

# 6-PIN DIP OPTOCOUPLERS FOR POWER SUPPLY APPLICATIONS (NO BASE CONNECTION)

## DESCRIPTION

The CNY17F 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
- 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

**CNY17F-1**

(CTR = 40%-80%)

**CNY17F-2**

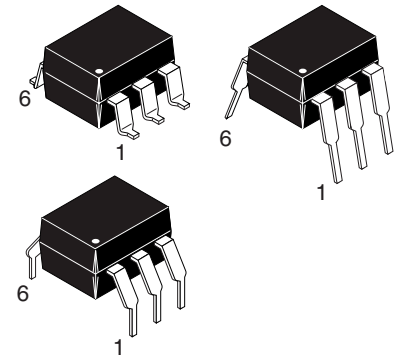
(CTR = 63%-125%)

**CNY17F-3**

(CTR = 100%-200%)

**CNY17F-4**

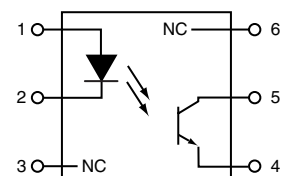
(CTR = 160%-320%)



## ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ Unless otherwise specified)

Rating	Symbol	Value	Unit
<b>EMITTER</b>			
Forward Current - Continuous	$I_F$	90	mA
Forward Current - Peak (PW = 1 $\mu$ s, 300pps)	$I_F(\text{pk})$	3.0	A
Reverse Voltage	$V_R$	6	Volts
LED Power Dissipation @ $T_A = 25^\circ\text{C}$	$P_D$	135	mW
Derate above $25^\circ\text{C}$		1.8	mW/ $^\circ\text{C}$
<b>DETECTOR</b>			
Detector Power Dissipation @ $T_A = 25^\circ\text{C}$	$P_D$	200	mW
Derate above $25^\circ\text{C}$		2.67	mW/ $^\circ\text{C}$
<b>TOTAL DEVICE</b>			
Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$	$P_D$	260	mW
Derate above $25^\circ\text{C}$		3.5	mW/ $^\circ\text{C}$
Ambient Operating Temperature Range	$T_A$	-55 to +100	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	-55 to +150	$^\circ\text{C}$
Lead Soldering Temperature (1/16" from case, 10 sec. duration)	$T_L$	260	$^\circ\text{C}$

## SCHEMATIC



- PIN 1. ANODE  
 2. CATHODE  
 3. NO CONNECTION  
 4. EMITTER  
 5. COLLECTOR  
 6. NO CONNECTION

## NOTE

1. Input-Output Isolation Voltage, VISO, is an internal device dielectric breakdown rating.

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C Unless otherwise specified.)

### INDIVIDUAL COMPONENT CHARACTERISTICS

Parameter	Test Conditions	Symbol	Min	Typ**	Max	Unit
<b>EMITTER</b>						
Input Forward Voltage	(I <sub>F</sub> = 60 mA)	V <sub>F</sub>		1.35	1.65	V
Forward Voltage Temp. Coefficient		$\frac{\Delta V_F}{\Delta T_A}$		-1.8		mV/°C
Reverse Voltage	(I <sub>R</sub> = 10 μA)	V <sub>R</sub>	6.0	15		V
Junction Capacitance	(V <sub>F</sub> = 0 V, f = 1 MHz)	C <sub>J</sub>		50		pF
	(V <sub>F</sub> = 1 V, f = 1 MHz)			65		
Reverse Leakage Current	(V <sub>R</sub> = 3.0 V)	I <sub>R</sub>		.35	10	μA
<b>DETECTOR</b>						
Collector-Emitter Breakdown Voltage	(I <sub>C</sub> = 1.0 mA, I <sub>F</sub> = 0)	BV <sub>CEO</sub>	70	100		V
Emitter-Collector Breakdown Voltage	(I <sub>E</sub> = 100 μA, I <sub>F</sub> = 0)	BV <sub>ECCO</sub>	7	10		V
Collector-Emitter Dark Current	(V <sub>CE</sub> = 10 V, I <sub>F</sub> = 0)	I <sub>CEO</sub>		5	50	nA
Capacitance	(V <sub>CE</sub> = 0 V, f = 1 MHz)	C <sub>CE</sub>		8		pF

### TRANSFER CHARACTERISTICS

AC Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Units
<b>NON-SATURATED SWITCHING TIMES</b>						
Turn-on Time	(R <sub>L</sub> = 100 Ω, I <sub>C</sub> = 2 mA, V <sub>CC</sub> = 10 V) (Fig. 7)	t <sub>on</sub>		6.0	10	μs
Turn-off Time		t <sub>off</sub>		5.5	10	μs
<b>SATURATED SWITCHING TIMES</b>						
Turn-on Time	(I <sub>F</sub> = 20 mA, V <sub>CE</sub> = 0.4 V)	t <sub>on</sub>		3.0	5.5	μs
CNY17F-1						
CNY17F-2						
CNY17F-3 CNY17F-4	(I <sub>F</sub> = 10 mA, V <sub>CE</sub> = 0.4 V)			4.2	8.0	
Rise Time	(I <sub>F</sub> = 20 mA, V <sub>CE</sub> = 0.4 V)	t <sub>r</sub>		2.0	4.0	μs
CNY17F-1						
CNY17F-2						
CNY17F-3 CNY17F-4	(I <sub>F</sub> = 10 mA, V <sub>CE</sub> = 0.4 V)			3.0	6.0	
Turn-off Time	(I <sub>F</sub> = 20 mA, V <sub>CE</sub> = 0.4 V)	t <sub>off</sub>		18	34	μs
CNY17F-1						
CNY17F-2						
CNY17F-3 CNY17F-4	(I <sub>F</sub> = 10 mA, V <sub>CE</sub> = 0.4 V)			23	39	
Fall Time	(I <sub>F</sub> = 20 mA, V <sub>CE</sub> = 0.4 V)	t <sub>f</sub>		11	20	μs
CNY17F-1						
CNY17F-2						
CNY17F-3 CNY17F-4	(I <sub>F</sub> = 10 mA, V <sub>CE</sub> = 0.4 V)			14	24	

\*\* All typicals at T<sub>A</sub> = 25°C

## TRANSFER CHARACTERISTICS

DC Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Units
Current Transfer Ratio, Collector-Emitter	( $I_F = 10 \text{ mA}$ , $V_{CE} = 5 \text{ V}$ )	CTR	40		80	%
CNY17F-1			63		125	
CNY17F-2			100		200	
CNY17F-3			160		320	
Saturation Voltage	( $I_F = 10 \text{ mA}$ , $I_C = 2.5 \text{ mA}$ )	$V_{CE(sat)}$		0.15	0.40	V

## ISOLATION CHARACTERISTICS

Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Units
Input-Output Isolation Voltage	( $I_{I-O} \leq 1 \mu\text{A}$ , 1 min.)	$V_{ISO}$	5300			Vac(rms)
			7500			Vac(pk)
Isolation Resistance	( $V_{I-O} = 500 \text{ VDC}$ )	$R_{ISO}$	$10^{11}$			$\Omega$
Isolation Capacitance	( $f = 1 \text{ MHz}$ )	$C_{ISO}$		0.5		pf

\*\* All typicals at  $T_A = 25^\circ\text{C}$

### TYPICAL CHARACTERISTICS

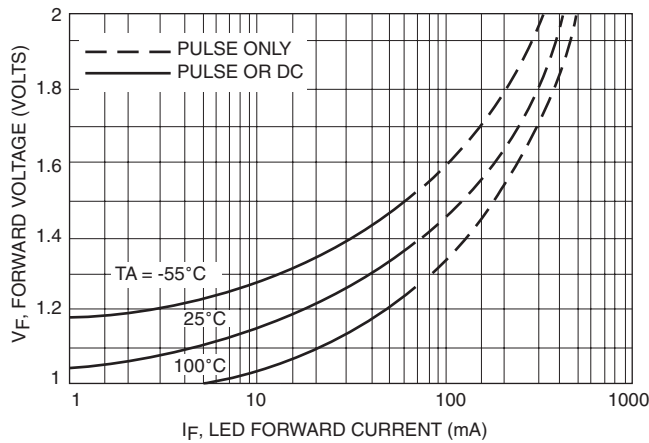


Figure 1. LED Forward Voltage versus Forward Current

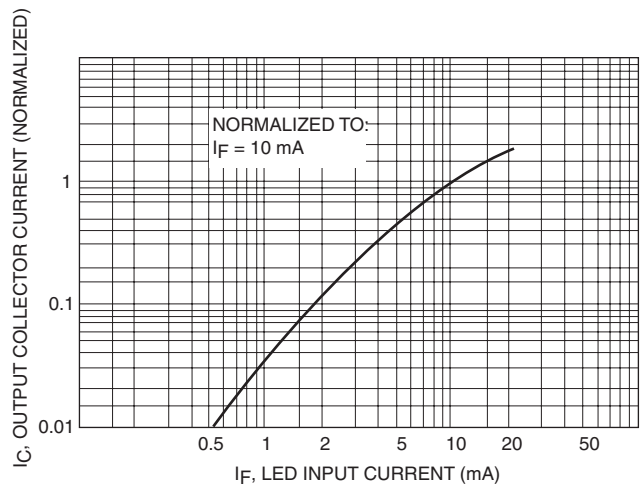
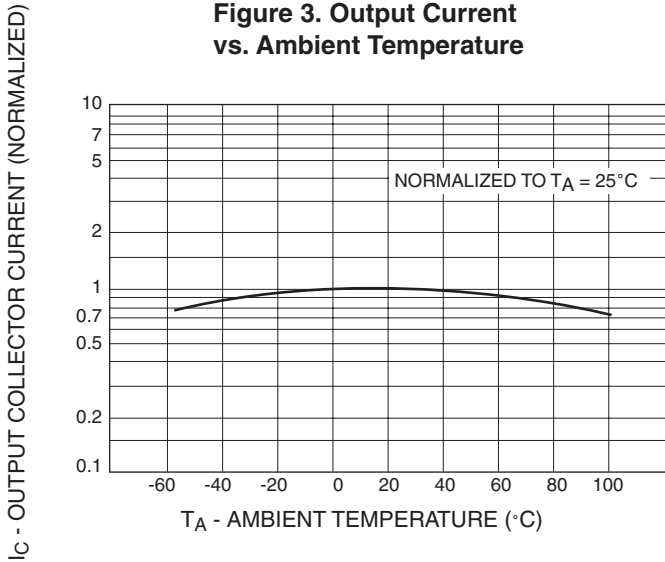
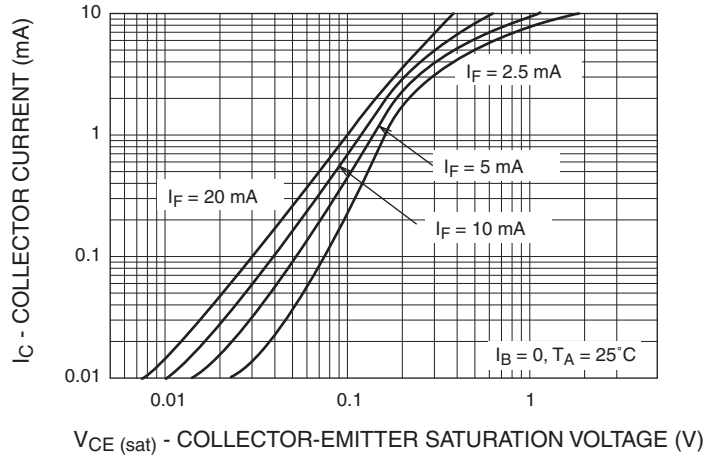


Figure 2. Output Current versus Input Current

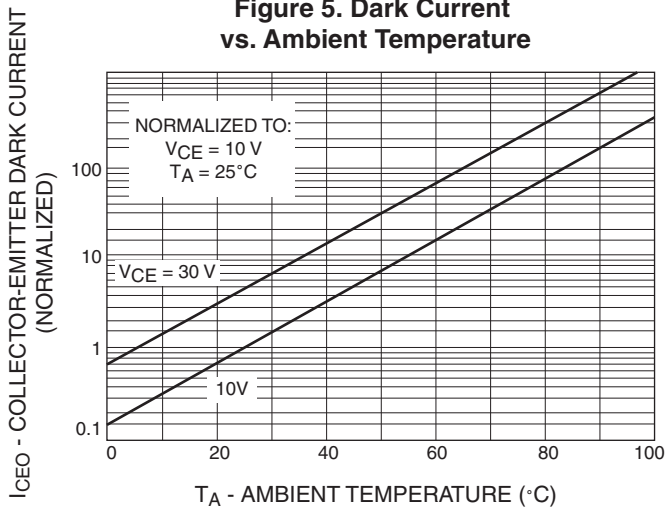
**Figure 3. Output Current vs. Ambient Temperature**



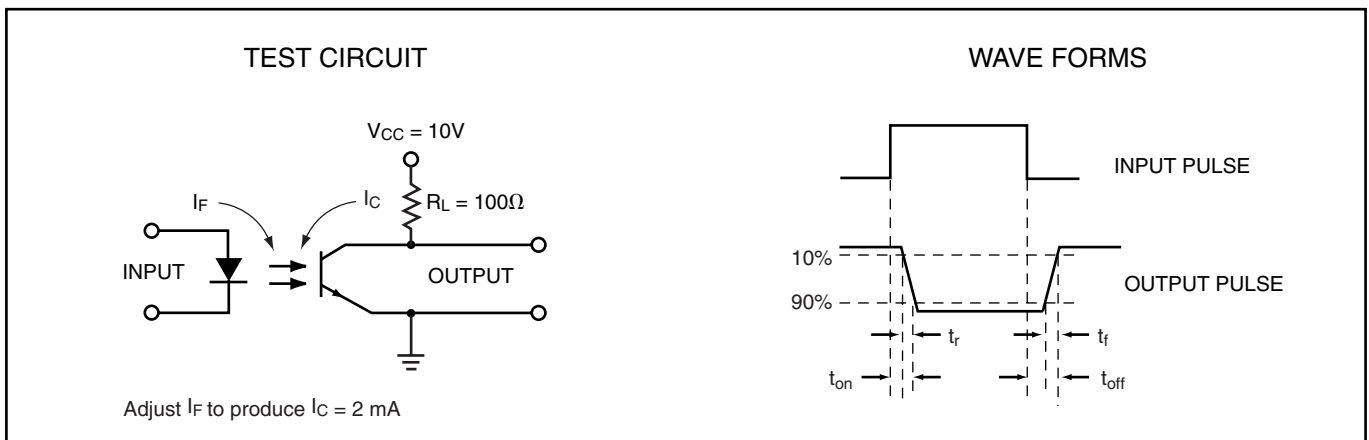
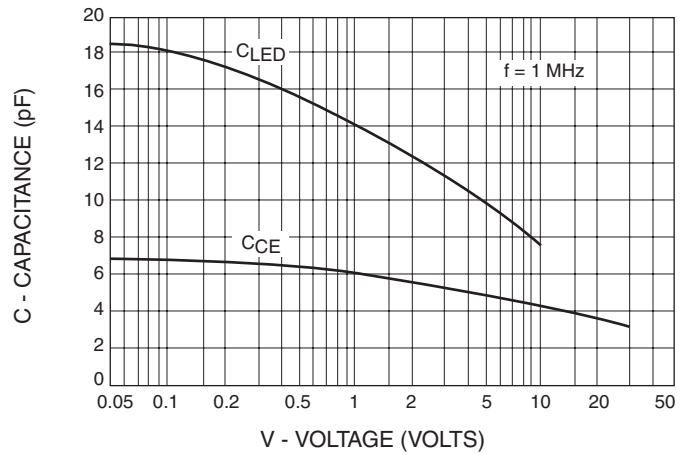
**Fig. 4 Collector Current vs. Collector-Emitter Saturation Voltage**



**Figure 5. Dark Current vs. Ambient Temperature**

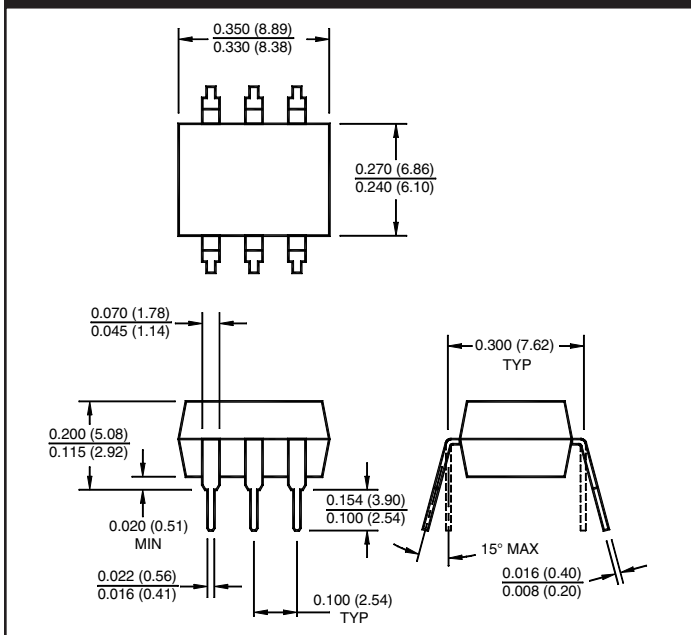


**Figure 6. Capacitance versus Voltage**

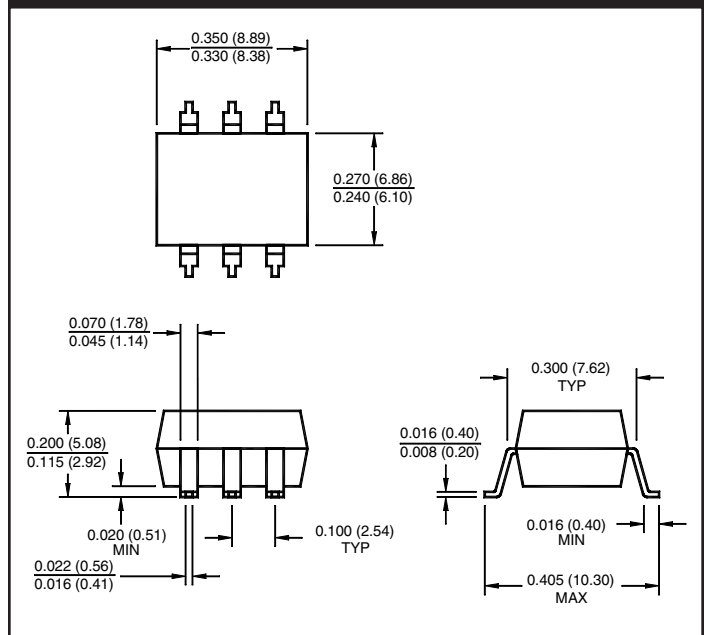


**Figure 7. Switching Time Test Circuit and Waveforms**

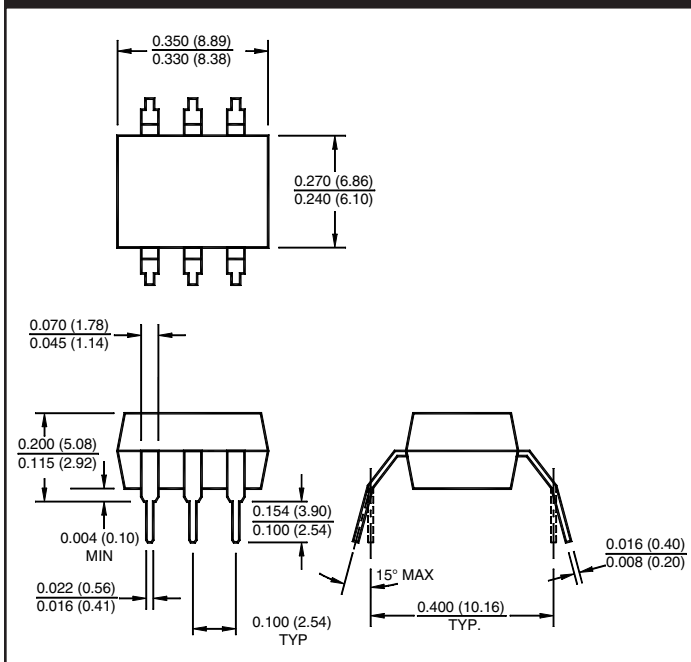
**Package Dimensions (Through Hole)**



**Package Dimensions (Surface Mount)**



**Package Dimensions (0.4" Lead Spacing)**



**NOTE**

All dimensions are in inches (millimeters)

**Call QT Optoelectronics for more information or the phone number of your nearest distributor.**

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