

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

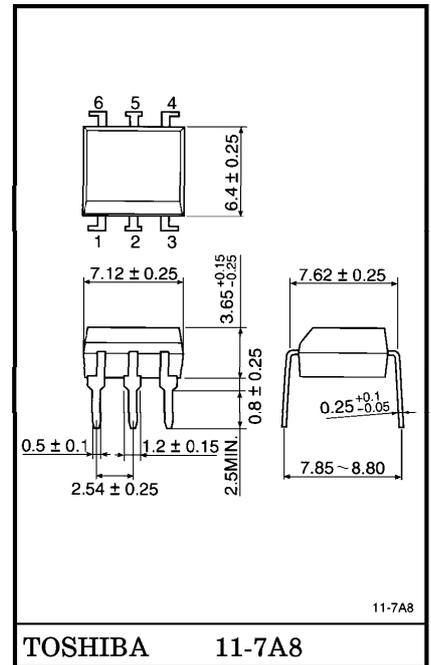
**4N29(Short), 4N29A(Short), 4N30(Short), 4N31(Short)  
4N32(Short), 4N32A(Short), 4N33(Short)**

- 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.

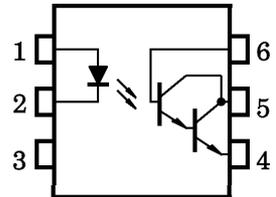
- Switching Time : 100 $\mu$ s (Max.)
- DC Current Transfer Ratio : 500%
- Isolation Resistance : 10<sup>11</sup> $\Omega$  (Typ.)
- Isolation Voltage : 2500V<sub>rms</sub> (Min.)
- UL Recognized : UL1577, File No. E67349

Unit in mm



Weight : 0.4g

PIN CONFIGURATIONS (Top view)



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

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current (Continuous)	I <sub>F</sub>	80	mA
	Forward Current Derating	ΔI <sub>F</sub> / °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	ΔP <sub>D</sub> / °C	2.0(*)	mW / °C
	Reverse Voltage	V <sub>R</sub>	3	V
DETECTOR	Collector-Emitter Voltage	BV <sub>CEO</sub>	30	V
	Collector-Base Voltage	BV <sub>CBO</sub>	30	V
	Emitter-Collector Voltage	BV <sub>ECO</sub>	5	V
	Collector Current (Continuous)	I <sub>C</sub>	100	mA
	Power Dissipation	P <sub>C</sub>	150	mW
	Power Dissipation Derating	ΔP <sub>C</sub> / °C	2.0(*)	mW / °C
COUPLED	Storage Temperature Range	T <sub>stg</sub>	-55~150	°C
	Operating Temperature Range	T <sub>opr</sub>	-55~100	°C
	Lead Soldering Temperature	T <sub>sol</sub>	260	°C
	Total Package Power Dissipation	P <sub>T</sub>	250	mW
	Total Package Power Dissipation Derating	ΔP <sub>T</sub> / °C	3.3(*)	mW / °C

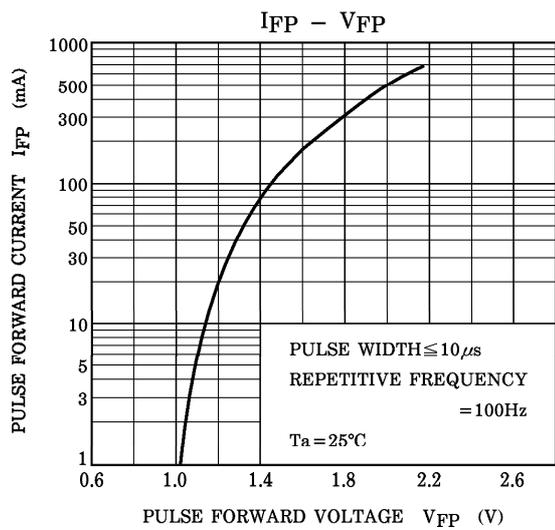
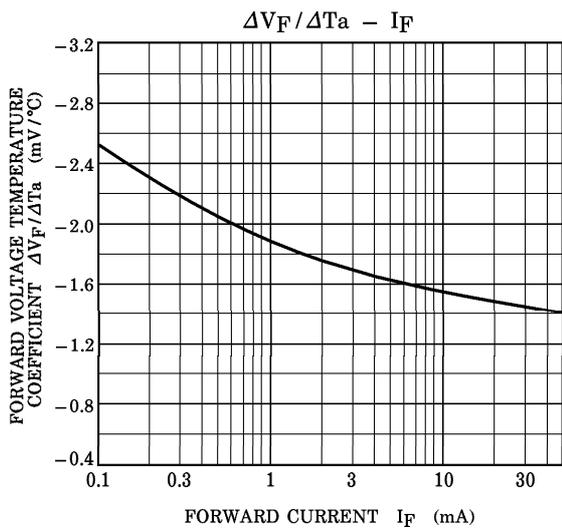
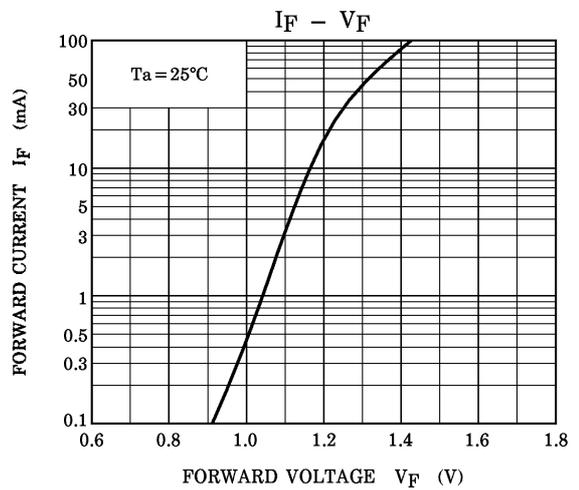
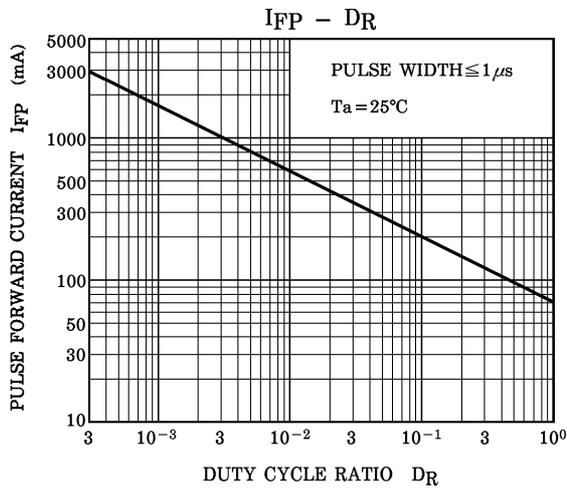
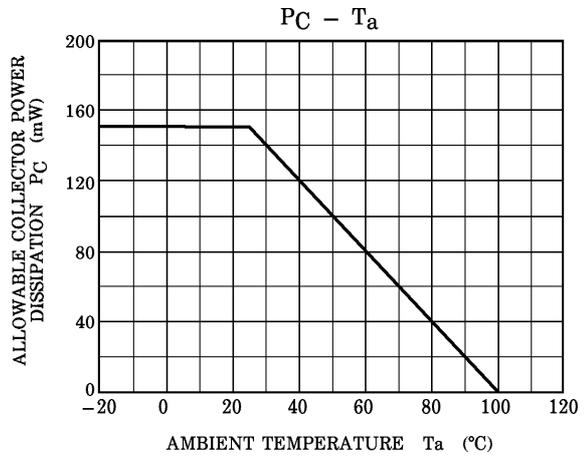
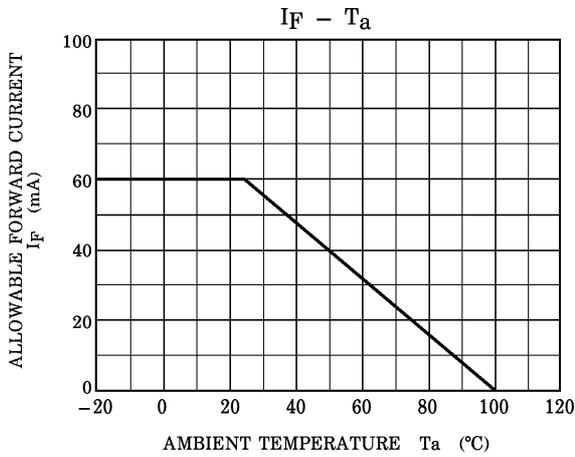
(Note 1) Pulse width 300μs, 2% duty cycle.

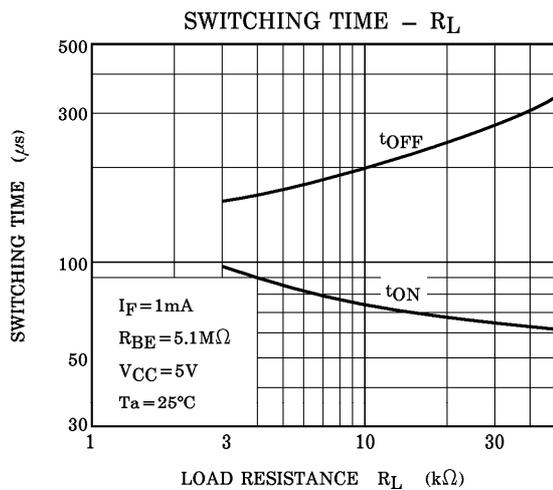
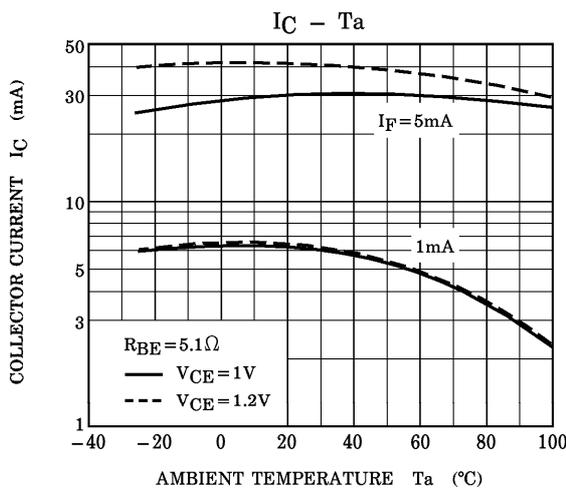
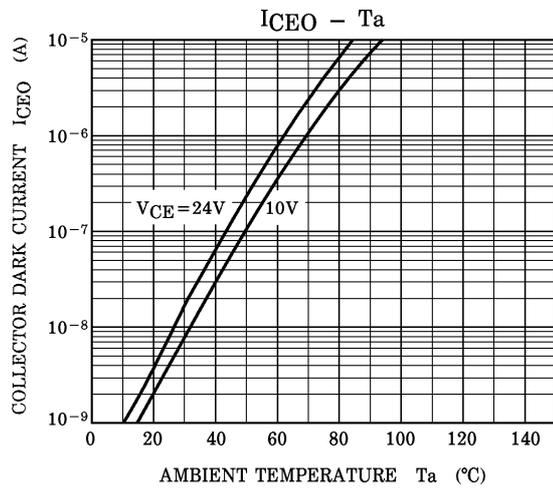
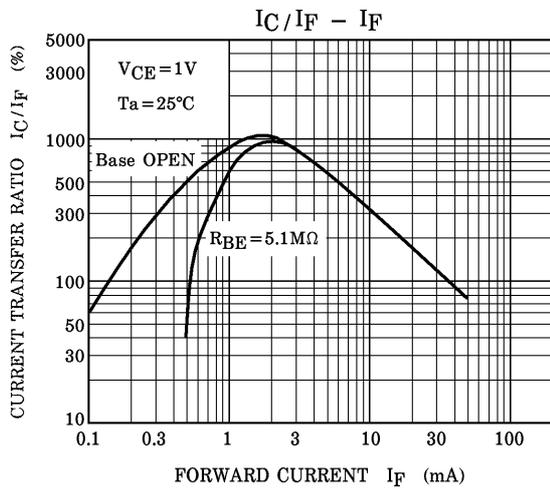
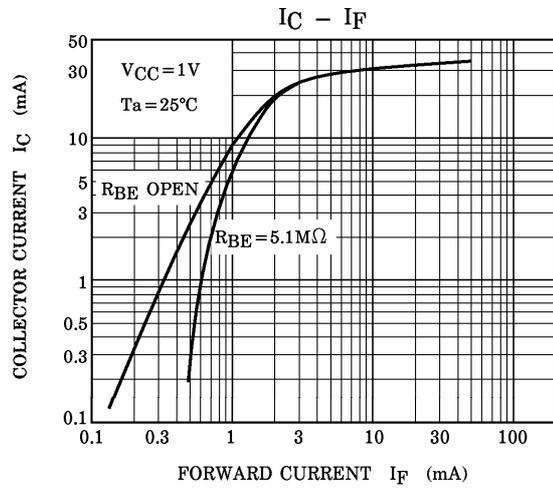
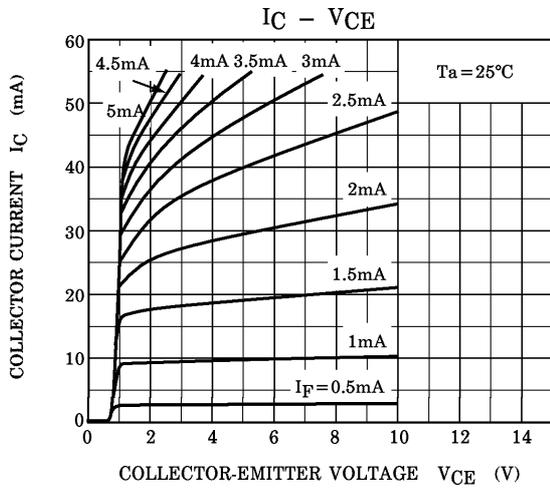
(\*) Above 25°C ambient.

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	$\mu\text{A}$	
	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 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.





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