)

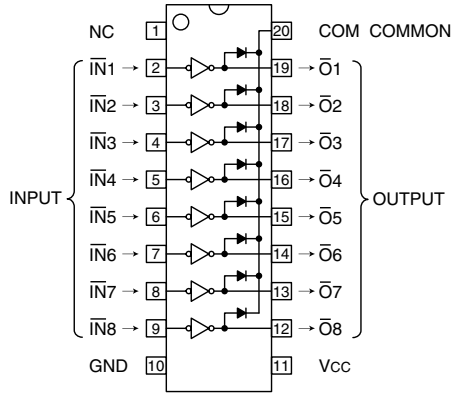
APPLICATION

Output for 3 voltage microcomputer series and interface with high voltage system. Relay and small printer driver, LED, or incandescent display digit driver.

FUNCTION

The M63836FP/KP is transistor-array of high active level eight units type which can do direct drive of 3 voltage microcomputer series. A resistor of 3.5kΩ is connected between the input and the base of PNP transistors. A clamp diode for inductive load transient suppression is connected for the output pin (collector) and COM pin. The input diode is intended to prevent the flow of current from the input to the Vcc. without this diode, the current flows from "H" input to the Vcc and the "L" input circuit is activated, in such a case where one of the inputs of the 8 circuit is "H" and the other are "L" to save power consumption. The diode is inserted to prevent such mis-operation. The outputs are capable of driving 500mA and are rated for operation with output voltage up to 50V.

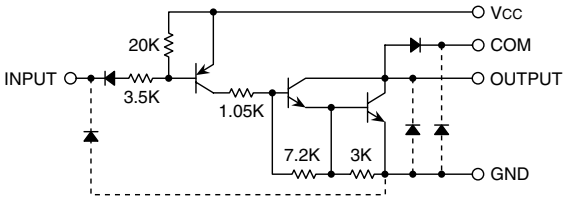
PIN CONFIGURATION



Package type 20P2N-A(FP)
20P2E-A(KP)

NC : No connection

CIRCUIT DIAGRAM



The eight circuits share the Vcc, 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 = –40 ~ +85°C)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage		7	V
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 ~ V_{CC}	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	1.10(FP)/0.68(KP)	W
T_{opr}	Operating temperature		–40 ~ +85	°C
T_{stg}	Storage temperature		–55 ~ +125	°C

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RECOMMENDED OPERATING CONDITIONS (Unless otherwise noted, Ta = –40 ~ +85°C)

Symbol	Parameter		Limits			Unit
			min	typ	max	
V_{CC}	Supply voltage		2.7	3.0	3.6	V
I_C	Collector current (Current per 1 circuit when 8 circuits are coming on simultaneously)	Duty Cycle FP : no more than 4% KP : no more than 2%	0	—	400	mA
		Duty Cycle FP : no more than 15% KP : no more than 6%	0	—	200	
V_{IH}	"H" input voltage		V_{CC}-0.5	—	V_{CC}	V
V_{IL}	"L" input voltage		0	—	V_{CC}-2.2	V

ELECTRICAL CHARACTERISTICS (Unless otherwise noted, Ta = –40 ~ +85°C)

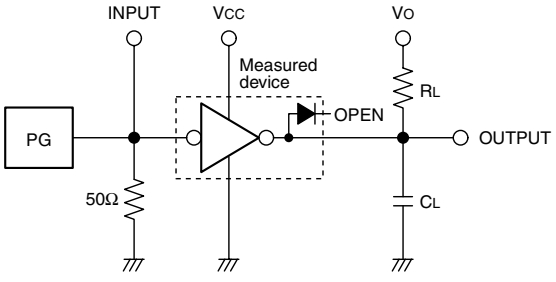
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ*	max	
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_{CEO} = 100μA	50	—	—	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_{CC} = 2.7V, V_I = 0.5V, I_C = 400mA	—	1.15	2.4	V
		V_{CC} = 2.7V, V_I = 0.5V, I_C = 200mA	—	0.93	1.6	
I_I	Input current	V_I = V_{CC}-2.2V	—	–220	–600	μA
V_F	Clamping diode forward volltage	I_F = 400mA	—	1.4	2.4	V
I_R	Clamping diode reverse current	V_R = 50V	—	0.1	100	μA
I_{CC}	Supply current (AN only Input)	V_{CC} = 3.6V, V_I = 0.5V	—	2.6	4.0	mA
h_{FE}	DC amplification factor	V_{CC} = 2.7V, V_{CE} = 2V, I_C = 0.35A, Ta = 25°C	2000	10000	—	—

✻ : Typical values are at Ta = 25°C

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

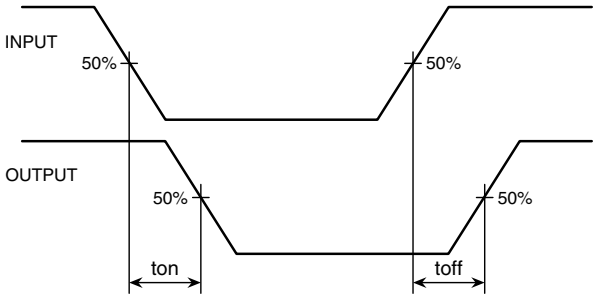
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
t_{on}	Turn-on time	C_L = 15pF (note 1)	—	120	—	ns
t_{off}	Turn-off time		—	4500	—	ns

NOTE 1 TEST CIRCUIT



(1)Pulse generator (PG) characteristics : PRR=1kHz,
tw = 10μs, tr = 6ns, tf = 6ns, Zo = 50Ω
V_I = 0.5 ~ 2.7V
(2)Input-output conditions : R_L = 30Ω, Vo = 10V, V_{CC} = 2.7V
(3)Electrostatic capacity C_L includes floating capacitance
at connections and input capacitance at probes

TIMING DIAGRAM



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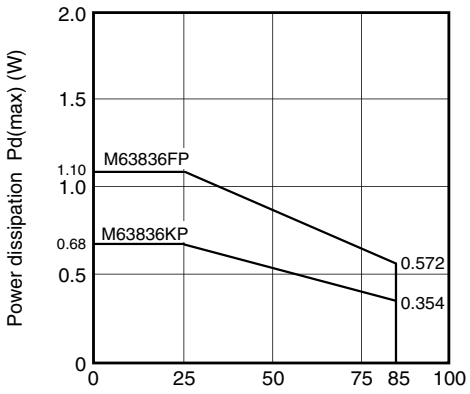
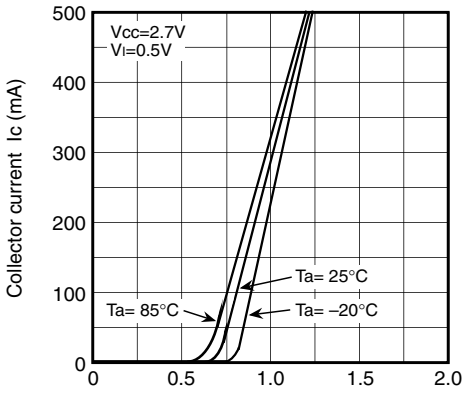
TYPICAL CHARACTERISTICS

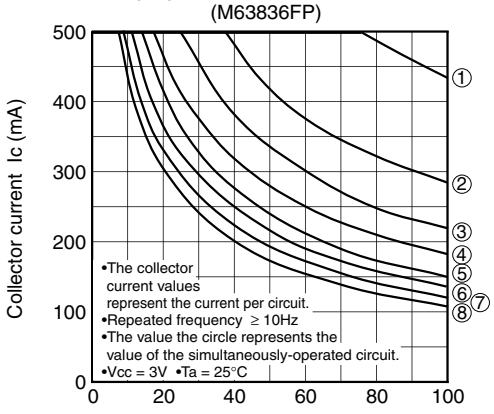
Thermal Derating Factor Characteristics



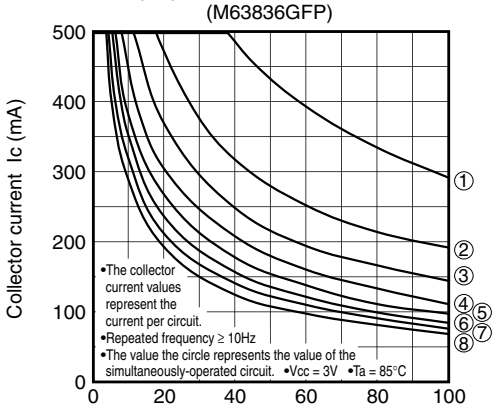
Output Saturation Voltage
Collector Current Characteristics



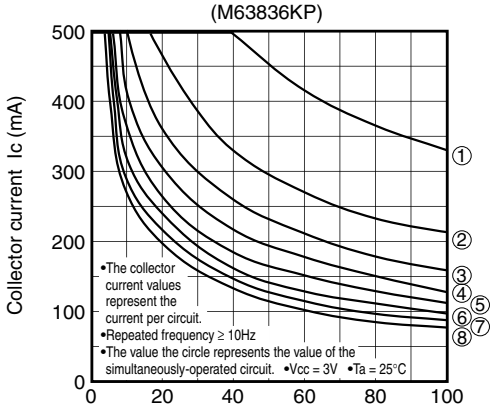
Duty Cycle-Collector Characteristics
(M63836FP)



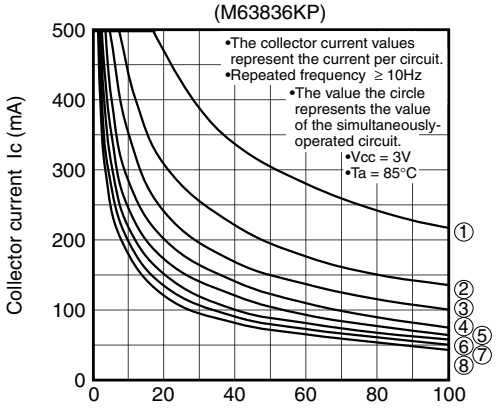
Duty Cycle-Collector Characteristics
(M63836GFP)



Duty Cycle-Collector Characteristics
(M63836KP)



Duty Cycle-Collector Characteristics
(M63836KP)



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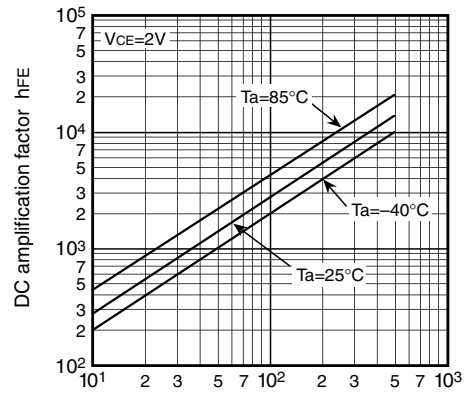
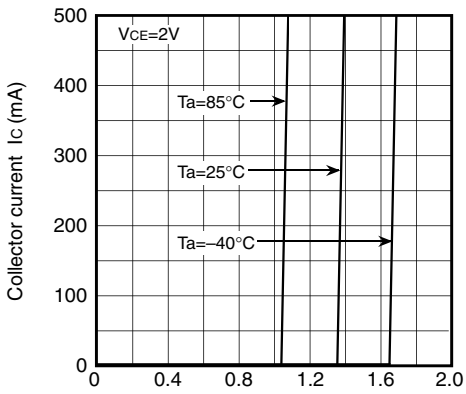
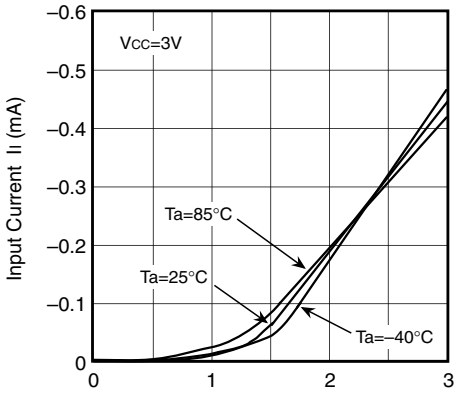
DC Amplification Factor
Collector Current Characteristics



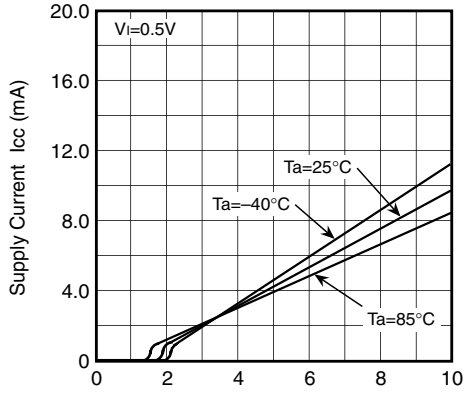
Output Current Characteristics



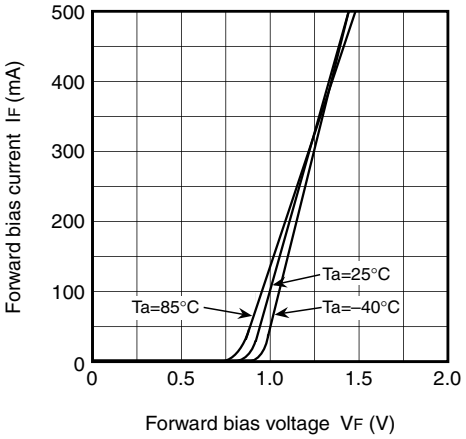
Input Characteristics



Driver Supply Characteristics



Clamping Diode Characteristics



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