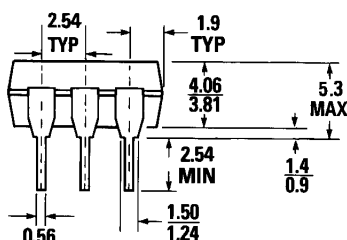
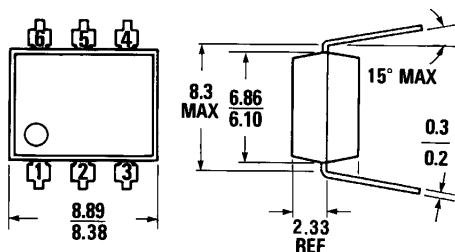


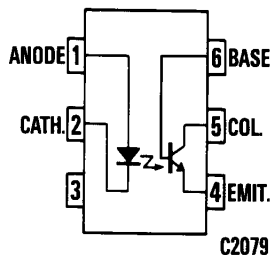
**CNY17-1 CNY17-3  
CNY17-2 CNY17-4**

**PACKAGE DIMENSIONS**



DIMENSIONS IN mm  
PACKAGE CODE K

ST1603A



Equivalent Circuit

**DESCRIPTION**

The CNY17 series consists of a Gallium Arsenide IRED coupled with an NPN phototransistor.

**FEATURES**

- High isolation voltage  
5300 VAC RMS—1 minute  
7500 VAC PEAK—1 minute
- High  $BV_{CEO}$  minimum 70 volts
- Current transfer ratio in selected groups:  
CNY17-1: 40%- 80%  
CNY17-2: 63%-125%  
CNY17-3: 100%-200%  
CNY17-4: 160%-320%
- Maximum switching time in saturation specified
- Underwriters Laboratory (UL) recognized File #E90700

**APPLICATIONS**

- Power supply regulators
- Digital logic inputs
- Microprocessor inputs
- Appliance sensor systems
- Industrial controls

**ABSOLUTE MAXIMUM RATINGS**

**TOTAL PACKAGE**

Storage temperature .....  $-55^{\circ}\text{C}$  to  $150^{\circ}\text{C}$   
Operating temperature .....  $-55^{\circ}\text{C}$  to  $100^{\circ}\text{C}$   
Lead temperature  
(soldering, 10 sec) .....  $260^{\circ}\text{C}$   
Total package power dissipation @  $25^{\circ}\text{C}$   
(LED plus detector) ..... 260 mW  
Derate linearly from  $25^{\circ}\text{C}$  ..... 3.5 mW/ $^{\circ}\text{C}$

**INPUT DIODE**

Forward DC current ..... 90 mA  
Reverse voltage ..... 6 V  
Peak forward current  
(1  $\mu\text{s}$  pulse, 300 pps) ..... 3.0 A  
Power dissipation  $25^{\circ}\text{C}$  ambient ..... 135 mW  
Derate linearly from  $25^{\circ}\text{C}$  ..... 1.8 mW/ $^{\circ}\text{C}$

**OUTPUT TRANSISTOR**

Power dissipation @  $25^{\circ}\text{C}$  ..... 200 mW  
Derate linearly from  $25^{\circ}\text{C}$  ..... 2.67 mW/ $^{\circ}\text{C}$



## PHOTOTRANSISTOR OPTOCOUPERS

### ELECTRO-OPTICAL CHARACTERISTICS (25°C Temperature Unless Otherwise Specified)

#### INDIVIDUAL COMPONENT CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
<b>INPUT DIODE</b>						
Forward voltage	$V_f$		1.3	1.50	V	$I_f = 60 \text{ mA}$
Forward voltage temp. coefficient	$\frac{\Delta V_f}{\Delta T_A}$		-1.8		mV/°C	
Reverse voltage	$V_R$	6.0	15		V	$I_R = 10 \text{ } \mu\text{A}$
Junction capacitance	$C_j$		50		pF	$V_f = 0 \text{ V}, f = 1 \text{ MHz}$
			65		pF	$V_f = 1 \text{ V}, f = 1 \text{ MHz}$
Reverse leakage current	$I_R$		.35	10	$\mu\text{A}$	$V_R = 3.0 \text{ V}$
<b>OUTPUT TRANSISTOR</b>						
DC forward current gain	$h_{FE}$	100	500			$V_{CE} = 5 \text{ V}, I_C = 100 \text{ } \mu\text{A}$
Breakdown voltage Collector to emitter	$BV_{CEO}$	70			V	$I_C = 1.0 \text{ mA}, I_E = 0$
Collector to base	$BV_{CBO}$	70			V	$I_C = 10 \text{ } \mu\text{A}, I_E = 0$
Emitter to collector Leakage current	$BV_{ECO}$	7			V	$I_E = 100 \text{ } \mu\text{A}, I_F = 0$
Collector to emitter	$I_{CEO}$		5	50	nA	$V_{CE} = 10 \text{ V}, I_E = 0$
Collector to base	$I_{CBO}$			20	nA	$V_{CB} = 10 \text{ V}, I_E = 0$
Capacitance Collector to emitter			8		pF	$V_{CE} = 0, f = 1 \text{ MHz}$
Collector to base			20		pF	$V_{CB} = 5, f = 1 \text{ MHz}$
Emitter to base			10		pF	$V_{EB} = 0, f = 1 \text{ MHz}$

#### TRANSFER CHARACTERISTICS

DC CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Current Transfer Ratio, collector to emitter CNY17-1	CTR	40		80	%	$I_f = 10 \text{ mA}; V_{CE} = 5 \text{ V}$
		63		125		
		100		200		
		160		320		
Saturation voltage	$V_{CE(SAT)}$		0.27	.40	V	$I_f = 10 \text{ mA}; I_C = 2.5 \text{ mA}$

#### TRANSFER CHARACTERISTICS

AC CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
<b>SWITCHING TIMES</b>						
Non-saturated Turn-on time	$t_{on}$		6.0	10	$\mu\text{s}$	$R_L = 100 \text{ } \Omega; I_C = 2 \text{ mA}; V_{CC} = 10 \text{ V}$
Turn-off time	$t_{off}$		5.5	10	$\mu\text{s}$	See Fig. 10 and Fig. 11.

**ELECTRO-OPTICAL CHARACTERISTICS**  
(25°C Temperature Unless Otherwise Specified) (Cont'd)

**TRANSFER CHARACTERISTICS** (Cont'd)

AC CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
<b>SATURATED SWITCHING TIMES</b>						
Turn-on time	$t_{on}$					
CNY17-1			3.0	5.5	$\mu S$	$I_F = 20 \text{ mA}$ , $V_{CE} = 0.4 \text{ V}$
CNY17-2, CNY17-3, CNY17-4			4.2	8.0	$\mu S$	$I_F = 10 \text{ mA}$ , $V_{CE} = 0.4 \text{ V}$
Rise-time	$t_r$					
CNY17-1			2.0	4.0	$\mu S$	$I_F = 20 \text{ mA}$ , $V_{CE} = 0.4 \text{ V}$
CNY17-2, CNY17-3, CNY17-4			3.0	6.0	$\mu S$	$I_F = 10 \text{ mA}$ , $V_{CE} = 0.4 \text{ V}$
Turn-off time	$t_{off}$					
CNY17-1			18	34	$\mu S$	$I_F = 20 \text{ mA}$ , $V_{CE} = 0.4 \text{ V}$
CNY17-2, CNY17-3, CNY17-4			23	39	$\mu S$	$I_F = 10 \text{ mA}$ , $V_{CE} = 0.4 \text{ V}$
Fall-time	$t_f$					
CNY17-1			11	20	$\mu S$	$I_F = 20 \text{ mA}$ , $V_{CE} = 0.4 \text{ V}$
CNY17-2, CNY17-3, CNY17-4			14	24	$\mu S$	$I_F = 10 \text{ mA}$ , $V_{CE} = 0.4 \text{ V}$

**ISOLATION CHARACTERISTICS**

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Isolation Voltage	$V_{iso}$	5300			$V_{AC} \text{ RMS}$	$I_{FO} \leq 1 \mu A$ , 1 minute
	$V_{iso}$	7500			$V_{AC} \text{ PEAK}$	$I_{FO} \leq 1 \mu A$ , 1 minute
Isolation resistance	$R_{iso}$	$10^{11}$			ohms	$V_{FO} = 500 \text{ VDC}$
Isolation capacitance	$C_{iso}$		0.5		pF	$f = 1 \text{ MHz}$

**ELECTRICAL CHARACTERISTIC CURVES**  
(25°C Free Air Temperature Unless Otherwise Specified)

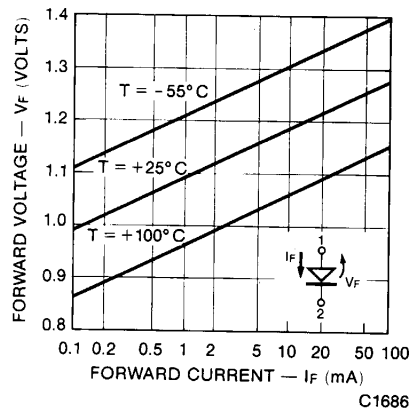


Fig. 1. Forward Voltage vs. Current

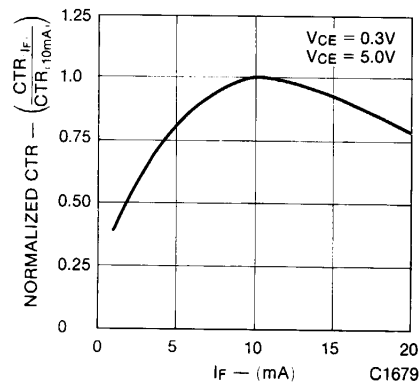


Fig. 2. Normalized CTR vs. Forward Current

**ELECTRICAL CHARACTERISTIC CURVES**

(25°C Free Air Temperature Unless Otherwise Specified) (Cont'd)

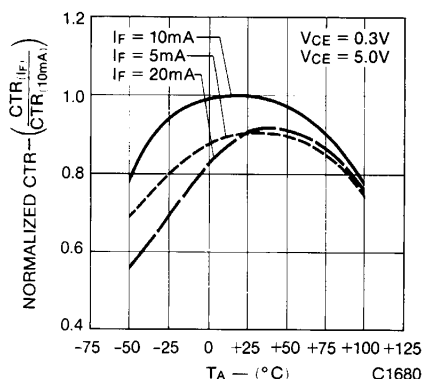


Fig. 3. Normalized CTR vs. Temperature

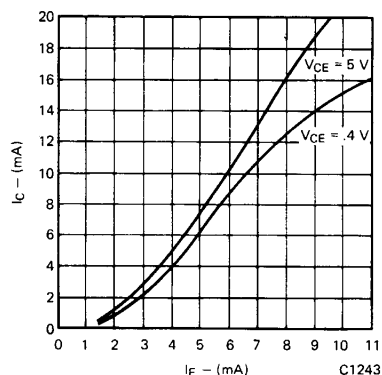


Fig. 4. Collector Current vs. Forward Current

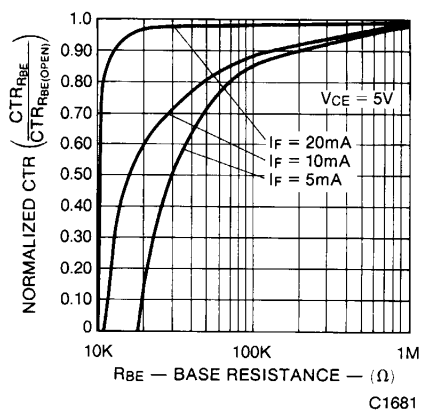


Fig. 5. CTR vs.  $R_{BE}$  (Unsaturated)

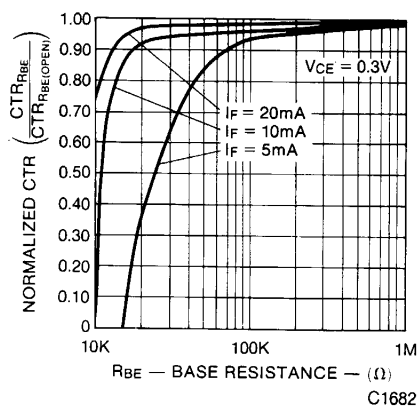


Fig. 6. CTR vs.  $R_{BE}$  (Saturated)

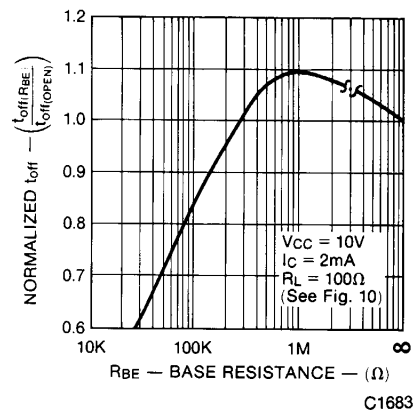


Fig. 7. Normalized  $T_{OFF}$  vs.  $R_{BE}$

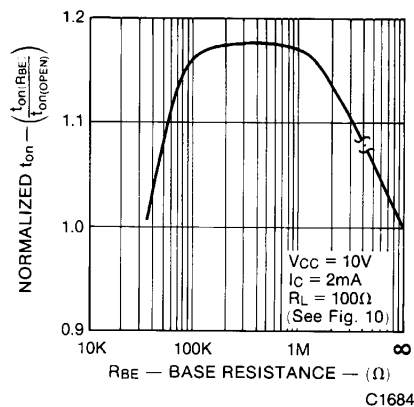


Fig. 8. Normalized  $T_{ON}$  vs.  $R_{BE}$

**ELECTRICAL CHARACTERISTIC CURVES**  
(25°C Free Air Temperature Unless Otherwise Specified) (Cont'd)

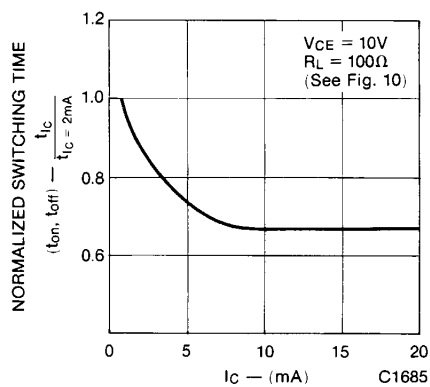


Fig. 9. Switching Time vs.  $I_C$

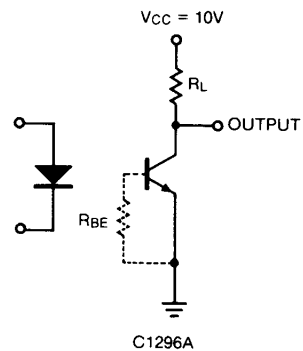


Fig. 10. Switching Time Test Circuit

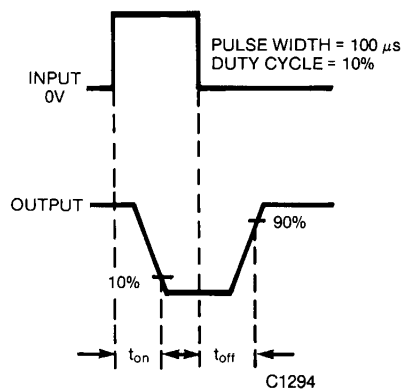


Fig. 11. Switching Time Waveforms