

CNX35U CNX36U CNX38U CNX39U

DESCRIPTION

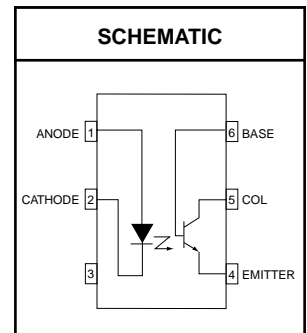
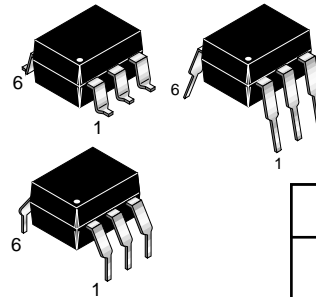
The CNX35U, CNX36U, CNX38U and CNX39U are optically coupled isolators consisting of an infrared emitting GaAs diode and a silicon NPN phototransistor with accessible base. These devices are housed in 6-pin dual-in-line packages (DIP).

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 μ s pulse, $\delta = 0.01$)	$I_F(pk)$	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

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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	$I_F = 10\text{ mA}$	V_F	All		1.15	1.5	V	
Reverse Current	$V_R = 5\text{ V}$	I_R	All			10	μA	
DETECTOR								
Leakage Current Collector to Emitter	$V_{CE} = 10\text{ V}$	I_{CEO}	CNX35U, CNX36U, CNX39U		2	50	nA	
	$V_{CE} = 50\text{ V}$		CNX38U		2	50	nA	
	$V_{CE} = 10\text{ V}, T_A = 70^\circ\text{C}$		CNX35U, CNX36U, CNX39U				10	μA
	$V_{CE} = 50\text{ V}, T_A = 70^\circ\text{C}$		CNX38U				10	μA
		$V_{CE} = 10\text{ V}$	I_{CBO}	All			20	nA
Breakdown Voltage								
Collector to Emitter	$I_C = 1\text{ mA}, I_F = 0$	BV_{CEO}	CNX35U, CNX36U, CNX39U	30			V	
			CNX38U	80				
Collector to Base	$I_C = 0.1\text{ mA}, I_F = 0$	BV_{CBO}	CNX35U, CNX36U, CNX39U	70			V	
			CNX38U	120				
Emitter to Collector	$I_E = 0.1\text{ mA}, I_F = 0$	BV_{ECO}	All	7			V	

ISOLATION CHARACTERISTICS

Characteristic	Test Conditions	Symbol	Min	Typ	Max	Units
Input-Output Isolation Voltage	$t = 1\text{ min.}$	V_{ISO}	5,300			V_{RMS}
Isolation Resistance	$V_{I-O} = 500\text{ VDC}$	R_{ISO}	1	10		$T\Omega$
Isolation Capacitance	$I_F = 0, V = 0V, f = 1\text{ MHz}$	C_{ISO}		0.6	1.3	pF

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TRANSFER CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise specified.)							
DC Characteristics	Test Conditions	Symbol	Device	Min	Typ	Max	Units
Output/Input Current Transfer Ratio	$I_F = 10\text{ mA}, V_{CE} = 0.4\text{ V}$	CTR	CNX35U	40		160	%
			CNX39U	60		100	
	CNX36U		80		200		
	CNX38U		70		210		
			50				
$I_F = 2\text{ mA}, V_{CE} = 5\text{ V}$	All	15					
Collector-Emitter Saturation Voltage	$I_F = 10\text{ mA}, I_C = 2\text{ mA}$	$V_{CE(SAT)}$	CNX35U, CNX39U		0.15	0.4	V
	$I_F = 10\text{ mA}, I_C = 4\text{ mA}$		CNX36U		0.19	0.4	
	$I_F = 16\text{ mA}, I_C = 2\text{ mA}$		CNX38U		0.2	0.4	
AC Characteristics	Test Conditions	Symbol	Device	Min	Typ	Max	Units
Non-Saturated Switching Times Turn-On Time See Fig. 1 and Fig. 2	$R_L = 100\ \Omega, I_C = 2\text{ mA}, V_{CC} = 5\text{ V}$	t_{on}	CNX35U			20	μs
	$R_L = 100\ \Omega, I_C = 4\text{ mA}, V_{CC} = 5\text{ V}$		CNX39U			20	
Turn-Off Time See Fig. 1 and Fig. 2		$R_L = 100\ \Omega, I_C = 2\text{ mA}, V_{CC} = 5\text{ V}$	CNX36U			20	
	CNX38U				20		
Saturated Switching Times Turn-On Time See Fig. 1 and Fig. 2	$R_L = 1\text{ k}\Omega, I_C = 2\text{ mA}, V_{CC} = 5\text{ V}$	t_{on}	CNX35U			50	μs
	$R_L = 1\text{ k}\Omega, I_C = 4\text{ mA}, V_{CC} = 5\text{ V}$		CNX39U			50	
Turn-Off Time See Fig. 1 and Fig. 2		$R_L = 1\text{ k}\Omega, I_C = 2\text{ mA}, V_{CC} = 5\text{ V}$	CNX36U			50	
	CNX38U				50		
	$R_L = 1\text{ k}\Omega, I_C = 4\text{ mA}, V_{CC} = 5\text{ V}$	t_{off}	CNX35U			50	μs
			CNX39U			50	
			CNX36U			50	
			CNX38U			50	

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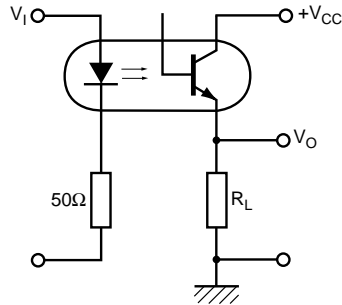


Fig. 1 Switching Test Circuit

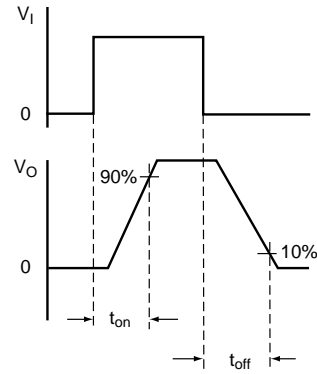


Fig. 2 Switching Test Waveforms

Fig. 3 LED Forward Voltage vs. Forward Current

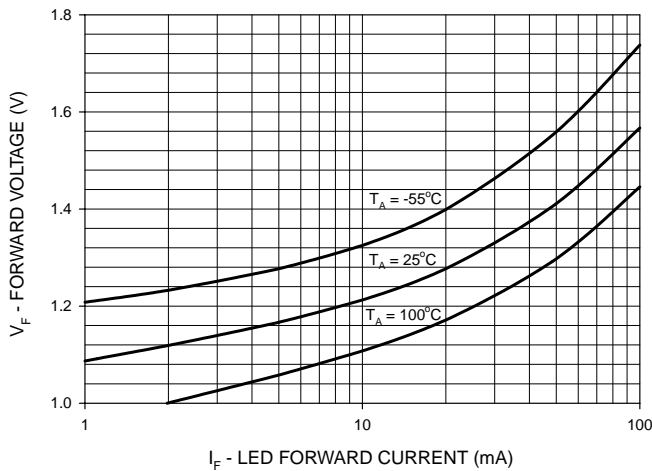


Fig. 4 Normalized CTR vs. Forward Current

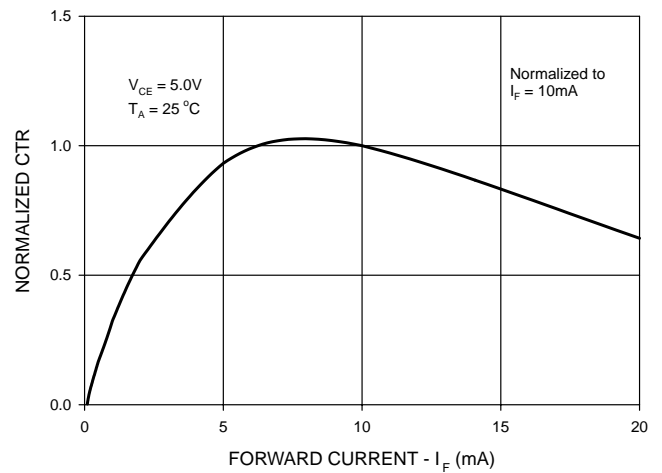


Fig. 5 Normalized CTR vs. Temperature

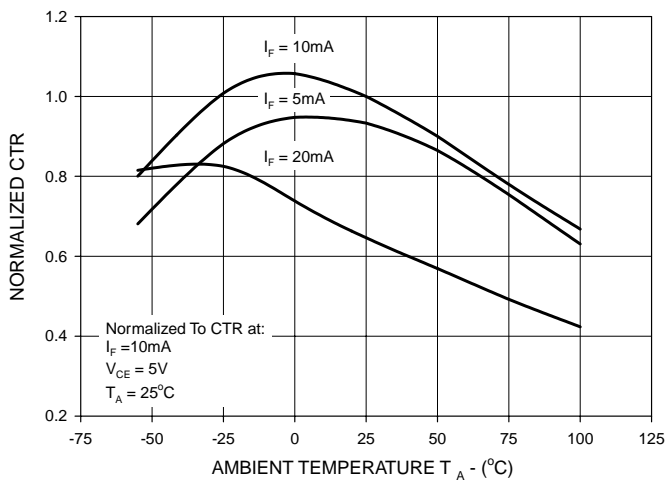
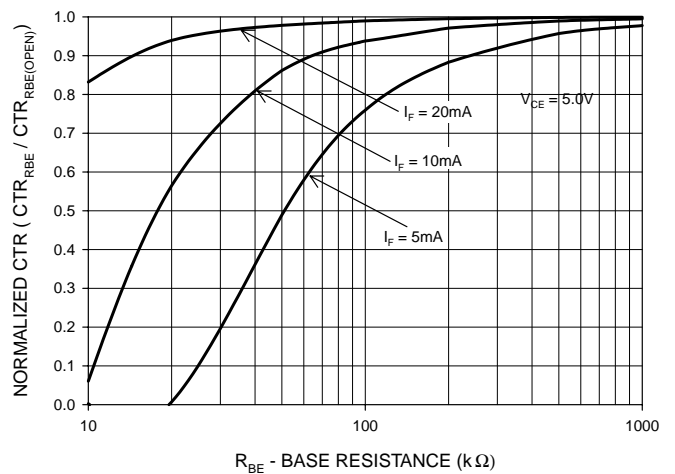


Fig. 6 CTR vs. R_BE (Unsaturated)



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

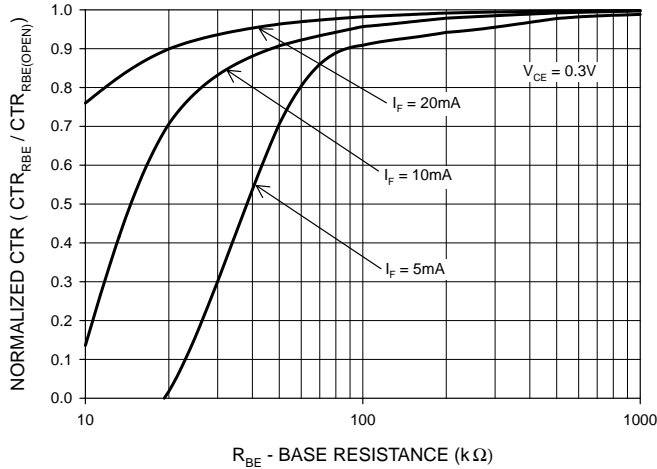


Fig. 8 Normalized t_{on} vs. R_{BE}

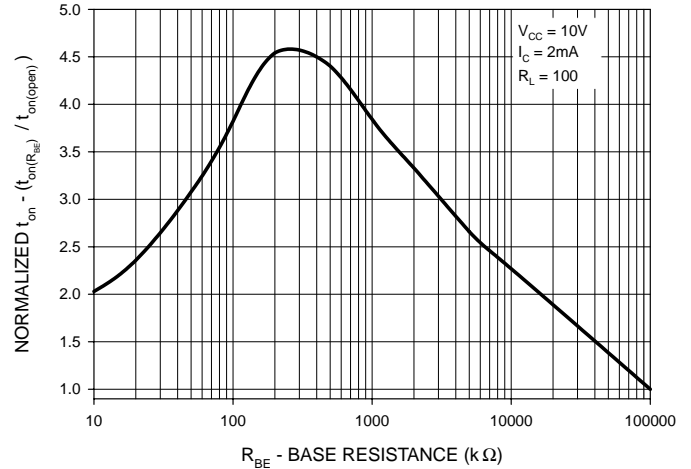


Fig. 9 Normalized t_{off} vs. R_{BE}

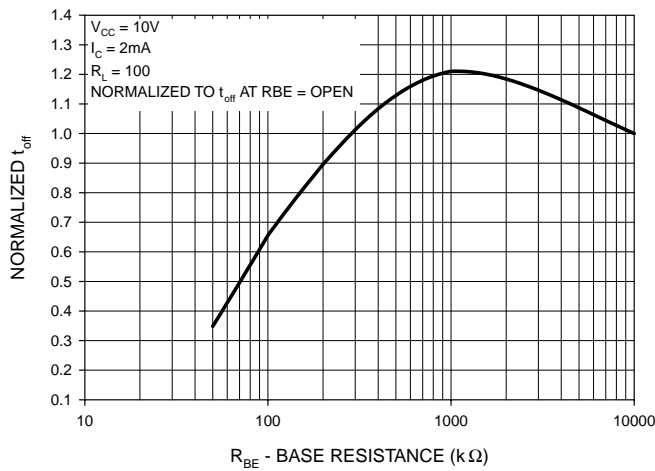


Fig. 10 Switching Speed vs. Load Resistor

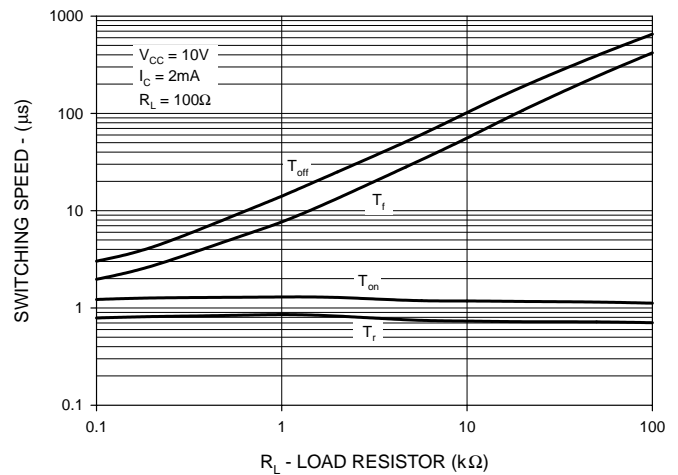
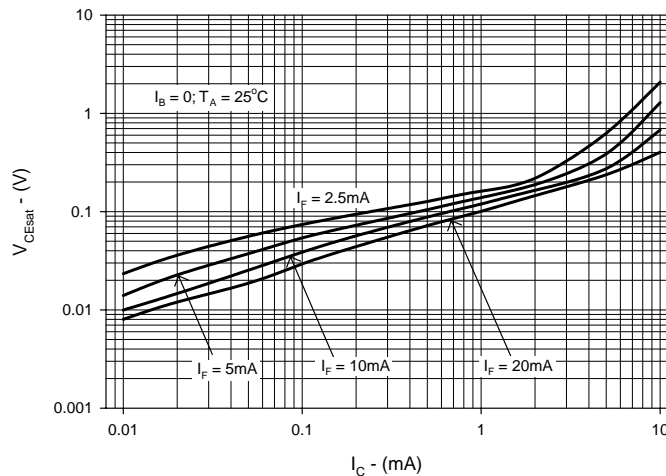
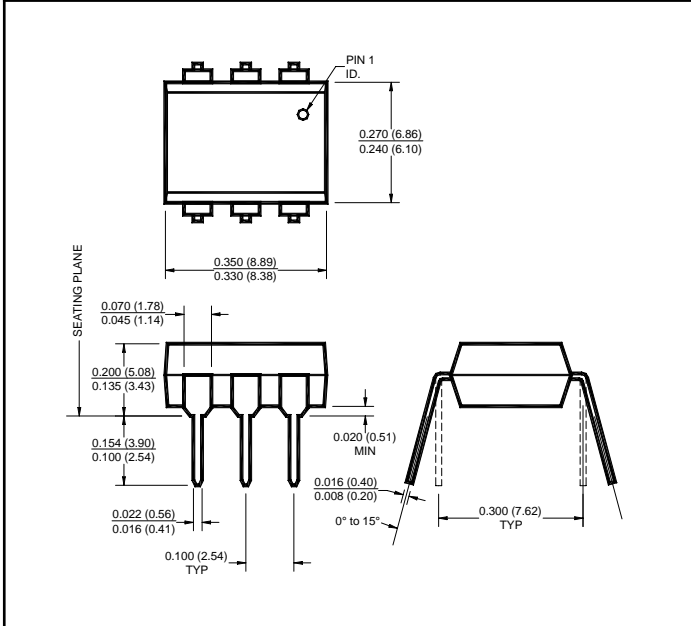


Fig. 11 Collector-Emitter Saturation Voltage as a Function of Collector Current

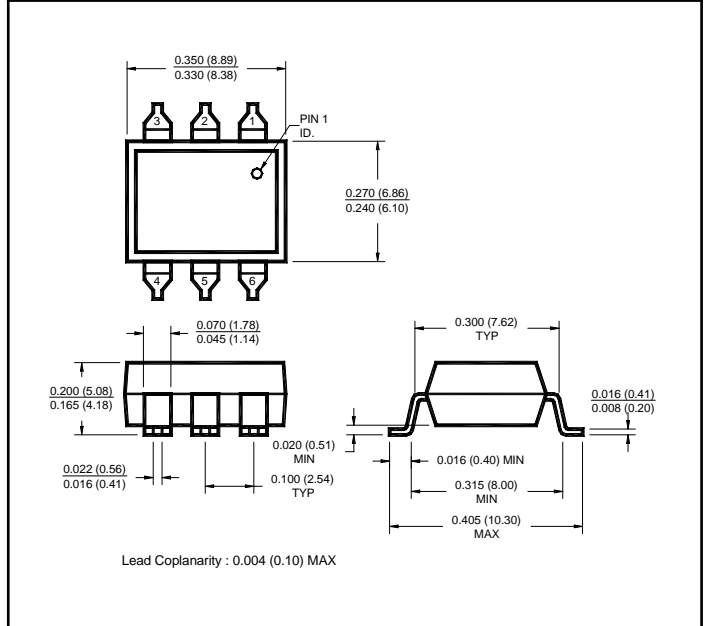


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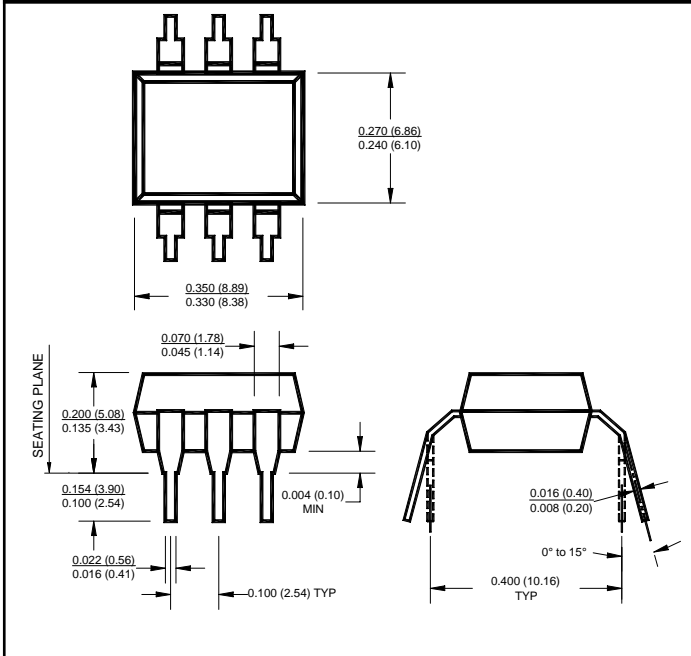
Package Dimensions (Through Hole)



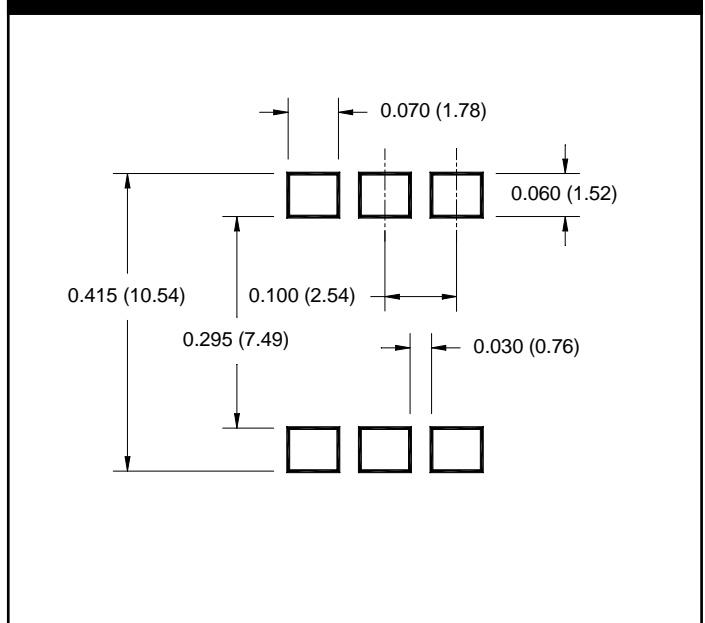
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



**Recommended Pad Layout for
Surface Mount Leadform**



NOTE

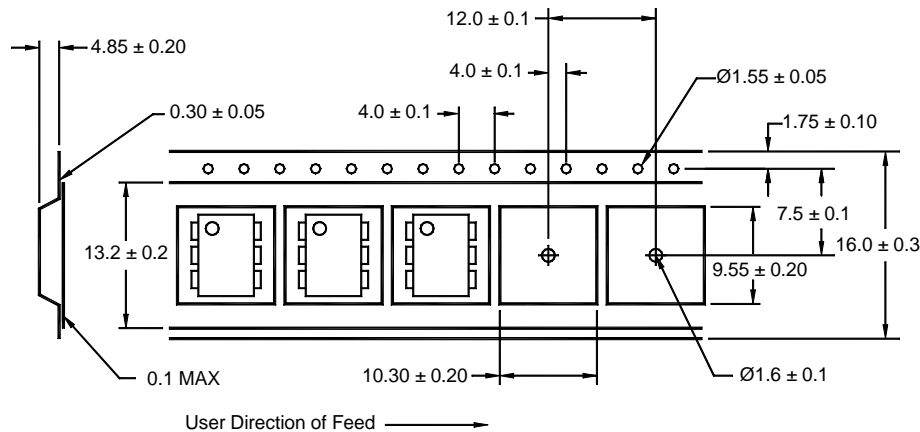
All dimensions are in inches (millimeters)

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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

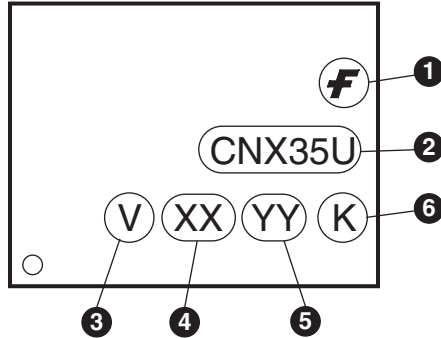
Carrier Tape Specifications ("D" Taping Orientation)



NOTE

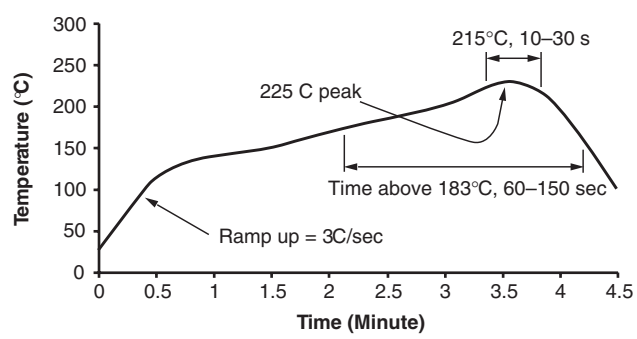
All dimensions are in inches (millimeters)

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

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CROSSVOLT™	GlobalOptoisolator™	MicroPak™	QFET®	SuperSOT™-8
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E ² CMOS™	μC™	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™
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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.
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