

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

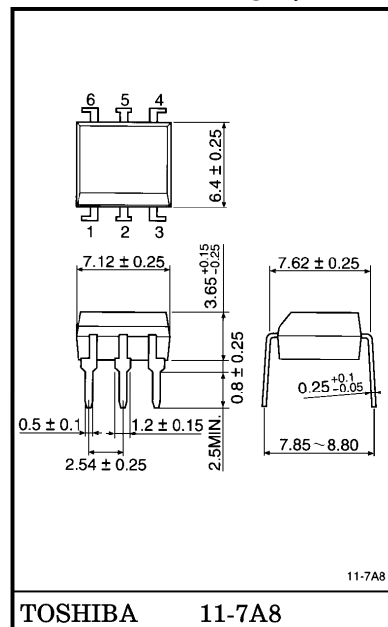
4N38(Short), 4N38A(Short)

- 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.

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.

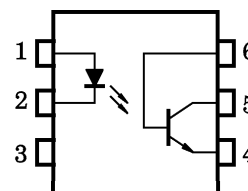
- Switching Speeds : $3\mu s$ (Typ.)
- DC Current Transfer Ratio : 100% (Typ.)
- Isolation Resistance : $10^{11}\Omega$ (Min.)
- Isolation Voltage : 2500Vrms (Min.)
- UL Recognized : UL1577, File No. E67349

Unit in mm



Weight : 0.4g

PIN CONFIGURATIONS (Top view)



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

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}	80	V
	Collector-Base Voltage	BV _{CBO}	80	V
	Emitter-Collector Voltage	BV _{ECO}	7	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	T _{stg}	-55~150	°C
	Operating Temperature	T _{opr}	-55~100	°C
	Lead Soldering Temperature (at 10s)	T _{sol}	260	°C
	Total Package Dissipation	P _T	250	mW
	Total Package Power Dissipation Derating	ΔP _T /°C	3.3 (*)	mW/°C

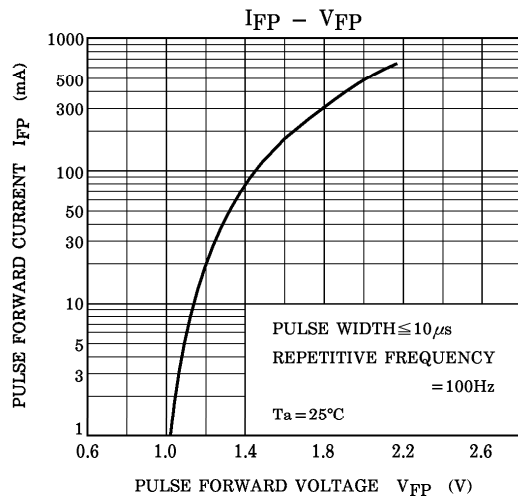
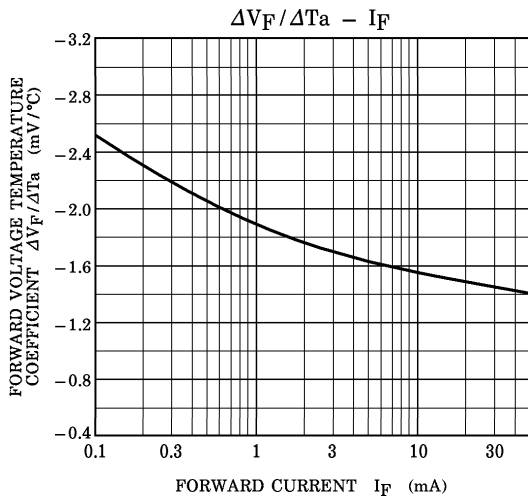
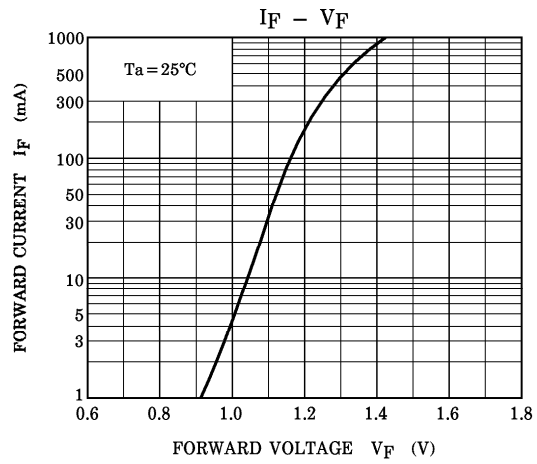
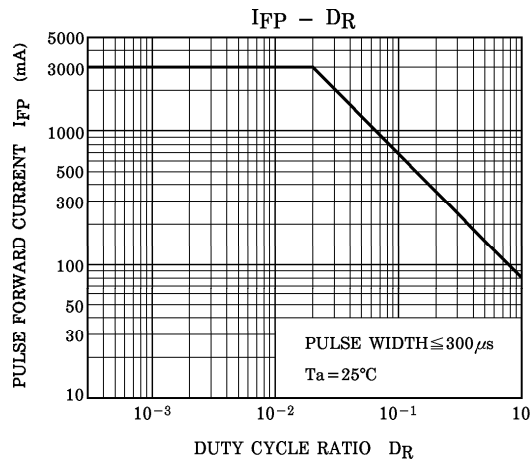
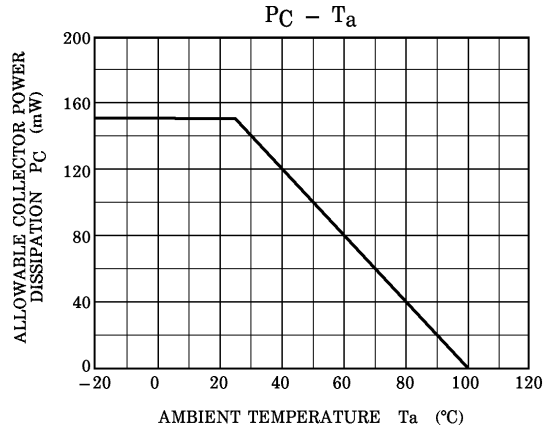
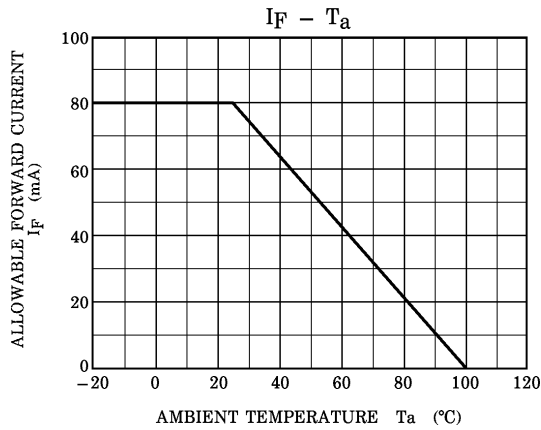
(Note 1) Pulse width 300μs, 2% duty cycle.

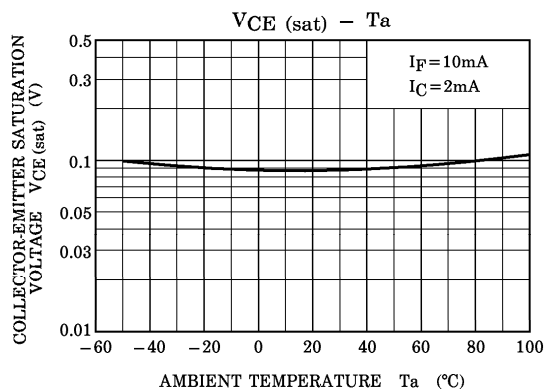
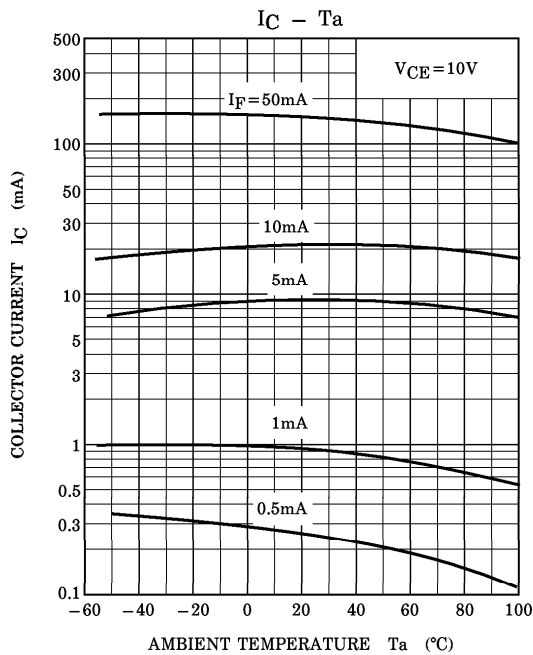
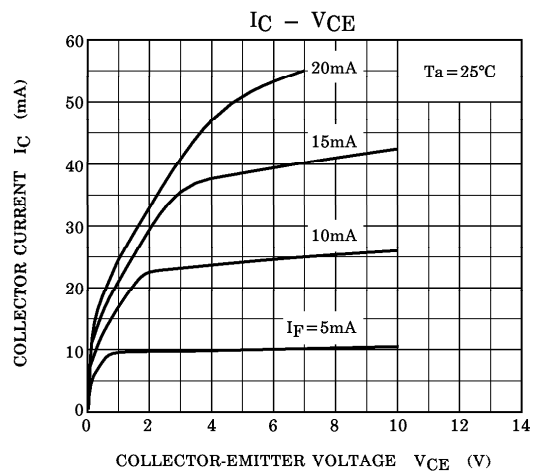
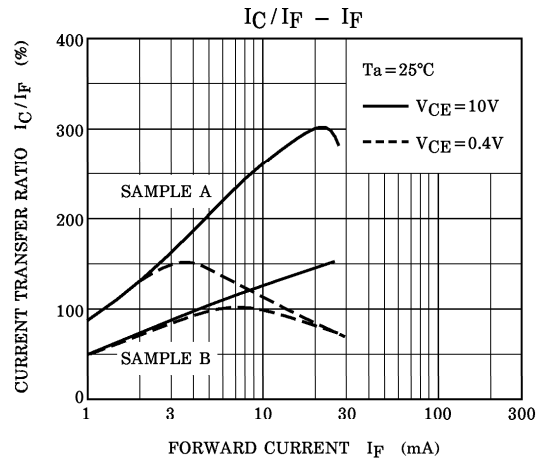
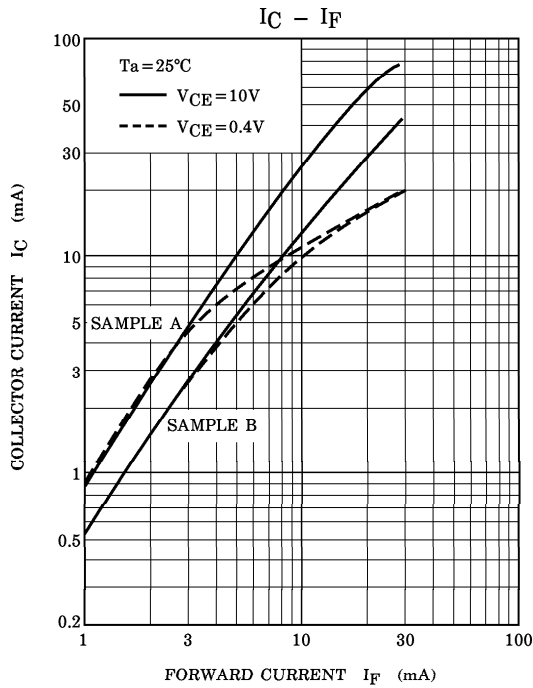
(*) Above 25°C ambient.

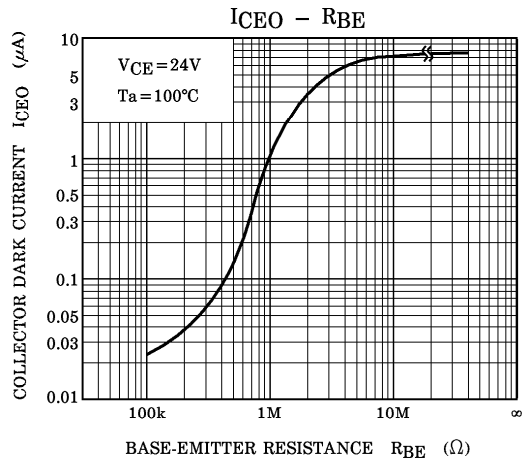
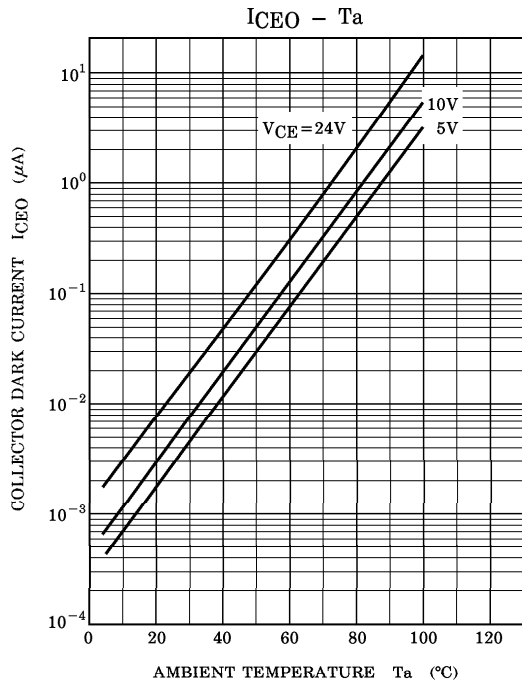
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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}	$V_{CE} = 5\text{V}, I_C = 500\mu\text{A}$	—	200	—	—	
	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1\text{mA}$	80	—	—	V	
	Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}$	80	—	—	V	
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	$I_E = 100\mu\text{A}$	7	—	—	V	
	Collector Dark Current	I_{CEO}	$V_{CE} = 60\text{V}$	—	1	50	nA	
	Collector Dark Current	I_{CBO}	$V_{CB} = 60\text{V}$	—	0.1	20	nA	
	Collector-Emitter Capacitance	C_{CE}	$V = 0, f = 1\text{MHz}$	—	10	—	pF	
COUPLED	Current Transfer Ratio	I_C / I_F	$I_F = 10\text{mA}, V_{CE} = 10\text{V}$	10	100	—	%	
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F = 20\text{mA}, I_C = 4\text{mA}$	—	—	1.0	V	
	Capacitance Input to Output	C_S	$V_S = 0, f = 1\text{MHz}$	—	0.8	—	pF	
	Isolation Resistance	R_S	$V_S = 500\text{V}, \text{R.H.} \leq 60\%$	10^{11}	—	—	Ω	
	Isolation Voltage	4N38 4N38A 4N38A	BV_S	AC, 1 minute	2500	—	—	V_{rms}
			$BV_S (*)$	AC, peak	1500	—	—	V_{pk}
				AC, 1 second	1775	—	—	V_{rms}
	Turn-On Time	t_{ON}	$V_{CE} = 10\text{V}, I_C = 2\text{mA}$	—	3	—	μs	
Turn-Off Time	t_{OFF}	$R_L = 100\Omega$	—	3	—			

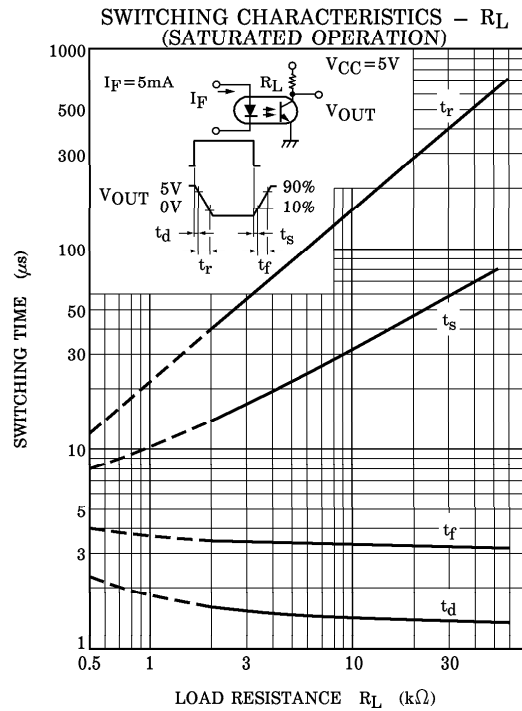
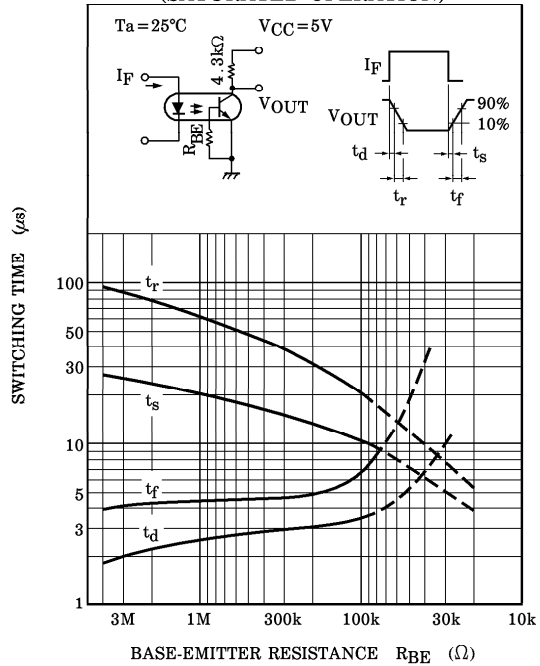
(*) JEDEC registered minimum BV_S , however, TOSHIBA specifies a minimum BV_S of 2500Vrms, 1 minute.







SWITCHING CHARACTERISTICS - RBE (SATURATED OPERATION)



RESTRICTIONS ON PRODUCT USE

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