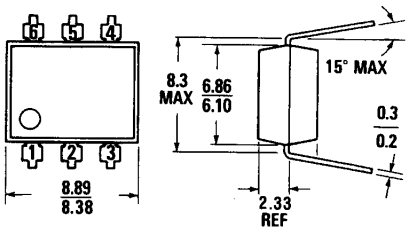
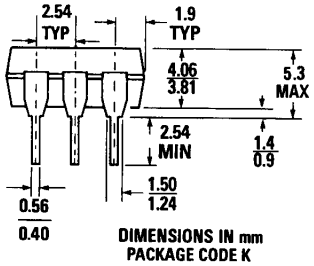
QT OPTOELECTRONICS

HIGH VOLTAGE PHOTODARLINGTON OPTOCOUPLERS

H11G1
H11G2

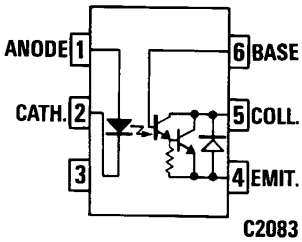
PACKAGE DIMENSIONS





DIMENSIONS IN mm
PACKAGE CODE K

ST1603A



Equivalent Circuit

DESCRIPTION

The H11G1 and H11G2 are the photodarlington-type optically coupled optoisolators. Both devices have a gallium arsenide infrared emitting diode coupled with a silicon darlington connected phototransistor which has an integral base-emitter resistor to optimize elevated temperature characteristics.

FEATURES

- High BV_{CEO}
  Minimum 100V for H11G1
  Minimum 80V for H11G2
- High sensitivity to low input current—Minimum 500 percent CTR at I_F=1 mA
- Low leakage current at elevated temperature (maximum 100 μA at 80°C).
- Underwriters Laboratory (UL) recognized File #E90700

APPLICATIONS

- CMOS logic interface
- Telephone ring detector
- Low input TTL interface
- Power supply isolation
- Replace pulse transformer

ABSOLUTE MAXIMUM RATINGS

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
Isolation voltage ..... 7500 VAC PEAK

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

OUTPUT TRANSISTOR

Power dissipation @ 25°C ..... 200 mW
Derate linearly from 25°C ..... 2.67 mW/°C
Collector to emitter voltage
H11G1 ..... 100 V
H11G2 ..... 80 V

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

INDIVIDUAL COMPONENT CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
INPUT DIODE						
Forward voltage	V_F		1.3	1.50	V	I_F=10 mA
Forward voltage temp. coefficient	$\frac{\Delta V_F}{\Delta T_A}$	−1.8		mV/°C		
Reverse breakdown voltage	BV_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 DARLINGTON						
Breakdown voltage Collector to emitter	BV_{CEO}					
H11G1		100			V	I_C=1.0 mA; I_F=0
H11G2		80			V	
Collector to base	BV_{CBO}					
H11G1		100			V	I_C=100 μA
H11G2		80			V	
Emitter to base	BV_{EBO}	7	10		V	I_E=100 μA, I_F=0
Leakage current Collector to emitter	I_{CEO}					
H11G1				100	nA	V_{CE}=80V, I_F=0
H11G2				100	nA	V_{CE}=60V, I_F=0
H11G1				100	μA	V_{CE}=80V, I_F=0, T_A=80°C
H11G2				100	μA	V_{CE}=60V, I_F=0, T_A=80°C

TRANSFER CHARACTERISTICS

DC CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Current Transfer Ratio, collector to emitter	CTR					
H11G1/2		1000			%	I_F=10 mA; V_{CE}=1 V
H11G1/2		500			%	I_F=1 mA; V_{CE}=5 V
Saturation voltage	$V_{CE(SAT)}$		0.85	1.0	V	I_F=16 mA; I_C=50 mA
			0.75	1.0	V	I_F=1 mA; I_C=1 mA

TRANSFER CHARACTERISTICS

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
SWITCHING TIMES						
Turn-on time	t_{on}		5		μs	R_L=100Ω; I_F=10 mA
Turn-off time	t_{off}		100		μs	V_{CE}=5V Pulse width ≤ 300 μsec, f ≤ 30 Hz

TYPICAL ELECTRICAL CHARACTERISTIC CURVES

(25°C Free Air Temperature Unless Otherwise Specified) (Cont'd)

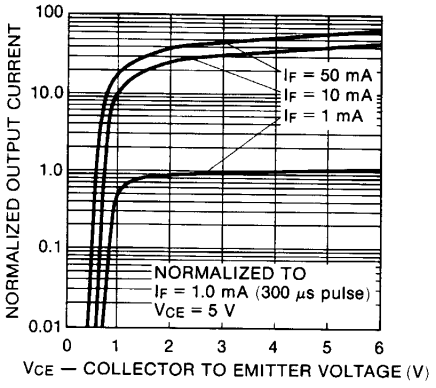


Fig. 3. Output Characteristics

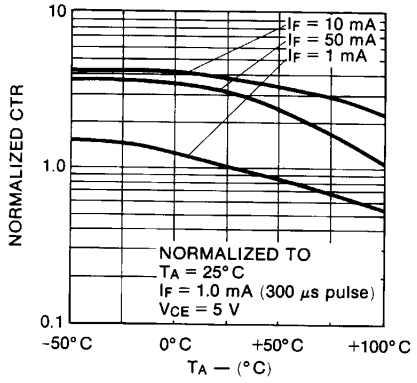


Fig. 4. Normalized CTR vs. Temperature

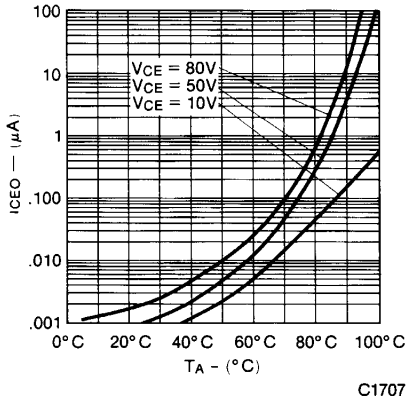


Fig. 5. Dark Current vs. Temperature

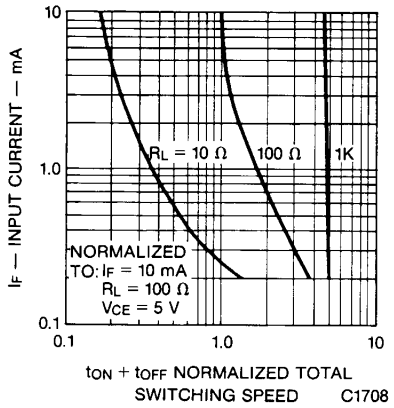


Fig. 6. Switching Speed

TYPICAL ELECTRICAL CHARACTERISTIC CURVES

(25°C Free Air Temperature Unless Otherwise Specified) (Cont'd)

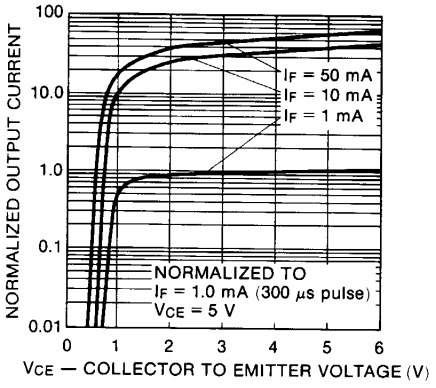


Fig. 3. Output Characteristics

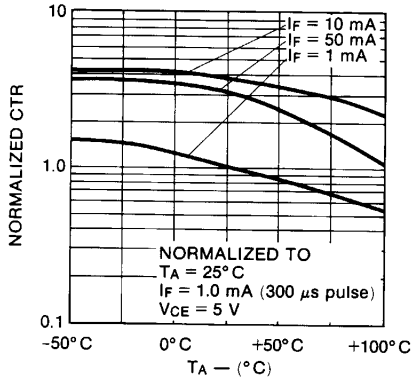


Fig. 4. Normalized CTR vs. Temperature

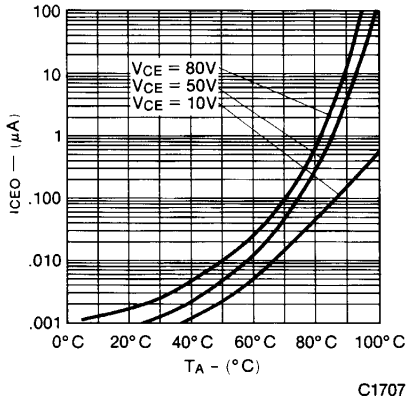


Fig. 5. Dark Current vs. Temperature

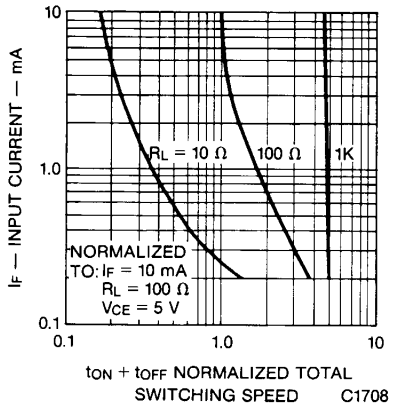


Fig. 6. Switching Speed