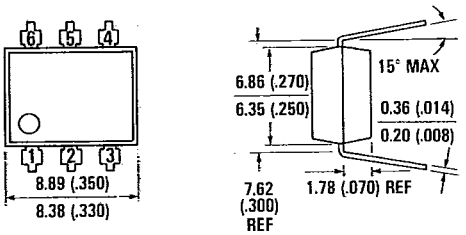
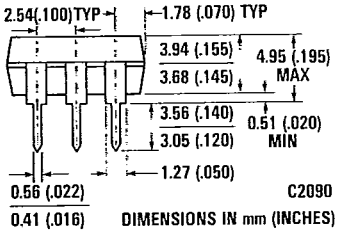
GENERAL INSTRUMENT

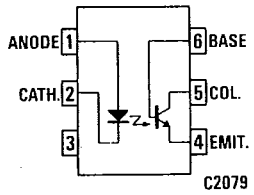
HIGH-VOLTAGE VDE APPROVED PHOTOTRANSISTOR OPTOCOUPLERS

H11D1/1Z
H11D2/2Z
H11D3/3Z

PACKAGE DIMENSIONS







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 V
  H11D3, BV_{CER} = 200 V
- High isolation voltage
  5300 VAC RMS — 5 seconds
  7500 VAC PEAK — 5 seconds
- Minimum current transfer ratio of
  H11D1, H11D2, H11D3—20%
- Underwriters Laboratory (UL) recognized
  File #E50151

APPLICATIONS

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

ABSOLUTE MAXIMUM RATINGS (T_A=25° 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 ..... 3.5mW/° C

INPUT DIODE

Forward DC current ..... 60 mA
Reverse voltage ..... 6 V
Peak forward current
(1μs pulse, 300 pps) ..... 3.0 A
Power dissipation 25° C ambient ..... 100 mW
Derate linearly from 25° C ..... 1.8 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_{CBO}	300 V	200 V
V_{ECO}	6 V	6 V
Collector current (continuous)	100 mA	100 mA

H11D1/1Z H11D2/2Z H11D3/3Z

T-41-83

ELECTRO-OPTICAL CHARACTERISTICS (T_A = 25° C Unless Otherwise Specified)

	TRANSFER CHARACTERISTICS						
	CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
DC	Current Transfer Ratio, collector to emitter	CTR					I_F = 10 mA; V_{CE} = 10V
	H11D1, H11D2, H11D3		20			%	R_{BE} = 1 meg
			10			%	
	Saturation voltage	$V_{CE(SAT)}$		0.1	.40	V	I_F = 10 mA; I_C = 0.5mA R_{BE} = 1 meg
SWITCHING TIMES	Non-saturated Turn-on	t_{on}		5		μs	V_{CE} = 10V, I_{CE} = 2mA, R_L = 100Ω
	Turn-off time	t_{off}		5		μs	
ISOLATION	Isolation Voltage	*V_{ISO}	5300			V_{AC}RMS	Relative humidity≤50% $I_{I-O} \leq 10\ \mu A$, 5 seconds
		*V_{ISO}	7500			V_{AC} PEAK	Relative humidity ≤50% $I_{I-O} \geq 10\ \mu A$, 5 seconds
	Isolation resistance	R_{ISO}	10^{11}			ohms	V_{I-O} = 500 VDC
	Isolation capacitance	C_{ISO}		0.5		pF	f = 1 MHz

*Additional specification for General Instrument devices.

	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 mA
	Forward voltage temp. coefficient			-1.8		mV/° C	
	Reverse breakdown voltage	V_R	3.0	25		V	I_R = 10 μA
	Junction capacitance	C_J		50		pF	V_F = 0 V, f = 1 MHz
				65		pF	V_F = 1 V, f = 1 MHz
	Reverse leakage current	I_R		0.35	10	μA	V_R = 3.0 V
OUTPUT TRANSISTOR	Breakdown voltage Collector to emitter	BV_{CER}					
	H11D1, H11D2,		300			V	I_C = 1 mA; I_F = 0,
	H11D3		200			V	R_{BE} = 1 meg
	Collector to base	BV_{CBO}					
	H11D1, H11D2,		300			V	I_C = 100μA; I_F = 0
	H11D3		200			V	
	Emitter to base	BV_{EBO}	5	7		V	I_E = 100μA, I_F = 0
	Leakage current Collector to emitter	I_{CER}					R_{BE} = 1 meg.
	H11D1, H11D2,				100	nA	V_{CE} = 200V; I_F = 0; T_A=25° C
					250	μA	V_{CE} = 200V; I_F=0; T_A=100° C
	H11D3	I_{CER}			100	nA	V_{CE} = 100V; I_F = 0; T_A=25° C
					250	μA	V_{CE} = 100V; I_F=0; T_A=100° C

TYPICAL CHARACTERISTICS

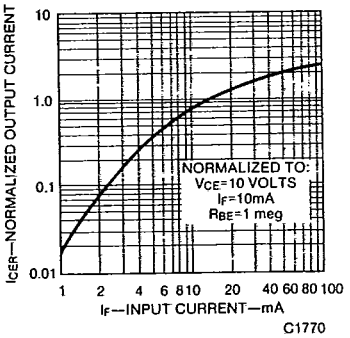


Fig. 1. Output Current vs. Input Current

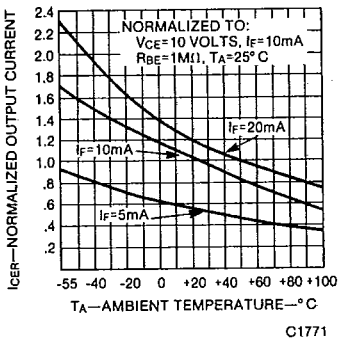


Fig. 2. Output Current vs. Temperature

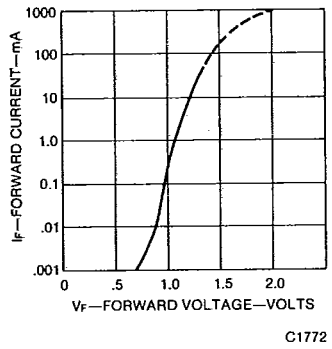


Fig. 3. Input Characteristics

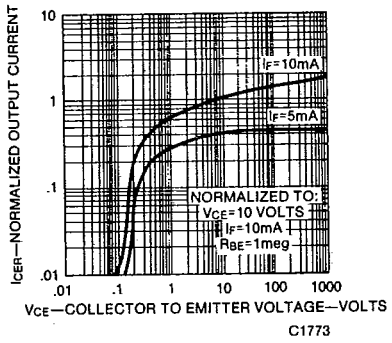


Fig. 4. Output Characteristics

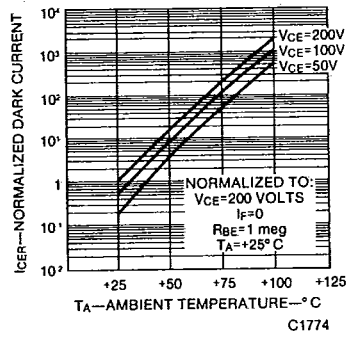


Fig. 5. Normalized Dark Current vs. Temperature

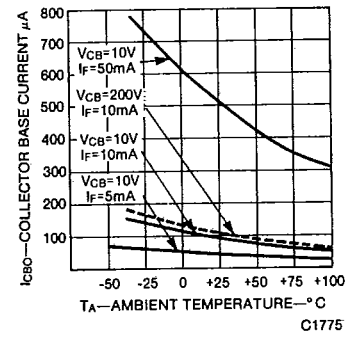


Fig. 6. Collector Base Current vs. Temperature