

### DESCRIPTION

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

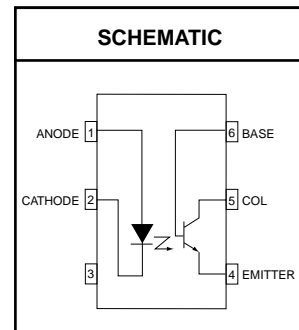
<b>CNY17-1</b>	<b>CNY17-3</b>
<b>CNY17-2</b>	<b>CNY17-4</b>

### FEATURES

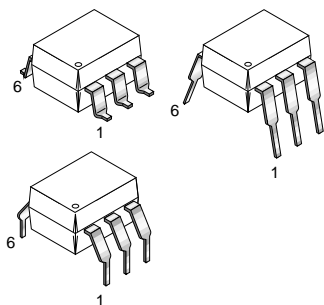
- CNY17-1/2/3 are also available in white package by specifying -M suffix (eg. CNY17-2-M)
- UL recognized (File # E90700)
- VDE recognized
  - 102497 for white package      -Add option V for white package (e.g., CNY17-2V-M)
  - File #102497                      -Add option '300' for black package (e.g., CNY17-2.300)
  - File #94766
- Current transfer ratio in select groups
- High  $BV_{CEO}$ —70V minimum

### APPLICATIONS

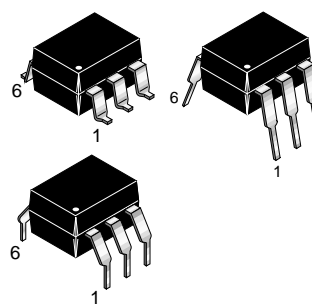
- Power supply regulators
- Microprocessor inputs
- Industrial controls
- Digital logic inputs
- Appliance sensor systems



### WHITE PACKAGE (-M SUFFIX)



### BLACK PACKAGE (NO -M SUFFIX)



Parameters	Symbol	Device	Value	Units
<b>TOTAL DEVICE</b>				
Storage Temperature	$T_{STG}$	All	-55 to +150	°C
Operating Temperature	$T_{OPR}$	All	-55 to +100	°C
Lead Solder Temperature	$T_{SOL}$	All	260 for 10 sec	°C
Total Device Power Dissipation @ 25°C (LED plus detector)	$P_D$	-M	250	mW
Derate Linearly From 25°C		non -M	260	
		-M	2.94	mW/°C
		non -M	3.50	
<b>EMITTER</b>				
Continuous Forward Current	$I_F$	-M	60	mA
Reverse Voltage	$V_R$	All	6	
Forward Current - Peak (1 $\mu$ s pulse, 300 pps)	$I_{F(pk)}$	-M	1.5	A
		non -M	3.0	
LED Power Dissipation 25°C Ambient	$P_D$	-M	120	mW
Derate Linearly From 25°C		non -M	135	
		-M	1.41	mW/°C
		non -M	1.8	
<b>DETECTOR</b>				
Detector Power Dissipation @ 25°C	$P_D$	-M	150	mW
Derate Linearly from 25°C		non -M	200	
		-M	1.76	mW/°C
		non -M	2.67	

<b>CNY17-1</b>	<b>CNY17-3</b>
<b>CNY17-2</b>	<b>CNY17-4</b>

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

### INDIVIDUAL COMPONENT CHARACTERISTICS

Parameters	Test Conditions	Symbol	Device	Min	Typ	Max	Units
<b>EMITTER</b> Input Forward Voltage	I <sub>F</sub> = 60 mA	V <sub>F</sub>	-M		1.35	1.65	V
	I <sub>F</sub> = 10 mA		non -M		1.15	1.50	
Capacitance	V <sub>F</sub> = 0 V, f = 1.0 MHz	C <sub>J</sub>	non -M		50		pF
			-M		18		
Reverse Leakage Current	V <sub>R</sub> = 6 V	I <sub>R</sub>	All		0.001	10	μA
<b>DETECTOR</b>							
Breakdown Voltage Collector to Emitter	I <sub>C</sub> = 1.0 mA, I <sub>F</sub> = 0	BV <sub>CEO</sub>	All	70	100		V
Collector to Base	I <sub>C</sub> = 10 μA, I <sub>F</sub> = 0	BV <sub>CBO</sub>	All	70	120		V
Emitter to Collector	I <sub>E</sub> = 100 μA, I <sub>F</sub> = 0	BV <sub>ECO</sub>	All	7	10		V
Leakage Current Collector to Emitter	V <sub>CE</sub> = 10 V, I <sub>F</sub> = 0	I <sub>CEO</sub>	All		1	50	nA
Collector to Base	V <sub>CB</sub> = 10 V, I <sub>F</sub> = 0	I <sub>CBO</sub>	All			20	nA
Capacitance Collector to Emitter	V <sub>CE</sub> = 0, f = 1 MHz	C <sub>CE</sub>	All		8		pF
Collector to Base	V <sub>CB</sub> = 0, f = 1 MHz	C <sub>CB</sub>	All		20		pF
Emitter to Base	V <sub>EB</sub> = 0, f = 1 MHz	C <sub>EB</sub>	All		10		pF

### ISOLATION CHARACTERISTICS

Characteristic	Test Conditions	Symbol	Device	Min	Typ**	Max	Units
Input-Output Isolation Voltage	f = 60 Hz, t = 1 min.	V <sub>ISO</sub>	Black Package	5300			Vac(rms)*
			'-M' White Package	7500			Vac(pk)
Isolation Resistance	V <sub>I-O</sub> = 500 VDC	R <sub>ISO</sub>	All	10 <sup>11</sup>			Ω
Isolation Capacitance	V <sub>I-O</sub> = ∅, f = 1 MHz	C <sub>ISO</sub>	Black Package		0.5		pF
			'-M' White Package		0.2		

Note

\* 5300 Vac(rms) for 1 minute equates to approximately 9000 Vac (pk) for 1 second

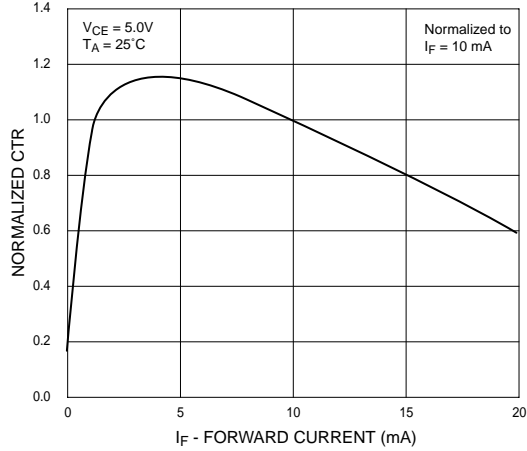
\*\* Typical values at T<sub>A</sub> = 25°C

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

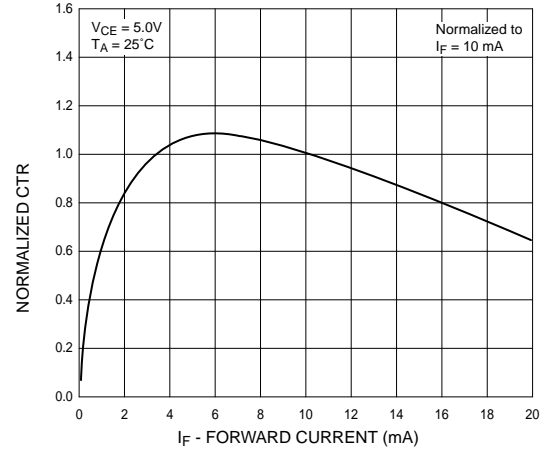
<b>TRANSFER CHARACTERISTICS</b> ( $T_A = 25^\circ\text{C}$ Unless otherwise specified.)								
<b>DC Characteristics</b>	<b>Test Conditions</b>	<b>Symbol</b>	<b>Device</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Units</b>	
Current Transfer Ratio, Collector to Emitter	$I_F = 10\text{ mA}, V_{CE} = 5\text{ V}$	CTR	CNY17-1/-1-M	40		80	%	
			CNY17-2/-2-M	63		125		
			CNY17-3/-3-M	100		200		
			CNY17-4	160		320		
Saturation Voltage	$I_F = 10\text{ mA}, I_C = 2.5\text{ mA}$	$V_{CE(SAT)}$	All			.40	V	
<b>AC Characteristics</b>	<b>Test Conditions</b>	<b>Symbol</b>	<b>Device</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Units</b>	
<b>Non-Saturated Switching Times</b>	$R_L = 100\ \Omega, I_C = 2\text{ mA}, V_{CC} = 10\text{ V}$	$t_{on}$	non -M			10	$\mu\text{s}$	
Turn-On Time (Fig.19 and Fig.20)								
Turn-Off Time (Fig.19 and Fig.20)		non -M			10	$\mu\text{s}$		
Delay Time (Fig.19 and Fig.20)		$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 75\ \Omega$	$t_d$	-M			5.6	$\mu\text{s}$
Rise Time (Fig.19 and Fig.20)		$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 75\ \Omega$	$t_r$	-M			4.0	$\mu\text{s}$
Storage Time (Fig.19 and Fig.20)		$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 75\ \Omega$	$t_s$	-M			4.1	$\mu\text{s}$
Fall Time (Fig.19 and Fig.20)		$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 75\ \Omega$	$t_f$	-M			3.5	$\mu\text{s}$
<b>Saturated Switching Times</b>	$I_F = 20\text{ mA}, V_{CE} = 0.4\text{ V}$	$t_{on}$	CNY17-1			5.5	$\mu\text{s}$	
Turn-On Time (Fig.19 and Fig.20)	$I_F = 10\text{ mA}, V_{CE} = 0.4\text{ V}$		CNY17-2, CNY17-3, CNY17-4			8.0		
Rise-Time (Fig.19 and Fig.20)	$I_F = 20\text{ mA}, V_{CE} = 0.4\text{ V}$	$t_r$	CNY17-1			4.0	$\mu\text{s}$	
	$I_F = 10\text{ mA}, V_{CE} = 0.4\text{ V}$		CNY17-2, CNY17-3, CNY17-4			6.0		
	$I_F = 20\text{ mA}, V_{CC} = 5\text{ V}, R_L = 1\text{ K}\Omega$		CNY17-1-M			4.0		
	$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 1\text{ K}\Omega$		CNY17-2-M, CNY17-3-M			6.0		
Delay Time (Fig.19 and Fig.20)	$I_F = 20\text{ mA}, V_{CC} = 5\text{ V}, R_L = 1\text{ K}\Omega$	$t_d$	CNY17-1-M			5.5	$\mu\text{s}$	
	$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 1\text{ K}\Omega$		CNY17-2, CNY17-3			8.0		
Turn-Off Time (Fig.19 and Fig.20)	$I_F = 20\text{ mA}, V_{CE} = 0.4\text{ V}$	$t_{off}$	CNY17-1			34.0	$\mu\text{s}$	
	$I_F = 10\text{ mA}, V_{CE} = 0.4\text{ V}$		CNY17-2, CNY17-3, CNY17-4			39.0		
Fall-Time (Fig.19 and Fig.20)	$I_F = 20\text{ mA}, V_{CE} = 0.4\text{ V}$	$t_f$	CNY17-1			20.0	$\mu\text{s}$	
	$I_F = 10\text{ mA}, V_{CE} = 0.4\text{ V}$		CNY17-2, CNY17-3, CNY17-4			24.0		
	$I_F = 20\text{ mA}, V_{CC} = 5\text{ V}, R_L = 1\text{ K}\Omega$		CNY17-1-M			20.0		
	$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 1\text{ K}\Omega$		CNY17-2-M, CNY17-3-M			24.0		
Storage Time (Fig.19 and Fig.20)	$I_F = 20\text{ mA}, V_{CC} = 5\text{ V}, R_L = 1\text{ K}\Omega$	$t_s$	CNY17-1-M			34.0	$\mu\text{s}$	
	$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 1\text{ K}\Omega$		CNY17-2-M, CNY17-3-M			39.0		

<b>CNY17-1</b>	<b>CNY17-3</b>
<b>CNY17-2</b>	<b>CNY17-4</b>

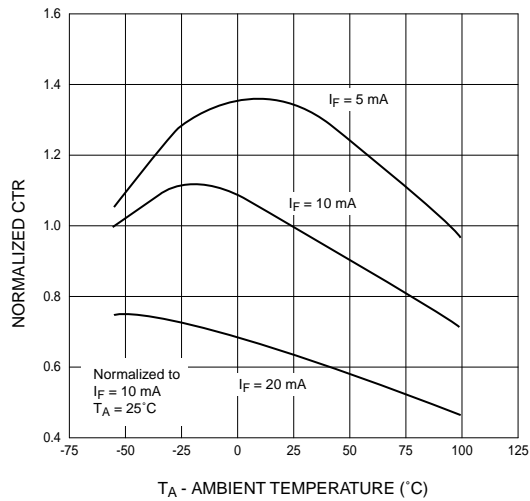
**Fig.1 Normalized CTR vs. Forward Current (Black Package)**



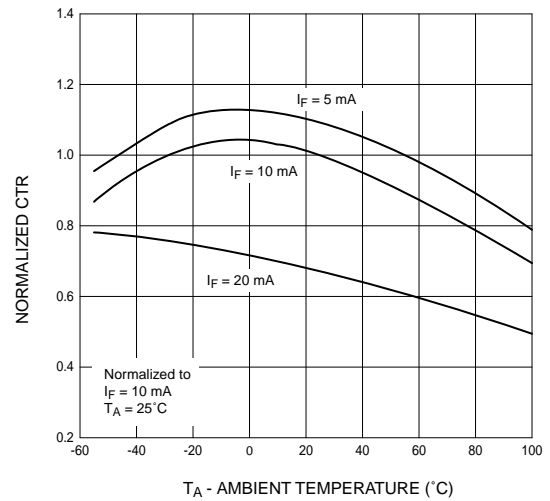
**Fig.2 Normalized CTR vs. Forward Current (White Package)**



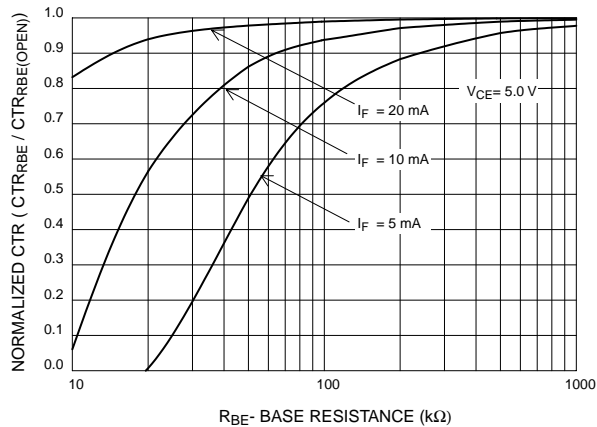
**Fig. 3 Normalized CTR vs. Ambient Temperature (Black Package)**



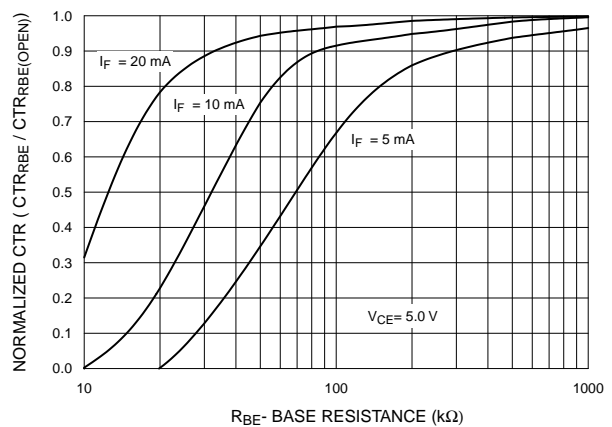
**Fig. 4 Normalized CTR vs. Ambient Temperature (White Package)**



**Fig. 5 CTR vs. RBE (Unsatrated) (Black Package)**

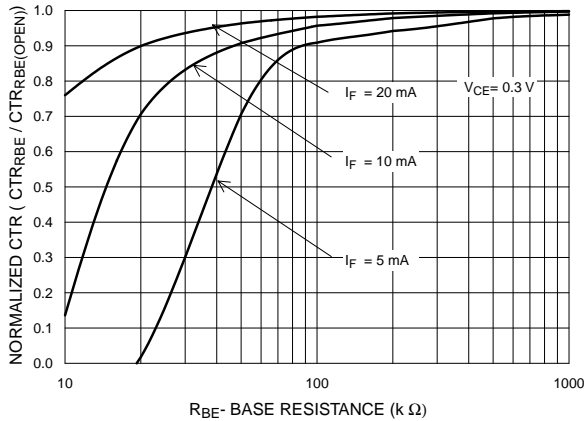


**Fig. 6 CTR vs. RBE (Unsatrated) (White Package)**

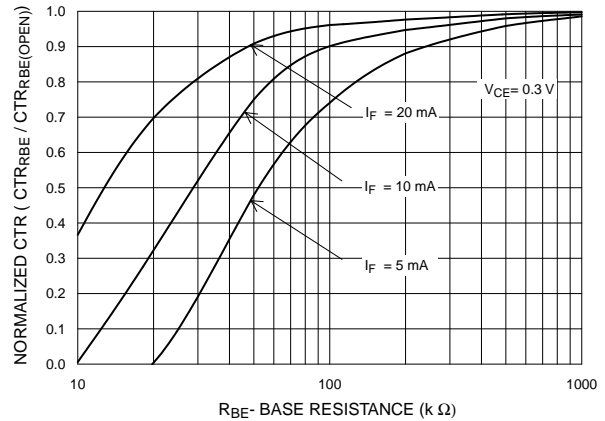


<b>CNY17-1</b>	<b>CNY17-3</b>
<b>CNY17-2</b>	<b>CNY17-4</b>

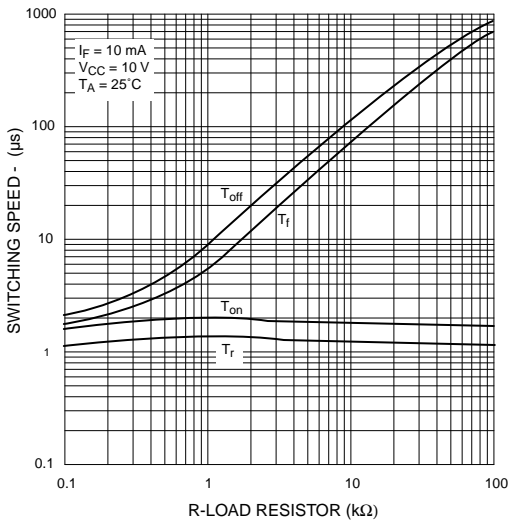
**Fig. 7 CTR vs. RBE (Saturated)  
(Black Package)**



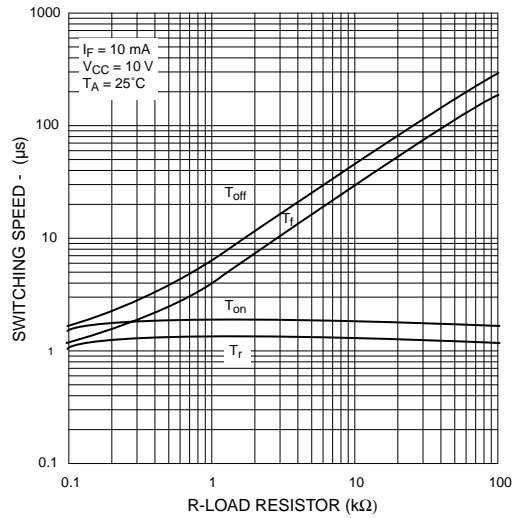
**Fig. 8 CTR vs. RBE (Saturated)  
(White Package)**



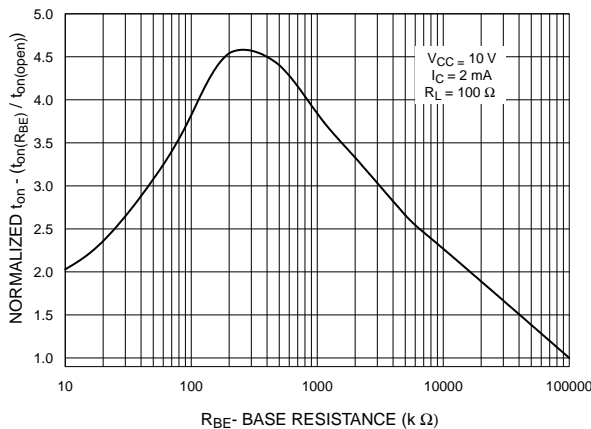
**Fig. 9 Switching Speed vs. Load Resistor  
(Black Package)**



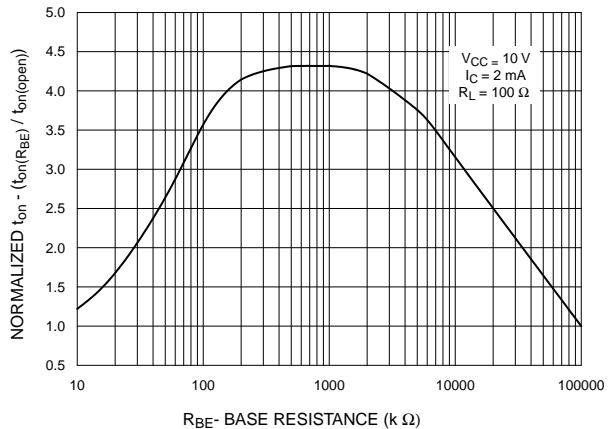
**Fig. 10 Switching Speed vs. Load Resistor  
(White Package)**



**Fig. 11 Normalized ton vs. RBE  
(Black Package)**

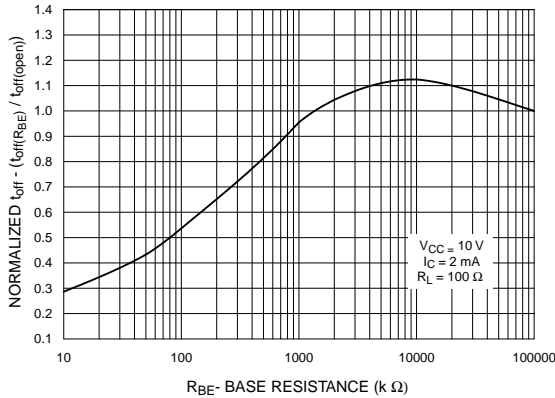


**Fig. 12 Normalized ton vs. RBE  
(White Package)**

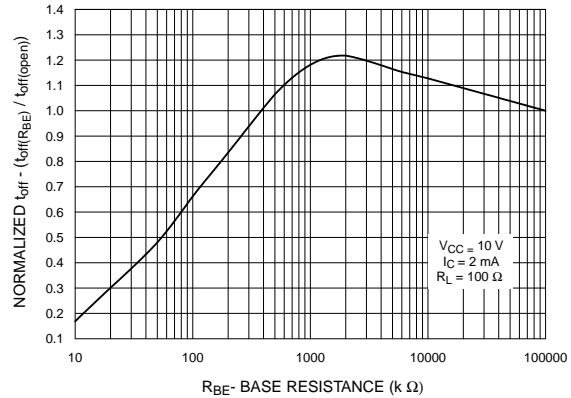


**CNY17-1 CNY17-3**  
**CNY17-2 CNY17-4**

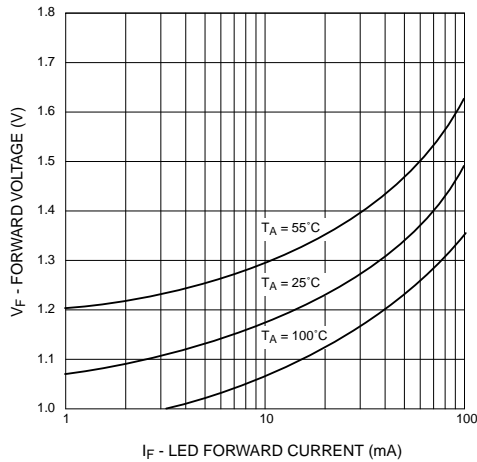
**Fig. 13 Normalized  $t_{off}$  vs.  $R_{BE}$  (Black Package)**



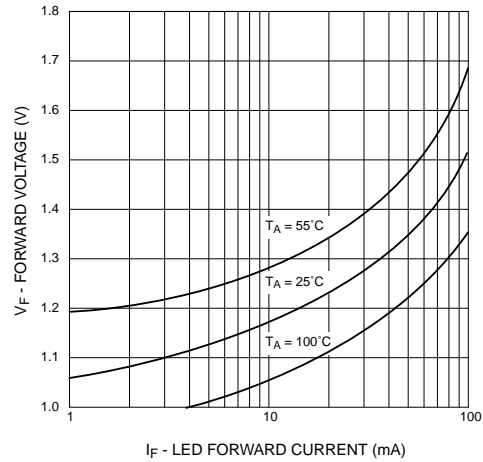
**Fig. 14 Normalized  $t_{off}$  vs.  $R_{BE}$  (White Package)**



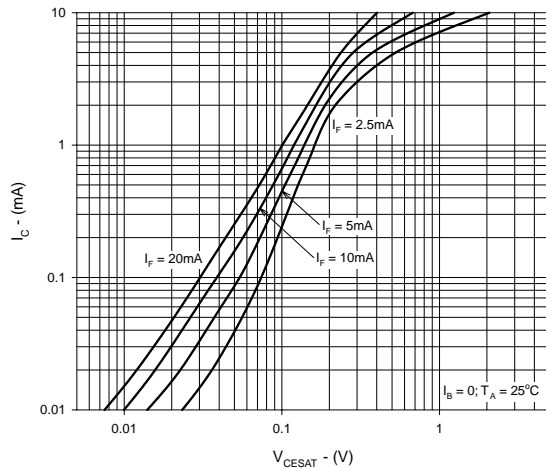
**Fig. 15 LED Forward Voltage vs. Forward Current (Black Package)**



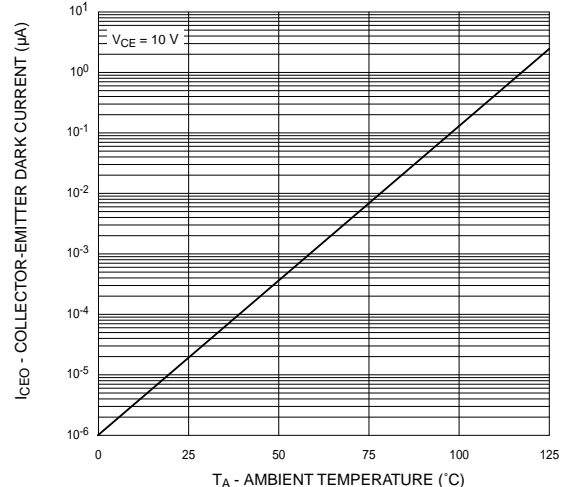
**Fig. 16 LED Forward Voltage vs. Forward Current (White Package)**



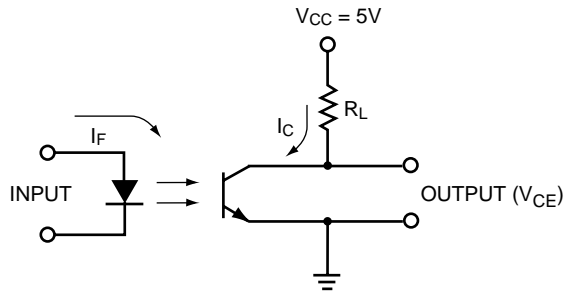
**Fig. 17 Collector Current vs. Collector-Emitter Saturation Voltage**



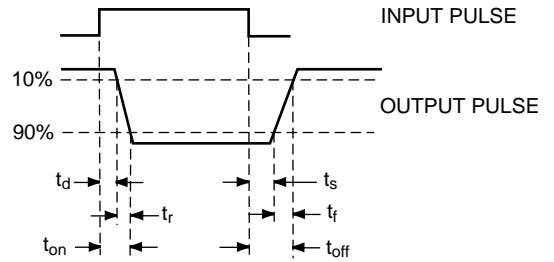
**Fig. 18 Dark Current vs. Ambient Temperature (Black Package)**



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



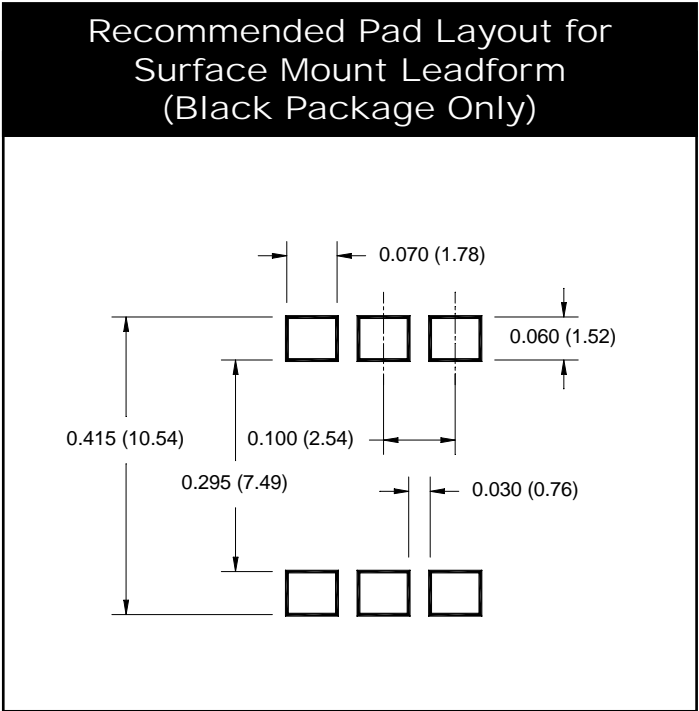
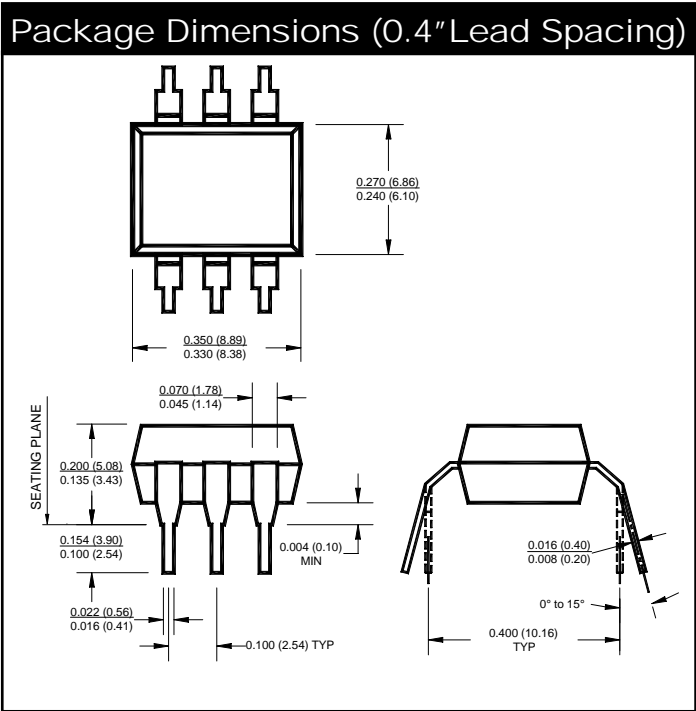
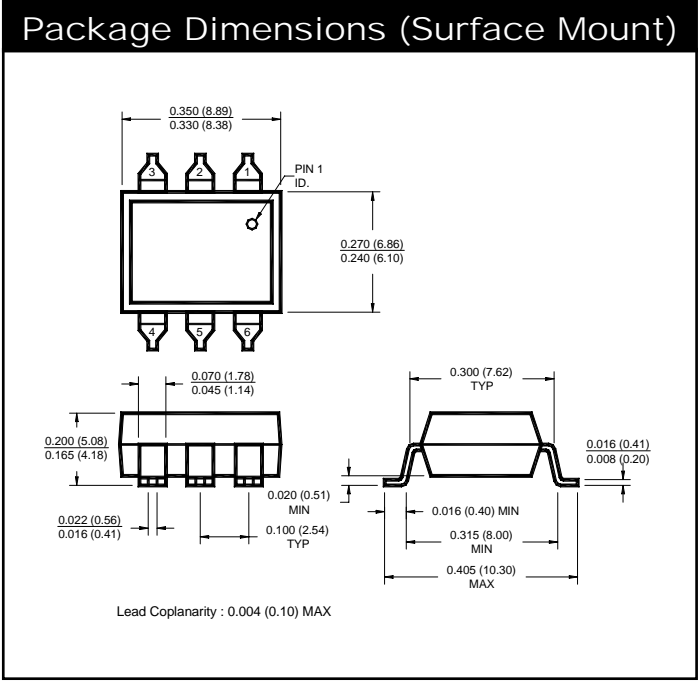
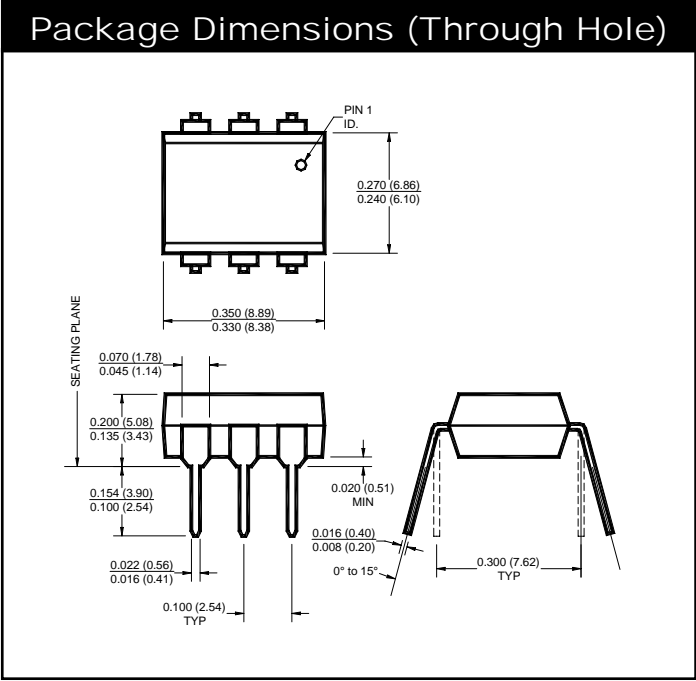
**Figure 19. Switching Time Test Circuit**



**Figure 20. Switching Time Waveforms**

Black Package (No -M Suffix)

<b>CNY17-1</b>	<b>CNY17-3</b>
<b>CNY17-2</b>	<b>CNY17-4</b>



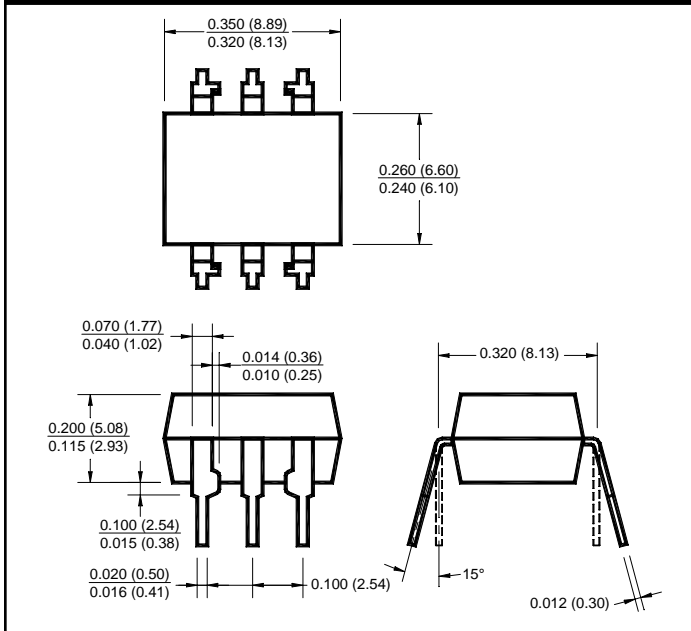
**NOTE**  
All dimensions are in inches (millimeters)



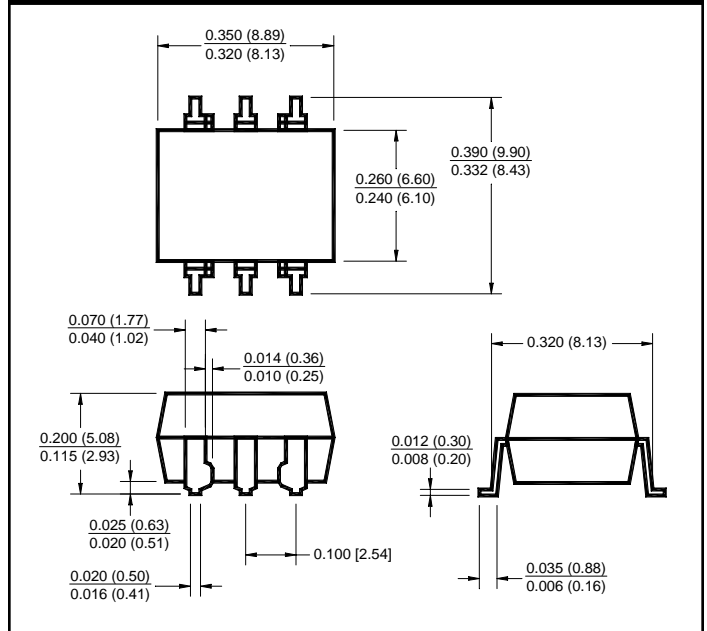
White Package (-M Suffix)

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

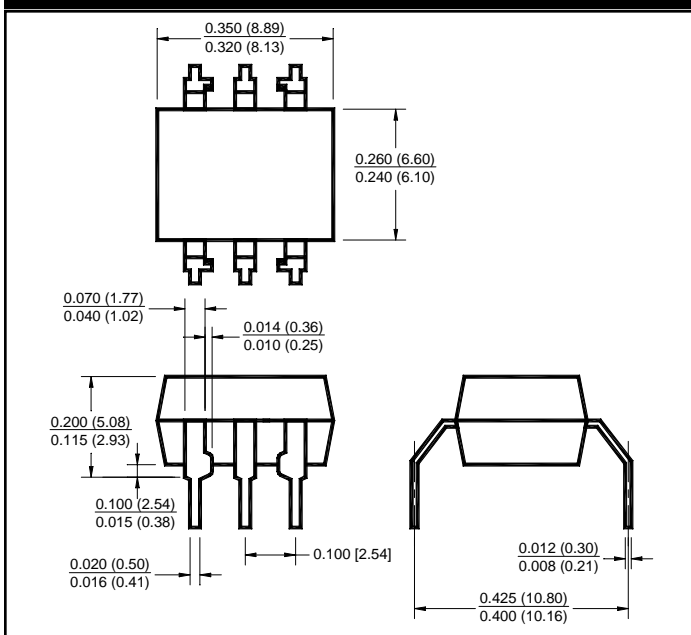
Package Dimensions (Through Hole)



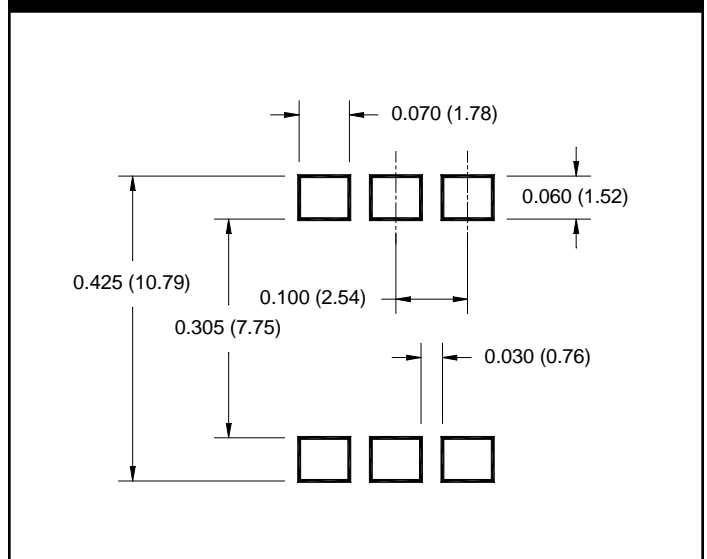
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



Recommended Pad Layout for Surface Mount Leadform (White Package Only)



**NOTE**

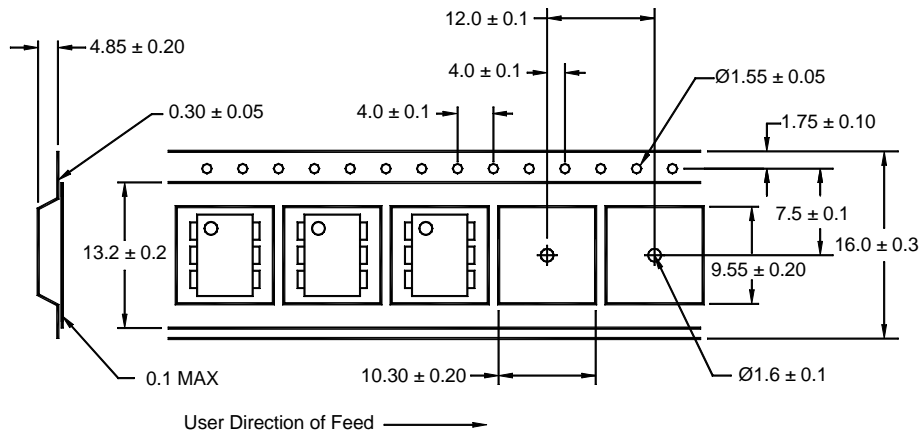
All dimensions are in inches (millimeters)

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

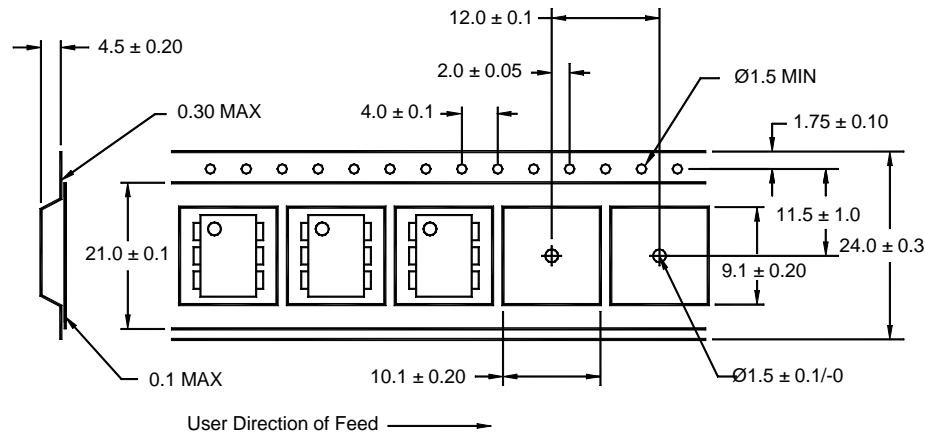
**ORDERING INFORMATION**

Option	Black Package (No Suffix)	White Package (-m Suffix)	Description
<b>Order Entry Identifier</b>			
S	.S	S	Surface Mount Lead Bend
SD	.SD	SR2	Surface Mount; Tape and reel
W	.W	T	0.4" Lead Spacing
300	.300	V	VDE 0884
300W	.300W	TV	VDE 0884, 0.4" Lead Spacing
3S	.3S	SV	VDE 0884, Surface Mount
3SD	.3SD	SR2V	VDE 0884, Surface Mount, Tape & Reel

**Carrier Tape Specifications (Black Package, No Suffix)**



**Carrier Tape Specifications (White Package, -M Suffix)**



**NOTE**

All dimensions are in inches (millimeters)

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

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CNY17-1-M  
6-Pin High BV<sub>ceo</sub> White Package  
Phototransistor 6-PIN, DIP

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General description

The CNY17 series consists of a gallium arsenide IRED coupled with an NPN phototransistor

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Features

- CNY17-1/2/3 are also available in white package by specifying -M suffix (eg. CNY17-2-M)
- UL recognized (File #E90700)
- VDE recognized
  - 102497 for white package
  - File #102497
  - File #94766
  - Add option V for white package (e.g., CNY17-2V-M)
  - Add option '300' for black package (e.g., CNY17-2.300)
- Current transfer ratio in selected groups
- High BV<sub>CEO</sub> - 70V minimum

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Applications

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

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Ordering information

The following options can be ordered with this part:

Option	Black Package (No Suffix) Order Entry Identifier	White Package (-m Suffix) Order Entry Identifier	Description
S	.S	S	Surface Mount Lead Bend
SD	.SD	SR2	Surface Mount; Tape and Reel
W	.W	T	0.4" Lead Spacing
300	.300	V	VDE 0884
300W	.300W	TV	VDE 0884, 0.4" Lead Spacing
3S	.3S	SV	VDE 0884, Surface Mount
3SD	.3SD	SR2V	VDE 0884, Surface Mount, Tape & Reel

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Product status/pricing/packaging

Product	Product status	Pricing*	Package type	Leads	Packing method
CNY17-1S-M	Full Production	\$0.159	DIP	6	BULK
CNY17-1T-M	Full Production	\$0.159	DIP	6	BULK
CNY17-1TV-M	Full Production	\$0.159	N/A	N/A	BULK
CNY17-1SR2-M	Full Production	\$0.167	DIP	6	TAPE REEL
CNY17-1V-M	Full Production	\$0.159	N/A	N/A	BULK
CNY17-1SV-M	Full Production	\$0.159	DIP	6	BULK
CNY17-1-M	Full Production	\$0.159	N/A	N/A	BULK
CNY17-1FV-M	Full Production	\$0.176	N/A	N/A	BULK
CNY17-1FR2V-M	Full Production	\$0.185	DIP	6	TAPE REEL
CNY17-1FR2-M	Full Production	\$0.185	DIP	6	TAPE REEL
CNY17-1F-M	Full Production	\$0.176	N/A	N/A	BULK
CNY17-1SR2V-M	Full Production	\$0.167	DIP	6	TAPE REEL

\* 1,000 piece Budgetary Pricing

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Safety agency certificates

Certificate	Agency	
<a href="#">310983-01</a> (95 K)	DEMKO	DEMKO Testing & Certification
<a href="#">P01101866</a> (383 K)	NEMKO	NEMKO
<a href="#">CR/0117</a> (424 K)	BABT	British Approvals Board of Telecommunications
<a href="#">102497</a> (1629 K)	VDE	VDE Pruf-und Zertifizierungsinstitut
<a href="#">1113639</a> (111 K)	CSA	Canadian Standards Association
<a href="#">0134082</a> (136 K)	SEMKO	SEMKO
<a href="#">FI 17434</a> (47 K)	FIMKO	FIMKO
<a href="#">E90700, Vol. 2</a> (254 K)	UL	Underwriters Laboratories Inc.

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