

TOSHIBA

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

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

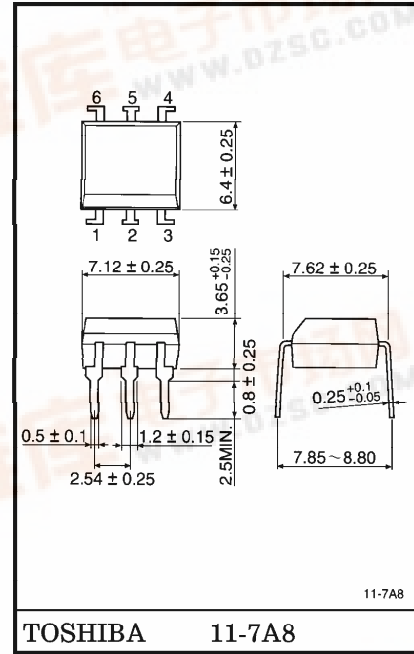
**4N29(Short), 4N29A(Short), 4N30(Short), 4N31(Short)
4N32(Short), 4N32A(Short), 4N33(Short)**

- 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 : 100μs (Max.)
- DC Current Transfer Ratio : 500%
- Isolation Resistance : 10¹¹Ω (Typ.)
- Isolation Voltage : 2500V_{rms} (Min.)
- UL Recognized : UL1577, File No. E67349

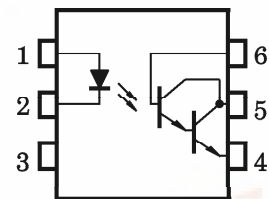
Unit in mm



TOSHIBA 11-7A8

Weight : 0.4g

PIN CONFIGURATIONS (Top view)



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

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● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

● 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.

● The products described in this document are subject to foreign exchange and foreign trade control laws.

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● The information contained herein is subject to change without notice.



MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current (Continuous)	I _F	80	mA
	Forward Current Derating	ΔI _F / °C	1.07(*)	mA / °C
	Peak Forward Current (Note 1)	I _{PF}	3	A
	Power Dissipation	P _D	150	mW
	Power Dissipation Derating	ΔP _D / °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	ΔP _C / °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	ΔP _T / °C	3.3(*)	mW / °C

(Note 1) Pulse width 300μs, 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	μA	
	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_C	$I_F = 10\text{mA}, V_{CE} = 10\text{V}$	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	μs
	Turn-off Time	4N29, 4N29A 4N30, 4N31	t_{OFF}		—	—	40	μs
		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}	—	Ω
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}
		4N30, 4N31 4N33			1500	—	—	
				AC, 1 second	1775	—	—	V_{rms}

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

