

CNY17-1, CNY17-3, CNY17-2, CNY17-4 Phototransistor Optocouplers

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

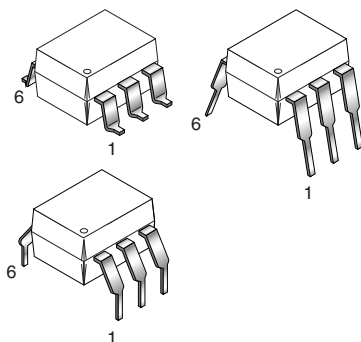
Applications

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

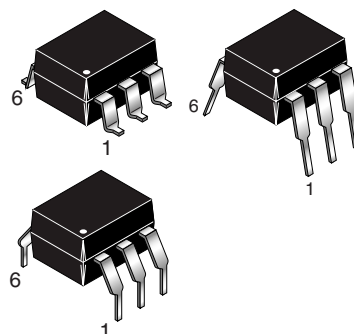
Description

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

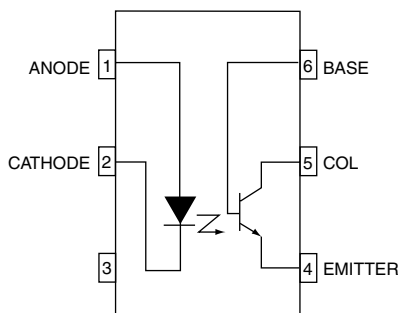
White Package (-M Suffix)



Black Package (No -M Suffix)



Schematic



Parameters	Symbol	Device	Value	Units
TOTAL DEVICE				
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	
EMITTER				
Continuous Forward Current	I _F	-M	60	mA
		non -M	90	
Reverse Voltage	V _R	All	6	V
Forward Current - Peak (1 μs 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	
DETECTOR				
Detector Power Dissipation @ 25°C	P _D	-M	150	mW
		non -M	200	
		-M	1.76	mW/°C
		non -M	2.67	

Electrical Characteristics ($T_A = 25^\circ\text{C}$ Unless otherwise specified.)

Individual Component Characteristics

Parameters	Test Conditions	Symbol	Device	Min	Typ	Max	Units
EMITTER							
Input Forward Voltage	$I_F = 60\text{ mA}$	V_F	-M		1.35	1.65	V
	$I_F = 10\text{ mA}$		non -M		1.15	1.50	
Capacitance	$V_F = 0\text{ V}, f = 1.0\text{ MHz}$	C_J	non -M		50		pF
			-M		18		
Reverse Leakage Current	$V_R = 6\text{ V}$	I_R	All		0.001	10	μA
DETECTOR							
Breakdown Voltage	$I_C = 1.0\text{ mA}, I_F = 0$ $I_C = 10\text{ }\mu\text{A}, I_F = 0$ $I_E = 100\text{ }\mu\text{A}, I_F = 0$	BV_{CEO}	All	70	100		V
Collector to Emitter		BV_{CBO}	All	70	120		V
Collector to Base		BV_{ECO}	All	7	10		V
Leakage Current	$V_{CE} = 10\text{ V}, I_F = 0$ $V_{CB} = 10\text{ V}, I_F = 0$	I_{CEO} I_{CBO}	All		1	50	nA
Collector to Emitter			All			20	nA
Capacitance	$V_{CE} = 0, f = 1\text{ MHz}$ $V_{CB} = 0, f = 1\text{ MHz}$ $V_{EB} = 0, f = 1\text{ MHz}$	C_{CE}	All		8		pF
Collector to Emitter		C_{CB}	All		20		pF
Collector to Base		C_{EB}	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 _{ISO}	Black Package	5300			Vac(rms)*
			'-M' White Package	7500			Vac(pk)
Isolation Resistance	V _{I-O} = 500 VDC	R _{ISO}	All	1011			Ω
Isolation Capacitance	V _{I-O} = Ø, f = 1 MHz	C _{ISO}	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_A = 25°C

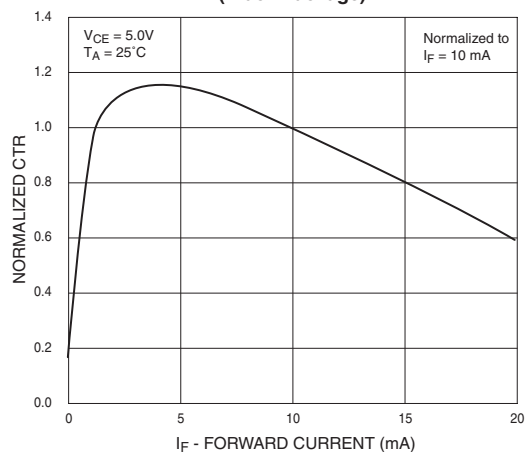
Transfer Characteristics (T_A = 25°C Unless otherwise specified.)

DC Characteristics	Test Conditions	Symbol	Device	Min	Typ	Max	Units
Current Transfer Ratio, Collector to Emitter	I _F = 10 mA, V _{CE} = 5 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 mA, I _C = 2.5 mA	V _{CE(SAT)}	All			.40	V
AC Characteristics	Test Conditions	Symbol	Device	Min	Typ	Max	Units
Non-Saturated Switching Times							
Turn-On Time (Fig.19 and Fig.20)	R _L = 100 Ω, I _C = 2 mA, V _{CC} = 10 V	t _{on}	non -M			10	μs
Turn-Off Time (Fig.19 and Fig.20)	R _L = 100 Ω, I _C = 2 mA, V _{CC} = 10 V	t _{off}	non -M			10	μs
Delay Time (Fig.19 and Fig.20)	I _F = 10 mA, V _{CC} = 5 V, R _L = 75 Ω	t _d	-M			5.6	μs
Rise Time (Fig.19 and Fig.20)	I _F = 10 mA, V _{CC} = 5 V, R _L = 75 Ω	t _r	-M			4.0	μs
Storage Time (Fig.19 and Fig.20)	I _F = 10 mA, V _{CC} = 5 V, R _L = 75 Ω	t _s	-M			4.1	μs
Fall Time (Fig.19 and Fig.20)	I _F = 10 mA, V _{CC} = 5 V, R _L = 75 Ω	t _f	-M			3.5	μs
Saturated Switching Times							
Turn-On Time (Fig.19 and Fig.20)	I _F = 20 mA, V _{CE} = 0.4 V	t _{on}	CNY17-1			5.5	μs
	I _F = 10 mA, V _{CE} = 0.4 V		CNY17-2, CNY17-3, CNY17-4			8.0	
Rise-Time (Fig.19 and Fig.20)	I _F = 20 mA, V _{CE} = 0.4 V	t _r	CNY17-1			4.0	μs
	I _F = 10 mA, V _{CE} = 0.4 V		CNY17-2, CNY17-3, CNY17-4			6.0	
	I _F = 20 mA, V _{CC} = 5 V, R _L = 1 KΩ		CNY17-1-M			4.0	
	I _F = 10 mA, V _{CC} = 5 V, R _L = 1 KΩ		CNY17-2-M, CNY17-3-M			6.0	
Delay Time (Fig.19 and Fig.20)	I _F = 20 mA, V _{CC} = 5 V, R _L = 1 KΩ	t _d	CNY17-1-M			5.5	μs
	I _F = 10 mA, V _{CC} = 5 V, R _L = 1 KΩ		CNY17-2, CNY17-3			8.0	
Turn-Off Time (Fig.19 and Fig.20)	I _F = 20 mA, V _{CE} = 0.4 V	t _{off}	CNY17-1			34.0	ms
	I _F = 10 mA, V _{CE} = 0.4 V		CNY17-2, CNY17-3, CNY17-4			39.0	

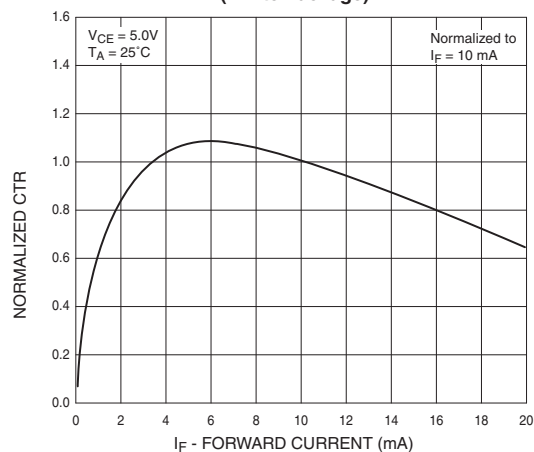
Transfer Characteristics ($T_A = 25^\circ\text{C}$ Unless otherwise specified.) (Continued)

DC Characteristics	Test Conditions	Symbol	Device	Min	Typ	Max	Units
Fall-Time (Fig. 19 and Fig. 20)	$I_F = 20\text{ mA}, V_{CE} = 0.4\text{V}$	t_f	CNY17-1			20.0	μs
	$I_F = 10\text{ mA}, V_{CE} = 0.4\text{V}$		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	μs
	$I_F = 10\text{ mA}, V_{CC} = 5\text{V}, R_L = 1\text{K}\Omega$		CNY17-2-M, CNY17-3-M,			39.0	

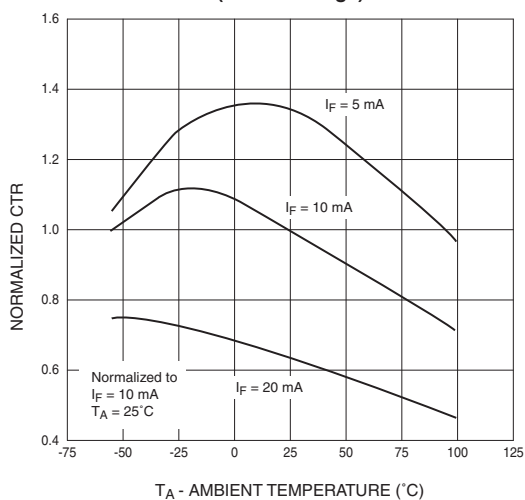
**Fig.1 Normalized CTR vs. Forward Current
(Black Package)**



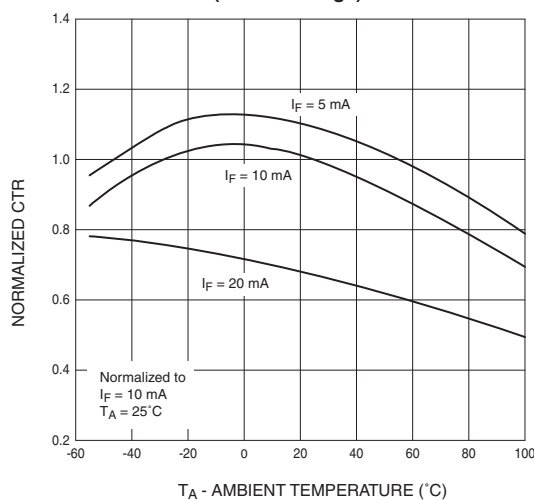
**Fig.2 Normalized CTR vs. Forward Current
(White Package)**



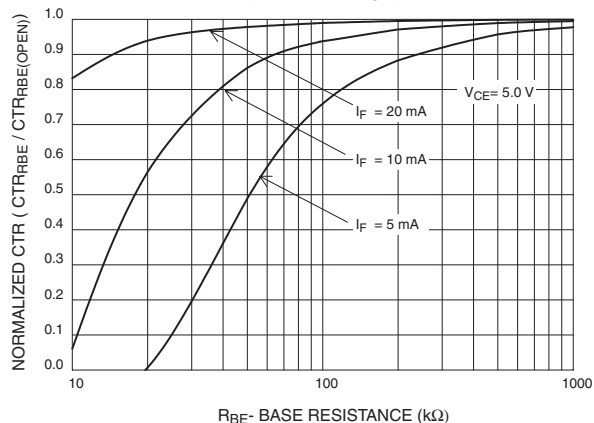
**Fig. 3 Normalized CTR vs. Ambient Temperature
(Black Package)**



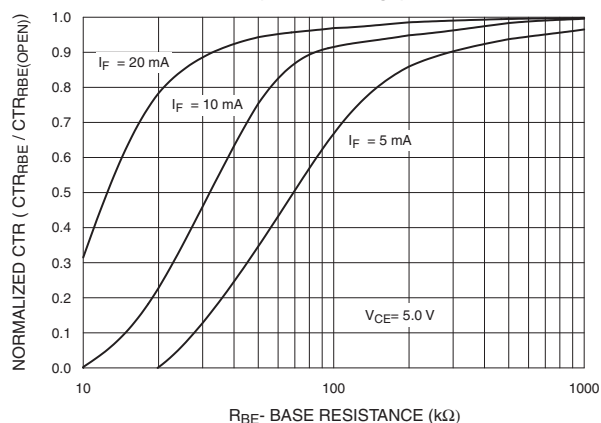
**Fig. 4 Normalized CTR vs. Ambient Temperature
(White Package)**



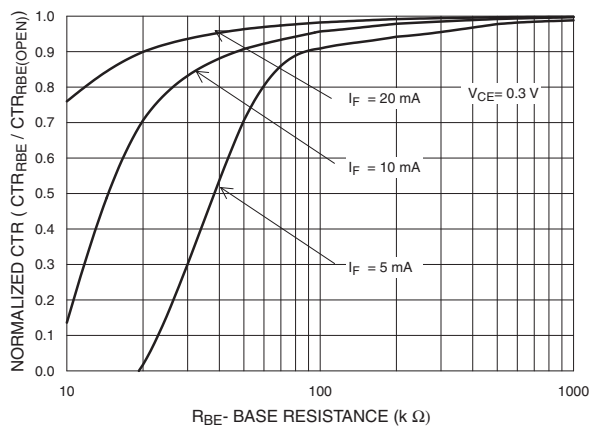
**Fig. 5 CTR vs. RBE (Unsaturated)
(Black Package)**



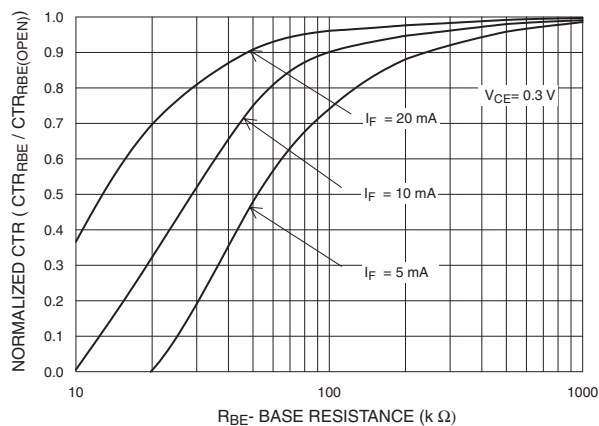
**Fig. 6 CTR vs. RBE (Unsaturated)
(White Package)**



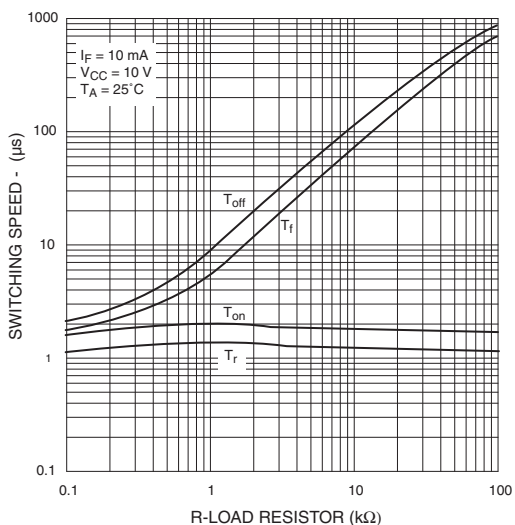
**Fig. 7 CTR vs. R_{BE} (Saturated)
(Black Package)**



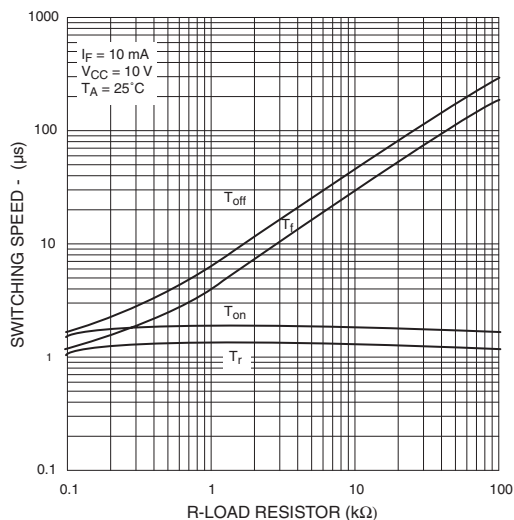
**Fig. 8 CTR vs. R_{BE} (Saturated)
(White Package)**



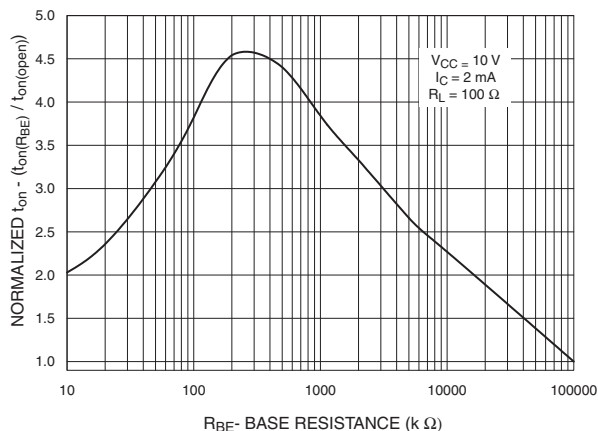
**Fig. 9 Switching Speed vs. Load Resistor
(Black Package)**



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



**Fig. 11 Normalized t_{on} vs. R_{BE}
(Black Package)**



**Fig. 12 Normalized t_{on} vs. R_{BE}
(White Package)**

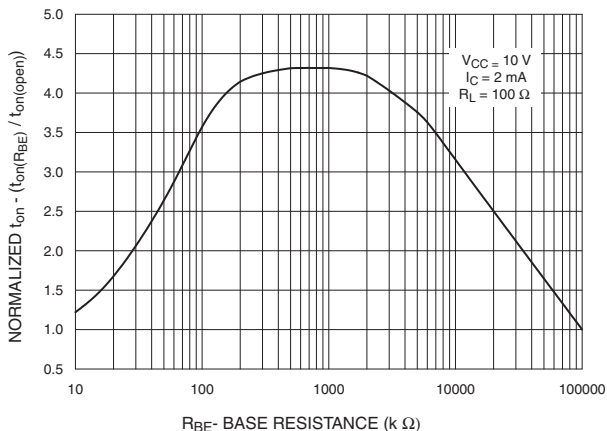


Fig. 13 Normalized t_{off} vs. R_{BE} (Black Package)

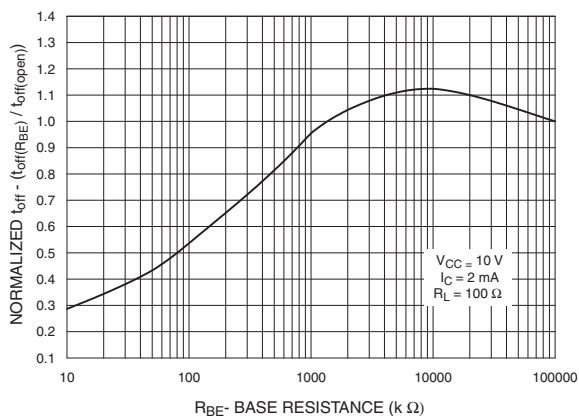


Fig. 14 Normalized t_{off} vs. R_{BE} (White Package)

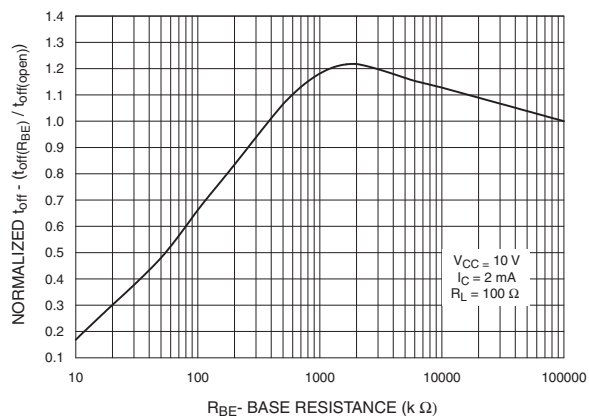


Fig. 15 LED Forward Voltage vs. Forward Current (Black Package)

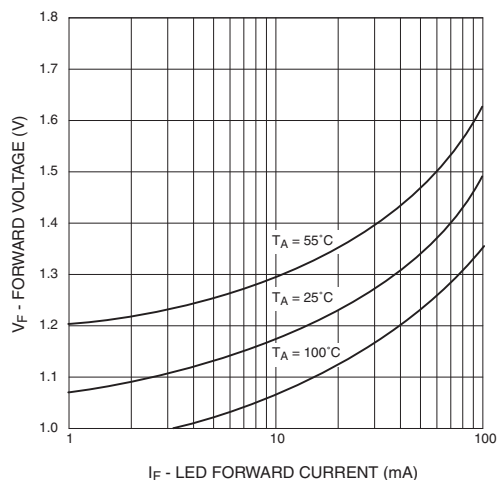


Fig. 16 LED Forward Voltage vs. Forward Current (White Package)

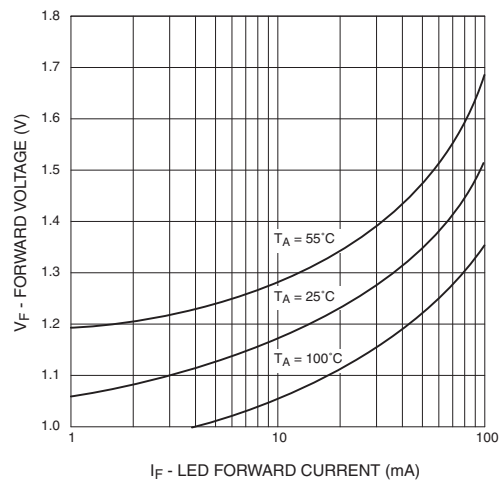


Fig. 17 Collector Current vs. Collector-Emitter Saturation Voltage

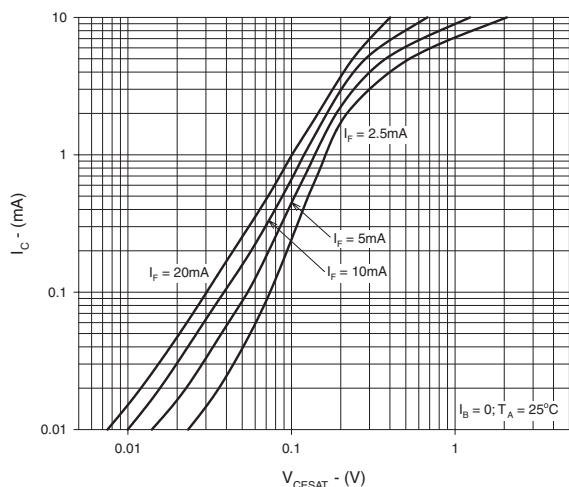
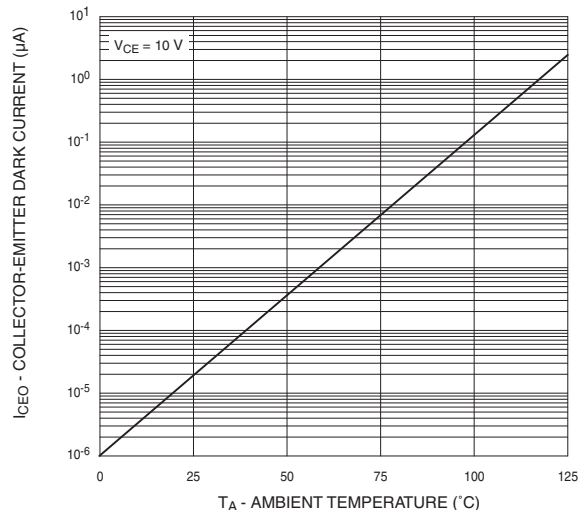


Fig. 18 Dark Current vs. Ambient Temperature (Black Package)



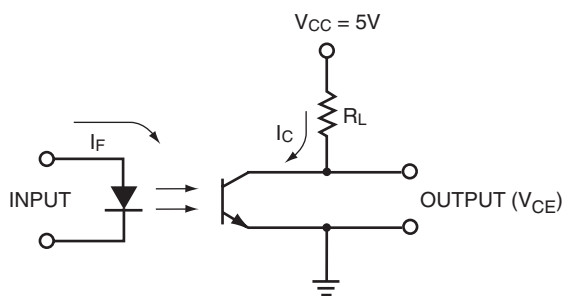


Figure 19. Switching Time Test Circuit

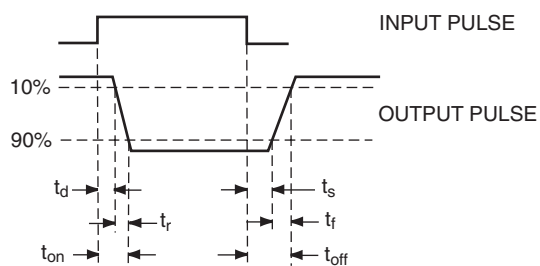
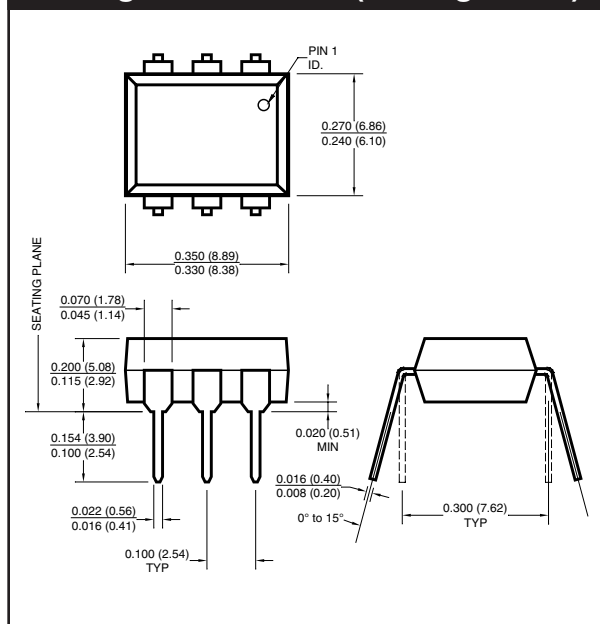


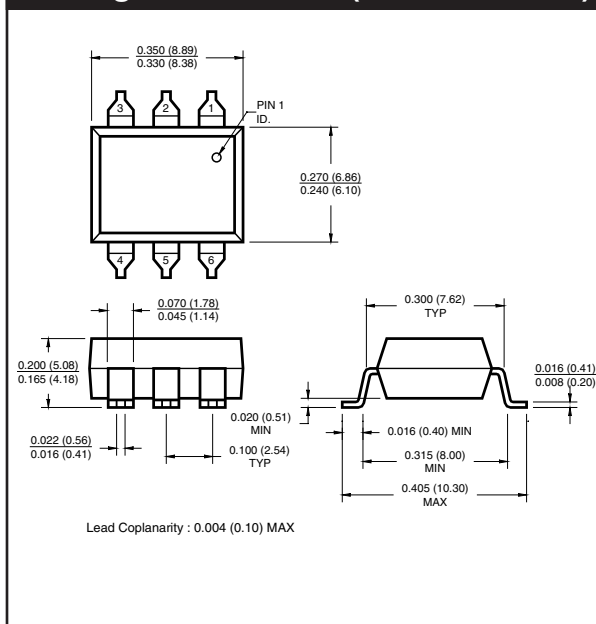
Figure 20. Switching Time Test Circuit

Black Package (No -M Suffix)

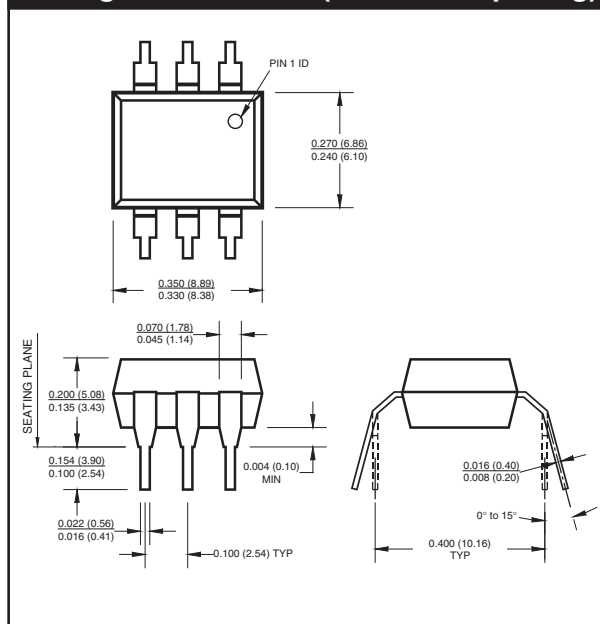
Package Dimensions (Through Hole)



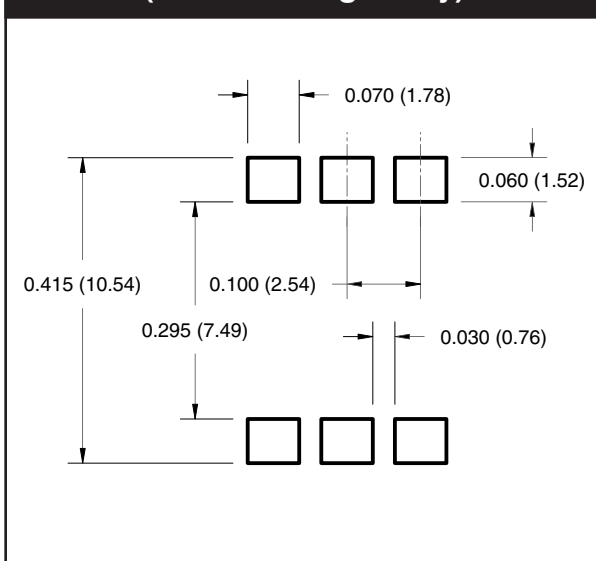
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



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

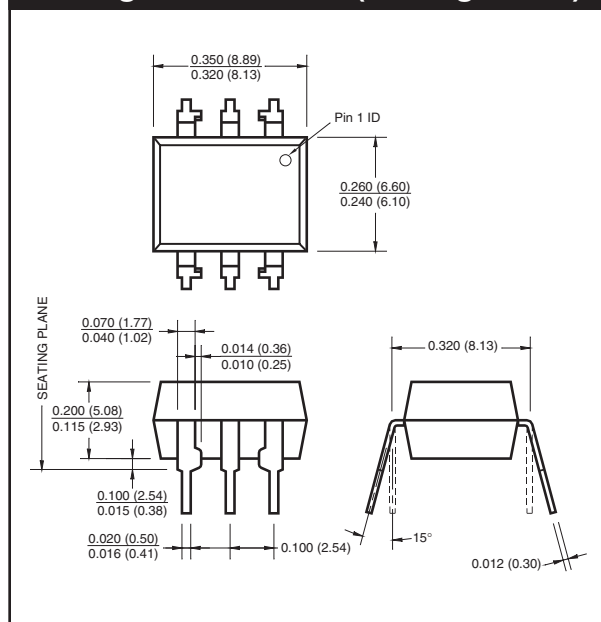


NOTE

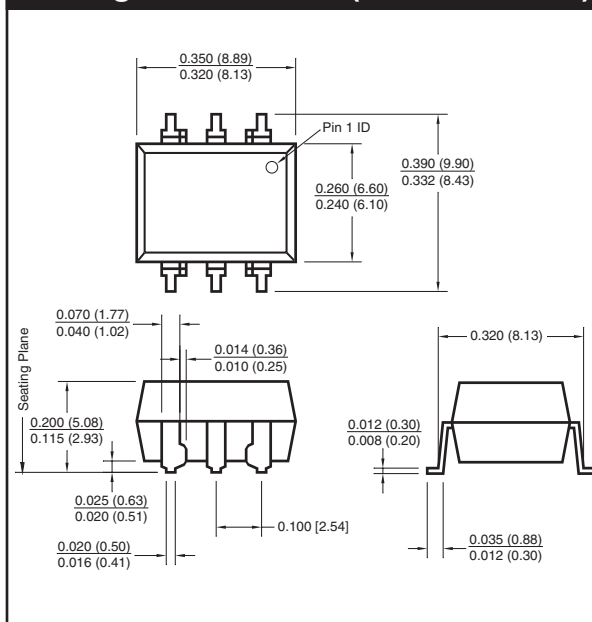
All dimensions are in inches (millimeters)

White Package (-M Suffix)

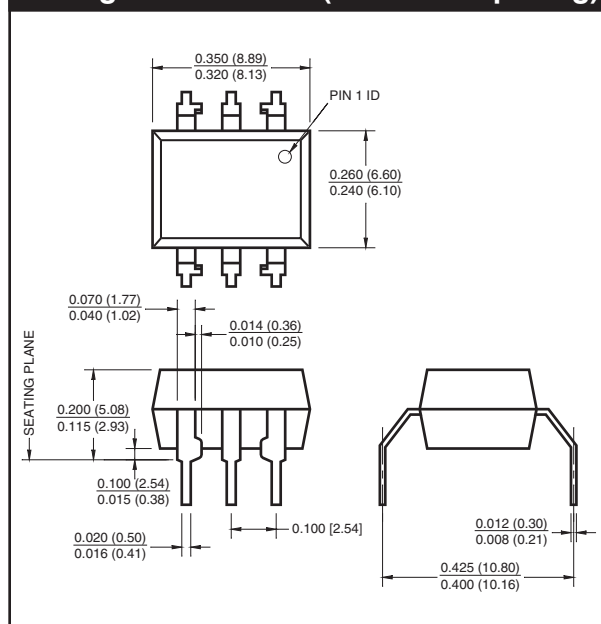
Package Dimensions (Through Hole)



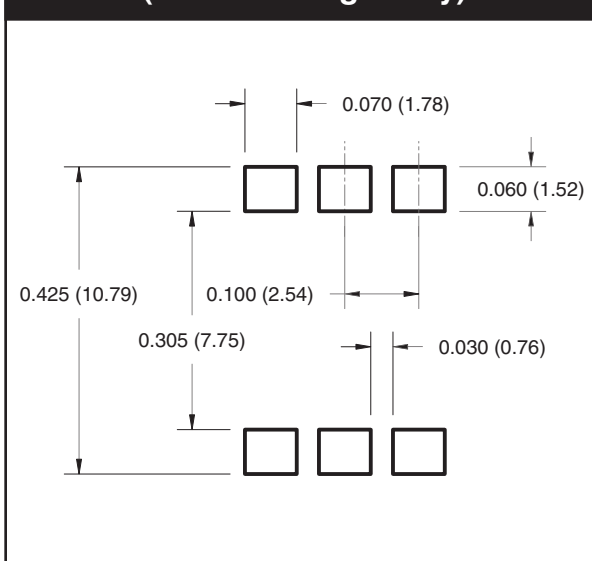
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



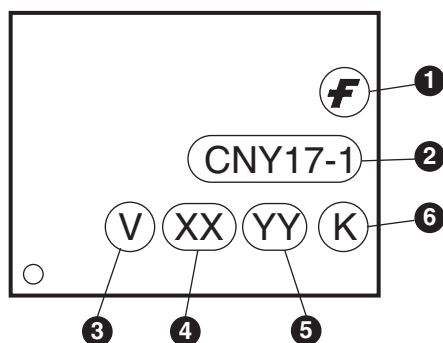
Recommended Pad Layout for Surface Mount Leadform (White Package Only)



NOTE

All dimensions are in inches (millimeters)

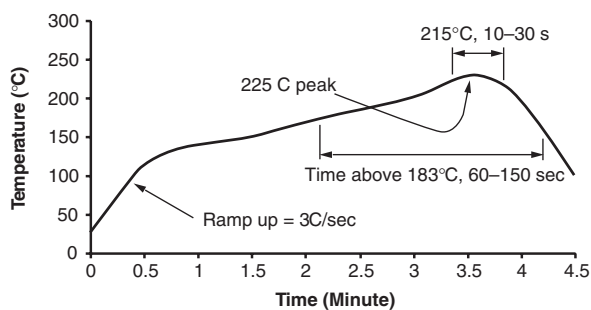
Marking Information



Definitions

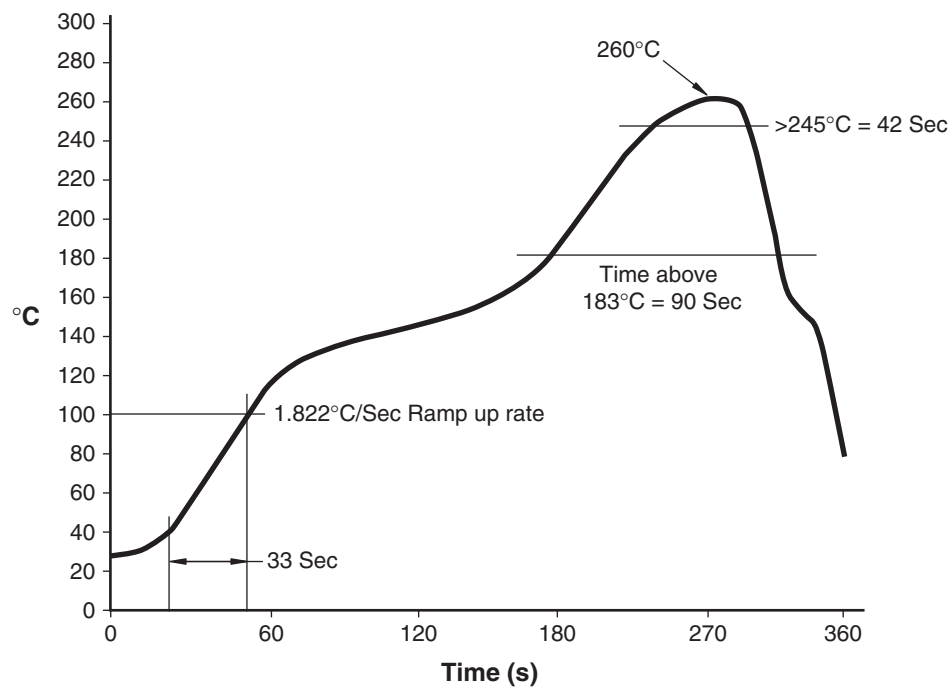
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	Two digits year code, e.g., '03'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

Reflow Profile (Black Package, No Suffix)



- Peak reflow temperature: 225°C (package surface temperature)
- Time of temperature higher than 183°C for 60-150 seconds
- One time soldering reflow is recommended

Reflow Profile (White Package, -M Suffix)



TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACE [™]	FAST [®]	ISOPLANAR [™]	PowerSaver [™]	SuperSOT [™] -8
ActiveArray [™]	FASTr [™]	LittleFET [™]	PowerTrench [®]	SyncFET [™]
Bottomless [™]	FPS [™]	MICROCOUPLER [™]	QFET [®]	TinyLogic [®]
Build it Now [™]	FRFET [™]	MicroFET [™]	QS [™]	TINYOPTO [™]
CoolFET [™]	GlobalOptoisolator [™]	MicroPak [™]	QT Optoelectronics [™]	TruTranslation [™]
CROSSVOLT [™]	GTO [™]	MICROWIRE [™]	Quiet Series [™]	UHC [™]
DOMET [™]	HiSeC [™]	MSX [™]	RapidConfigure [™]	UltraFET [®]
EcoSPARK [™]	I ² C [™]	MSXPro [™]	RapidConnect [™]	UniFET [™]
E ² CMOS [™]	i-Lo [™]	OCX [™]	μSerDes [™]	VCX [™]
EnSigna [™]	ImpliedDisconnect [™]	OCXPro [™]	SILENT SWITCHER [®]	Wire [™]
FACT [™]	IntelliMAX [™]	OPTOLOGIC [®]	SMART START [™]	
FACT Quiet Series [™]		OPTOPLANAR [™]	SPM [™]	
Across the board. Around the world. [™]		PACMAN [™]	Stealth [™]	
The Power Franchise [®]		POP [™]	SuperFET [™]	
Programmable Active Droop [™]		Power247 [™]	SuperSOT [™] -3	
		PowerEdge [™]	SuperSOT [™] -6	

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.

Rev. 116



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.