

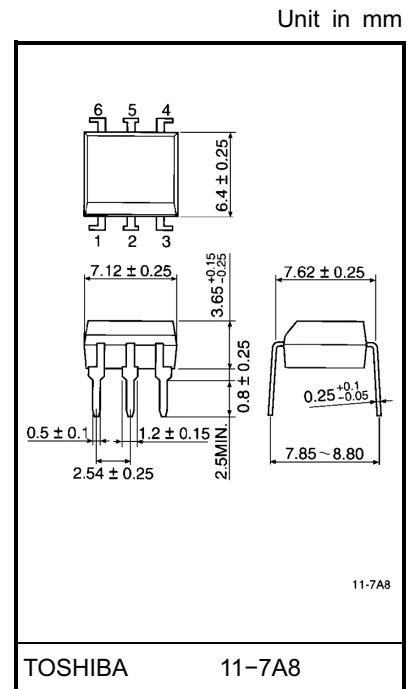
TOSHIBA Photocoupler GaAs IRed & Photo-Transistor

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.

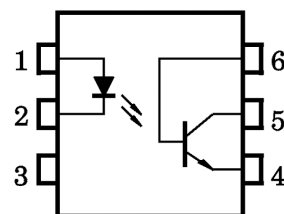
The TOSHIBA 4N35 (short) through 4N37 (short) consists of a gallium arsenide infrared emitting diode coupled with a silicon phototransistor in a dual in-line package.

- Switching speeds: 3μs (typ.)
- DC current transfer ratio: 100% (min.)
- Isolation resistance: 10¹¹Ω (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)	<table border="1"> <tr> <td>4N35</td> <td rowspan="3">$BV_S (**)$</td> <td>2500 / 3550</td> <td rowspan="3">Vrms / Vpk</td> </tr> <tr> <td>4N36</td> <td>1750 / 2500</td> </tr> <tr> <td>4N37</td> <td>1050 / 1500</td> </tr> </table>	4N35	$BV_S (**)$	2500 / 3550	Vrms / Vpk	4N36	1750 / 2500	4N37	1050 / 1500	
4N35	$BV_S (**)$	2500 / 3550	Vrms / Vpk								
4N36		1750 / 2500									
4N37		1050 / 1500									

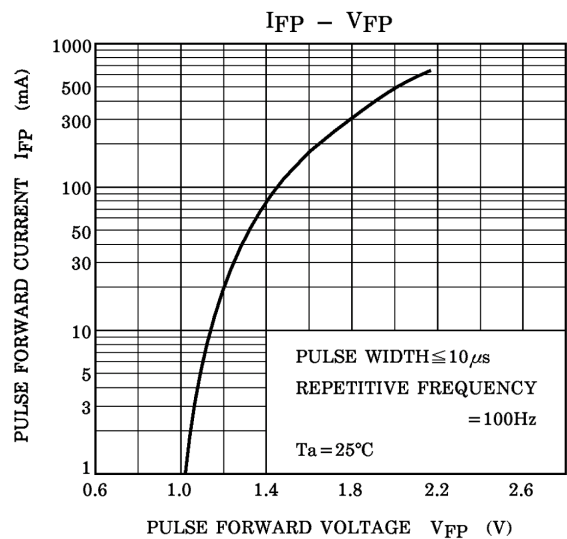
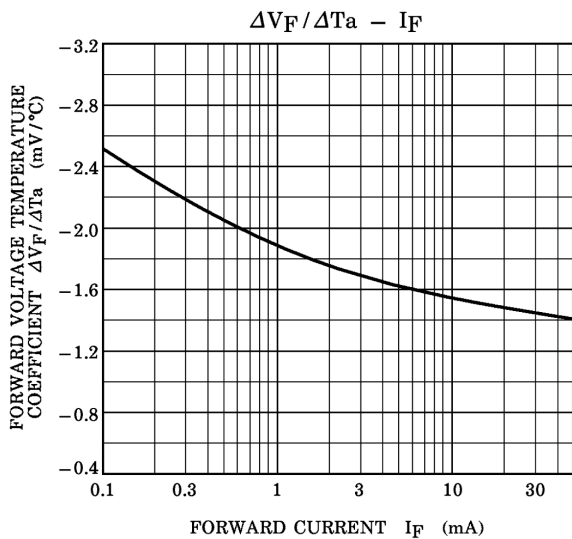
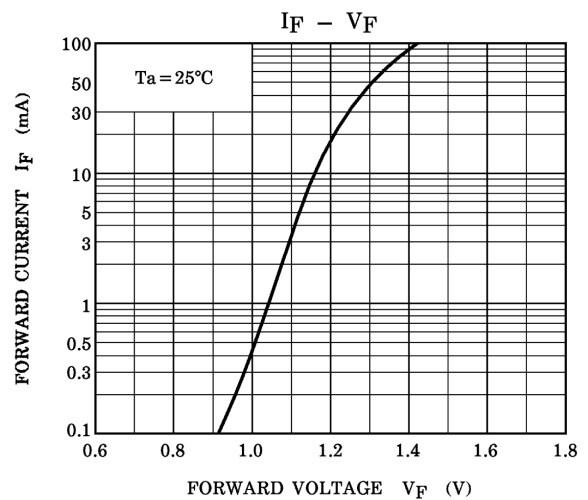
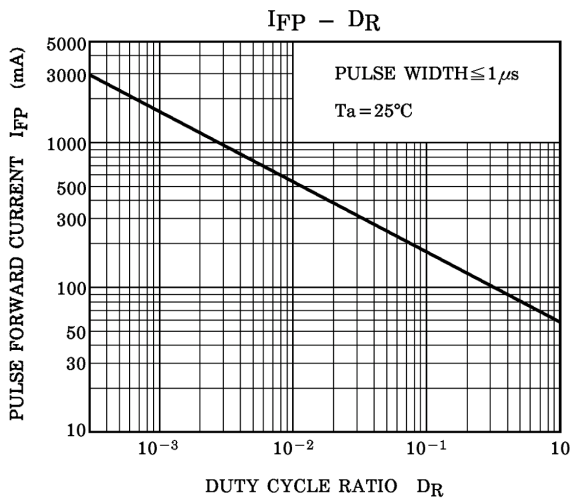
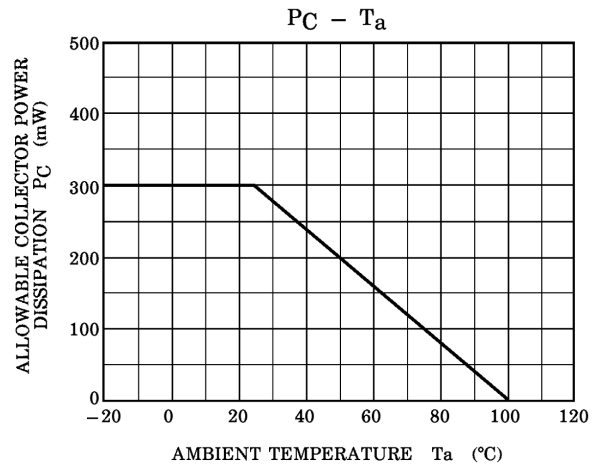
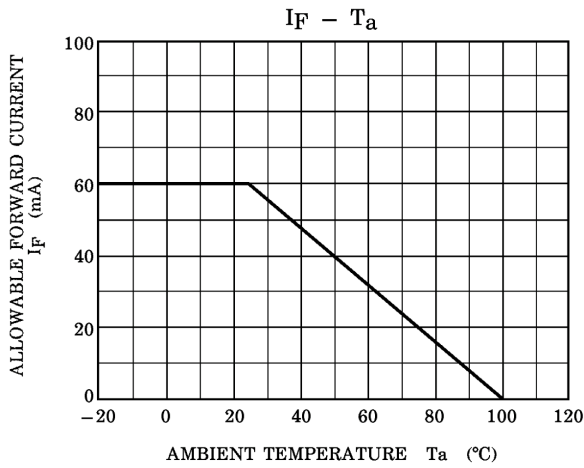
(Note 1) Pulse width 1μs, 300pps

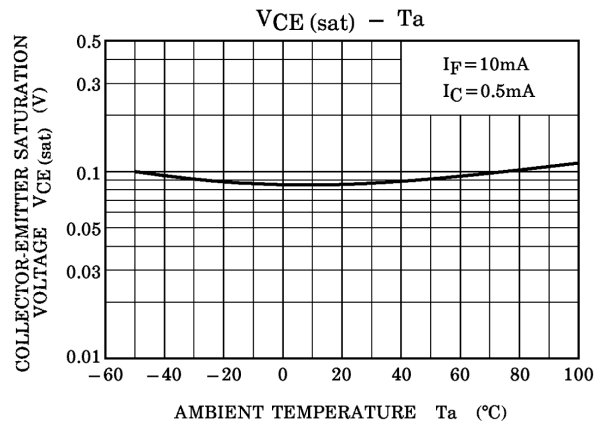
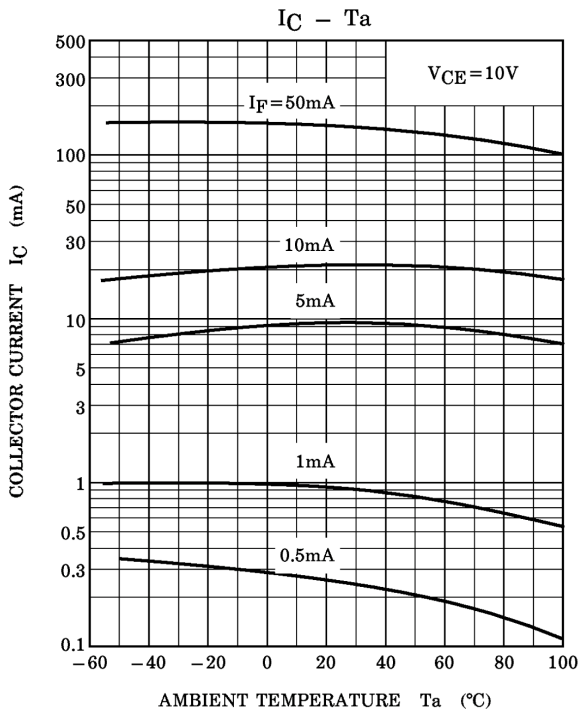
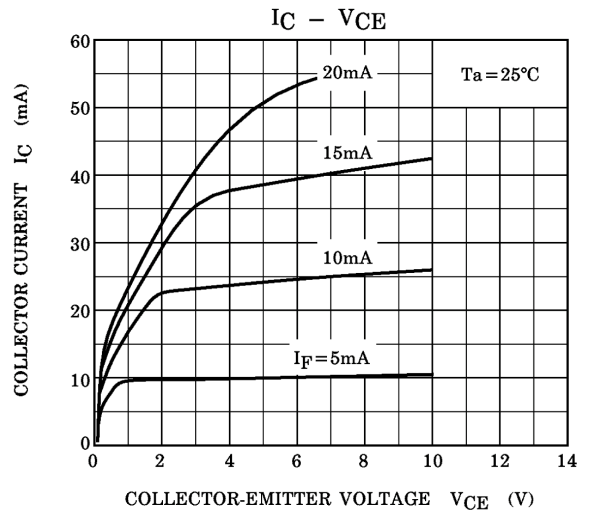
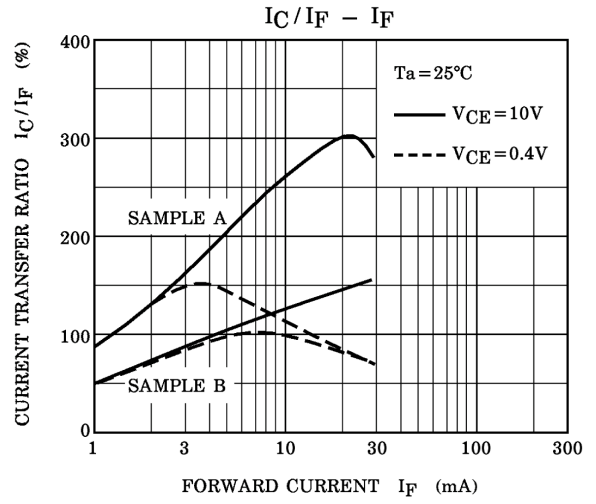
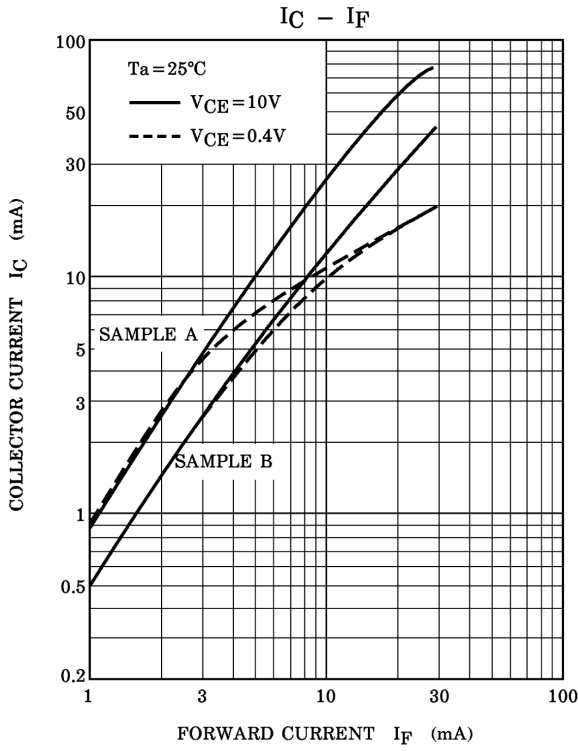
(*) Above 25°C ambient.

(**) JEDEC registered maximum BV_S , however, TOSHIBA specifies a maximum BV_S of 2500V_{rms}, 1 minute.

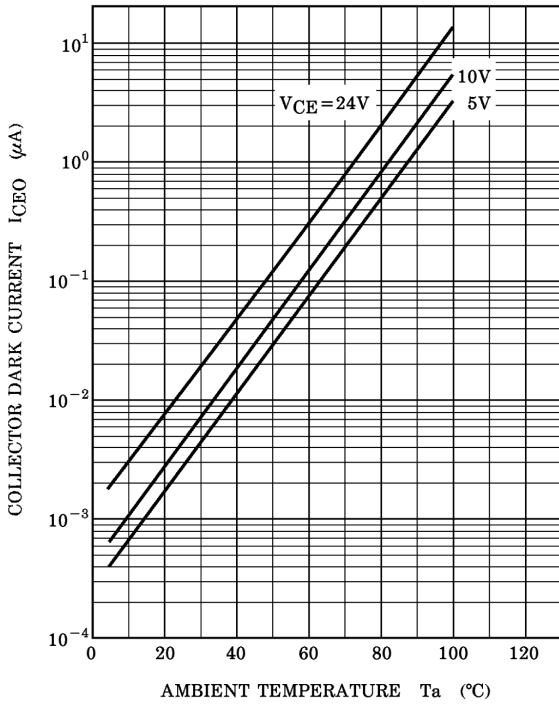
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit		
LED	Forward voltage	V _F	I _F = 10 mA	0.8	1.15	1.5	V		
			I _F = 10 mA, Ta = -55°C	0.9	—	1.7			
			I _F = 10 mA, Ta = 100°C	0.7	—	1.4			
	Reverse current	I _R	V _R = 6 V	—	—	10	μA		
Capacitance		C _D	V = 0, f = 1 MHz	—	30	100	pF		
Detector	DC forward current gain		h _{FE}	V _{CE} = 5V, I _C = 500 μA	—	200	—		
	Collector-emitter breakdown voltage		V _{(BR)CEO}	I _C = 10 mA	30	—	—	V	
	Collector-base breakdown voltage		V _{(BR)CBO}	I _C = 100 μA	70	—	—	V	
	Emitter-collector breakdown voltage		V _{(BR)ECO}	I _E = 100 μA	7	—	—	V	
	Collector dark current		I _{CEO}	V _{CE} = 10 V	—	1	50	nA	
	Collector dark current		I _{CEO}	V _{CE} = 30 V, Ta = 100°C	—	—	500	μA	
	Collector-emitter capacitance		C _{CE}	V = 0, f = 1 MHz	—	10	—	pF	
Coupled	Current transfer ratio	I _C / I _F	I _F = 10 mA, V _{CE} = 10 V	100	—	—	%		
			I _F = 10 mA, V _{CE} = 10 V Ta = -55°C	40	—	—			
			I _F = 10 mA, V _{CE} = 10 V Ta = 100°C	40	—	—			
	Collector-emitter saturation voltage		V _{CE(sat)}	I _F = 10 mA, I _C = 0.5 mA	—	0.1	0.3	V	
	Capacitance input to output		C _S	V _S = 0, f = 1 MHz	—	0.8	2.5	pF	
	Isolation resistance		R _S	V _S = 500 V, R.H. ≤ 60 %	10 ¹¹	—	—	Ω	
	Input to output isolation current (pulse width = 8ms)	4N35	I _{IO}	V _{io} = 3550 Vpk	—	—	100	μA	
		4N36			V _{io} = 2500 Vpk	—	—		100
		4N37			V _{io} = 1500 Vpk	—	—		100
Turn-on time		t _{ON}	V _{CC} = 10 V, I _C = 2 mA R _L = 100Ω	—	3	10	μs		
Turn-off time		t _{OFF}		—	3	10			

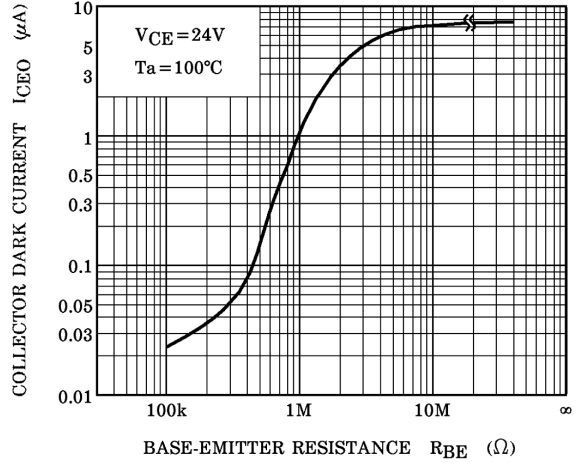




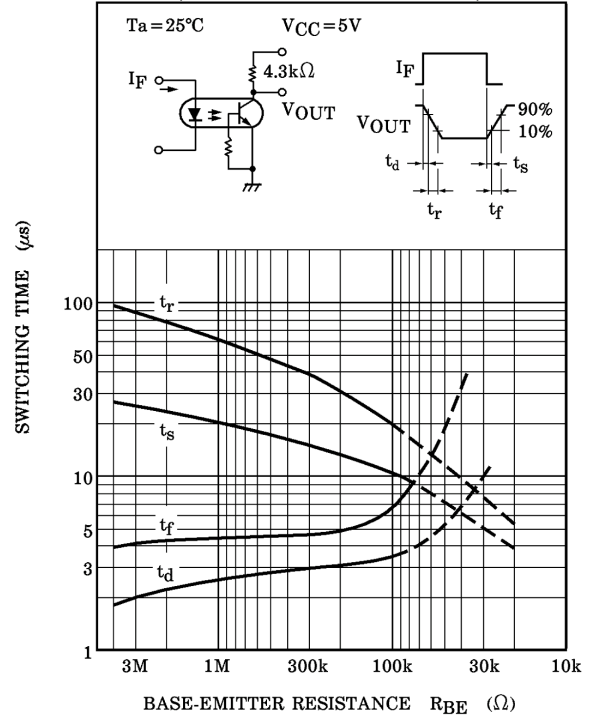
$I_{CEO} - T_a$



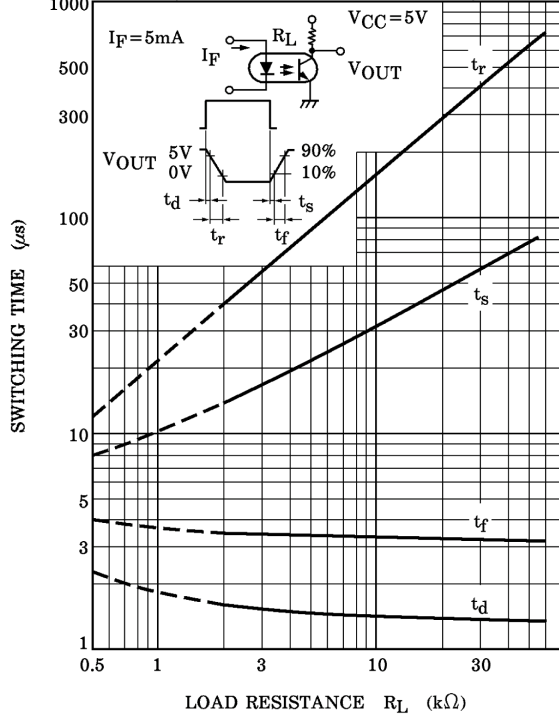
$I_{CEO} - R_{BE}$



SWITCHING CHARACTERISTICS - R_{BE}
(SATURATED OPERATION)



SWITCHING CHARACTERISTICS - R_L
(SATURATED OPERATION)



RESTRICTIONS ON PRODUCT USE

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