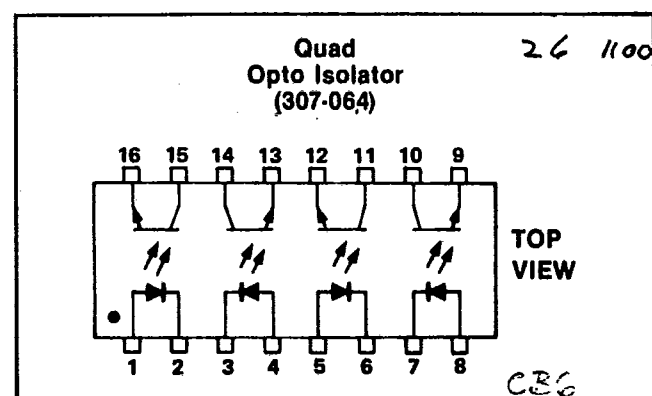
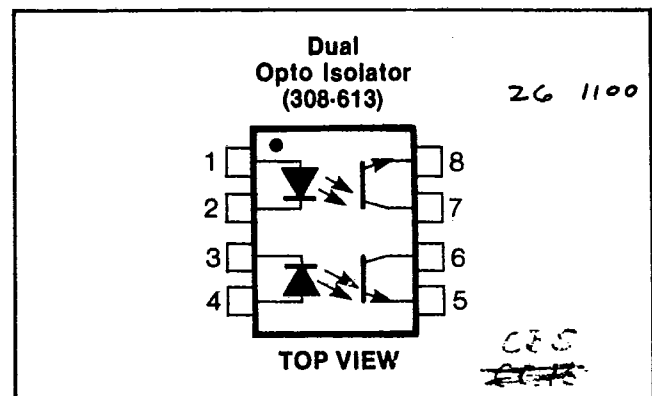
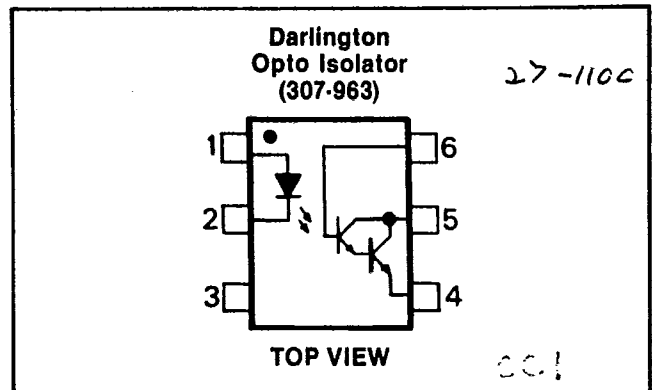
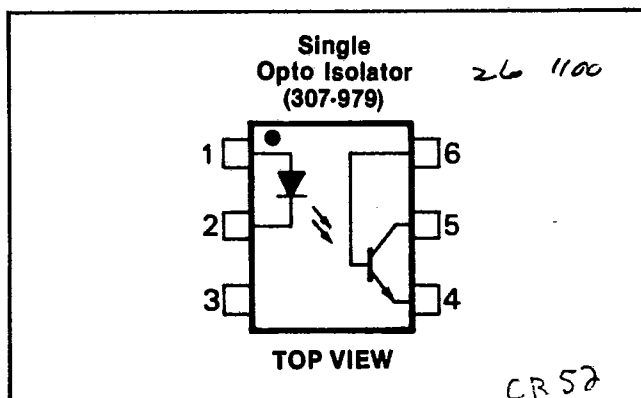


R S COMPONENTS LTD

**RS
data****Opto isolators and
opto coupled
SCR/triacs***new
RSCB
030085**T-41-83
T-41-85
T-41-87*

Four infra-red light emitting diode and silicon phototransistor couplers consisting of: (1) A single Opto Isolator in dual-in-line package suited for fast signal transfer and offering excellent noise immunity. (2) A single Opto Isolator also in a 6 pin dual-in-line package suited for fast signal transfer and offering a high transfer ratio and a darlington transistor output for greater drive capability which will respond to low power signal sources. (3) A dual Opto Isolator having two isolated light emitting diode-photo transistor couplers in one 8 pin dual-in-line Package. (4) A quad Opto Isolator having 4 isolated light emitting diode-photo transistor couplers in one 16 pin dual-in-line package. These last two items offer space and cost saving when multiple isolation is required. In addition an opto-coupled SCR and two opto-coupled triacs are available in 6-pin DIL packages. See pages 4 and 5. All of these couplers offer high voltage and AC isolation and are suited for interface applications in TTL and analogue circuits.

Phototransistor opto isolators**Pin configurations**

Ratings	Single Opto Isolator (307-979)	Darlington Opto Isolator (307-963)	Dual Opto Isolator (308-613)	Quad Opto Isolator (307-064)
Isolation voltage (dc)	±4000V	±4000V	±1500V	±1500V
V _{CE} (max) Transistor (dc)	30V	30V	30V	30V
I _F (max) Diode (dc)	60mA	60mA	100mA	100mA
DC Current transfer Ratio (min)	20%	300%	12.5%	12.5%
	6-pin DIL packages with transistor connection for biasing.		8-pin DIL package	16-pin DIL package

Absolute maximum ratings	Single Opto Isolator (307-979)	Darlington Opto Isolator (307-963)	Dual Opto Isolator (308-613)	Quad Opto Isolator (307-064)	Unit
T _A TEMPERATURE RANGE	-50 to +100	-50 to +100	-55 to +100	-55 to +100	°C
V I/O ISOLATION	±4000	±4000	±1500	±1500	V
I _F DIODE	60	60	100	100	mA
V _F DIODE	3	3	3	3	V
P _d DIODE					
derate at 1.33mW/°C > 25°C	100	100	150	150	mW
V _{CEO}	30	30	30	30	V
V _{ECO}	5	5	7	7	V
P _d TRANSISTOR					
derate at 2.0mW/°C > 25°C	150	150	150	150	mW
TOTAL PACKAGE DISSIPATION					
derate at 5.33mW/°C > 25°C	—	—	400	—	mW
derate at 6.67mW/°C > 25°C	—	—	—	500	mW

Electrical characteristics T_a = 25°C

T-41-87

Parameter	Test conditions	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Units
DIODE														
V _F	I _F = 10mA I _F = 20mA I _F = 100mA	—	—	1.5	—	—	1.5	—	—	—	—	—	—	V
I _R	V _R = 3V	—	—	10	—	—	100	—	—	1.3	—	1.3	0.1	μA
TRANSISTOR														
BV _{CEO}	I _C = 1mA I _C = 100μA	30	—	—	30	—	—	10	—	—	10	—	—	V
BV _{ECO}	I _E = 10μA I _E = 100μA	5	—	—	5	—	—	—	—	—	—	—	—	V
BV _{CBO}	I _C = 10μA	70	—	—	30	—	—	—	—	—	—	—	—	V
I _{CEO} DARK CURRENT	V _{CE} = 5V I _F = 0 V _{CE} = 10V I _F = 0 H = 0	—	5	50	—	—	100	—	5	500	—	5	500	nA
I _{CBO}	V _{CE} = 10V I _E = 0	—	—	20	—	—	50	—	—	—	—	—	—	nA
h _{FE}	V _{CE} = 5V I _C = 100μA	100	200	—	20k	—	—	—	—	—	—	—	—	—
C _{CE}	V _{CE} = 0	—	8	—	5	—	—	—	2	—	—	2	—	pF
COUPLED														
I _C /I _F DC CURRENT TRANSFER RATIO	I _F = 10mA V _{CE} = 2V I _F = 16mA V _{CE} = 5V	20	—	—	300	—	—	12.5	35	—	12.5	35	—	%
R _{ISO} ISOLATION RESISTANCE	V = 500V	10 ¹¹	—	—	10 ¹¹	—	—	—	10 ¹¹	—	—	10 ¹¹	—	Ω
V _{CE} (SAT)	I _F = 10mA I _C = 10mA I _F = 16mA I _C = 2mA	—	—	0.4	—	1	—	—	0.5	—	—	0.5	—	V
C I/O INPUT/OUTPUT CAPACITANCE		2	—	—	0.5	—	—	—	0.5	—	—	0.5	—	pF
t _r RISE TIME	V _{CE} = 10V, I _B = 0, I _F = 10mA V _{CE} = 10V, R _L = 100Ω, I _F = 10mA	2	—	—	—	—	—	—	—	—	—	—	—	μs
	V _{CE} = 10V, R _L = 100Ω, I _F = 8mA	—	—	—	3	—	—	—	—	—	—	—	—	μs
t _f FALL TIME	V _{CE} = 10V, I _B = 0, I _F = 10mA V _{CE} = 10V, R _L = 100Ω, I _F = 10mA	2	—	—	—	—	—	—	2	—	—	2	—	μs
	V _{CE} = 10V, R _L = 100Ω, I _C = 8mA	—	—	—	25	—	—	—	—	—	—	—	—	μs

Figure 1

Response time vs base resistance for 307-979

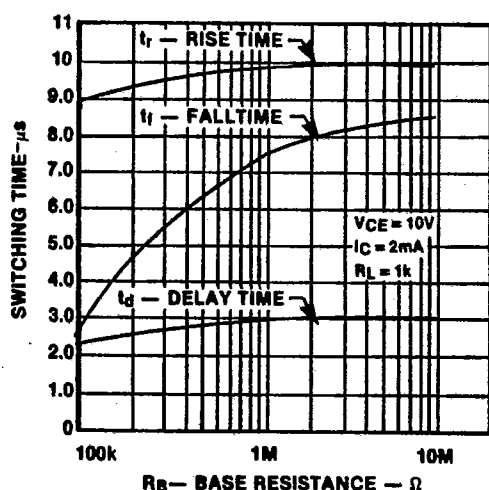


Figure 2

Rise and fall time vs load resistance for 307-979

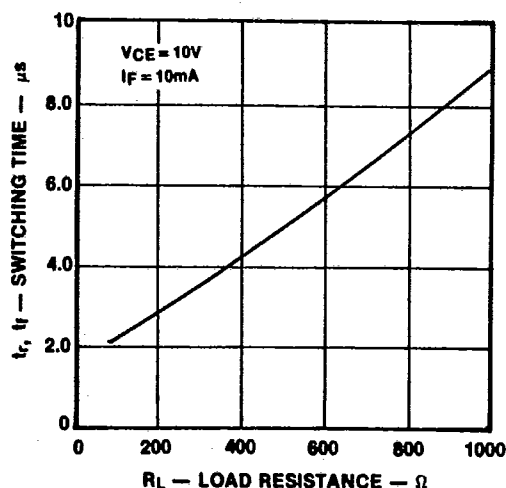
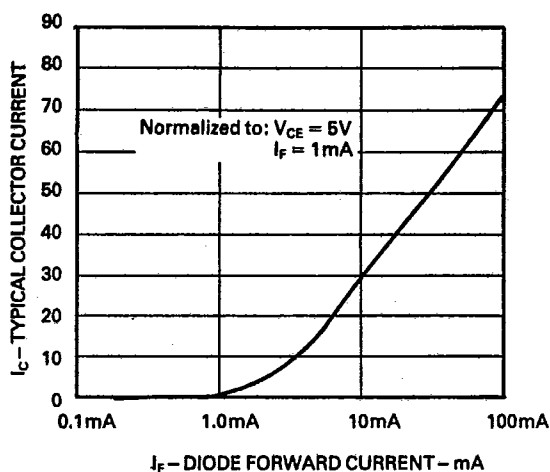
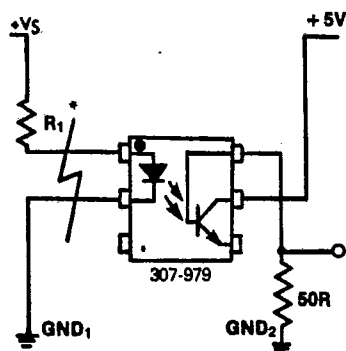


Figure 3 Typical collector current vs diode forward current for 307 & 963



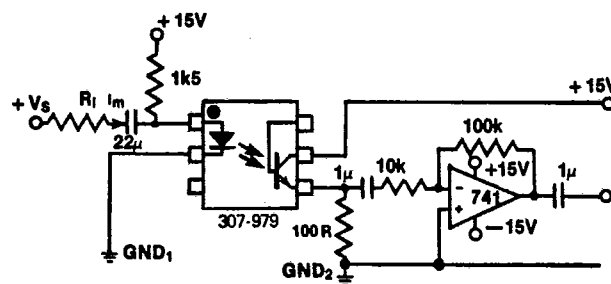
Applications

Figure 4 Fast pulse transfer



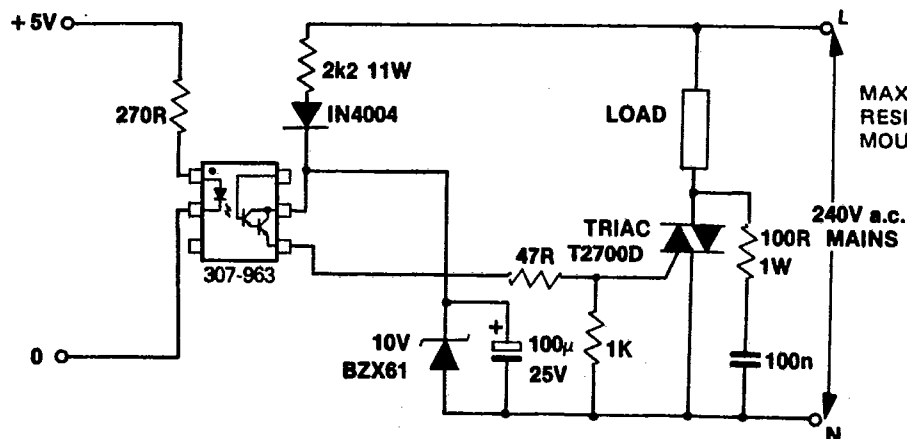
This mode of operation increases switching speed from about 2 μ s to about 100ns but reduces current transfer ratio to about 0.2%

Figure 5 A.C. signal isolation



Choose R_1 to limit modulating current (I_m) to 5mA max. Useful frequency range in the order of 20Hz to 20kHz

Figure 6 Light activated solid state relay



MAXIMUM LOAD:- 540W
RESISTIVE/INDUCTIVE LOAD 6A
MOUNT TRIAC ON A 4°C/W HEAT SINK.

3958

Figure 7 TTL interface

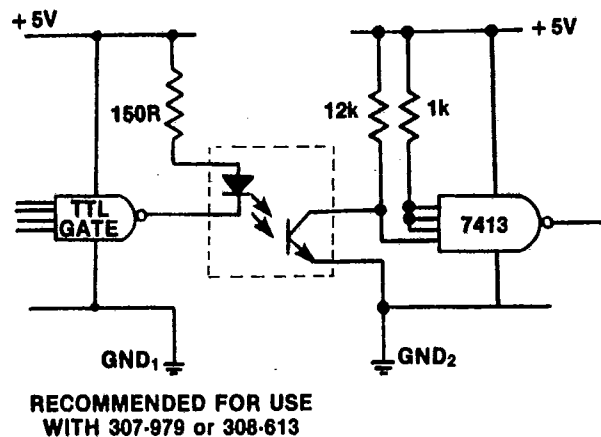
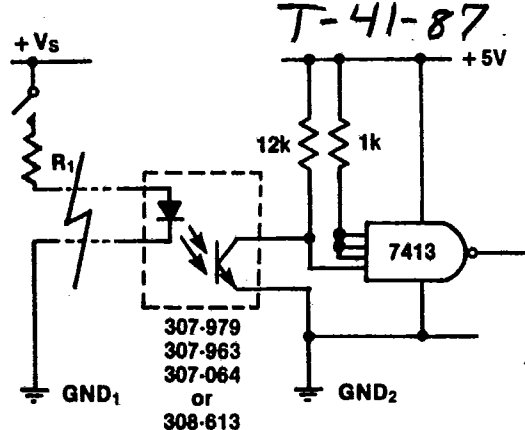


Figure 8 Switched input isolation offering good noise immunity



NOTE: *R₁ is chosen to limit I_F, $R_1 = \frac{V_s - V_F}{I_F}$

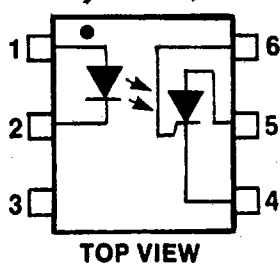
Where V_F—forward volts drop of diode
I_F—forward diode current
V_s—supply voltage

Opto-coupled SCR and Triacs

A gallium arsenide infra-red light emitting diode coupled with a light activated silicon controlled rectifier or triac in a 6 pin dual-in-line package.

OE 28 1100

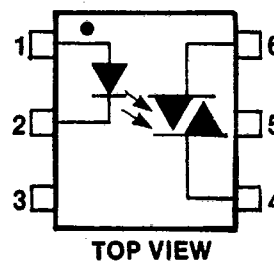
Opto-Coupled
SCR H11C4
(308-001)



CD1

OE 28 1200

Opto-Coupled
Triac 3020
(308-196)

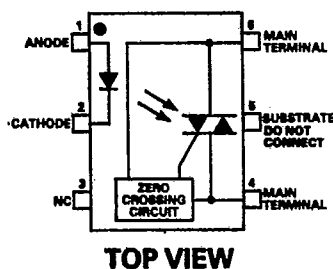


TRIAC
SUBSTRATE
DO NOT
CONNECT

CD3

OE 28 1200

Zero Voltage Crossing
Opto-Coupled Triac 3041
(301-628)



CD8

Electrical characteristics $T_A = 25^\circ\text{C}$ unless otherwise stated

OK

T-41-85

T-41-87

	308-001			308-196			301-628			
LED	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
V_F (at $I_F = 10\text{mA}$)	-	1.2	1.5	-	1.2	1.5	-	1.2	1.5	V
I_R (at $V_R = 3\text{V}$)	-	-	10	-	0.05	100	-	-	100	μA
Output switch (SCR or triac)										
V_{DRM}	400	-	-	400	-	-	400	-	-	V
V_{RRM}	400	-	-	400	-	-	400	-	-	V
V_{TM}	-	1.1	1.3	-	2.5	3.0	-	1.75	3.0	V
		$(I_{TM} = 0.3\text{A})$			$(I_{TM} = 0.1\text{A})$					
I_{DRM} (at $400\text{V } V_{DRM}$)	-	-	150 $(T_A = 100^\circ\text{C})$	-	0.01	0.1	-	0.01	0.1	μA
I_H	-	100 $(R_{GK} = 10\text{k}\Omega,$ $V_{AK} = 50\text{V})$	-	-	100 $(V_{AK} = 3\text{V})$	-	-	200	-	μA
dV/dt	-	20 $(R_{GK} = 10\text{k}\Omega)$	-	-	2	-	-	100	-	$\text{V}/\mu\text{s}$
Total device										
LED current to latch O/P switch	-	-	20 $(V_{AK} = 50\text{V}, R_{GK} = 10\text{k}\Omega)$	-	8	15				mA
	-	-	11 $(V_{AK} = 100\text{V}, R_{GK} = 27\text{k}\Omega)$		$(V_{AK} = 3.0\text{V}, 10\text{mA LED Drive})$					
Isolation				Surge voltage (5s) 7,500V Peak						

Absolute maximum ratings

L.E.D.	308-001	308-196	301-628
Continuous forward current	60mA	50mA	50mA
Reverse voltage	6V	3V	6V
Output switch (SCR or triac)			
V_{DRM}	400V	400V	400V
V_{RRM}	400V	400V	400V
$I_{T(RMS)}$	300mA	100mA	50mA
I_{TSM}	5A	1.2A	1.2A
	[100 μs pulse 1% duty cycle]	[10 μs pulse 10% duty cycle]	[10ms pulse 10% duty cycle]
P_D at $T_A = 25^\circ\text{C}$			
	[400mW Derate 5.3 mW/ $^\circ\text{C}$ above 25°C]	[300mW Derate 4 mW/ $^\circ\text{C}$ above 25°C]	[330mW Derate 4.4 mW/ $^\circ\text{C}$ above 25°C]

3958

Opto-coupled SCR

Figure 9 On-state current vs maximum allowable temperature

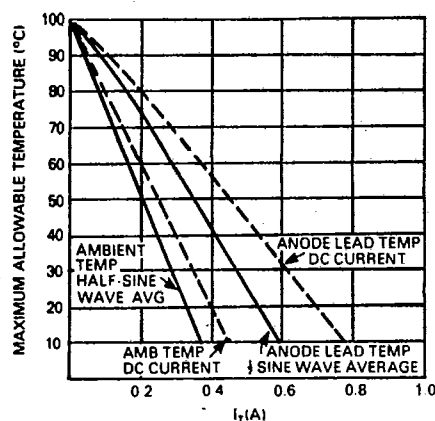
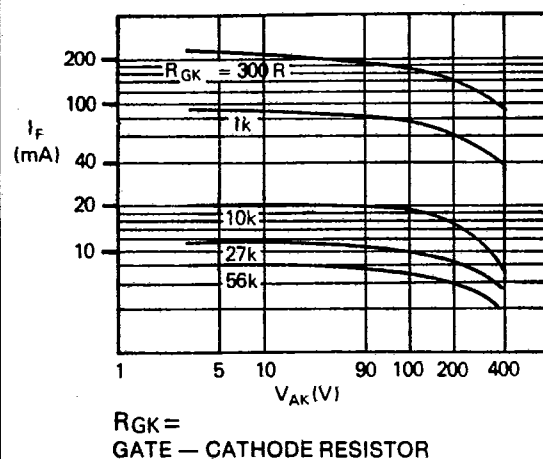


Figure 10 Input current to trigger vs anode-cathode voltage



Applications

Figure 11 Lamp driver with TTL input

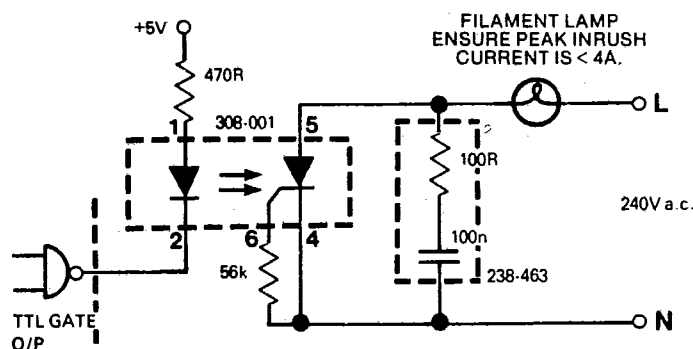
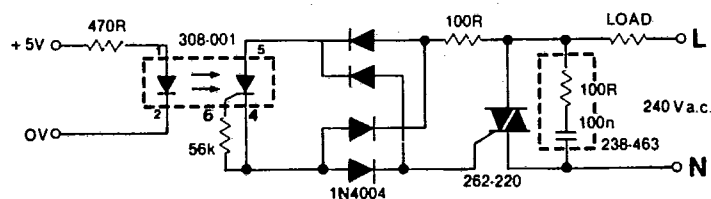


Figure 12 Solid state relay



Opto-coupled triac

Figure 13 On-state characteristics

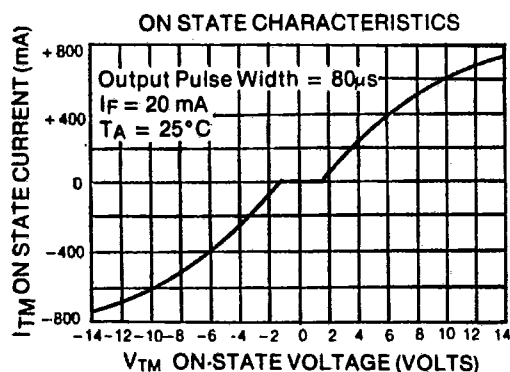
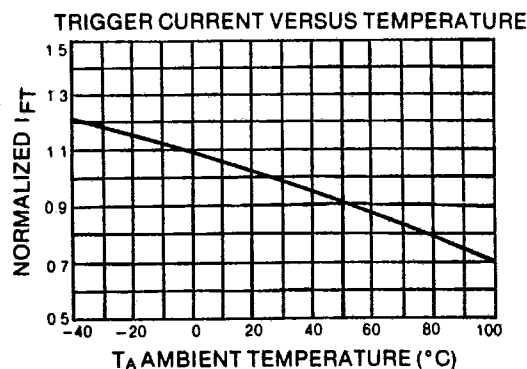


Figure 14 Trigger current vs temperature



Applications

T-41-85

T-41-87

Figure 15 Resistive load with TTL input

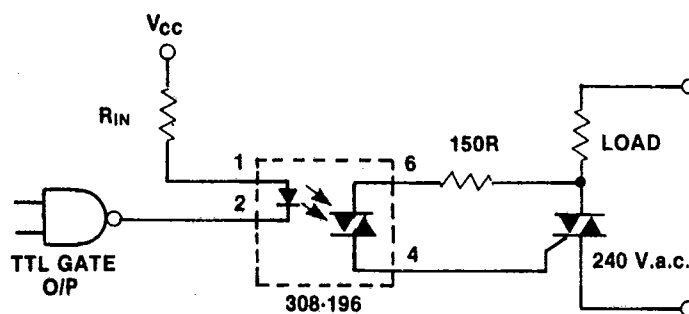
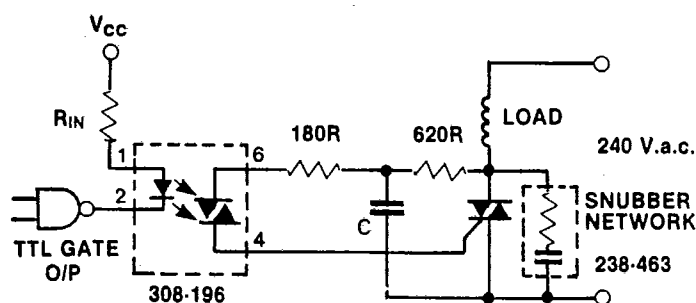
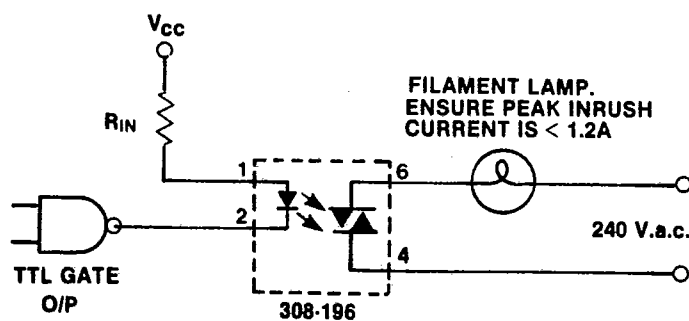


Figure 16 Inductive load with TTL input



C	LOAD POWER FACTOR
220n	0.75
330n	0.5

Figure 17 Low power filament lamp driver with TTL input



RS data

Zero voltage crossing opto-coupled triac

Figure 18 Trigger current vs temperature

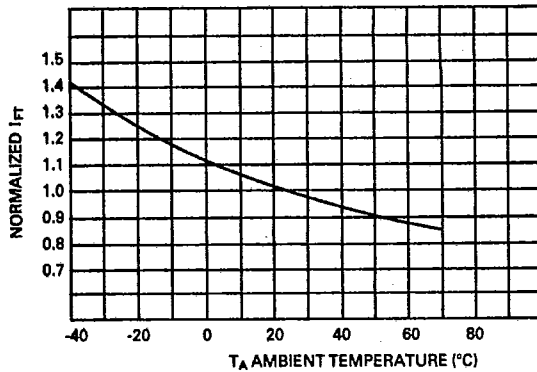
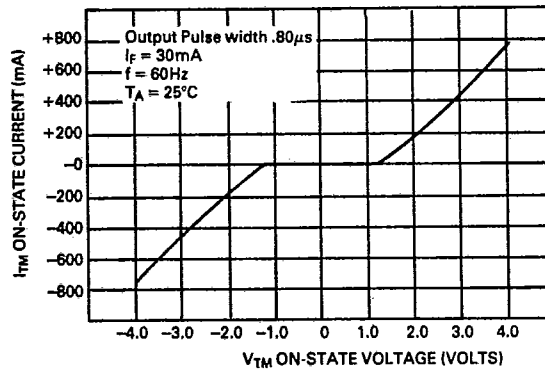


Figure 19 On-state characteristics



Applications

Figure 20 Mains switching

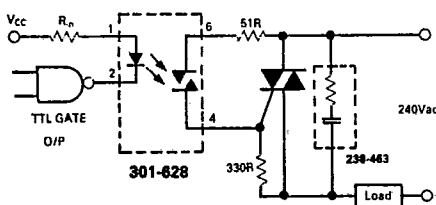


Figure 21 Inverse - parallel SCR driver circuit

