



H11L1M, H11L2M, H11L3M 6-Pin DIP Optocoupler

Features

- High data rate, 1MHz typical (NRZ)
- Free from latch up and oscillation throughout voltage and temperature ranges.
- Microprocessor compatible drive
- Logic compatible output sinks 16mA at 0.4V maximum
- Guaranteed on/off threshold hysteresis
- Wide supply voltage capability, compatible with all popular logic systems
- Underwriters Laboratory (UL) recognized—file #E90700, Volume 2
- VDE recognized – File#102497 – Add option V (e.g., H11L1VM)

Applications

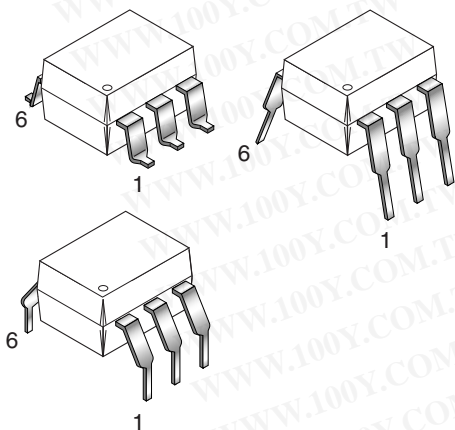
- Logic to logic isolator
- Programmable current level sensor
- Line receiver—eliminate noise and transient problems
- A.C. to TTL conversion—square wave shaping
- Digital programming of power supplies
- Interfaces computers with peripherals

Description

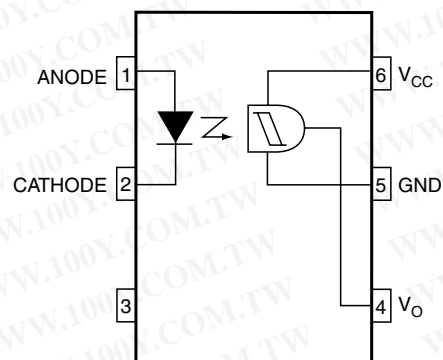
The H11LXM series has a high speed integrated circuit detector optically coupled to a gallium-arsenide infrared emitting diode. The output incorporates a Schmitt trigger, which provides hysteresis for noise immunity and pulse shaping. The detector circuit is optimized for simplicity of operation and utilizes an open collector output for maximum application flexibility.

勝特力材料 886-3-5753170
 勝特力电子(上海) 86-21-54151736
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Packages



Schematic



Truth Table

Input	Output
H	L
L	H

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ Unless otherwise specified.)

Symbol	Parameters	Value	Units
TOTAL DEVICE			
T_{STG}	Storage Temperature	-55 to +150	$^\circ\text{C}$
T_{OPR}	Operating Temperature	-40 to +85	$^\circ\text{C}$
T_{SOL}	Lead Solder Temperature	260 for 10 sec	$^\circ\text{C}$
P_D	Total Device Power Dissipation @ 25°C	250	mW
	Derate Above 25°C	2.94	$\text{mW}/^\circ\text{C}$
EMITTER			
I_F	Continuous Forward Current	60	mA
V_R	Reverse Voltage	6	V
$I_{F(pk)}$	Forward Current – Peak (1 μs pulse, 300pps)	3.0	A
P_D	LED Power Dissipation 25°C Ambient	120	mW
	Derate Linearly From 25°C	1.41	$\text{mW}/^\circ\text{C}$
DETECTOR			
P_D	Detector Power Dissipation @ 25°C	150	mW
	Derate Linearly from 25°C	2.0	$\text{mW}/^\circ\text{C}$
V_O	V_{45} Allowed Range	0 to 16	V
V_{CC}	V_{65} Allowed Range	3 to 16	V
I_O	I_4 Output Current	50	mA

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

Individual Component Characteristics

Symbol	Parameters	Test Conditions	Device	Min.	Typ.	Max.	Units
EMITTER							
V _F	Input Forward Voltage	I _F = 10mA	All		1.2	1.5	V
		I _F = 0.3mA		0.75	1.0		
I _R	Reverse Current	V _R = 3V	All			10	μA
C _J	Capacitance	V = 0, f = 1.0MHz	All			100	pF
DETECTOR							
V _{CC}	Operating Voltage Range		All	3		15	V
I _{CC(off)}	Supply Current	I _F = 0, V _{CC} = 5V	All		1.6	5.0	mA
I _{OH}	Output Current, High	I _F = 0, V _{CC} = V _O = 15V	All			100	μA

Transfer Characteristics

Symbol	Parameter	Test Conditions	Device	Min.	Typ.	Max.	Units
DC CHARACTERISTICS							
I _{CC(on)}	Supply Current	I _F = 10mA, V _{CC} = 5V	All		1.6	5.0	mA
V _{OL}	Output Voltage, low	R _L = 270Ω, V _{CC} = 5V, I _F = I _{F(on)} max.	All		0.2	0.4	V
I _{F(on)}	Turn-On Threshold Current ⁽¹⁾	R _L = 270Ω, V _{CC} = 5V	H11L1M			1.6	mA
			H11L2M			10.0	
			H11L3M			5.0	
I _{F(off)}	Turn-Off Threshold Current	R _L = 270Ω, V _{CC} = 5V	All	0.3	1.0		mA
I _{F(off)} /I _{F(on)}	Hysteresis Ratio	R _L = 270Ω, V _{CC} = 5V	All	0.50	0.75	0.90	
AC CHARACTERISTICS, Switching Speed							
t _{on}	Turn-On time	R _L = 270Ω, V _{CC} = 5V, I _F = I _{F(on)} , T _A = 25°C	All		1.0	4	μs
t _f	Fall Time	R _L = 270Ω, V _{CC} = 5V, I _F = I _{F(on)} , T _A = 25°C	All		0.1		μs
t _{off}	Turn-Off Time	R _L = 270Ω, V _{CC} = 5V, I _F = I _{F(on)} , T _A = 25°C	All		1.2	4	μs
t _r	Rise time	R _L = 270Ω, V _{CC} = 5V, I _F = I _{F(on)} , T _A = 25°C	All		0.1		μs
	Data Rate		All		1.0		MHz

Isolation Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V _{ISO}	Input-Output Isolation Voltage	t = 1 sec.	7500			V _{PEAK}
C _{ISO}	Isolation Capacitance	V _{I-O} = 0V, f = 1MHz		0.4	0.6	pF
R _{ISO}	Isolation Resistance	V _{I-O} = ±500 VDC	10 ¹¹			Ω

Note:

- Maximum I_{F(ON)} is the maximum current required to trigger the output. For example, a 1.6mA maximum trigger current would require the LED to be driven at a current greater than 1.6mA to guarantee the device will turn on. A 10% guard band is recommended to account for degradation of the LED over its lifetime. The maximum allowable LED drive current is 60mA.

Typical Performance Curves

Figure 1. Transfer Characteristics

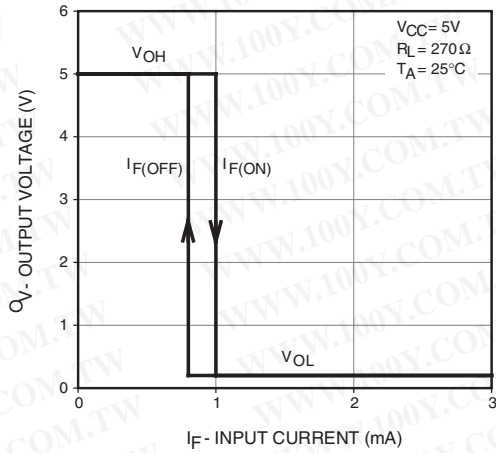


Figure 2. Threshold Current vs. Supply Voltage

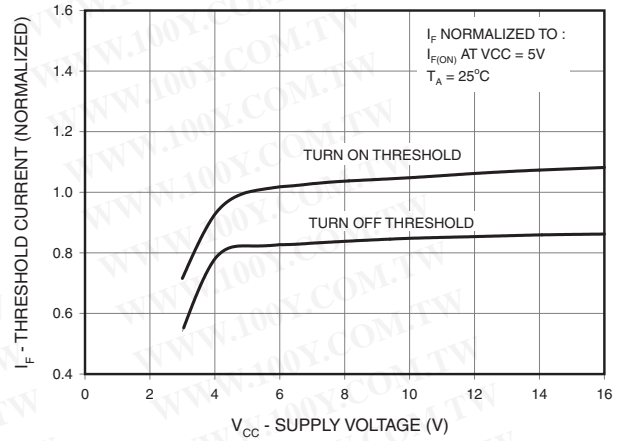


Figure 3. Threshold Current vs. Supply Temperature

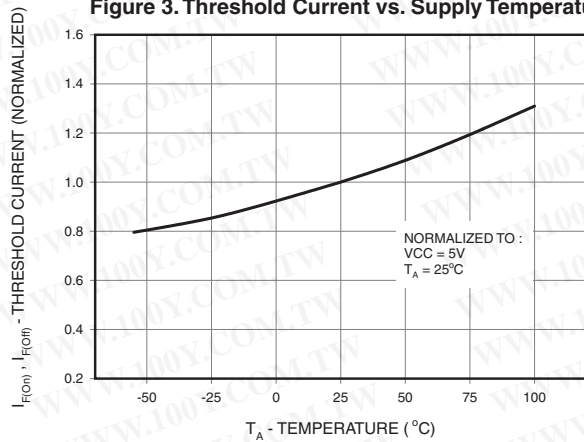


Figure 4. Output Voltage, Low vs. Load Current

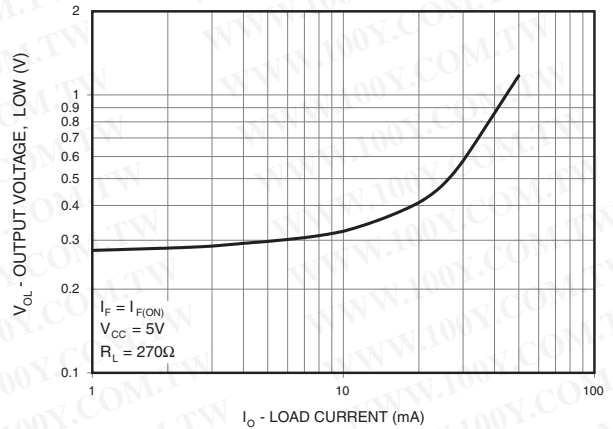


Figure 5. Supply Current vs. Supply Voltage

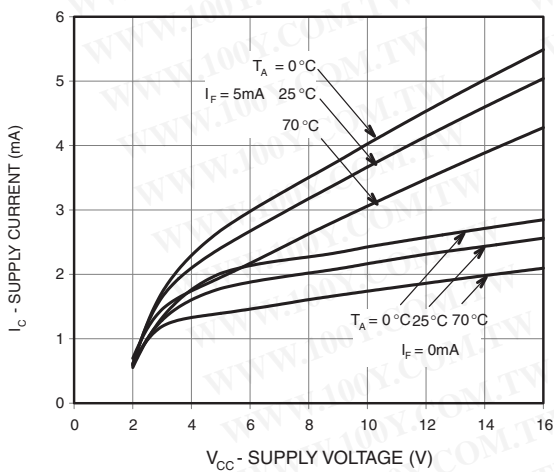
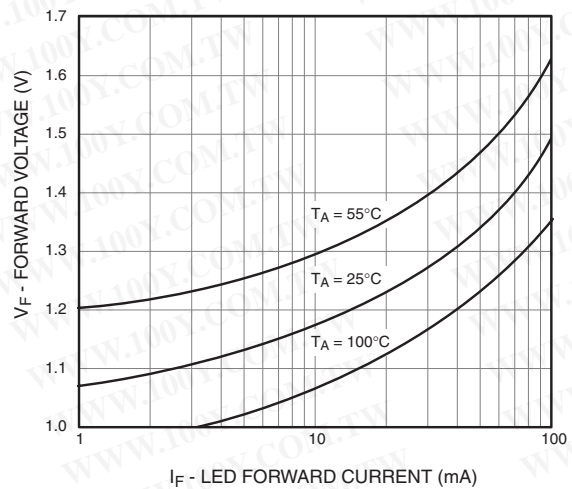


Figure 6. LED Forward Voltage vs. Forward Current



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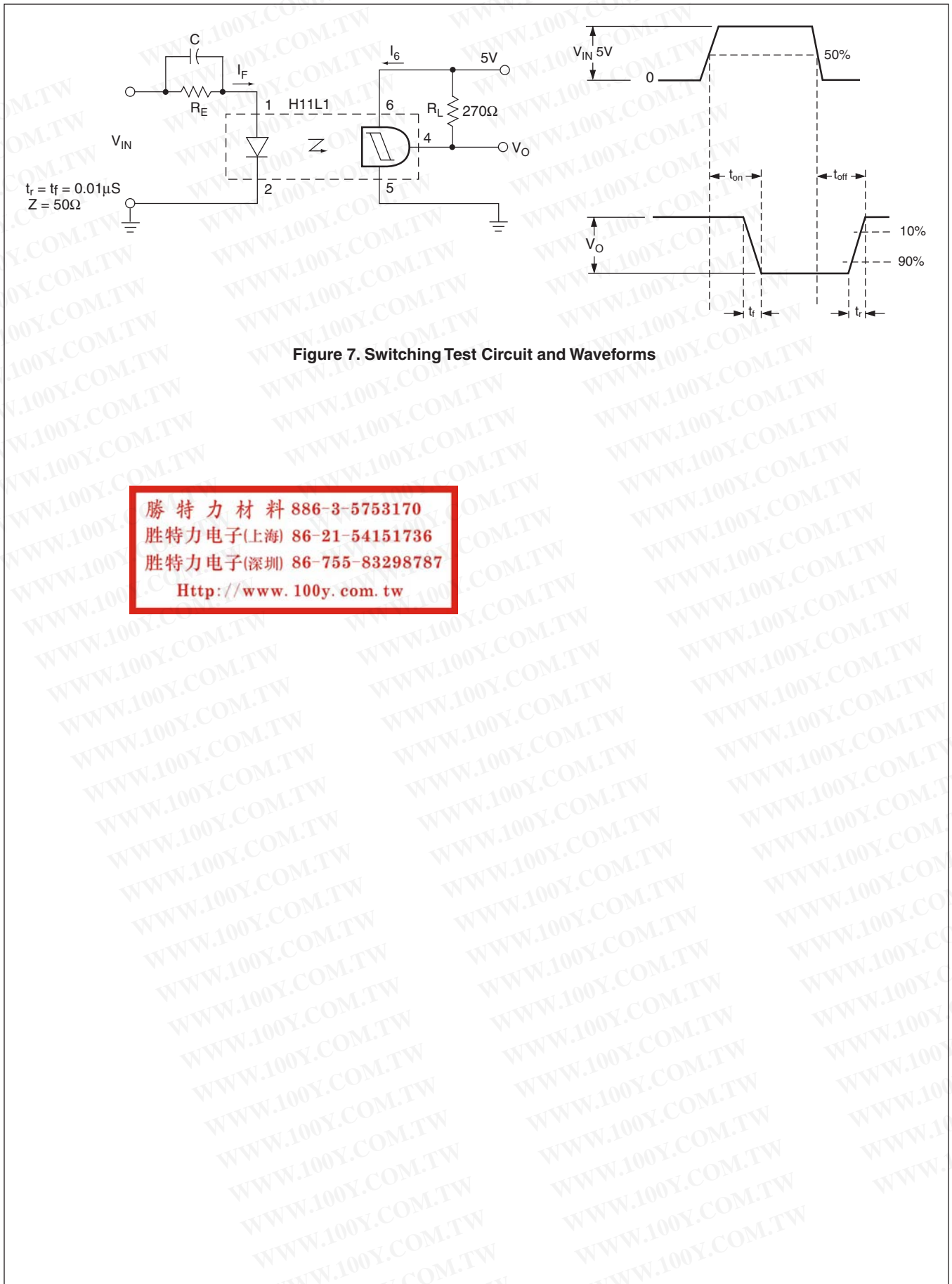
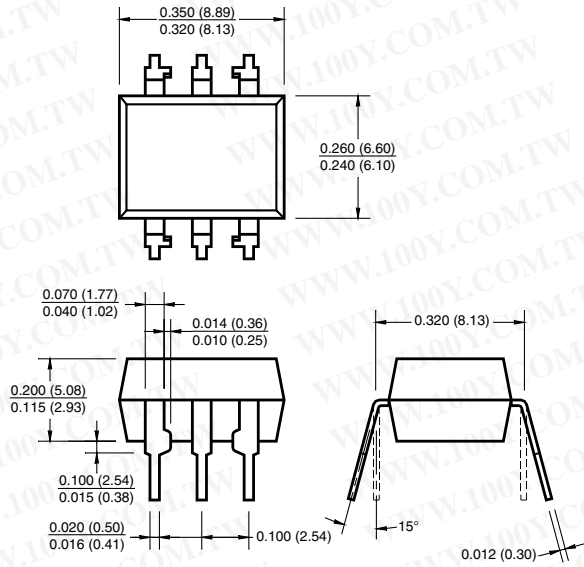


Figure 7. Switching Test Circuit and Waveforms

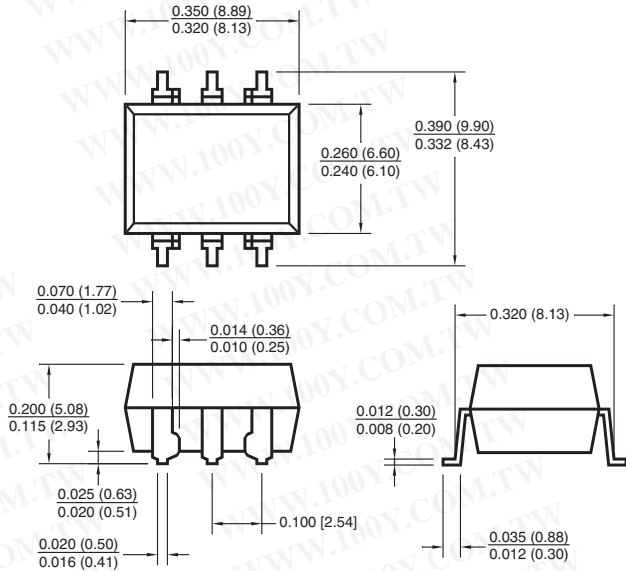
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Package Dimensions

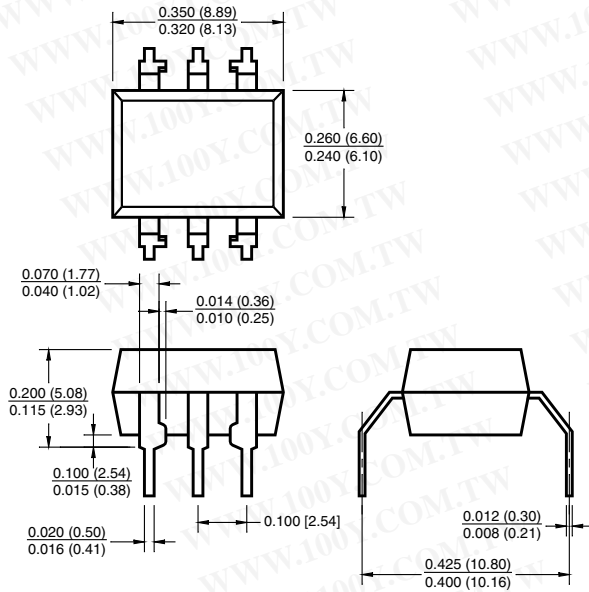
Through Hole



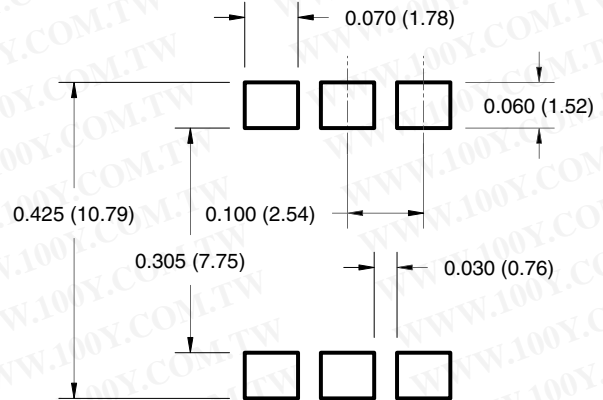
Surface Mount



0.4" Lead Spacing



Recommend Pad Layout for Surface Mount Leadform



Note:

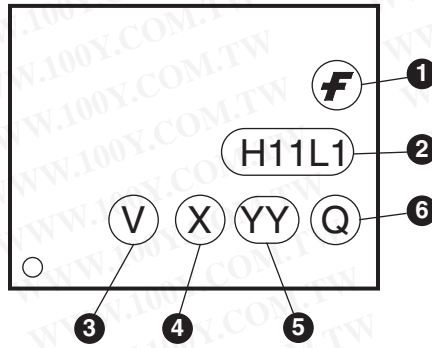
All dimensions are in inches (millimeters).

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Ordering Information

Option/Order Entry Identifier	Description
S	Surface Mount Lead Bend
SR2	Surface Mount; Tape and reel
T	0.4" Lead Spacing
V	VDE 0884
TV	VDE 0884, 0.4" Lead Spacing
SV	VDE 0884, Surface Mount
SR2V	VDE 0884, Surface Mount, Tape & Reel

Marking Information



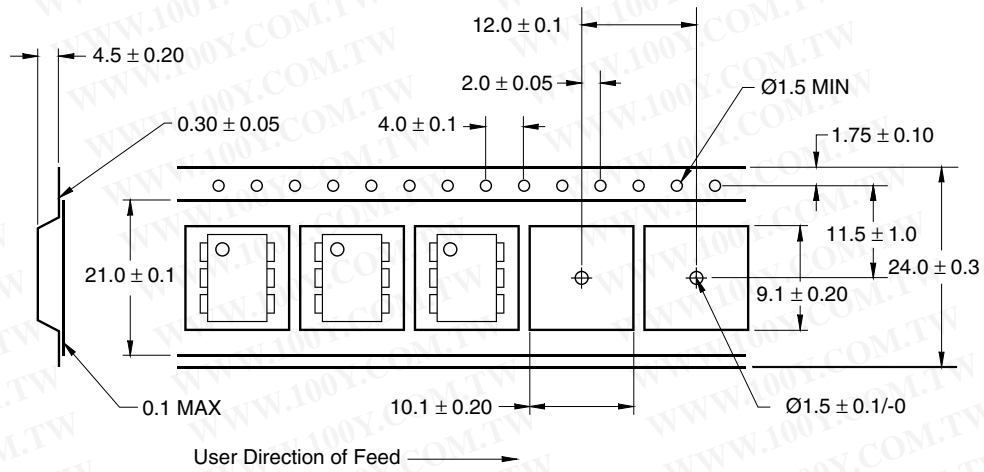
Definitions

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

*Note – Parts that do not have the 'V' option (see definition 3 above) that are marked with date code '325' or earlier are marked in portrait format.

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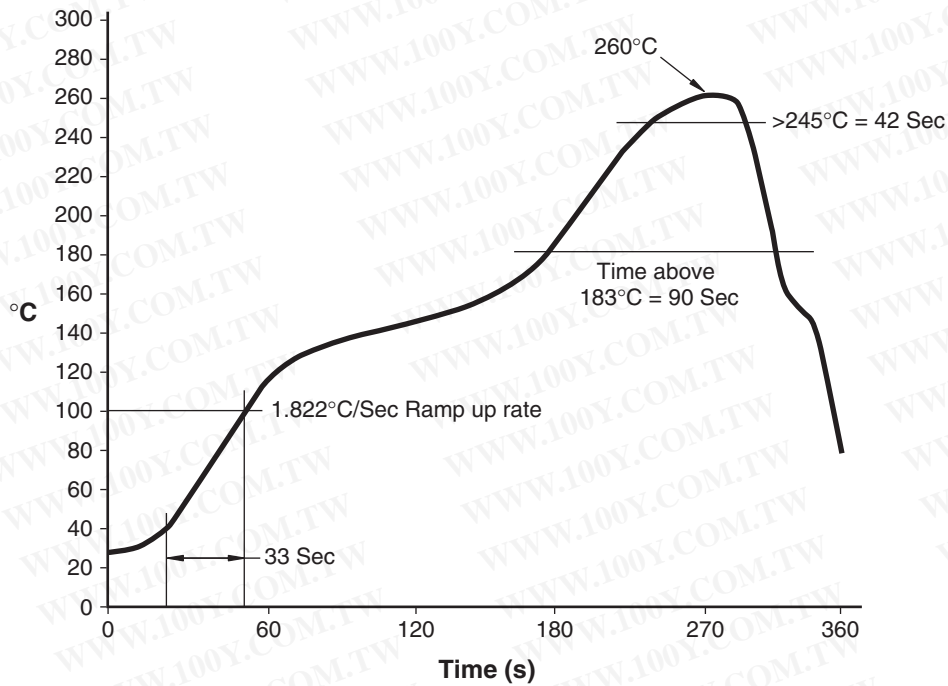
Tape Dimensions



Note:

All dimensions are in millimeters.

Reflow Profile



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FASTr™	MicroPak™	QT Optoelectronics™	TinyPWM™	
FPS™	MICROWIRE™	Quiet Series™	TinyPower™	
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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.
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No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
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