Phototransistor Type Photocoupler

H11A1 thru H11A5 Series

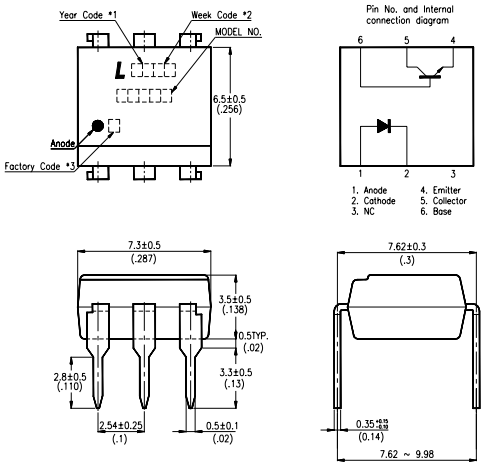
Features

- High input-output isolation voltage
  (V_{ISO} = 5,000Vrms)
- Current transfer ratio
  (CTR : MIN. 10% at I_F = 10mA, V_{CE} = 10V)
- UL approved (No. E113898)
- VDE approved (No. 094722)
- FIMKO approved (No.209049)
- SEMKO approved (No. 9943380/01-20)
- NEMKO approved (No. P99102464)
- DEMKO approved (No. 99-04182)
- CSA approve in progress
- Options Available :
  - Leads with 0.4" (10.16mm) Spacing (M Type)
  - Lead Bends for Surface Mounting (S Type)
  - Tape and Reel of Type I for SMD (Add "-TA" Suffix)
  - Tape and Reel of Type II for SMD (Add "-TA1" Suffix)
  - VDE 0884 Approvals (Add "-V" Suffix)

Applications

1. General Purpose Switching Circuits
2. Interfacing and coupling systems of different potentials and impedances
3. Monitor and detection circuits

Package Dimensions



NOTES :

1. Year date code.
2. 2-digit work week.
3. Factory code shall be marked (Z : Taiwan, Y : Thailand).
4. Model No.: H11A1 ; H11A2 ; H11A3 ; H11A4 ; H11A5
5. All dimensions are in millimeters (inches).
6. Tolerance is ± 0.25mm (.010") unless otherwise noted.
7. Specifications are subject to change without notice.

Ordering Information

Part Number	Package	Safety Standard Approval	Application part number
H11A1 H11A1M H11A1S H11A1S-TA H11A1S-TA1	6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II)	• UL approved • FIMKO approved • SEMKO approved • DEMKO approved • NEMKO approved • CSA approve in progress	H11A1
H11A2 H11A2M H11A2S H11A2S-TA H11A2S-TA1	6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II)		H11A2
H11A3 H11A3M H11A3S H11A3S-TA H11A3S-TA1	6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II)		H11A3
H11A4 H11A4M H11A4S H11A4S-TA H11A4S-TA1	6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II)		H11A4
H11A5 H11A5M H11A5S H11A5S-TA H11A5S-TA1	6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II)		H11A5
H11A1-V H11A1M-V H11A1S-V H11A1STA-V H11A1STA1-V	6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II)	• VDE approved	H11A1
H11A2-V H11A2M-V H11A2S-V H11A2STA-V H11A2STA1-V	6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II)		H11A2
H11A3-V H11A3M-V H11A3S-V H11A3STA-V H11A3STA1-V	6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II)		H11A3
H11A4-V H11A4M-V H11A4S-V H11A4STA-V H11A4STA1-V	6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II)		H11A4
H11A5-V H11A5M-V H11A5S-V H11A5STA-V H11A5STA1-V	6-pin DIP 6-pin (leads with 0.4" spacing) 6-pin (lead bends for surface mount) 6-pin (tape and reel packaging of type I) 6-pin (tape and reel packaging of type II)		H11A5

Ratings and Characteristics

Absolute Maximum Ratings

(Ta=25℃)

Parameter		Symbol	Rating	Unit
Input	Forward Current	I_F	60	mA
	Reverse Voltage	V_R	6	V
	Power Dissipation	P	100	mW
Output	Collector-Emitter Voltage	V_{CEO}	30	V
	Emitter-Collector Voltage	V_{ECO}	7	V
	Collector-Base Voltage	V_{CBO}	70	V
	Collector Current	I_C	150	mA
	Collector Power Dissipation	P_C	150	mW
Total Power Dissipation		P_{tot}	250	mW
*1.Isolation Voltage		V_{iso}	5,000	Vrms
Operating Temperature		T_{opr}	-55~+100	℃
Storage Temperature		T_{stg}	-55~+150	℃
*2.Soldering Temperature		T_{sol}	260	℃

*1. AC for 1 minute, R.H. = 40 ~ 60%
Isolation voltage shall be measured using the following method.
(1) Short between anode and cathode on the primary side and between collector and emitter on the secondary side.
(2) The isolation voltage tester with zero-cross circuit shall be used.
(3) The waveform of applied voltage shall be a sine wave.

*2. For 10 seconds

Absolute Maximum Ratings

(Ta=25℃)

Parameter			Symbol	Min.	Typ.	Max.	unit	Conditions
Input	Forward Voltage		V_F	–	1.2	1.5	V	I_F=10mA
	Reverse Current		I_R	–	–	10	μA	V_R=6V
	Terminal Capacitance		C_t	–	18	–	pF	V=0, f=1MHz
Output	Collector Dark Current		I_{CEO}	–	–	50	nA	V_{CE}=10V, I_F=0
	Collector-Emitter Breakdown Voltage		BV_{CER}	30	–	–	V	I_C=0.1mA, I_F=0
	Emitter-Collector Breakdown Voltage		BV_{ECO}	7	–	–	V	I_E=10 μA I_F=0mA
	Collector-Base Breakdown Voltage		BV_{ECO}	70	–	–	V	I_C=0.1mA, I_F=0
	Collector-Emitter Capacitance		C_{CE}	–	12	–	pF	V=0V, f=1MHz
	Collector-Base Capacitance		C_{CB}	–	17	–	pF	V_{CB}=0V, f=1MHz
	Emitter-Base Capacitance		C_{EB}	–	25	–	pF	V_{EB}=0V, f=1MHz
Transfer Characteristics	*1 Current Transfer Ratio	H11A1	CTR	50	–	–	%	I_F=10mA V_{CE}=10V
		H11A2		20	–	–		
		H11A3		20	–	–		
		H11A4		10	–	–		
		H11A5		30	–	–		
	Collector-emitter Saturation Voltage		$V_{CE(sat)}$	–	0.15	0.4	V	I_F=10mA, I_C=0.5mA
	Isolation Resistance		R_{ISO}	100	–	–	GΩ	DC500V 40~60% R.H.
	Floating Capacitance		C_f	–	0.3	–	pF	V=0, f=1MHz
	Response Time (Rise)		t_r	–	2.8	–	μs	V_{CC}=10V, I_C=10mA
	Response Time (Fall)		t_f	–	4.5	–	μs	R_L=100Ω

*1. CTR= $\frac{I_C}{I_F} \times 100\%$

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Typical Electrical/Optical Characteristic Curves
(25℃Ambient Temperature Unless Otherwise Noted)

Fig.1 Forward Current vs. Ambient Temperature

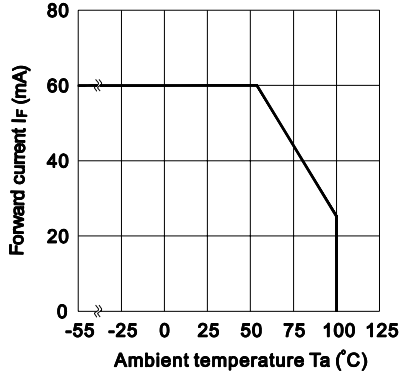


Fig.2 Collector Power Dissipation vs. Ambient Temperature

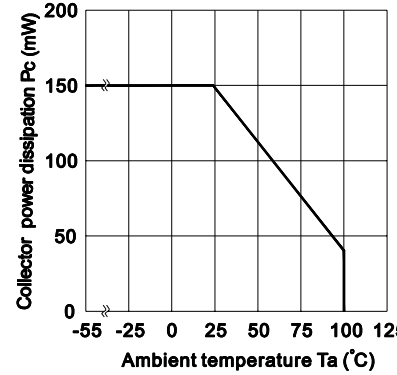


Fig.3 Collector-emitter saturation Voltage vs. Forward current

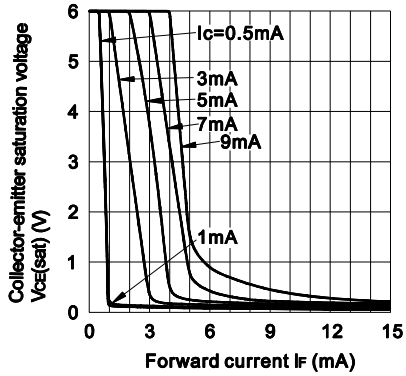


Fig.4 Turn-On Switching Times

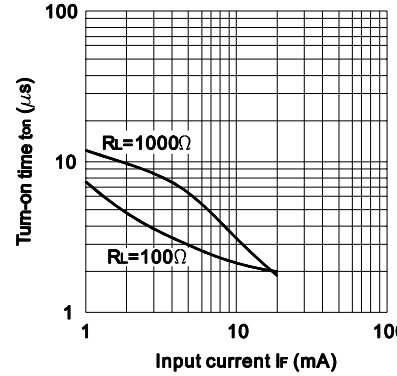


Fig.5 Current Transfer Ratio vs. Forward Current

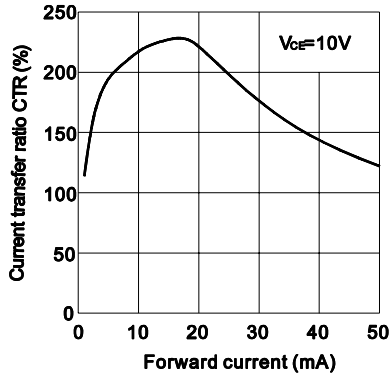


Fig.6 Collector Current vs. Collector-emitter Voltage

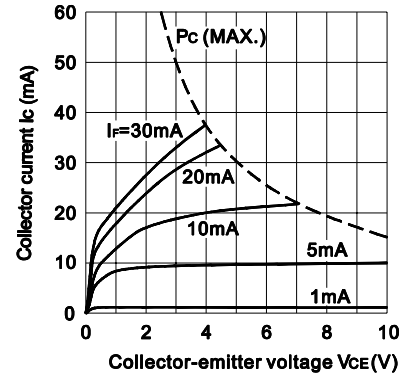


Fig.7 Rise and Fall Times

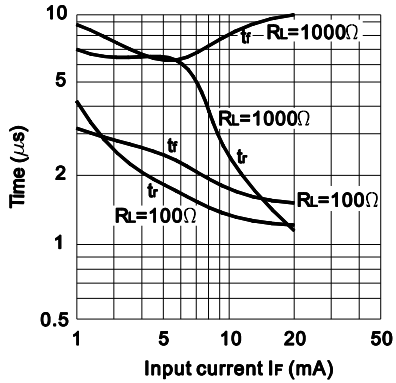
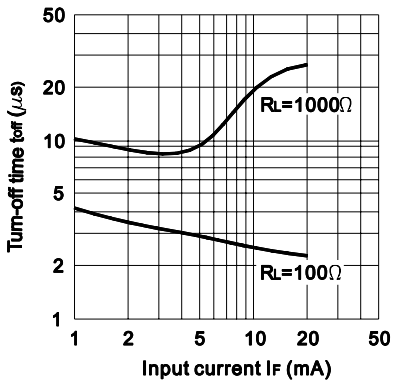
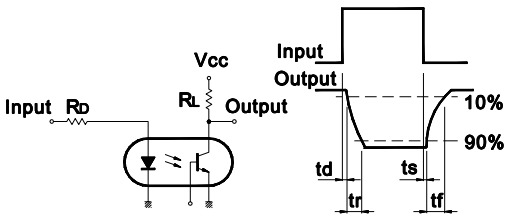


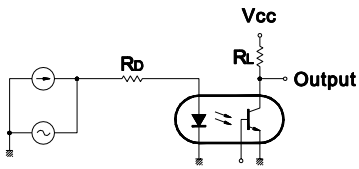
Fig.8 Turn-off Switching Times



Test Circuit for Response Time



Test Circuit for Frequency Response



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