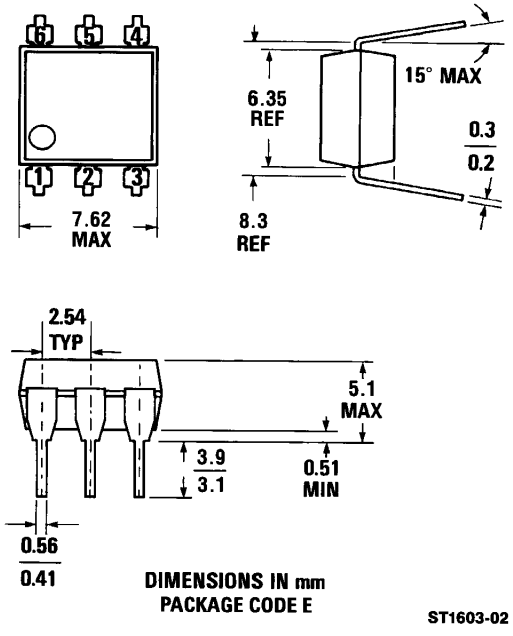
FAIRCHILD
SEMICONDUCTOR™

AC INPUT/PHOTOTRANSISTOR OPTOCOUPLERS

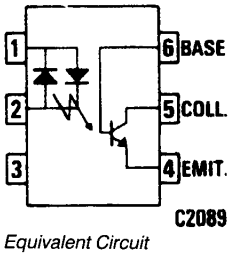
H11AA1 H11AA3
H11AA2 H11AA4

PACKAGE DIMENSIONS



DIMENSIONS IN mm
PACKAGE CODE E

ST1603-02



Equivalent Circuit

DESCRIPTION

The H11AAX family of devices has two GaAs emitters connected in inverse parallel driving a single silicon phototransistor output.

FEATURES

- Bi-polar emitter input
- Built-in reverse polarity input protection
- UL recognized (File #E90700)

APPLICATIONS

- AC line monitor
- Unknown polarity DC sensor
- Telephone line interface

ABSOLUTE MAXIMUM RATINGS

TOTAL PACKAGE

Power dissipation	350 mW
Derate linearly from 25°C	4.6 mW
Storage temperature	−55°C to 150°C
Operating temperature	−55°C to 100°C
Lead temperature (soldering, 10 sec)	260°C

INPUT DIODE

Forward current	100 mA
Peak forward current (1 μs pulse, 300 pps)	±1.0 A
Power dissipation	200 mW
Derate linearly from 25°C	2.6 mW/°C

OUTPUT TRANSISTOR

Power dissipation	300 mW
Derate linearly from 25°C	4.0 mW/°C

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INDIVIDUAL COMPONENT CHARACTERISTICS (T_A=25°C Unless Otherwise Specified)

CHARACTERISTIC	SYMBOL	DEVICE	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
INPUT DIODE							
Forward voltage	V_F	ALL		1.2	1.5	V	I_F=±10 mA
Forward voltage coefficient	$\Delta V_F/\Delta T_A$	ALL		−1.9		mV/°C	I_F=2 mA
Junction capacitance	C_J	ALL		80		pF	V_F=0 V, f=1 MHz
OUTPUT TRANSISTOR							
Breakdown voltage							
Collector to emitter	BV_{CEO}	ALL	30			V	I_C=1 mA, I_F=0
Collector to base	BV_{CBO}	ALL	70			V	I_C=100 μA, I_F=0
Emitter to base	BV_{EBO}	ALL	5			V	I_E=100 μA, I_F=0
Emitter to collector	BV_{ECO}	ALL	7			V	I_E=100 μA, I_F=0
Leakage current	I_{CEO}	H11AA1,3,4			50	nA	V_{CE}=10 V, I_F=0
	I_{CEO}	H11AA2			200	nA	V_{CE}=10 V, I_F=0
Capacitance							
Collector to emitter	C_{CE}	ALL		10		pF	V_{CE}=0, f=1 MHz
Collector to base	C_{CB}	ALL		80		pF	V_{CE}=0, f=1 MHz
Emitter to base	C_{EB}	ALL		15		pF	V_{CE}=0, f=1 MHz

TRANSFER CHARACTERISTICS (T_A=25°C Unless Otherwise Specified)

CHARACTERISTIC	SYMBOL	DEVICE	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Current transfer (Collector-Emitter)	CTR_{CE}	H11AA4	100			%	I_F=±10 mA, V_{CE}=10 V
		H11AA3	50				I_F=±10mA, V_{CE}=10 V
		H11AA1	20				I_F=±10mA, V_{CE}=10 V
		H11AA2	10				I_F=±10mA, V_{CE}=10 V
Current transfer ratio symmetry		ALL	0.33		3.0		I_F=±10 mA, V_{CE}=10 V Fig. 6
Saturation voltage (Collector-Emitter)	$V_{CE}SAT$	ALL			0.4	V	I_F=±10 mA, I_{CE}=0.5 mA
		H11AA3,4		0.4		V	I_F=±16 mA, I_{CE}=2.0 mA

ISOLATION CHARACTERISTICS (T_A=25°C Unless Otherwise Specified)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Package capacitance input/output	C_{I-O}		0.7		pF	V_{I-O}=0, f=1 MHz
Withstand insulation test voltage	V_{ISO}	5300			$V_{AC(RMS)}$	I_{I-O}≤1 μA, 1 minute
Insulation resistance	R_{ISO}	10^{11}			Ohms	V_{I-O}=500 V

ELECTRICAL CHARACTERISTIC CURVES (T_A=25°C Unless Otherwise Specified)

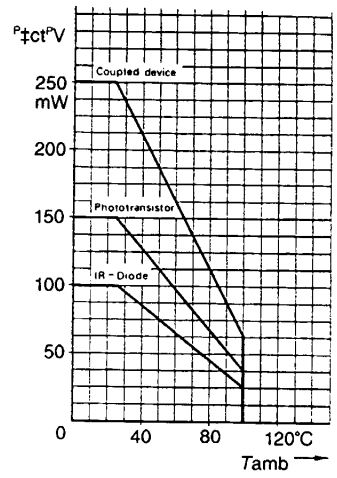

Fig. 1.

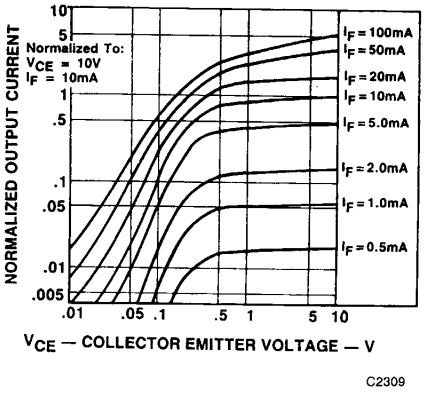

Fig. 2. Transfer Characteristics

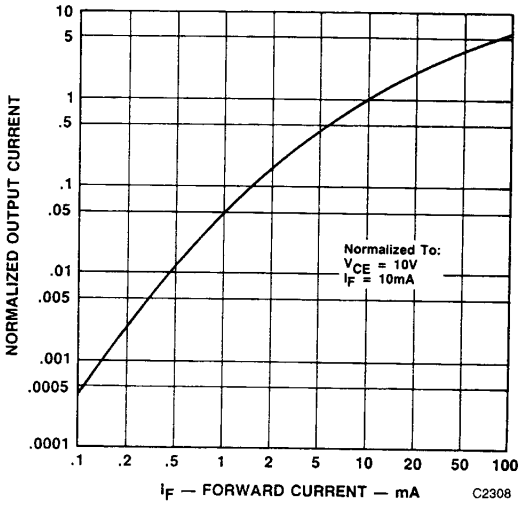

Fig. 3. Input Current vs. Output Current

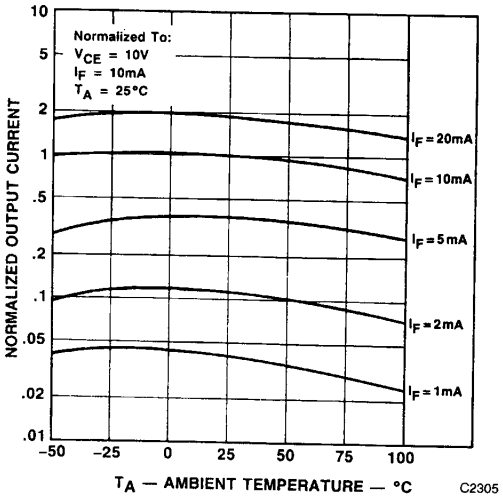

Fig. 4. Output Current vs. Temperature

ELECTRICAL CHARACTERISTIC CURVES (T_A=25°C Unless Otherwise Specified) (Cont'd)

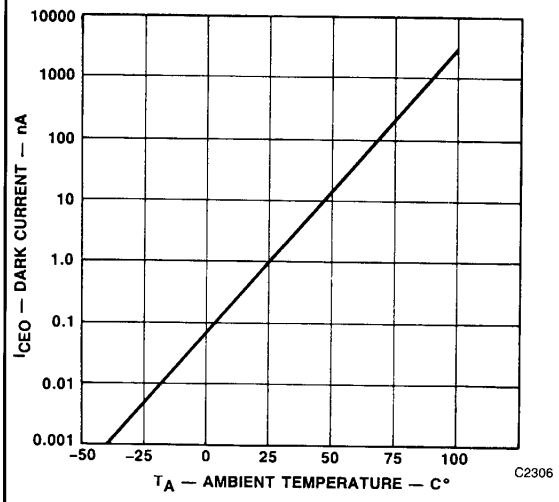

Fig. 5 Dark Current vs. Temperature

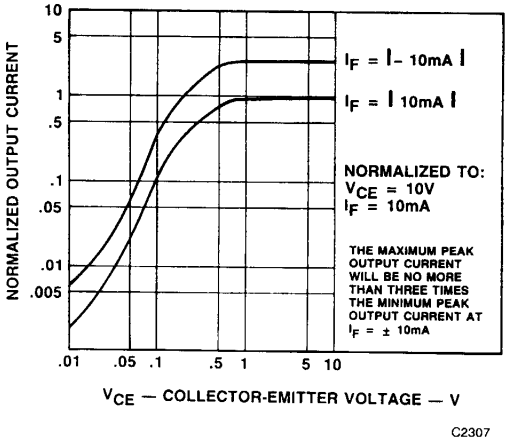

Fig. 6. Output Symmetry Characteristics

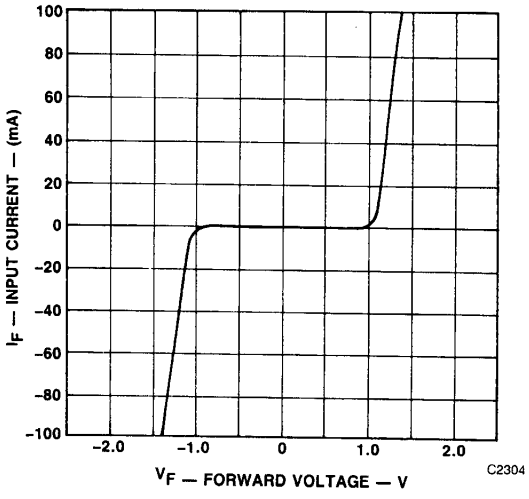

Fig. 7.

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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.