PRELIMINARY

M63840P/FP/KP

8-Unit 500mA Source Type Darlington Transistor-Array With Clamp Diode

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

DESCRIPTION

M63840P/FP/KP are eight-circuit output-sourcing Darlington transistor array.The circuits are made of PNP and NPN transistors. Both the semiconductor integrated circuits perform high-current driving with extremely low input-current supply.

FEATURES

- High breakdown voltage（BV_{CEO}≧ 40V）
- High-current driving（I_O(max)＝－500mA ）
- With output clamping diodes
- Driving available with TTL output or C-MOS IC output
- Wide operating temperature range (Ta= -40～+85℃)
- Output current-sourcing type

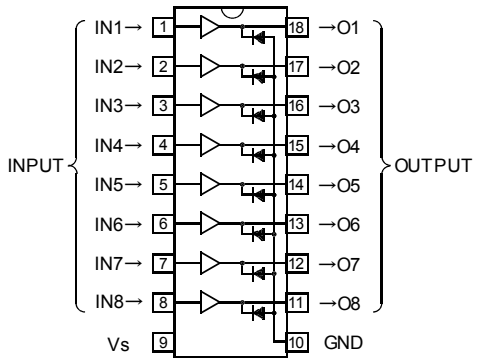
APPLICATION

Drives of relays, printers, LEDs, fluorescent display tubes and lamps. and interfaces between MOS-bipolar logic systems and relays, solenoids, of small motors.

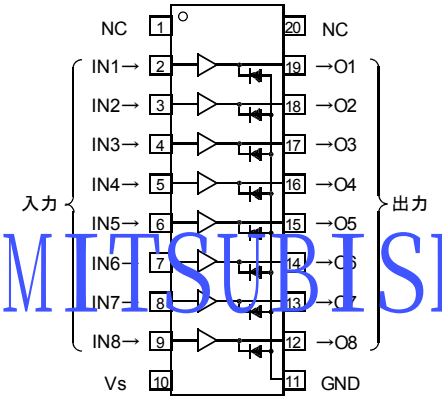
FUNCTION

The M63840P/FP/KP each have eight circuits, which are made of input inverters and current-sourcing outputs. The output are made of PNP transistors and NPN Darlington transistors. The PNP transistor base current is constant. A clamping diode is provided between each output and GND. Vs and GND are used commonly among the eight circuits.
The inputs have resistance of 10kΩ, and voltage of up to 15V is applicable. Output current is 500mA maximum. Supply voltage Vs is 40V maximum.
The M63840FP/KP is enclosed in a molded small flat package, enabling space-saving design.

PIN CONFIGURATION（TOP VIEW）



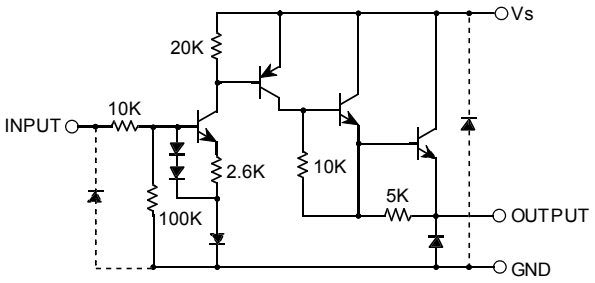
Package type 18P4G(P)



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

NC: No connection

CIRCUIT DIAGRAM（EACH CIRCUIT）



The eight circuits share Vs and GND.

The diode, indicated with the dotted line, is parasitic, and cannot be used.

Unit: Ω

M63840P/FP/KP

8-Unit 500mA Source Type Darlington Transistor-Array With Clamp Diode

ABSOLUTE MAXIMUM RATINGS (Unless otherwise noted, Ta= -40～+85℃)

Symbol	Parameter	Conditions		Ratings	Unit
V_{CEO}	Collector-emitter voltage	Output, L		-0.5～+40	V
V_S	Supply voltage			40	V
V_I	Input voltage			-0.5～+15	V
I_O	Output current	Current per circuit output, H		-500	mA
I_F	Clamping diode forward current			-500	mA
V_R	Clamping diode reverse voltage			35	V
Pd	Power dissipation	Ta= 25℃, when mounted on board	M63840P	1.79	W
			M63840FP	1.10	
			M63840KP	0.68	
Topr	Operating temperature			-40～+85	℃
Tstg	Storage temperature			-55～+125	℃

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

Symbol	Parameter		Limits			Unit
			min	typ	max	
V_S	Supply voltage		0	-	40	V
I_O	Output current (Current per 1 circuit when 8 circuits are coming on simultaneously)	Duty Cycle P: no more then 10% FP: no more then 5% KP: no more then 3%	0	-	-350	mA
		Duty Cycle P: no more then 54% FP: no more then 30% KP: no more then 18%	0	-	-100	
V_{IH}	"H" input voltage		2.0	-	12	V
V_{IL}	"L" input voltage		0	-	0.8	V

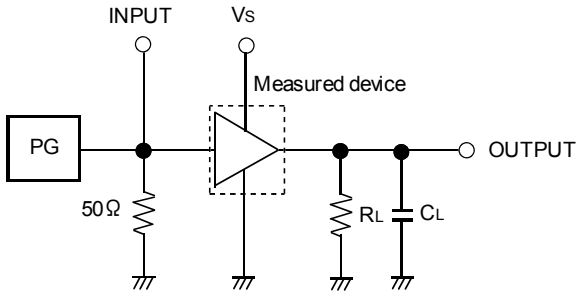
ELECTRICAL CHARACTERISTICS (Unless otherwise noted, Ta= 25℃)

Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
$I_{S(leak)}$	Supply leak current	V_S= 40V, V_I= 0.8V	-	-	100	μA
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_S= 10V, V_I= 2V, I_O= -350mA	-	1.7	2.0	V
		V_S= 10V, V_I= 2V, I_O= -100mA	-	1.5	1.8	
I_I	Input current	V_I= 2.4V	-	36	52	μA
		V_I= 3.85V	-	180	260	
I_S	Supply current	V_S= 40V, V_I= 2V (per 1 circuit)	-	-	2.5	mA
V_F	Clamping diode forward voltage	I_F= 350mA	-	1.3	2.0	V
I_R	Clamping diode reverse current	V_R= 40V	-	-	100	μA

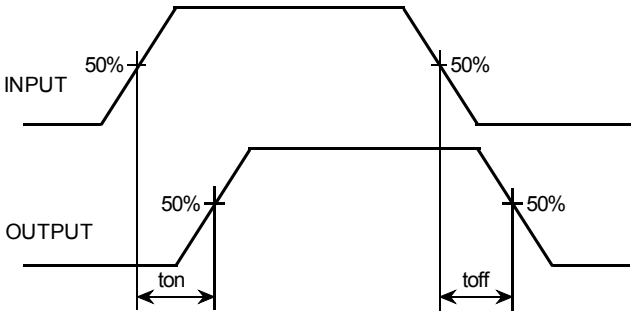
SWITCHING CHARACTERISTICS (Unless otherwise noted, Ta= 25℃)

Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
ton	Turn-on time	C_L= 15pF (note 1)	-	180	-	ns
toff	Turn-off time		-	2200	-	ns

NOTE 1 TEST CIRCUIT



TIMING DIAGRAM



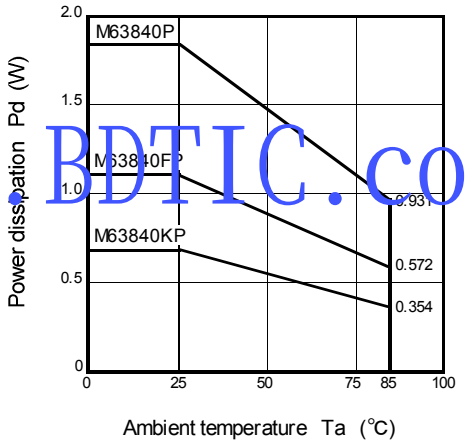
(1)Pulse generator (PG) characteristics: PRR= 1KHz,
tw= 10μs, tr= 6ns, tf= 6ns, Zo= 50Ω,
VI= 0～2.4V

(2)Input-output conditions: RL= 100Ω, Vs= 40V

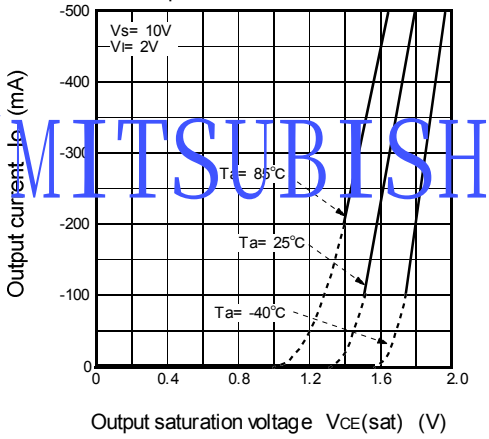
(3)Electrostatic capacity CL includes floating capacitance at connections and input capacitance at probes.

TYPICAL CHARACTERISTICS

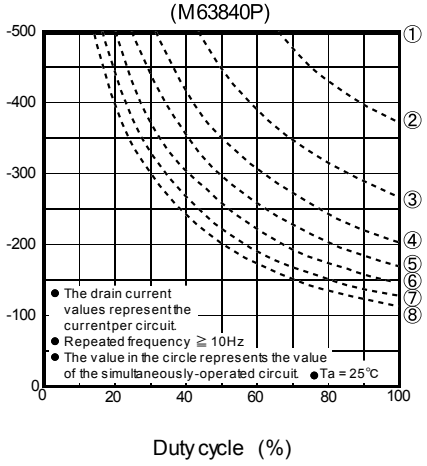
Thermal Derating Factor Characteristics



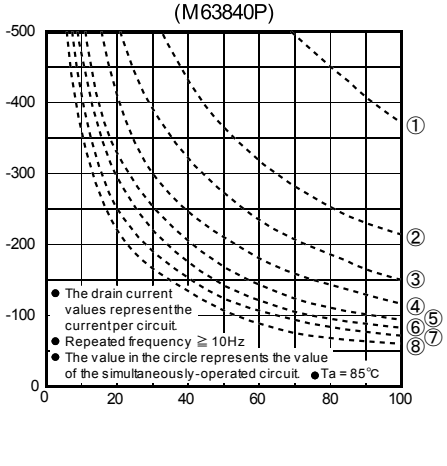
Output Saturation Voltage
Output Current Characteristics



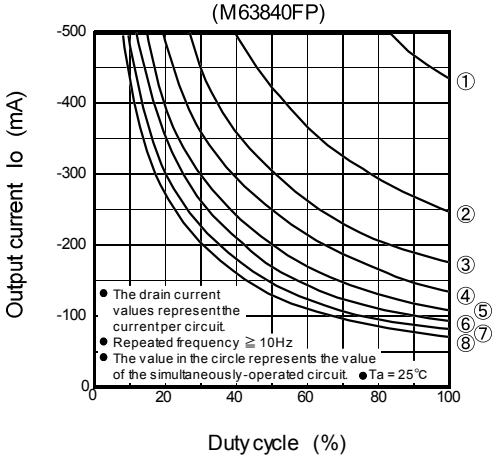
Duty-Cycle-Output Current Characteristics
(M63840P)



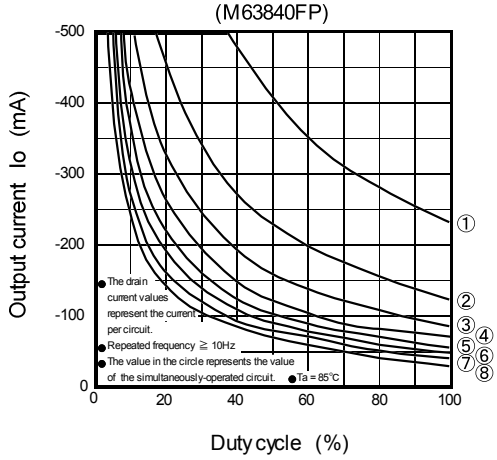
Duty-Cycle-Output Current Characteristics
(M63840P)



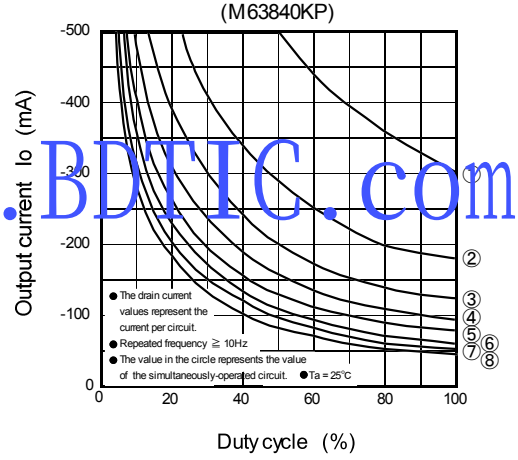
Duty-Cycle-Output Current Characteristics
(M63840FP)



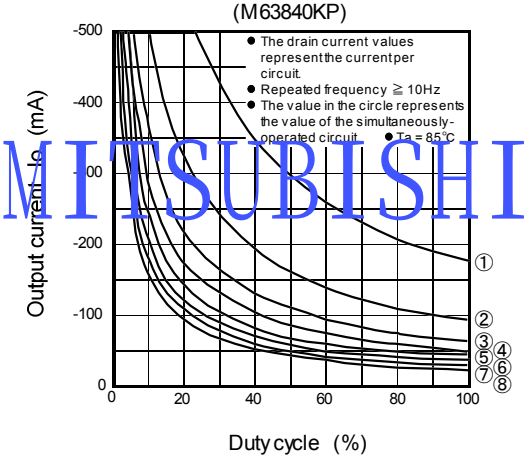
Duty-Cycle-Output Current Characteristics
(M63840FP)



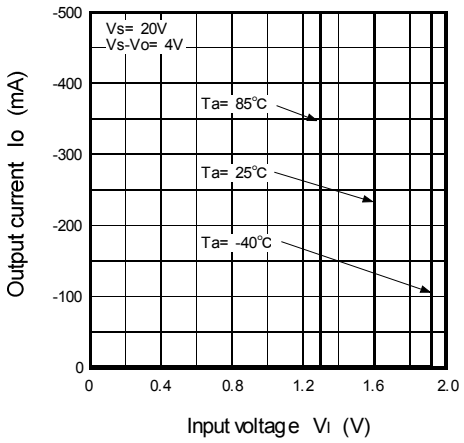
Duty-Cycle-Output Current Characteristics
(M63840KP)



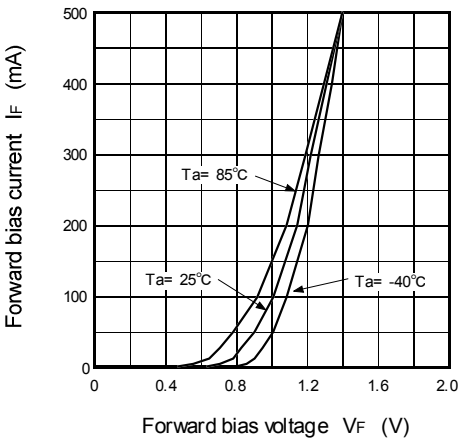
Duty-Cycle-Output Current Characteristics
(M63840KP)



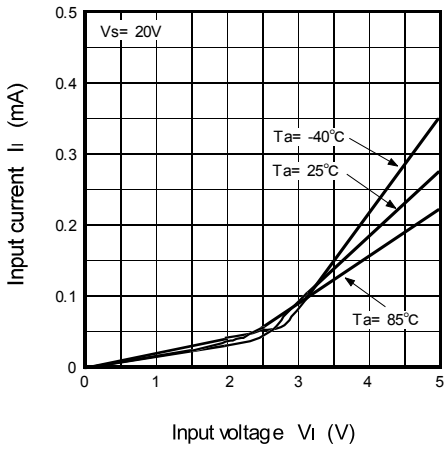
Grounded Emitter Transfer Characteristics



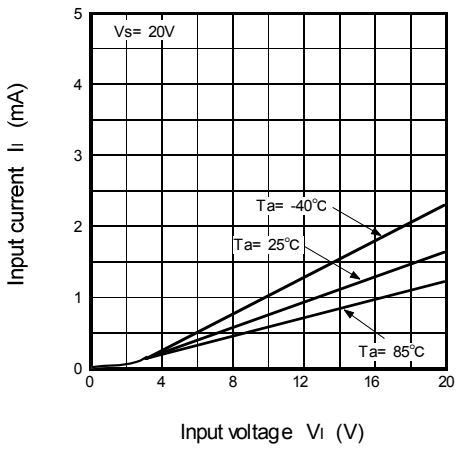
Clamping Diode Characteristics



Input Characteristics



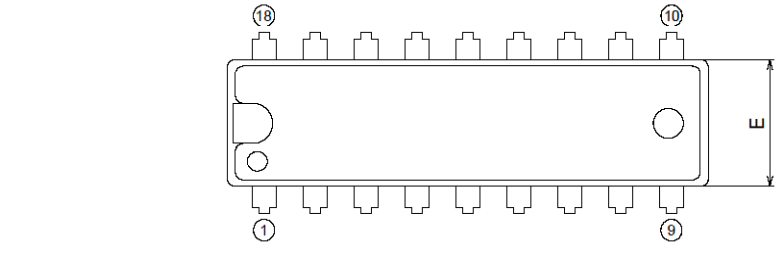
Input Characteristics

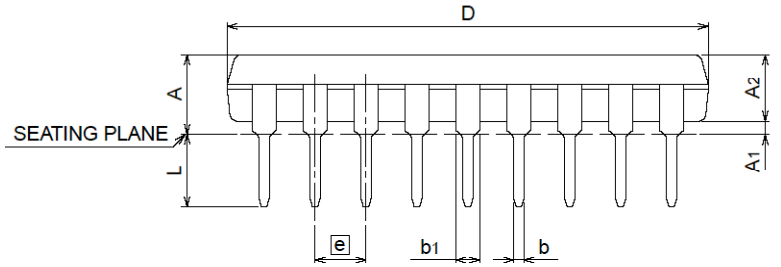


18P4G

Plastic 18pin 300mil DIP

EIAJ Package Code	JEDEC Code	Weight(g)	Lead Material
DIP18-P-300-2.54	–	1.3	Cu Alloy





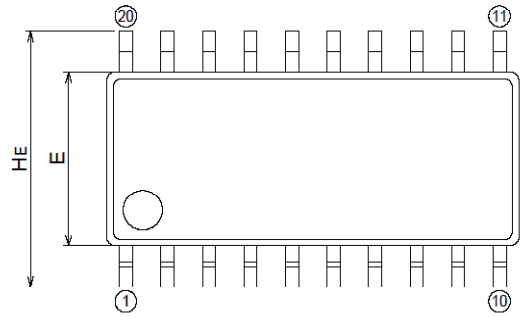
Symbol	Dimension in Millimeters		
	Min	Nom	Max
A	–	–	4.5
A1	0.51	–	–
A2	–	3.3	–
b	0.4	0.5	0.6
b1	1.1	1.2	1.5
c	0.2	0.25	0.32
D	23.8	24.0	24.2
E	6.15	6.3	6.45
e	–	2.54	–
e1	–	7.62	–
L	3.0	–	–
θ	0°	–	15°

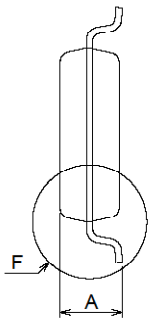
20P2N-A

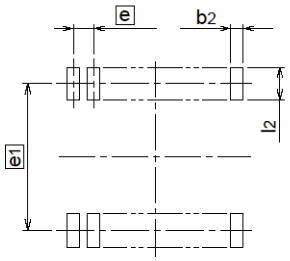
MMP

Plastic 20pin 300mil SOP

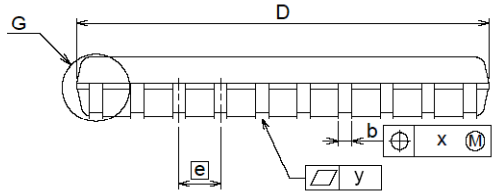
EIAJ Package Code	JEDEC Code	Weight(g)	Lead Material
SOP20-P-300-1.27	–	0.26	Cu Alloy

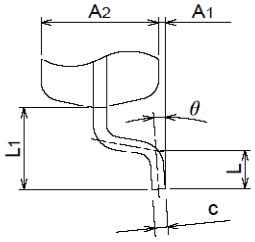


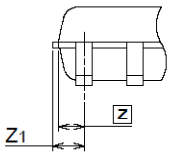




Recommended Mount Pad







Detail G

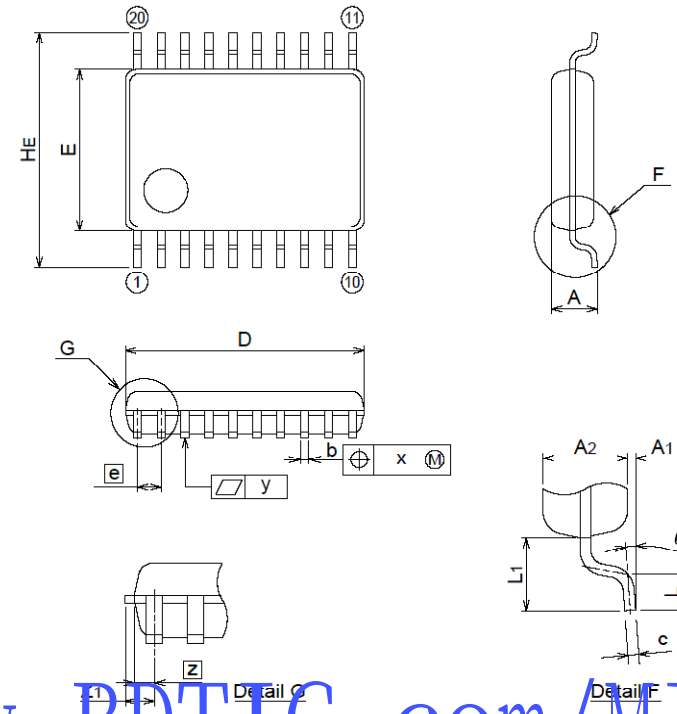
Detail F

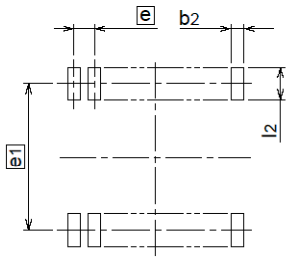
Symbol	Dimension in Millimeters		
	Min	Nom	Max
A	–	–	2.1
A1	0	0.1	0.2
A2	–	1.8	–
b	0.35	0.4	0.5
c	0.18	0.2	0.25
D	12.5	12.6	12.7
E	5.2	5.3	5.4
e	–	1.27	–
HE	7.5	7.8	8.1
L	0.4	0.6	0.8
L1	–	1.25	–
Z	–	0.585	–
Z1	–	–	0.735
x	–	–	0.25
y	–	–	0.1
θ	0°	–	8°
b2	–	0.76	–
e1	–	7.62	–
l2	1.27	–	–

20P2E-A

Plastic 20pin 225mil SSOP

EIAJ Package Code	JEDEC Code	Weight(g)	Lead Material
SSOP20-P-225-0.65	–	0.08	Alloy 42





Recommended Mount Pad

Symbol	Dimension in Millimeters		
	Min	Nom	Max
A	–	–	1.45
A1	0	0.1	0.2
A2	–	1.15	–
b	0.17	0.22	0.32
c	0.13	0.15	0.2
D	6.4	6.5	6.6
E	4.3	4.4	4.5
e	–	0.65	–
HE	6.2	6.4	6.6
L	0.3	0.5	0.7
L1	–	1.0	–
Z	–	0.325	–
Z1	–	–	0.475
x	–	–	0.13
y	–	–	0.1
θ	0°	–	10°
b2	–	0.35	–
e1	–	5.8	–
l2	1.(	–	–