POWEREX

M63816P/FP/KP

8-UNIT 300mA TRANSISTOR ARRAY WITH CLAMP DIODE

DESCRIPTION

M63816P/FP/KP are eight-circuit Single 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

- Three package configurations (P, FP, and KP)
- Medium breakdown voltage ($BV_{CEO} \geq 35V$)
- Synchronizing current ($I_{C(max)}$ = 300mA)
- With clamping diodes
- Low output saturation voltage
- Wide operating temperature range (Ta = –40 to +85°C)

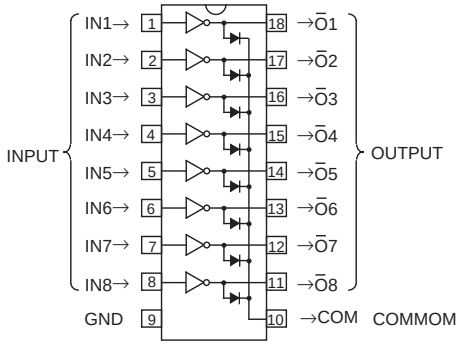
APPLICATION

Driving of digit drives of indication elements (LEDs and lamps) with small signals

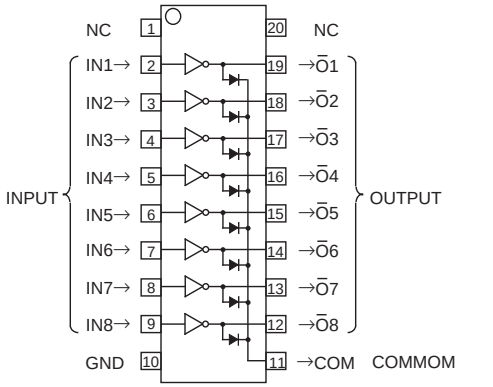
FUNCTION

The M63816P/FP/KP each have eight circuits consisting of NPN transistor. A spike-killer clamping diode is provided between each output pin (collector) and COM pin. The transistor emitters are all connected to the GND pin. The transistors allow synchronous flow of 300mA collector current. A maximum of 35V voltage can be applied between the collector and emitter.

PIN CONFIGURATION



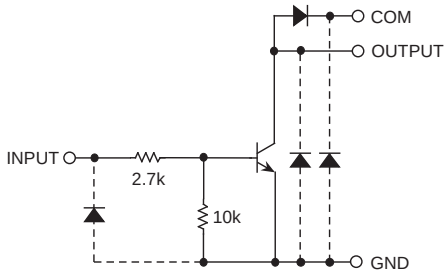
Package type 18P4G(P)



NC : No connection

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

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

MITSUBISHI ELECTRIC

ABSOLUTE MAXIMUM RATINGS (Unless otherwise noted, Ta = –40 ~ +85°C)

Symbol	Parameter	Conditions		Ratings	Unit
V_{CEO}	Collector-emitter voltage	Output, H		–0.5 ~ +35	V
I_C	Collector current	Current per circuit output, L		300	mA
V_I	Input voltage			–0.5 ~ +35	V
I_F	Clamping diode forward current			300	mA
V_R	Clamping diode reverse voltage			35	V
P_d	Power dissipation	Ta = 25°C, when mounted on board	M63816P	1.79	W
			M63816FP	1.10	
			M63816KP	0.68	
T_{opr}	Operating temperature			–40 ~ +85	°C
T_{stg}	Storage temperature			–55 ~ +125	°C

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

Symbol	Parameter		Test conditions	Limits			Unit
				min	typ	max	
V_O	Output voltage			0	—	35	V
I_C	Collector current (Current per 1 circuit when 8 circuits are coming on simultaneously)	M63816P	Duty Cycle no more than 50%	0	—	250	mA
			Duty Cycle no more than 100%	0	—	170	
		M63816FP	Duty Cycle no more than 30%	0	—	250	
			Duty Cycle no more than 100%	0	—	130	
		M63816KP	Duty Cycle no more than 12%	0	—	250	
			Duty Cycle no more than 100%	0	—	100	
V_{IN}	Input voltage			0	—	20	V

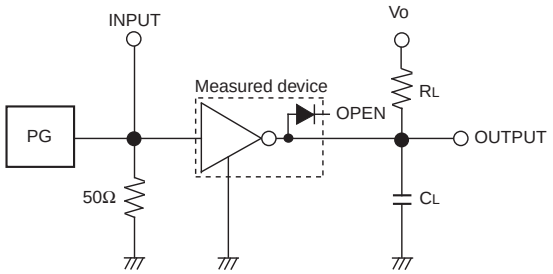
ELECTRICAL CHARACTERISTICS (Unless otherwise noted, Ta = 25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_{CEO} = 10μA	35	—	—	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_{IN} = 1mA, I_C = 10mA	—	—	0.2	V
		I_{IN} = 2mA, I_C = 150mA	—	—	0.8	
$V_{IN(on)}$	"On" input voltage	I_{IN} = 1mA, I_C = 10mA	2.4	3.5	4.2	V
V_F	Clamping diode forward volltage	I_F = 250mA	—	1.2	2.0	V
I_R	Clamping diode reverse current	V_R = 35V	—	—	10	μA
h_{FE}	DC amplification factor	V_{CE} = 10V, I_C = 10mA	50	—	—	—

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

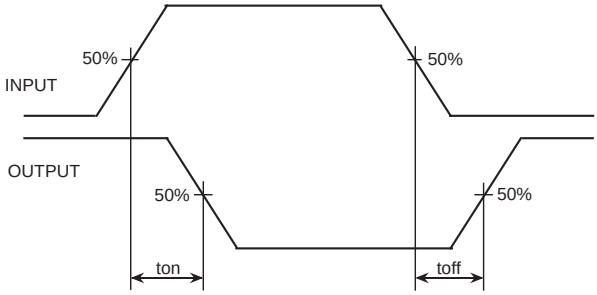
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
t_{on}	Turn-on time	C_L = 15pF (note 1)	—	125	—	ns
t_{off}	Turn-off time		—	250	—	ns

NOTE 1 TEST CIRCUIT



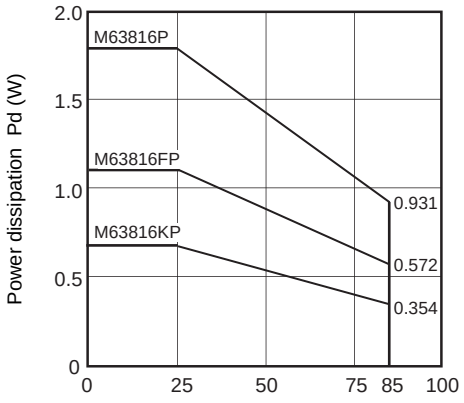
(1)Pulse generator (PG) characteristics : PRR = 1kHz, tw = 10μs, tr = 6ns, tf = 6ns, Zo = 50Ω, V_{IH} = 3V
(2)Input-output conditions : R_L = 220Ω, Vo = 35V
(3)Electrostatic capacity C_L includes floating capacitance at connections and input capacitance at probes

TIMING DIAGRAM

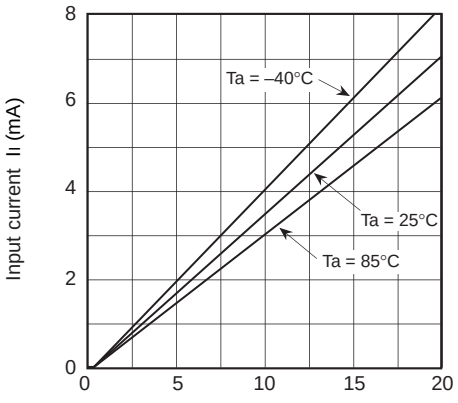


TYPICAL CHARACTERISTICS

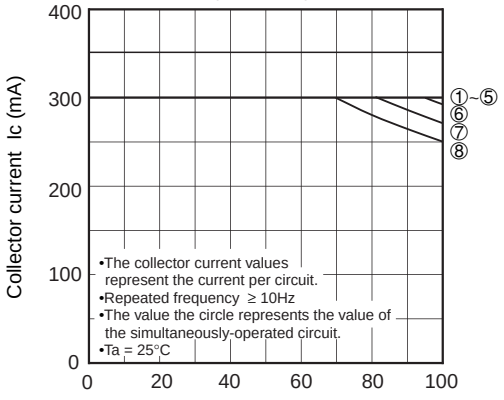
Thermal Derating Factor Characteristics



Input Characteristics



Duty Cycle-Collector Characteristics (M63816P)



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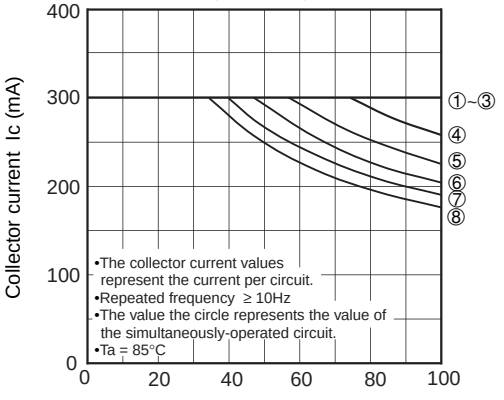
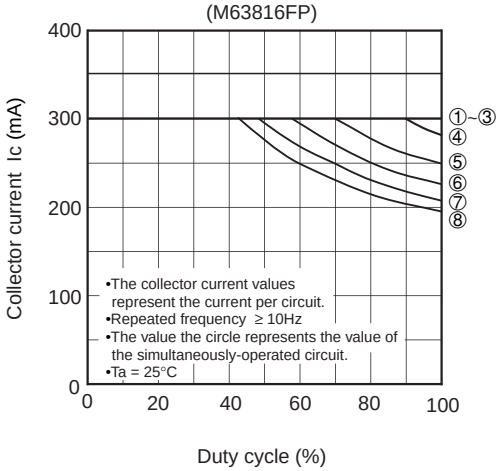
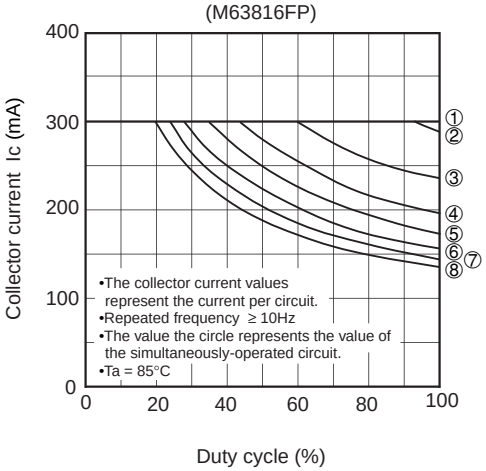


Duty Cycle-Collector Characteristics
(M63816FP)



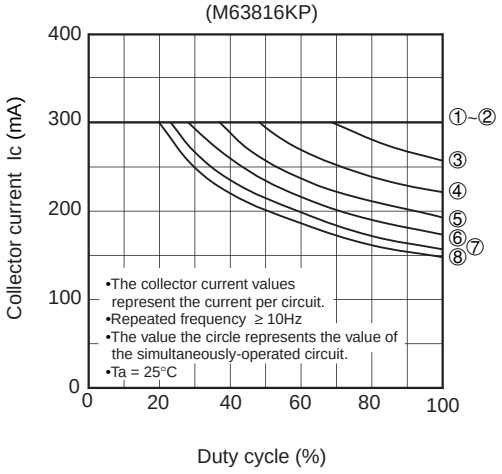
Duty cycle (%)

Duty Cycle-Collector Characteristics
(M63816FP)



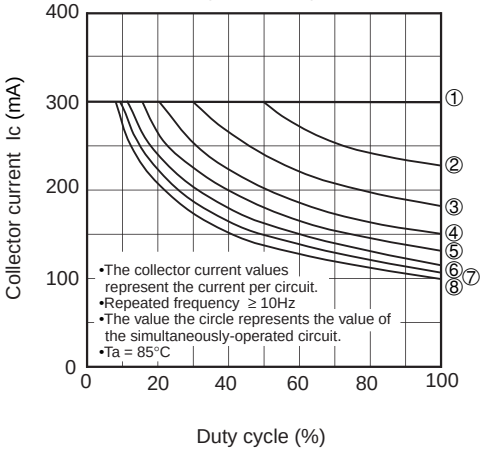
Duty cycle (%)

Duty Cycle-Collector Characteristics
(M63816KP)



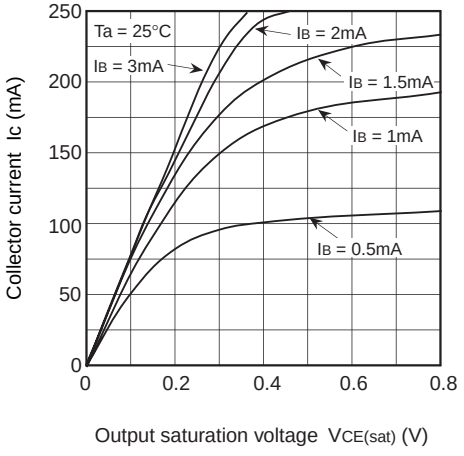
Duty cycle (%)

Duty Cycle-Collector Characteristics
(M63816KP)



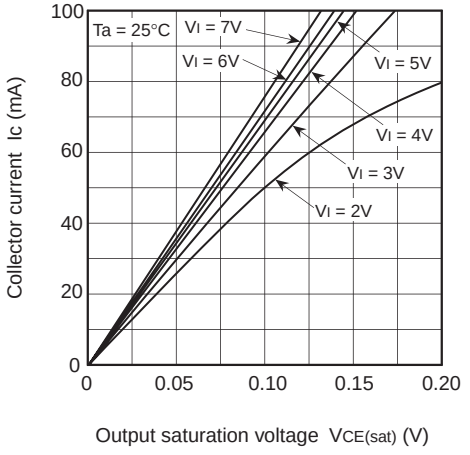
Duty cycle (%)

Output Saturation Voltage
Collector Current Characteristics



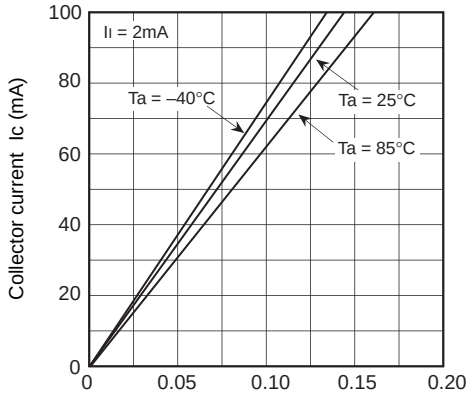
Output saturation voltage $V_{CE(sat)}$ (V)

Output Saturation Voltage
Collector Current Characteristics

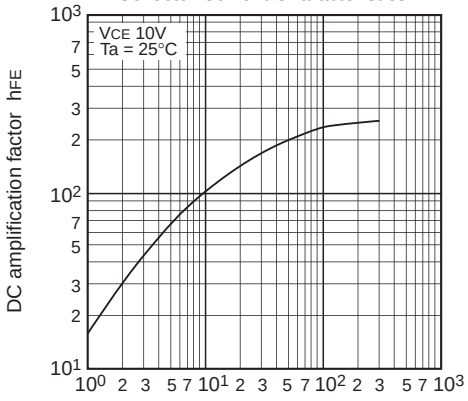


Output saturation voltage $V_{CE(sat)}$ (V)

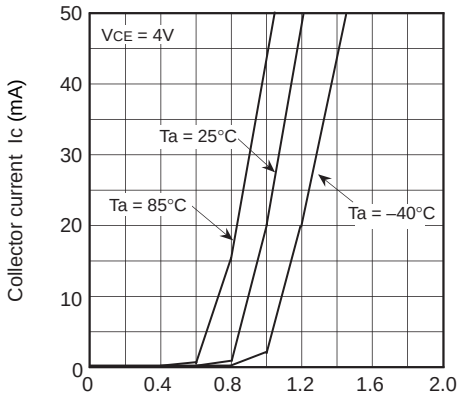
Output Saturation Voltage
Collector Current Characteristics



DC Amplification Factor
Collector Current Characteristics



Grounded Emitter Transfer Characteristics



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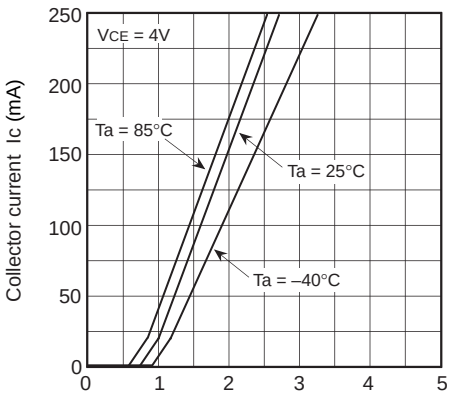

Clamping Diode Characteristics