FAIRCHILD
SEMICONDUCTOR™

HIGH VOLTAGE PHOTODARLINGTON OPTOCOUPLERS

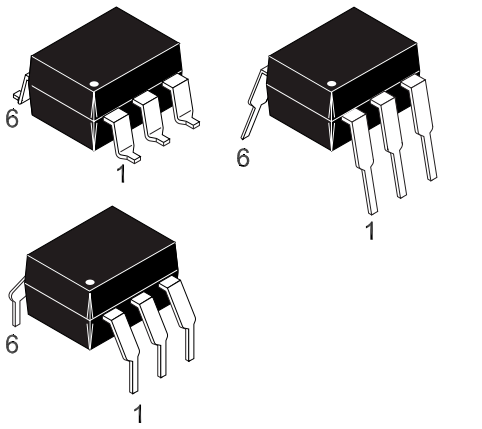
H11G1
H11G2
H11G3

DESCRIPTION

The H11GX series are photodarlington-type optically coupled optocouplers. These 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.

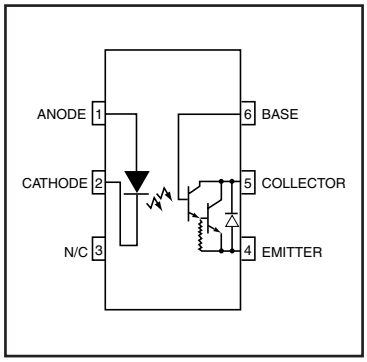
FEATURES

- High BV_{CEO}
  - Minimum 100 V for H11G1
  - Minimum 80 V for H11G2
  - Minimum 55 V for H11G3
- 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



NOTE
All dimensions are in inches (millimeters)

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Units
TOTAL DEVICE			
Storage Temperature	T_{STG}	-55 to +150	°C
Operating Temperature	T_{OPR}	-55 to +100	°C
Lead Solder Temperature	T_{SOL}	260 for 10 sec	°C
Total Device Power Dissipation @ T_A = 25°C	P_D	260	mW
Derate above 25°C		3.5	mW/°C
Input-Output Isolation Voltage	V_{ISO}	5300	Vac(rms)
EMITTER			
Forward Input Current	I_F	60	mA
Reverse Input Voltage	V_R	6.0	V
Forward Current - Peak (1µs pulse, 300pps)	I_F(pk)	3.0	A
LED Power Dissipation @ T_A = 25°C	P_D	100	mW
Derate above 25°C		1.8	mW/°C
DETECTOR			
Collector-Emitter Voltage			
H11G1	V_{CEO}	100	V
H11G2		80	
H11G3		55	
Detector Power Dissipation @ T_A = 25°C	P_D	200	mW
Derate above 25°C		2.67	mW/°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C Unless otherwise specified.)

INDIVIDUAL COMPONENT CHARACTERISTICS

Characteristic	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit
EMITTER							
Forward Voltage	(I_F = 10 mA)	V_F	ALL		1.3	1.50	V
Forward Voltage Temp. Coefficient		$\frac{\Delta V_F}{\Delta T_A}$	ALL		-1.8		mV/°C
Reverse Breakdown Voltage	(I_R = 10 µA)	BV_R	ALL	3.0	25		V
Junction Capacitance	(V_F = 0 V, f = 1 MHz)	C_J	ALL		50		pF
	(V_F = 1 V, f = 1 MHz)		ALL		65		pF
Reverse Leakage Current	(V_R = 3.0 V)	I_R	ALL		0.001	10	µA
DETECTOR							
Breakdown Voltage Collector to Emitter	(I_C = 1.0 mA, I_F = 0)	BV_{CEO}	H11G1	100			V
			H11G2	80			
			H11G3	55			
Collector to Base	(I_C = 100 µA)	BV_{CBO}	H11G1	100			
			H11G2	80			
			H11G3	55			
Emitter to Base		BV_{EBO}	ALL	7	10		
Leakage Current Collector to Emitter	(V_{CE} = 80 V, I_F = 0)	I_{CEO}	H11G1			100	nA
	(V_{CE} = 60 V, I_F = 0)		H11G2				
	(V_{CE} = 30 V, I_F = 0)		H11G3				
	(V_{CE} = 80 V, I_F = 0, T_A = 80°C)		H11G1			100	µA
	(V_{CE} = 60 V, I_F = 0, T_A = 80°C)		H11G2				

TRANSFER CHARACTERISTICS

DC Characteristic	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit
EMITTER							
Current Transfer Ratio Collector to Emitter	(I_F = 10 mA, V_{CE} = 1 V)	CTR	H11G1/2	100 (1000)			mA (%)
	(I_F = 1 mA, V_{CE} = 5 V)		H11G1/2	5 (500)			
			H11G3	2 (200)			
Saturation Voltage	(I_F = 16 mA, I_C = 50 mA)	$V_{CE\ (SAT)}$	H11G1/2		0.85	1.0	V
	(I_F = 1 mA, I_C = 1 mA)		H11G1/2		0.75	1.0	
	(I_F = 20 mA, I_C = 50 mA)		H11G3		0.85	1.2	

TRANSFER CHARACTERISTICS

Characteristic	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit
SWITCHING TIMES							
Turn-on Time	(R_L = 100 Ω, I_F = 10 mA)	t_{on}	ALL		5		µs
Turn-off Time	(V_{CE} = 5 V) Pulse Width ≤ 300 µs, f ≤ 30 Hz)	t_{off}	ALL		100		

** All typical values at T_A = 25°C

Fig. 1 Output Current vs. Input Current

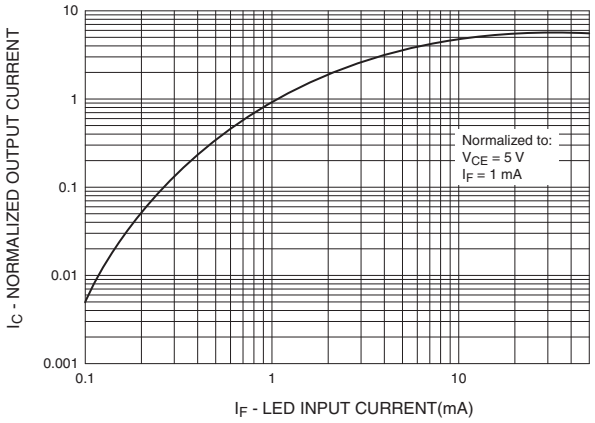


Fig. 2 Normalized Output Current vs. Temperature

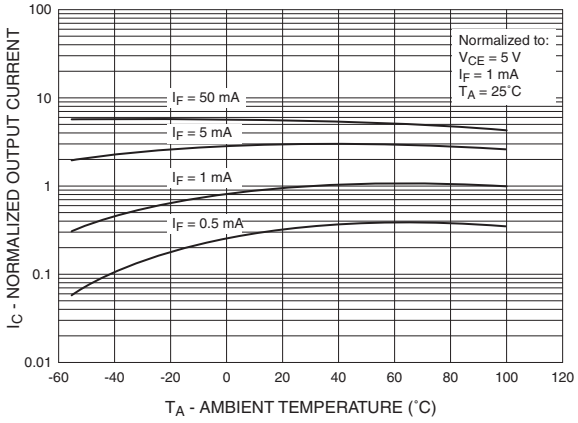


Fig. 3 Output Current vs. Collector - Emitter Voltage

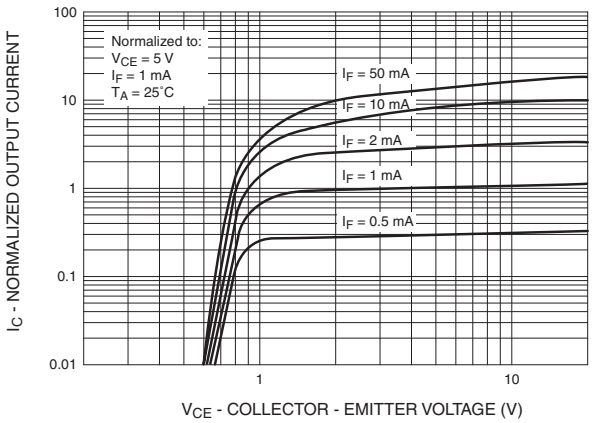


Fig. 4 Collector-Emitter Dark Current vs. Ambient Temperature

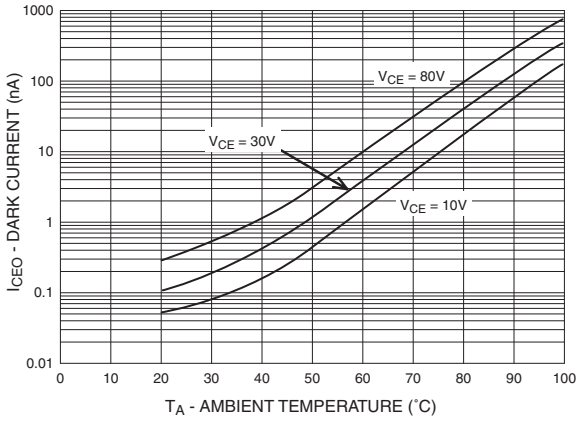
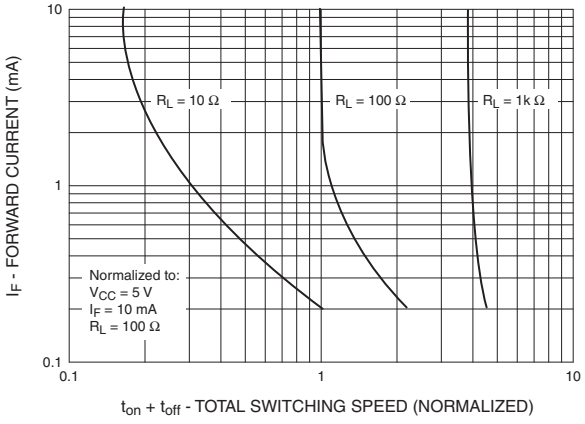


Fig. 5 Input Current vs. Total Switching Speed (Typical Values)



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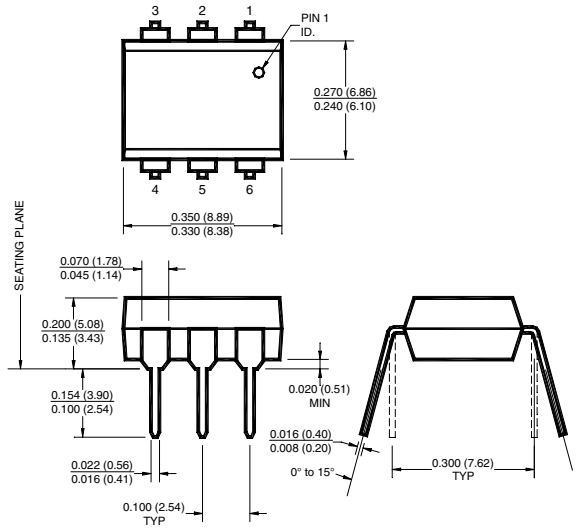
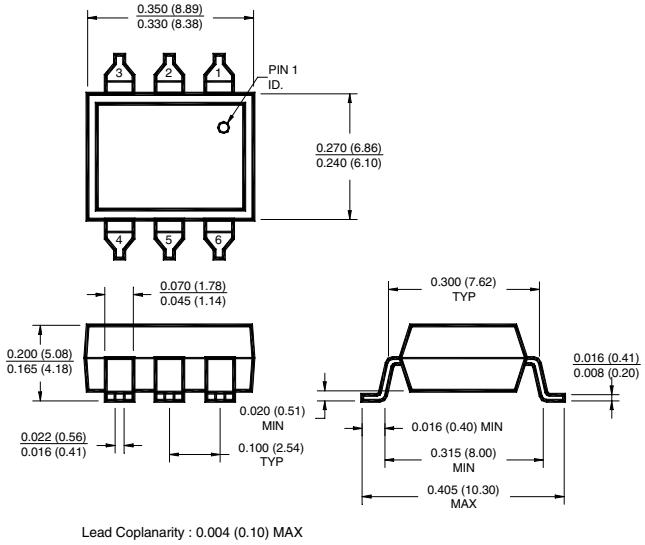
Package Dimensions (Through Hole)

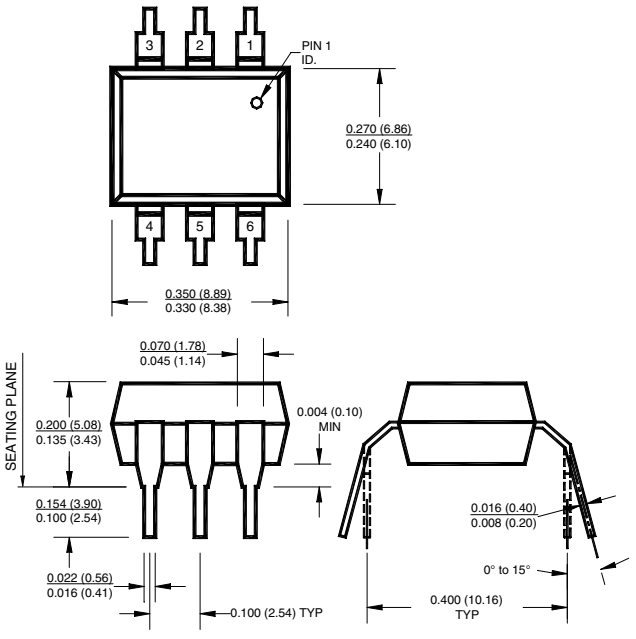


Package Dimensions (Surface Mount)

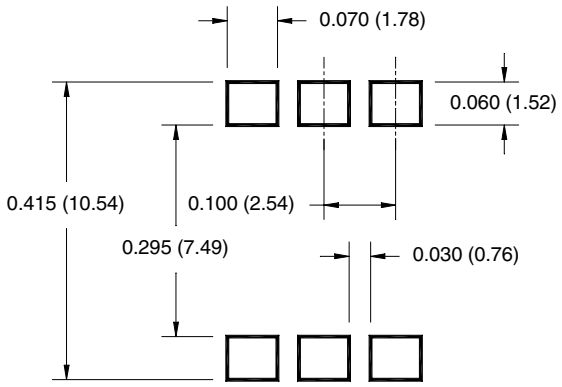


Lead Coplanarity : 0.004 (0.10) MAX

Package Dimensions (0.4”Lead Spacing)



Recommended Pad Layout for Surface Mount Leadform



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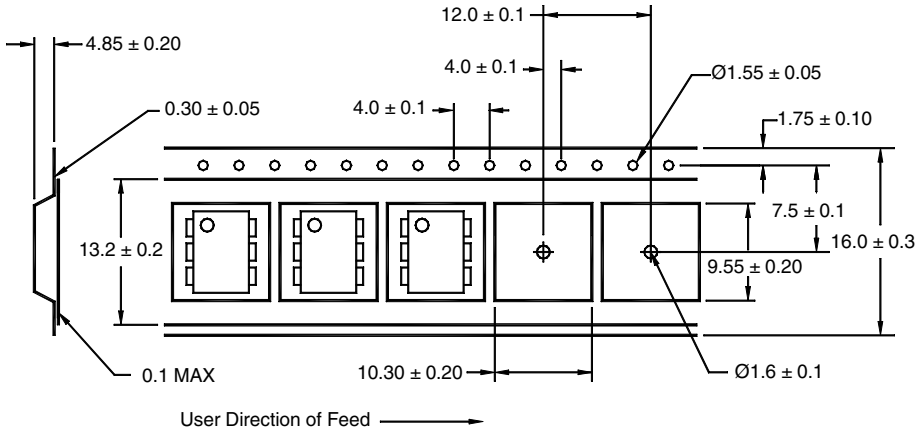
ORDERING INFORMATION

Option	Order Entry Identifier	Description
S	.S	Surface Mount Lead Bend
SD	.SD	Surface Mount; Tape and reel
W	.W	0.4” Lead Spacing
300	.300	VDE 0884
300W	.300W	VDE 0884, 0.4” Lead Spacing
3S	.3S	VDE 0884, Surface Mount
3SD	.3SD	VDE 0884, Surface Mount, Tape & Reel

QT Carrier Tape Specifications (“D” Taping Orientation)



NOTE

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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.