MITSUBISHI ELECTRIC

<TRANSISTOR ARRAY>

M63840KP

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

DESCRIPTION

M63840KP 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 (BVCEO ≥ 40V)
- High-current driving (Io(max) = –500mA)
- With clamping diodes
- Wide operating temperature range (Ta= -40 ~ +85℃)
- Driving available with PMOS IC output of 6 ~ 16V or with TTL output
- Output current-sourcing type

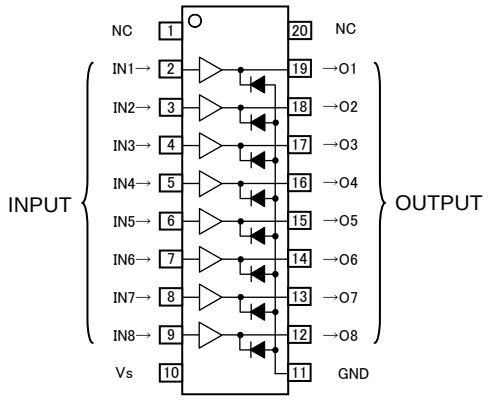
APPLICATIONS

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

FUNCTION

The M63840KP each have eight circuits, which are made of input inverters and current-sourcing outputs.
The outputs 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 500 mA maximum. Supply voltage VS is 50V maximum.

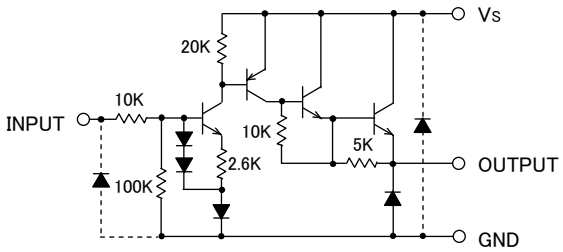
PIN CONFIGURATION



Package type 20P2F-A

NC : No connection

CIRCUIT DIAGRAM



The eight circuits share the VS 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_{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		40	V
P_d	Power dissipation	Ta = 25℃, when mounted on board	0.9	W
T_{opr}	Operating temperature		−40 ～ +85	℃
T_{stg}	Storage temperature		−55 ～ +125	℃

: Unused Input pins must be connected to GND.

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RECOMMENDED OPERATING (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 no more than 3%	0	—	−350	mA
		Duty Cycle no more than 25%	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℃)

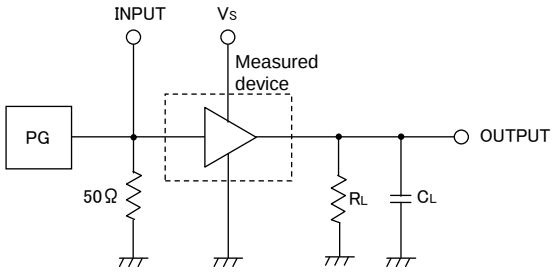
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
$I_{S(leak)}$ #	Supply leak current	V_S = 40V, V_I = 0.8V	—	—	100	μA
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_S = 10V, V_I = 2.0V, I_O = −350mA	—	1.7	2.0	V
		V_S = 10V, V_I = 2.0V, I_O = −100mA	—	1.5	2.0	
I_I	Input current	V_I = 2.4V	—	36	52	μA
		V_I = 3.85V	—	180	5.0	
I_S	Supply current	V_S = 40V, V_I = 2V (all input)	—	—	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

: Unused Input pins must be connected to GND.

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

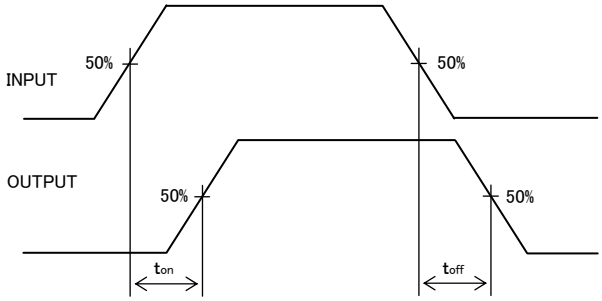
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
ton	Turn-on time	C_L = 15pF (note 1)	—	210	—	ns
toff	Turn-off time		—	2200	—	ns

NOTE 1 TEST CIRCUIT



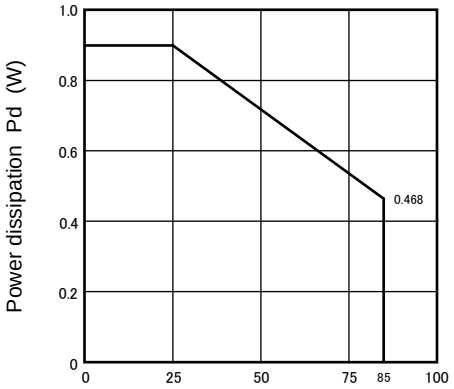
(1) Pulse generator (PG) characteristics: PRR = 1kHz, tw = 10ms, tr = 6ns, tf = 6ns, Z_O = 50Ω, V_I = 0 to 2V
(2) Input-output conditions : R_L = 30Ω, V_S = 10V
(3) Electrostatic capacity CL includes floating capacitance at connections and input capacitance at probes

TIMING DIAGRAM

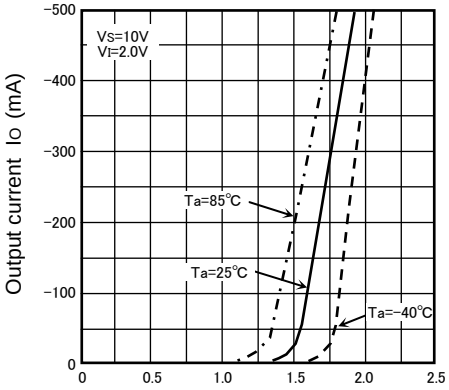


TYPICAL CHARACTERISTICS

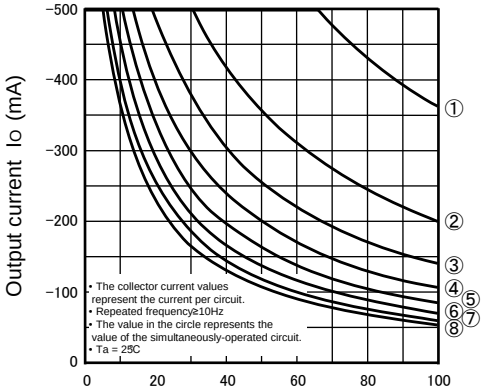
Thermal Derating Factor Characteristics



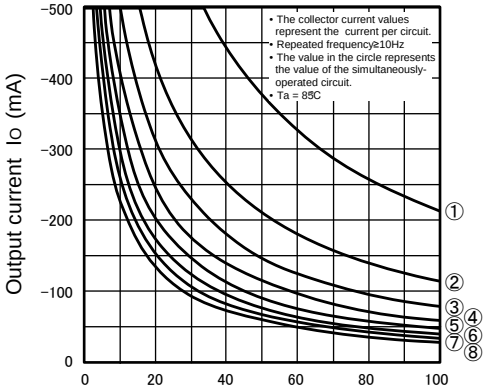
Output Saturation Voltage Collector Current Characteristics



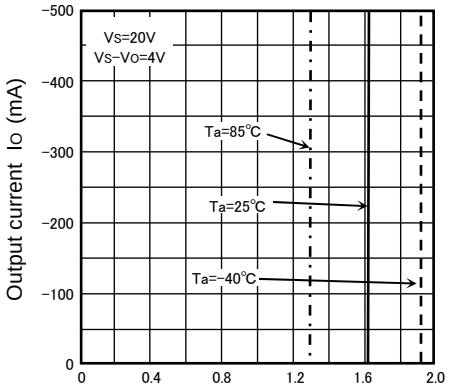
Duty-Cycle-Output current Characteristics



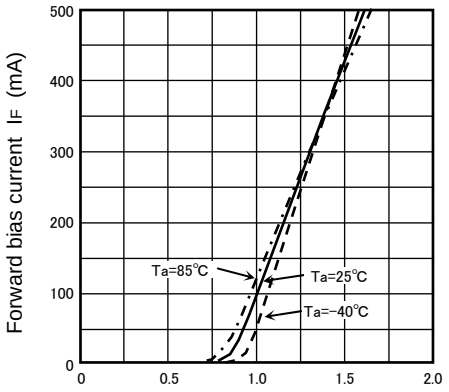
Duty-Cycle-Output current Characteristics



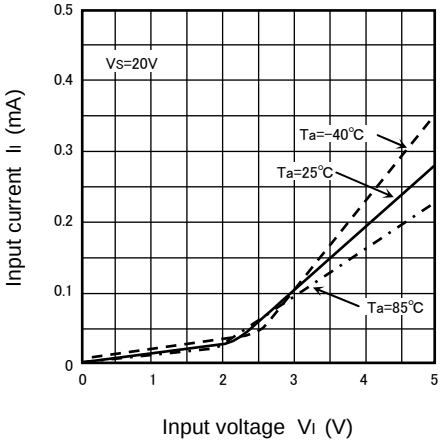
Grounded Emitter Transfer Characteristics



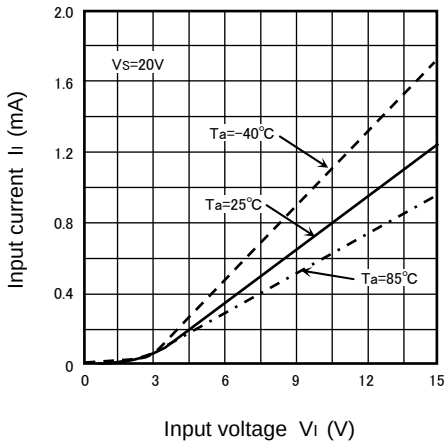
Clamping Diode Characteristics



Input Characteristics



Input Characteristics



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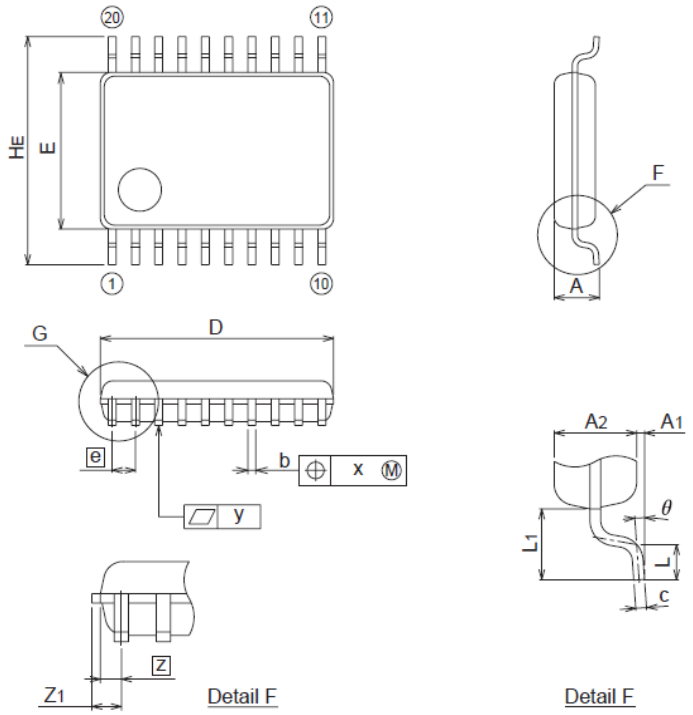
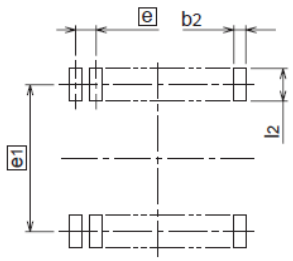
PACKAGE OUTLINE

20P2F-A Recommended

Plastic 20pin 255mil SSOP

EIAJ Package Code	JEDEC Code	Weight(g)	Lead Material
SSOP20-P-255-0.65	–	–	Cu Alloy





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	1.0	–	–

Keep safety first in your circuit designs!

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