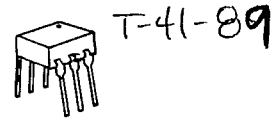


H11F1, H11F2, H11F3



Photon Coupled Bilateral Analog FET

The GE Solid State H11F family consists of a gallium arsenide infrared emitting diode coupled to a symmetrical bilateral silicon photo detector. The detector is electrically isolated from the input and performs like an ideal isolated FET designed for distortion-free control of low level ac and dc analog signals. The H11F series devices are mounted in a dual-in-line package. These devices are also available in Surface-Mount packaging.

FEATURES:

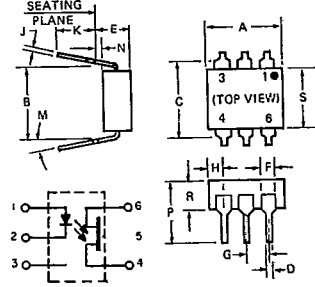
- | | |
|--|--|
| As a Remote Variable Resistor — | As An Analog Signal Switch — |
| • $\leq 100\Omega$ to $\geq 300M\Omega$ | • Extremely Low Offset Voltage |
| • $\geq 99.9\%$ Linearity | • 60V pk-pk Signal Capability |
| • ≤ 15 pF Shunt Capacitance | • No Charge Injection or Latchup |
| • $\geq 100G\Omega$ I/O Isolation Resistance | • $t_{on}, t_{off} \leq 15\mu\text{sec}$. |

Absolute Maximum Ratings: (25°C Unless Otherwise Specified)

INFRARED EMITTING DIODE	
Power Dissipation	$T_A = 25^\circ\text{C}$ *150 milliwatts
Forward Current (Continuous)	60 milliamps
Forward Current (Peak)	
(Pulse Width 100 μsec 100 pps)	500 milliamps
Forward Current (Peak)	
(Pulse Width 1 μsec 300 pps)	3 amps
Reverse Voltage	6 volts
*Derate 2.0 mW/°C above 25°C.	

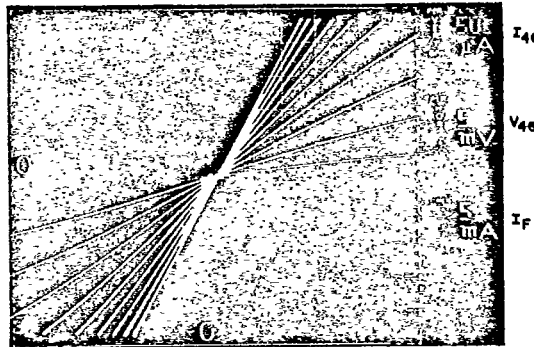
PHOTO DETECTOR	
Power Dissipation	$T_A = 25^\circ\text{C}$ **300 milliwatts
Breakdown Voltage	
H11F1 — H11F2	± 30 volts
H11F3	± 15 volts
Detector Current (Continuous)	± 100 milliamps
**Derate 4.0 mW/°C above 25°C.	

TOTAL DEVICE	
Storage Temperature	-55 to +150°C
Operating Temperature	-55 to +100°C
Lead Soldering Time (at 260°C),	10 Seconds
Surge Isolation Voltage (Input to Output)	
H11F1—H11F2	3535V _(PEAK) 2500V _(RMS)
Steady-State Isolation Voltage (Input to Output)	
H11F1—H11F2	3180V _(PEAK) 2250V _(RMS)



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	8.38	8.89	.330	.350	1
B	7.62 REF		.300 REF.		2
C		8.64		.340	
D	.408	.508	.016	.020	3
E		5.08		.200	
F	1.01	1.78	.040	.070	
G	2.28	2.80	.090	.110	4
H		2.16		.085	
J	.203	.305	.008	.012	
K	2.54		.100		
M		15°		15°	
N	.381		.015		
P		9.53		.375	
R	2.92	3.43	.115	.135	
S	6.10	6.86	.240	.270	

- NOTES:
 1. INSTALLED POSITION LEAD CENTERS.
 2. OVERALL INSTALLED DIMENSION.
 3. THESE MEASUREMENTS ARE MADE FROM THE SEATING PLANE.
 4. FOUR PLACES.



1. TYPICAL LOW LEVEL OUTPUT CHARACTERISTIC

Ⓜ Covered under U.L. component recognition program, reference file E51868

Ⓜ VDE Approved to 0883/6.80 0110b Certificate # 35025

Individual Electrical Characteristics: (25°C Unless Otherwise Specified)

F-41-89

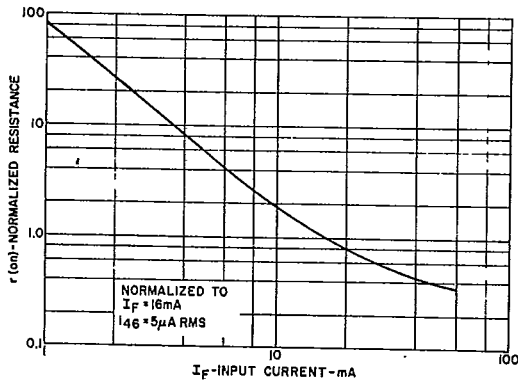
INFRARED EMITTING DIODE	TYP.	MAX.	UNITS	PHOTO-DETECTOR (Either Polarity)	MIN.	MAX.	UNITS
Forward Voltage ($I_F = 16 \text{ mA}$)	1.1	1.75	volts	Breakdown Voltage - $V_{(BR)46}$ ($I_{46} = 10 \mu\text{A}; I_F = 0$) - F1,2	30	-	volts
Reverse Current ($V_R = 6 \text{ V}$)	-	10	microamps	- F3	15	-	volts
Capacitance ($V = 0, f = 1 \text{ MHz}$)	50	-	picofarads	Off-State Dark Current - I_{46} ($V_{46} = 15 \text{ V}; I_F = 0; T_A = 25^\circ\text{C}$)	-	50	nanoamps
				($V_{46} = 15 \text{ V}; I_F = 0; T_A = 100^\circ\text{C}$)	-	50	microamps
				Off-State Resistance - r_{46} ($V_{46} = 15 \text{ V}; I_F = 0$)	300	-	megohms
				Capacitance - C_{46} ($V_{46} = 0, I_F = 0, f = 1 \text{ MHz}$)	-	15	picofarads

Coupled Electrical Characteristics: (25°C)

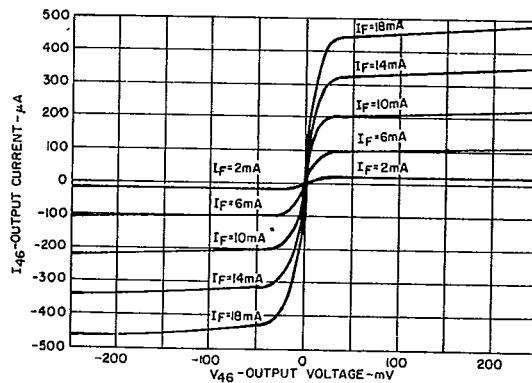
		MIN.	TYP.	MAX.	UNITS
On-State Resistance - r_{46} ($I_F = 16 \text{ mA}, I_{46} = 100 \mu\text{A}$)	H11F1	-	-	200	ohms
	H11F2	-	-	330	ohms
	H11F3	-	-	470	ohms
On-State Resistance - r_{64} ($I_F = 16 \text{ mA}, I_{64} = 100 \mu\text{A}$)	H11F1	-	-	200	ohms
	H11F2	-	-	330	ohms
	H11F3	-	-	470	ohms
Isolation Resistance (Input to Output) ($V_{IO} = 500 \text{ V}$)		100	-	-	gigohms
Input to Output Capacitance ($V_{IO} = 0, f = 1 \text{ MHz}$)		-	-	2	picofarads
Turn-On Time - t_{on} ($I_F = 16 \text{ mA}, R_L = 50 \Omega, V_{46} = 5 \text{ V}$)		-	-	15	microseconds
Turn-Off Time - t_{off} ($I_F = 16 \text{ mA}, R_L = 50 \Omega, V_{46} = 5 \text{ V}$)		-	-	15	microseconds
Resistance, Non-Linearity and Asymmetry ($I_F = 16 \text{ mA}, i_{46} = 25 \mu\text{A RMS}, f = 1 \text{ KHz}$)		-	-	0.1	percent

10

TYPICAL CHARACTERISTICS (25°C) - EITHER POLARITY

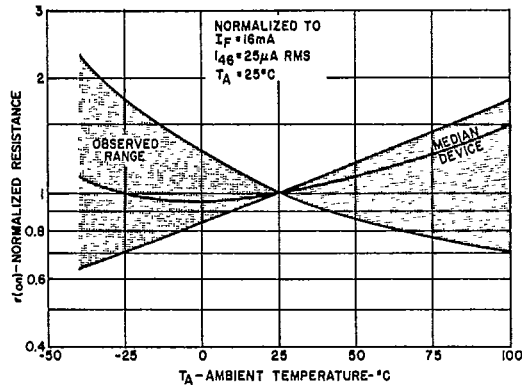


2. RESISTANCE VS. INPUT CURRENT

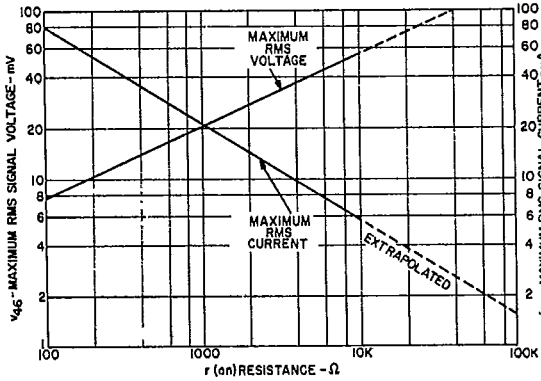


3. OUTPUT CHARACTERISTICS

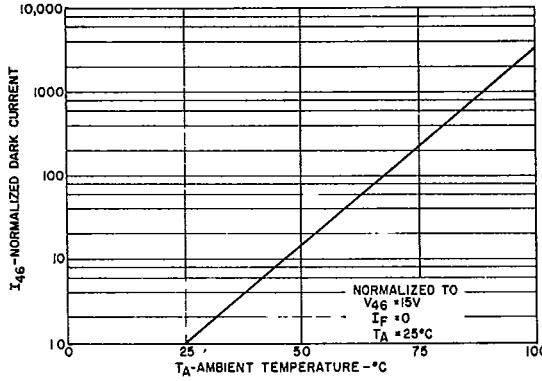
E-41-89



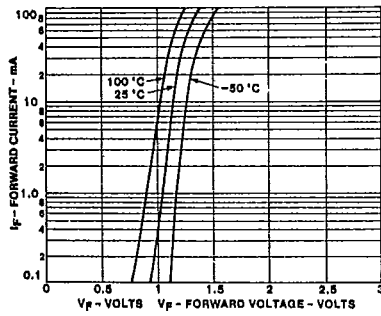
4. RESISTANCE VS. TEMPERATURE



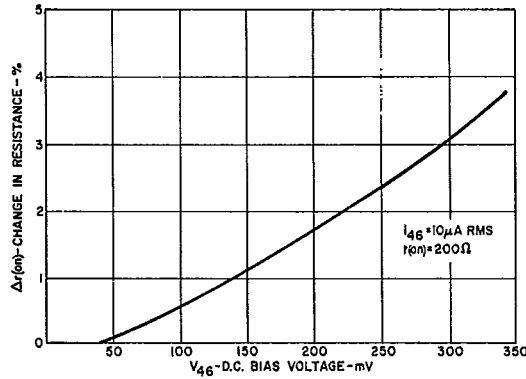
5. REGION OF LINEAR RESISTANCE



6 OFF-STATE CURRENT VS. TEMPERATURE



7. FORWARD VOLTAGE VS. FORWARD CURRENT



8. RESISTIVE NON-LINEARITY VS. D.C. BIAS

H11F1, H11F2, H11F3

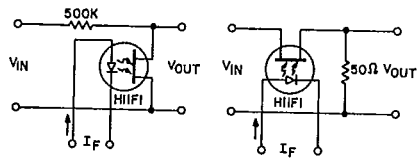
T-41-89

TYPICAL APPLICATIONS

AS A VARIABLE RESISTOR

AS AN ANALOG SIGNAL SWITCH

ISOLATED VARIABLE ATTENUATORS

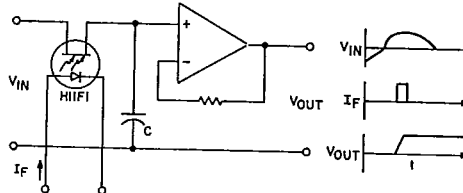


LOW FREQUENCY
@ 10KHz DYNAMIC RANGE ≈ 70db
FOR 0 ≤ IF ≤ 30mA

HIGH FREQUENCY
@ 1MHz DYNAMIC RANGE ≈ 50db
FOR 0 ≤ IF ≤ 30mA

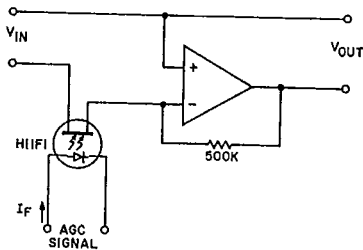
Distortion free attenuation of low level A.C. signals is accomplished by varying the IRED current, IF. Note the wide dynamic range and absence of coupling capacitors; D.C. level shifting or parasitic feedback to the controlling function.

ISOLATED SAMPLE AND HOLD CIRCUIT



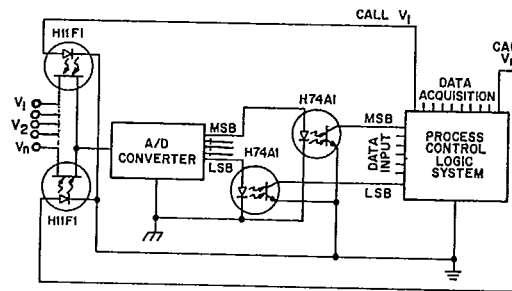
Accuracy and range are improved over conventional FET switches because the H11F has no charge injection from the control signal. The H11F also provides switching of either polarity input signal up to 30V magnitude.

AUTOMATIC GAIN CONTROL



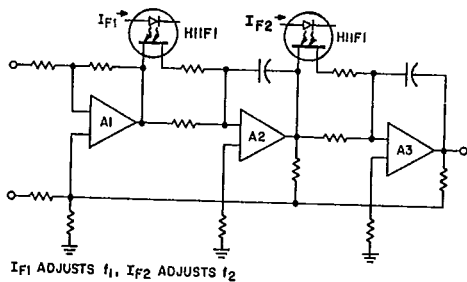
This simple circuit provides over 70db of stable gain control for an AGC signal range of from 0 to 30mA. This basic circuit can be used to provide programmable fade and attack for electronic music and can be modified with six components to a high performance compression amplifier.

MULTIPLEXED, OPTICALLY-ISOLATED A/D CONVERSION



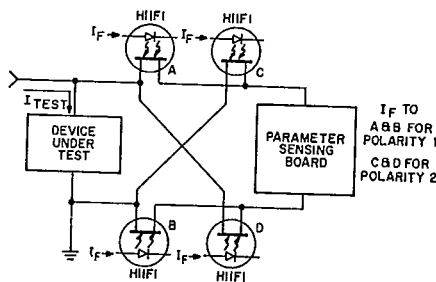
The optical isolation, linearity and low offset voltage of the H11F allows the remote multiplexing of low level analog signals from such transducers as thermocouples, Hall effect devices, strain gauges, etc. to a single A/D converter.

ACTIVE FILTER FINE TUNING/BAND SWITCHING



The linearity of resistance and the low offset voltage of the H11F allows the remote tuning or band-switching of active filters without switching glitches or distortion. This schematic illustrates the concept, with current to the H11F1 IRED's controlling the filter's transfer characteristic.

TEST EQUIPMENT - KELVIN CONTACT POLARITY



In many test equipment designs the auto polarity function uses reed relay contacts to switch the Kelvin Contact polarity. These reeds are normally one of the highest maintenance cost items due to sticking contacts and mechanical problems. The totally solid-state H11F eliminates these troubles while providing faster switching.

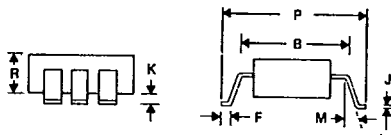
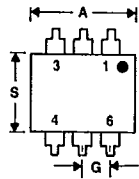
HARRIS SEMICONDUCTOR

37E D 430227J 0027193 J HAS



T-91-20

Surface-Mount Optoisolators



Surface-mount packaging for the entire 6-pin DIP optoisolator line!

Add the "SMA" or "SMB" suffix to any 6-pin optoisolator part number when ordering.

DIMENSIONAL OUTLINE NO. 298
All Surface-Mount Types

SMB (Standard)
Surface-Mount Package

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	0.330	0.350	8.38	8.89	
B	0.330 REF		8.38 REF		
F	0.020	0.040	0.508	1.02	
J	0.008	0.012	0.203	0.305	
K	0.0040	0.0098	0.102	0.249	
M	—	15°	—	15°	
P	0.375	0.395	9.53	10.03	
R	0.115	0.135	2.92	3.43	
S	0.240	0.270	6.10	6.86	
Coplanarity	0	0.002	0	0.051	1

92CS-42862

1. Coplanarity is the distance from a plane, defined by the end of the three longest legs to the end of the shortest leg.

SMA (Low Profile)
Surface-Mount Package

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	0.330	0.350	8.38	8.89	
B	0.330 REF		8.38 REF		
F	0.020	0.040	0.508	1.02	
J	0.008	0.012	0.203	0.305	
K	0.0005	0.0040	0.013	0.102	
M	—	15°	—	15°	
P	0.373	0.393	9.47	9.98	
R	0.115	0.135	2.92	3.43	
S	0.240	0.270	6.10	6.86	
Coplanarity	0	0.002	0	0.051	1

92CS-42861

1. Coplanarity is the distance from a plane, defined by the end of the three longest legs to the end of the shortest leg.

