



H11G1M, H11G2M, H11G3M High Voltage Photodarlington Optocouplers

Features

- High BV_{CEO}
 - Minimum 100V for H11G1M
 - Minimum 80V for H11G2M
 - Minimum 55V for H11G3M
- High sensitivity to low input current (Min. 500% CTR at $I_F = 1\text{mA}$)
- Low leakage current at elevated temperature (Max. $100\mu\text{A}$ at 80°C)
- Underwriters Laboratory (UL) recognized File # E90700, Volume 2
- IEC 60747-5-2 approved (ordering option V)

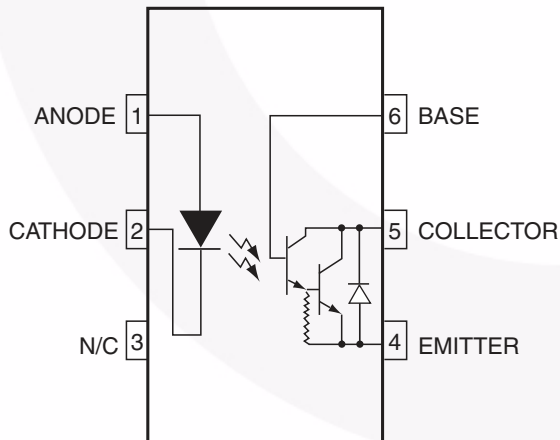
Applications

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

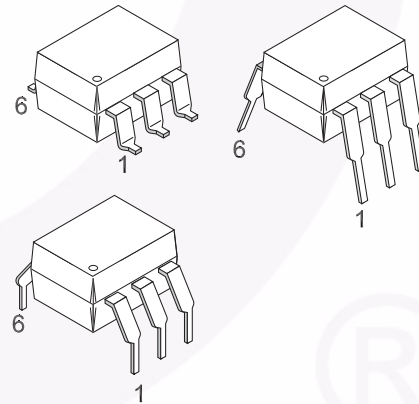
General Description

The H11GXM 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.

Schematic



Package Outlines



Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Value	Units
TOTAL DEVICE			
T _{STG}	Storage Temperature	-40 to +150	°C
T _{OPR}	Operating Temperature	-40 to +100	°C
T _{SOL}	Lead Solder Temperature (Wave Solder)	260 for 10 sec	°C
P _D	Total Device Power Dissipation @ T _A = 25°C Derate Above 25°C	260	mW
		3.5	mW/°C
EMITTER			
I _F	Forward Input Current	60	mA
V _R	Reverse Input Voltage	6.0	V
I _{F(pk)}	Forward Current – Peak (1μs pulse, 300pps)	3.0	A
P _D	LED Power Dissipation @ T _A = 25°C Derate Above 25°C	100	mW
		1.8	mW/°C
DETECTOR			
V _{CEO}	Collector-Emitter Voltage H11G1M H11G2M H11G3M	100	V
		80	
		55	
P _D	Photodetector Power Dissipation @ T _A = 25°C Derate Above 25°C	200	mW
		2.67	mW/°C

Electrical Characteristics (T_A = 25°C unless otherwise specified.)

Individual Component Characteristics

Symbol	Characteristic	Test Conditions	Device	Min.	Typ.*	Max.	Unit
EMITTER							
V _F	Forward Voltage	I _F = 10mA	All		1.3	1.50	V
$\frac{\Delta V_F}{\Delta T_A}$	Forward Voltage Temp. Coefficient		All		-1.8		mV/°C
BV _R	Reverse Breakdown Voltage	I _R = 10μA	All	3.0	25		V
C _J	Junction Capacitance	V _F = 0V, f = 1MHz	All		50		pF
		V _F = 1V, f = 1MHz			65		
I _R	Reverse Leakage Current	V _R = 3.0V	All		0.001	10	μA
DETECTOR							
BV _{CEO}	Breakdown Voltage Collector to Emitter	I _C = 1.0mA, I _F = 0	H11G1M	100			V
			H11G2M	80			
			H11G3M	55			
BV _{CBO}	Collector to Base	I _C = 100μA	H11G1M	100			V
			H11G2M	80			
			H11G3M	55			
BV _{EBO}	Emitter to Base		All	7	10		V
I _{CEO}	Leakage Current Collector to Emitter	V _{CE} = 80V, I _F = 0	H11G1M			100	nA
		V _{CE} = 60V, I _F = 0	H11G2M				
		V _{CE} = 30V, I _F = 0	H11G3M				
		V _{CE} = 80V, I _F = 0, T _A = 80°C	H11G1M			100	μA
		V _{CE} = 60V, I _F = 0, T _A = 80°C	H11G2M				

Transfer Characteristics

Symbol	Characteristics	Test Conditions	Device	Min.	Typ.*	Max.	Units
EMITTER							
CTR	Current Transfer Ratio, Collector to Emitter	I _F = 10mA, V _{CE} = 1V	H11G1M/2M	100 (1000)			mA (%)
		I _F = 1mA, V _{CE} = 5V	H11G1M/2M	5 (500)			
			H11G3M	2 (200)			
V _{CE(SAT)}	Saturation Voltage	I _F = 16mA, I _C = 50mA	H11G1M/2M		0.85	1.0	V
		I _F = 1mA, I _C = 1mA	H11G1M/2M		0.75	1.0	
		I _F = 20mA, I _C = 50mA	H11G3M		0.85	1.2	
SWITCHING TIMES							
t _{ON}	Turn-on Time	R _L = 100Ω, I _F = 10mA,	All		5		μs
t _{OFF}	Turn-off Time	V _{CE} = 5V, f ≤ 30Hz, Pulse Width ≤ 300μs	All		100		μs

Isolation Characteristics

Symbol	Characteristic	Test Conditions	Device	Min.	Typ.*	Max.	Units
V _{ISO}	Isolation Voltage	f = 60Hz, t = 1 sec.	All	7500			V _{AC} PEAK
R _{ISO}	Isolation Resistance	V _{I-O} = 500 VDC	All	10 ¹¹			Ω
C _{ISO}	Isolation Capacitance	f = 1MHz	All		0.2		pF

*All Typical values at T_A = 25°C

Typical Performance Curves

Fig. 1 Output Current vs. Input Current

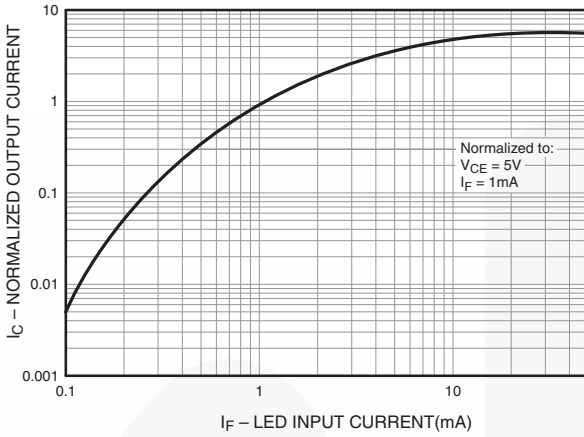


Fig. 2 Normalized Output Current vs. Temperature

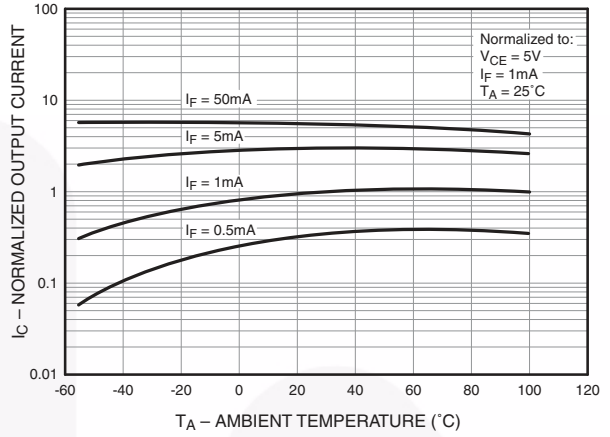


Fig. 3 Output Current vs. Collector - Emitter Voltage

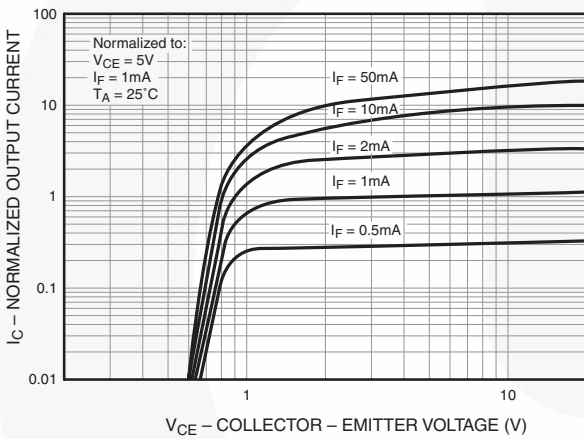


Fig. 4 Collector-Emitter Dark Current vs. Ambient Temperature

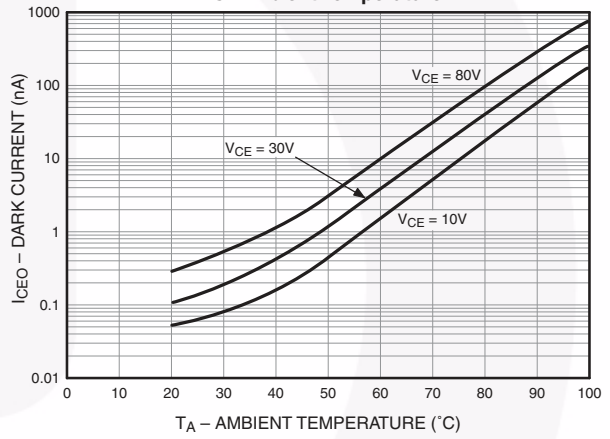
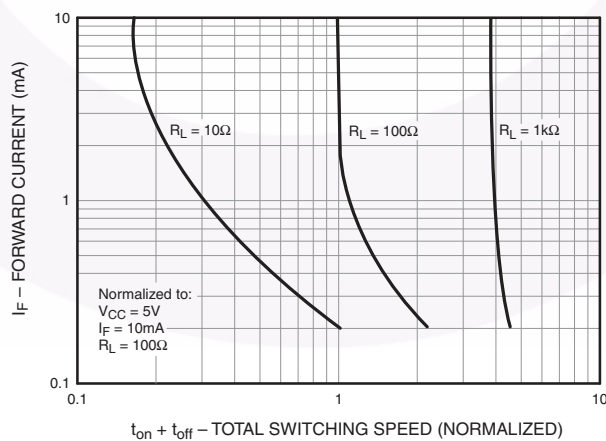
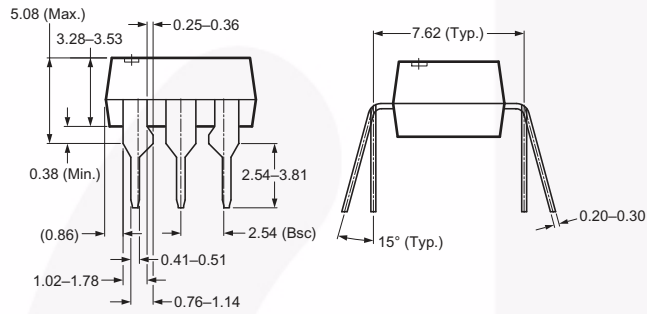
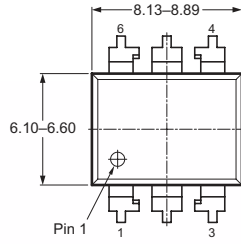


Fig. 5 Input Current vs. Total Switching Speed (Typical Values)

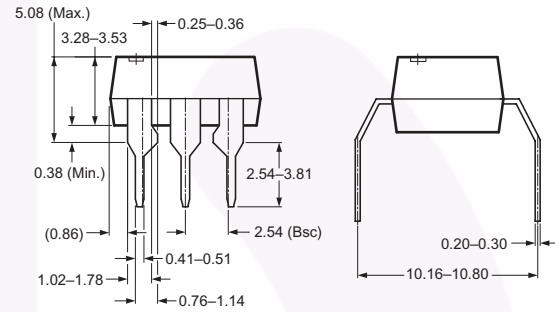
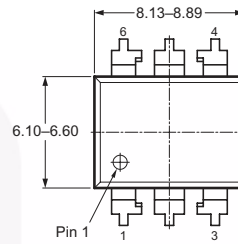


Package Dimensions

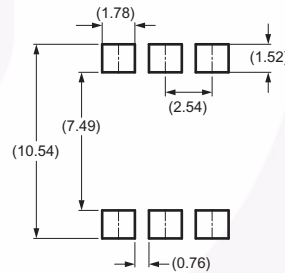
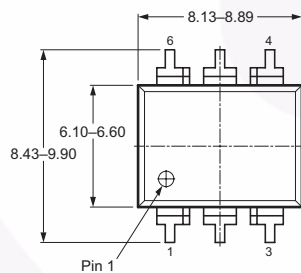
Through Hole



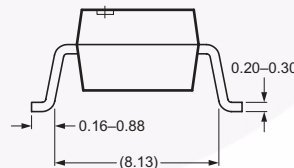
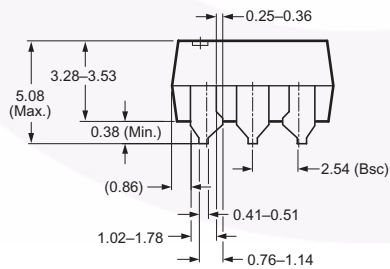
0.4" Lead Spacing



Surface Mount



Recommended Pad Layout

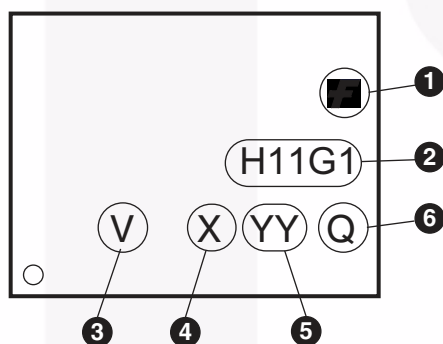


Note:
All dimensions in mm.

Ordering Information

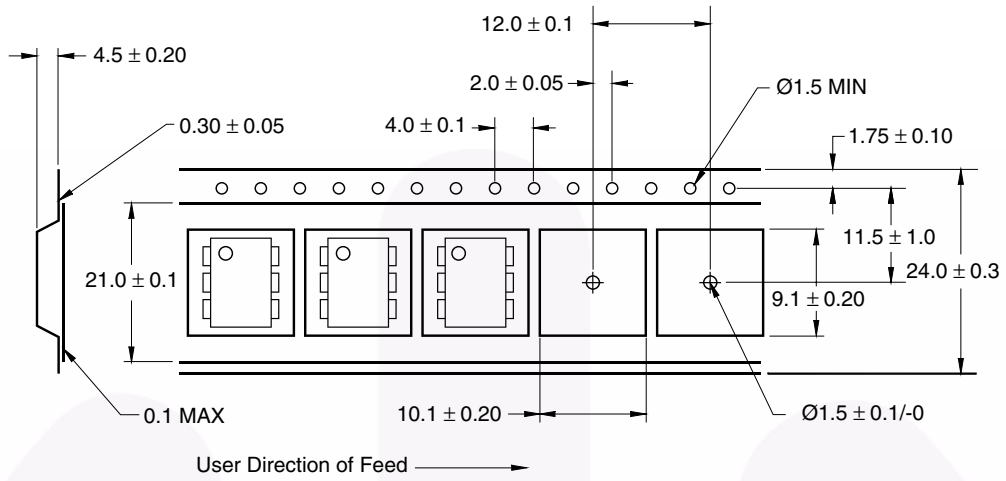
Option	Order Entry Identifier (Example)	Description
No option	H11G1M	Standard Through Hole Device
S	H11G1SM	Surface Mount Lead Bend
SR2	H11G1SR2M	Surface Mount; Tape and Reel
T	H11G1TM	0.4" Lead Spacing
V	H11G1VM	VDE 0884
TV	H11G1TVM	VDE 0884, 0.4" Lead Spacing
SV	H11G1SVM	VDE 0884, Surface Mount
SR2V	H11G1SR2VM	VDE 0884, Surface Mount, Tape and Reel

Marking Information

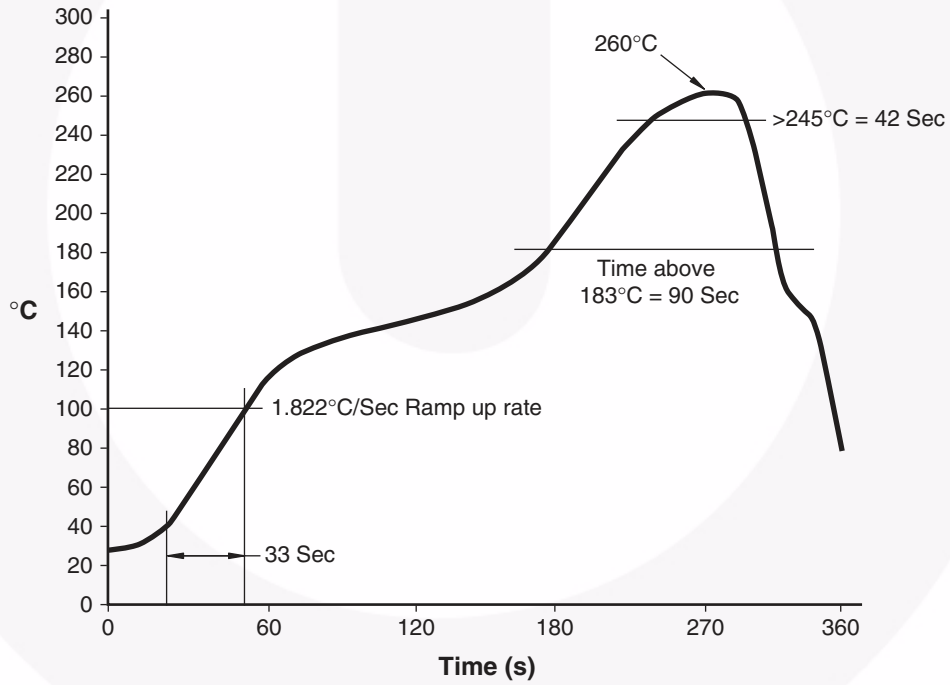


Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One digit year code, e.g., '7'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code







Carrier Tape Specification



Reflow Profile





<p>CorePLUS™ CorePOWER™ CROSSVOLT™ CTL™ Current Transfer Logic™ EcoSPARK® EfficientMax™ EZSWITCH™ *   Fairchild® Fairchild Semiconductor® FACT Quiet Series™ FACT® FAST® FastvCore™ FlashWriter® * FPS™ F-PFS™</p>	<p>Global Power ResourceSM Green FPS™ Green FPS™ e-Series™ GTO™ IntelliMAX™ ISOPLANAR™ MegaBuck™ MICROCOUPLER™ MicroFET™ MicroPak™ MillerDrive™ MotionMax™ Motion-SPM™ OPTOLOGIC® OPTOPLANAR®  PDP SPM™ Power-SPM™ PowerTrench® PowerXS™</p>	<p>Programmable Active Drop QFET® QS™ Quiet Series™ RapidConfigure™  Saving our world, 1mW/W/kW at a time™ SmartMax™ SMART START™ SPM® STEALTH™ SuperFET™ SuperSOT™-3 SuperSOT™-6 SuperSOT™-8 SupreMOS™ SyncFET™  The Power Franchise®</p>	<p>power franchise TinyBoost™ TinyBuck™ TinyLogic® TINYOPTO™ TinyPower™ TinyPWM™ TinyWire™ TriFault Detect™ SerDes™  UHC® Ultra FRFET™ UniFET™ VCX™ VisualMax™ XS™</p>
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