



ON Semiconductor®

H11AXM-5164

General Purpose 6-Pin Phototransistor Optocouplers

Features

- UL recognized (File # E90700, Volume 2)

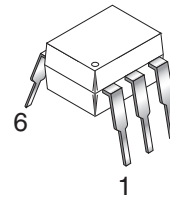
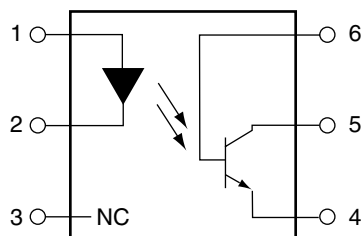
Applications

- Power supply regulators
- Digital logic inputs
- Microprocessor inputs

Description

This optocoupler consists of a gallium arsenide infrared emitting diode driving a silicon phototransistor in a 6-pin dual in-line package.

Functional Block Diagram



- PIN 1. ANODE
2. CATHODE
3. NO CONNECTION
4. EMITTER
5. COLLECTOR
6. BASE

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Value	Units
TOTAL DEVICE			
T_{STG}	Storage Temperature	-40 to +150	$^\circ\text{C}$
T_{OPR}	Operating Temperature	-40 to +100	$^\circ\text{C}$
T_{SOL}	Wave solder temperature (see page 8 for reflow solder profile)	260 for 10 sec	$^\circ\text{C}$
P_D	Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	250	mW
		2.94	
EMITTER			
I_F	DC/Average Forward Input Current	60	mA
V_R	Reverse Input Voltage	6	V
$I_F(pk)$	Forward Current – Peak (300 μs , 2% Duty Cycle)	3	A
P_D	LED Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	120	mW
		1.41	mW/ $^\circ\text{C}$
DETECTOR			
V_{CEO}	Collector-Emitter Voltage	70	V
V_{CBO}	Collector-Base Voltage	70	V
V_{ECO}	Emitter-Collector Voltage	7	V
P_D	Detector Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	150	mW
		1.76	mW/ $^\circ\text{C}$

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Individual Component Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.*	Max.	Unit
EMITTER						
V_F	Input Forward Voltage	$I_F = 10\text{mA}$		1.18	1.50	V
		$I_F = 10\text{mA}, T_A = -40^\circ\text{C}$			1.7	
		$I_F = 10\text{mA}, T_A = 100^\circ\text{C}$			1.4	
I_R	Reverse Leakage Current	$V_R = 6.0\text{V}$		0.001	10	μA
DETECTOR						
BV_{CEO}	Collector-Emitter Breakdown Voltage	$I_C = 1.0\text{mA}, I_F = 0$	70	100		V
BV_{CBO}	Collector-Base Breakdown Voltage	$I_C = 100\mu\text{A}, I_F = 0$	70	120		V
BV_{ECO}	Emitter-Collector Breakdown Voltage	$I_E = 100\mu\text{A}, I_F = 0$	7	10		V
I_{CEO}	Collector-Emitter Dark Current	$V_{CE} = 10\text{V}, I_F = 0$		1	50	nA
I_{CBO}	Collector-Base Dark Current	$V_{CB} = 10\text{V}$		18		nA
C_{CE}	Capacitance	$V_{CE} = 0\text{V}, f = 1\text{MHz}$		8		pF

Isolation Characteristics

Symbol	Characteristic	Test Conditions	Min.	Typ.*	Max.	Units
V_{ISO}	Input-Output Isolation Voltage	$f = 60\text{Hz}, t = 1\text{sec}$	7500			Vac(pk)
R_{ISO}	Isolation Resistance	$V_{I-O} = 500\text{VDC}$	10^{11}			Ω
C_{ISO}	Isolation Capacitance	$V_{I-O} = \&, f = 1\text{MHz}$		0.2	2	pF

Transfer Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.*	Max.	Unit
DC CHARACTERISTICS						
CTR	Current Transfer Ratio, Collector to Emitter	$I_F = 10\text{mA}, V_{CE} = 10\text{V}$	100		300	%
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	$I_C = 2\text{mA}, I_F = 20\text{mA}$			0.4	V
AC CHARACTERISTICS						
T_{ON}	Non-Saturated Turn-on Time	$I_C = 2\text{mA}, V_{CC} = 10\text{V}, R_L = 100\Omega$ (Fig. 11)		2	15	μs
T_{OFF}	Turn-off Time	$I_C = 2\text{mA}, V_{CC} = 10\text{V}, R_L = 100\Omega$ (Fig. 11)		2	15	μs

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

Typical Performance Curves

Fig. 1 LED Forward Voltage vs. Forward Current

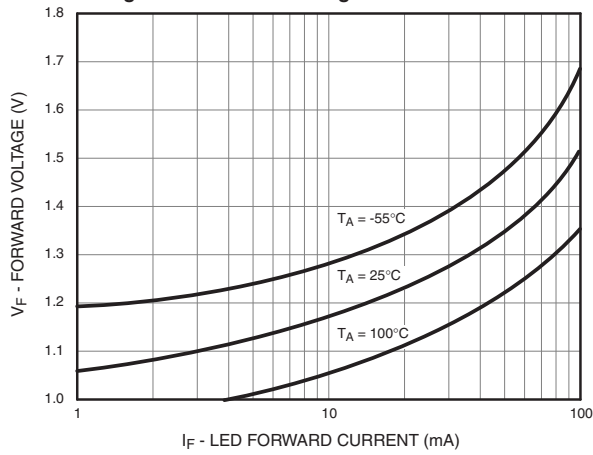


Fig.2 Normalized CTR vs. Forward Current

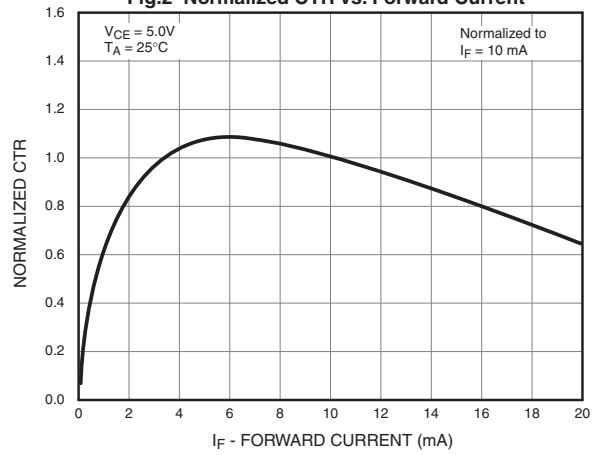


Fig. 3 Normalized CTR vs. Ambient Temperature

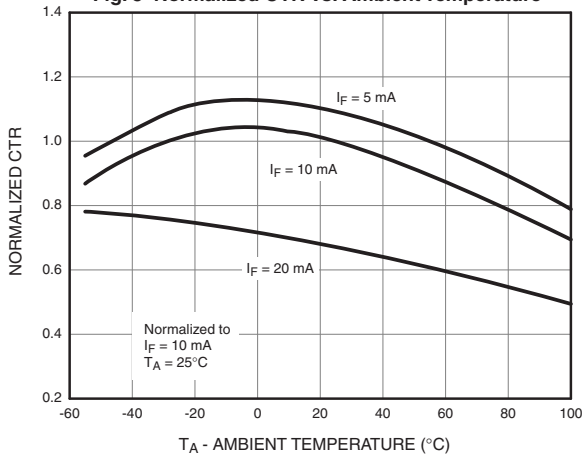


Fig. 4 CTR vs. R_{BE} (Unsaturated)

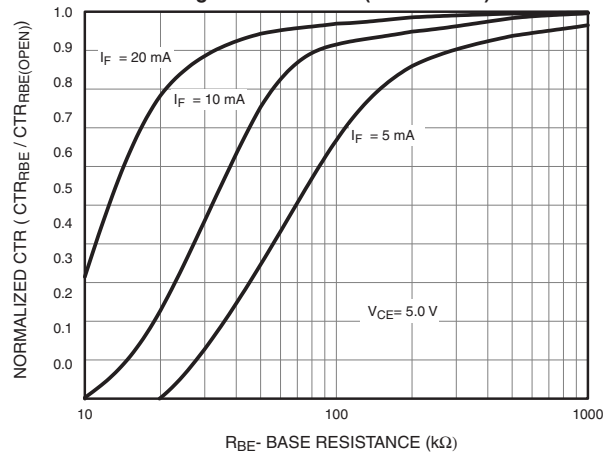


Fig. 5 CTR vs. R_{BE} (Saturated)

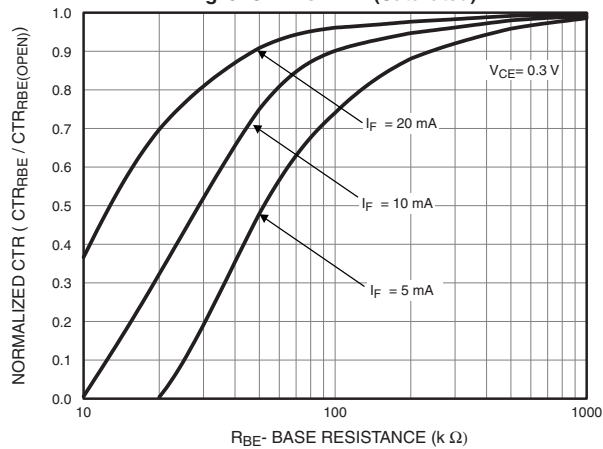
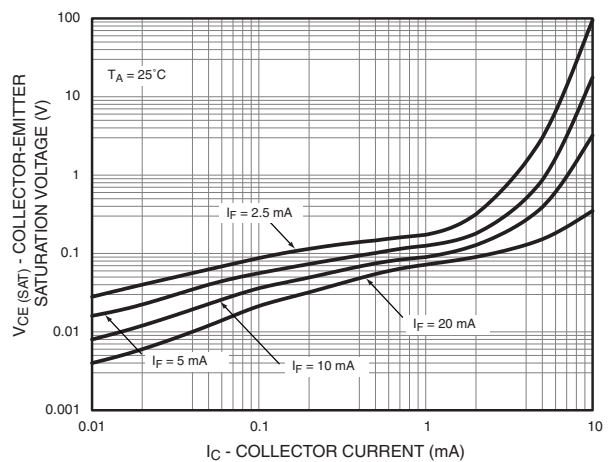


Fig. 6 Collector-Emitter Saturation Voltage vs. Collector Current



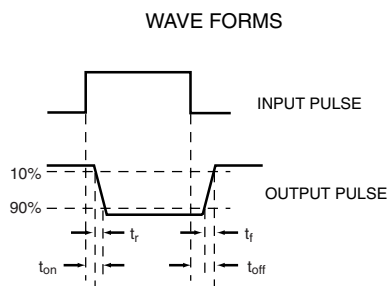
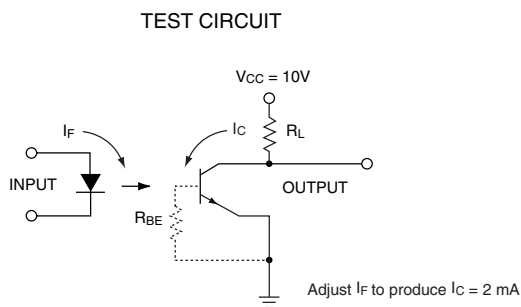
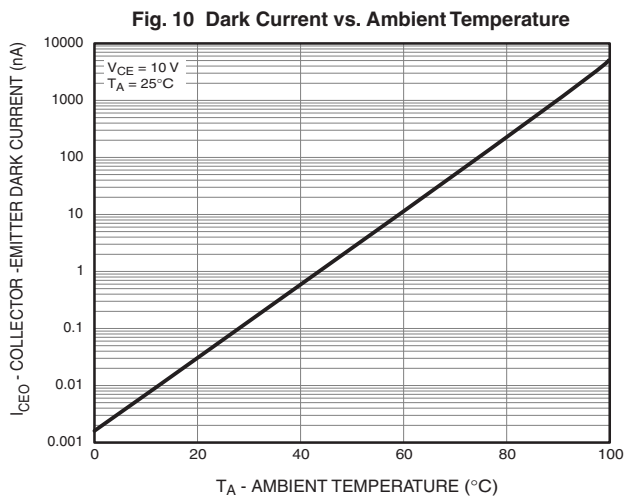
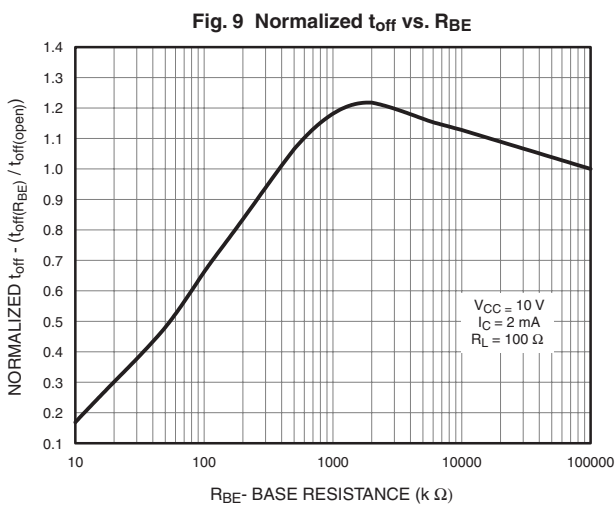
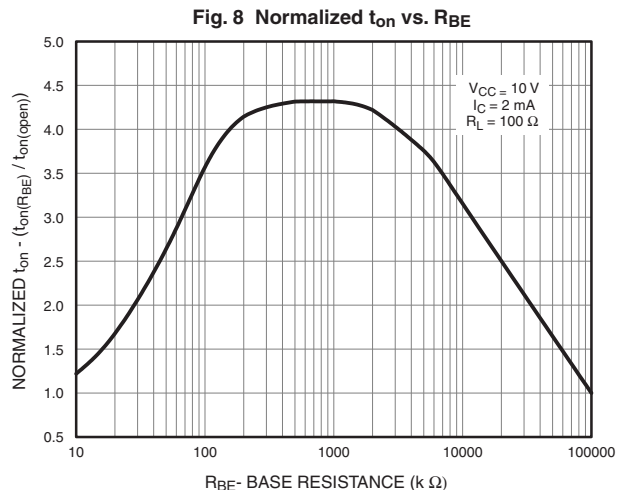
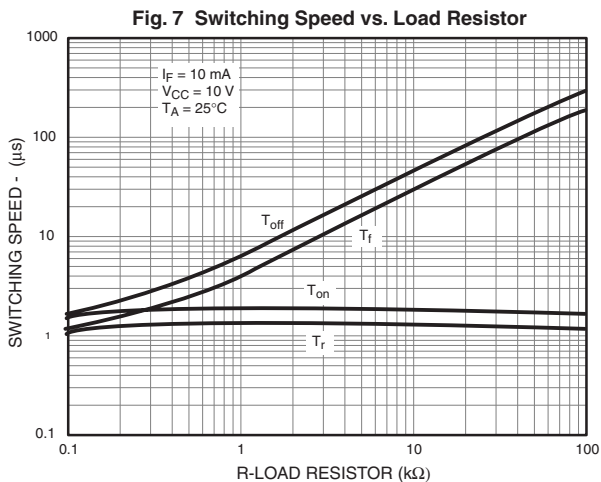
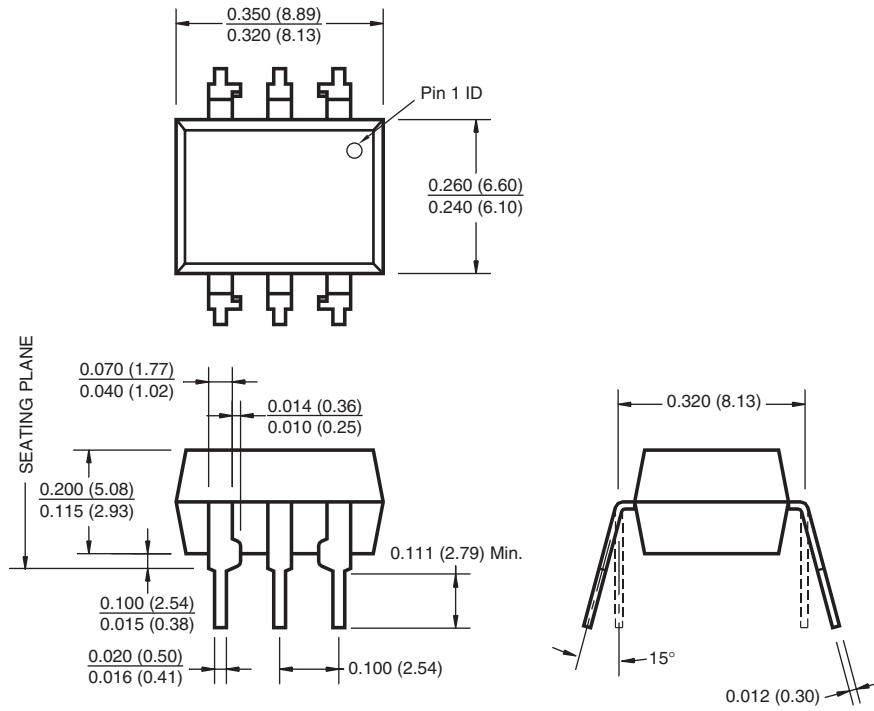


Figure 11. Switching Time Test Circuit and Waveforms

Package Dimensions

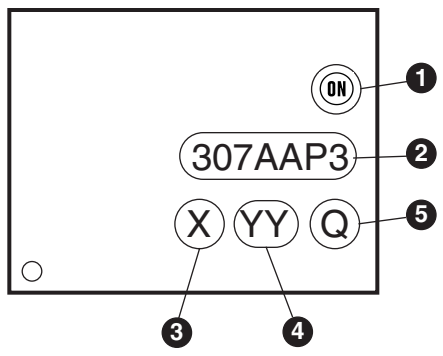
Through Hole



Note:

All dimensions are in inches (millimeters)

Marking Information



Definitions	
1	ON Semiconductor logo
2	Device number
3	One digit year code, e.g., '7'
4	Two digit work week ranging from '01' to '53'
5	Assembly package code

*Note – Packing tubes are labeled with customer part no. (41A296307AAP3)

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