

M5270L

LOW SATURATION OUTPUT TYPE CURRENT DRIVER

DESCRIPTION

M5270L is dual Darlington current driver (semiconductor integrated circuit) which consists of NPN transistors with clamp diode and it can be driven directly from 5V-type micro-computers or logic ICs.

Low saturation output can be obtained by separating the output stage transistor's collector from the drive stage transistors.

FEATURES

- High voltage resistance $BV_{CEO} \geq 80V$
 - High input voltage resistance $V_I \geq 20V$
 - Large current drive $I_{C(max)} = 3.0A^*$
 - Low saturation output $0.3V$ (typ) ($I_C = 0.7A$)
 - Contains a clamp diode.
 - Operates by the "H" level input.
 - Wide operating temperature range . . . $T_a = -40 \sim +85^\circ C$
- * $PW = 10$ ms, duty cycle $\leq 10\%$

APPLICATION

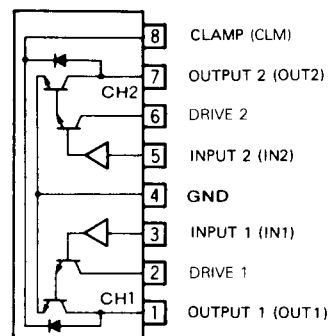
Motor drives for various relays or portable printers, digit drives for display elements such as LEDs and lamps, or power amplifiers

FUNCTION

Unlike the existing common-collector-type transistor arrays, M5270L realizes $0.3V$ of low saturation output voltage (typ, $I_C = 0.7A$) by separating the drive stage collector from the output stage collector. Therefore, the power dissipation which is determined by the product of the load current and the saturation output voltage can be greatly decreased.

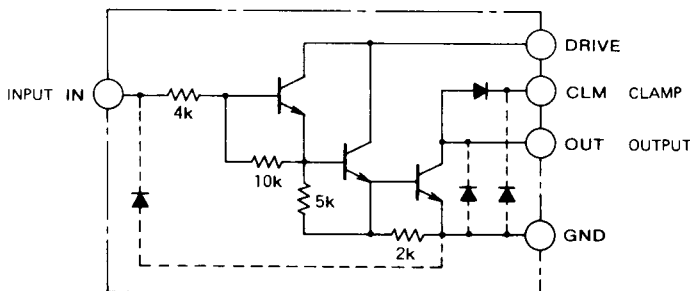
The maximum output current is $3.0A$ and up to $80V$ can be applied as the output voltage.

PIN CONFIGURATION (TOP VIEW)



Outline 8P5

CIRCUIT DIAGRAM



HIGH ACTIVE

* Output - Function

Input	Output
L	H(OFF)
H	L(ON)

CLM, GND are common to channels 1 and 2.
The diode indicated by dashed lines are already contained in the IC structure, therefore, it is not necessary to attach it externally.

UNIT: Ω

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ABSOLUTE MAXIMUM RATINGS (Ta=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
VD	Drive stage applied voltage		80	V
VCEO	Output voltage	When the output is "H"	80	V
VI	Input voltage		20	V
IC	Output current	Current per circuit when the output is "L"	3.0*	A
VR	Clamp diode reverse voltage		80	V
IF	Clamp diode forward current		3.0	A
Pd	Power dissipation	Ta=25℃	1.2(1.7)**	W
Topr	Operating temperature		-40~+85	℃
Tstg	Storage temperature		-55~+150	℃

* : PW = 10ms, duty cycle ≤ 10%
** : 400mm² of copper film is added

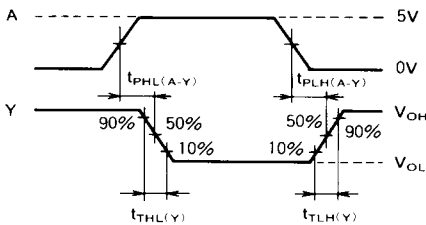
RECOMMENDED OPERATING CONDITIONS (Ta=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Limits			Unit
			Min	Typ	Max	
VD	Drive stage applied voltage		4	5	70	V
VCE	Output applied voltage		0		70	V
IC	Output current	Current per current	0	0.7	2.0	A
VR	Clamp diode reverse voltage		0		70	V
IF	Clamp diode forward current		0		2.0	A
Pd	Operating temperature		0		1.0	W

ELECTRICAL CHARACTERISTICS (Ta=25℃, value/circuit unless otherwise noted)

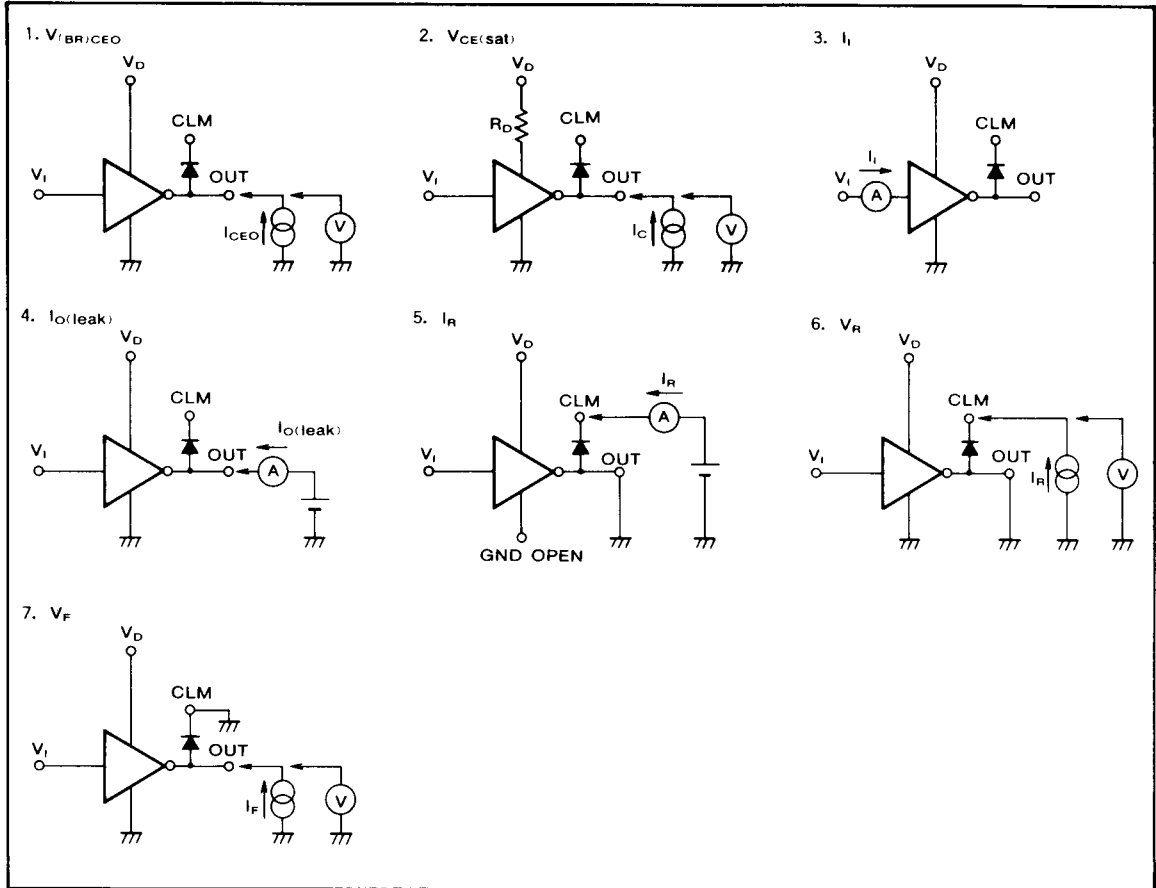
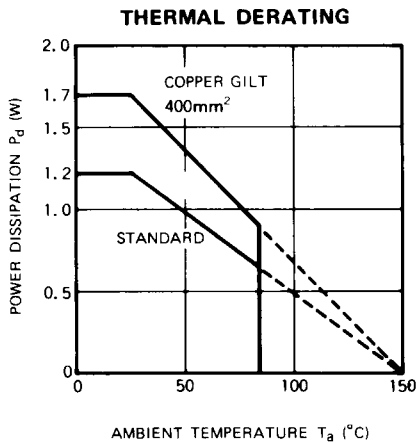
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V(BR)CEO	Output breakdown voltage	ICEO = 100μA				V
VCE(sat)	Saturation output voltage	VD = 4V VI = 3.5V IC = 1.8A, RD = 30Ω IC = 1.0A, RD = 50Ω IC = 0.7A, RD = 100Ω		0.8 0.4 0.3	1.5 0.8 0.6	V
II	Input current	VI = 4V VI = 0.5V			1.0 0.1	mA
IO(leak)	Output lead current	VCE = 80V			100	μA
IR	Clamp diode leak current	VR = 80V			50	μA
VR	Clamp diode reverse voltage	IR = 100μA	80			V
VF	Clamp diode forward voltage	IF = 2.0A			3.0	V
VIH	"H" input voltage	IC = 2.0A	3.5			V
VIL	"L" input voltage	IO(leak) = 50μA			1.0	V

TIMING DIAGRAM

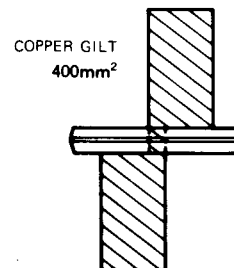


TYPICAL SPEED (Example)

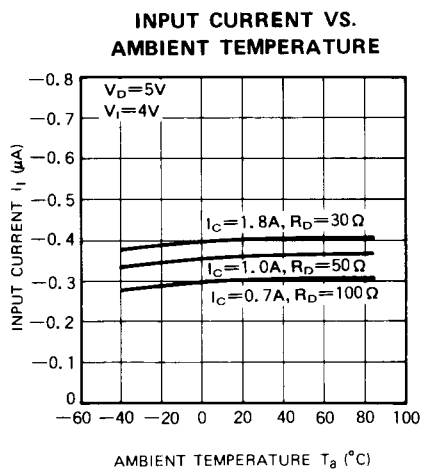
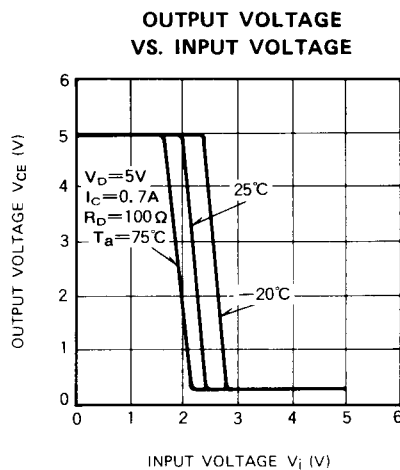
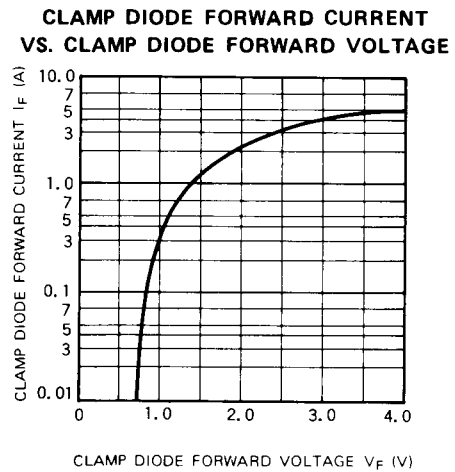
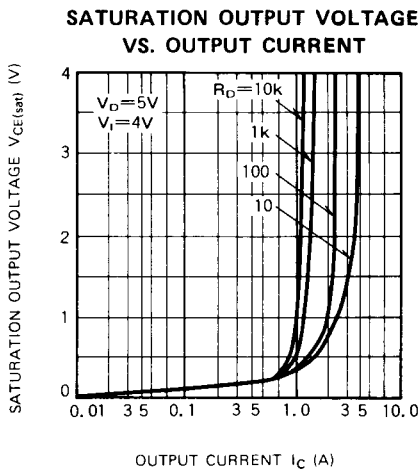
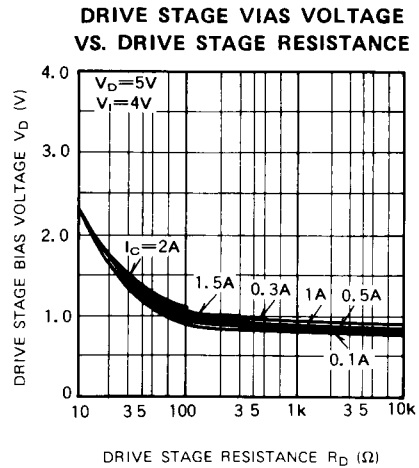
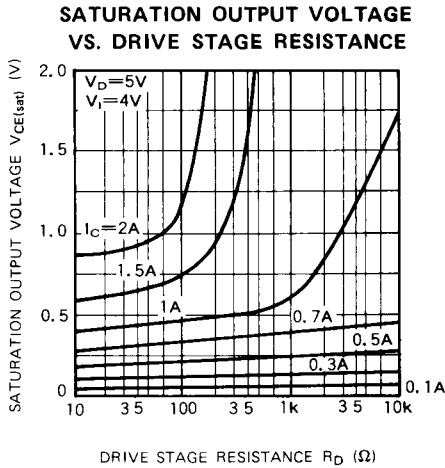
t _{PHL(A-Y)}	t _{PLH(A-Y)}	t _{THL(Y)}	t _{TLH(Y)}
400ns	3.2μs	15ns	30ns

LOW SATURATION OUTPUT TYPE CURRENT DRIVER**TEST CIRCUITS****TYPICAL CHARACTERISTICS****SAMPLE PCB LAYOUT**

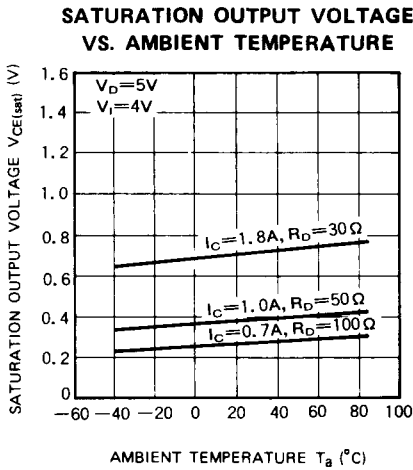
When you design a layout of a PCB, you have to consider the thermal derating. To improve the heat radiation of an IC, add a 400 mm² of copper film at the base of the GND pin. This will improve the thermal derating characteristics.



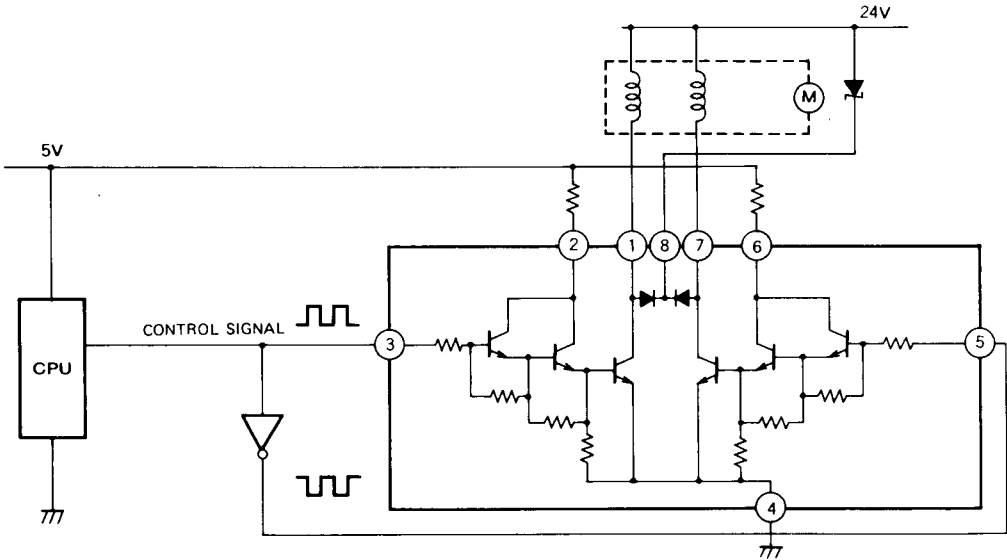
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APPLICATION CIRCUIT (Stepping motor drive for a printer)



V_{CC} , DRIVE, CLAMP, AND GND ARE THE SAME FOR BOTH CIRCUITS.