

FAIRCHILD
SEMICONDUCTOR™

HIGH VOLTAGE PHOTODARLINGTON OPTOCOUPLEDERS

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.

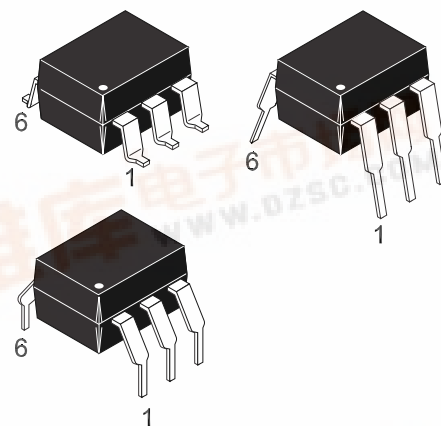
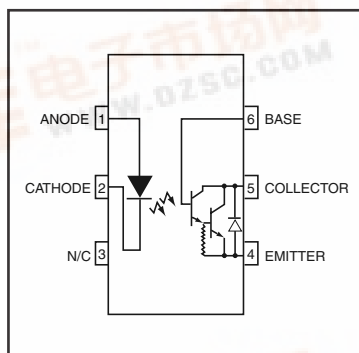
**H11G1
H11G2
H11G3**

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 μ A 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	V _{CEO}		V
H11G1		100	
H11G2		80	
H11G3		55	
Detector Power Dissipation @ T _A = 25°C	P _D	200	mW
Derate above 25°C		2.67	mW/°C

H11G1, H11G2, H11G3

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

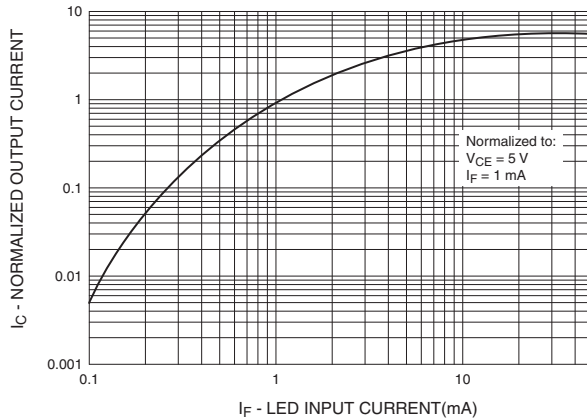


Fig. 2 Normalized Output Current vs. Temperature

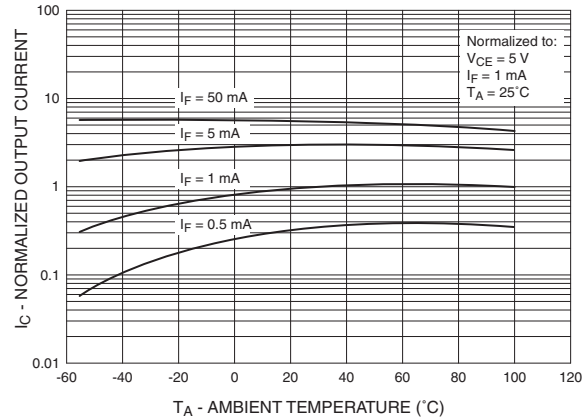


Fig. 3 Output Current vs. Collector - Emitter Voltage

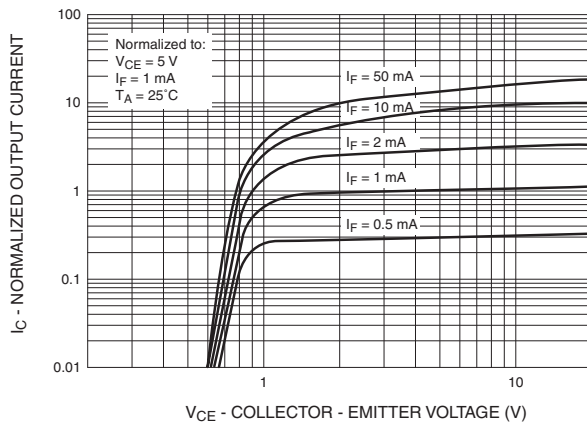


Fig. 4 Collector-Emitter Dark Current vs. Ambient Temperature

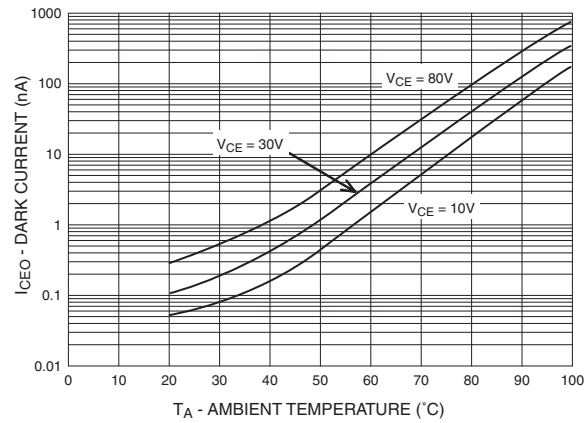
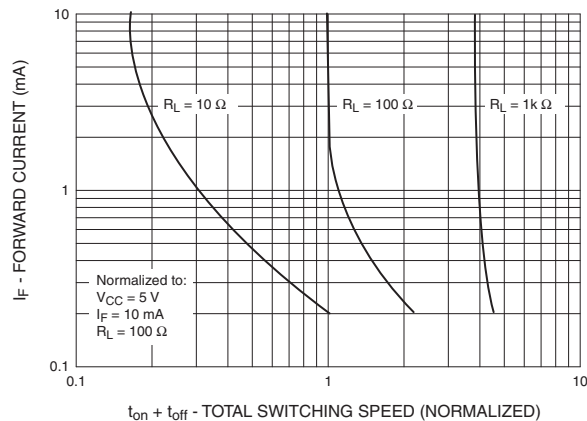
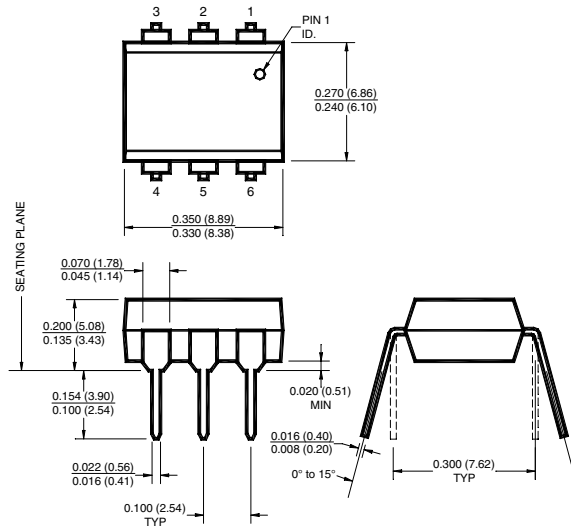


Fig. 5 Input Current vs. Total Switching Speed (Typical Values)

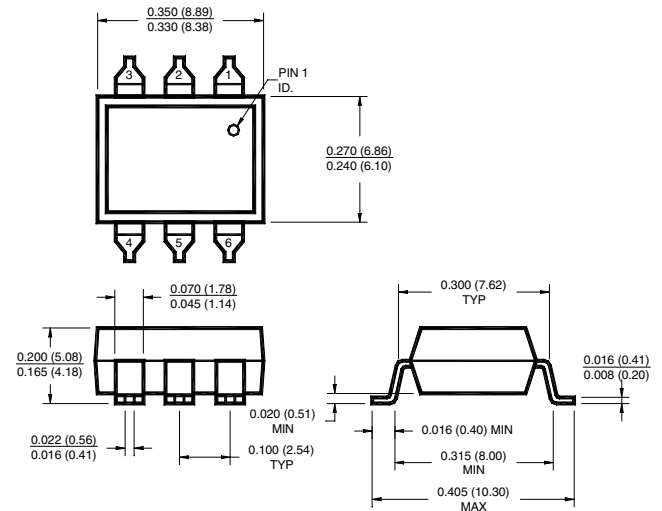


H11G1, H11G2, H11G3

Package Dimensions (Through Hole)

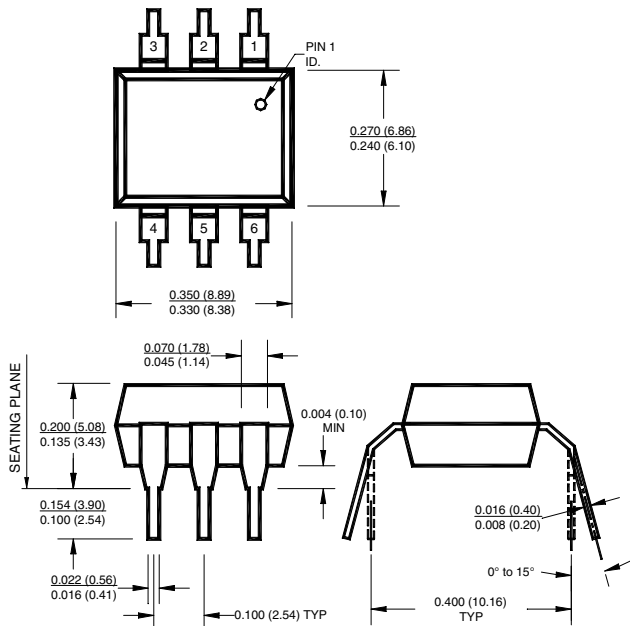


Package Dimensions (Surface Mount)

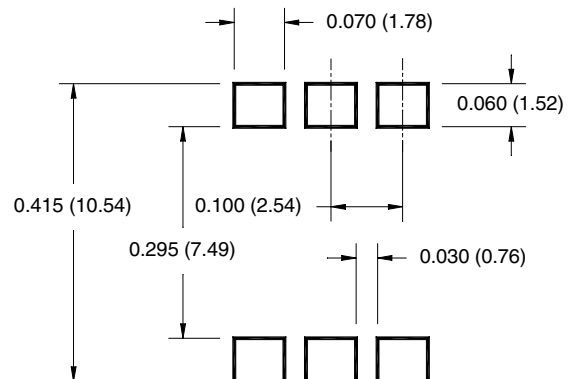


Lead Coplanarity : 0.004 (0.10) MAX

Package Dimensions (0.4"Lead Spacing)



Recommended Pad Layout for Surface Mount Leadform



NOTE

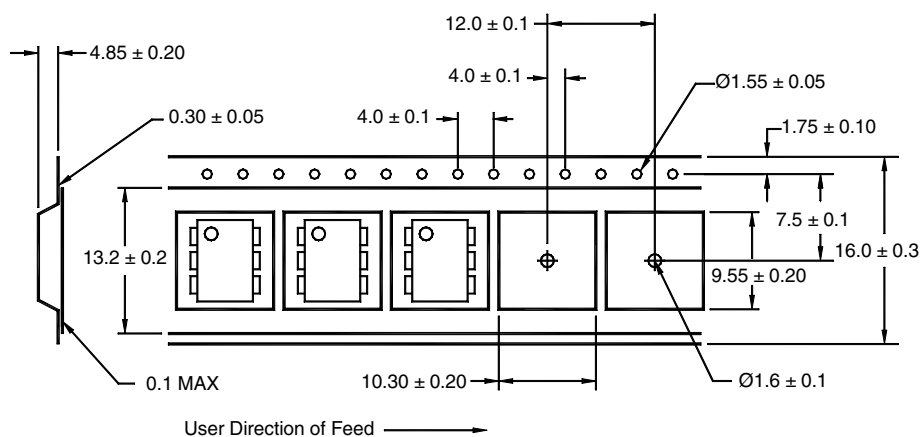
All dimensions are in inches (millimeters)

H11G1, H11G2, H11G3

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

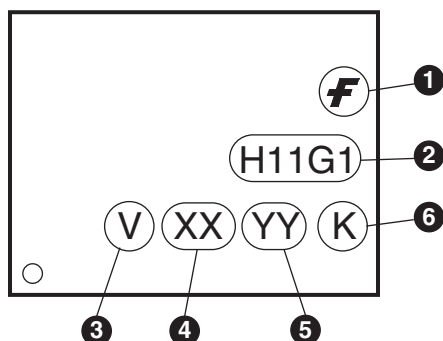
QT Carrier Tape Specifications ("D" Taping Orientation)



NOTE

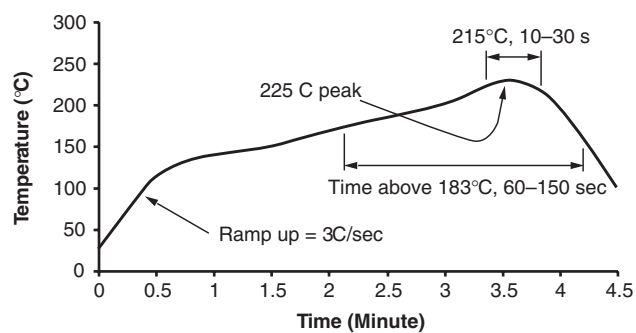
All dimensions are in millimeters

MARKING INFORMATION



Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	Two digit year code, e.g., '03'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

Reflow Profile (Black Package, No Suffix)



- Peak reflow temperature: 225°C (package surface temperature)
- Time of temperature higher than 183°C for 60–150 seconds
- One time soldering reflow is recommended

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Definition of Terms

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