

DESCRIPTION

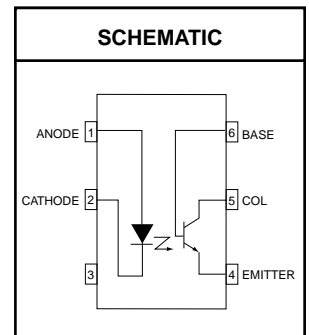
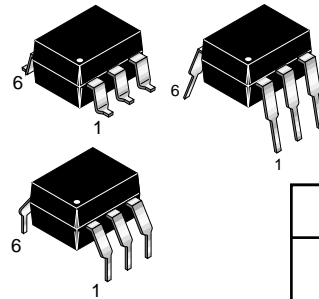
The SL5500, SL5501 and SL5511 are optically coupled isolators each consisting of an infrared emitting GaAs diode and a silicon NPN phototransistor with accessible base. These devices are housed in 6-pin dual-in-line packages (DIP).

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
TOTAL DEVICE			
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
EMITTER			
Continuous Reverse Voltage	V_R	3	V
Continuous Forward Current	I_F	100	mA
Forward Current - Peak (10 μs 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
DETECTOR			
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°C Unless otherwise specified.)

INDIVIDUAL COMPONENT CHARACTERISTICS

Parameters	Test Conditions	Symbol	Device	Min	Typ*	Max	Units
EMITTER							
Input Forward Voltage	I _F = 20 mA, T _A = 25 to 70°C	V _F	All		1.23	1.3	V
	I _F = 2 mA				1.10	1.2	V
Reverse Current	V _R = 3 V, T _A = 25 to 70°C	I _R	All		0.001	10	μA
DETECTOR							
Leakage Current Collector to Emitter	V _{CE} = 10 V	I _{CEO}	All		1	50	nA
	V _{CE} = 30 V				0.005	10	μA
	V _{CE} = 10 V, T _A = 70°C					500	nA
	V _{CB} = 30 V	I _{CBO}			0.001	50	μA
Breakdown Voltage							
Collector to Emitter	I _C = 10 μA, I _F = 0	BV _{CEO}	All	30	100		V
Collector to Base	I _C = 10 μA, I _F = 0	BV _{CBO}	All	30	120		V
Emitter to Collector	I _E = 10 μA, I _F = 0	BV _{ECO}	All	7	10		V
Emitter to Base	I _E = 10 μA, 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 = 60Hz, T = 1 min.	V _{ISO}	5300			V _{AC(RMS)}
Isolation Resistance	V _{I-O} = ±500 VDC	R _{ISO}	1	10		TΩ
Isolation Capacitance	f = 1 MHz, V = 0V	C _{ISO}		0.6	1.3	pF

* Typical values at T_A=25°C.

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	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	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	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, SL5511			0.4	
AC Characteristics	Test Conditions	Symbol	Device	Min	Typ	Max	Units
Saturated Switching Times							
Turn-On Time	$R_L = 1\text{ k}\Omega, I_F = 16\text{ mA}, V_{CC} = 5\text{ V}$ See Fig. 1 and Fig. 2	t_{on}	All			20	μs
Turn-Off Time		t_{off}	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.

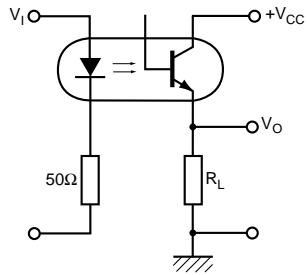


Fig. 1 Switching Circuit

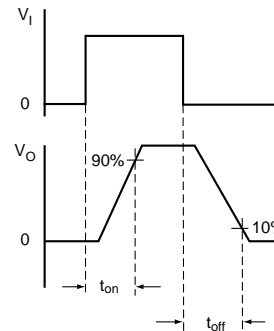


Fig. 2 Waveforms

Fig.3 LED Forward Voltage vs. Forward Current

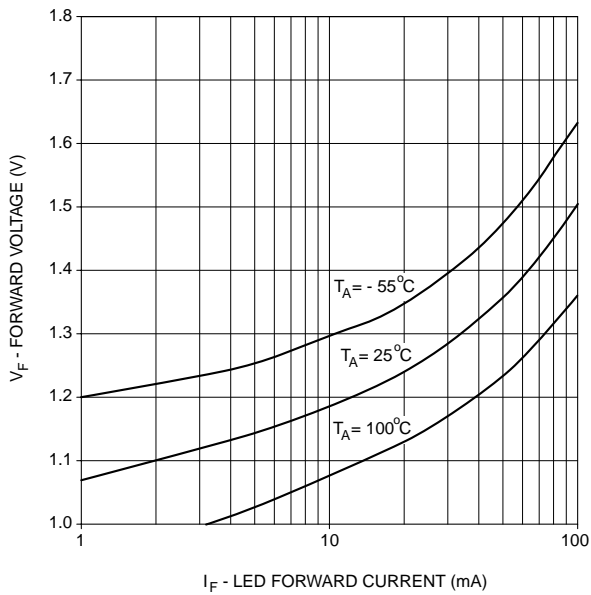


Fig.4 Normalized CTR vs. Forward Current

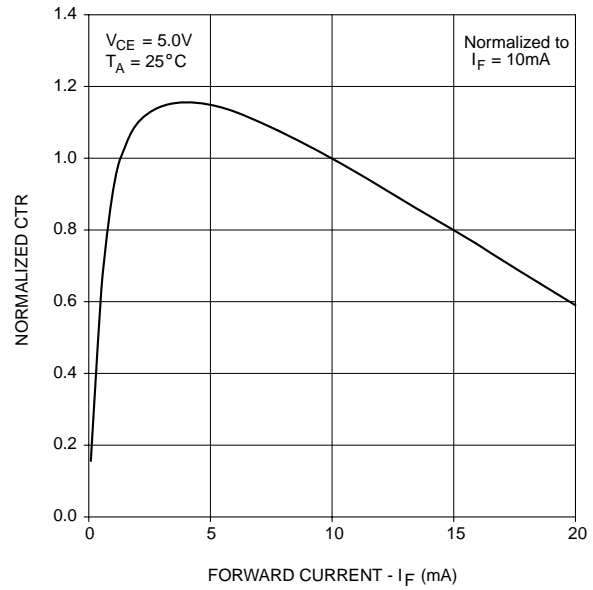


Fig. 5 Normalized CTR vs. Ambient Temperature

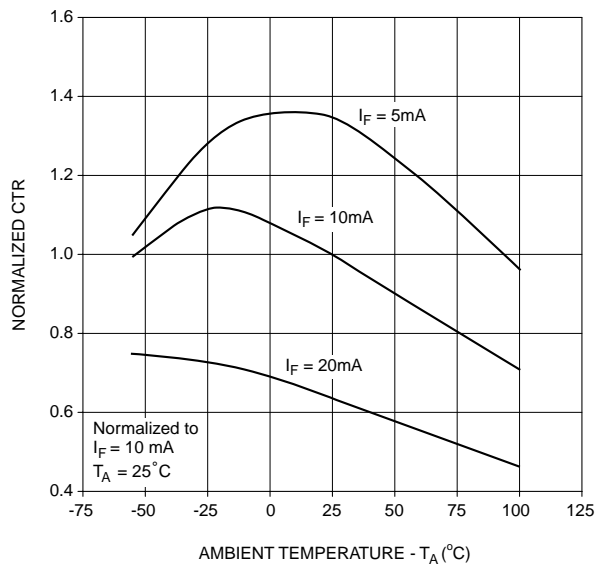


Fig. 7 CTR vs. RBE (Unsaturated)

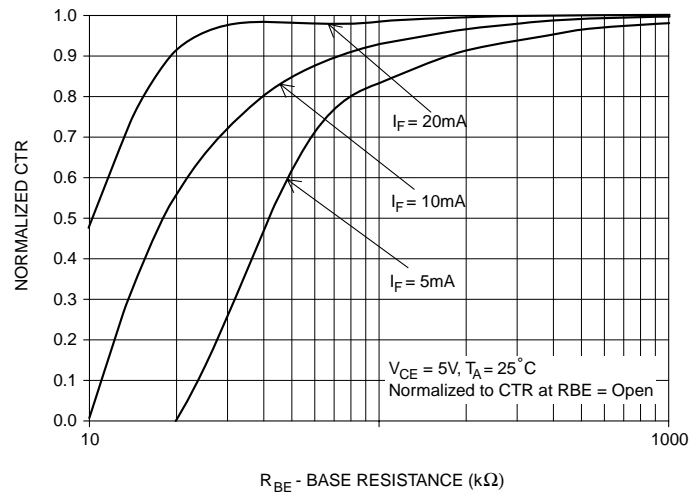


Fig. 7 CTR vs. R_{BE} (Saturated)

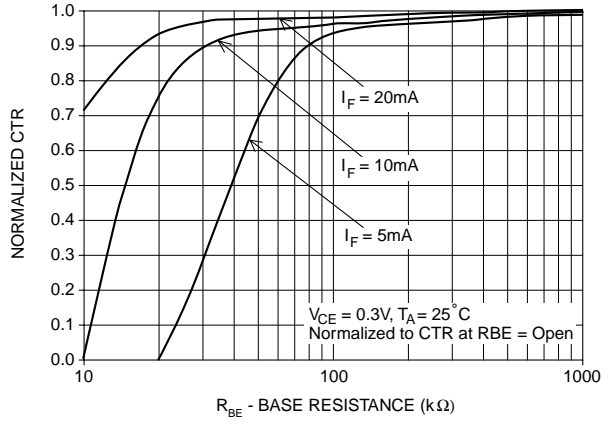


Fig. 8 Normalized t_{off} vs. R_{BE}

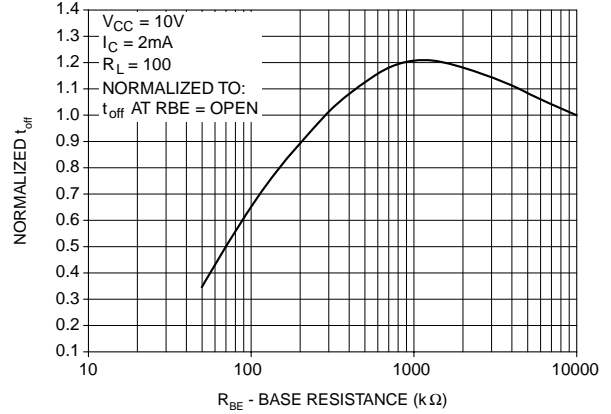


Fig. 9 Normalized t_{on} vs. R_{BE}

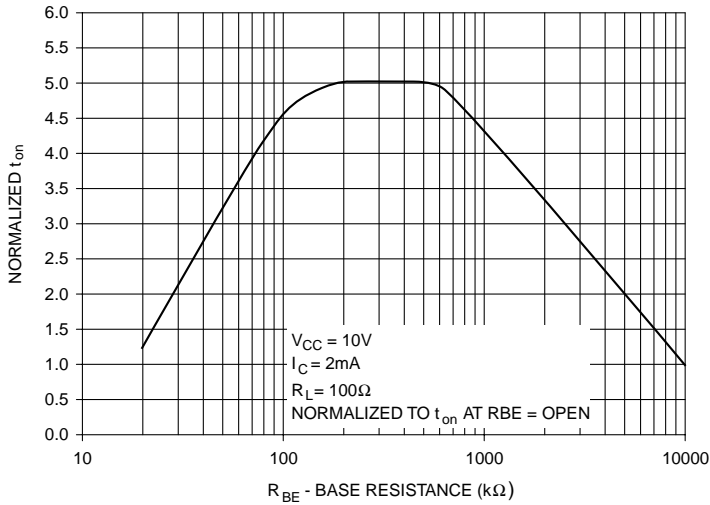


Fig. 10 Switching Speed vs. Load Resistor

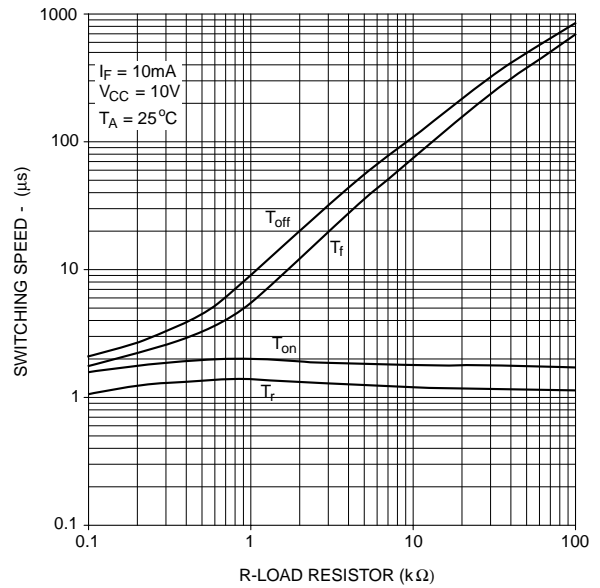


Fig. 11 Collector Emitter Saturation Voltage vs. Collector Current

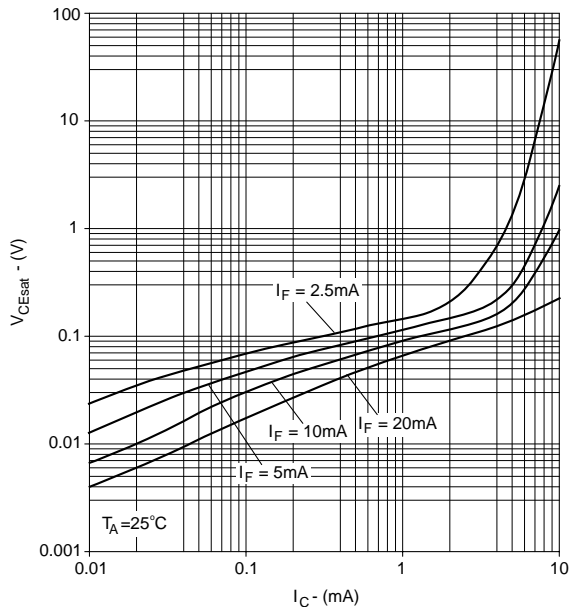
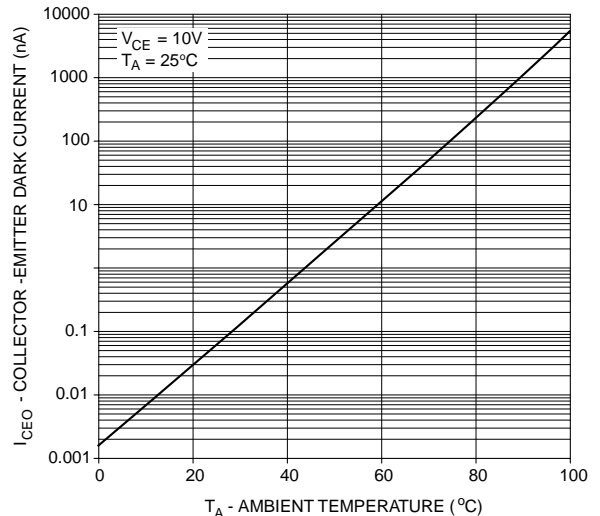
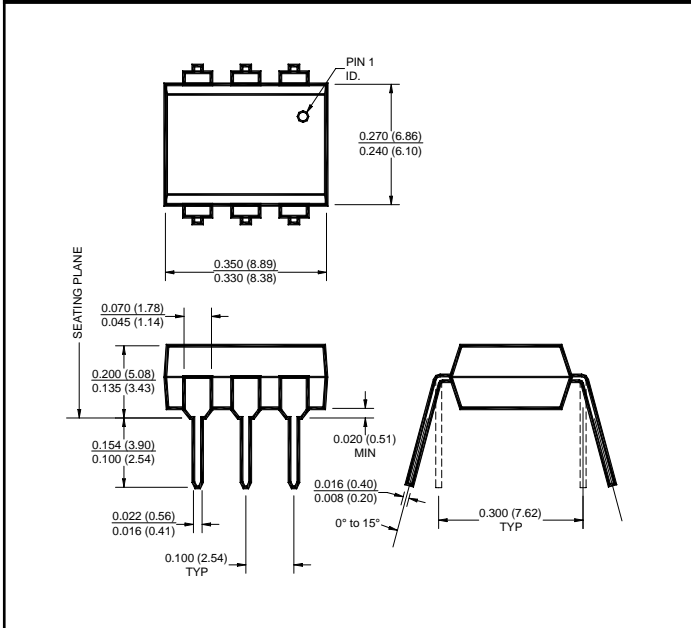


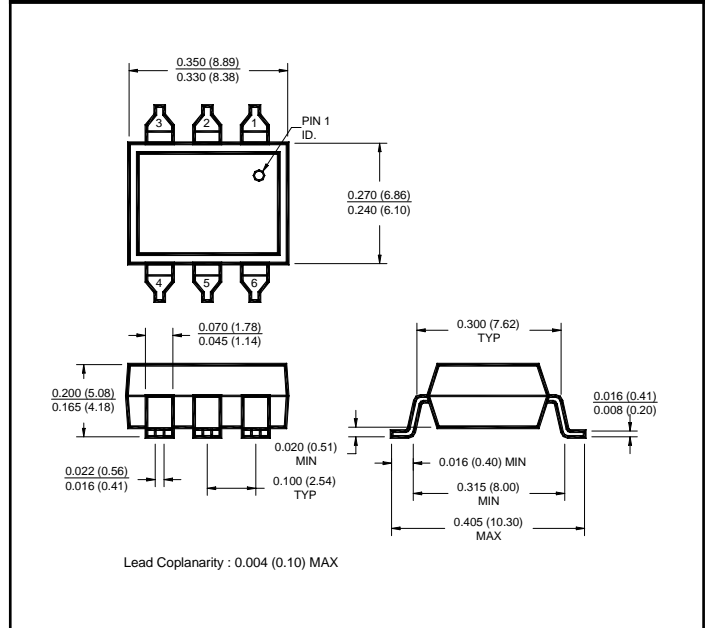
Fig. 12 Dark Current vs. Ambient Temperature



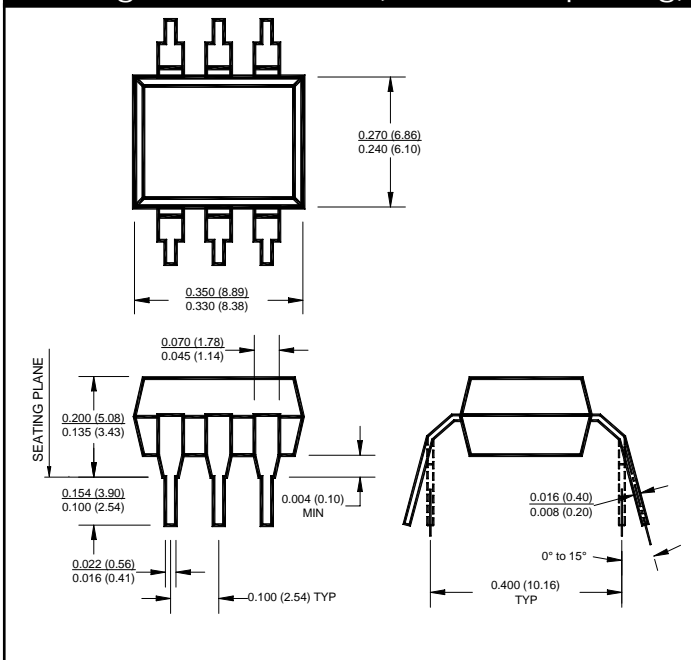
Package Dimensions (Through Hole)



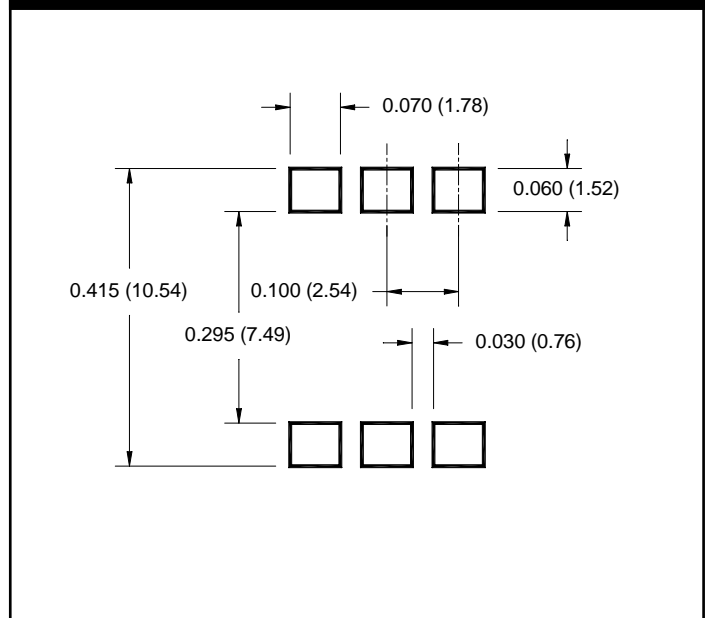
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



**Recommended Pad Layout for
Surface Mount Leadform**



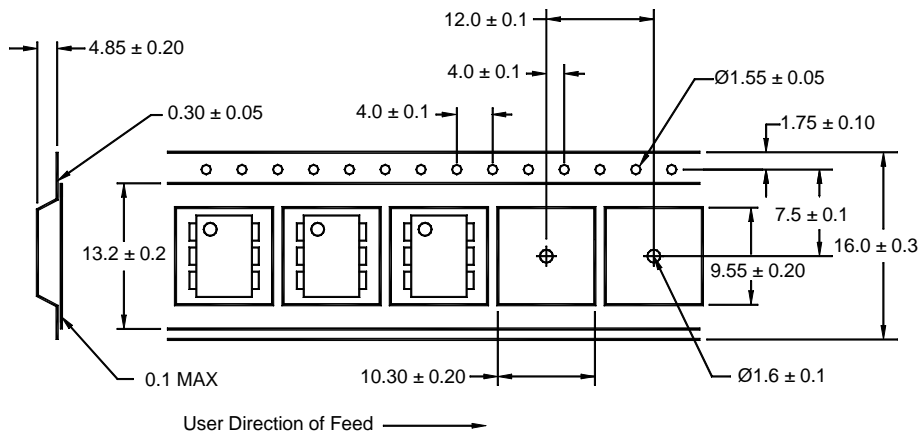
NOTE

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)

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE 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 THE PRESIDENT 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, and (c) whose failure to perform when properly used in accordance with instructions for use provided in labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in 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.