

**DESCRIPTION**

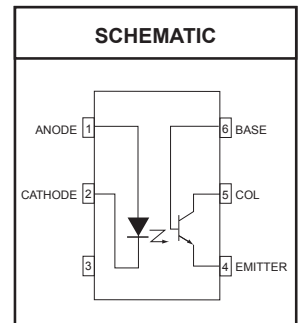
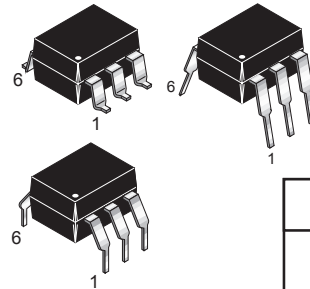
The SL5500, SL5501 and SL5511 are optically coupled isolators each consisting of an infrared emitting GaAs diode and a silicon NPN phototransistor with accessible base. These devices are housed in 6-pin dual-in-line packages (DIP).

**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



Parameters	Symbol	Value	Units
<b>TOTAL DEVICE</b>			
Storage Temperature	$T_{STG}$	-55 to +150	°C
Operating Temperature	$T_{OPR}$	-55 to +100	°C
Lead Solder Temperature	$T_{SOL}$	260 for 10 sec	°C
Total Power Dissipation at $T_A=25^\circ\text{C}$ Ambient Derate Linearly from 25°C	$P_D$	260	mW
		3.3	mW/°C
<b>EMITTER</b>			
Continuous Reverse Voltage	$V_R$	3	V
Continuous Forward Current	$I_F$	100	mA
Forward Current - Peak (10 $\mu\text{s}$ pulse, $\delta = 0.01$ )	$I_F(pk)$	3.0	A
Total Power Dissipation $T_A=25^\circ\text{C}$ Ambient Derate Linearly from 25°C	$P_D$	150	mW
		2.0	mW/°C
<b>DETECTOR</b>			
Collector to Emitter Voltage (open base)	$V_{CEO}$	30	V
Collector to Base Voltage (open emitter)	$V_{CBO}$	70	V
Emitter to Collector Voltage (open base)	$V_{ECO}$	7	V
Emitter to Base Voltage (open collector)	$V_{EBO}$	7	V
DC Collector Current	$I_C$	100	mA
Detector Power Dissipation @ $T_A=25^\circ\text{C}$ Ambient Derate Linearly from 25°C	$P_D$	150	mW
		2.0	mW/°C

**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	$\mu\text{A}$
<b>Breakdown Voltage</b>							
Collector to Emitter	$I_C = 10\text{ }\mu\text{A}, I_F = 0$	$BV_{CEO}$	All	30	100		V
Collector to Base	$I_C = 10\text{ }\mu\text{A}, I_F = 0$	$BV_{CBO}$	All	30	120		V
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		$\tau\Omega$
Isolation Capacitance	$f = 1\text{ MHz}, V = 0\text{ V}$	$C_{ISO}$		0.6	1.3	pF

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

TRANSFER CHARACTERISTICS (T <sub>A</sub> = 25°C Unless otherwise specified.)							
DC Characteristics	Test Conditions	Symbol	Device	Min	Typ	Max	Units
Output/Input Current Transfer Ratio	I <sub>F</sub> = 10 mA, V <sub>CE</sub> = 0.4 V	CTR	SL5500	50		300	%
	I <sub>F</sub> = 10 mA, V <sub>CE</sub> = 0.4 V, T <sub>A</sub> = 70°C		SL5500	40		300	
	I <sub>F</sub> = 10 mA, V <sub>CE</sub> = 0.4 V, T <sub>A</sub> = 25°C to 70°C		SL5501	25		400	
	I <sub>F</sub> = 2 mA, V <sub>CE</sub> = 5 V		SL5500	40			
	I <sub>F</sub> = 2 mA, V <sub>CE</sub> = 5 V, T <sub>A</sub> = 70°C		SL5500	30			
	I <sub>F</sub> = 2 mA, V <sub>CE</sub> = 5 V, T <sub>A</sub> = 25°C to 70°C		SL5501	15			
	I <sub>F</sub> = 2 mA, V <sub>CE</sub> = 5 V, T <sub>A</sub> = 25°C to 70°C		SL5511	25			
	I <sub>F</sub> = 0.5 mA, V <sub>CE</sub> = 0.4 V, T <sub>A</sub> = 25°C to 70°C		SL5511	20			
Collector-Emitter Saturation Voltage	I <sub>F</sub> = 50 mA, I <sub>C</sub> = 10 mA	V <sub>CE(SAT)</sub>	SL5500			0.4	V
	I <sub>F</sub> = 20 mA, I <sub>C</sub> = 2 mA		SL5501, SL5511			0.4	
AC Characteristics	Test Conditions	Symbol	Device	Min	Typ	Max	Units
<b>Saturated Switching Times</b>							
Turn-On Time	R <sub>L</sub> = 1 kΩ, I <sub>F</sub> = 16 mA, V <sub>CC</sub> = 5 V See Fig. 1 and Fig. 2	t <sub>on</sub>	All			20	μs
Turn-Off Time		t <sub>off</sub>	All			50	μs

Note

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

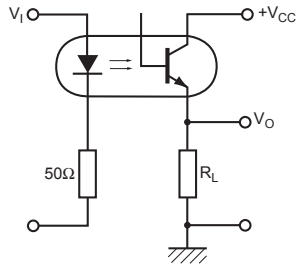


Fig. 1 Switching Circuit

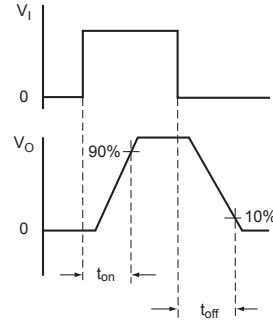


Fig. 2 Waveforms

Fig.3 LED Forward Voltage vs. Forward Current

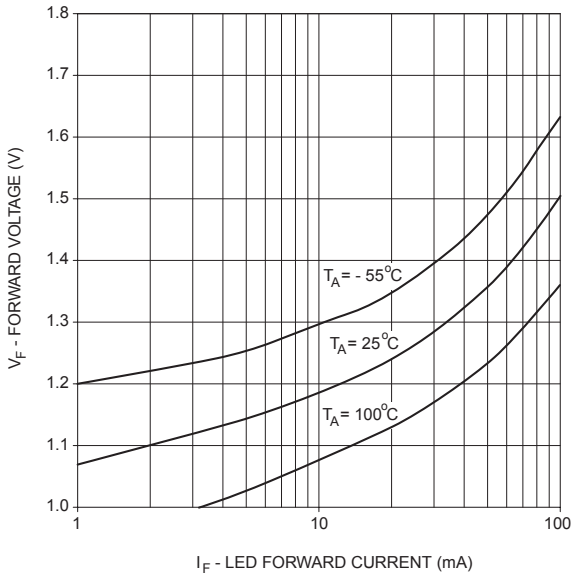


Fig.4 Normalized CTR vs. Forward Current

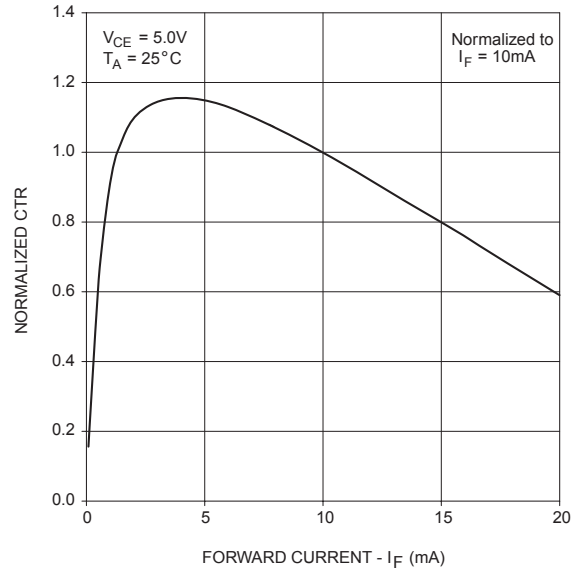


Fig. 5 Normalized CTR vs. Ambient Temperature

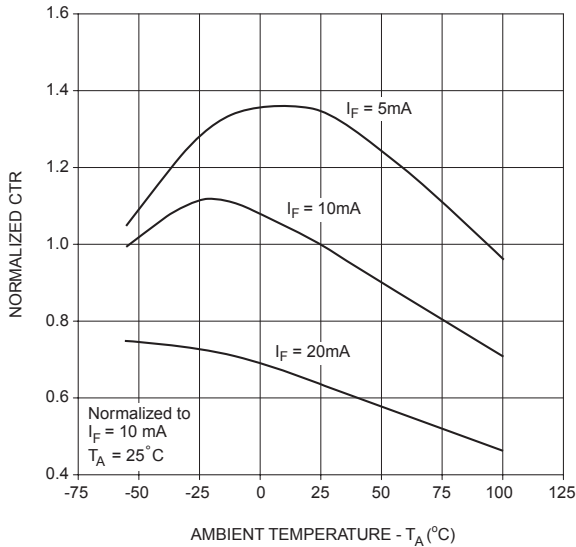
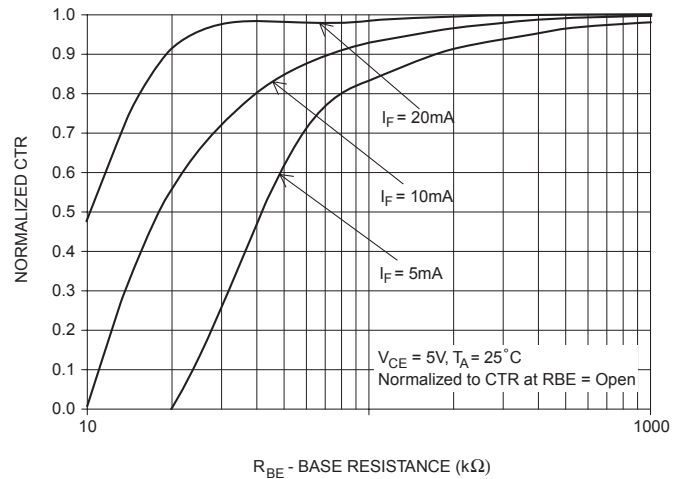
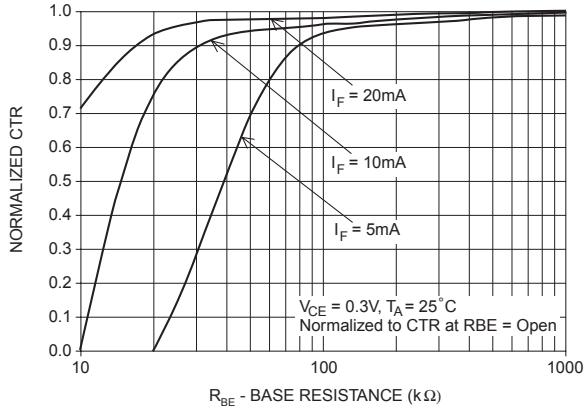


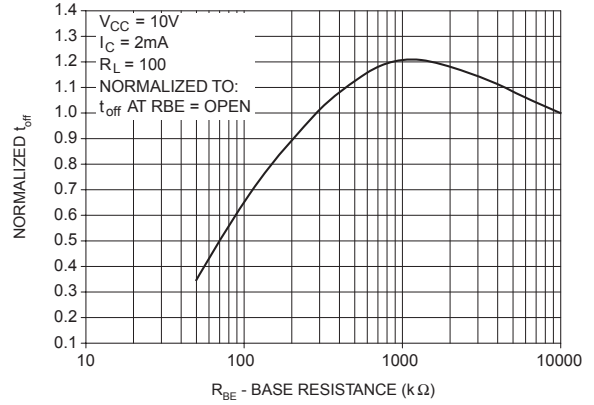
Fig. 7 CTR vs. R\_BE (Unsaturated)



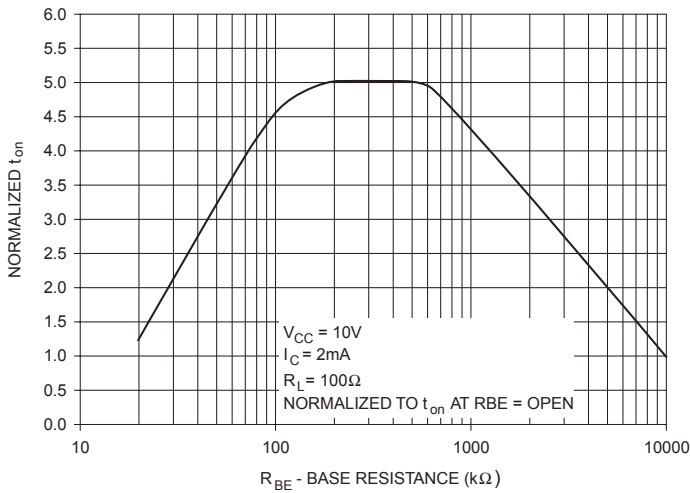
**Fig. 7 CTR vs. R<sub>BE</sub> (Saturated)**



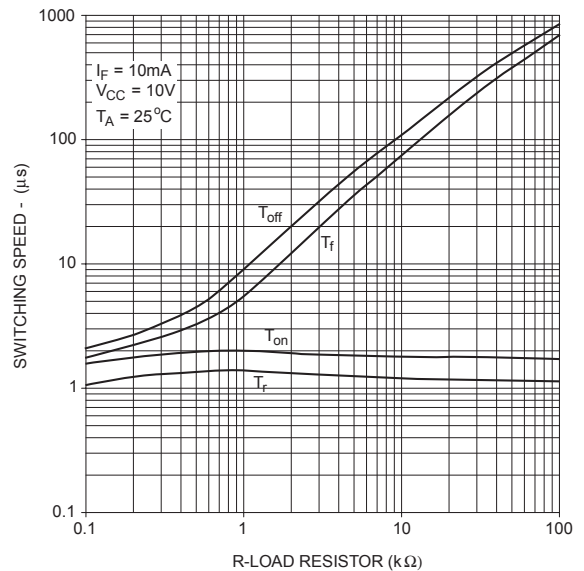
**Fig. 8 Normalized t<sub>off</sub> vs. R<sub>BE</sub>**



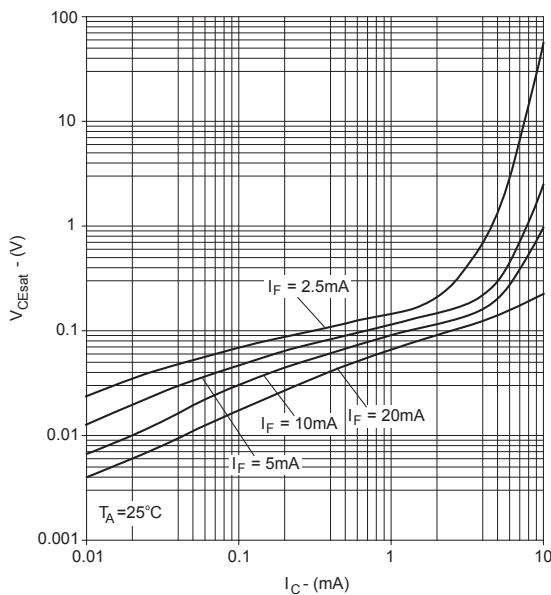
**Fig. 9 Normalized t<sub>on</sub> vs. R<sub>BE</sub>**



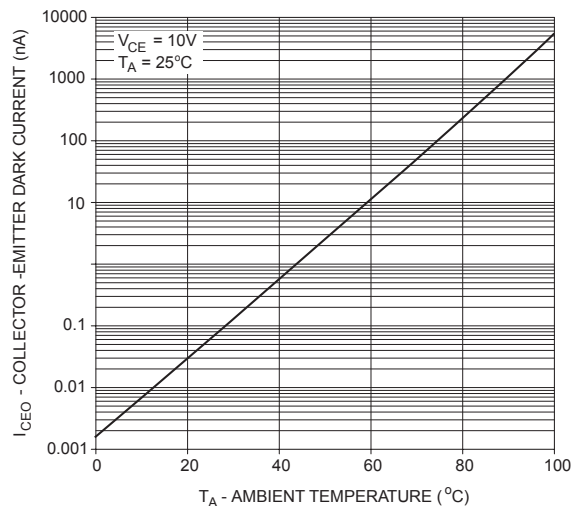
**Fig. 10 Switching Speed vs. Load Resistor**



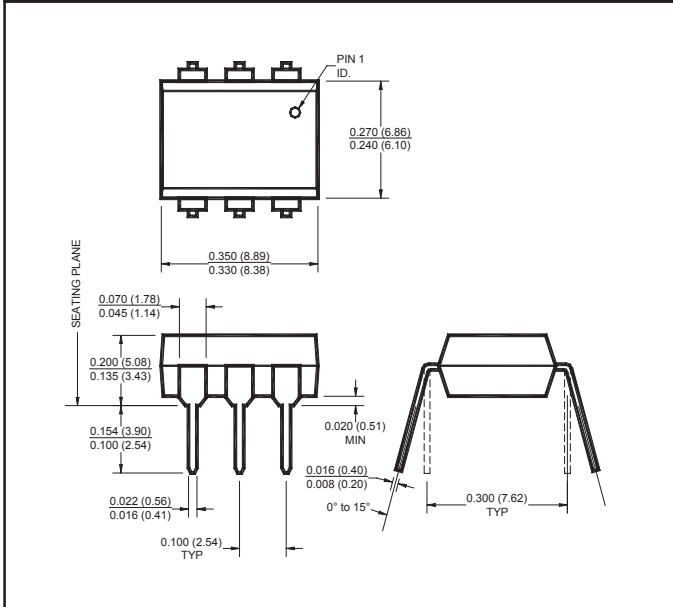
**Fig. 11 Collector Emitter Saturation Voltage vs. Collector Current**



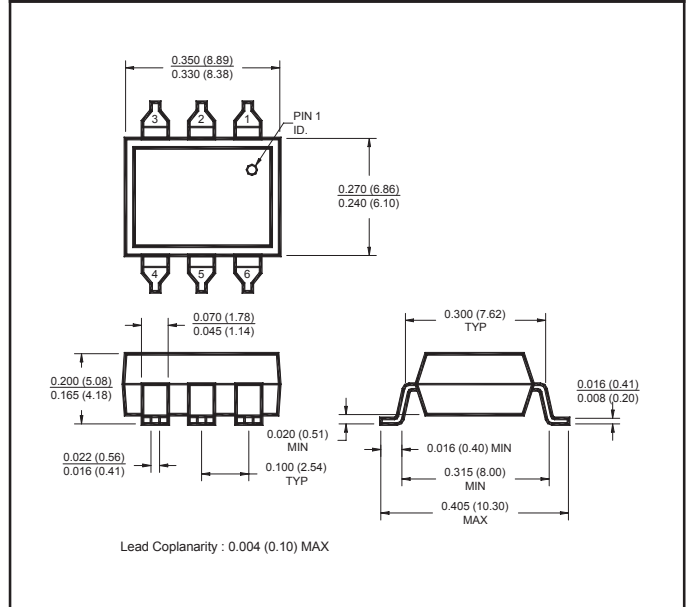
**Fig. 12 Dark Current vs. Ambient Temperature**



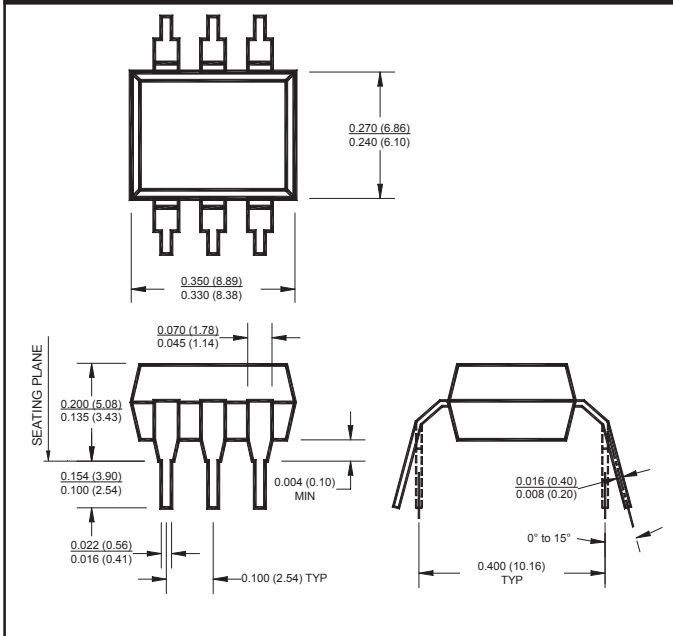
**Package Dimensions (Through Hole)**



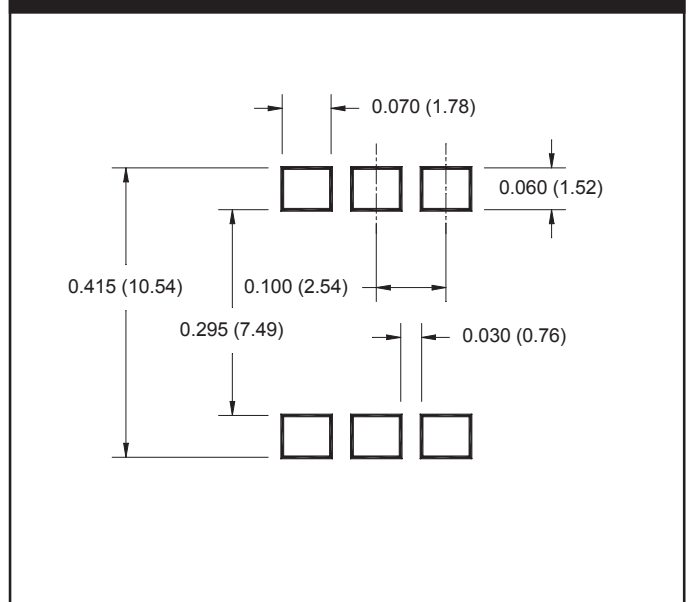
**Package Dimensions (Surface Mount)**



**Package Dimensions (0.4" Lead Spacing)**



**Recommended Pad Layout for  
Surface Mount Leadform**



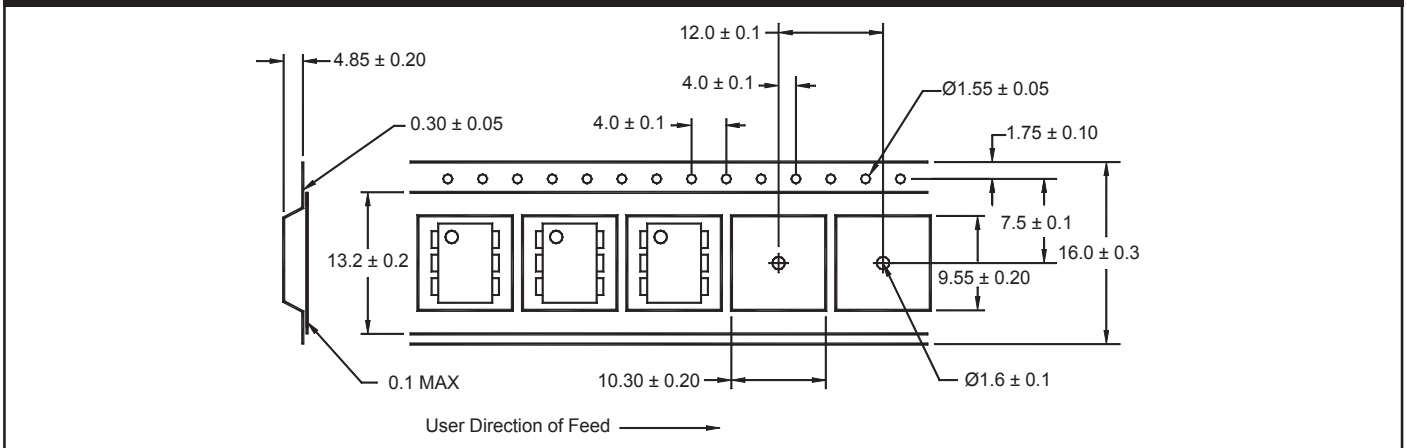
**NOTE**

All dimensions are in inches (millimeters)

**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)

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