

### FEATURES

- **Current Transfer Ratio, 20% Min.**
- **AC or Polarity Insensitive Input**
- **Built-in Reverse Polarity Input Protection**
- **I/O Compatible with Integrated Circuits**
- **Industry Standard DIP Package**
- **Underwriters Lab File #E52744**
- **VDE Approval #0884 (Available with Option 1)**

### DESCRIPTION

The H11AA1 is a bi-directional input optically coupled isolator consisting of two Gallium Arsenide infrared LEDs coupled to a silicon NPN phototransistor in a 6-pin DIP package. The H11AA1 has a minimum CTR of 20% and a CTR symmetry of 1:3 and is designed for applications requiring detection or monitoring of AC signals.

### Maximum Ratings

#### Emitter

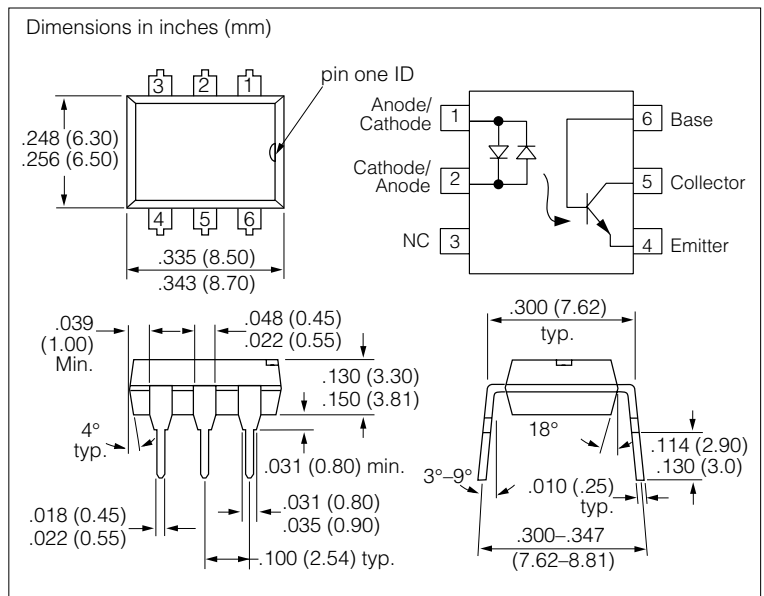
Continuous Forward Current ..... 60 mA  
 Power Dissipation at 25°C ..... 100 mW  
 Derate Linearly from 25°C ..... 1.3mW/°C

#### Detector

Power Dissipation at 25°C Ambient ..... 200 mW  
 Derate Linearly from 25°C ..... 2.6mW/°C  
 Collector-Emitter Breakdown Voltage,  $BV_{CEO}$  ... 30 V  
 Emitter-Base Breakdown Voltage,  $BV_{EBO}$  ..... 5.0 V  
 Collector-Base Breakdown Voltage,  $BV_{CBO}$  ..... 70 V

#### Package

Isolation Test Voltage (between emitter and detector referred to standard climate 23°C/50%RH, DIN 50014)..... 5300  $V_{RMS}$   
 Creepage ..... min. 7.0 mm  
 Clearance ..... min. 7 mm  
 Comparative Tracking Index per DIN IEC 112/VDE 0303, part 1 ..... 175  
 Isolation Resistance  
 $V_{IO}=500$  V,  $T_A=25^\circ\text{C}$ .....  $\geq 10^{12} \Omega$   
 $V_{IO}=500$  V,  $T_A=100^\circ\text{C}$ .....  $\geq 10^{11} \Omega$   
 Storage Temperature ..... -55°C to +150°C  
 Operating Temperature ..... -55°C to +100°C  
 Lead Soldering Time at 260°C ..... 10 sec.



### Electrical Characteristics $T_A=25^\circ\text{C}$

Parameter	Min.	Typ.	Max.	Unit	Condition
<b>Emitter</b>					
Forward Voltage, $V_F$	—	1.2	1.5	V	$I_F=\pm 10$ mA
<b>Detector</b>					
Breakdown Voltage	—	—	—	—	—
$BV_{CEO}$	30	—	—	V	$I_C=1.0$ mA
$BV_{EBO}$	7.0	—	—		$I_E=100$ $\mu\text{A}$
$BV_{CBO}$	70	—	—		$I_C=100$ $\mu\text{A}$
$I_{CEO}$	—	5.0	100	nA	$V_{CE}=10$ V
<b>Package</b>					
$V_{CEsat}$	—	—	0.4	V	$I_F=\pm 10$ mA, $I_C=0.5$ mA
DC Current Transfer Ratio	20	—	—	%	$I_F=\pm 10$ mA, $V_{CE}=10$ V
Symmetry CTR at + 10 mA CTR at - 10 mA	0.33	1.0	3.0	—	—

Figure 1. LED forward current versus forward voltage

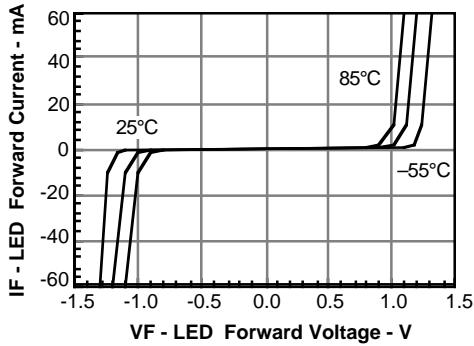


Figure 2. Normalized non-saturated and saturated CTR at  $T_A=25^\circ\text{C}$  versus LED current

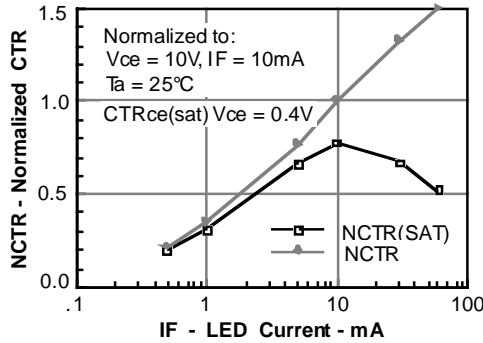


Figure 3. Normalized non-saturated and saturated CTR at  $T_A=50^\circ\text{C}$  versus LED current

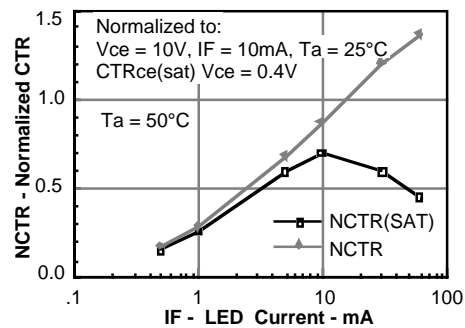


Figure 4. Normalized non-saturated and saturated CTR at  $T_A=70^\circ\text{C}$  versus LED current

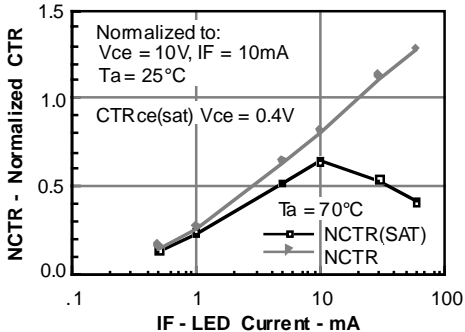


Figure 5. Normalized non-saturated and saturated CTR at  $T_A=85^\circ\text{C}$  versus LED current

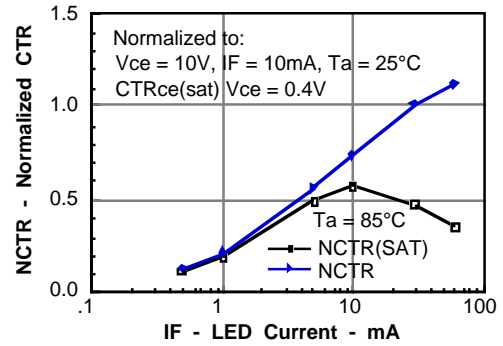


Figure 6. Collector-emitter current versus temperature and LED current

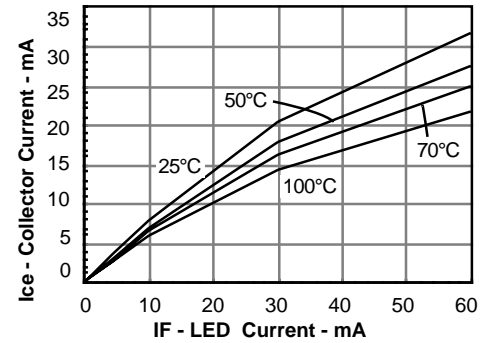


Figure 7. Collector-emitter leakage current versus temperature

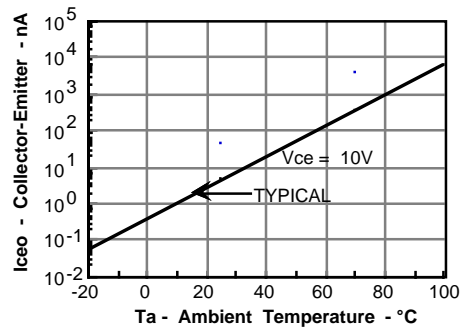
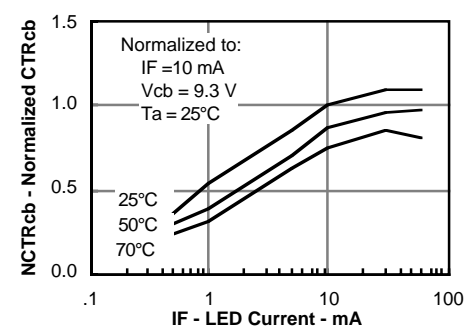
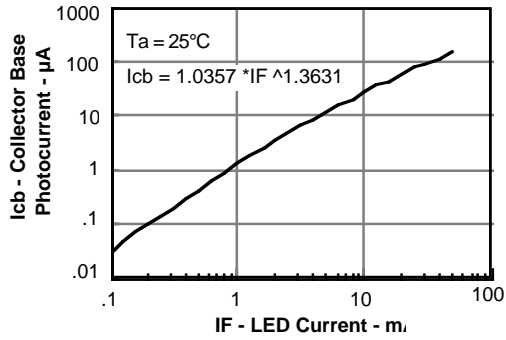


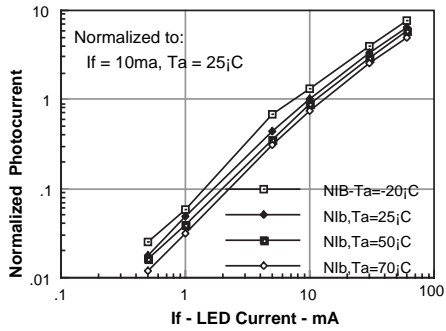
Figure 8. Normalized  $CTR_{cb}$  versus LED current and temperature



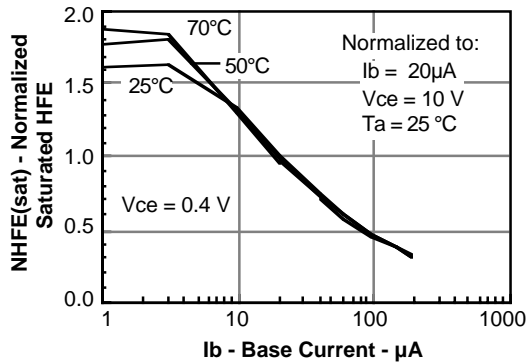
**Figure 9. Collector base photocurrent versus LED current**



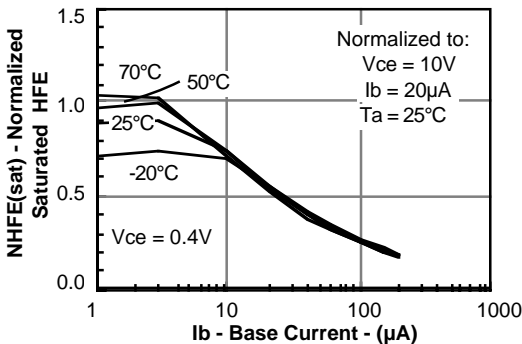
**Figure 10. Normalized photocurrent versus LED current**



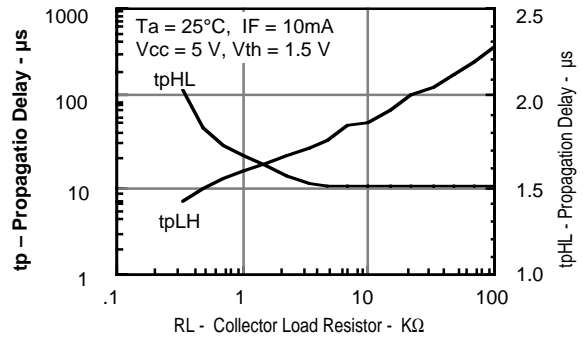
**Figure 11. Normalized saturated HFE versus base current and temperature**



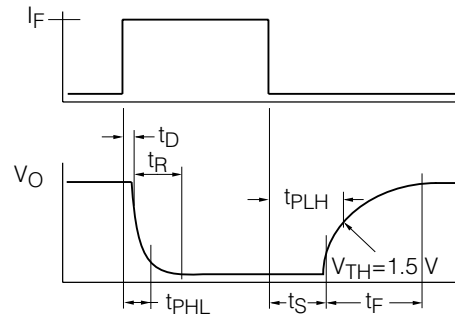
**Figure 12. Normalized saturated HFE versus base current and temperature**



**Figure 13. Propagation delay versus collector load resistor**



**Figure 14. Switching waveform**



**Figure 15. Switching schematic**

