

CNX35U CNX36U CNX38U CNX39U

DESCRIPTION

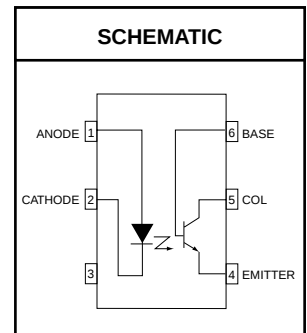
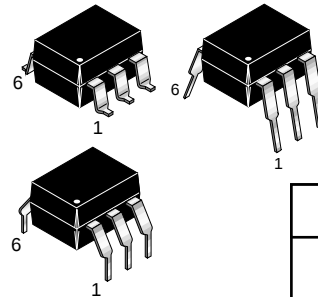
The CNX35U, CNX36U CNX38U and CNX39U are optically coupled isolators consisting of an infrared emitting GaAs diode and a silicon NPN phototransistor with accessible base. These devices are housed in 6-pin dual-in-line packages (DIP).

FEATURES

- High output/input DC current transfer ratio
- Low saturation voltage
- UL recognized (File # E90700)
- VDE recognized (File # 94766)
- Ordering option '300' (e.g. CNX35U.300)

APPLICATIONS

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



Parameters	Symbol	Device	Value	Units
TOTAL DEVICE				
Storage Temperature	T _{STG}	All	-55 to +150	°C
Operating Temperature	T _{OPR}	All	-40 to +100	°C
Lead Solder Temperature	T _{SOL}	All	260 for 10 sec	°C
EMITTER				
Continuous Reverse Voltage	V _R	All	5	V
Continuous Forward Current	I _F	All	100	mA
Forward Current - Peak (10 μs pulse, δ = 0.01)	I _{F(pk)}	All	3.0	A
Total Power Dissipation up to 25°C Ambient Derate Linearly from 25°C	P _D	All	200	mW
		All	2.0	mW/°C
DETECTOR				
Collector to Emitter Voltage (open base)	V _{CEO}	CNX38U	80	V
		CNX35U, CNX36U, CNX39U	30	
Collector to Base Voltage (open emitter)	V _{CBO}	CNX38U	120	V
		CNX35U, CNX36U, CNX39U	70	
Emitter to Collector Voltage (open base)	V _{ECO}	All	7	V
DC Collector Current	I _C	All	100	mA
Detector Power Dissipation up to 25°C Ambient Derate Linearly from 25°C	P _D	All	200	mW
		All	2.0	mW/°C

CNX35U CNX36U CNX38U CNX39U

ELECTRICAL CHARACTERISTICS (T_A = 25°C Unless otherwise specified.)

INDIVIDUAL COMPONENT CHARACTERISTICS

Parameters	Test Conditions	Symbol	Device	Min	Typ	Max	Units
EMITTER							
Input Forward Voltage	I _F = 10 mA	V _F	All		1.15	1.5	V
Reverse Current	V _R = 5 V	I _R	All			10	μA
DETECTOR							
Leakage Current Collector to Emitter	V _{CE} = 10 V	I _{CEO}	CNX35U, CNX36U, CNX39U		2	50	nA
	V _{CE} = 50 V		CNX38U		2	50	nA
	V _{CE} = 10 V, T _A = 70°C		CNX35U, CNX36U, CNX39U			10	μA
	V _{CE} = 50 V, T _A = 70°C		CNX38U			10	μA
	V _{CE} = 10 V	I _{CBO}	All			20	nA
Breakdown Voltage							
Collector to Emitter	I _C = 1 mA, I _F = 0	BV _{CEO}	CNX35U, CNX36U, CNX39U	30			V
			CNX38U	80			
Collector to Base	I _C = 0.1 mA, I _F = 0	BV _{CBO}	CNX35U, CNX36U, CNX39U	70			V
			CNX38U	120			
Emitter to Collector	I _E = 0.1 mA, I _F = 0	BV _{ECO}	All	7			V

ISOLATION CHARACTERISTICS

Characteristic	Test Conditions	Symbol	Min	Typ	Max	Units
Input-Output Isolation Voltage	t = 1 min.	V _{ISO}	5,300			V _{RMS}
Isolation Resistance	V _{I-O} = 500 VDC	R _{ISO}	1	10		TΩ
Isolation Capacitance	I _F = 0, V = 0V, f = 1 MHz	C _{ISO}		0.6	1.3	pF

CNX35U CNX36U CNX38U CNX39U

TRANSFER CHARACTERISTICS (T _A = 25°C Unless otherwise specified.)							
DC Characteristics	Test Conditions	Symbol	Device	Min	Typ	Max	Units
Output/Input Current Transfer Ratio	I _F = 10 mA, V _{CE} = 0.4 V	CTR	CNX35U	40		160	%
			CNX39U	60		100	
			CNX36U	80		200	
	I _F = 10 mA, V _{CE} = 10 V		CNX38U	70		210	
				50			
	I _F = 16 mA, V _{CE} = 0.4 V		All	15			
Collector-Emitter Saturation Voltage	I _F = 10 mA, I _C = 2 mA	V _{CE(SAT)}	CNX35U, CNX39U		0.15	0.4	V
	I _F = 10 mA, I _C = 4 mA		CNX36U		0.19	0.4	
	I _F = 16 mA, I _C = 2 mA		CNX38U		0.2	0.4	
	AC Characteristics	Test Conditions	Symbol	Device	Min	Typ	Max
Non-Saturated Switching Times							
Turn-On Time See Fig. 1 and Fig. 2	R _L = 100 Ω, I _C = 2 mA, V _{CC} = 5 V	t _{on}	CNX35U			20	μs
			CNX39U			20	
			CNX36U			20	
	R _L = 100 Ω, I _C = 4 mA, V _{CC} = 5 V		CNX38U			20	
Turn-Off Time See Fig. 1 and Fig. 2	R _L = 100 Ω, I _C = 2 mA, V _{CC} = 5 V	t _{off}	CNX35U			20	μs
			CNX39U			20	
			CNX36U			20	
	R _L = 100 Ω, I _C = 4 mA, V _{CC} = 5 V		CNX38U			20	
Saturated Switching Times							
Turn-On Time See Fig. 1 and Fig. 2	R _L = 1 kΩ, I _C = 2 mA, V _{CC} = 5 V	t _{on}	CNX35U			50	μs
			CNX39U			50	
			CNX36U			50	
	R _L = 1 kΩ, I _C = 4 mA, V _{CC} = 5 V		CNX38U			50	
Turn-Off Time See Fig. 1 and Fig. 2	R _L = 1 kΩ, I _C = 2 mA, V _{CC} = 5 V	t _{off}	CNX35U			50	μs
			CNX39U			50	
			CNX36U			50	
	R _L = 1 kΩ, I _C = 4 mA, V _{CC} = 5 V		CNX38U			50	

CNX35U CNX36U CNX38U CNX39U

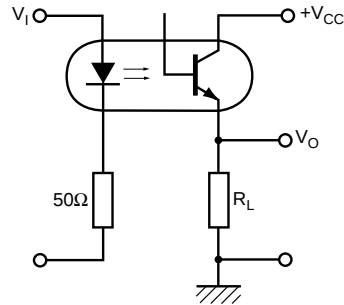


Fig. 1 Switching Test Circuit

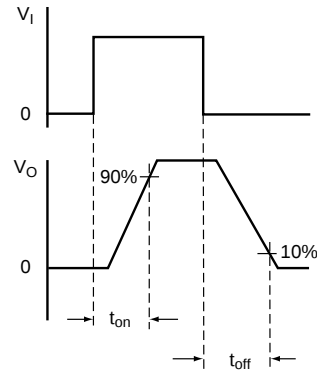


Fig. 2 Switching Test Waveforms

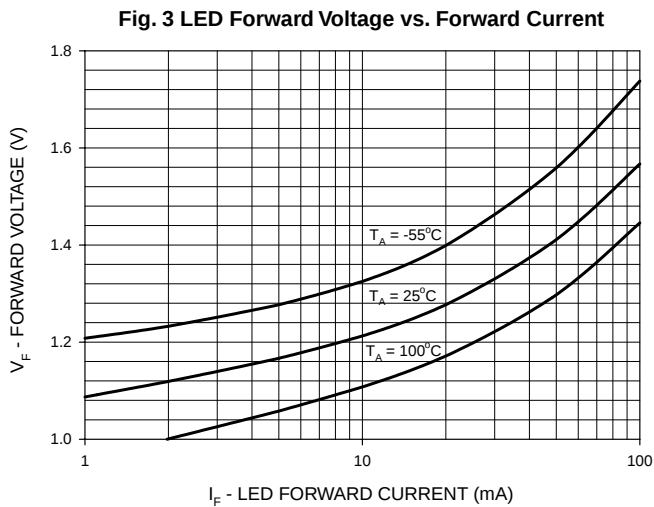


Fig. 3 LED Forward Voltage vs. Forward Current

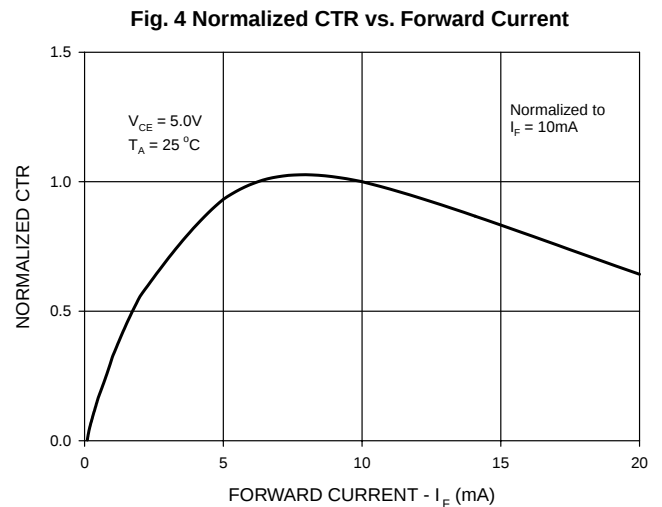


Fig. 4 Normalized CTR vs. Forward Current

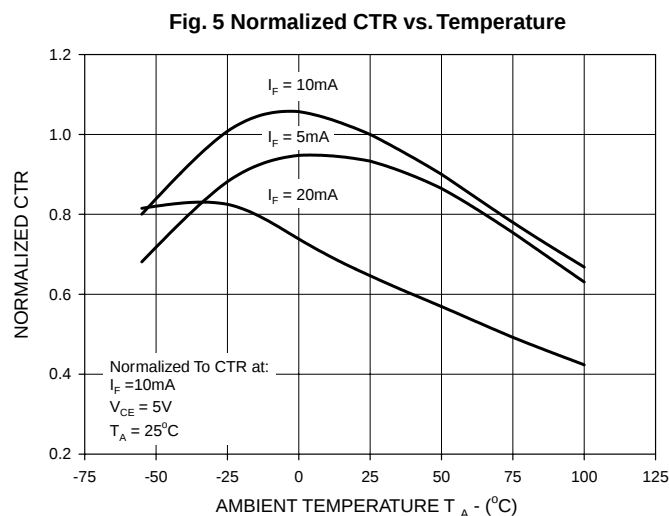


Fig. 5 Normalized CTR vs. Temperature

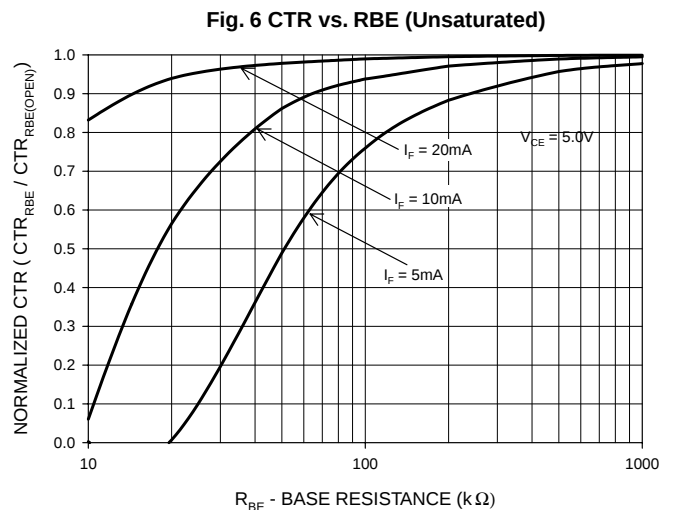


Fig. 6 CTR vs. RBE (Unsaturated)

CNX35U CNX36U CNX38U CNX39U

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

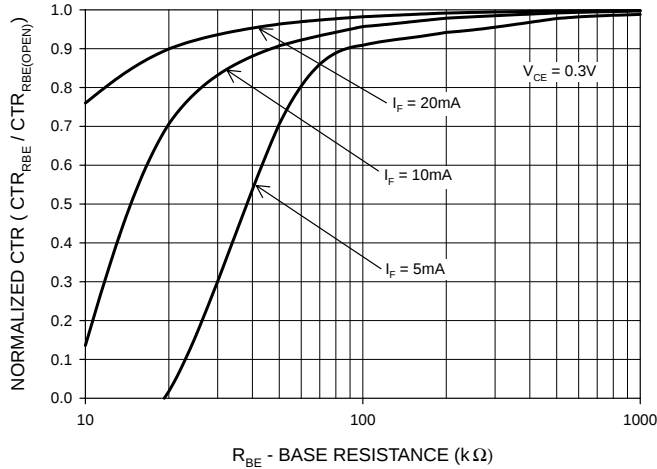


Fig. 8 Normalized t_{on} vs. R_{BE}

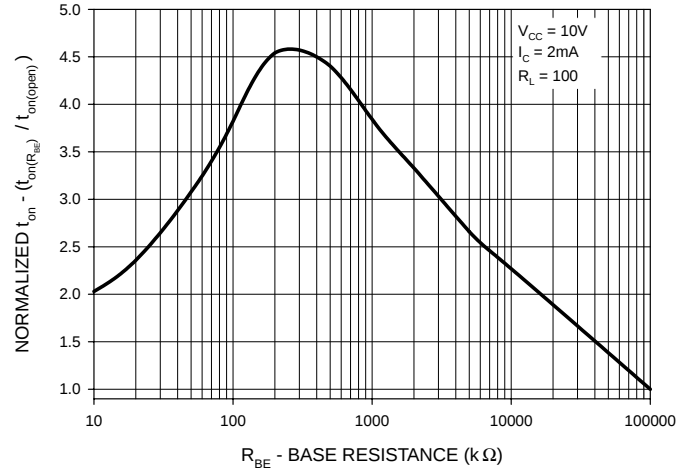


Fig. 9 Normalized t_{off} vs. R_{BE}

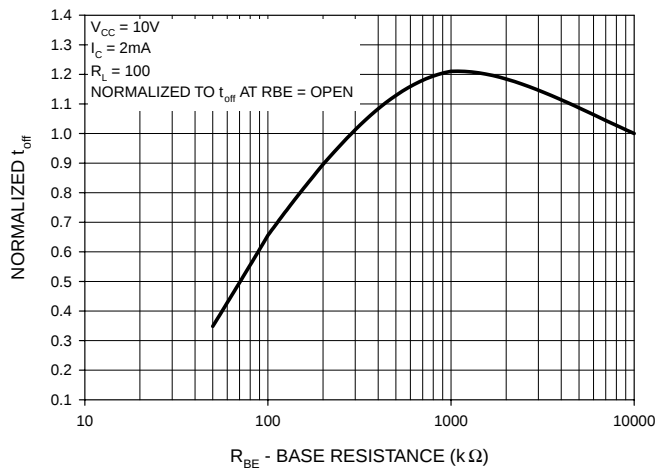


Fig. 10 Switching Speed vs. Load Resistor

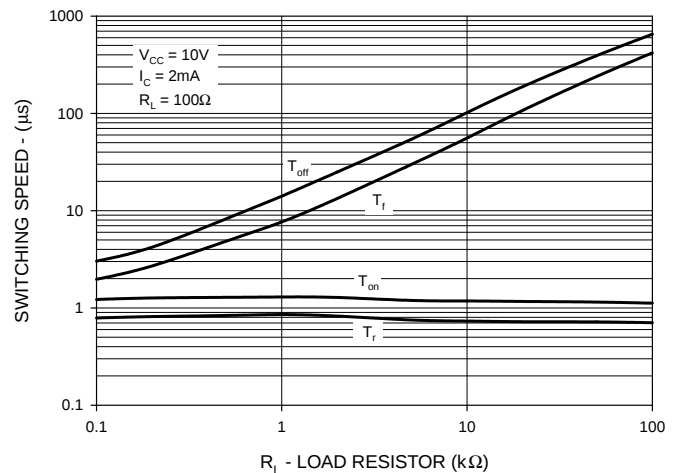
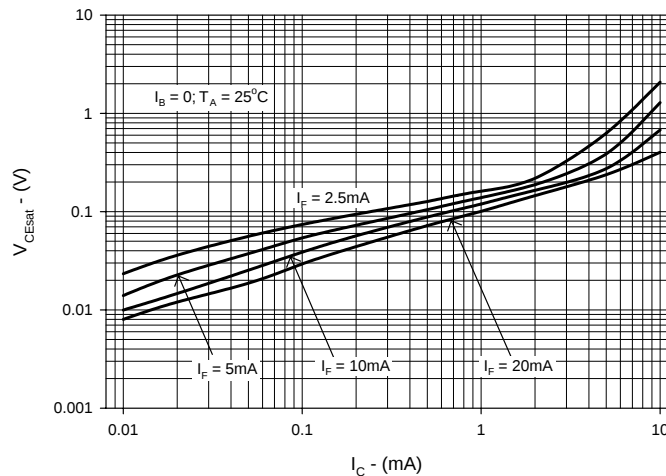
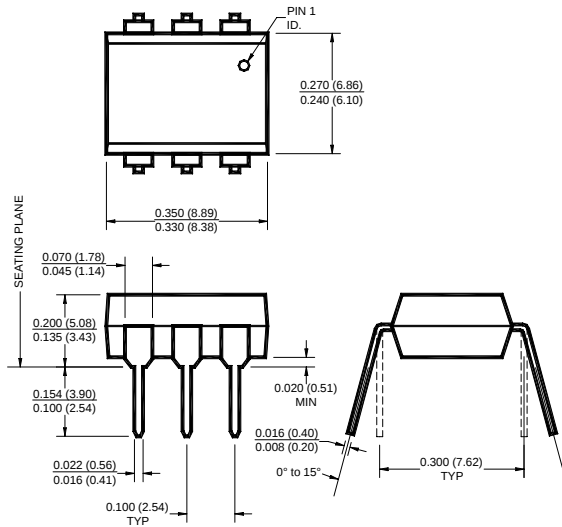


Fig. 11 Collector-Emitter Saturation Voltage as a Function of Collector Current

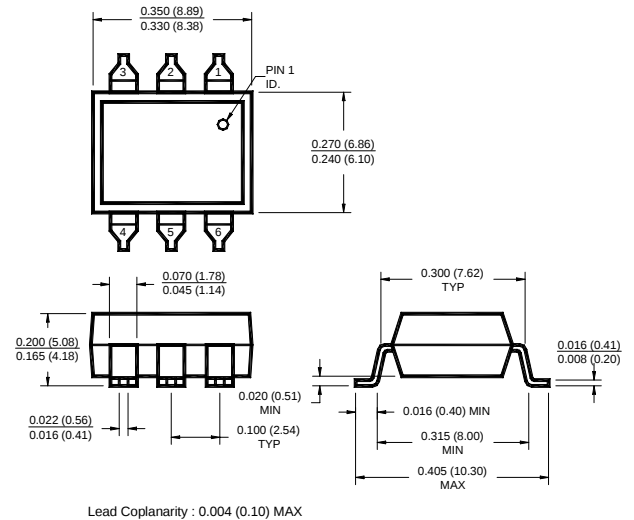


CNX35U CNX36U CNX38U CNX39U

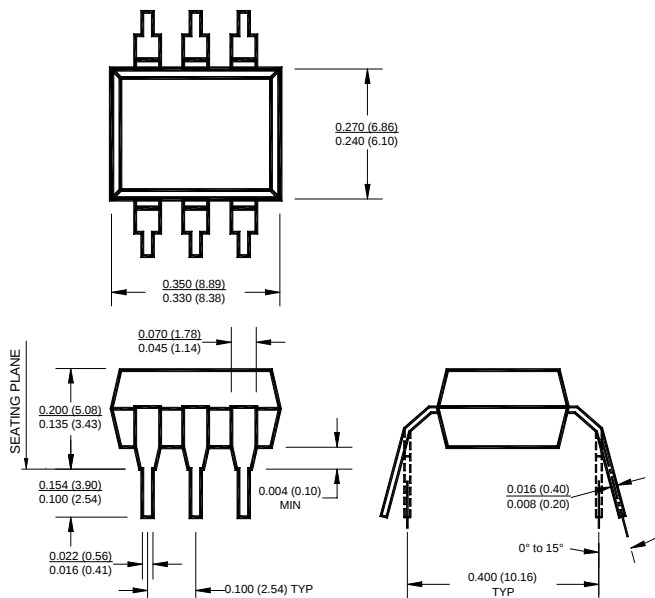
Package Dimensions (Through Hole)



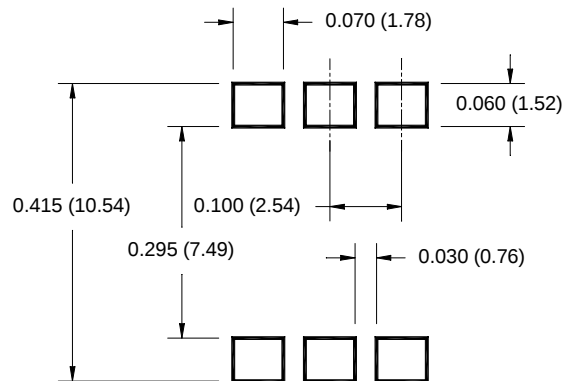
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



Recommended Pad Layout for Surface Mount Leadform



NOTE

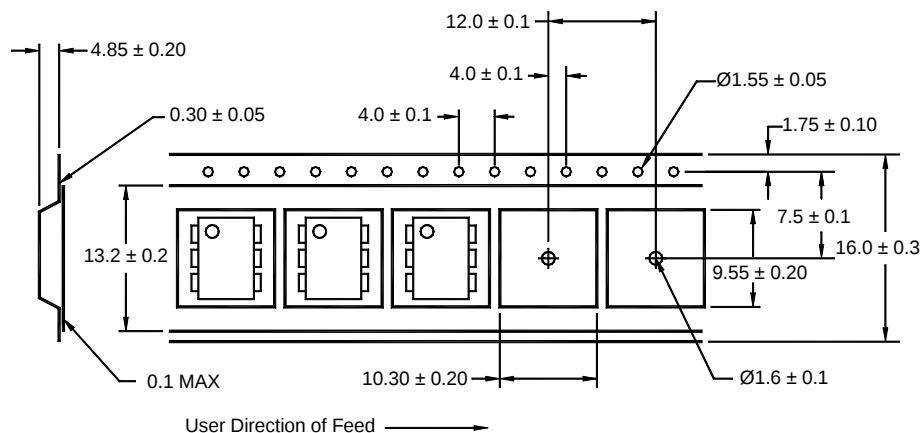
All dimensions are in inches (millimeters)

CNX35U CNX36U CNX38U CNX39U

ORDERING INFORMATION

Option	Order Entry Identifier	Description
S	.S	Surface Mount Lead Bend
SD	.SD	Surface Mount; Tape and reel
W	.W	0.4" Lead Spacing
300	.300	VDE 0884
300W	.300W	VDE 0884, 0.4" Lead Spacing
3S	.3S	VDE 0884, Surface Mount
3SD	.3SD	VDE 0884, Surface Mount, Tape & Reel

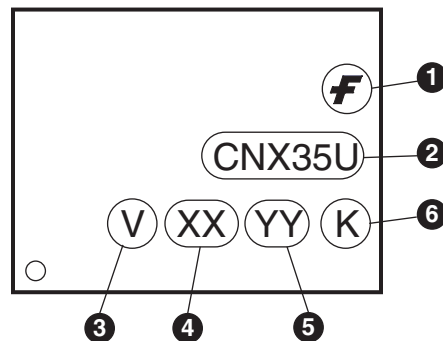
Carrier Tape Specifications ("D" Taping Orientation)



NOTE

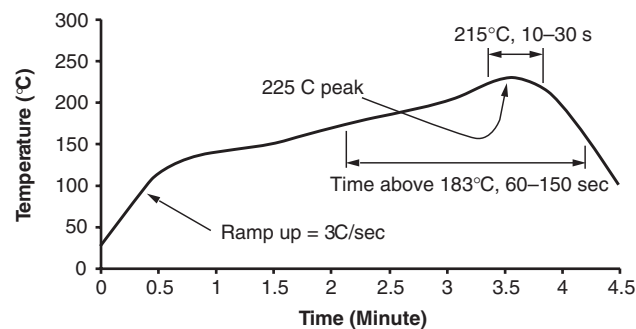
All dimensions are in inches (millimeters)

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 digit 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

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.

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

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.