

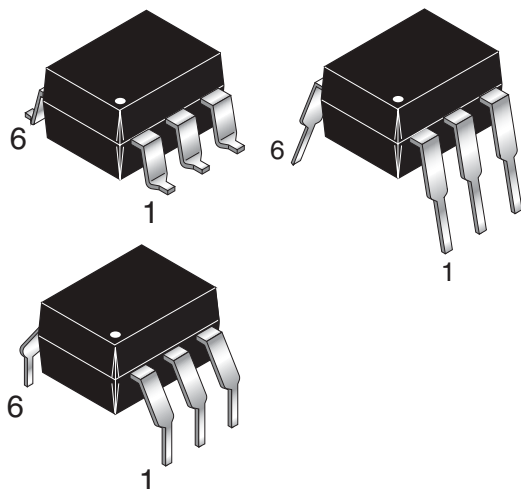
SL5500

SL5501

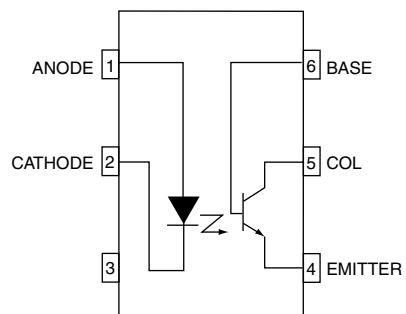
SL5504

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
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°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, δ = 0.01)		I _{F(pk)}	3.0	A
Total Power Dissipation T _A = 25°C Ambient Derate Linearly from 25°C		P _D	150	mW
			2.0	mW/°C
DETECTOR				
Collector to Emitter Voltage (open base)	SL5500, SL5501, SL5511	V _{CEO}	30	V
	SL5504		80	
Collector to Base Voltage (open emitter)	SL5500, SL5501, SL5511	V _{CBO}	70	V
	SL5504		120	
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°C Ambient Derate Linearly from 25°C		P _D	150	mW
			2.0	mW/°C

SL5500

SL5501

SL5504

SL5511

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise specified.)

INDIVIDUAL COMPONENT CHARACTERISTICS

Parameters	Test Conditions	Symbol	Device	Min	Typ*	Max	Units
EMITTER							
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	μA
DETECTOR							
Leakage Current Collector to Emitter	$V_{CE} = 10\text{ V}$	I_{CEO}	All		1	50	nA
	$V_{CE} = 30\text{ V}$				0.005	10	μA
	$V_{CE} = 10\text{ V}$, $T_A = 70^\circ\text{C}$					500	nA
	$V_{CB} = 30\text{ V}$	I_{CBO}			0.001	50	μA
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

SL5504

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	μs
			SL5504			50	
Turn-Off Time	See Fig. 1 and Fig. 2	t_{off}	SL5500, SL5501, SL5511			50	μs
			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

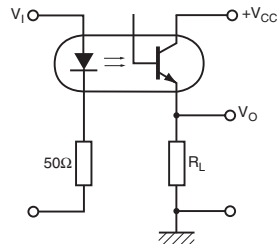


Fig. 1 Switching Circuit

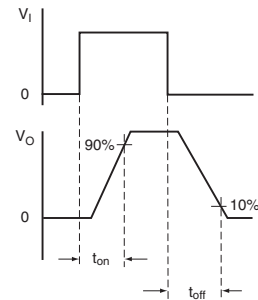


Fig. 2 Waveforms

Fig. 3 LED Forward Voltage vs. Forward Current

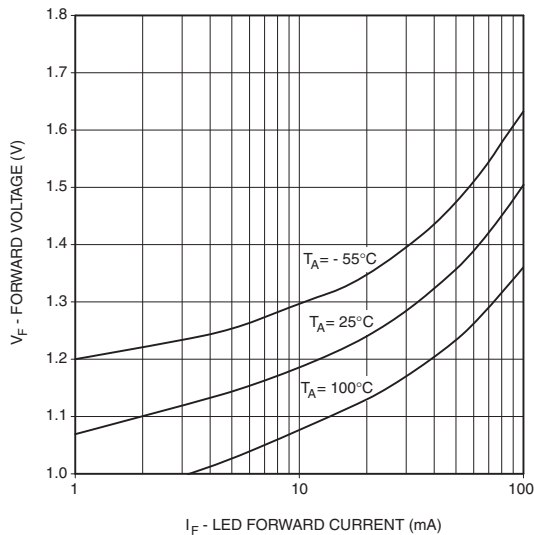


Fig. 4 Normalized CTR vs. Forward Current

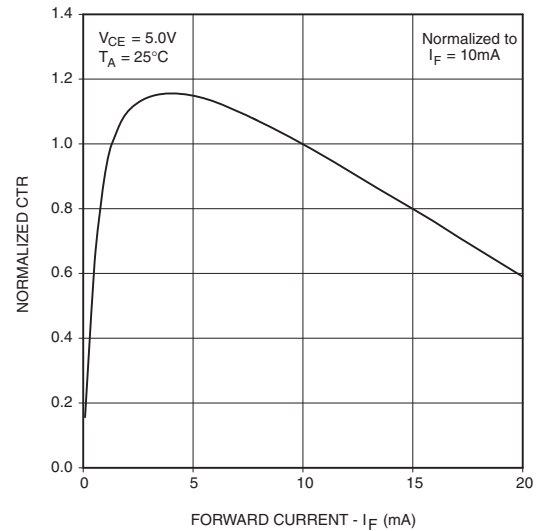


Fig. 5 Normalized CTR vs. Ambient Temperature

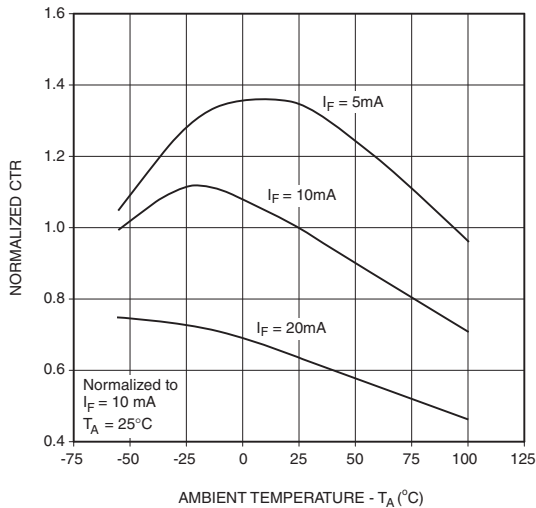
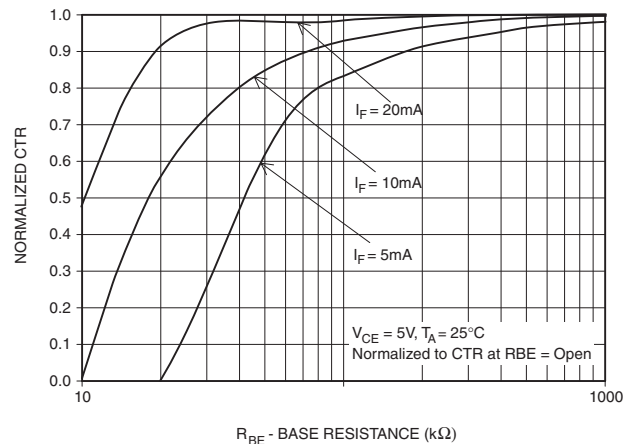


Fig. 7 CTR vs. R_BE (Unsaturated)



SL5500

SL5501

SL5504

SL5511

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

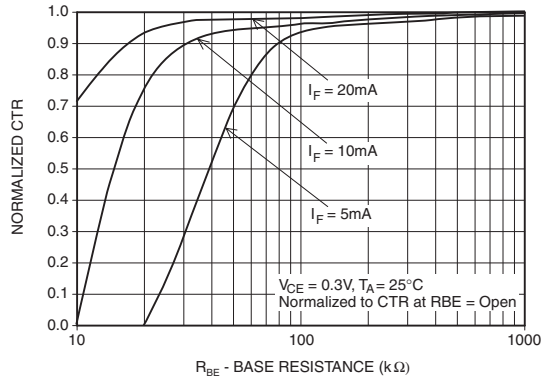


Fig. 8 Normalized t_{off} vs. R_{BE}

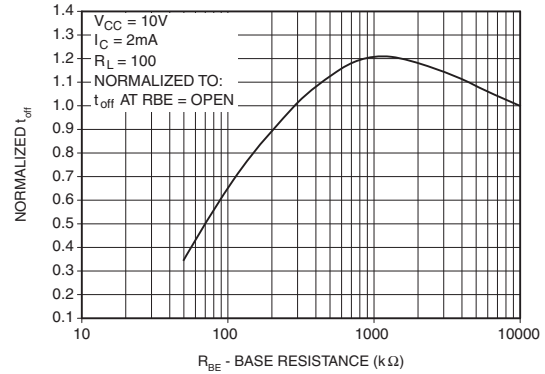


Fig. 9 Normalized t_{on} vs. R_{BE}

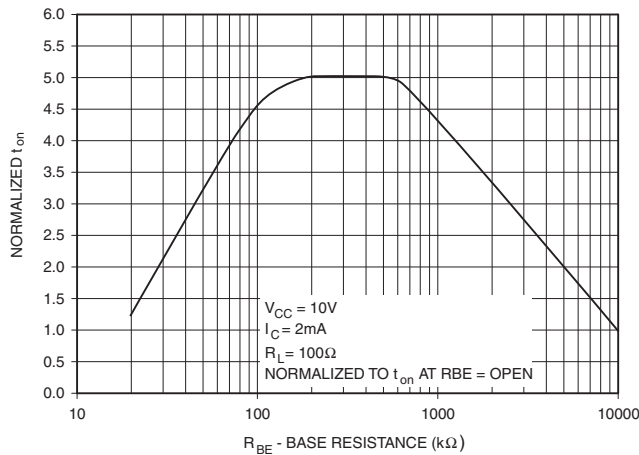


Fig. 10 Switching Speed vs. Load Resistor

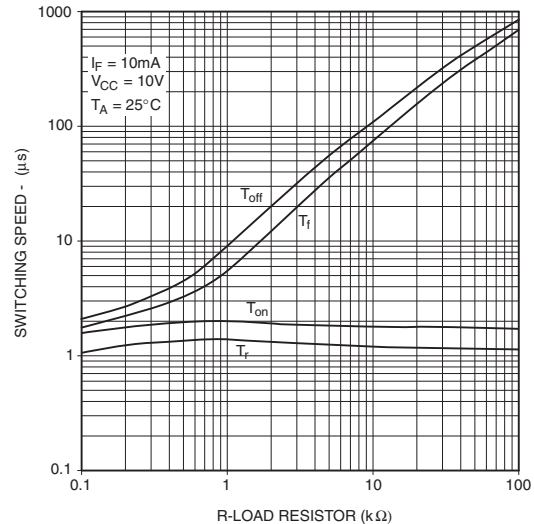


Fig. 11 Collector Emitter Saturation Voltage vs. Collector Current

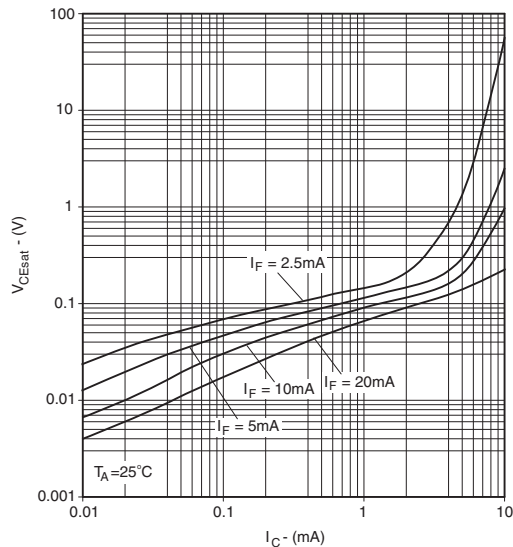


Fig. 12 Dark Current vs. Ambient Temperature

