High Transfer Efficiency, General Purpose Type Photocoupler

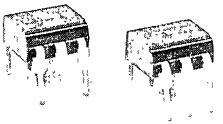
LTV4N32/LTV4N33

■ FEATURES

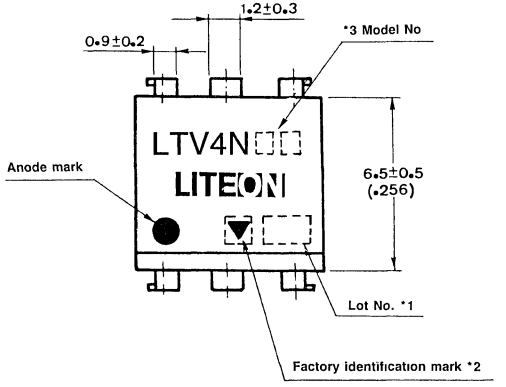
1. High current transfer ratio
   LTV4N32, LTV4N33
   (CTR:MIN. 500% at $I_F = 10mA$, $V_{CE} = 10V$)
2. Response time t_{on}:MAX. 5μs at $I_F = 200mA$
   $V_{CC} = 10V$, $I_C = 50mA$
3. UL approved (No E113898 (S))

■ APPLICATIONS

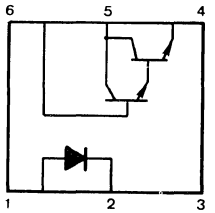
1. I/O interfaces for computers
2. System appliances, measuring instruments
3. Signal transmission between circuits of different potentials and impedances



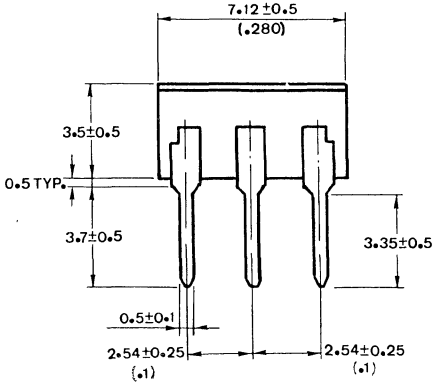
■ OUTLINE DIMENSIONS (UNIT: mm)

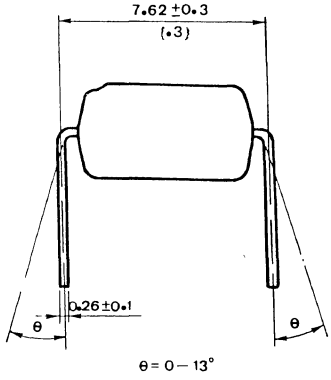


Pin No and internal connection diagram



1. Anode 4. Emitter
2. Cathode 5 Collector
3. NC 6. Base





*1 2-digit number marked according to DIN standard
*2 Factory identification mark shall be or shall not be marked

*3 Model No.
LTV4N32
LTV4N33

■ RATINGS AND CHARACTERISTICS

• Absolute maximum ratings

(Ta = 25°C)

Parameter			Symbol	Rating	Unit
Input	Forward current		I_F	80	mA
	*1 Peak forward current		I_{FM}	3	A
	Reverse voltage		V_R	6	V
	Power dissipation		P	150	mW
Output	Collector-emitter voltage		V_{CEO}	30	V
	Collector-base voltage		V_{CBO}	30	V
	Emitter-collector voltage		V_{ECO}	5	V
	Collector current		I_C	100	mA
	Collector power dissipation		P_C	150	mW
Total power dissipation			P_{tot}	250	mW
* 2 Isolation voltage		LTV4N32	V_{iso}	2500	V_{rms}
		LTV4N33		1500	
Operating temperature			T_{opr}	−55 ~ +100	°C
Storage temperature			T_{stg}	−55 ~ +150	°C
* 3 Soldering temperature			T_{sol}	260	°C

*1 Pulse width ≤ 1 μs Duty radio 0 001
*2 AC for 1 minute 40 ~ 60% R.H.
*3 For 10 seconds

• Electro-optical characteristics

(Ta = 25°C)

	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 = 4V
	Terminal capacitance	C_t	—	50	—	pF	V = 0, f = 1 kHz
Output	Collector dark current	I_{CEO}	—	—	100	nA	V_{CE} = 10V, I_F = 0
	Collector-emitter breakdown voltage	BV_{CEO}	30	—	—	V	I_C = 0.1mA I_F = 0
	Emitter-collector breakdown voltage	BV_{ECO}	5	—	—	V	I_E = 10μA I_F = 0
	Collector-base breakdown voltage	BV_{CBO}	30	—	—	V	I_C = 0.1mA I_F = 0
Transfer characteristics	*1 Collector current	I_C	50	—	—	mA	I_F = 10mA V_{CE} = 10V
	Collector-emitter saturation voltage	$V_{CE(sat)}$	—	—	1.0	V	I_F = 8mA I_C = 2mA
	Isolation resistance	R_{iso}	5×10^{10}	1×10^{11}	—	Ω	DC500V 40 ~ 60% R.H.
	Floating capacitance	C_f	—	1.0	—	pF	V = 0, f = 1MHz
	Response time (Turn-on time)	t_{on}	—	—	5	μs	I_F = 200mA (tw ≈ 1.0mS) V_{CC} = 10V I_C = 50mA
	Response time (Turn-off time)	t_{off}	—	—	100	μs	

*1 Pulse test: Input pulse width = 300μs Duty ratio ≤ 0.02 , CTR $= \frac{IC}{IF} \times 100\%$

■ SUPPLEMENT

• Isolation voltage shall be measured in the following method.

(1) Short between anode and cathode on the primary side and between collector, emitter and base on the secondary side.
(2) The isolation voltage tester with a zero-cross circuit shall be used.
(3) The waveform of applied voltage shall be a sine wave.

• Inspection standard

Outgoing inspection standard for LITON products are shown below.
(1) A single sampling plan, normal inspection level II based on MIL-STD-105D is applied. The AQL according to the inspection items are shown below.

Defect	Inspection item	AQL(%)	Judgement criterion
Major defect	• Electrical characteristics • Unreadable marking • Open, short	0.25	Depend on the specification
Minor defect	• Appearance • Dimension	0.4	

Fig. 1 Forward Current vs. Ambient Temperature

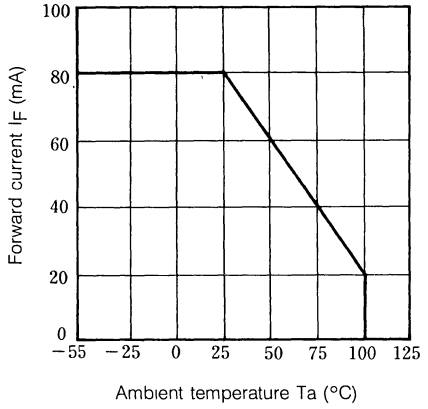


Fig. 2 Collector Power Dissipation vs. Ambient Temperature

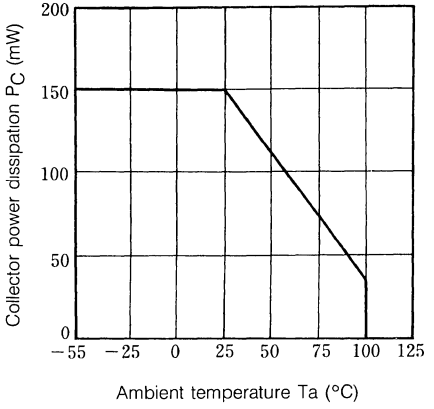


Fig. 3 Forward Current vs. Forward Voltage

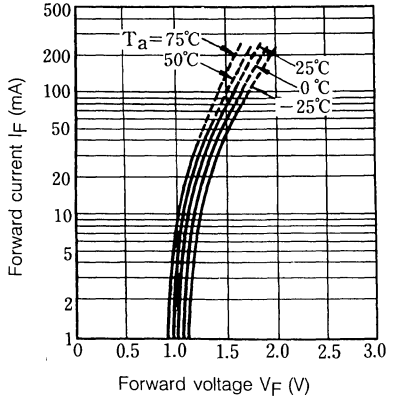


Fig. 4 Current Transfer Ratio vs. Forward Current

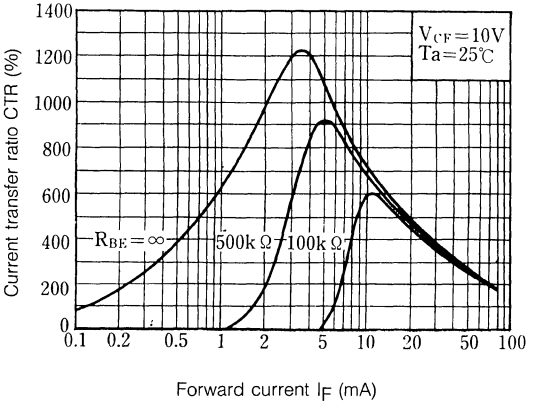


Fig. 5 Collector Current vs. Collector-emitter Voltage

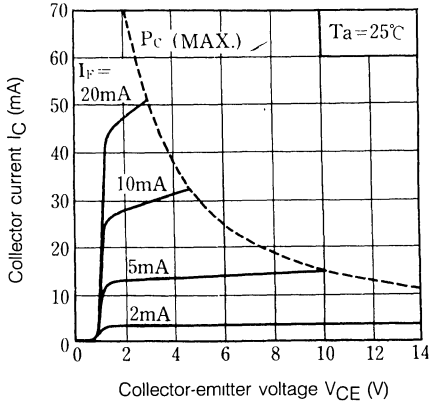


Fig. 6 Relative Current Transfer Ratio vs Ambient Temperature

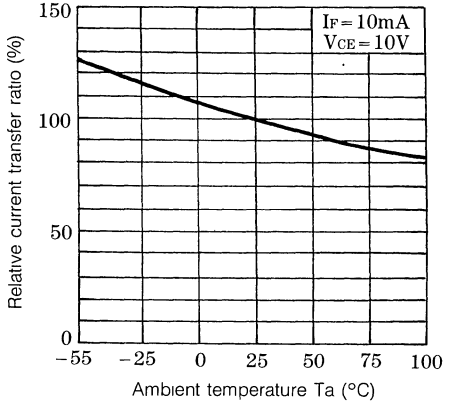


Fig. 7 Collector-emitter Saturation Voltage vs. Ambient Temperature

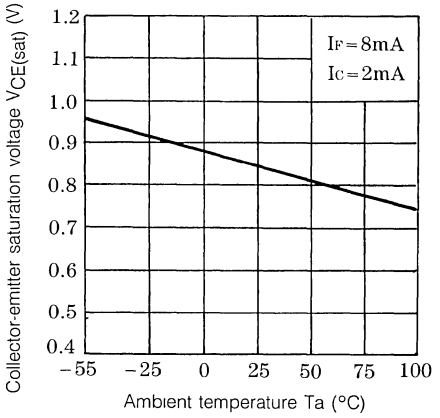


Fig. 8 Collector Dark Current vs. Ambient Temperature

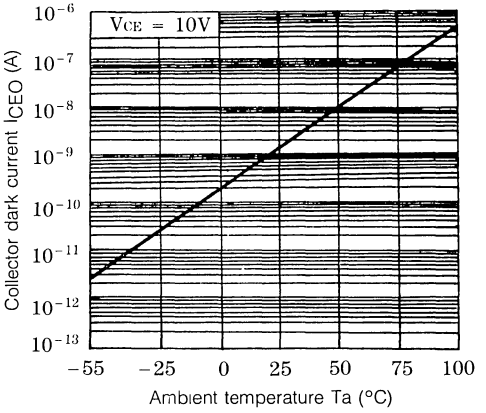


Fig. 9 Frequency Response

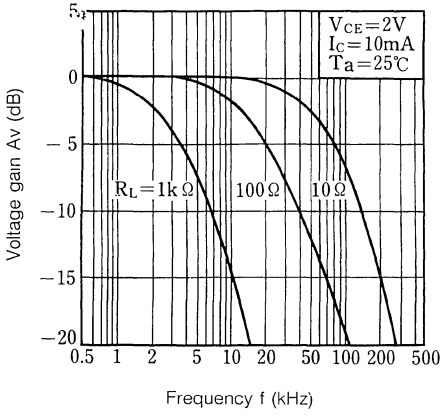


Fig. 10 Collector-emitter Saturation Voltage vs. Forward Current

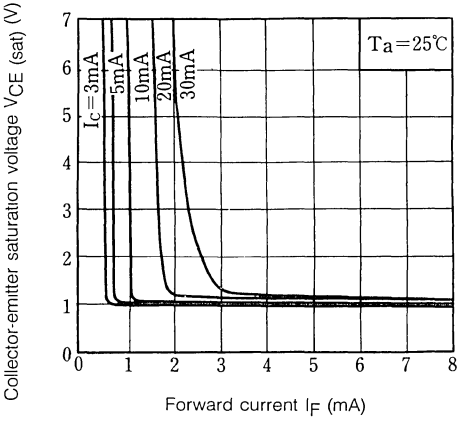


Fig.11 Test Circuit for Response Time

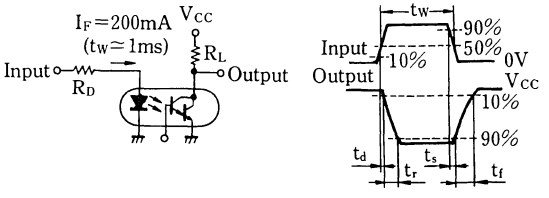
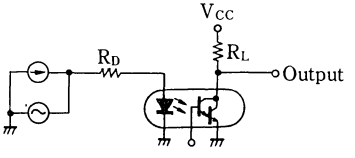


Fig. 12 Test Circuit for Frequency Response



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