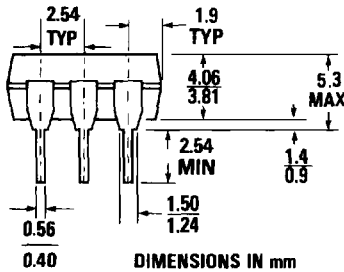
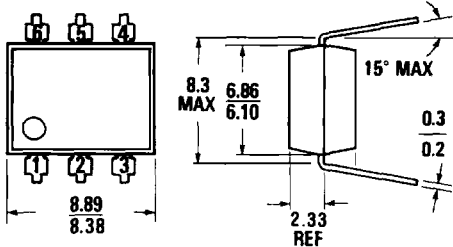


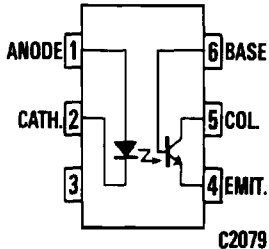
**CNY17-1 CNY17-3  
CNY17-2 CNY17-4**

**PACKAGE DIMENSIONS**



DIMENSIONS IN mm  
PACKAGE CODE K

ST1603A



C2079

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°C to 150°C
Operating temperature	-55°C to 100°C
Lead temperature (soldering, 10 sec)	260°C
Total package power dissipation @ 25°C (LED plus detector)	260 mW
Derate linearly from 25°C	3.5 mW/°C

**INPUT DIODE**

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

**OUTPUT TRANSISTOR**

Power dissipation @ 25°C	200 mW
Derate linearly from 25°C	2.67 mW/°C

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

All values are typical unless otherwise specified.

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	$I_R=10\ \mu\text{A}$
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			$V_{CE}=5\text{ V}, I_C=100\ \mu\text{A}$
Breakdown voltage						
Collector to emitter	$BV_{CEO}$	70			V	$I_C=1.0\text{ mA}, I_F=0$
Collector to base	$BV_{CBO}$	70			V	$I_C=10\ \mu\text{A}, I_F=0$
Emitter to collector	$BV_{ECO}$	7			V	$I_E=100\ \mu\text{A}, I_F=0$
Leakage current						
Collector to emitter	$I_{CEO}$		5	50	nA	$V_{CE}=10\text{ V}, I_F=0$
Collector to base	$I_{CBO}$			20	nA	$V_{CB}=10\text{ V}, I_F=0$
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	$V_{EB}=0, f=1\text{ MHz}$

DC CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Current Transfer Ratio, collector to emitter	CTR				%	$I_F=10\text{ mA}; V_{CE}=5\text{ V}$
CNY17-1		40		80		
CNY17-2		63		125		
CNY17-3		100		200		
CNY17-4		160		320		
Saturation voltage	$V_{CE(SAT)}$		0.27	.40	V	$I_F=10\text{ mA}; I_C=2.5\text{ mA}$

AC CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
<b>SWITCHING TIMES</b>						
Non-saturated						$R_L=100\ \Omega; I_C=2\text{ mA}; V_{CC}=10\text{ V}$
Turn-on time	$t_{on}$		6.0	10	$\mu\text{s}$	
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	$I_F = 20$ mA, $V_{CE} = 0.4$ V
CNY17-2, CNY17-3, CNY17-4			4.2	8.0	$\mu$ S	$I_F = 10$ mA, $V_{CE} = 0.4$ V
Rise-time	$t_r$					
CNY17-1			2.0	4.0	$\mu$ S	$I_F = 20$ mA, $V_{CE} = 0.4$ V
CNY17-2, CNY17-3, CNY17-4			3.0	6.0	$\mu$ S	$I_F = 10$ mA, $V_{CE} = 0.4$ V
Turn-off time	$t_{off}$					
CNY17-1			18	34	$\mu$ S	$I_F = 20$ mA, $V_{CE} = 0.4$ V
CNY17-2, CNY17-3, CNY17-4			23	39	$\mu$ S	$I_F = 10$ mA, $V_{CE} = 0.4$ V
Fall-time	$t_f$					
CNY17-1			11	20	$\mu$ S	$I_F = 20$ mA, $V_{CE} = 0.4$ V
CNY17-2, CNY17-3, CNY17-4			14	24	$\mu$ S	$I_F = 10$ mA, $V_{CE} = 0.4$ V

**ISOLATION CHARACTERISTICS**

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

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

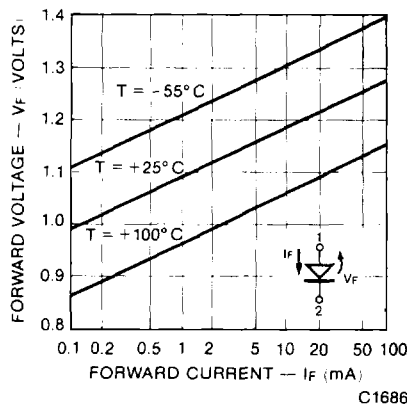


Fig. 1. Forward Voltage vs. Current

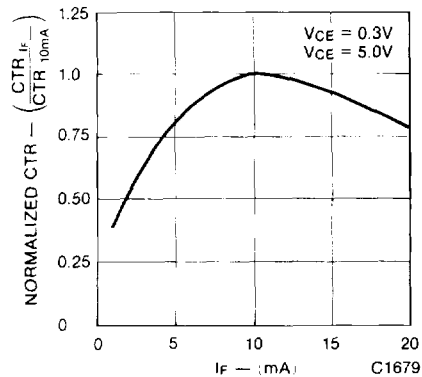


Fig. 2. Normalized CTR vs. Forward Current

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

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

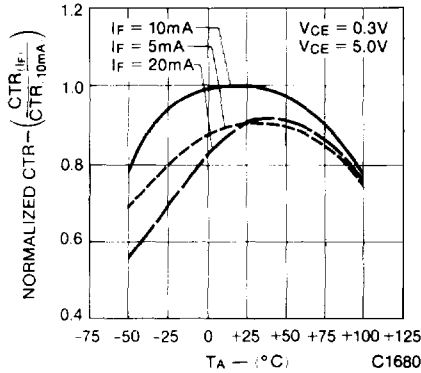


Fig. 3. Normalized CTR vs. Temperature

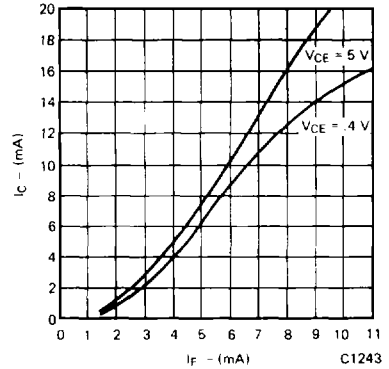


Fig. 4. Collector Current vs. Forward Current

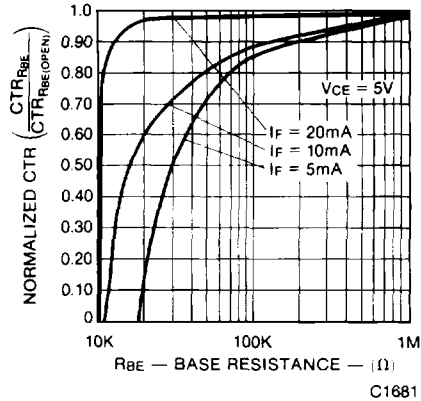


Fig. 5. CTR vs. RBE (Unsaturated)

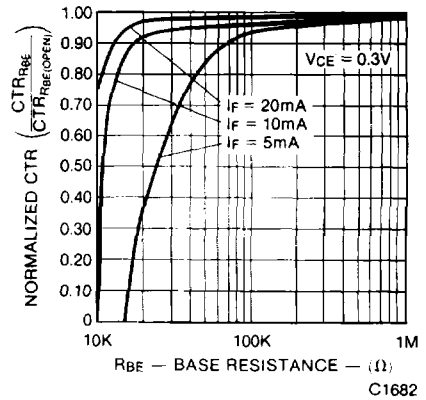


Fig. 6. CTR vs. RBE (Saturated)

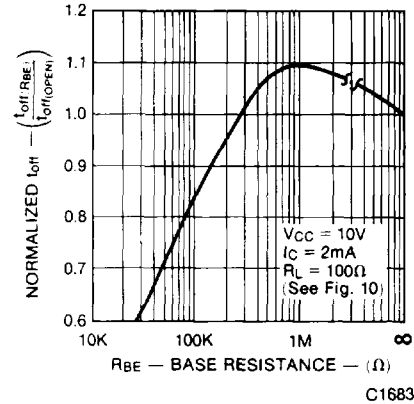


Fig. 7. Normalized  $T_{OFF}$  vs. RBE

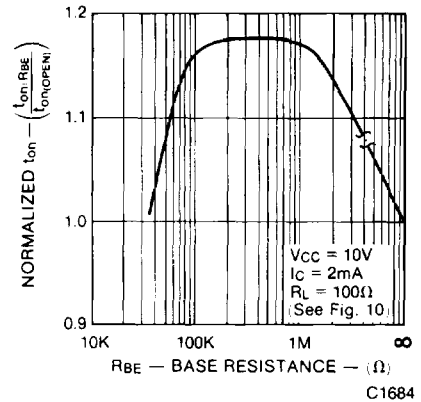


Fig. 8. Normalized  $T_{ON}$  vs. RBE

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

**ELECTRICAL CHARACTERISTIC CURVES**

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

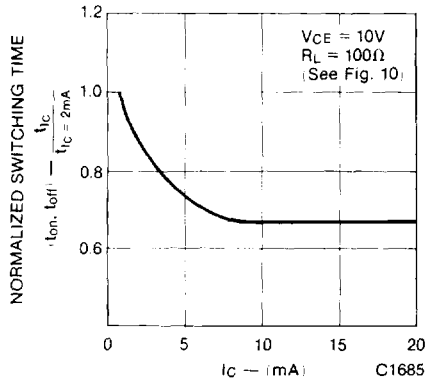


Fig. 9. Switching Time vs. IC

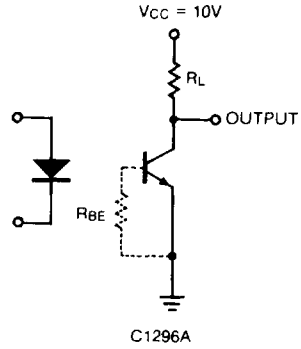


Fig. 10. Switching Time Test Circuit

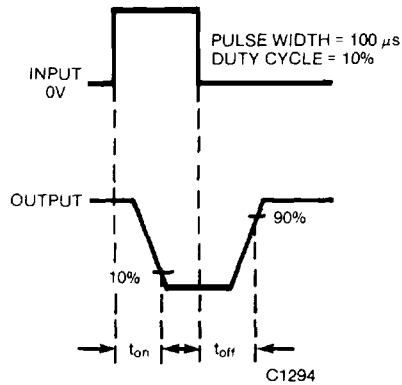


Fig. 11. Switching Time Waveforms

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