

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

## 4N29(Short), 4N29A(Short), 4N30(Short), 4N31(Short) 4N32(Short), 4N32A(Short), 4N33(Short)

AC LINE / DIGITAL LOGIC ISOLATOR.

DIGITAL LOGIC/DIGITAL LOGIC ISOLATOR.

TELEPHONE LINE RECEIVER.

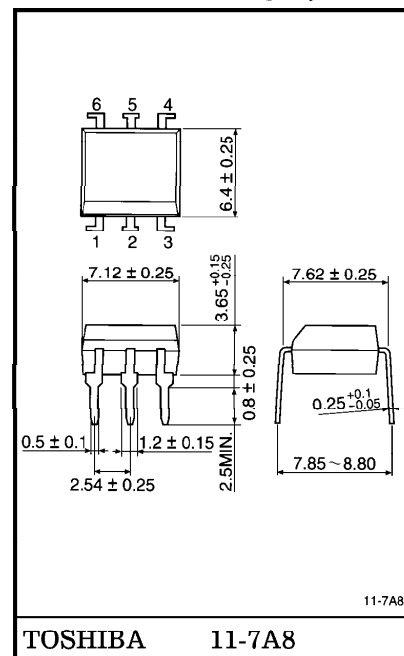
TWISTED PAIR LINE RECEIVER.

RELAY CONTACT MONITOR.

The TOSHIBA 4N29 (Short) through 4N33 (Short) consists arsenide infrared emitting diode coupled with a silicon photo darlington in a dual in-line package.

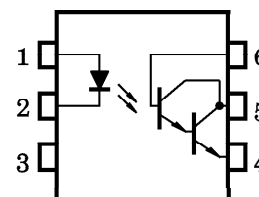
- Switching Time : 100 $\mu$ s (Max.)
- DC Current Transfer Ratio : 500%
- Isolation Resistance : 10<sup>11</sup> $\Omega$  (Typ.)
- Isolation Voltage : 2500V<sub>rms</sub> (Min.)
- UL Recognized : UL1577, File No. E67349

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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MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current (Continuous)	$I_F$	80	mA
	Forward Current Derating	$\Delta I_F / ^\circ C$	1.07(*)	mA / °C
	Peak Forward Current (Note 1)	$I_{PF}$	3	A
	Power Dissipation	$P_D$	150	mW
	Power Dissipation Derating	$\Delta P_D / ^\circ C$	2.0(*)	mW / °C
	Reverse Voltage	$V_R$	3	V
DETECTOR	Collector-Emitter Voltage	$BV_{CEO}$	30	V
	Collector-Base Voltage	$BV_{CBO}$	30	V
	Emitter-Collector Voltage	$BV_{ECO}$	5	V
	Collector Current (Continuous)	$I_C$	100	mA
	Power Dissipation	$P_C$	150	mW
	Power Dissipation Derating	$\Delta P_C / ^\circ C$	2.0(*)	mW / °C
COUPLED	Storage Temperature Range	$T_{stg}$	-55~150	°C
	Operating Temperature Range	$T_{opr}$	-55~100	°C
	Lead Soldering Temperature	$T_{sol}$	260	°C
	Total Package Power Dissipation	$P_T$	250	mW
	Total Package Power Dissipation Derating	$\Delta P_T / ^\circ C$	3.3(*)	mW / °C

(Note 1) Pulse width 300 $\mu$ s, 2% duty cycle.

(\*) Above 25°C ambient.

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
LED	Forward Voltage	$V_F$	$I_F = 10\text{mA}$	—	1.15	1.5	V	
	Reverse Current	$I_R$	$V_R = 3\text{V}$	—	—	100	$\mu\text{A}$	
	Capacitance	$C_D$	$V = 0, f = 1\text{MHz}$	—	30	—	pF	
DETECTOR	DC Forward Current Gain	$h_{FE}$	$V_{CE} = 5, I_C = 0.5\text{mA}$	—	10k	—	—	
	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1\text{mA}$	30	—	—	V	
	Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}$	30	—	—	V	
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	$I_E = 100\mu\text{A}$	5	—	—	V	
	Collector Dark Current	$I_{CEO}$	$V_{CE} = 10\text{V}$	—	1.0	100	nA	
COUPLED	Collector Output Current	4N32, 4N32A 4N33	$I_F = 10\text{mA}, V_{CE} = 10\text{V}$	50	—	—	mA	
		4N29, 4N29A 4N30		10	—	—		
		4N31		5	—	—		
	Collector-Emitter Saturation Voltage	4N29, 4N29A 4N30, 4N32 4N32A, 4N33	$V_{CE(sat)}$	$I_F = 8\text{mA}, I_C = 2\text{mA}$	—	—	1.0	V
		4N31			—	—	1.2	
	Turn-on Time		$t_{ON}$	$I_F = 200\text{mA}, V_{CC} = 10\text{V}$ $I_C = 50\text{mA}$	—	—	5	$\mu\text{s}$
	Turn-off Time	4N29, 4N29A 4N30, 4N31	$t_{OFF}$		—	—	40	$\mu\text{s}$
		4N32, 4N32A 4N33			—	—	100	
	Capacitance Input to Output		$C_S$	$V = 0, f = 1\text{MHz}$	—	0.8	—	pF
	Isolation Resistance		$R_S$	$V = 500\text{V}$	—	$10^{11}$	—	$\Omega$
Isolation Voltage			$BV_S$	$AC, 1 \text{ minute R. H.} \leq 60\%$	2500	—	$V_{rms}$	
	4N29, 4N29A 4N32, 4N32A	$BV_S (*)$	AC, peak	2500	—	—	$V_{pk}$	
				1500	—	—		
	4N30, 4N31 4N33		AC, 1 second	1775	—	—	$V_{rms}$	
4N29A, 4N32A	1775			—	—			

(\*) JEDEC registered minimum  $BV_S$ , however, Toshiba specifies a minimum  $BV_S$  of  $2500V_{rms}$  1 minute.

