MCH2890R

DUAL POWER DRIVER

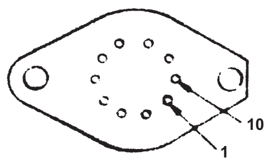
HYBRID DUAL POWER DRIVER

The MCH2890 dual Power Driver is capable of driving a wide variriety of inductive and resistive loads, included are hammer solenoids in high-speed digital printrers, paper-tape punchers and stepper motors in computer operated plotters.

- High Current - to 6.0 Amperes
- High Breakdown Voltage BV_{CEX} = 120V min.
- MTTL Compatibility
- Separate Integrated Circuit and Darlington Power Grounds
- Low Vsat at 3.0 and 6.0 Amperes
- Low Leakage Current - 0.1 µA typ

DUAL POWER DRIVER

HYBRID SILICON INTEGRATED CIRCUIT

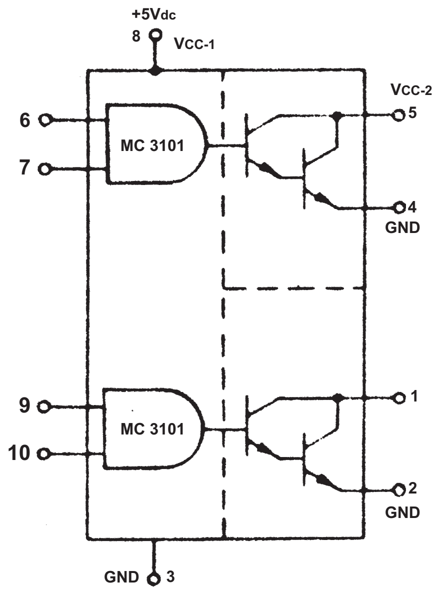


bottom view

CASE 685
METAL PACKAGE

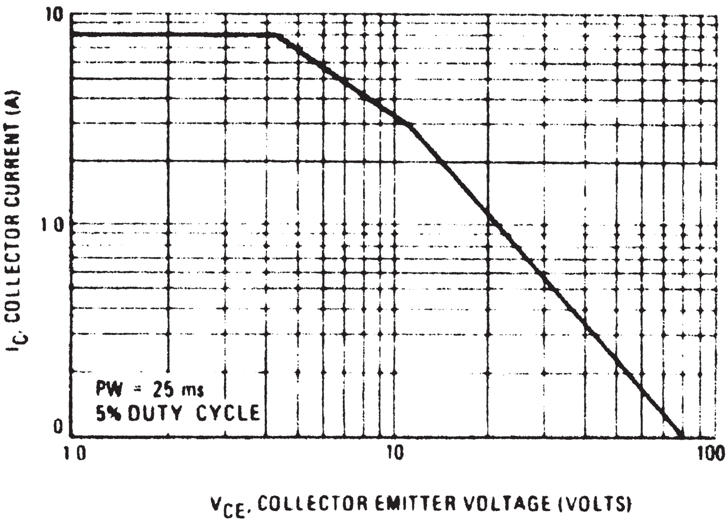
MAXIMUM RATINGS (TA - +25°C unless otherwise noted

Rating	Symbol	Value	Unit
Collector current Peak Continous	I_C	 8.0 1.0	A
Collector Emitter Berakdown Voltage Minimum at I_C < 0.5 mA	BV_{CEX} (pins 1, 5)	120	V_{dc}
Power Supply Voltage (Integrated Circuit)	$V_{CC\ 1}$	7.0	V_{dc}
Power Dissipation and Theermal Characteristics T_A 25 °C Derate above T_A = 25 °C Thermal Resistance Junction to air T_C 25 °C Derate babove T_C = 25 °C Thermal Resistance Junction to Case	 P_D 1/ JA 1/ JA PD 1/ JC 1/ JC	 3.75 25 40 25 167 6.0	 Watts mW/°C °C/W Watts mW/°C °C/W
Operating Temperature Range	T_A	0 to +70	°C
Storage Temperature Range	T_{stg}	-55 to +175	°C



SAFE OPERATING AREA (Continued)

FIGURE 7 – COLLECTOR-EMITTER VOLTAGE versus COLLECTOR CURRENT



APPLICATIONS INFORMATION

The MCH2890 is designed for high-current and high-voltage applications such as hammer-drivers in high-speed printers, relay drivers, lamp drivers, paper tape punches, stepping motors, and other high current inductive and resistive loads.

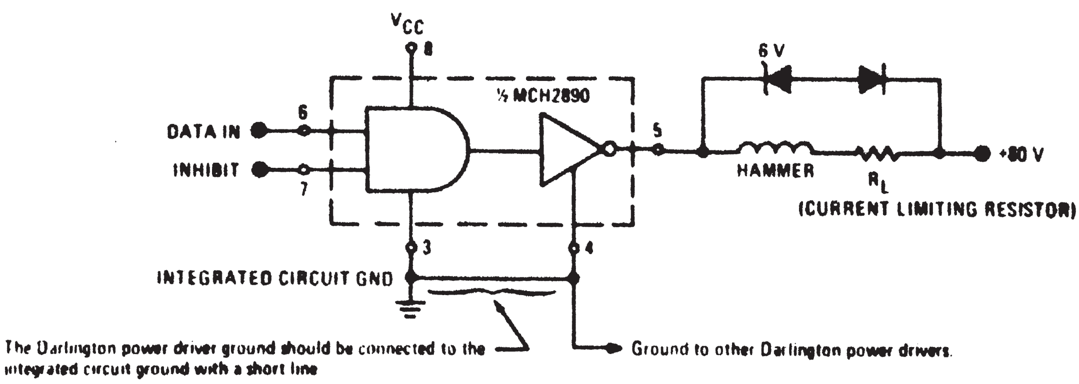
This dual hybrid driver, which consists of a monolithic MTTL "AND" gate and two power Darlington drivers, is capable of supplying up to 6.0 amperes at a maximum duty cycle of 10% with pulse widths up to 25 ms. In addition to the high-current drive capability the MCH2890 offers high collector-to-emitter break-down (BV_{CEX} 120 Volts min) which is desirable when driving inductive loads at high currents.

A typical high speed hammer driver application is illustrated in Figure 8. The number of drivers per printer is large, and considerable electrical noise is generated when they are switched simultaneously. The ground line, which terminates all of the Darlington power drivers, may be several feet in length resulting in substantial inductance and series resistance. The effect of this inductance and resistance becomes appreciable at the high-current levels required of hammer drivers. When the Darlington power drivers are switched "off", even a small inductance at the Darlington ground generates a negative voltage spike which tends to turn the Darlington power driver "on" rather than "off". This negative excursion of the emitter can result in oscillations. The oscillation can be stopped by tieing the integrated circuit ground (pin 3) to the Darlington ground (pins 2 and 4) with as short a line as possible. (See Figure 8). This circuit configuration pulls the gate output lower when the negative spike is present on the power ground line which guarantees "turn off" of the Darlington power driver.

To insure that the Darlington power driver does not go into secondary breakdown and latch up, a diode clamp is employed as shown. For high-speed printers, the addition of a zener diode can aid in dissipating the stored inductive power (during "turn off") in the hammer solenoid.

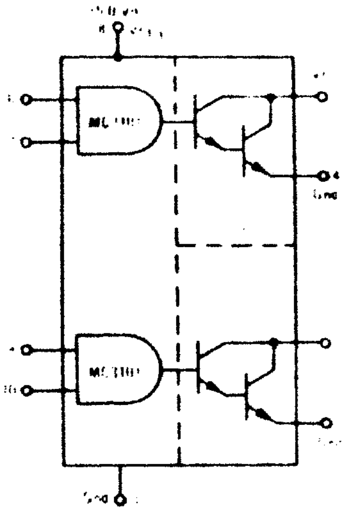
Additional features of the MCH2890 include fast switching and low leakage for minimum standby power.

FIGURE 8 – TYPICAL HAMMER DRIVER APPLICATION



ELECTRICAL CHARACTERISTICS

Test procedures are shown for only one power driver. The other power driver Is tested in the same manner.



	AMPERES		mA			VOLTS								
	$I_{OL}1$	$I_{OL}2$	I_{in}	I_D	$I_{C(max)}$	V_{IH}	V_{IL}	V_F	V_R	$V_{CC}1$	$V_{CC}2$	V_{CCIL}	V_{CCIH}	V_{RH}
0 °C	-	-	-	-	-	2.0	-	0.4	-	5.0	-	4.5	5.5	4.0
25 °C	3.0	6.0	1.0	10	0.5	1.8	1.1	0.4	2.4	5.0	90	4.5	5.5	4.0
75 °C	-	-	-	-	-	1.8	-	0.4	-	5.0	-	4.5	5.5	4.0

Characteristics	Symbol	Pin Under Test	TEST LIMITS 0 °C Min	0 °C Max	25 °C Min	25 °C Typ	25 °C Max	75 °C Min	75 °C Max	Unit
Input forward Current	I_F	6		2.0			-2.0		-2.0	mAdc
Input Lockage current	I_R	6		50			50		50	µAdc
Input Breakdown Voltage	BV_{in}	6			5.5					Vdc
Imput Clamp Voltage	V_D	6								Vdc
Output Voltage (See figure 1)	$V_{OL}1$ $V_{OL}2$ BV_{CEX}	5 5 5			- - 120		1.5 2.5 -			Vdc
Output Leakage Current	I_{CEX}	5				0.1	-			µAdc
Output Power Supply Drain Current	IPDL	8					30			mAdc
Output Power Supply Drain Current	IPDH	8					120			mAdc
Switching Parameters (See figure 21) **Turn-On Delay Time** **Turn-Off Delay Time**	Ipd- Ipd+	5,6 5,6				0.26 18				µs µs

TEST CURRENT/VOLTAGE APPLIED TO PNS BELOW

Characteristics	$I_{OL}1$	$I_{OL}2$	I_{in}	I_D	$I_{C(max)}$	V_{IH}	V_{IL}	V_F	V_R	$V_{CC}1$	$V_{CC}2$	V_{CCIL}	V_{CCIH}	V_{RH}	GND
Input forward Current								6				8		7	2,3,4
Input Lockage current									6				8		2,3,4
Input Breakdown Voltage			6										8		2,3,4
Imput Clamp Voltage				6								8			2,3,4
Output Voltage (See figure 1)	5 -- 	- 5 -			- - 5	6 - -		- - 6						7 7 7	2,3,4 2,3,4 2,3,4
Output Leakage Current											5			7	2,3,4
Output Power Supply Drain Current (IPDL)										8					2,3,4, 6.7.9. 10
Output Power Supply Drain Current (IPDH)										8				6,7,9, 10	2,3,4
Switching Parameters (See figure 21) Turn-On Delay Time / Turn-Off Delay Time	5 5		**Pulse In** 6 6	**Pulse Out** 5 5						8 8				7 7	2,3,4 2,3,4

TEST CIRCUITS

FIGURE 1 – V_{OL} TEST CIRCUIT

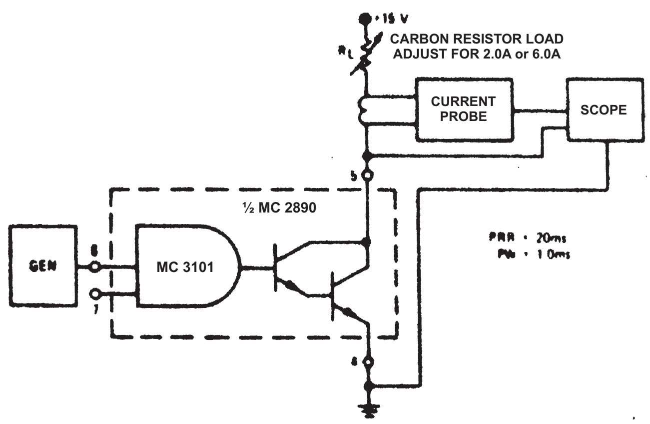
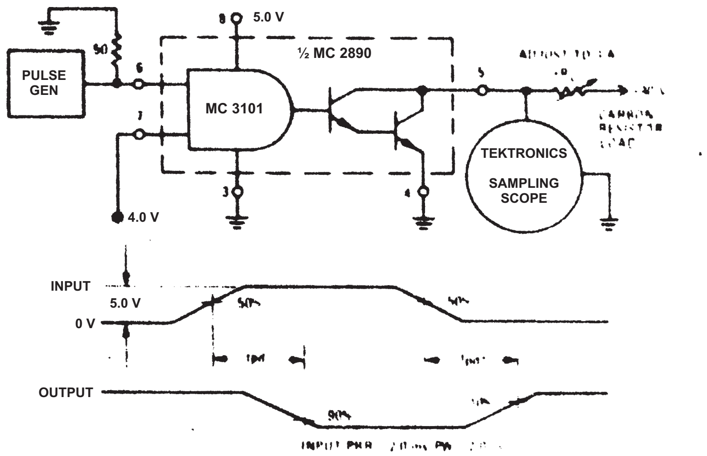


FIGURE 2 – PROPAGATION DELAY TIME TEST CIRCUIT



TYPICAL CHARACTERISTICS

FIGURE 3 – COLLECTOR-EMITTER VOLTAGE versus NEGATIVE EMITTER VOLTAGE

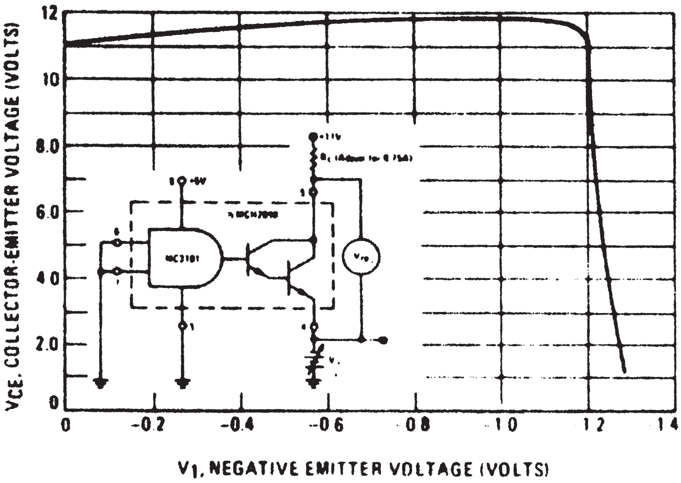
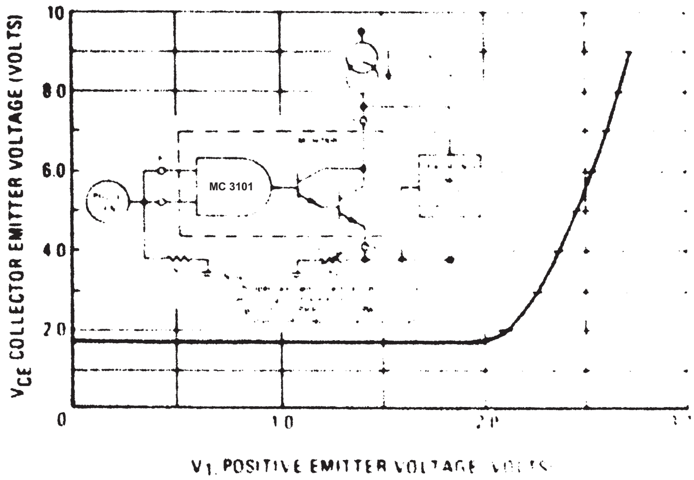


FIGURE 4 – COLLECTOR EMITTER VOLTAGE versus POSITIVE EMITTER VOLTAGE



SAFE OPERATING AREA

FIGURE 5 – COLLECTOR-EMITTER VOLTAGE versus COLLECTOR CURRENT

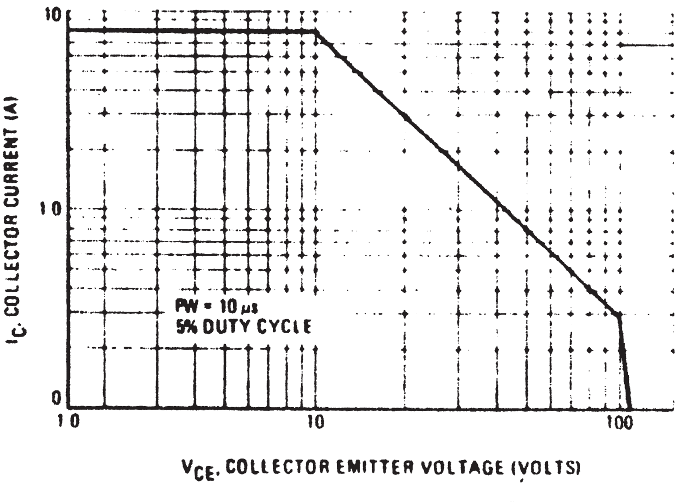


FIGURE 6 – COLLECTOR-EMITTER VOLTAGE versus COLLECTOR CURRENT