MFC8070

ZERO VOLTAGE SWITCH

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. . . designed for use in ac power switching applications with output drive capable of triggering triacs. Other operational features include:

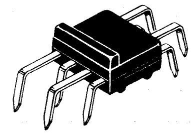
- A built-in voltage regulator that allows direct ac line operation
- A differential input with dual sensor inputs capable of testing the condition of two external sensors and controlling the gate pulse to a triac accordingly. Hysteresis or proportional control to this section may be added if desired.
- Sensor input "open and short" protection. This insures that the triac will never be turned "on" if either of the sensors are shorted or opened.
- A zero crossing detector that synchronizes the triac gate pulses with the zero crossing of the ac line voltage. This eliminates radio frequency interference (rfi) when used with resistive loads.

Typical Applications Include:

- Heater Controls
- Photo Controls
- Threshold Detector
- Lamp Driver
- Valve Control
- ON-OFF Power Controls
- Relay Driver
- Flasher Control

ZERO VOLTAGE SWITCH

Silicon Monolithic Functional Circuit



PLASTIC PACKAGE
CASE 644A

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
DC Voltage	V_{5-8}	15	Vdc
DC Voltage	V_{4-8}	15	Vdc
DC Voltage	V_{7-8}	15	Vdc
Power Dissipation @ $T_A = 25^oC$ Derate above 25^oC	P_D $1/\theta_{JA}$	1.0 10	Watt mW/^oC
Operating Temperature Range	T_A	-10 to +75	^oC
Storage Temperature Range	T_{stg}	-55 to + 150	^oC

See Packaging Information Section for outline dimensions.

ELECTRICAL CHARACTERISTICS (T_A = 25° C unless otherwise noted)

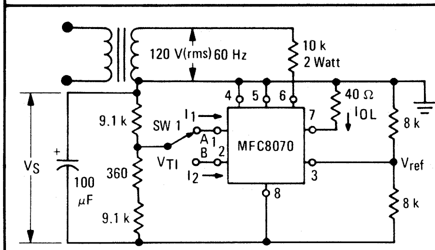
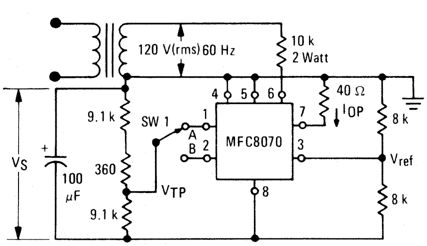
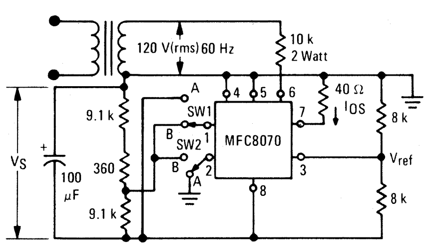
	Characteristic	Symbol	Min	Typ	Max	Unit
	V_S with Inhibit Output (Sw. 1: A or B)	V_{SI}	–	9.0	11	Vdc
	Output Leakage (Sw. 1: A or B)	I_{OL}	–	5.0	100	μA
	Input Current 1 (Sw. 1: A)	I_1	–	5.0	15	μA
	Input Current 2 (Sw. 1: B)	I_2	–	5.0	15	μA
	Inhibit Threshold (Sw. 1: A or B)	V_{TI}	V_{ref} +100 mV	V_{ref} +10 mV	–	Vdc
	V_S with Pulse Output (Sw. 1: A or B)	V_{SP}	6.0	8.5	–	Vdc
	Peak Output Current (Sw. 1: A or B)	I_{OP}	50	–	–	mA
	Pulse Threshold (Sw. 1: A or B)	V_{TP}	–	V_{ref} -10 mV	V_{ref} -100 mV	Vdc
	Output Pulse Width (Sw. 1: A or B) (See Figure 1)	τ_A, τ_B	–	70	–	μs
	Input Short Protection (Sw. 1: A; Sw. 2: B)	I_{OS}	–	5.0	100	μA
	Input Short Protection (Sw. 1: B; Sw. 2: A)	I_{OS}	–	5.0	100	μA

FIGURE 1 – OUTPUT PULSE DEFINITION

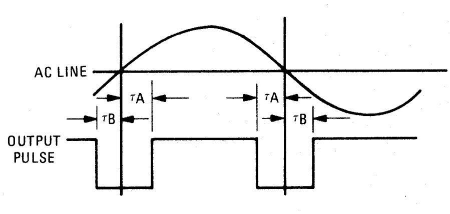


FIGURE 2 – CIRCUIT SCHEMATIC

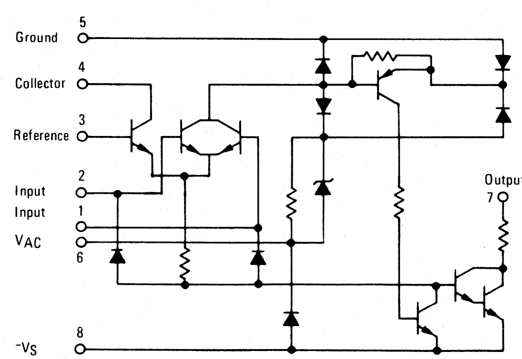


FIGURE 3 — CIRCUIT FOR MEASURING OUTPUT PULSE WIDTH versus SOURCE RESISTANCE

Suggested circuit to vary output pulse width by value of R_S (See Figure 4)

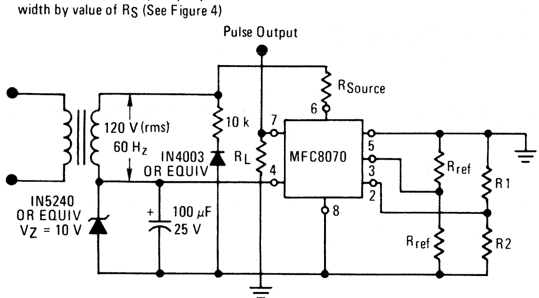
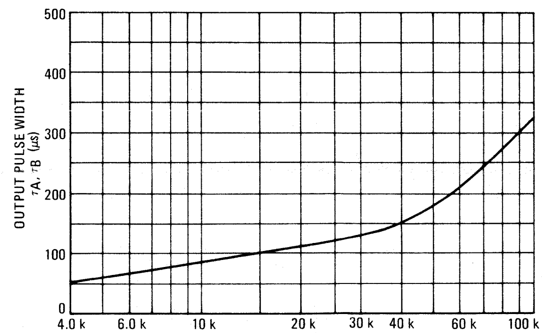
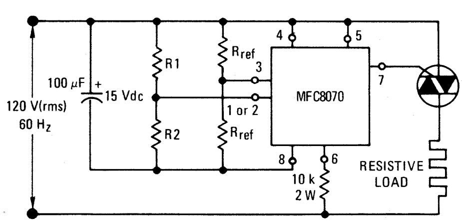


FIGURE 4 — OUTPUT PULSE WIDTH versus SOURCE RESISTANCE



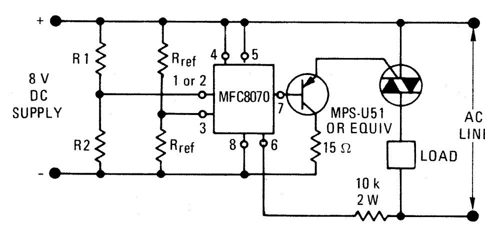
TYPICAL ZERO VOLTAGE SWITCH APPLICATIONS FOR TRIAC CONTROL

FIGURE 5 — TRIAC CONTROL CIRCUIT



Basic triac trigger circuit utilizing the zero crossing detector and the input comparator to control the gate of the triac.

FIGURE 6 — TRIAC CONTROL CIRCUIT WITH CURRENT BOOST UTILIZING DC SUPPLY

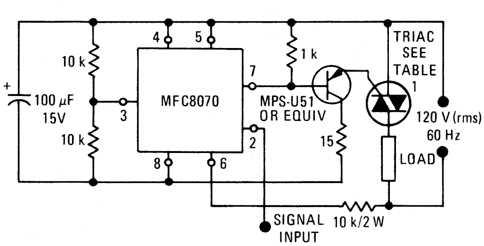


Basic DC trigger application using the input comparator to control a PNP capable of furnishing gate drive of approximately 0.5 Amp.

R1 is an external sensor

R2 must be the external sensor for the internal short and open protection to be operative.

FIGURE 7 — TRIAC CONTROL CIRCUIT WITH CURRENT BOOST UTILIZING AC SUPPLY



Zero crossing triac control circuit for gate current requirements greater than 50 mA.

Recommended Motorola triacs for use in circuit.

Maximum Continuous (Current (Amp [rms])	Triac Family	Case No.
10	2N6151/2N6153 (MAC 10)	90 (Plastic)
10	2N6139/2N6144 (MAC 1, 2, 3)	85, 86, 87L
30	2N6157/2N6165 (MAC 35, 36)	174, 175

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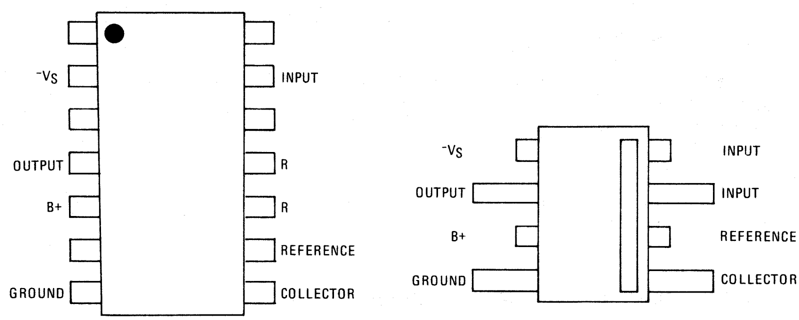
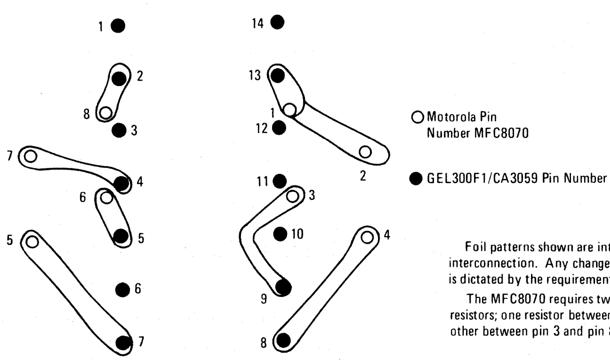
PIN COMPARISON OF MFC8070 AND GEL300F1 (PA424)/CA3059



GEL300F1/CA3059

MFC 8070

COMPATIBLE PRINTED CIRCUIT FOIL PATTERN FOR MFC8070 FOR MFC8070, GEL300F1 (PA424) AND CA3059



Foil patterns shown are intended to show pin-for-pin interconnection. Any change in the number of components is dictated by the requirements of the individual design.

The MFC8070 requires two external reference resistors; one resistor between pin 3 and 5 and the other between pin 3 and pin 8.