

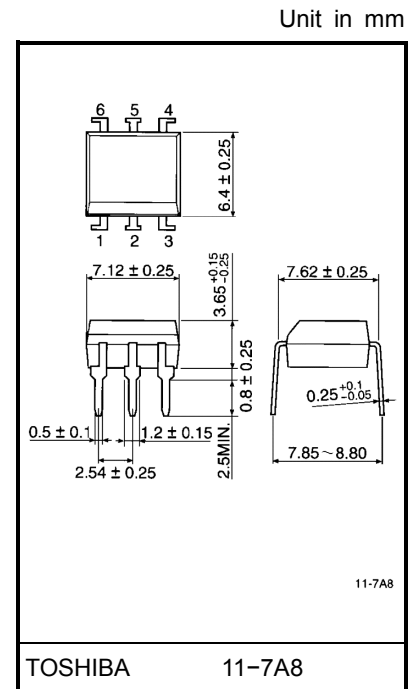
TOSHIBA Photocoupler GaAs IRed & Photo-Transistor

## 4N35(Short), 4N36(Short), 4N37(Short)

- AC Line / Digital Logic Isolator.
- Digital Logic / Digital Logic Isolator.
- Telephone Line Receiver.
- High Frequency Power Supply Feedback Control.
- Relay Contact Monitor.

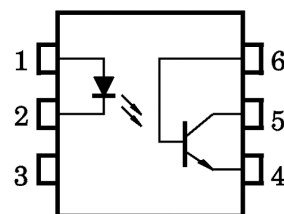
The TOSHIBA 4N35 (short) through 4N37 (short) consists of a gallium arsenide infrared emitting diode coupled with a silicon phototransistor in a dual in-line package.

- Switching speeds: 3μs (typ.)
- DC current transfer ratio: 100% (min.)
- Isolation resistance: 10<sup>11</sup>Ω (min.)
- Isolation voltage: 2500Vrms (min.)
- UL recognized: UL1577, file no. E67349



Weight: 0.4 g

### 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)	$I_F$	60	mA
	Forward current derating	$\Delta I_F / ^\circ\text{C}$	0.8 (*)	mA / °C
	Peak forward current (Note 1)	$I_{PF}$	3	A
	Power dissipation	$P_D$	100	mW
	Power dissipation derating	$\Delta P_D / ^\circ\text{C}$	1.33 (*)	mW / °C
	Reverse voltage	$V_R$	6	V
Detector	Collector-emitter voltage	$BV_{CEO}$	30	V
	Collector-base voltage	$BV_{CBO}$	70	V
	Emitter-collector voltage	$BV_{ECO}$	7	V
	Collector current (continuous)	$I_C$	100	mA
	Power dissipation	$P_C$	300	mW
	Power dissipation derating	$\Delta P_C / ^\circ\text{C}$	4.0 (*)	mW / °C
Coupled	Storage temperature	$T_{stg}$	-55~150	°C
	Operating temperature	$T_{opr}$	-55~100	°C
	Lead soldering temperature (at 10 s)	$T_{sol}$	260	°C
	Total package power dissipation	$P_T$	300	mW
	Total package power dissipation derating	$\Delta P_T / ^\circ\text{C}$	3.3 (*)	mW / °C
		$BV_S$	2500	Vrms
	Input to output isolation voltage (AC, 1 minute)	4N35	$BV_S (**)$	2500 / 3550
4N36		1750 / 2500		
4N37		1050 / 1500		

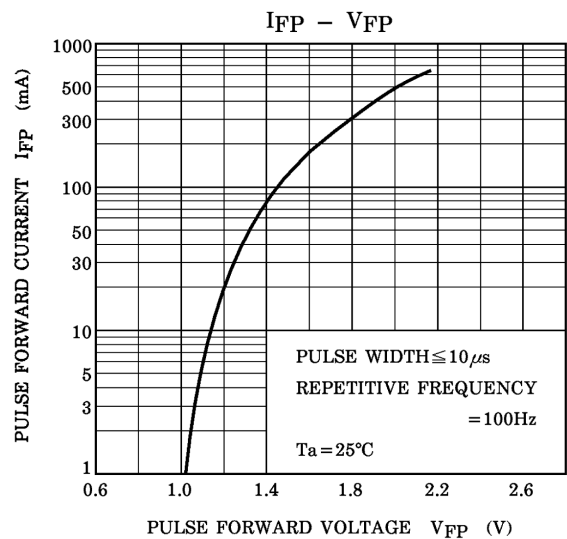
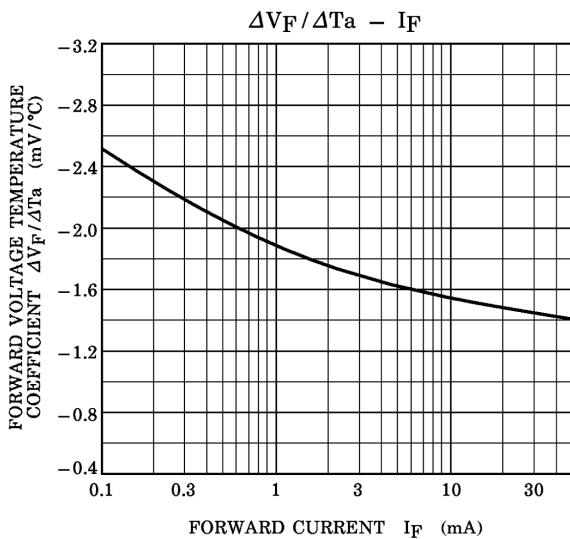
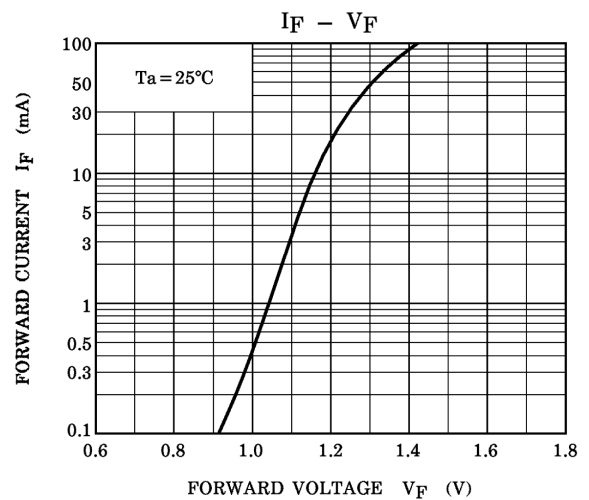
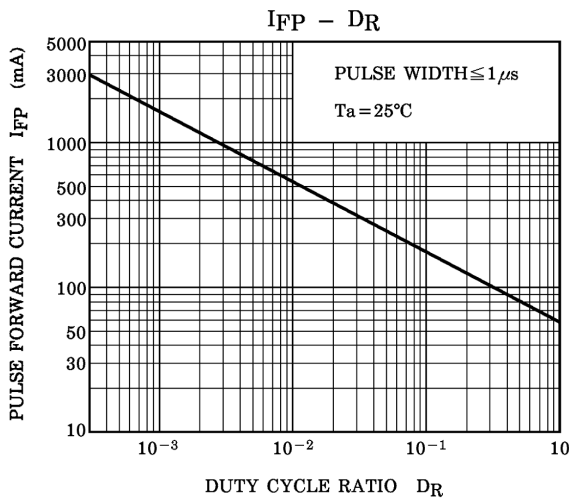
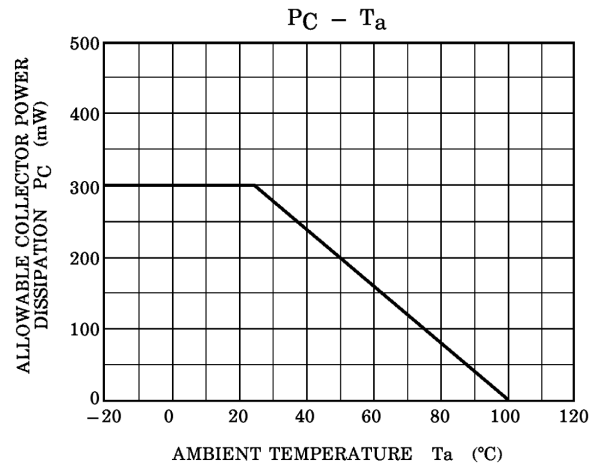
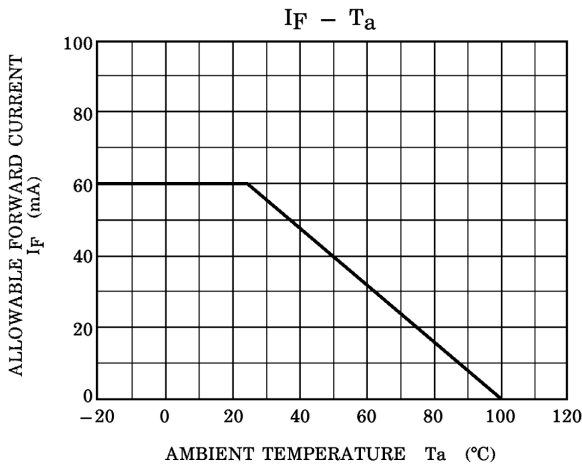
(Note 1) Pulse width 1μs, 300pps

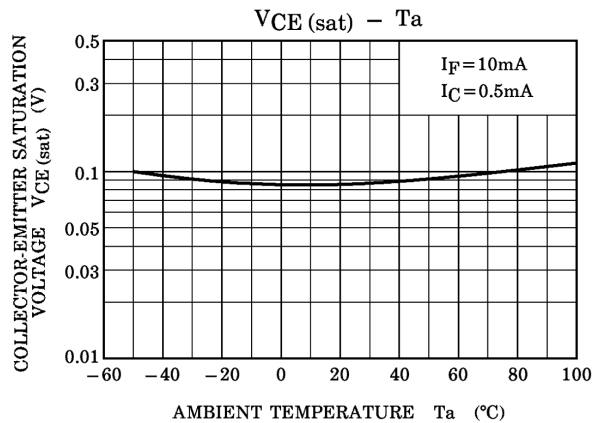
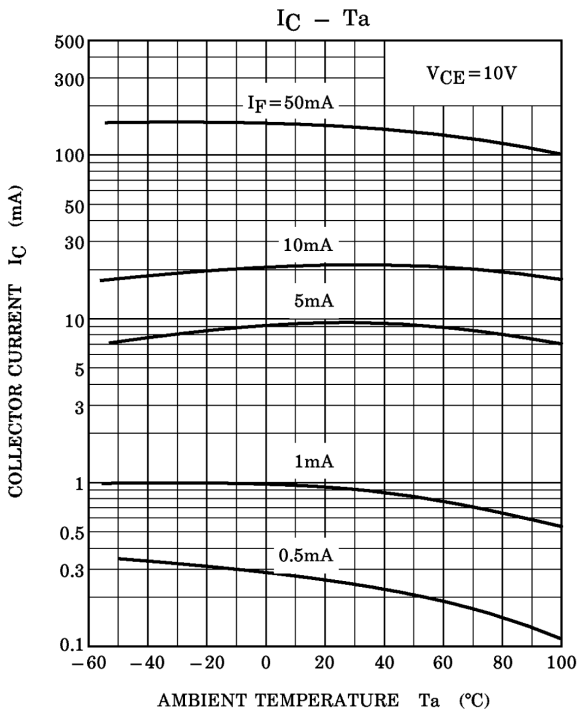
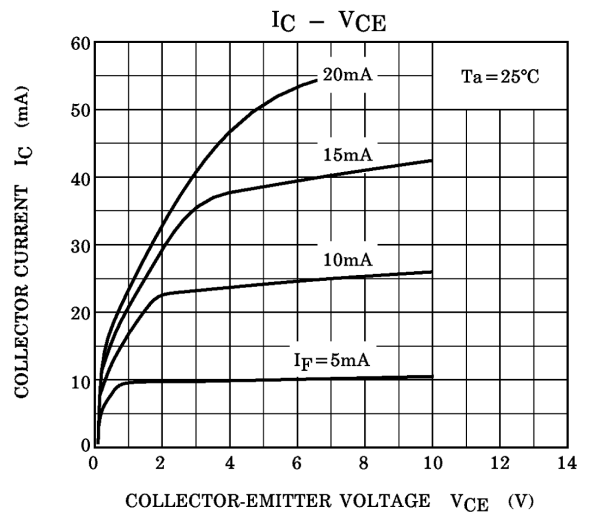
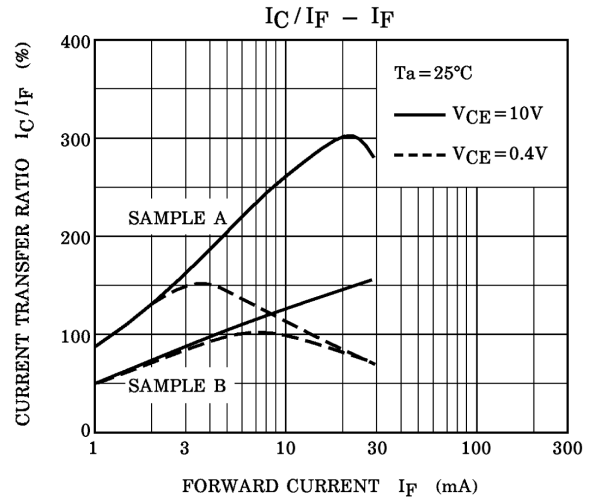
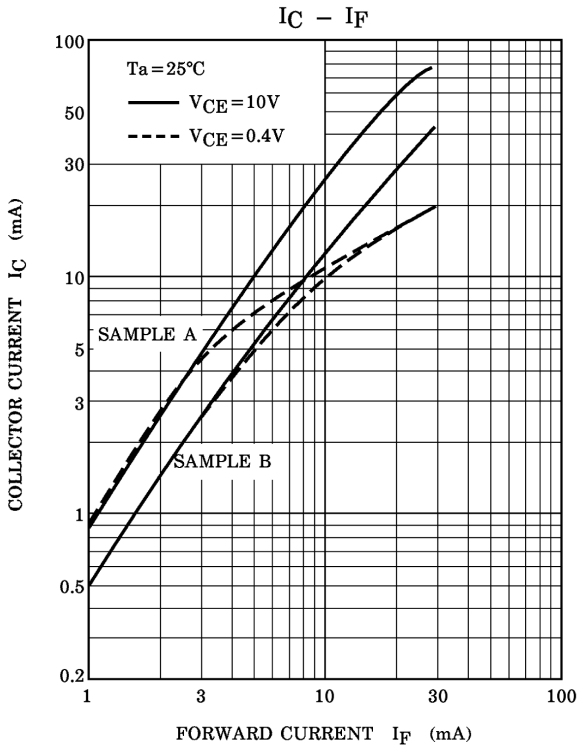
(\*) Above 25°C ambient.

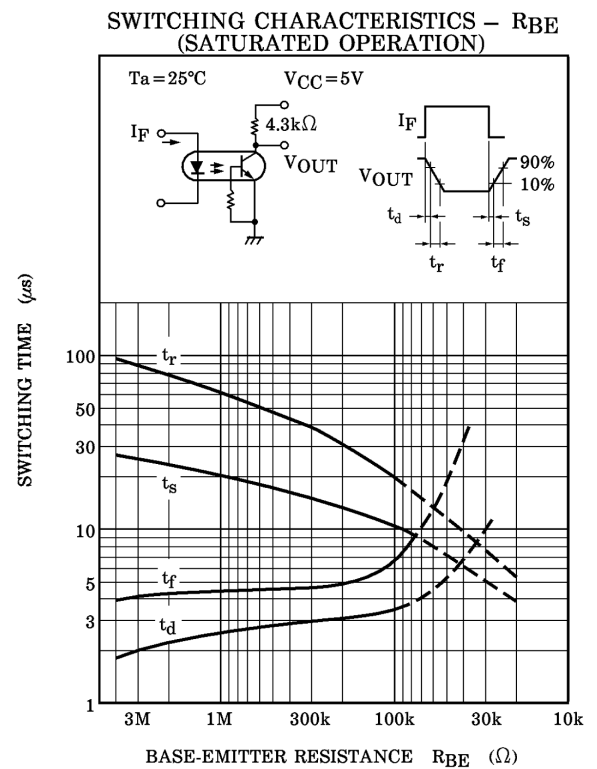
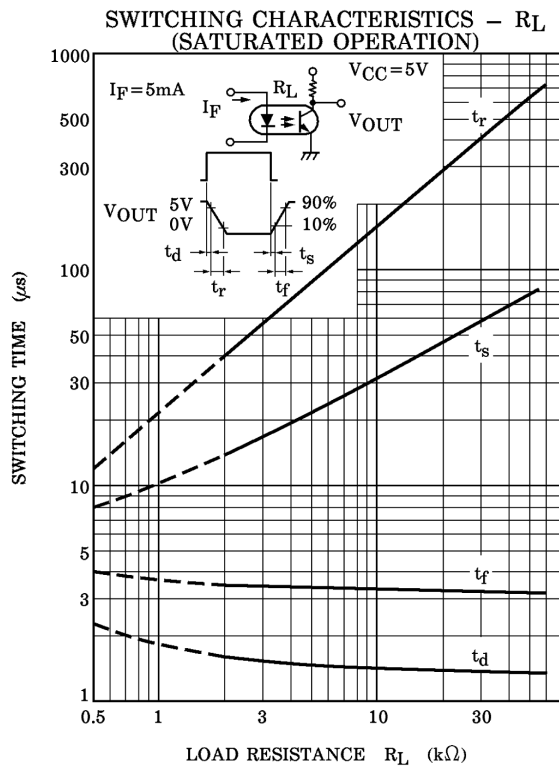
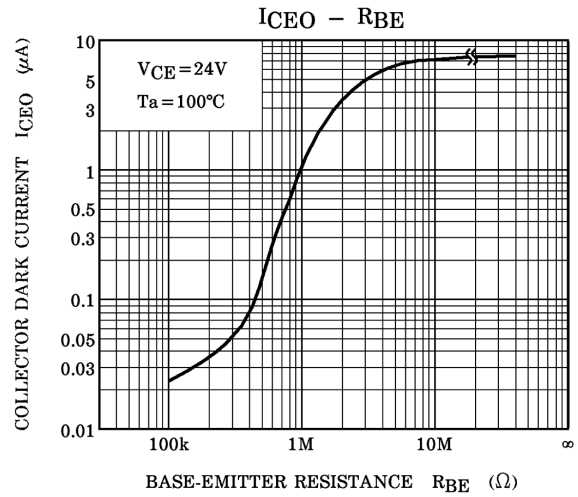
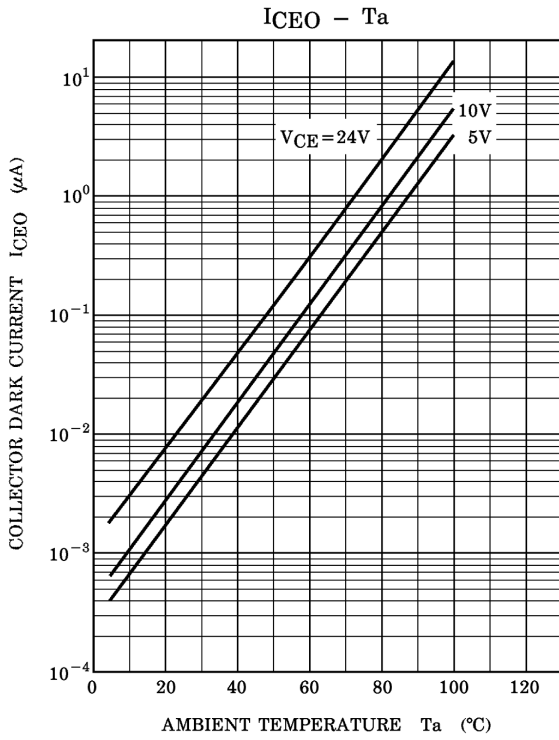
(\*\*) JEDEC registered maximum  $BV_S$ , however, TOSHIBA specifies a maximum  $BV_S$  of 2500V<sub>rms</sub>, 1 minute.

## Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit	
LED	Forward voltage	$V_F$	$I_F = 10 \text{ mA}$	0.8	1.15	1.5	V	
			$I_F = 10 \text{ mA}, T_a = -55^\circ\text{C}$	0.9	—	1.7		
			$I_F = 10 \text{ mA}, T_a = 100^\circ\text{C}$	0.7	—	1.4		
	Reverse current	$I_R$	$V_R = 6 \text{ V}$	—	—	10	$\mu\text{A}$	
	Capacitance	$C_D$	$V = 0, f = 1 \text{ MHz}$	—	30	100	pF	
Detector	DC forward current gain	$h_{FE}$	$V_{CE} = 5 \text{ V}, I_C = 500 \mu\text{A}$	—	200	—	—	
	Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 10 \text{ mA}$	30	—	—	V	
	Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 100 \mu\text{A}$	70	—	—	V	
	Emitter-collector breakdown voltage	$V_{(BR)ECO}$	$I_E = 100 \mu\text{A}$	7	—	—	V	
	Collector dark current	$I_{CEO}$	$V_{CE} = 10 \text{ V}$	—	1	50	nA	
	Collector dark current	$I_{CEO}$	$V_{CE} = 30 \text{ V}, T_a = 100^\circ\text{C}$	—	—	500	$\mu\text{A}$	
	Collector-emitter capacitance	$C_{CE}$	$V = 0, f = 1 \text{ MHz}$	—	10	—	pF	
Coupled	Current transfer ratio	$I_C / I_F$	$I_F = 10 \text{ mA}, V_{CE} = 10 \text{ V}$	100	—	—	%	
			$I_F = 10 \text{ mA}, V_{CE} = 10 \text{ V}, T_a = -55^\circ\text{C}$	40	—	—		
			$I_F = 10 \text{ mA}, V_{CE} = 10 \text{ V}, T_a = 100^\circ\text{C}$	40	—	—		
	Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_F = 10 \text{ mA}, I_C = 0.5 \text{ mA}$	—	0.1	0.3	V	
	Capacitance input to output	$C_S$	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	2.5	pF	
	Isolation resistance	$R_S$	$V_S = 500 \text{ V}, R.H. \leq 60 \%$	$10^{11}$	—	—	$\Omega$	
	Input to output isolation current (pulse width = 8ms)	4N35 4N36 4N37	$I_{IO}$	$V_{IO} = 3550 \text{ Vpk}$	—	—	100	$\mu\text{A}$
				$V_{IO} = 2500 \text{ Vpk}$	—	—	100	
				$V_{IO} = 1500 \text{ Vpk}$	—	—	100	
Turn-on time	$t_{ON}$	$V_{CC} = 10 \text{ V}, I_C = 2 \text{ mA}, R_L = 100\Omega$	—	3	10	$\mu\text{s}$		
Turn-off time	$t_{OFF}$		—	3	10			







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