M63830P/FP

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

4-UNIT 1.5A DARLINGTON TRANSISTOR-ARRAY WITH CLAMP DIODE

DESCRIPTION

The M63830P/FP 4-channel sinkdriver, consists of 4 PNP and 8 NPN transistors connected to from four high current gain driver pairs.

FEATURES

- High breakdown voltage ($BV_{CEO} \geq 50V$)
- High-current driving ($I_{C(max)} = 1.5A$)
- 3V micro computer series compatible input
- With clamping diodes
- With input diode
- Wide operating temperature range (Ta = –40 to +85°C)

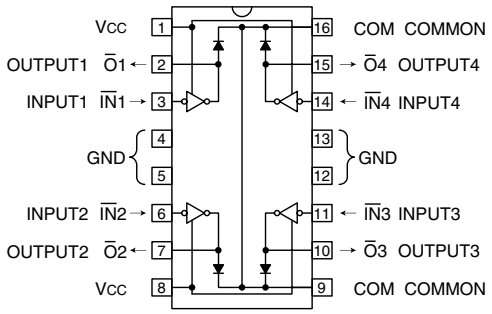
APPLICATION

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

FUNCTION

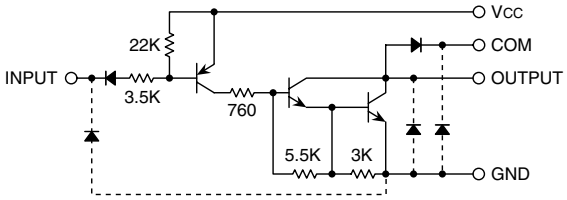
The M63830FP/P is transistor-array of high active level four units type which can do direct drive of 3 voltage microcomputer series. A resistor of 3.5kΩ is connected between the input and the base of PNP transistors. A clamp diode for inductive load transient suppression is connected for the output pin (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 4 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 1.5A and are rated for operation with output voltage up to 50V.

PIN CONFIGURATION



16P4(P)
Package type 16P2N-A(FP)

CIRCUIT DIAGRAM



The four 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 = –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	1.5	A
V_I	Input voltage		–0.5 ~ V_{CC}	V
V_R	Clamping diode reverse voltage		50	V
I_F	Clamping diode forward current	Pulse width ≤ 10ms, duty cycle ≤ 5%	1.5	A
		Pulse width ≤ 100ms, duty cycle ≤ 5%	1.0	
P_d	Power dissipation	Ta = 25°C, when mounted on board	1.92(P)/1.00(FP)	W
T_{opr}	Operating temperature		–40 ~ +85	°C
T_{stg}	Storage temperature		–55 ~ +125	°C

MITSUBISHI ELECTRIC

M63830P/FP

4-UNIT 1.5A DARLINGTON TRANSISTOR-ARRAY WITH CLAMP DIODE

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
V_O	Output voltage		0	—	50	V
I_C	Collector current (Current per 1 circuit when 4 circuits are coming on simultaneously)	V_{CC} = 3V, Duty Cycle P : no more than 5% FP : no more than 2%	0	—	1.25	A
		V_{CC} = 3V, Duty Cycle P : no more than 15% FP : no more than 7%	0	—	0.7	
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)

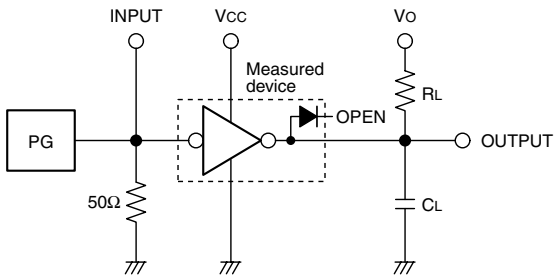
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ*	max	
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_{CEO} = 100μA	50	—	—	V
I_{CC}	Supply current (AN only Input)	V_{CC} = 3.6V, V_I = 0.5V	—	3.7	5.0	mA
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_{CC} = 2.7V, V_I = 0.5V, I_C = 1.25A	—	1.4	2.2	V
		V_{CC} = 2.7V, V_I = 0.5V, I_C = 0.7A	—	1.0	1.7	
I_I	Input current	V_I = V_{CC}-2.2V	—	–0.22	–0.6	mA
		V_I = V_{CC}-3.6V	—	–0.60	–0.95	
I_R	Clamping diode reverse current	V_R = 50V	—	—	100	μA
V_F	Clamping diode forward volltage	I_F = 1.25A, V_{CC} open	—	1.5	2.3	V
h_{FE}	DC amplification factor	V_{CC} = 2.7V, V_{CE} = 2V, I_C = 1A, Ta = 25°C	4000	30000	—	—

✻ : Typical values are at Ta = 25°C

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

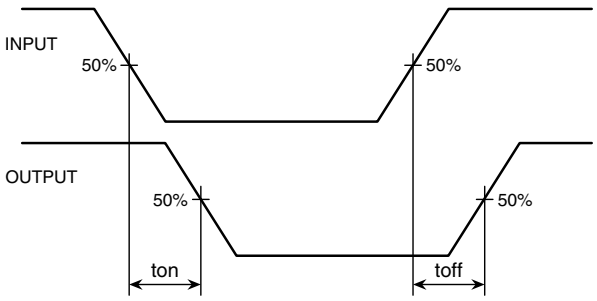
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
t_{on}	Turn-on time	C_L = 15pF (note 1)	—	190	—	ns
t_{off}	Turn-off time		—	5300	—	ns

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 = 8.3Ω, Vo = 10V, Vcc = 2.7V
(3)Electrostatic capacity C_L includes floating capacitance at connections and input capacitance at probes

TIMING DIAGRAM



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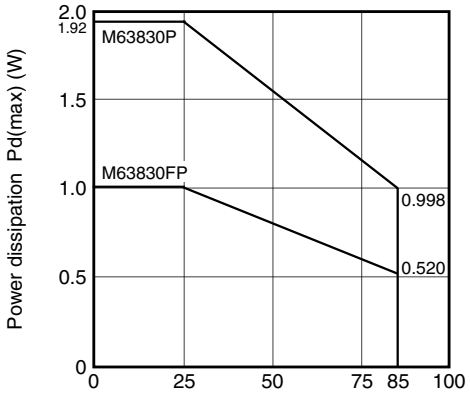
M63830P/FP

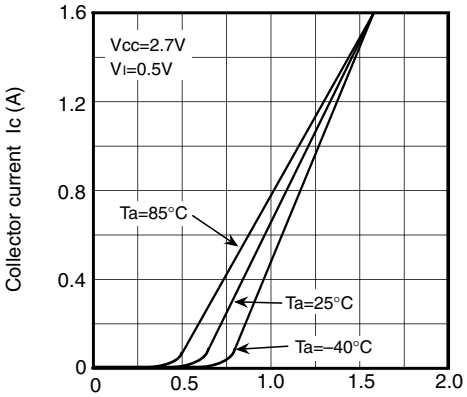
4-UNIT 1.5A DARLINGTON TRANSISTOR-ARRAY WITH CLAMP DIODE

TYPICAL CHARACTERISTICS

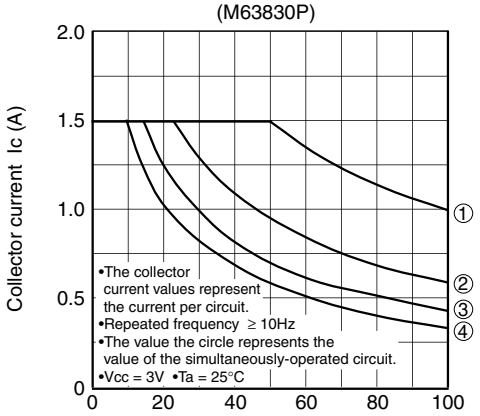
Thermal Derating Factor Characteristics



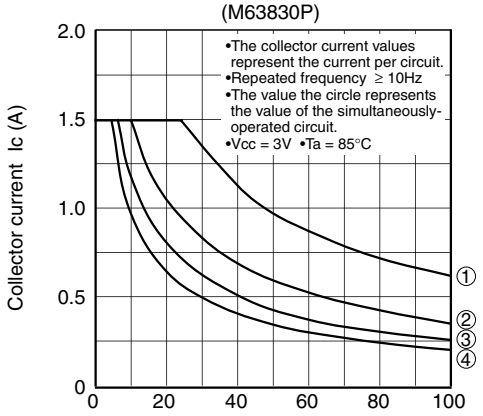
Output Saturation Voltage
Collector Current Characteristics



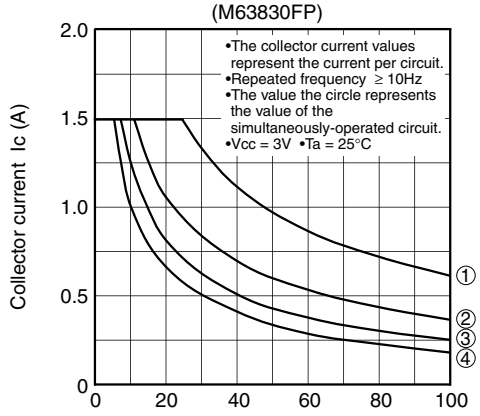
Duty Cycle-Collector Characteristics
(M63830P)



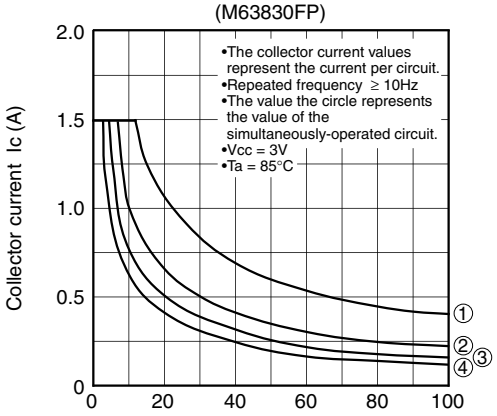
Duty Cycle-Collector Characteristics
(M63830P)



Duty Cycle-Collector Characteristics
(M63830FP)



Duty Cycle-Collector Characteristics
(M63830FP)



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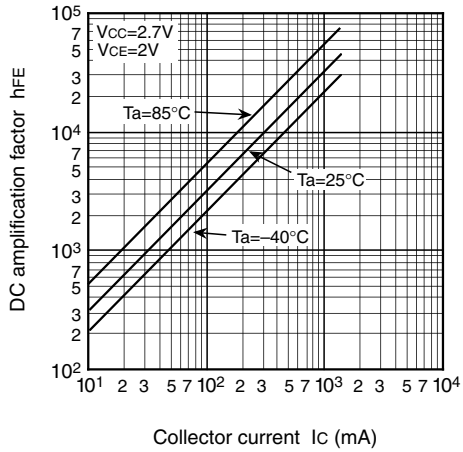
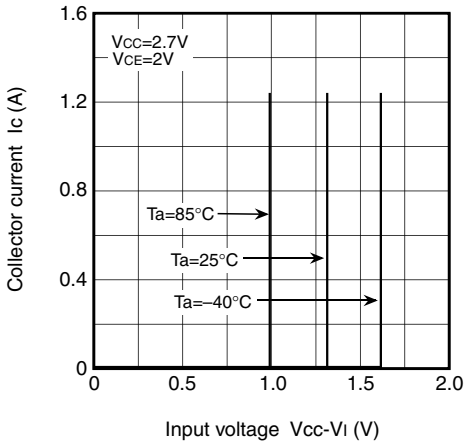
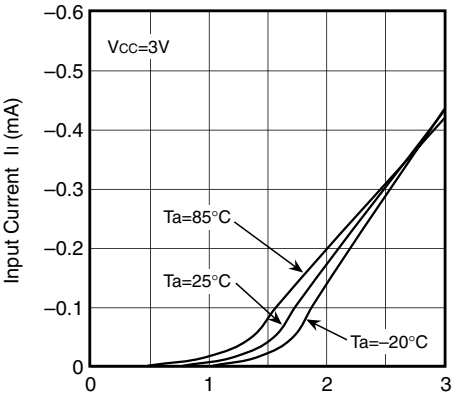
DC Amplification Factor
Collector Current Characteristics



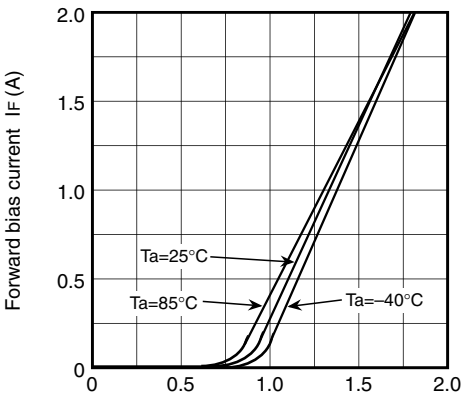
Grounded Emitter Transfer Characteristics



Input Characteristics



Clamping Diode Characteristics



Driver Supply Characteristics