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

CNY17F-1
(CTR = 40%-80%)

CNY17F-2
(CTR = 63%-125%)

CNY17F-3
(CTR = 100%-200%)

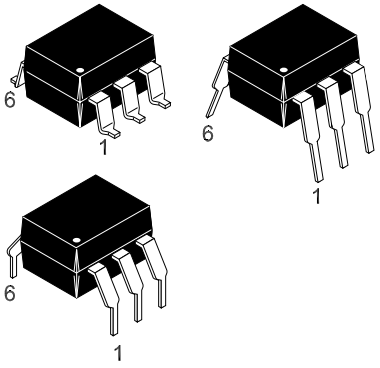
CNY17F-4
(CTR = 160%-320%)

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

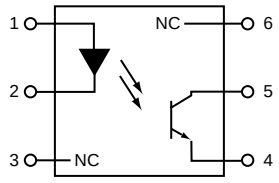
- Power supply regulators
- Digital logic inputs
- Microprocessor inputs
- Appliance sensor systems
- Industrial controls



ABSOLUTE MAXIMUM RATINGS (T_A =25°C Unless otherwise specified)

Rating	Symbol	Value	Unit
INPUT LED			
Forward Current - Continuous	I_F	90	mA
Forward Current - Peak (PW = 1µs, 300pps)	I_F(pk)	3.0	A
Reverse Voltage	V_R	6	Volts
LED Power Dissipation @ T_A = 25°C	P_D	135	mW
Derate above 25°C		1.8	mW/°C
OUTPUT TRANSISTOR			
Detector Power Dissipation @ T_A = 25°C	P_D	200	mW
Derate above 25°C		2.67	mW/°C
TOTAL DEVICE			
Total Device Power Dissipation @ T_A = 25°C	P_D	260	mW
Derate above 25°C		3.5	mW/°C
Ambient Operating Temperature Range	T_A	-55 to +100	°C
Storage Temperature Range	T_{stg}	-55 to +150	°C
Lead Soldering Temperature (1/16" from case, 10 sec. duration)	T_L	260	°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_A = 25°C Unless otherwise specified.)

INDIVIDUAL COMPONENT CHARACTERISTICS

Parameter	Test Conditions	Symbol	Min	Typ**	Max	Unit
EMITTER						
Input Forward Voltage	(I_F = 60 mA)	V_F		1.35	1.65	V
Forward Voltage Temp. Coefficient		$\frac{\Delta V_F}{\Delta T_A}$		-1.8		mV/°C
Reverse Voltage	(I_R = 10 µA)	V_R	6.0	15		V
Junction Capacitance	(V_F = 0 V, f = 1 MHz)	C_J		50		pF
	(V_F = 1 V, f = 1 MHz)			65		
Reverse Leakage Current	(V_R = 3.0 V)	I_R		.35	10	µA
DETECTOR						
Collector-Emitter Breakdown Voltage	(I_C = 1.0 mA, I_F = 0)	BV_{CEO}	70	100		V
Emitter-Collector Breakdown Voltage	(I_E = 100 µA, I_F = 0)	BV_{ECO}	7	10		V
Collector-Emitter Dark Current	(V_{CE} = 10 V, I_F = 0)	I_{CEO}		5	50	nA
Capacitance	(V_{CE} = 0 V, f = 1 MHz)	C_{CE}		8		pF

TRANSFER CHARACTERISTICS

AC Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Units
SWITCHING TIMES						
Non-Saturated Turn-on Time	(R_L = 100 Ω, I_C = 2 mA, V_{CC} = 10 V)	t_{on}		6.0	10	µs
Turn-off Time		t_{off}		5.5	10	µs
SATURATED SWITCHING TIMES						
Turn-on Time						
CNY17F-1	(I_F = 20 mA, V_{CE} = 0.4 V)	t_{on}		3.0	5.5	µs
CNY17F-2 CNY17F-3 CNY17F-4	(I_F = 10 mA, V_{CE} = 0.4 V)			4.2	8.0	
Rise Time						
CNY17F-1	(I_F = 20 mA, V_{CE} = 0.4 V)	t_r		2.0	4.0	µs
CNY17F-2 CNY17F-3 CNY17F-4	(I_F = 10 mA, V_{CE} = 0.4 V)			3.0	6.0	
Turn-off Time						
CNY17F-1	(I_F = 20 mA, V_{CE} = 0.4 V)	t_{off}		18	34	µs
CNY17F-2 CNY17F-3 CNY17F-4	(I_F = 10 mA, V_{CE} = 0.4 V)			23	39	
Fall Time						
CNY17F-1	(I_F = 20 mA, V_{CE} = 0.4 V)	t_f		11	20	µs
CNY17F-2 CNY17F-3 CNY17F-4	(I_F = 10 mA, V_{CE} = 0.4 V)			14	24	

** All typicals at T_A = 25°C

OPTOELECTRONICS

CNY17F-1, CNY17F-2, CNY17F-3, CNY17F-4

TRANSFER CHARACTERISTICS

DC Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Units
Current Transfer Ratio, Collector-Emitter						
CNY17F-1	(I_F = 10 mA, V_{CE} = 5 V)	CTR	40		80	%
CNY17F-2			63		125	
CNY17F-3			100		200	
CNY17F-4			160		320	
Saturation Voltage	(I_F = 10 mA, I_C = 2.5 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 µA, 1 min.)	V_{ISO}	5300			Vac(rms)
			7500			Vac(pk)
Isolation Resistance	(V_{I-O} = 500 VDC)	R_{ISO}	10^{11}			Ω
Isolation Capacitance	(f = 1 MHz)	C_{ISO}		0.5		pf

** All typicals at T_A = 25°C

TYPICAL CHARACTERISTICS

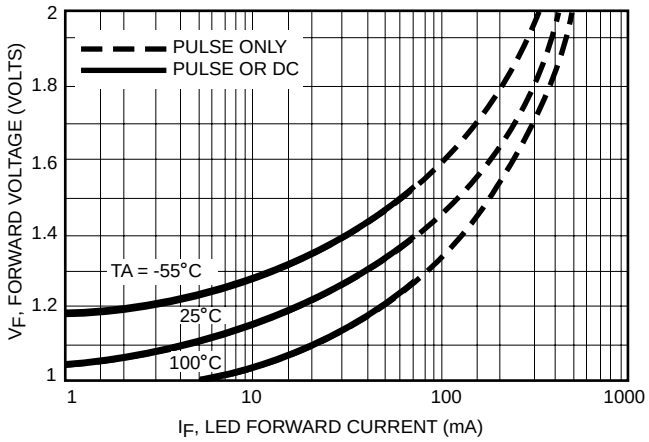


Figure 1. LED Forward Voltage versus Forward Current

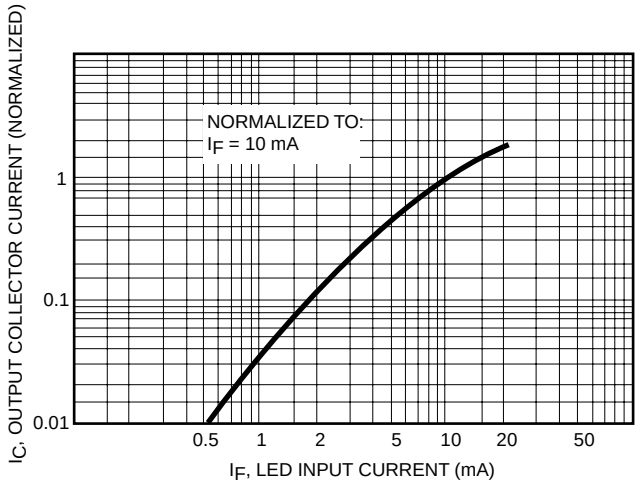


Figure 2. Output Current versus Input Current

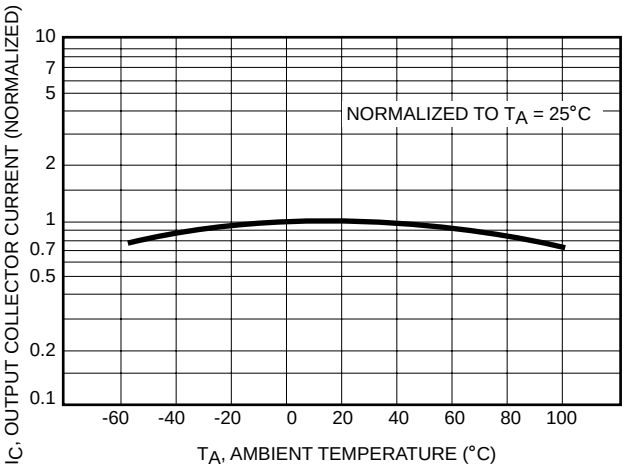


Figure 3. Output Current versus Ambient Temperature

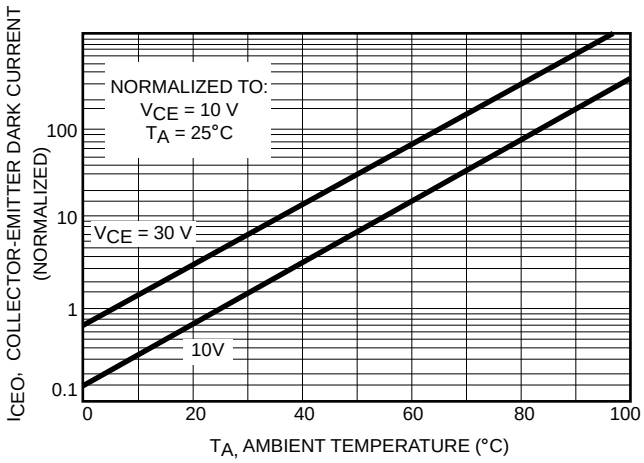


Figure 4. Dark Current versus Ambient Temperature

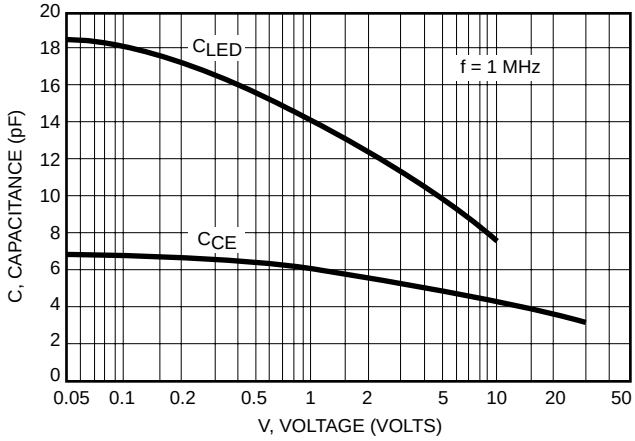


Figure 5. Capacitance versus Voltage

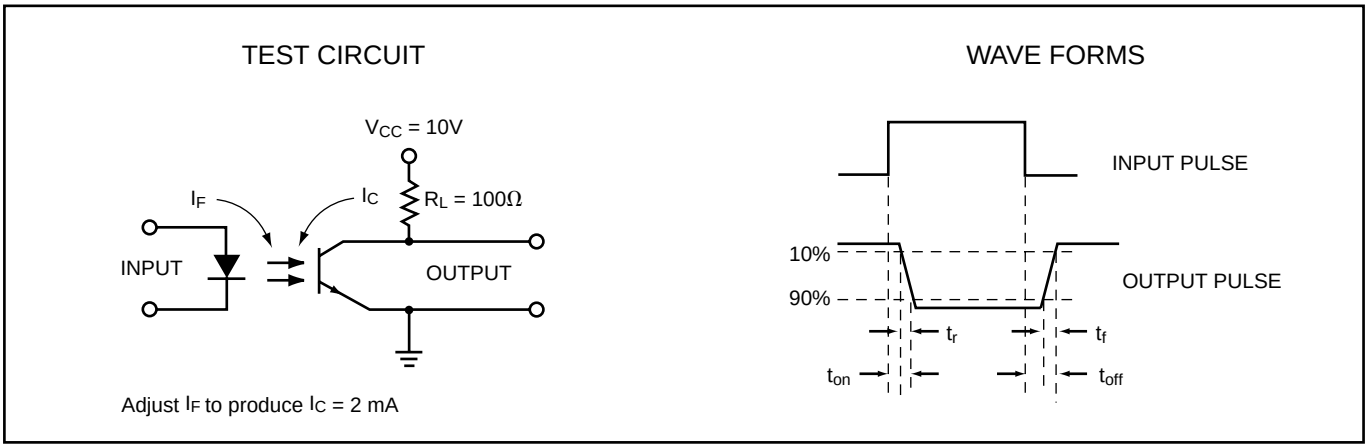
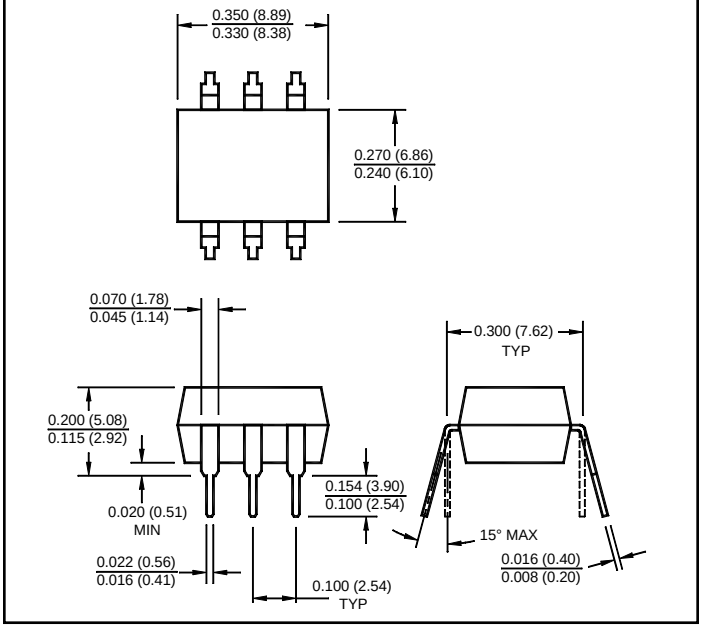


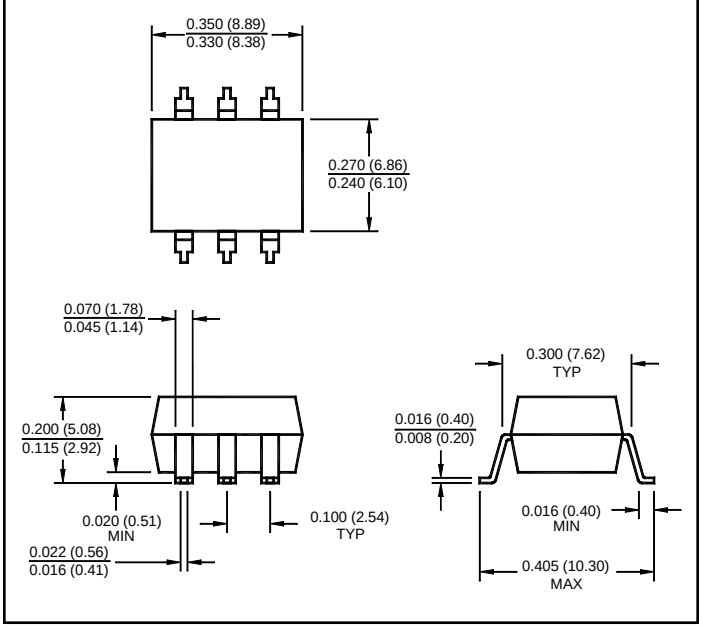
Figure 6. Switching Time Test Circuit and Waveforms

CNY17F-1, CNY17F-2, CNY17F-3, CNY17F-4

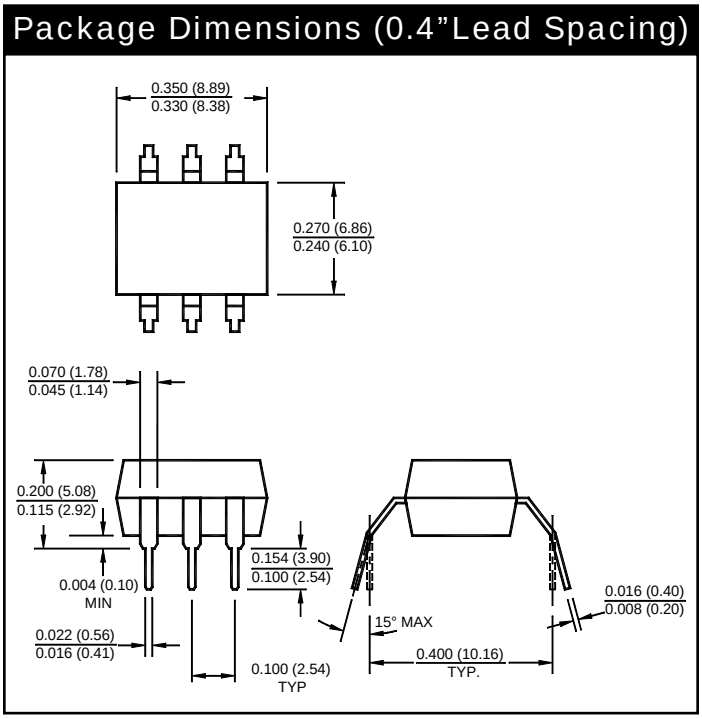
Package Dimensions (Through Hole)



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.

United States 800-533-6786 • France 33 [0] 1.45.18.78.78 • Germany 49 [0] 89/96.30.51 • United Kingdom 44 [0] 1296 394499 • Asia/Pacific 603-7352417

www.qtopto.com