

PRELIMINARY
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 Some parametric limits are subject to change.

MITSUBISHI SEMICONDUCTOR <TRANSISTOR ARRAY>

M63830P/FP

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 form 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 ($T_a = -40$ to $+85^\circ C$)

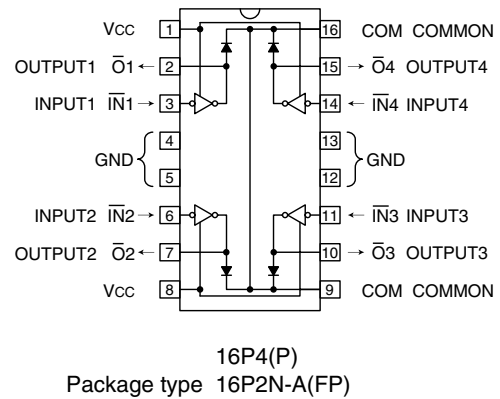
APPLICATION

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

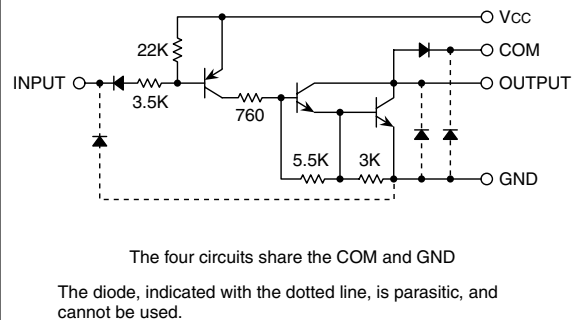
FUNCTION

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 $3.5k\Omega$ 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 V_{CC} . Without this diode, the current flows from "H" input to the V_{CC} 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



CIRCUIT DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Unless otherwise noted, $T_a = -40 \sim +85^\circ C$)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage		7	V
V_{CEO}	Collector-emitter voltage	Output, H	$-0.5 \sim +50$	V
I_C	Collector current	Current per circuit output, L	1.5	A
V_I	Input voltage		$-0.5 \sim V_{CC}$	V
V_R	Clamping diode reverse voltage		50	V
I_F	Clamping diode forward current	Pulse width $\leq 10ms$, duty cycle $\leq 5\%$	1.5	A
		Pulse width $\leq 100ms$, duty cycle $\leq 5\%$	1.0	
P_d	Power dissipation	$T_a = 25^\circ C$, when mounted on board	1.92(P)/1.00(FP)	W
T_{opr}	Operating temperature		$-40 \sim +85$	$^\circ C$
T_{stg}	Storage temperature		$-55 \sim +125$	$^\circ C$

Sep. 2001

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

Symbol	Parameter		Limits			Unit
			min	typ	max	
VCC	Supply voltage		2.7	3.0	3.6	V
Vo	Output voltage		0	—	50	V
Ic	Collector current (Current per 1 circuit when 4 circuits are coming on simultaneously)	VCC = 3V, Duty Cycle P : no more than 5% FP : no more than 2%	0	—	1.25	A
		VCC = 3V, Duty Cycle P : no more than 15% FP : no more than 7%	0	—	0.7	
VIH	“H” input voltage		VCC-0.5	—	VCC	V
VIL	“L” input voltage		0	—	VCC-2.2	V

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

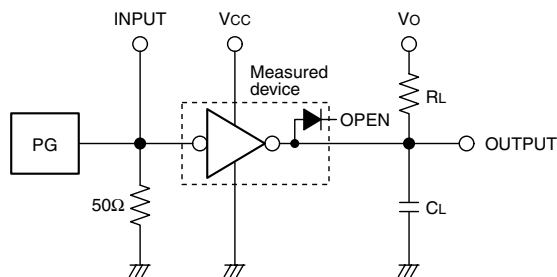
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ*	max	
V (BR) CEO	Collector-emitter breakdown voltage	I _{CEO} = 100μA	50	—	—	V
I _{CC}	Supply current (AN only Input)	V _{CC} = 3.6V, V _I = 0.5V	—	3.7	5.0	mA
V _{CE(sat)}	Collector-emitter saturation voltage	V _{CC} = 2.7V, V _I = 0.5V, I _C = 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 voltage	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)

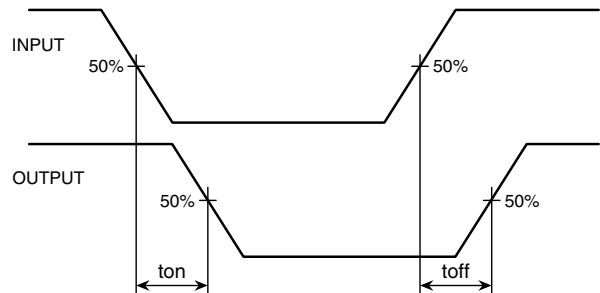
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
t _{on}	Turn-on time	C _L = 15pF (note 1)	—	190	—	ns
t _{off}	Turn-off time		—	5300	—	ns

NOTE 1 TEST CIRCUIT



- (1) Pulse generator (PG) characteristics : PRR=1kHz,
 tw = 10μs, tr = 6ns, tf = 6ns, Zo = 50Ω
 Vi = 0.5 ~ 2.7V
- (2) Input-output conditions : RL = 8.3Ω, Vo = 10V, V_{CC} = 2.7V
- (3) Electrostatic capacity CL includes floating capacitance
 at connections and input capacitance at probes

TIMING DIAGRAM

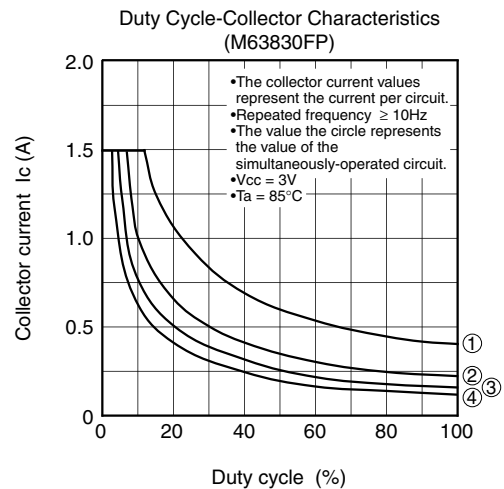
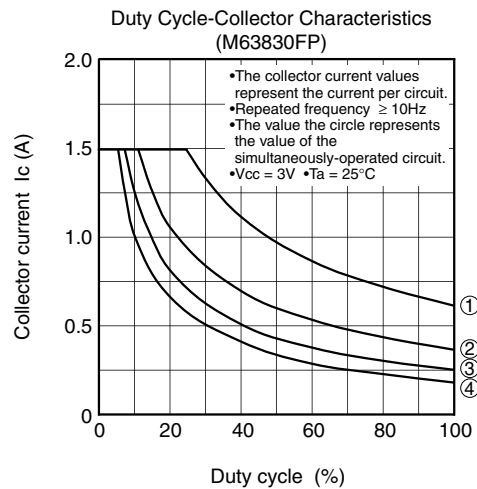
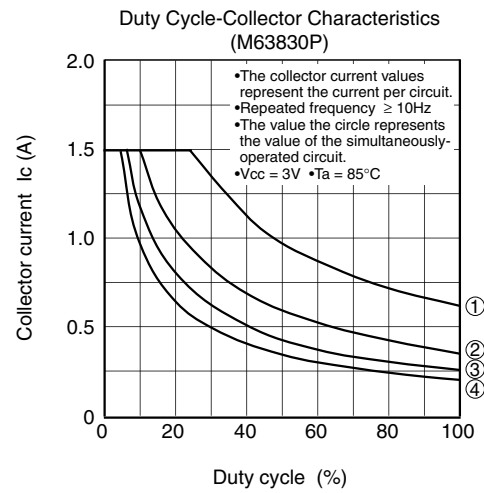
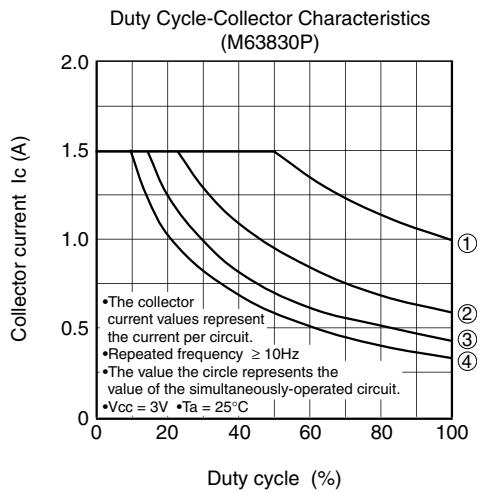
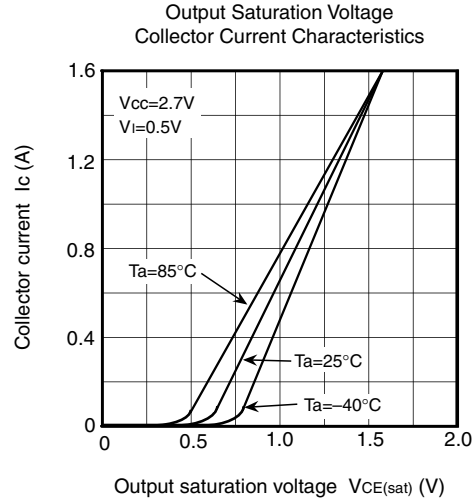
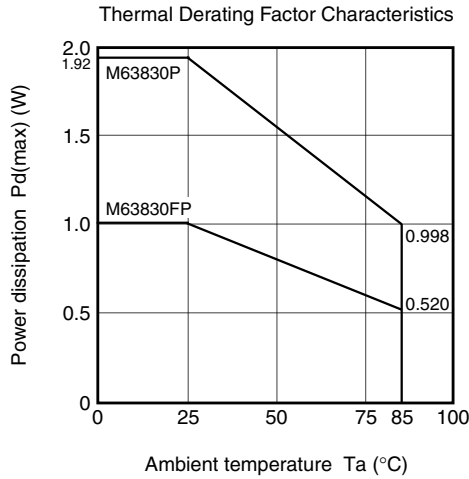


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TYPICAL CHARACTERISTICS

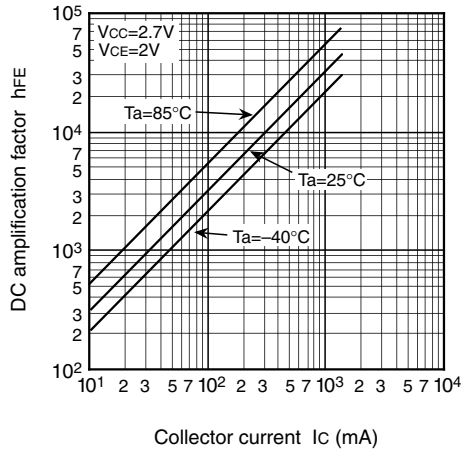


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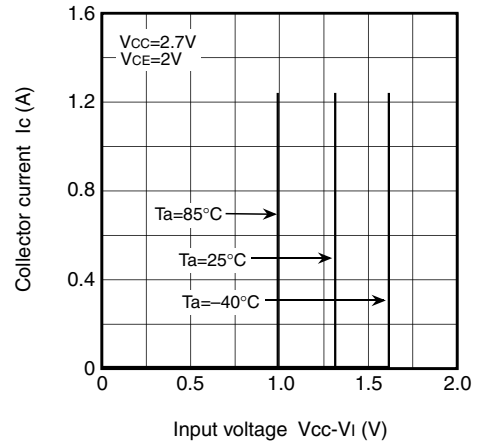
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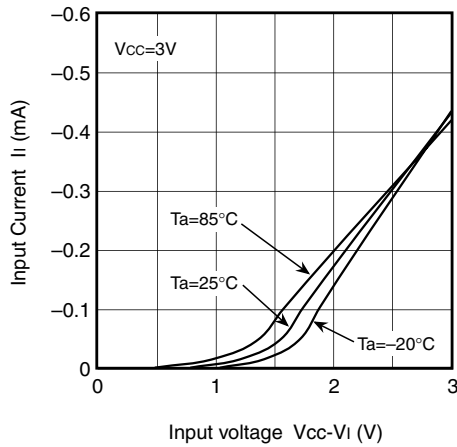
DC Amplification Factor
 Collector Current Characteristics



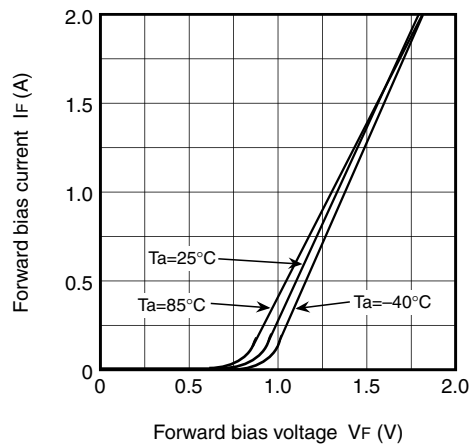
Grounded Emitter Transfer Characteristics



Input Characteristics



Clamping Diode Characteristics



Driver Supply Characteristics

