

**DESCRIPTION**

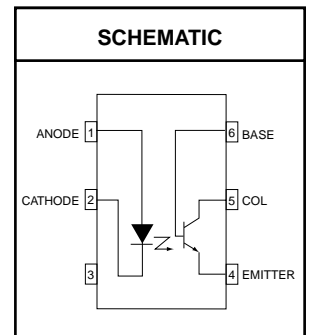
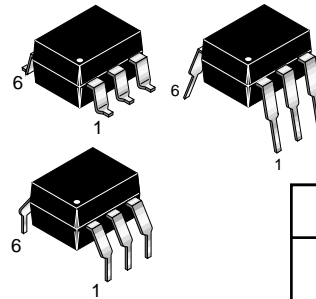
The SL5500, SL5501 and SL5511 are optically coupled isolators each consisting of an infrared emitting GaAs diode and a silicon NPN phototransistor with accessible base. These devices are housed in 6-pin dual-in-line packages (DIP).

**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<sub>A</sub> = 25°C Unless otherwise specified.)

### INDIVIDUAL COMPONENT CHARACTERISTICS

Parameters	Test Conditions	Symbol	Device	Min	Typ*	Max	Units
<b>EMITTER</b>							
Input Forward Voltage	I <sub>F</sub> = 20 mA, T <sub>A</sub> = 25 to 70°C	V <sub>F</sub>	All		1.23	1.3	V
	I <sub>F</sub> = 2 mA				1.10	1.2	V
Reverse Current	V <sub>R</sub> = 3 V, T <sub>A</sub> = 25 to 70°C	I <sub>R</sub>	All		0.001	10	μA
<b>DETECTOR</b>							
Leakage Current Collector to Emitter	V <sub>CE</sub> = 10 V	I <sub>CEO</sub>	All		1	50	nA
	V <sub>CE</sub> = 30 V				0.005	10	μA
	V <sub>CE</sub> = 10 V, T <sub>A</sub> = 70°C					500	nA
	V <sub>CB</sub> = 30 V	I <sub>CBO</sub>			0.001	50	μA
<b>Breakdown Voltage</b>							
Collector to Emitter	I <sub>C</sub> = 10 μA, I <sub>F</sub> = 0	BV <sub>CEO</sub>	All	30	100		V
Collector to Base	I <sub>C</sub> = 10 μA, I <sub>F</sub> = 0	BV <sub>CBO</sub>	All	30	120		V
Emitter to Collector	I <sub>E</sub> = 10 μA, I <sub>F</sub> = 0	BV <sub>ECO</sub>	All	7	10		V
Emitter to Base	I <sub>E</sub> = 10 μA, I <sub>F</sub> = 0	BV <sub>EBO</sub>	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 <sub>ISO</sub>	5300			V <sub>AC(RMS)</sub>
Isolation Resistance	V <sub>I-O</sub> = ±500 VDC	R <sub>ISO</sub>	1	10		TΩ
Isolation Capacitance	f = 1 MHz, V = 0V	C <sub>ISO</sub>		0.6	1.3	pF

\* Typical values at T<sub>A</sub>=25°C.

<b>TRANSFER CHARACTERISTICS</b> ( $T_A = 25^\circ\text{C}$ Unless otherwise specified.)							
<b>DC Characteristics</b>	<b>Test Conditions</b>	<b>Symbol</b>	<b>Device</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Units</b>
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	
<b>AC Characteristics</b>	<b>Test Conditions</b>	<b>Symbol</b>	<b>Device</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Units</b>
<b>Saturated Switching Times</b>							
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	$\mu\text{s}$
Turn-Off Time		$t_{off}$	All			50	$\mu\text{s}$

**Note**

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

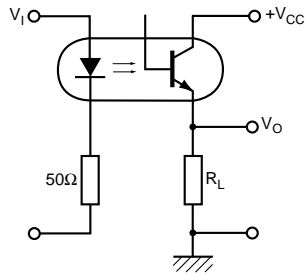


Fig. 1 Switching Circuit

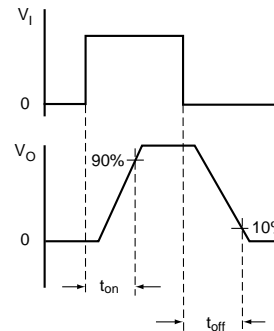


Fig. 2 Waveforms

Fig.3 LED Forward Voltage vs. Forward Current

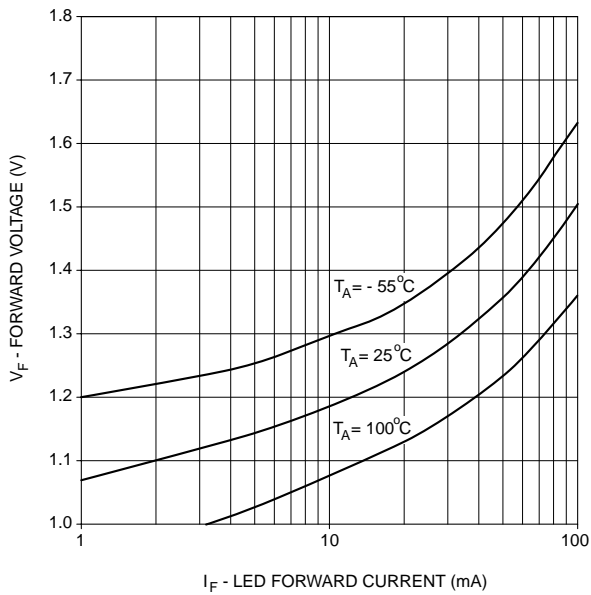


Fig.4 Normalized CTR vs. Forward Current

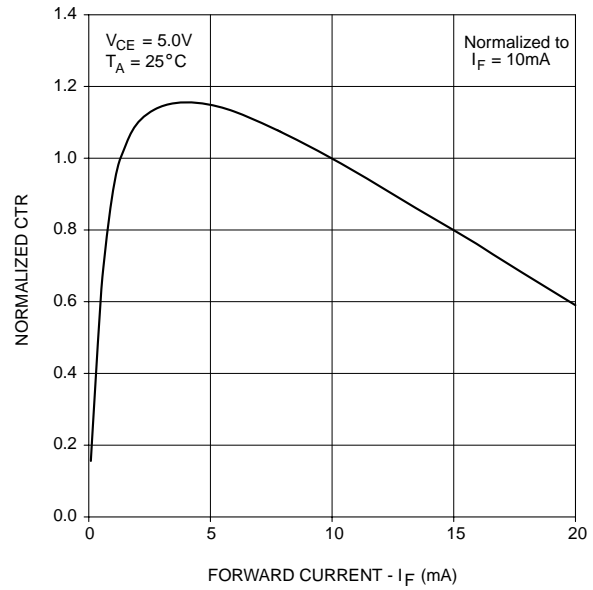


Fig. 5 Normalized CTR vs. Ambient Temperature

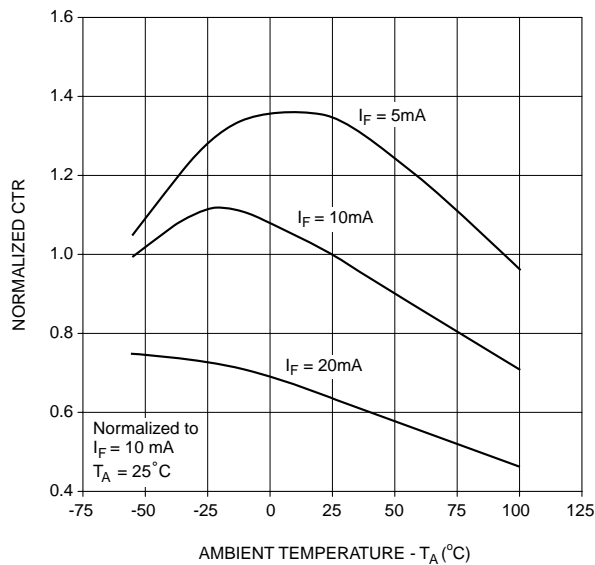
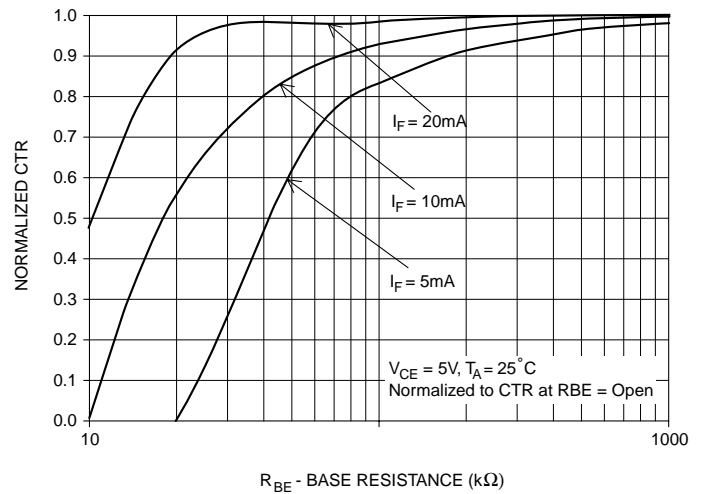
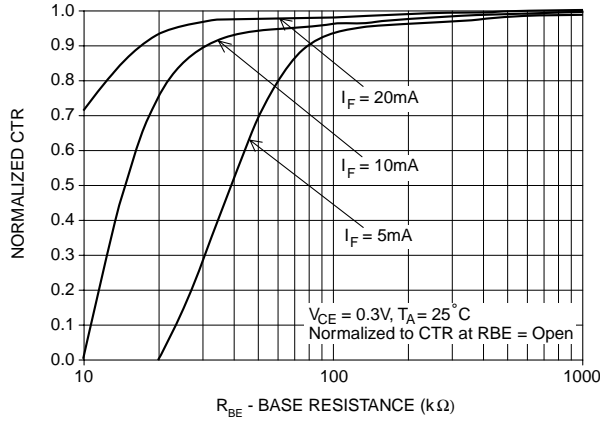


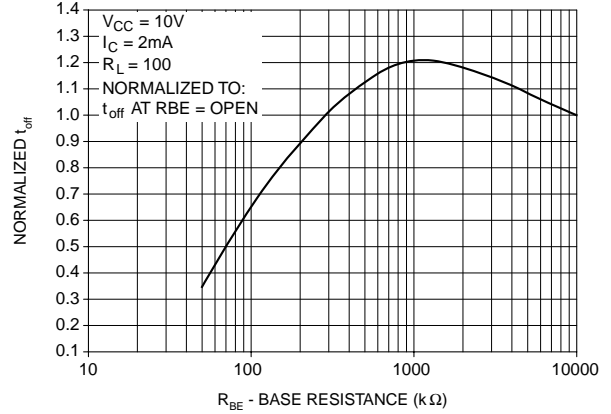
Fig. 7 CTR vs. RBE (Unsaturated)



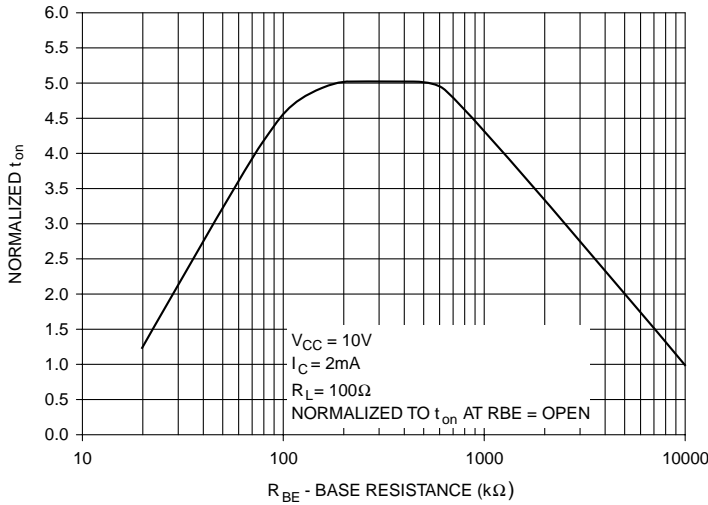
**Fig. 7 CTR vs. R<sub>BE</sub> (Saturated)**



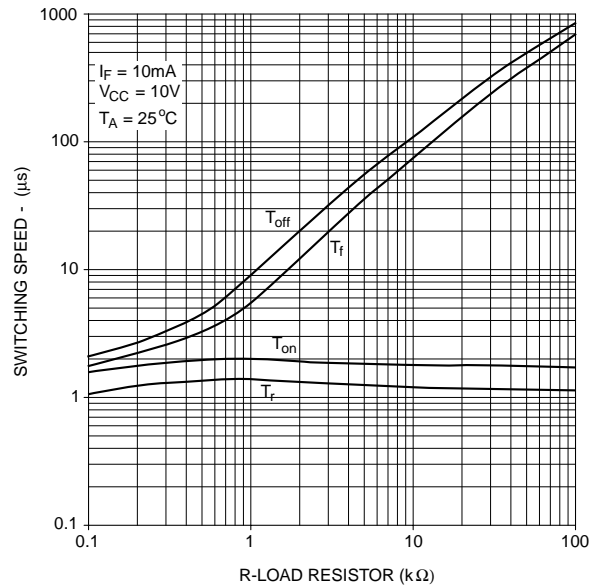
**Fig. 8 Normalized t<sub>off</sub> vs. R<sub>BE</sub>**



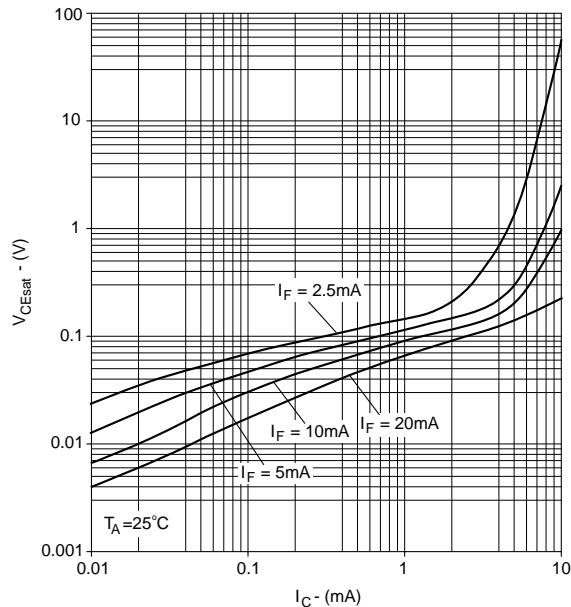
**Fig. 9 Normalized t<sub>on</sub> vs. R<sub>BE</sub>**



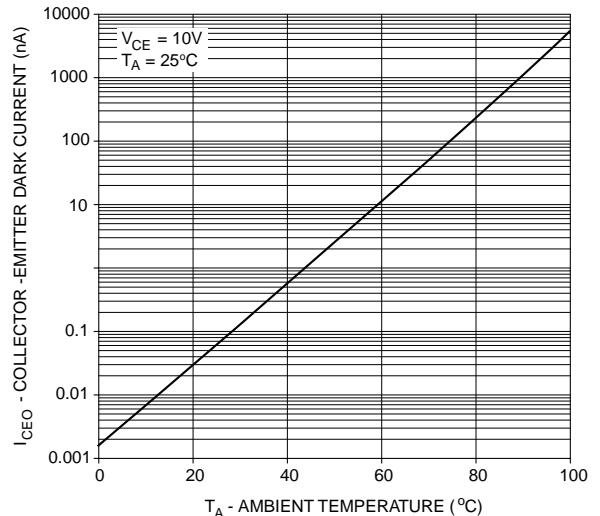
**Fig. 10 Switching Speed vs. Load Resistor**



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



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

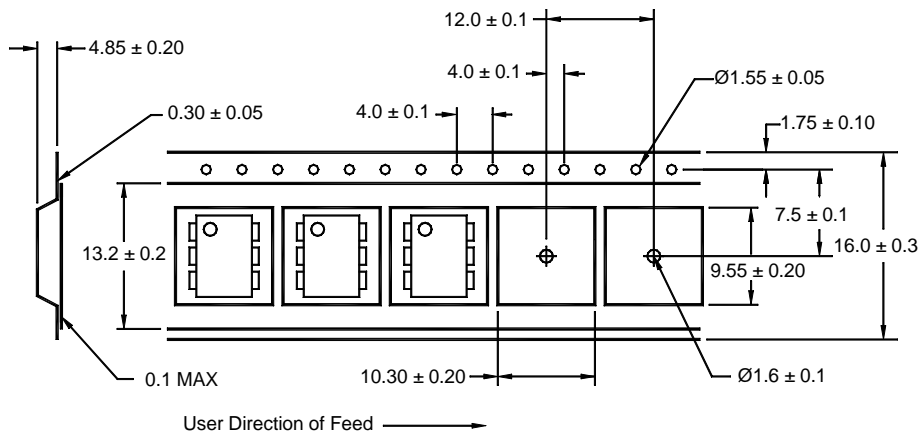




**ORDERING INFORMATION**

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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