

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

## 4N35(Short), 4N36(Short), 4N37(Short)

AC LINE /DIGITAL LOGIC ISOLATOR.

DIGITAL LOGIC /DIGITAL LOGIC ISOLATOR.

TELEPHONE LINE RECEIVER.

TWISTED PAIR LINE RECEIVER.

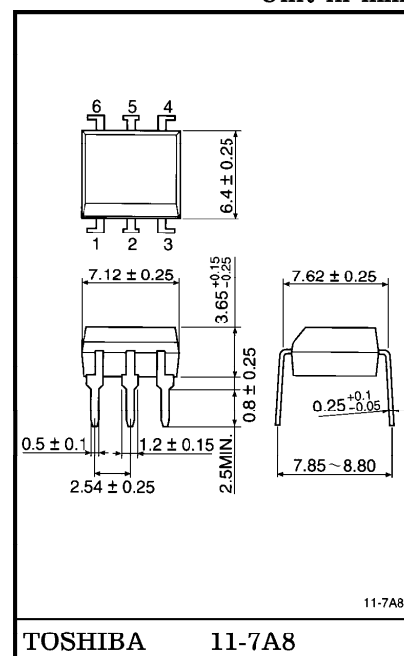
HIGH FREQUENCY POWER SUPPLY FEEDBACK CONTROL.

RELAY CONTACT MONITOR.

The TOSHIBA 4N35 (Short) through 4N37 (Short) consists of a gallium arsenide infrared emitting diode coupled with a silicon phototransistor in a dual in-line package.

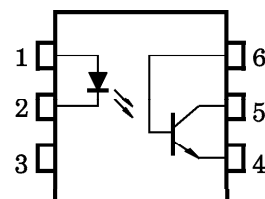
- Switching Speeds :  $3\mu\text{s}$  (Typ.)
- DC Current Transfer Ratio : 100% (Min.)
- Isolation Resistance :  $10^{11}\Omega$  (Min.)
- Isolation Voltage : 2500Vrms (Min.)
- UL Recognized : UL1577, File No. E67349

Unit in mm



Weight : 0.4g

PIN CONFIGURATIONS (Top view)



- 1 : ANODE
- 2 : CATHODE
- 3 : N.C.
- 4 : EMITTER
- 5 : COLLECTOR
- 6 : BASE

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- Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.
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## MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current (Continuous)	$I_F$	60	mA
	Forward Current Derating	$\Delta I_F / ^\circ\text{C}$	0.8 (*)	mA / °C
	Peak Forward Current (Note 1)	$I_{PF}$	3	A
	Power Dissipation	$P_D$	100	mW
	Power Dissipation Derating	$\Delta P_D / ^\circ\text{C}$	1.33 (*)	mW / °C
	Reverse Voltage	$V_R$	6	V
DETECTOR	Collector-Emitter Voltage	$BV_{CEO}$	30	V
	Collector-Base Voltage	$BV_{CBO}$	70	V
	Emitter-Collector Voltage	$BV_{ECO}$	7	V
	Collector Current (Continuous)	$I_C$	100	mA
	Power Dissipation	$P_C$	300	mW
	Power Dissipation Derating	$\Delta P_C / ^\circ\text{C}$	4.0 (*)	mW / °C
COUPLED	Storage Temperature	$T_{stg}$	-55~150	°C
	Operating Temperature	$T_{opr}$	-55~100	°C
	Lead Soldering Temperature (at 10s)	$T_{sol}$	260	°C
	Total Package Power Dissipation	$P_T$	300	mW
	Total Package Power Dissipation Derating	$\Delta P_T / ^\circ\text{C}$	3.3 (*)	mW / °C
	Input to Output Isolation Voltage (AC, 1 Minute)	$BV_S$	2500	Vrms
		4N35	2500 / 3550	Vrms / Vpk
		4N36	1750 / 2500	
		4N37	1050 / 1500	

(Note 1) Pulse width 1 $\mu$ s, 300pps

(\*) Above 25°C ambient.

(\*\*) JEDEC registered maximum  $BV_S$ , however, TOSHIBA specifies a maximum  $BV_S$  of 2500V<sub>rms</sub>, 1 minute.

## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	$V_F$	$I_F = 10\text{mA}$	0.8	1.15	1.5	V
			$I_F = 10\text{mA}$ , Ta = -55°C	0.9	—	1.7	
			$I_F = 10\text{mA}$ , Ta = 100°C	0.7	—	1.4	
	Reverse Current	$I_R$	$V_R = 6\text{V}$	—	—	10	$\mu\text{A}$
	Capacitance	$C_D$	$V = 0$ , f = 1MHz	—	30	100	pF
DETECTOR	DC Forward Current Gain	$h_{FE}$	$V_{CE} = 5\text{V}$ , $I_C = 500\mu\text{A}$	—	200	—	—
	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 10\text{mA}$	30	—	—	V
	Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}$	70	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	$I_E = 100\mu\text{A}$	7	—	—	V
	Collector Dark Current	$I_{CEO}$	$V_{CE} = 10\text{V}$	—	1	50	nA
	Collector Dark Current	$I_{CEO}$	$V_{CE} = 30\text{V}$ , Ta = 100°C	—	—	500	$\mu\text{A}$
	Collector-Emitter Capacitance	$C_{CE}$	$V = 0$ , f = 1MHz	—	10	—	pF
COUPLED	Current Transfer Ratio		$I_F = 10\text{mA}$ , $V_{CE} = 10\text{V}$	100	—	—	%
			$I_F = 10\text{mA}$ , $V_{CE} = 10\text{V}$ Ta = -55°C	40	—	—	
			$I_F = 10\text{mA}$ , $V_{CE} = 10\text{V}$ Ta = 100°C	40	—	—	
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F = 10\text{mA}$ , $I_C = 0.5\text{mA}$	—	0.1	0.3	V
	Capacitance Input to Output	$C_S$	$V_S = 0$ , f = 1MHz	—	0.8	2.5	pF
	Isolation Resistance	$R_S$	$V_S = 500\text{V}$ , R. H. $\leq 60\%$	$10^{11}$	—	—	$\Omega$
	Input to Output Isolation Current (Pulse Width = 8ms)	4N35	$I_{IO}$	$V_{io} = 3550\text{Vpk}$	—	100	$\mu\text{A}$
		4N36		$V_{io} = 2500\text{Vpk}$	—	100	
		4N37		$V_{io} = 1500\text{Vpk}$	—	100	
	Turn-On Time	$t_{ON}$	$V_{CC} = 10\text{V}$ , $I_C = 2\text{mA}$	—	3	10	$\mu\text{s}$
	Turn-Off Time	$t_{OFF}$	$R_L = 100\Omega$	—	3	10	

