SIEMENS

H11D1/H11D2/H11D3

PHOTOTRANSISTOR, 5.3 KV, TRIOS® HIGH BV_{CER} VOLTAGE OPTOCOUPLER

FEATURES

- **CTR at I_F=10 mA, BV_{CER}=10 V: ≥20%**
- **Good CTR Linearity with Forward Current**
- **Low CTR Degradation**
- **Very High Collector-Emitter Breakdown Voltage**
  - **H11D1/H11D2, BV_{CER}=300 V**
  - **H11D3, BV_{CER}=200 V**
- **Isolation Test Voltage: 5300 VAC_{RMS}**
- **Low Coupling Capacitance**
- **High Common Mode Transient Immunity**
- **Phototransistor Optocoupler in 6 Pin DIP Package with Base Connection**
- **Field Effect Stable: TRIOS***
- **VDE 0884 Available with Option 1**
- **Underwriters Lab File #E52744**
- **Applications**
  - **Telecommunications**
  - **Replace Relays**

DESCRIPTION

The H11D1/2/3 are optocouplers with very high BV_{CER}. They are intended for telecommunications applications or any DC application requiring a high blocking voltage.

Maximum Ratings (T_A=25°C)

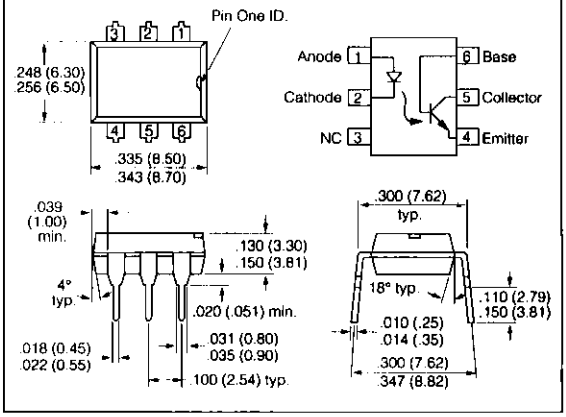
Emitter

Reverse Voltage ..... 6 V
DC Forward Current ..... 60 mA
Surge Forward Current (tp ≤ 10 µs) ..... 2.5 A
Total Power Dissipation ..... 100 mW

Detector

Collector-Emitter Voltage
H11D1/2 ..... 300 V
H11D3 ..... 200 V
Collector-Base Voltage
H11D1/2 ..... 300 V
H11D3 ..... 200 V
Emitter-Base Voltage ..... 7 V
Collector Current ..... 100 mA
Total Power Dissipation ..... 300 mW

Package Dimensions in Inches (mm)



Maximum Ratings (continued)

Package

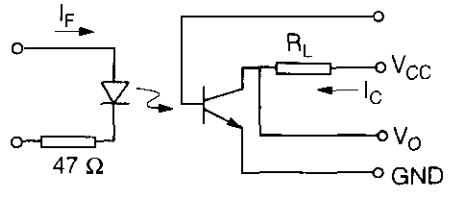
Isolation Test Voltage (between emitter and detector refer to climate DIN 40046, part 2, Nov. 74) ..... 5300 VAC_{RMS}
Insulation Thickness between Emitter and Detector ..... ≥0.4 mm
Creepage Distance ..... ≥7 mm
Clearance Distance ..... ≥7 mm
Comparative Tracking Index (per DIN IEC 112/VDE 0303, part 1) 175
Isolation Resistance
V_{IO}=500 V, T_A=25°C ..... $\geq 10^{12}\ \Omega$
V_{IO}=500 V, T_A=100°C ..... $\geq 10^{11}\ \Omega$
Storage Temperature Range ..... -55°C to +150°C
Operating Temperature Range ..... -55°C to +100°C
Junction Temperature ..... 100°C
Soldering Temperature (max. 10 sec., dip soldering: distance to seating plane ≥ 1.5 mm) ..... 260°C

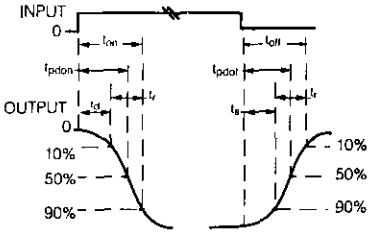
*TRIOS – TRansparent IOn Shield

Characteristics (T_A = 25°C, unless otherwise specified)

	Symbol	Min.	Typ.	Max.	Unit	Condition
Emitter						
Forward Voltage	V_F		1.1	1.5	V	I_F=10 mA
Reverse Voltage	V_R	6			V	I_R= 10 µA
Reverse Current	I_R		0.01	10	µA	V_R=6 V
Capacitance	C_O		25		pF	V_R=0 V, f=1 MHz
Thermal Resistance	R_{thJA}		750		K/W	
Detector						
Voltage						
Collector-Emitter	BV_{CER}					I_{CE}=1 mA, R_{BE}=1 MΩ
H11D1/H11D2		300			V	
H11D3		200			V	
Emitter-Base	BV_{EBO}	7			V	I_{EB}=100 µA
Capacitance	C_{CE}		7		pF	V_{CE}=10 V, f=1 MHz
	C_{CB}		8		pF	V_{CB}=10 V, f=1 MHz
	C_{EB}		38		pF	V_{EB}=5 V, f=1 MHz
Thermal Resistance	R_{thJA}		250		K/W	
Package						
Coupling Capacitance	C_C		0.6		pF	
Coupling Transfer Ratio	I_C/I_F	20			%	I_F=10 mA, V_{CE}=10 V, R_{BE}=1 MΩ
Collector-Emitter Saturation Voltage	V_{CEsat}		0.25	0.4	V	I_F=10 mA, I_C=0.5 mA, R_{BE}=1 MΩ
Leakage Current						
Collector-Emitter	I_{CER}					
H11D1/H11D2				100	nA	V_{CE}=200 V, R_{BE}=1 MΩ
H11D3				100	nA	V_{CE}=100 V, R_{BE}=1 MΩ
Collector-Emitter	I_{CER}					
H11D1/H11D2				250	µA	V_{CE}=200 V, R_{BE}=1 MΩ, T_A = 100°C
H11D3				250	µA	V_{CE}=100 V, R_{BE}=1 MΩ, T_A = 100°C

Switching Times Measurement—Test Circuit and Waveforms



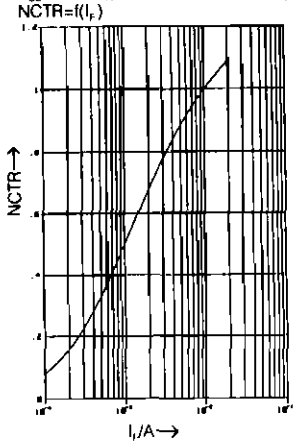


Switching Times (typ.)

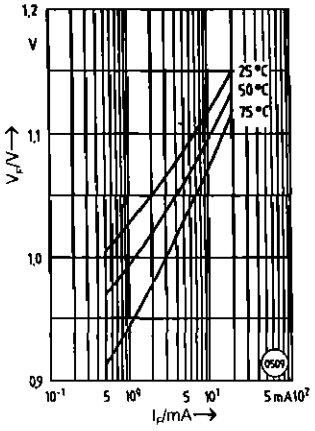
I_C=2 mA (to be adjusted by varying I_F), R_L=100 Ω,
T_A=25°C, V_{CC}=10 V

Description	Symbol	Values	Unit
Turn-On Time	t_{ON}	5	µs
Rise Time	t_R	2.5	µs
Turn-Off Time	t_{OFF}	6	µs
Fall Time	t_F	5.5	µs

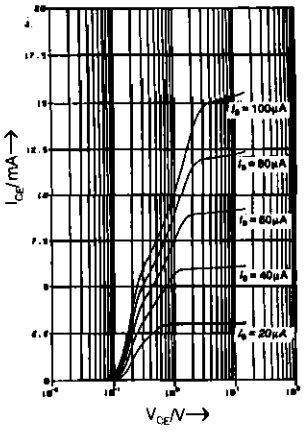
Current transfer ratio (typ.)
V_{CE}=10 V, T_A=25°C, normalized to I_F=10 mA
NCTR=f(I_F)



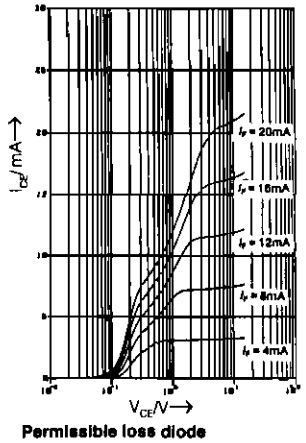
Diode forward voltage (typ.)
V_F=f(I_F, T_A)



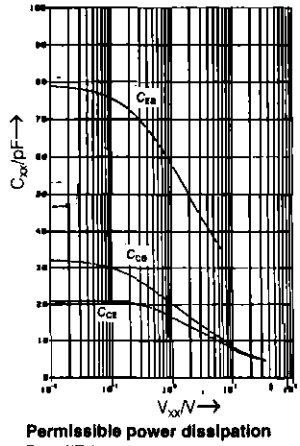
Output characteristics (typ.)
T_A=25°C, I_{CE}=f(V_{CE}, I_B)



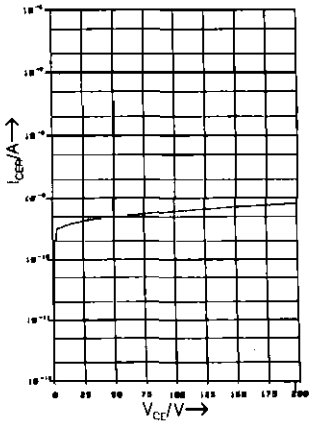
Output characteristics (typ.)
T_A=25°C, I_{CE}=f(V_{CE}, I_F)



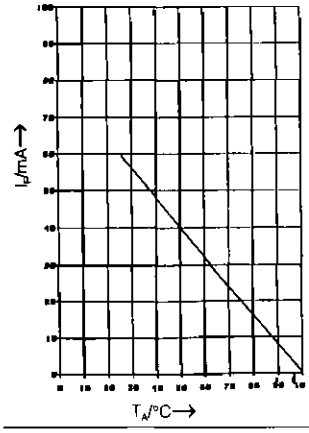
Transistor capacitances (typ.)
T_A=25°C, f=1 MHz, C_{CE}=f(V_{CE})
C_{CB}=f (V_{CB}), C_{EB}=f (V_{EB})



Collector-emitter leakage current (typ.)
I_F=0, R_{BE}=1 MΩ, I_{CER}=f(V_{CE})



Permissible loss diode
I_F= f(T_A)



Permissible power dissipation
P_{tot}=f(T_A)