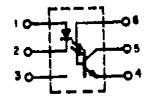
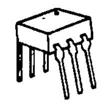
Photon Coupled Isolator CNY51



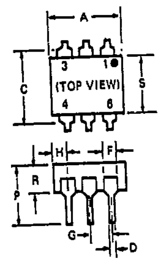


Ga As Infrared Emitting Diode & NPN Silicon Photo-Transistor

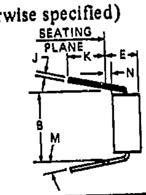
The GE Solid State CNY51 consists of a gallium arsenide, infrared emitting diode coupled with a silicon phototransistor in a dual-in-line package. This device is also available in Surface-Mount packaging.

FEATURES:

- High isolation voltage, 5000V minimum.
- GE Solid State unique patented glass isolation construction
- High efficiency liquid epitaxial IRED.
- High humidity resistant silicone encapsulation.
- Fast switching speeds.



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	4
H	—	2.16	—	.085	
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

Creepage Distance 8.2mm min.
Air Gap 7.6mm min.

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

INFRARED EMITTING DIODE		
Power Dissipation – $T_A = 25°C$	*100	milliwatts
Forward Current (Continuous)	60	milliamps
Forward Current (Peak) (Pulse width 1 μsec, 300 pps)	3	amperes
Reverse Voltage	6	volts

*Derate 1.33mW/°C above 25°C.

PHOTO-TRANSISTOR		
Power Dissipation – $T_A = 25°C$	**300	milliwatts
V_{CEO}	70	volts
V_{CBO}	70	volts
V_{EBO}	7	volts
Collector Current (Continuous)	100	milliamps

**Derate 4.0mW/°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). See Note 2.
5656V(peak) 4000V(RMS)
Steady-State Isolation Voltage (Input to Output). See Note 2.
5000V(DC) 3000V(RMS)

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

INFRARED EMITTING DIODE	MIN.	MAX.	UNITS
Forward Voltage — V_F (I_F = 60mA)	—	1.65	volts
Forward Voltage — V_F (I_F = 10mA)	.8	1.5	volts
Forward Voltage — V_F (I_F = 10mA) T_A = -55°C	.9	1.7	volts
Forward Voltage — V_F (I_F = 10mA) T_A = +100°C	.7	1.4	volts
Reverse Current — I_R (V_R = 6V)	—	10	microamps
Capacitance — C_J (V = 0, f = 1MHz)	—	100	picofarads

PHOTO-TRANSISTOR	MIN.	TYP.	MAX.	UNITS
Breakdown Voltage — $V_{(BR)CEO}$ (I_C = 10mA, I_F = 0)	70	—	—	volts
Breakdown Voltage — $V_{(BR)CEO}$ (I_C = 100μA, I_F = 0)	70	—	—	volts
Breakdown Voltage — $V_{(BR)CEO}$ (I_C = 100μA, I_F = 0)	7	—	—	volts
Collector Dark Current — I_{CEO} (V_{CE} = 10V, I_F = 0)	—	5	50	nano-amps
Collector Dark Current — I_{CEO} (V_{CE} = 10V, I_F = 0) T_A = 100°C	—	—	500	micro-amps
Capacitance — C_{CE} (V_{CE} = 10V, f = 1MHz)	—	2	—	pico farads

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VDE Approved to 0883/6.80 0110b Certificate # 35025

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

		MIN.	TYP.	MAX.	UNITS
DC Current Transfer Ratio (I_F = 10mA, V_{CE} = 10V)	CYN51	100	–	–	%
Saturation Voltage – Collector to Emitter (I_F = 20mA, I_C = 2mA)		–	–	0.4	volts
Isolation Resistance (Input to Output Voltage = 500V_{DC}. See Note 1)		100	–	–	gigaohms
Input to Output Capacitance (Input to Output Voltage = 0, f = 1 MHz. See Note 1)		–	–	2.0	picofarads
Turn-On Time – t_{on} (V_{CC} = 10V, I_C = 2mA, R_L = 100Ω). (See Figure 1)		–	5	10	microseconds
Turn-Off Time – t_{off} (V_{CC} = 10V, I_C = 2mA, R_L = 100Ω). (See Figure 1)		–	5	10	microseconds

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.

NOTE 2:

Surge Isolation Voltage

a. *Definition:*
This rating is used to protect against transient over-voltages generated from switching and lightning-induced surges. Devices shall be capable of withstanding this stress, a minimum of 100 times during its useful life. Ratings shall apply over entire device operating temperature range.

b. *Specification Format:*
Specification, in terms of peak and/or RMS, 60 Hz voltage, of specified duration (e.g., 5656V_{peak}/4000V_{RMS} for one minute).

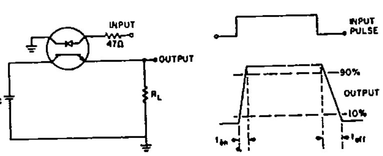
c. *Test Conditions:*
Application of full rated 60 Hz sinusoidal voltage for one minute, with initial application restricted to zero voltage (i.e., zero phase), from a supply capable of sourcing 5mA at rated voltage.

Steady-State Isolation Voltage

a. *Definition:*
This rating is used to protect against a steady-state voltage which will appear across the device isolation from an electrical source during its useful life. Ratings shall apply over the entire device operating temperature range for a period of 10 minutes minimum.

b. *Specification Format:*
Specified in terms of D.C. and/or RMS 60 Hz sinusoidal waveform.

c. *Test Conditions:*
Application of the full rated 60 Hz sinusoidal voltage, with initial application restricted to zero voltage (i.e., zero phase), from a supply capable of sourcing 5mA at rated voltage, for the duration of the test.



Adjust Amplitude of Input Pulse for Output (I_C) of 2mA
Test Circuit and Voltage Waveforms

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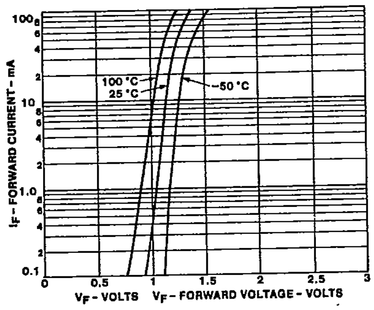
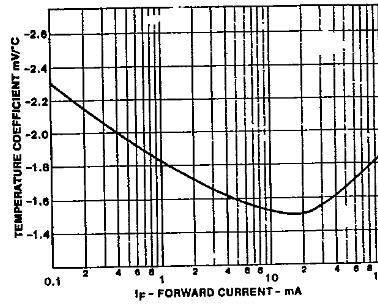
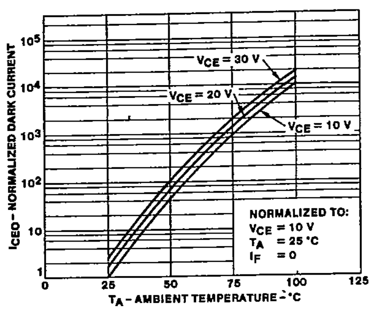
TYPICAL CHARACTERISTICS



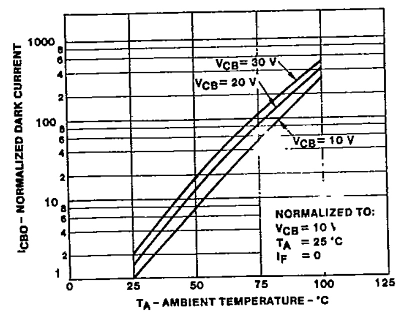
1. INPUT CHARACTERISTICS



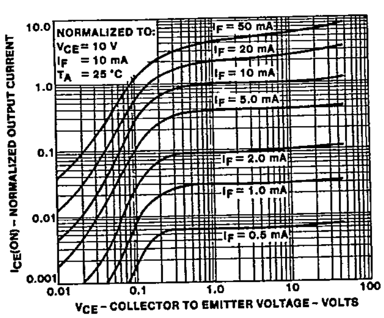
2. FORWARD VOLTAGE TEMPERATURE COEFFICIENT



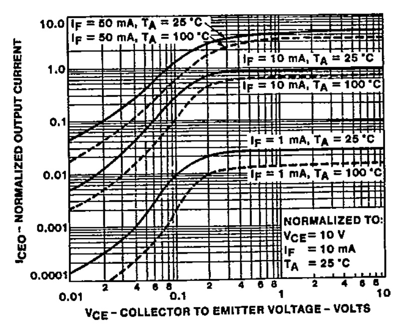
3. DARK I_{CEO} CURRENT VS TEMPERATURE



4. I_{CBO} VS TEMPERATURE



5. OUTPUT CHARACTERISTICS



6. OUTPUT CHARACTERISTICS

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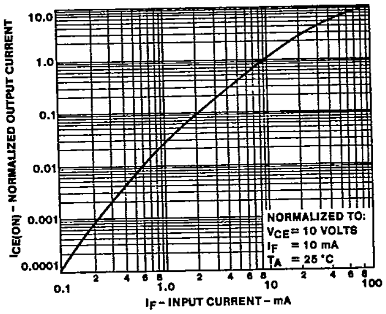
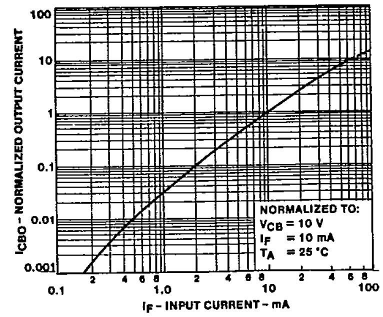
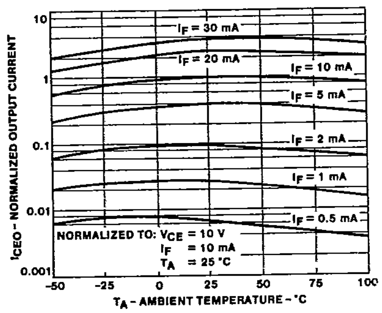
TYPICAL CHARACTERISTICS



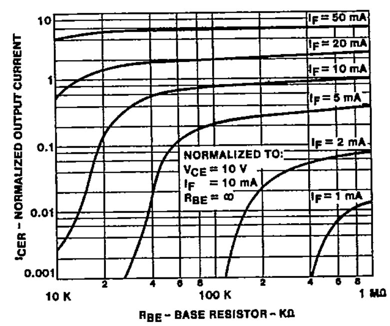
7. OUTPUT CURRENT VS INPUT CURRENT



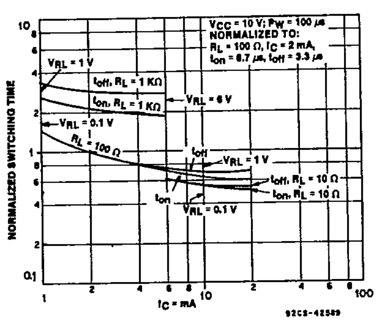
8. OUTPUT CURRENT — COLLECTOR-TO-BASE VS INPUT CURRENT



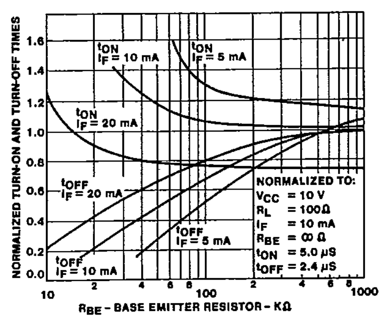
9. OUTPUT CURRENT VS TEMPERATURE



10. OUTPUT CURRENT VS BASE EMITTER



11. SWITCHING SPEED VS COLLECTOR CURRENT (NOT SATURATED)



12. SWITCHING TIME VS R_{BE}

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