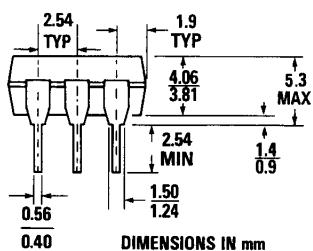
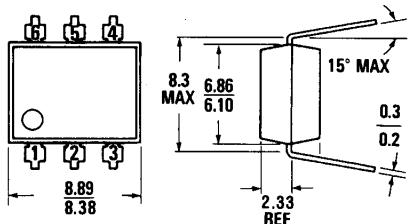




HIGH-VOLTAGE PHOTOTRANSISTOR OPTOCOUPLES

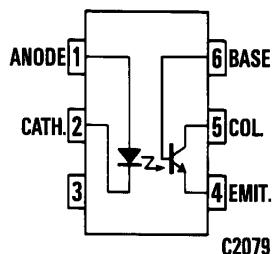
**H11D1 H11D2
H11D3**

PACKAGE DIMENSIONS



DIMENSIONS IN mm
PACKAGE CODE K

ST1603A



Equivalent Circuit

DESCRIPTION

The H11DX is a phototransistor-type optically coupled isolator. An infrared emitting diode manufactured from specially grown gallium arsenide is selectively coupled with an NPN silicon phototransistor. The device is supplied in a standard plastic six-pin dual-in-line package.

FEATURES

- High voltage
H11D1-D2, $BV_{CER}=300\text{ V}$
H11D3, $BV_{CER}=200\text{ V}$
- High isolation voltage
5300 VAC RMS—1 minute
7500 VAC PEAK—1 minute
- Minimum current transfer ratio of H11D1, H11D2,
H11D3—20%
- Underwriters Laboratory (UL) recognized File #E90700

APPLICATIONS

- Power supply regulators
- Digital logic inputs
- Microprocessor inputs
- Appliance sensor systems
- Industrial controls

ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$ Unless Otherwise Specified)

TOTAL PACKAGE

Storage temperature	-55°C to 150°C
Operating temperature	-55°C to 100°C
Lead temperature (soldering, 10 sec)	260°C
Total package power dissipation at 25°C (LED plus detector)	260 mW
Derate linearly from 25°C	3.5 mW/°C

OUTPUT TRANSISTOR

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

H11D1-D2 H11D3

V_{CER}	300 V	200 V
V_{CEO}	300 V	200 V
V_{ECO}	6 V	6 V
Collector current (continuous)	100 mA	100 mA

INPUT DIODE

Forward DC current	60 mA
Reverse voltage	6 V
Peak forward current (1 μs pulse, 300 pps)	3.0 A
Power dissipation 25°C ambient	100 mW
Derate linearly from 25°C	1.8 mW/°C



HIGH-VOLTAGE PHOTOTRANSISTOR OPTOCOUPERS

ELECTRO-OPTICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$ Unless Otherwise Specified)

INDIVIDUAL COMPONENT CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
INPUT DIODE						
Forward voltage	V_F		1.1	1.50	V	$I_F=10 \text{ mA}$
Forward voltage temp. coefficient	$\frac{\Delta V_F}{\Delta T_A}$		-1.8		mV/ $^\circ\text{C}$	
Reverse breakdown voltage	V_R	3.0	25		V	$I_R=10 \mu\text{A}$
Junction capacitance	C_J		50 65		pF	$V_F=0 \text{ V}, f=1 \text{ MHz}$ $V_F=1 \text{ V}, f=1 \text{ MHz}$
Reverse leakage current	I_R		0.35	10	μA	$V_R=3.0 \text{ V}$
OUTPUT TRANSISTOR						
Breakdown voltage Collector to emitter H11D1, H11D2,	BV_{CE}	300			V	$I_C=1 \text{ mA}; I_F=0;$
H11D3		200			V	$R_{BE}=1 \text{ meg}$
Collector to base H11D1, H11D2,	BV_{CB}	300			V	$I_C=100 \mu\text{A}; I_F=0$
H11D3		200			V	
Emitter to base	BV_{EB}	5	7		V	$I_E=100 \mu\text{A}, I_F=0$
Leakage current Collector to emitter ($R_{BE}=1 \text{ meg}$) H11D1, H11D2,	I_{CE}			100 250	nA μA	$V_{CE}=200\text{V}; I_F=0; T_A=25^\circ\text{C}$ $V_{CE}=200\text{V}; I_F=0; T_A=100^\circ\text{C}$
H11D3	I_{CE}			100 250	nA μA	$V_{CE}=100\text{V}; I_F=0; T_A=25^\circ\text{C}$ $V_{CE}=100\text{V}; I_F=0; T_A=100^\circ\text{C}$

TRANSFER CHARACTERISTICS

DC CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Current Transfer Ratio, collector to emitter H11D1, H11D2, H11D3	CTR	20			%	$I_F=10 \text{ mA}; V_{CE}=10\text{V}$ $R_{BE}=1 \text{ meg}$
Saturation voltage	$V_{CE(\text{SAT})}$		0.1	.40	V	$I_F=10 \text{ mA}; I_C=0.5 \text{ mA}$ $R_{BE}=1 \text{ meg}$

TRANSFER CHARACTERISTICS

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
SWITCHING TIMES						
Non-saturated Turn-on	t_{on}		5		μs	$V_{CE}=10\text{V}, I_{CE}=2\text{mA},$
Turn-off time	t_{off}		5		μs	$R_L=100 \Omega$

ISOLATION CHARACTERISTICS

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Isolation voltage	V_{ISO}	5300			$V_{AC\text{ RMS}}$	$I_{IO}\leq 1 \mu\text{A}, 1 \text{ minute}$
	V_{ISO}	7500			$V_{AC\text{ PEAK}}$	$I_{IO}\leq 1 \mu\text{A}, 1 \text{ minute}$
Isolation resistance	R_{ISO}	10^{11}			ohms	$V_{IO}=500 \text{ VDC}$
Isolation capacitance	C_{ISO}		0.5		pF	$f=1 \text{ MHz}$

TYPICAL CHARACTERISTICS

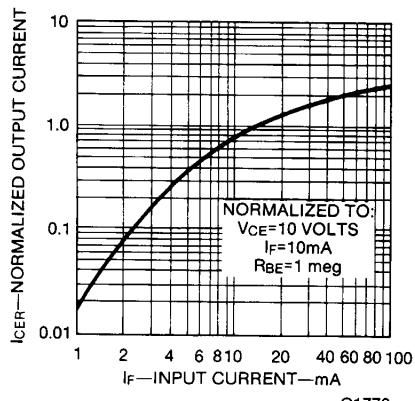


Fig. 1. Output Current vs. Input Current

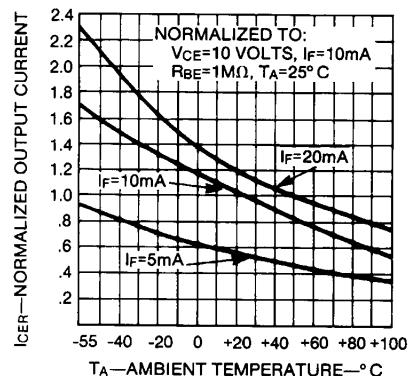


Fig. 2. Output Current vs. Temperature

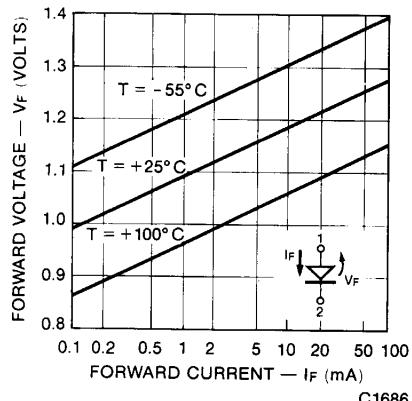


Fig. 3. Input Characteristics

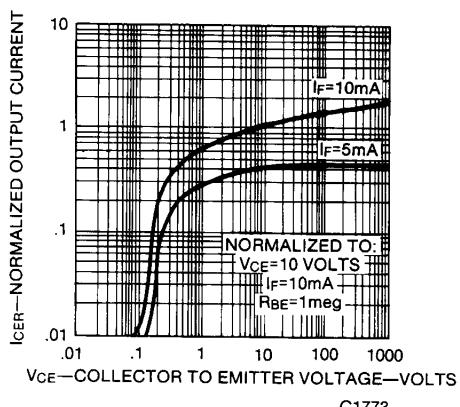


Fig. 4. Output Characteristics

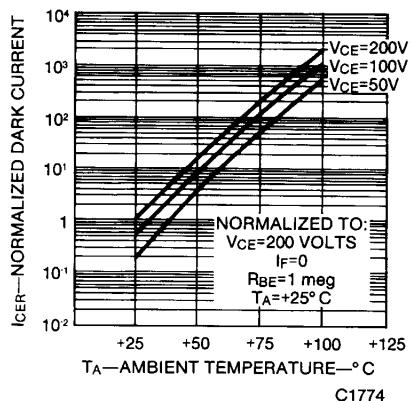


Fig. 5. Normalized Dark Current vs. Temperature

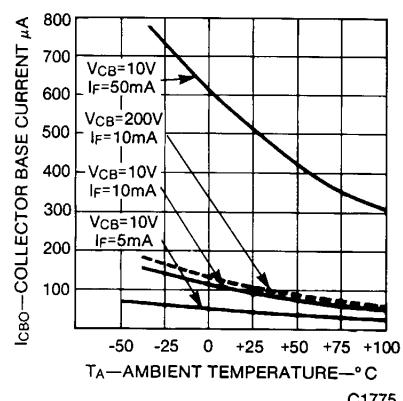


Fig. 6. Collector Base Current vs. Temperature