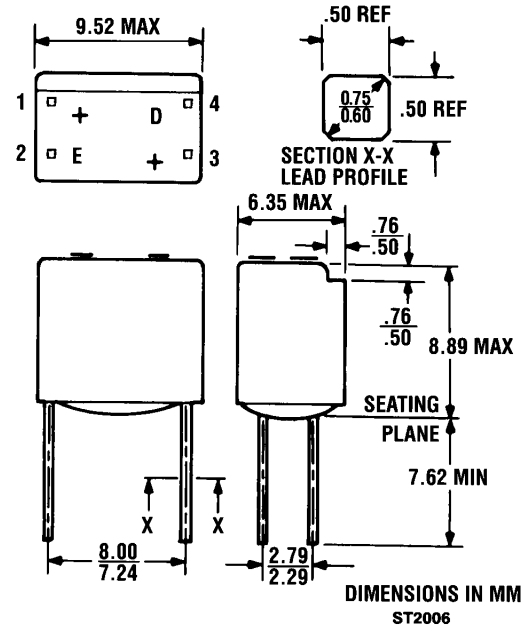
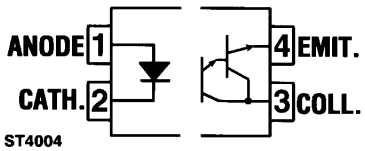
FAIRCHILD
SEMICONDUCTOR™

PHOTOTRANSISTOR OPTOCOUPLERS

H24A1 H24A2

PACKAGE DIMENSIONS





Equivalent Circuit

DESCRIPTION

The H24A series consists of a gallium arsenide infrared emitting diode coupled with a silicon phototransistor. The devices are housed in a low-cost plastic package with lead spacing compatible with a dual in-line package.

FEATURES

- 4-pin configuration
- Small package size and low cost
- UL recognized-file E51868

APPLICATIONS

- Digital logic inputs
- Microprocessor inputs
- Industrial controls

ABSOLUTE MAXIMUM RATINGS

TOTAL PACKAGE

Storage temperature ..... −55°C to 85°C
Operating temperature ..... −55°C to 85°C
Lead solder temperature ..... 260°C for 5 sec

INPUT DIODE

Power dissipation (25°C ambient) ..... 100 mW
Derate linearly (above 25°C) ..... 1.67 mW/°C
Continuous forward current ..... 60 mA
Reverse voltage ..... 4 V

DETECTOR

Power dissipation (25°C ambient) ..... 150 mW
Derate linearly (above 25°C) ..... 2.5 mW/°C
V_{CEO} ..... 30 V
V_{ECO} ..... 6 V
Continuous forward current ..... 100 mA

ELECTRICAL CHARACTERISTICS (25°C Temperature Unless Otherwise Specified)

INDIVIDUAL COMPONENT CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
INPUT DIODE						
Forward voltage	V_F			1.7	V	I_F=60 mA
Reverse current	I_R			1	μA	V_R=3 V
Reverse breakdown voltage	$V_{(BR)R}$	4			V	I_R=10 μA
Capacitance	C_J		30		pF	V=0, f=1 MHz
OUTPUT DETECTOR						
Breakdown voltage Collector to emitter	BV_{CEO}	30			V	I_C=1 mA, I_F=0
Breakdown voltage Emitter to Collector	BV_{ECO}	7			V	I_C=100 μA, I_F=0
Collector dark current	I_{CEO}		5	100	nA	V_{CE}=10 V, I_F=0
Capacitance	C_{CE}		3.3		pF	V_{CE}=5 V, f=1 MHz

TRANSFER CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
DC CURRENT TRANSFER RATIO						
H24A1	I_C	10.0			mA	I_F=10 mA, V_{CE}=10 V
H24A2	I_C	2.0			mA	I_F=10 mA, V_{CE}=10 V
Saturation voltage	$V_{CE(SAT)}$		0.1	0.4	V	I_F=10 mA, I_C=0.5 mA
Turn-on time	t_{on}		9		μs	I_C=2 mA, V_{CE}=10 V, R_L=100 Ω
Turn-off time	t_{off}		4		μs	I_F=2 mA, V_{CE}=10 V, R_L=100 Ω
Turn-on time	t_{on}		6.5		μs	I_F=10 mA, V_{CE}=5 V, R_L=10KΩ
Turn-off time	t_{off}		165		μs	I_F=10 mA, V_{CE}=5 V, R_L=10KΩ

ISOLATION CHARACTERISTICS

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Surge isolation voltage	V_{ISO}	6000			V_{Peak}	1 Minute
Steady-state isolation voltage	V_{ISO}	5300			V_{RMS}	1 Minute
Isolation resistance	R_{ISO}	10^{11}			ohms	V_{I-O}=500 VDC
Isolation capacitance	C_{ISO}		0.5		pF	V_{I-O}=0, f=1 MHz

TYPICAL ELECTRICAL CHARACTERISTIC CURVES

(25°C Free Air Temperature Unless Otherwise Specified)

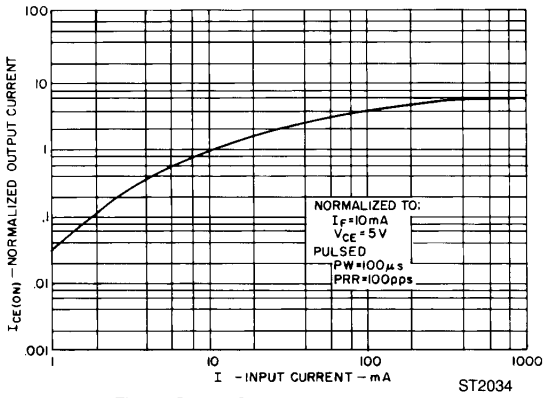


Fig. 1. Output Current vs. Input Current

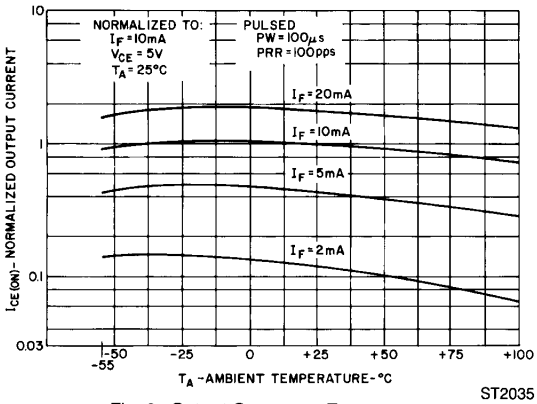


Fig. 2. Output Current vs. Temperature

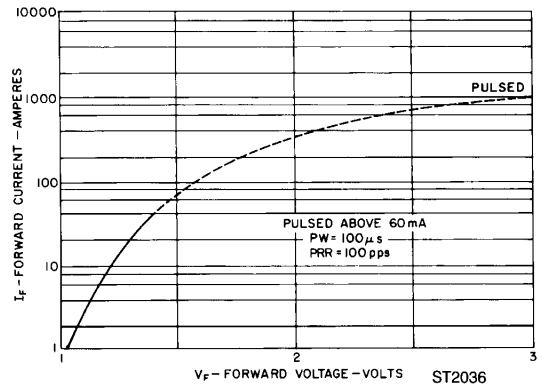


Fig. 3. Input Characteristics

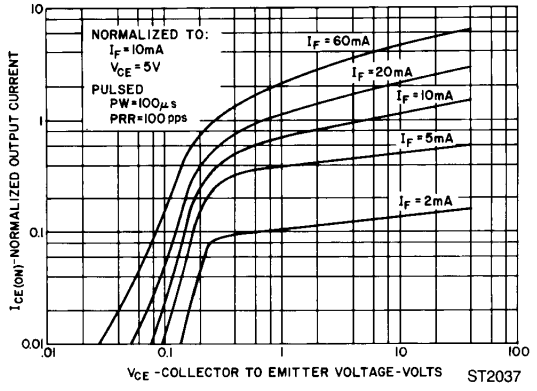


Fig. 4. Output Characteristics

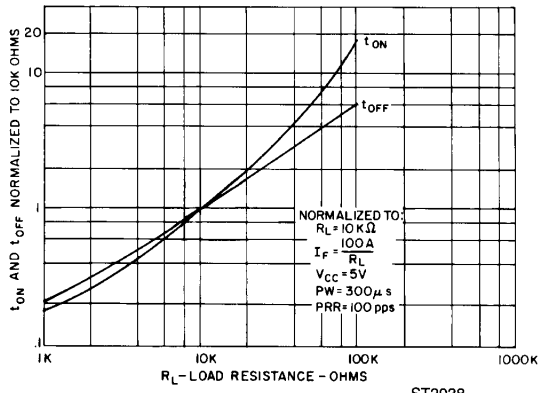


Fig. 5. Switching Speed vs. R_L

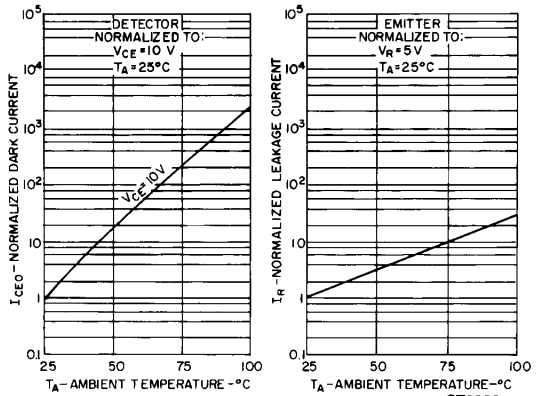


Fig. 6. Leakage Current vs. Temperature

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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.