



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)

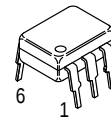
Rating	Symbol	Value	Unit
INPUT LED			
Reverse Voltage	V_R	6	Volts
Forward Current — Continuous	I_F	60	mA
Forward Current — Pk ($PW = 1 \mu\text{s}$, 330 pps)	$I_F(\text{pk})$	1.5	A
LED Power Dissipation @ $T_A = 25^\circ\text{C}$ with Negligible Power in Output Detector Derate above 25°C	P_D	120 1.41	mW 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 1.76	mW mW/ $^\circ\text{C}$

TOTAL DEVICE

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

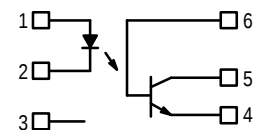
1. Isolation surge voltage is an internal device dielectric breakdown rating.
For this test, Pins 1 and 2 are common, and Pins 4, 5 and 6 are common.

CNY17-1
CNY17-2
CNY17-3



STANDARD THRU HOLE

SCHEMATIC



- PIN 1. LED ANODE
2. LED CATHODE
3. N.C.
4. EMITTER
5. COLLECTOR
6. BASE

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 T _A = -55°C T _A = 100°C	V _F	— — —	1.35 1.5 1.25	1.65 — —	Volts
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 CNY17–3	I _{CEO}	— —	5 5	50 100	nA
(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.

TYPICAL CHARACTERISTICS

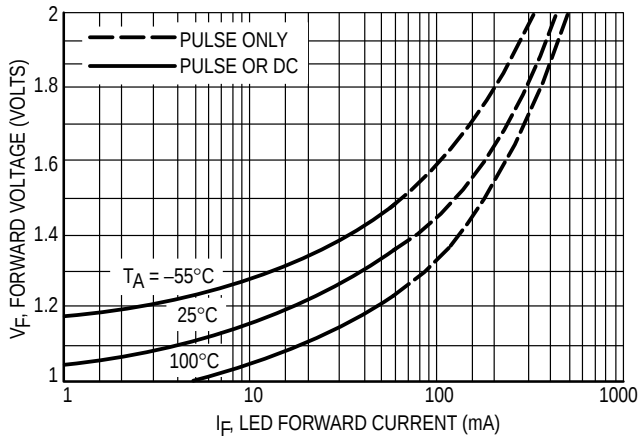


Figure 1. LED Forward Voltage versus Forward Current

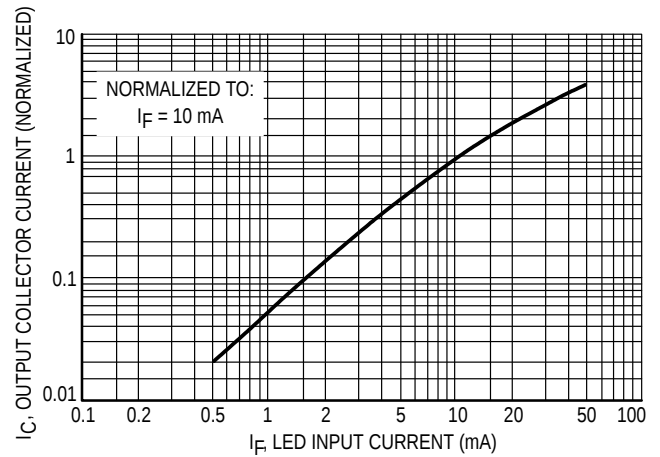


Figure 2. Output Current versus Input Current

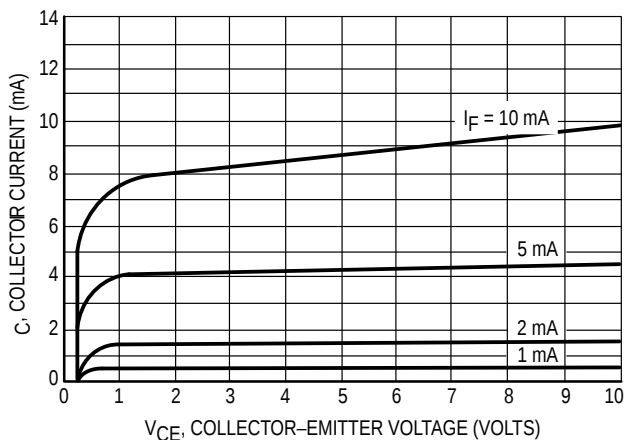


Figure 3. Collector Current versus Collector-Emitter Voltage

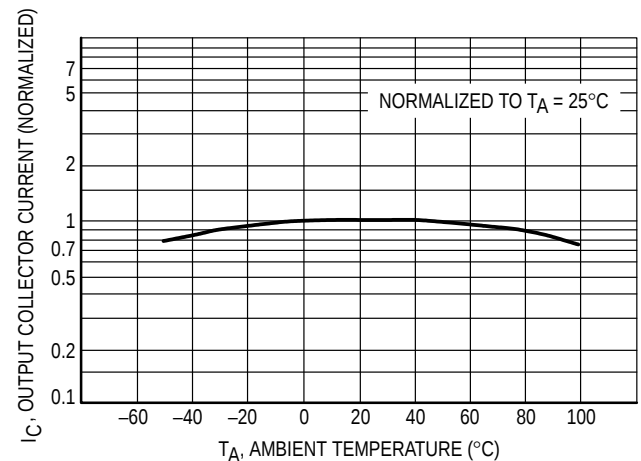


Figure 4. Output Current versus Ambient Temperature

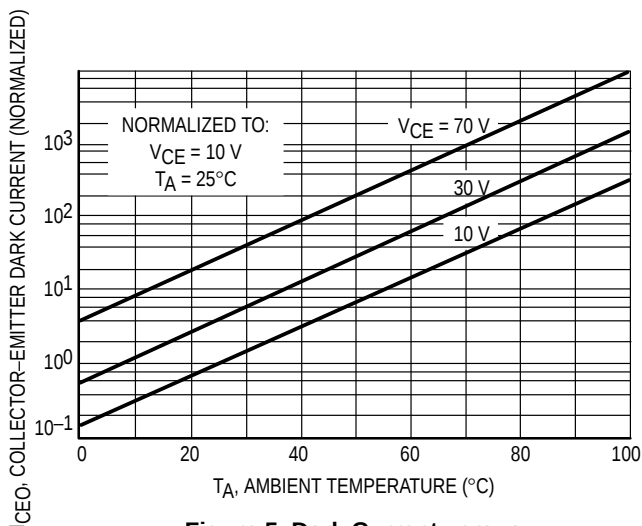
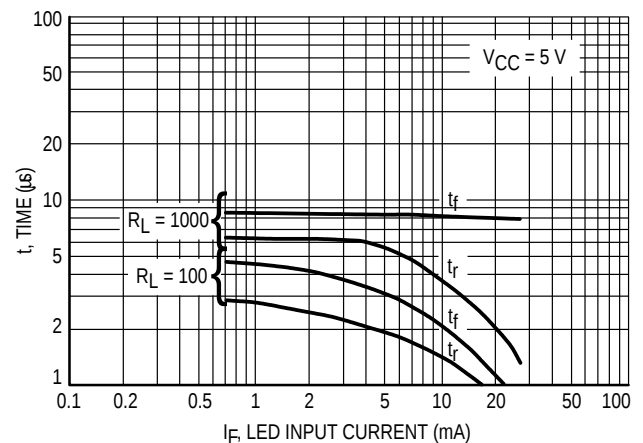


Figure 5. Dark Current versus Ambient Temperature



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

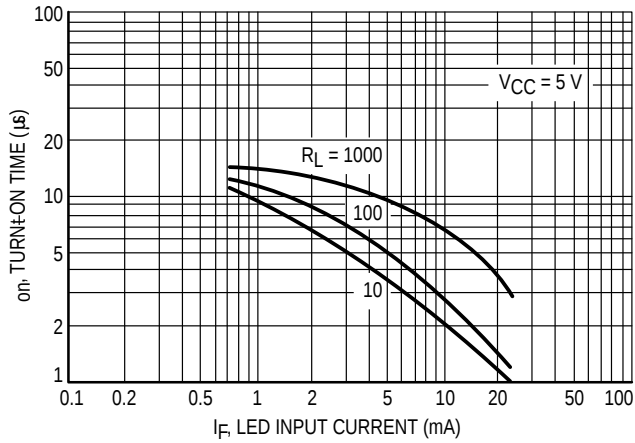
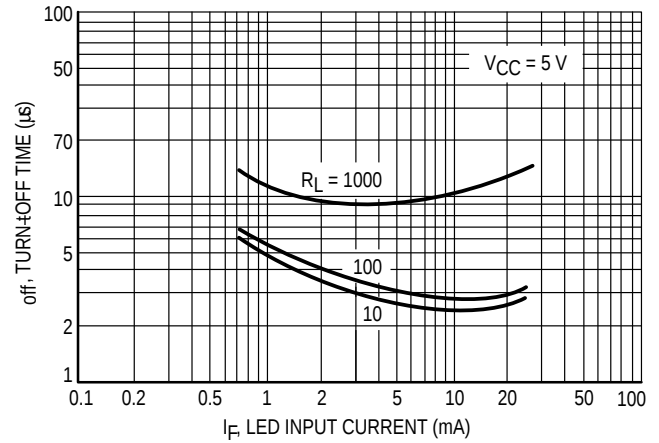


Figure 7. Turn-On Switching Times



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

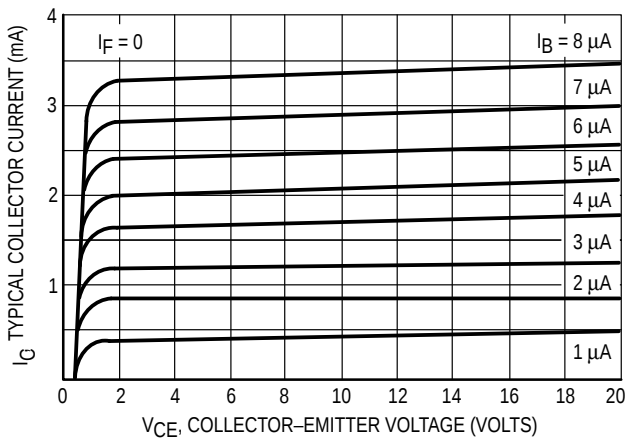


Figure 9. DC Current Gain (Detector Only)

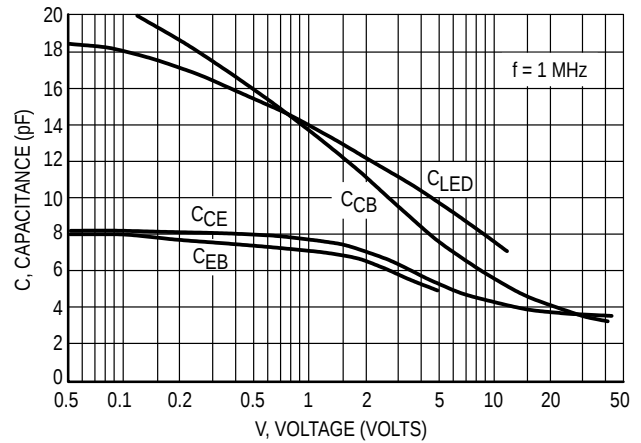


Figure 10. Capacitances versus Voltage

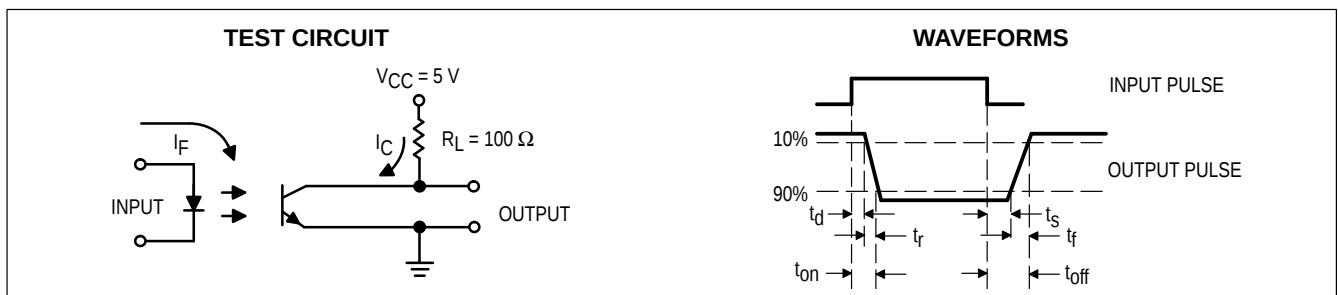
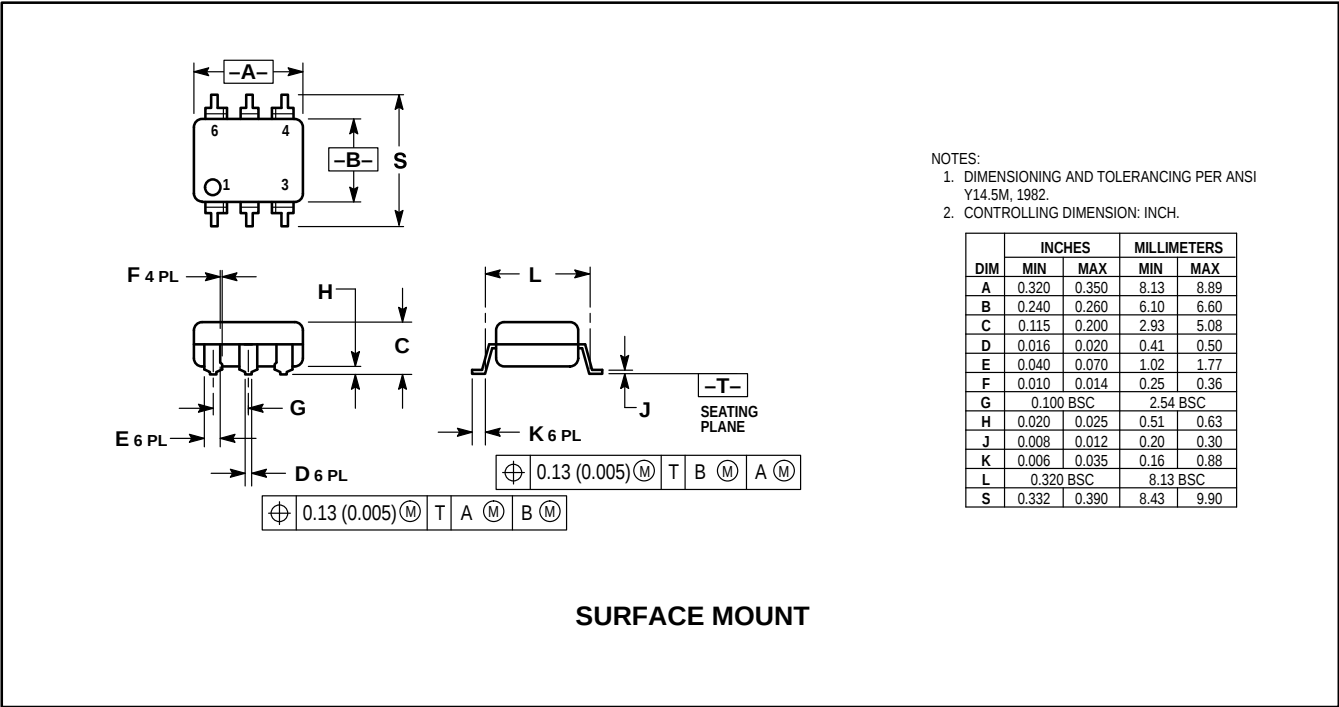
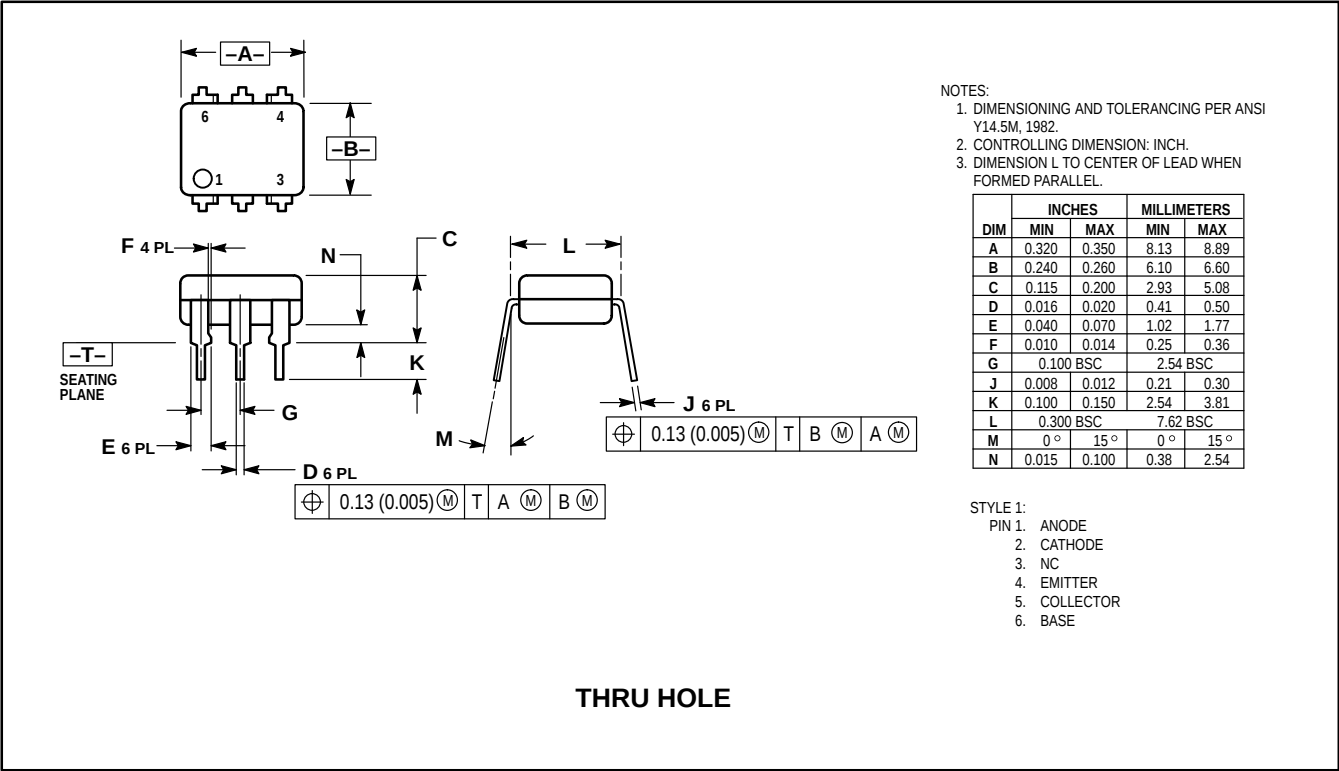
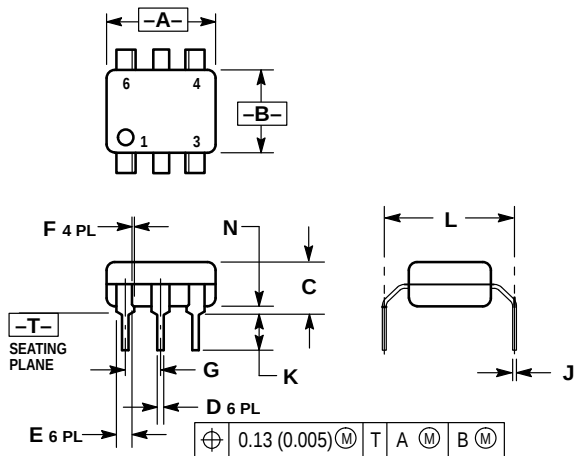


Figure 11. Switching Time Test Circuit and Waveforms

PACKAGE DIMENSIONS





NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.320	0.350	8.13	8.89
B	0.240	0.260	6.10	6.60
C	0.115	0.200	2.93	5.08
D	0.016	0.020	0.41	0.50
E	0.040	0.070	1.02	1.77
F	0.010	0.014	0.25	0.36
G	0.100 BSC		2.54 BSC	
J	0.008	0.012	0.21	0.30
K	0.100	0.150	2.54	3.81
L	0.400	0.425	10.16	10.80
N	0.015	0.040	0.38	1.02

0.4" LEAD SPACING

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