

**TOSHIBA**

**4N38,4N38A(Short)**

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

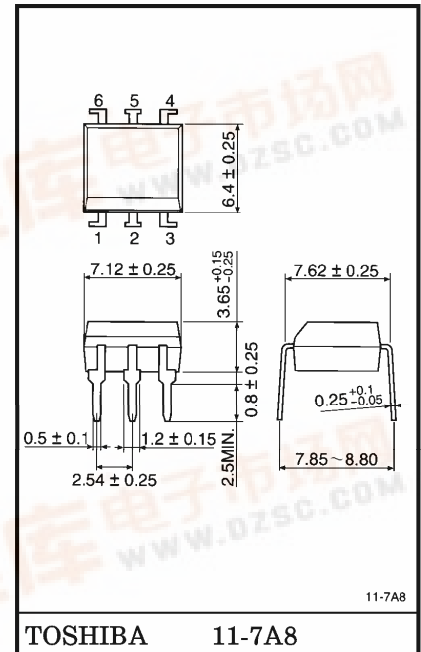
# 4N38(Short), 4N38A(Short)

- 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.

Unit in mm

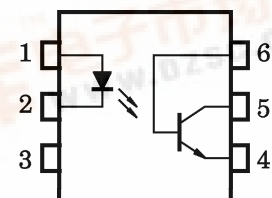
The TOSHIBA 4N38 (Short) through 4N38A (Short) consists of a gallium arsenide infrared emitting diode coupled with a silicon phototransistor in a dual in-line package.

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



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 <sub>F</sub>	80	mA
	Forward Current Derating	$\Delta I_F / ^\circ\text{C}$	1.07 (*)	mA / °C
	Peak Forward Current (Note 1)	I <sub>PF</sub>	3	A
	Power Dissipation	P <sub>D</sub>	150	mW
	Power Dissipation Derating	$\Delta P_D / ^\circ\text{C}$	2.0 (*)	mW / °C
	Reverse Voltage	V <sub>R</sub>	3	V
DETECTOR	Collector-Emitter Voltage	BV <sub>CEO</sub>	80	V
	Collector-Base Voltage	BV <sub>CBO</sub>	80	V
	Emitter-Collector Voltage	BV <sub>ECO</sub>	7	V
	Collector Current (Continuous)	I <sub>C</sub>	100	mA
	Power Dissipation	P <sub>C</sub>	150	mW
	Power Dissipation Derating	$\Delta P_C / ^\circ\text{C}$	2.0 (*)	mW / °C
COUPLED	Storage Temperature	T <sub>stg</sub>	-55~150	°C
	Operating Temperature	T <sub>opr</sub>	-55~100	°C
	Lead Soldering Temperature (at 10s)	T <sub>sol</sub>	260	°C
	Total Package Dissipation	P <sub>T</sub>	250	mW
	Total Package Power Dissipation Derating	$\Delta P_T / ^\circ\text{C}$	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 <sub>F</sub>	I <sub>F</sub> = 10mA	—	1.15	1.5	V	
	Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 3V	—	—	100	μA	
	Capacitance	C <sub>D</sub>	V = 0, f = 1MHz	—	30	—	pF	
DETECTOR	DC Forward Current Gain	h <sub>FE</sub>	V <sub>CE</sub> = 5V, I <sub>C</sub> = 500μA	—	200	—	—	
	Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> = 1mA	80	—	—	V	
	Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> = 100μA	80	—	—	V	
	Emitter-Collector Breakdown Voltage	V <sub>(BR)ECO</sub>	I <sub>E</sub> = 100μA	7	—	—	V	
	Collector Dark Current	I <sub>CEO</sub>	V <sub>CE</sub> = 60V	—	1	50	nA	
	Collector Dark Current	I <sub>CBO</sub>	V <sub>CB</sub> = 60V	—	0.1	20	nA	
	Collector-Emitter Capacitance	C <sub>CE</sub>	V = 0, f = 1MHz	—	10	—	pF	
COUPLED	Current Transfer Ratio	I <sub>C</sub> / I <sub>F</sub>	I <sub>F</sub> = 10mA, V <sub>CE</sub> = 10V	10	100	—	%	
	Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>F</sub> = 20mA, I <sub>C</sub> = 4mA	—	—	1.0	V	
	Capacitance Input to Output	C <sub>S</sub>	V <sub>S</sub> = 0, f = 1MHz	—	0.8	—	pF	
	Isolation Resistance	R <sub>S</sub>	V <sub>S</sub> = 500V, R.H. ≤ 60%	10 <sup>11</sup>	—	—	Ω	
	Isolation Voltage	4N38 4N38A 4N38A	BV <sub>S</sub>	AC, 1 minute	2500	—	—	V <sub>rms</sub>
			BV <sub>S</sub> (*)	AC, peak	1500	—	—	V <sub>pk</sub>
				AC, 1 second	1775	—	—	V <sub>rms</sub>
	Turn-On Time	t <sub>ON</sub>	V <sub>CE</sub> = 10V, I <sub>C</sub> = 2mA R <sub>L</sub> = 100Ω	—	3	—	μs	
Turn-Off Time	t <sub>OFF</sub>	—		3	—			

(\*) JEDEC registered minimum BV<sub>S</sub>, however, TOSHIBA specifies a minimum BV<sub>S</sub> of 2500V<sub>rms</sub>, 1 minute.

