

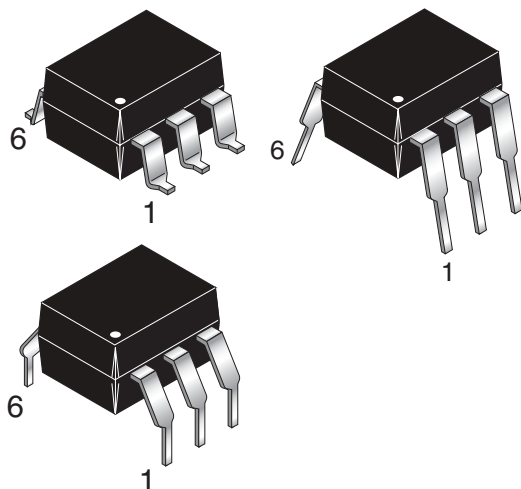
**SL5500**

**SL5501**

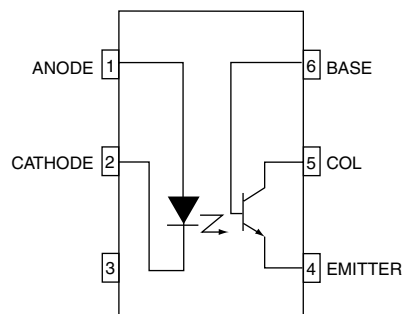
**SL5504**

**SL5511**

## PACKAGE



## SCHEMATIC



## DESCRIPTION

The SL5500, SL5501, SL5504 and SL5511 are optically coupled isolators each 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
- High isolation voltage of 5.3 kV RMS
- UL recognized (File # E90700)
- VDE recognized (File # 94766)
- Ordering option '300' (e.g. SL5500.300)

## APPLICATIONS

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

**SL5500**

**SL5501**

**SL5504**

**SL5511**

Parameters		Symbol	Value	Units
<b>TOTAL DEVICE</b>				
Storage Temperature		T <sub>STG</sub>	-55 to +150	°C
Operating Temperature		T <sub>OPR</sub>	-55 to +100	°C
Lead Solder Temperature		T <sub>SOL</sub>	260 for 10 sec	°C
Total Power Dissipation at T <sub>A</sub> = 25°C Ambient Derate Linearly from 25°C		P <sub>D</sub>	260	mW
			3.3	mW/°C
<b>EMITTER</b>				
Continuous Reverse Voltage		V <sub>R</sub>	3	V
Continuous Forward Current		I <sub>F</sub>	100	mA
Forward Current - Peak (10 μs pulse, δ = 0.01)		I <sub>F(pk)</sub>	3.0	A
Total Power Dissipation T <sub>A</sub> = 25°C Ambient Derate Linearly from 25°C		P <sub>D</sub>	150	mW
			2.0	mW/°C
<b>DETECTOR</b>				
Collector to Emitter Voltage (open base)	SL5500, SL5501, SL5511	V <sub>CEO</sub>	30	V
	SL5504		80	
Collector to Base Voltage (open emitter)	SL5500, SL5501, SL5511	V <sub>CBO</sub>	70	V
	SL5504		120	
Emitter to Collector Voltage (open base)		V <sub>ECO</sub>	7	V
Emitter to Base Voltage (open collector)		V <sub>EBO</sub>	7	V
DC Collector Current		I <sub>C</sub>	100	mA
Detector Power Dissipation @ T <sub>A</sub> = 25°C Ambient Derate Linearly from 25°C		P <sub>D</sub>	150	mW
			2.0	mW/°C

**SL5500**

**SL5501**

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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
<b>EMITTER</b>							
Input Forward Voltage	$I_F = 20\text{ mA}$ , $T_A = 25\text{ to }70^\circ\text{C}$	$V_F$	All		1.23	1.3	V
	$I_F = 2\text{ mA}$				1.10	1.2	V
Reverse Current	$V_R = 3\text{ V}$ , $T_A = 25\text{ to }70^\circ\text{C}$	$I_R$	All		0.001	10	$\mu\text{A}$
<b>DETECTOR</b>							
Leakage Current Collector to Emitter	$V_{CE} = 10\text{ V}$	$I_{CEO}$	All		1	50	nA
	$V_{CE} = 30\text{ V}$				0.005	10	$\mu\text{A}$
	$V_{CE} = 10\text{ V}$ , $T_A = 70^\circ\text{C}$					500	nA
	$V_{CB} = 30\text{ V}$	$I_{CBO}$			0.001	50	$\mu\text{A}$
Breakdown Voltage							
Collector to Emitter	$I_C = 10\text{ }\mu\text{A}$ , $I_F = 0$	$BV_{CEO}$	SL5500, SL5501, SL5511	30	100		V
			SL5504	80	110		
Collector to Base	$I_C = 10\text{ }\mu\text{A}$ , $I_F = 0$	$BV_{CBO}$	SL5500, SL5501, SL5511	30	120		V
			SL5504	120	150		
Emitter to Collector	$I_E = 10\text{ }\mu\text{A}$ , $I_F = 0$	$BV_{ECO}$	All	7	10		V
Emitter to Base	$I_E = 10\text{ }\mu\text{A}$ , $I_F = 0$	$BV_{EBO}$	All	7	10		V

**ISOLATION CHARACTERISTICS**

Characteristic	Test Conditions	Symbol	Min	Typ*	Max	Units
Input-Output Isolation Voltage (note 1)	$f = 60\text{ Hz}$ , $T = 1\text{ min.}$	$V_{ISO}$	5300			$V_{AC(RMS)}$
Isolation Resistance	$V_{I-O} = \pm 500\text{ VDC}$	$R_{ISO}$	1	10		$T\Omega$
Isolation Capacitance	$f = 1\text{ MHz}$ , $V = 0\text{ V}$	$C_{ISO}$		0.6	1.3	pF

\*Typical values at  $T_A = 25^\circ\text{C}$

**SL5500**

**SL5501**

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**SL5511**

**TRANSFER CHARACTERISTICS (TA = 25°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	SL5500	50		300	%
	$I_F = 10 \text{ mA}, V_{CE} = 0.4 \text{ V}, T_A = 70^\circ\text{C}$		SL5500	40		300	
	$I_F = 10 \text{ mA}, V_{CE} = 0.4 \text{ V}, T_A = 25^\circ\text{C to } 70^\circ\text{C}$		SL5501, SL5504	25		400	
	$I_F = 2 \text{ mA}, V_{CE} = 5 \text{ V}$		SL5500	40			
	$I_F = 2 \text{ mA}, V_{CE} = 5 \text{ V}, T_A = 70^\circ\text{C}$		SL5500	30			
	$I_F = 2 \text{ mA}, V_{CE} = 5 \text{ V}, T_A = 25^\circ\text{C to } 70^\circ\text{C}$		SL5501, SL5504	15			
	$I_F = 2 \text{ mA}, V_{CE} = 5 \text{ V}, T_A = 25^\circ\text{C to } 70^\circ\text{C}$		SL5511	25			
	$I_F = 0.5 \text{ mA}, V_{CE} = 0.4 \text{ V}, T_A = 25^\circ\text{C to } 70^\circ\text{C}$		SL5511	20			
Collector-Emitter Saturation Voltage	$I_F = 50 \text{ mA}, I_C = 10 \text{ mA}$	$V_{CE(SAT)}$	SL5500			0.4	V
	$I_F = 20 \text{ mA}, I_C = 2 \text{ mA}$		SL5501, SL5504, SL5511			0.4	
AC Characteristics	Test Conditions	Symbol	Device	Min	Typ	Max	Units
Turn-On Time	$R_L = 1 \text{ k}\Omega, I_F = 16 \text{ mA}, V_{CC} = 5 \text{ V}$	$t_{on}$	SL5500, SL5501, SL5511			20	$\mu\text{s}$
			SL5504			50	
Turn-Off Time	See Fig. 1 and Fig. 2	$t_{off}$	SL5500, SL5501, SL5511			50	$\mu\text{s}$
			SL5504			150	

**Note**

1. Device considered a two-terminal device: pins 1, 2 and 3 shorted together and pins 4, 5 and 6 shorted together.

SL5500

SL5501

SL5504

SL5511

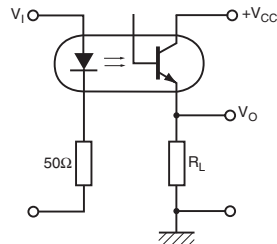


Fig. 1 Switching Circuit

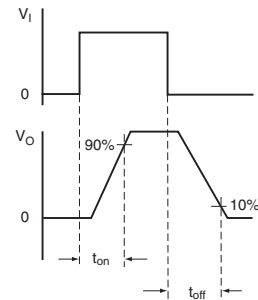


Fig. 2 Waveforms

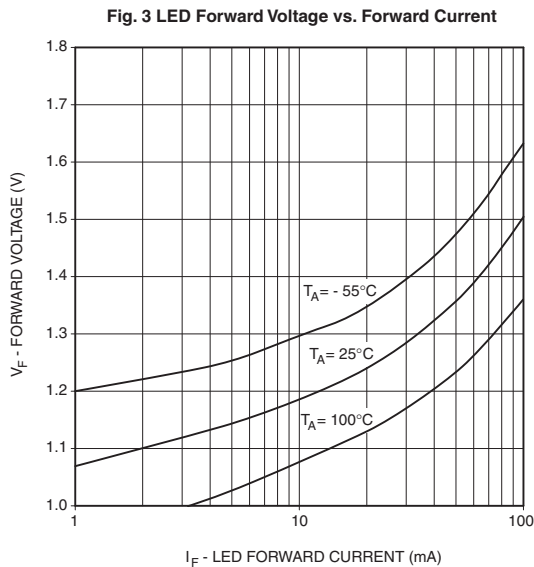


Fig. 3 LED Forward Voltage vs. Forward Current

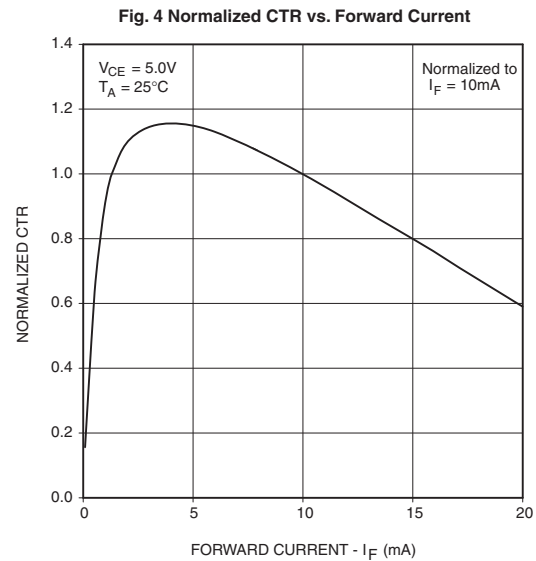


Fig. 4 Normalized CTR vs. Forward Current

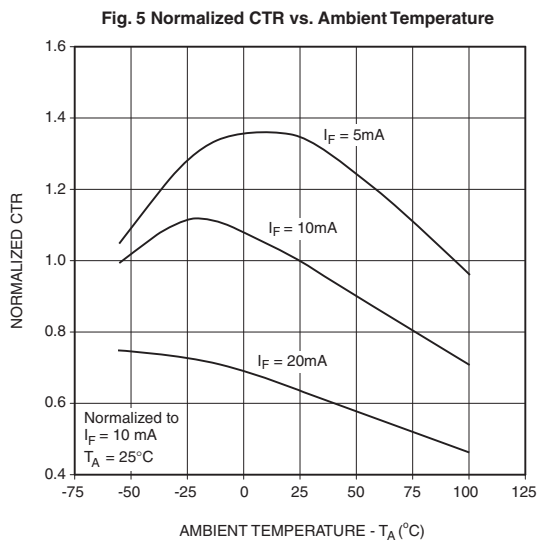


Fig. 5 Normalized CTR vs. Ambient Temperature

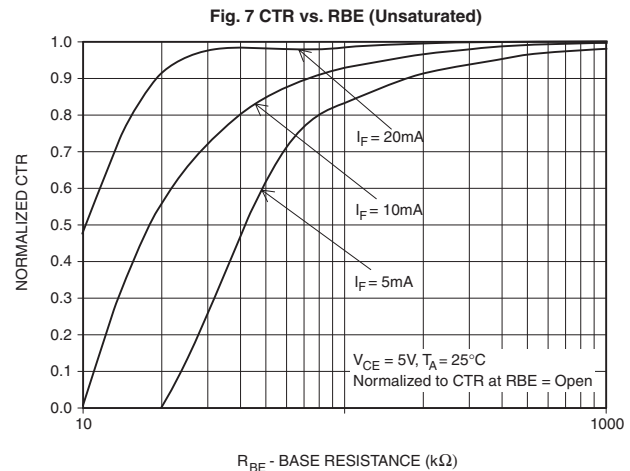


Fig. 7 CTR vs. R\_BE (Unsaturated)

SL5500

SL5501

SL5504

SL5511

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

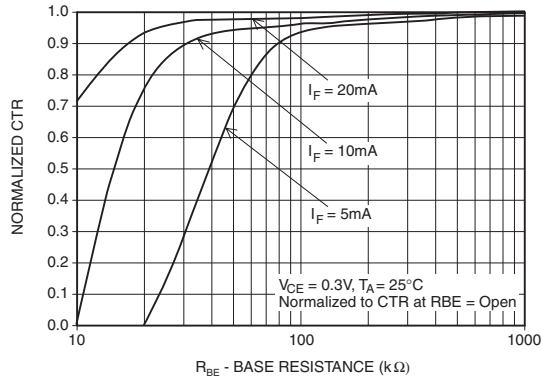


Fig. 8 Normalized  $t_{off}$  vs.  $R_{BE}$

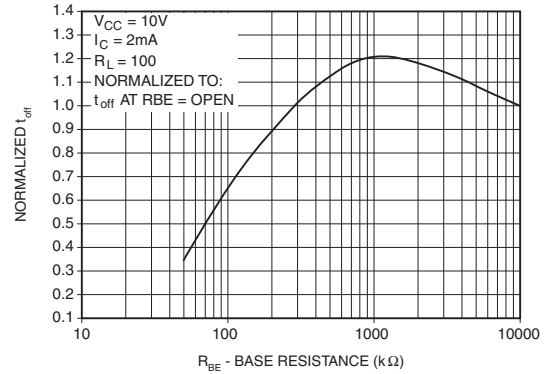


Fig. 9 Normalized  $t_{on}$  vs.  $R_{BE}$

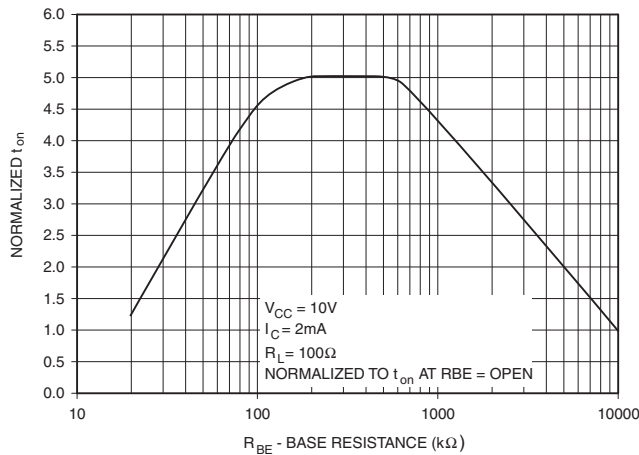


Fig. 10 Switching Speed vs. Load Resistor

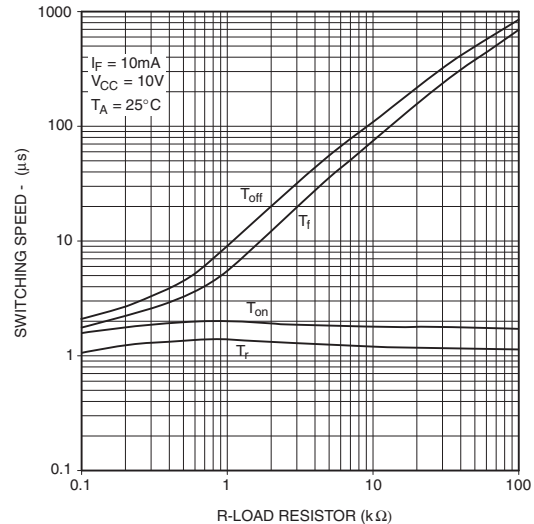


Fig. 11 Collector Emitter Saturation Voltage vs. Collector Current

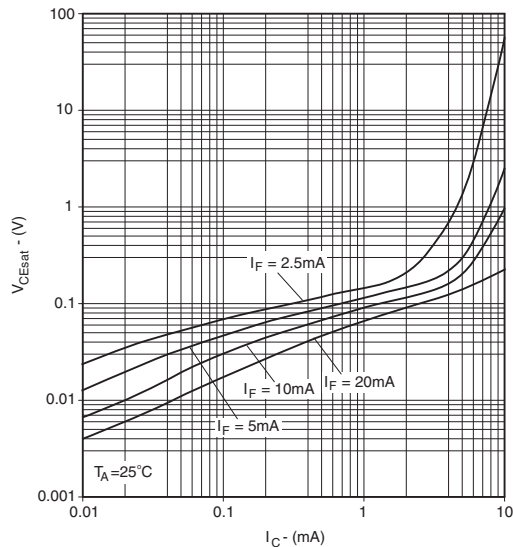
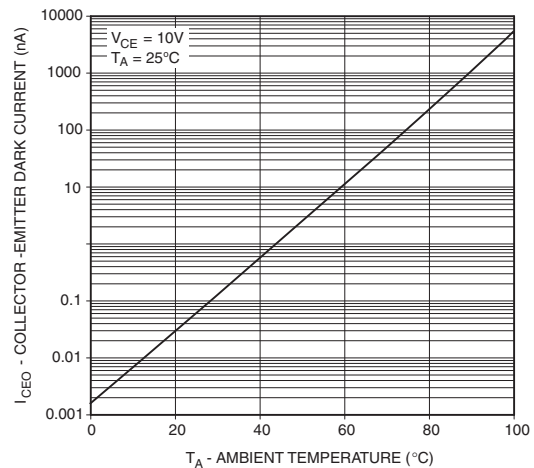


Fig. 12 Dark Current vs. Ambient Temperature



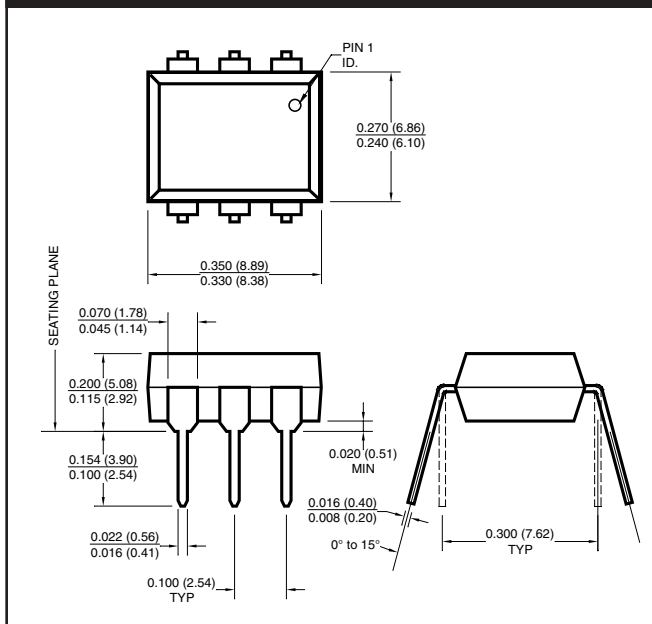
# SL5500

# SL5501

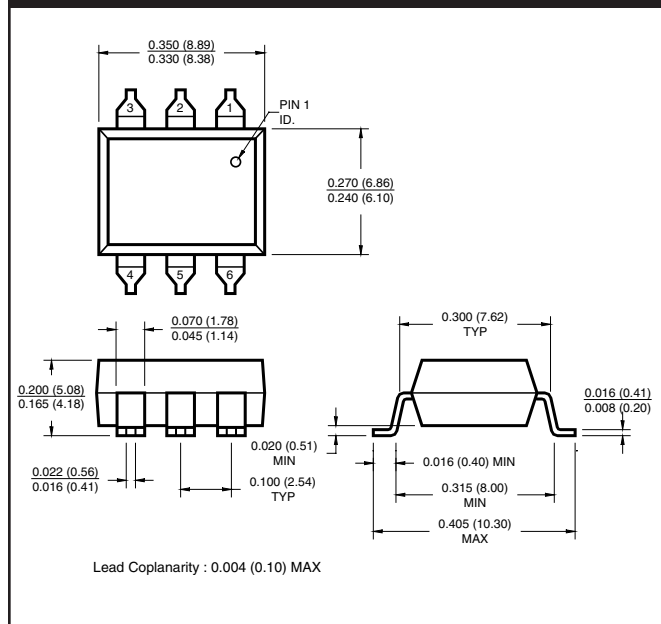
## SL5504

## SL5511

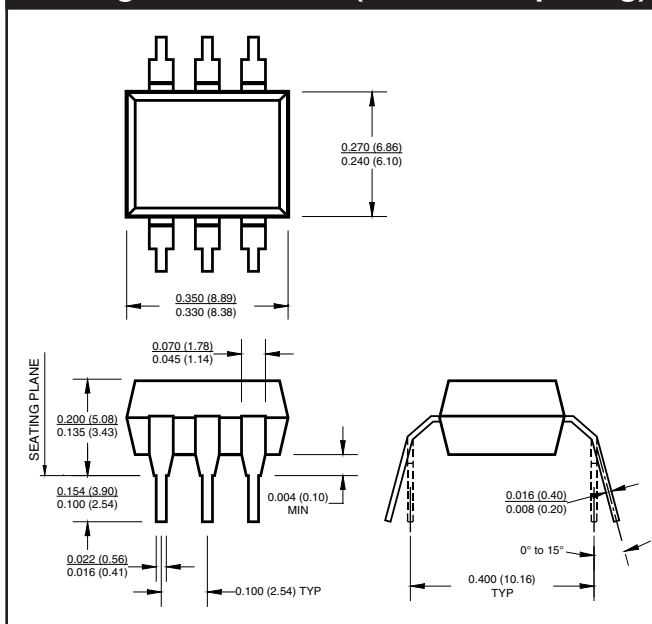
## Package Dimensions (Through Hole)



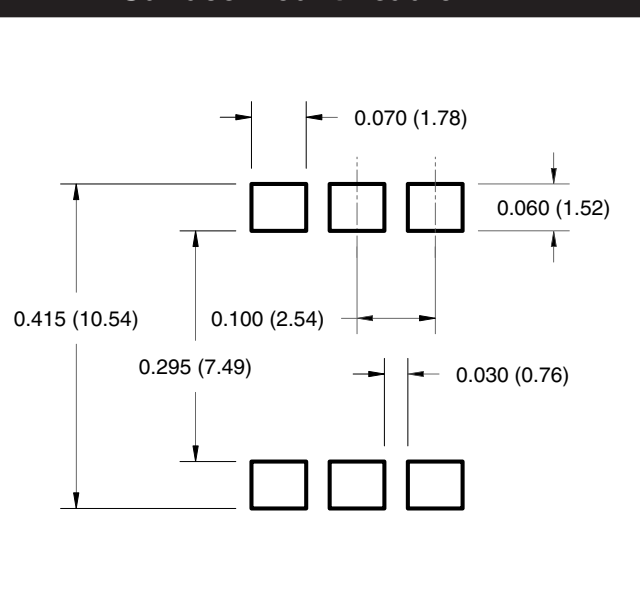
### Package Dimensions (Surface Mount)



### Package Dimensions (0.4" Lead Spacing)



## Recommended Pad Layout for Surface Mount Leadform



### Note

All dimensions are in inches (millimeters)

**SL5500**

**SL5501**

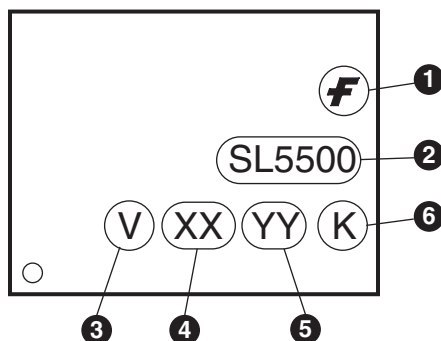
**SL5504**

**SL5511**

## 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 and 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	Two digit year code, e.g., '03'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code



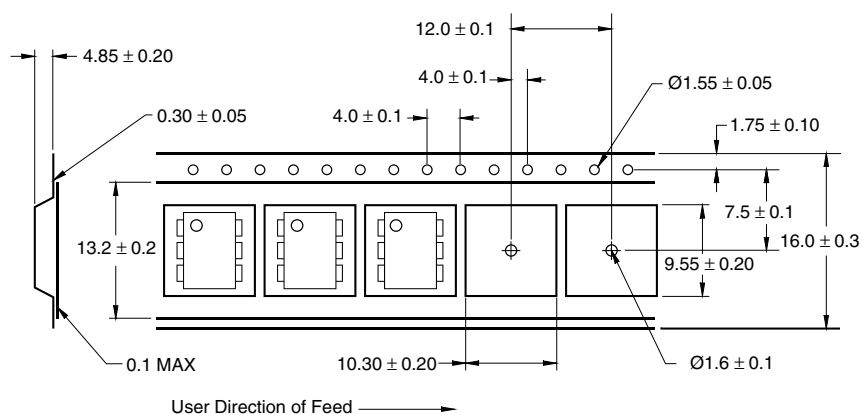
**SL5500**

**SL5501**

**SL5504**

**SL5511**

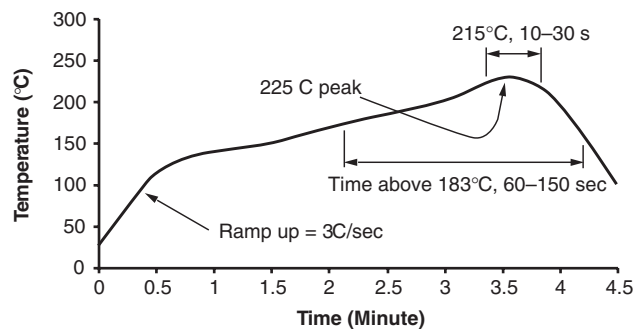
**Carrier Tape Specifications ("D" Taping Orientation)**



**NOTE**

All dimensions are in inches (millimeters)

**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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**SL5500**

**SL5501**

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**SL5511**

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