



6-Pin DIP Optoisolators Transistor Output

The CNY17-1, CNY17-2 and CNY17-3 devices consist of a gallium arsenide infrared emitting diode optically coupled to a monolithic silicon phototransistor detector.

- Closely Matched Current Transfer Ratio (CTR) to Minimize Unit-to-Unit Variation
- Guaranteed 70 Volt $V_{(BR)CEO}$ Minimum
- *To order devices that are tested and marked per VDE 0884 requirements, the suffix "V" must be included at end of part number. VDE 0884 is a test option.*

Applications

- Feedback Control Circuits, Open Loop Gain Control in Power Supplies
- Interfacing and coupling systems of different potentials and Impedances
- General Purpose Switching Circuits
- Monitor and Detection Circuits

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
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INPUT LED

Reverse Voltage	V_R	6	Volts
Forward Current — Continuous	I_F	60	mA
Forward Current — Pk ($PW = 1 \mu\text{s}$, 330 pps)	$I_F(pk)$	1.5	A
LED Power Dissipation @ $T_A = 25^\circ\text{C}$ with Negligible Power in Output Detector Derate above 25°C	P_D	120	mW
		1.41	mW/ $^\circ\text{C}$

OUTPUT TRANSISTOR

Collector-Emitter Voltage	V_{CEO}	70	Volts
Emitter-Base Voltage	V_{EBO}	7	Volts
Collector-Base Voltage	V_{CBO}	70	Volts
Collector Current — Continuous	I_C	100	mA
Detector Power Dissipation @ $T_A = 25^\circ\text{C}$ with Negligible Power in Input LED Derate above 25°C	P_D	150	mW
		1.76	mW/ $^\circ\text{C}$

TOTAL DEVICE

Isolation Surge Voltage ⁽¹⁾ (Peak ac Voltage, 60 Hz, 1 sec Duration)	V_{ISO}	7500	$V_{ac}(pk)$
Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	250	mW
		2.94	mW/ $^\circ\text{C}$
Ambient Operating Temperature Range ⁽²⁾	T_A	-55 to +100	$^\circ\text{C}$
Storage Temperature Range ⁽²⁾	T_{stg}	-55 to +150	$^\circ\text{C}$
Soldering Temperature (10 sec, 1/16" from case)	T_L	260	$^\circ\text{C}$

1. Isolation surge voltage is an internal device dielectric breakdown rating. For this test, Pins 1 and 2 are common, and Pins 4, 5 and 6 are common.
2. Refer to Quality and Reliability Section in Opto Data Book for information on test conditions. Preferred devices are Motorola recommended choices for future use and best overall value.

CNY17-1
[CTR = 40–80%]
CNY17-2*
[CTR = 63–128%]
CNY17-3*
[CTR = 100–200%]

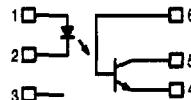
*Motorola Preferred Devices

STYLE 1 PLASTIC



STANDARD THRU HOLE
CASE 730A-04

SCHEMATIC



- PIN 1. LED ANODE
- LED CATHODE
- N.C.
- EMITTER
- COLLECTOR
- BASE

CNY17-1 CNY17-2 CNY17-3

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)⁽¹⁾

Characteristic	Symbol	Min	Typ	Max	Unit
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INPUT LED

Forward Voltage (I _F = 60 mA)	T _A = 25°C	V _F	—	1.35	1.65	Volts
	T _A = -55°C		—	1.5	—	
	T _A = 100°C		—	1.25	—	
Reverse Leakage Current (V _R = 6 V)		I _R	—	—	10	μA
Capacitance (V = 0, f = 1 MHz)		C _J	—	18	—	pF

OUTPUT TRANSISTOR

Collector-Emitter Dark Current (V _{CE} = 10 V, T _A = 25°C)	CNY17-1,2	I _{CEO}	—	5	50	nA
	CNY17-3		—	5	100	
(V _{CE} = 10 V, T _A = 100°C)	All devices	I _{CEO}	—	1.6	—	μA
Collector-Base Dark Current (V _{CB} = 10 V)		I _{CBO}	—	0.5	—	nA
Collector-Emitter Breakdown Voltage (I _C = 1 mA)		V _{(BR)CEO}	70	120	—	Volts
Collector-Base Breakdown Voltage (I _C = 100 μA)		V _{(BR)CBO}	70	120	—	Volts
Emitter-Base Breakdown Voltage (I _E = 100 μA)		V _{(BR)EBO}	7	7.8	—	Volts
DC Current Gain (I _C = 2 mA, V _{CE} = 5 V) (Typical Value)		h _{FE}	—	400	—	—
Collector-Emitter Capacitance (f = 1 MHz, V _{CE} = 0)		C _{CE}	—	8	—	pF
Collector-Base Capacitance (f = 1 MHz, V _{CB} = 0)		C _{CB}	—	21	—	pF
Emitter-Base Capacitance (f = 1 MHz, V _{EB} = 0)		C _{EB}	—	8	—	pF

COUPLED

Output Collector Current (I _F = 10 mA, V _{CE} = 5 V)	CNY17-1 CNY17-2 CNY17-3	I _C (CTR) ⁽²⁾	4 (40) 6.3 (63) 10 (100)	6 (60) 10 (100) 15 (150)	8 (80) 12.5 (125) 20 (200)	mA (%)
Collector-Emitter Saturation Voltage (I _C = 2.5 mA, I _F = 10 mA)		V _{CE(sat)}	—	0.18	0.4	Volts
Delay Time (I _F = 10 mA, V _{CC} = 5 V, R _L = 75 Ω, Figure 11)		t _d	—	1.6	5.6	μs
Rise Time (I _F = 10 mA, V _{CC} = 5 V, R _L = 75 Ω, Figure 11)		t _r	—	1.6	4	μs
Storage Time (I _F = 10 mA, V _{CC} = 5 V, R _L = 75 Ω, Figure 11)		t _s	—	0.7	4.1	μs
Fall Time (I _F = 10 mA, V _{CC} = 5 V, R _L = 75 Ω, Figure 11)		t _f	—	2.3	3.5	μs
Delay Time (I _F = 20 mA, V _{CC} = 5 V, R _L = 1 kΩ) ⁽³⁾ (I _F = 10 mA, V _{CC} = 5 V, R _L = 1 kΩ) ⁽³⁾	CNY17-1 CNY17-2,3	t _d	—	1.2 1.8	5.5 8	μs
Rise Time (I _F = 20 mA, V _{CC} = 5 V, R _L = 1 kΩ) ⁽³⁾ (I _F = 10 mA, V _{CC} = 5 V, R _L = 1 kΩ) ⁽³⁾	CNY17-1 CNY17-2,3	t _r	—	3.3 5	4 6	μs
Storage Time (I _F = 20 mA, V _{CC} = 5 V, R _L = 1 kΩ) ⁽³⁾ (I _F = 10 mA, V _{CC} = 5 V, R _L = 1 kΩ) ⁽³⁾	CNY17-1 CNY17-2,3	t _s	—	4.4 2.7	34 39	μs
Fall Time (I _F = 20 mA, V _{CC} = 5 V, R _L = 1 kΩ) ⁽³⁾ (I _F = 10 mA, V _{CC} = 5 V, R _L = 1 kΩ) ⁽³⁾	CNY17-1 CNY17-2,3	t _f	—	9.7 9.4, 20	20 24	μs
Isolation Voltage (f = 60 Hz, t = 1 sec) ⁽⁴⁾		V _{ISO}	7500	—	—	Vac(pk)
Isolation Resistance (V = 500 V) ⁽⁴⁾		R _{ISO}	10 ¹¹	—	—	Ω
Isolation Capacitance (V = 0, f = 1 MHz) ⁽⁴⁾		C _{ISO}	—	0.2	0.5	pF

1. Always design to the specified minimum/maximum electrical limits (where applicable).

2. Current Transfer Ratio (CTR) = I_C/I_F × 100%.

3. For test circuit setup and waveforms, refer to Figure 11.

4. For this test, Pins 1 and 2 are common, and Pins 4, 5 and 6 are common.

CNY17-1 CNY17-2 CNY17-3

TYPICAL CHARACTERISTICS

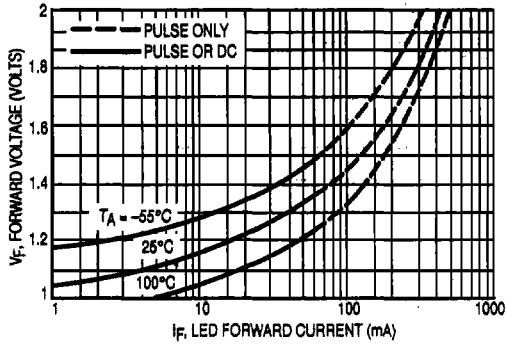


Figure 1. LED Forward Voltage versus Forward Current

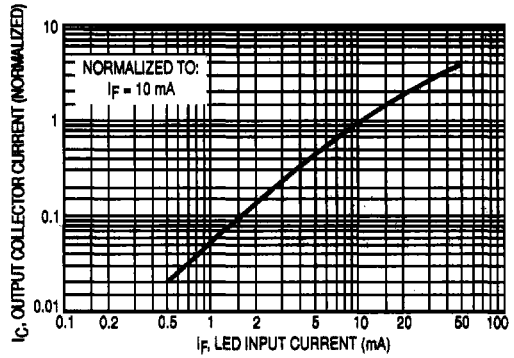


Figure 2. Output Current versus Input Current

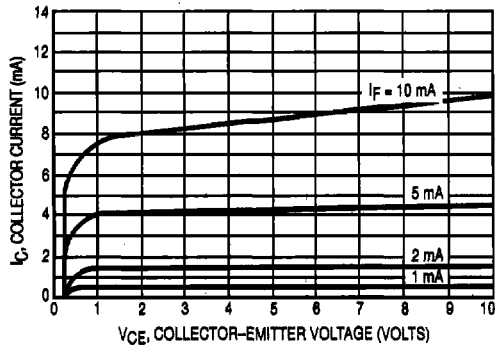


Figure 3. Collector Current versus Collector-Emitter Voltage

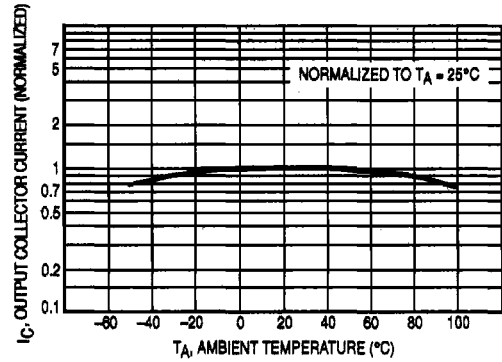


Figure 4. Output Current versus Ambient Temperature

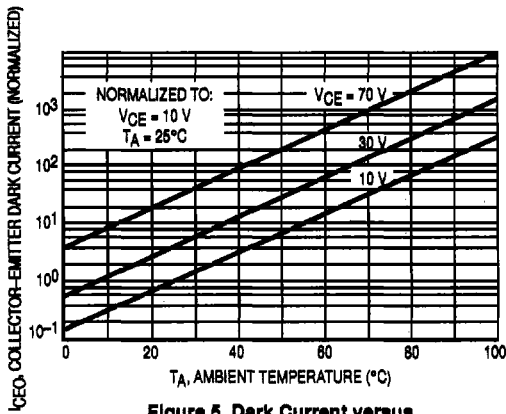


Figure 5. Dark Current versus Ambient Temperature

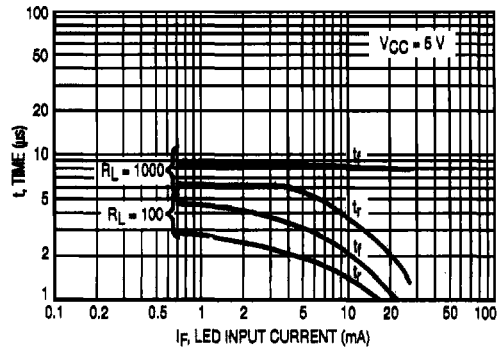


Figure 6. Rise and Fall Times CNY17-1 and CNY17-2

CNY17-1 CNY17-2 CNY17-3

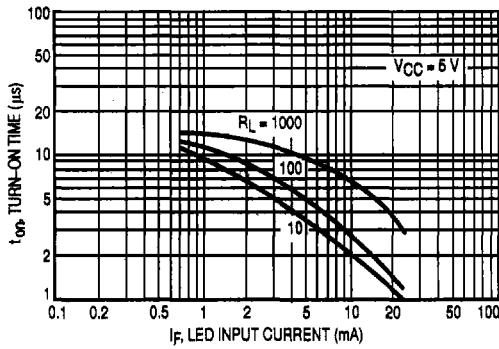
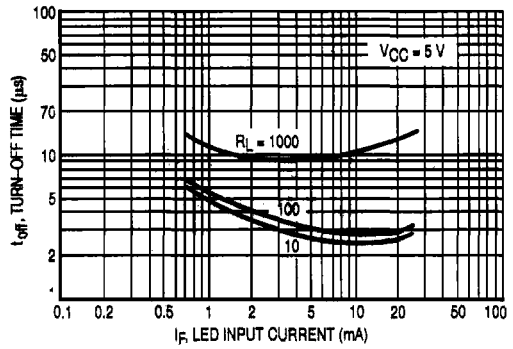


Figure 7. Turn-On Switching Times



**Figure 8. Turn-Off Switching Times
CNY17-1 and CNY17-2**

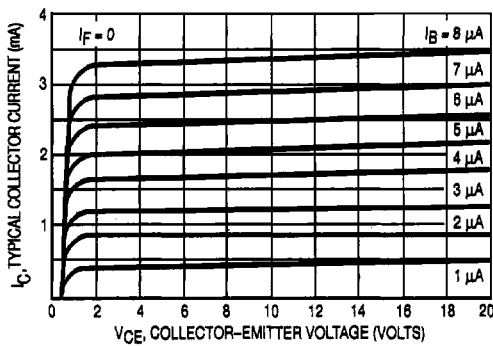


Figure 9. DC Current Gain (Detector Only)

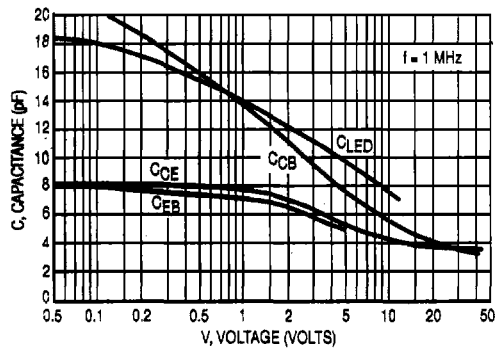


Figure 10. Capacitances versus Voltage

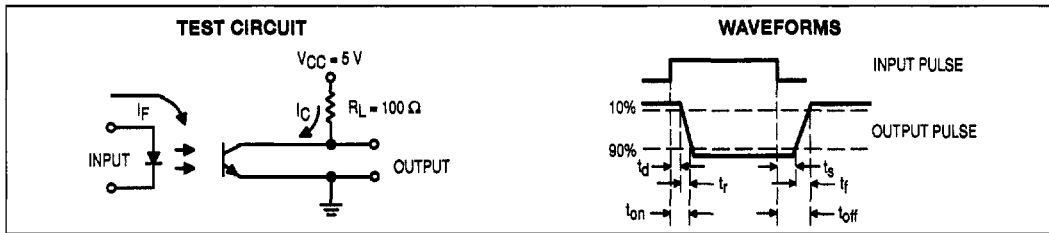


Figure 11. Switching Time Test Circuit and Waveforms