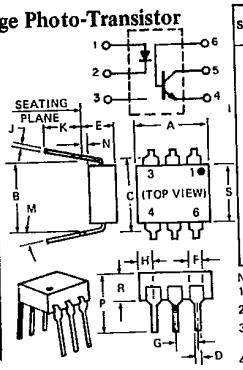
Photon Coupled Isolator CNY33

Ga As Infrared Emitting Diode & NPN Silicon High Voltage Photo-Transistor

The GE Solid State CNY33 is a gallium arsenide, infrared emitting diode coupled with silicon high voltage phototransistors in a dual-in-line package. This device is also available in Surface-Mount packaging.



SYMBOL	MILLIMETERS MIN.	MILLIMETERS MAX	INCHES MIN.	INCHES MAX.	NOTES
A	8.38	8.89	.330	.350	
B	7.62 REF		300 REF		1
C	–	8.64	–	.340	2
D	.406	.508	.016	.020	
E	–	5.08	–	.200	3
F	1.01	1.78	.040	.070	
G	2.28	2.80	.090	.110	
H	–	2.16	–	.085	4
J	.203	.305	.008	.012	
K	2.54	–	.100	–	
M	–	15	–	15	
N	.381	–	.015	–	
P	–	9.53	–	.375	
R	2.92	3.43	.115	.135	
S	6.10	6.86	.240	.270	

NOTES
1 INSTALLED POSITION LEAD CENTERS
2 OVERALL INSTALLED DIMENSION.
3 THESE MEASUREMENTS ARE MADE FROM THE SEATING PLANE.
4 FOUR PLACES

absolute maximum ratings: (25°C)

INFRARED EMITTING DIODE		
Power Dissipation	*100	milliwatts
Forward Current (Continuous)	60	milliamps
Forward Current (Peak) (Pulse width 1 μsec 300 pps)	3	ampere
Reverse Voltage	6	volts

*Derate 1.33mW/°C above 25°C ambient.

PHOTO-TRANSISTOR		
Power Dissipation	**300	milliwatts
V_{CEO}	300	volts
V_{CBO}	300	volts
V_{EBO}	7	volts
Collector Current (Continuous)	100	milliamps

**Derate 4.0mW/°C above 25° ambient.

TOTAL DEVICE

Storage Temperature -55 to 150°C
Operating Temperature -55 to 100°C
Lead Soldering Time (at 260°C) 10 seconds.
Surge Isolation Voltage (Input to Output).
$3535V_{(peak)}$ $2500V_{(RMS)}$
Steady-State Isolation Voltage (Input to Output).
$3180V_{(peak)}$ $2250V_{(RMS)}$

individual electrical characteristics (25°C)

INFRARED EMITTING DIODE	TYP.	MAX.	UNITS
Forward Voltage (I_F = 10mA)	1.1	1.5	volts
Reverse Current (V_R = 6V)	–	10	microamps
Capacitance (V = 0, f = 1 MHz)	50	–	picofarads

PHOTO-TRANSISTOR	MIN.	MAX.	UNITS
Breakdown Voltage – $V_{(BR)CEO}$ (I_C = 1mA; I_F = 0)	300	–	volts
Breakdown Voltage – $V_{(BR)CBO}$ (I_C = 100μA; I_F = 0)	300	–	volts
Breakdown Voltage – $V_{(BR)EBO}$ (I_E = 100μA; I_F = 0)	7	–	volts
Collector Dark Current – I_{CEO} (V_{CE}=200V; I_F=0, T_A= 25°C)	–	100	nanoamps
(V_{CE}=200V; I_F=0; T_A=100°C)	–	250	microamps

coupled electrical characteristics (25°C)

	MIN.	TYP.	MAX.	UNITS
DC Current Transfer Ratio (I_F = 10mA, V_{CE}= 10V)	20	–	–	%
Saturation Voltage – Collector to Emitter (I_F = 10mA, I_C = 0.5mA)	–	0.1	0.4	volts
Isolation Resistance (V_{IO} = 500V_{DC})	100	–	–	gigaohms
Input to Output Capacitance (V_{IO} = 0, f = 1MHz)	–	–	2	picofarads
Switching Speeds: Turn-On Time – (V_{CE} = 10V, I_{CE} = 2mA, R_L = 100Ω)	–	5	–	microseconds
Turn-Off Time – (V_{CE} = 10V, I_{CE} = 2mA, R_L = 100Ω)	–	5	–	microseconds

VDE Approved to 0883/6.80 0110b Certificate # 35025

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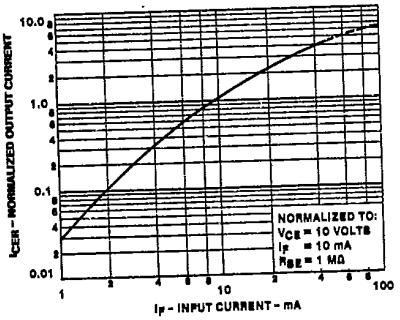
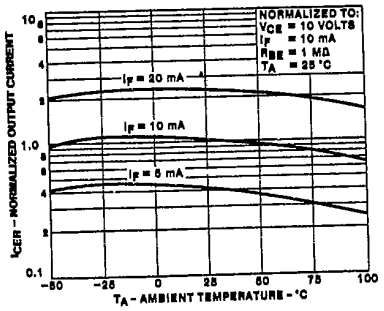
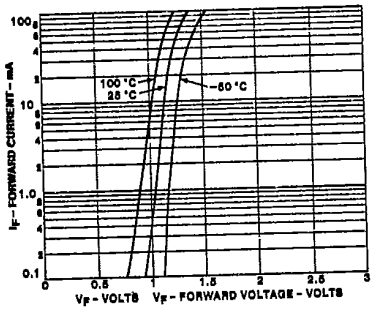
TYPICAL CHARACTERISTICS



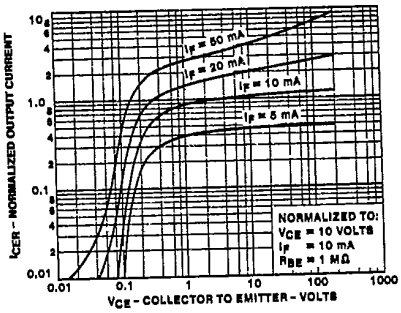
1. OUTPUT CURRENT VS INPUT CURRENT



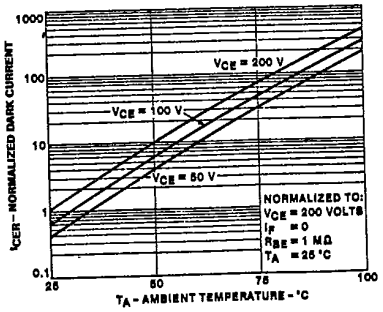
2. OUTPUT CURRENT VS. TEMPERATURE



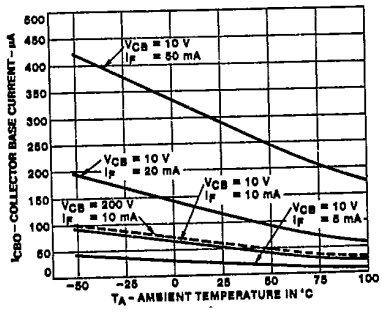
3. INPUT CHARACTERISTICS



4. OUTPUT CHARACTERISTICS



5. NORMALIZED DARK CURRENT VS. TEMPERATURE

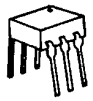


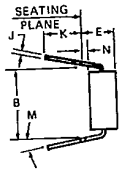
6. COLLECTOR BASE CURRENT VS. TEMPERATURE

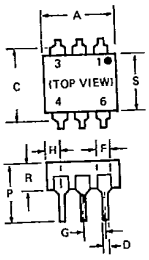
AC Input Photon Coupled Isolator CNY35

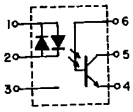
Ga As Infared Emitting Diodes & NPN Silicon Photo-Transistor

The GE Solid State CNY35 consists of two gallium arsenide, infrared emitting diodes connected in inverse parallel and coupled with a silicon phototransistor in a dual-in-line package. This device is also available in Surface-Mount packaging.









FEATURES:

- AC or polarity insensitive inputs
- Fast switching speeds
- Built-in reverse polarity input protection
- High isolation voltage
- High isolation resistance
- I/O compatible with integrated circuits

SYMBOL	MILLIMETERS MIN.	MILLIMETERS MAX.	INCHES MIN.	INCHES MAX.	NOTES
A	8.38	8.89	330	350	
B	7.62 REF.		300 REF.		1
C	–	8.64	–	340	2
D	.406	.508	016	020	
E	–	5.08	–	200	3
F	1.01	1.78	040	.070	
G	2.28	2.80	090	.110	
H	–	2.16	–	085	4
J	.203	305	008	012	
K	2.54	–	100	–	
M	–	15	–	15	
N	381	–	015	–	
P	–	9.53	–	375	
R	2.92	3.43	.115	.135	
S	6.10	6.86	240	270	

NOTES
1. INSTALLED POSITION LEAD CENTERS.
2. OVERALL INSTALLED DIMENSION.
3. THESE MEASUREMENTS ARE MADE FROM THE SEATING PLANE.
4. FOUR PLACES.

absolute maximum ratings: (25°C) (unless otherwise specified)

INFRARED EMITTING DIODE		
Power Dissipation – T_A = 25°C	*100	milliwatts
Power Dissipation – T_A = 25°C (T_C indicates collector lead temperature 1/32" from case)	*100	milliwatts
Input Current (RMS)	60	milliamps
Input Current (Peak) (Pulse width 1 μs, 300 pps)	±1	ampere

*Derate 1.33 mW/°C above 25°C

PHOTO-TRANSISTOR		
Power Dissipation – T_A = 25°C	**300	milliwatts
Power Dissipation – T_A = 25°C (T_C indicates collector lead temperature 1/32" from case)	***500	milliwatts
V_{CEO}	30	volts
V_{CBO}	70	volts
V_{EBO}	5	volts
Collector Current Continuous)	100	milliamps

**Derate 4.0 mW/°C above 25°C
***Derate 6.7 mW/°C above 25°C

TOTAL DEVICE	
Storage Temperature -55 to 150°C	
Operating Temperature -55 to 100°C	
Lead Soldering Time (at 260°C) 10 seconds	
Surge Isolation Voltage (Input to Output)	
$1500V_{(peak)}$	$1060V_{(RMS)}$
Steady-State Isolation Voltage (Input to Output)	
$950V_{(peak)}$	$660V_{(RMS)}$

individual electrical characteristics (25°C) (unless otherwise specified)

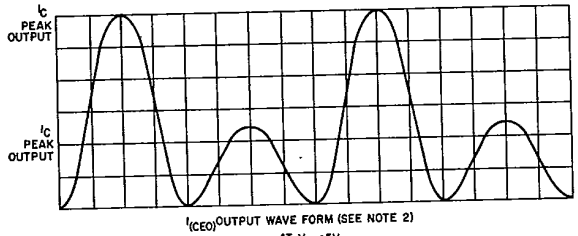
INFRARED EMITTING DIODE	MAX.	UNITS
Input Voltage – V_F (I_F = ±10mA)	1.8	volts
Capacitance (V = 0, f = 1 MHz)	100	picofarads

PHOTO-TRANSISTOR	MIN.	MAX.	UNITS
Breakdown Voltage – $V_{(BR)CEO}$ (I_C = 10mA, I_F = 0)	30	–	volts
Breakdown Voltage – $V_{(BR)CBO}$ (I_C = 100μA, I_F = 0)	70	–	volts
Breakdown Voltage – $V_{(BR)EBO}$ (I_E = 100μA, I_F = 0)	5	–	volts
Collector Dark Current – I_{CEO} (V_{CE} = 10V, I_F = 0)	–	200	nanoamps

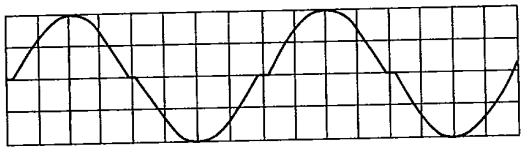
coupled electrical characteristics (25°C) (unless otherwise specified)

	MIN.	MAX.	UNITS
Current Transfer Ratio (V_{CE} = 10V, I_F = ± 10mA)	10	–	percent
Saturation Voltage – Collector to Emitter (I_{CEO} = 0.5 mA, I_F = ± 10mA)	–	0.4	volts
Isolation Resistance V_{IO} = 500V (note 1)	100	–	gigaohms

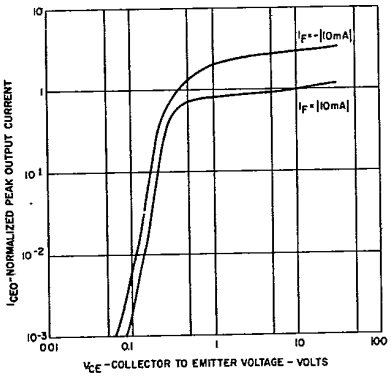
Note 1: Tests of input to output isolation current resistance, and capacitance are performed with the input terminals (diode) shorted together and the output terminals (transistor) shorted together.



$I_{(CEO)}$ OUTPUT WAVE FORM (SEE NOTE 2) AT V_{CE} = 5V



I_F INPUT WAVE FORM



Note 2: These waveforms and curves are exaggerated in amplitude differences to indicate the outputs corresponding to the positive and negative input polarities will not be identical. Typical differences in amplitude is 10% to 20%.

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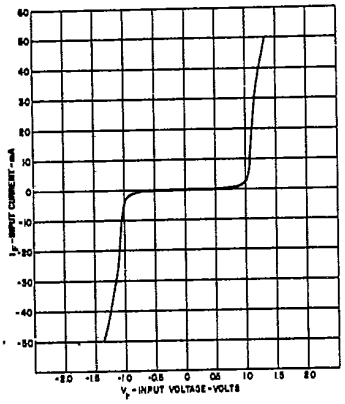
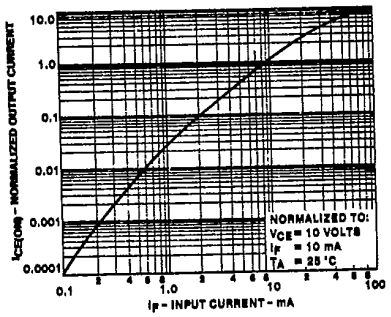
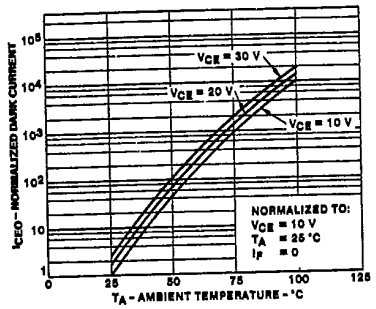
TYPICAL CHARACTERISTICS



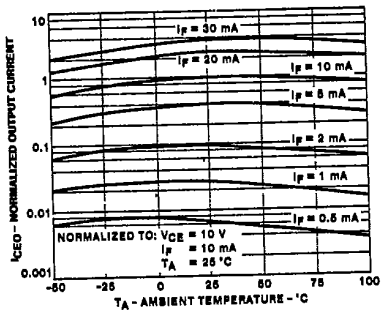
1. INPUT CHARACTERISTICS



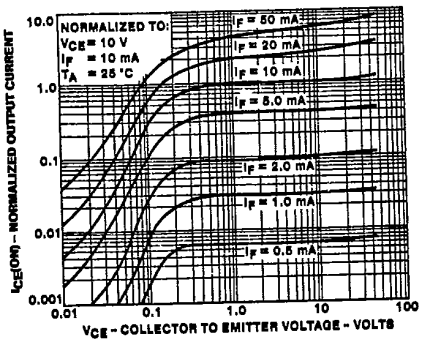
2. OUTPUT CURRENT VS INPUT CURRENT



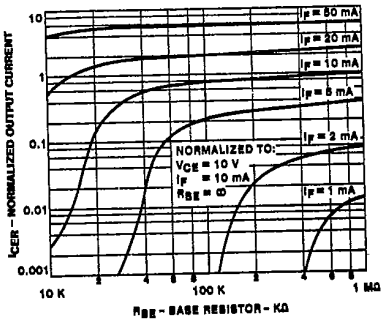
3. DARK I_{CEO} CURRENT VS TEMPERATURE



4. OUTPUT CURRENT VS TEMPERATURE



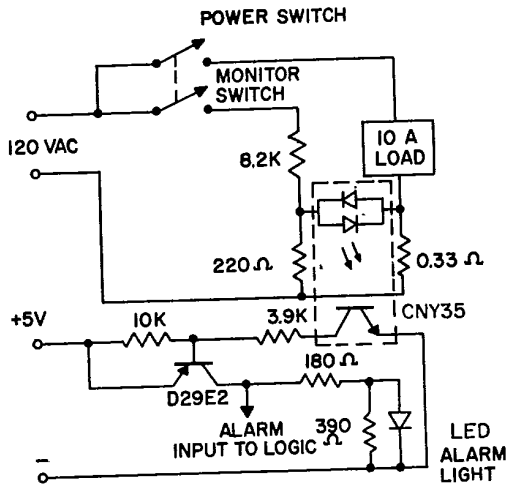
5. OUTPUT CHARACTERISTICS



6. OUTPUT CURRENT VS BASE EMITTER RESISTANCE

TYPICAL APPLICATIONS

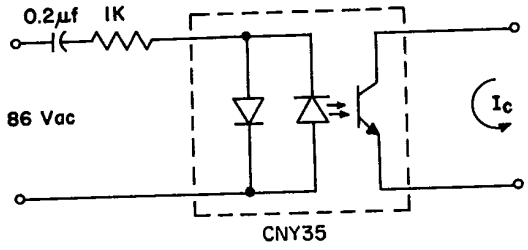
LOAD MONITOR AND ALARM



In many computer controlled systems where AC power is controlled, load dropout due to filament burnout, fusing, etc. or the opposite situation - load power when uncalled for due to switch failure can cause serious systems or safety problems. This circuit provides a simple AC power monitor which lights an alarm lamp and provides a "1" input to the computer control in either of these situations while maintaining complete electrical isolation between the logic and the power system.

Note that for other than resistive loads, phase angle correction of the monitoring voltage divider is required.

RING DETECTOR



In many telecommunications applications it is desirable to detect the presence of a ring signal in a system without any direct electrical contact with the system. When the 86 Vac ring signal is applied, the output transistor of the CNY35 is turned on indicating the presence of a ring signal in the isolated telecommunications system.

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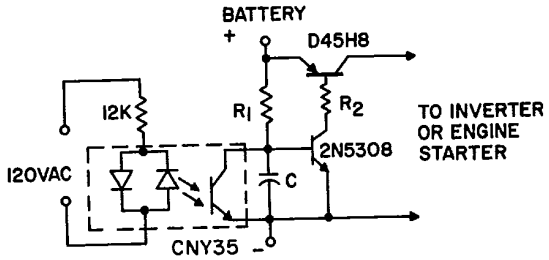
UPS SOLID STATE TURN-ON SWITCH



Interruption of the 120 VAC power line turns off the CNY35, allowing C to charge and turn on the 2N5308-D45H8 combination which activates the auxiliary power supply. This system features low standby drain, isolation to prevent ground loop problems and the capability of ignoring a fixed number of "dropped cycles" by choice of the value of C.