

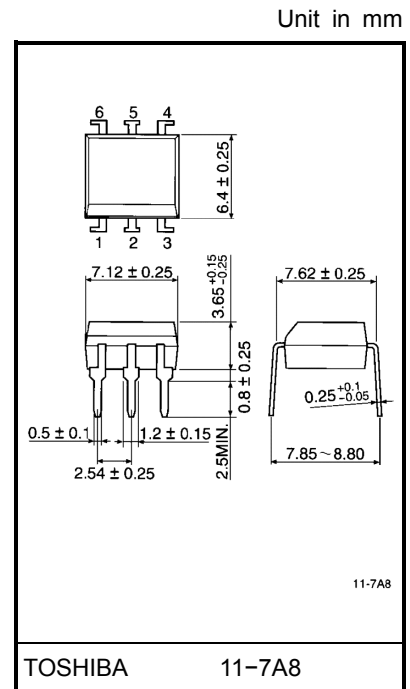
TOSHIBA Photocoupler GaAs IRed & Photo-Transistor

## 4N25(Short),4N25A(Short),4N26(Short),4N27(Short),4N28(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.

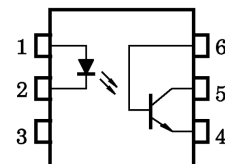
The TOSHIBA 4N25 (Short) through 4N28 (Short) consists of a gallium arsenide infrared emitting diode coupled with a silicon phototransistor in a dual in-line package.

- Switching speeds: 3μs (typ.)
- DC current transfer ratio: 100% (typ.)
- Isolation resistance: 10<sup>11</sup>Ω (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

## Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current (continuous)	$I_F$	80	mA
	Forward current derating	$\Delta I_F / ^\circ\text{C}$	1.07 (*)	mA / °C
	Peak forward current (Note 1)	$I_{PF}$	3	A
	Power dissipation	$P_D$	150	mW
	Power dissipation derating	$\Delta P_D / ^\circ\text{C}$	2.0 (*)	mW / °C
	Reverse voltage	$V_R$	3	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	$P_C$	150	mW
	Power dissipation derating	$\Delta P_C / ^\circ\text{C}$	2.0 (*)	mW / °C
Coupled	Storage temperature range	$T_{stg}$	-55~150	°C
	Operating temperature range	$T_{opr}$	-55~100	°C
	Lead soldering temperature (10s)	$T_{sol}$	260	°C
	Total package power dissipation	$P_T$	250	mW
	Total package power dissipation derating	$\Delta P_T / ^\circ\text{C}$	3.3 (*)	mW / °C

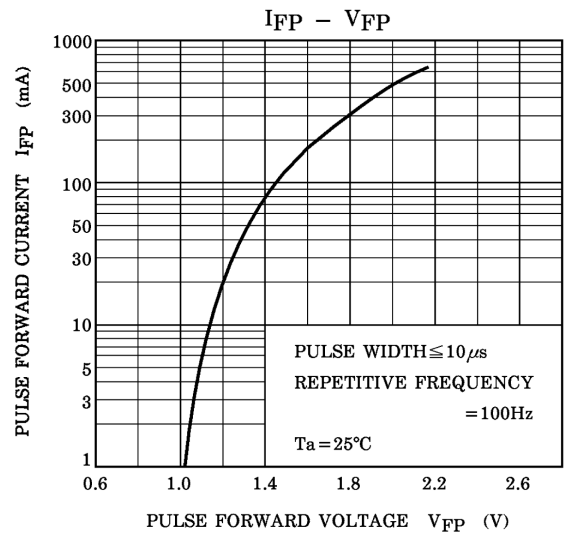
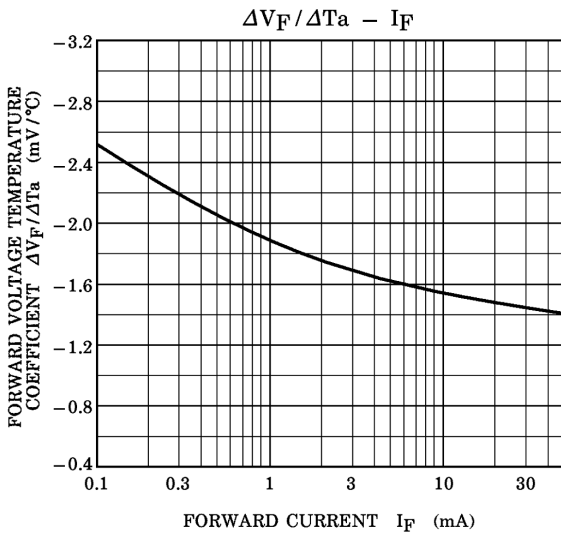
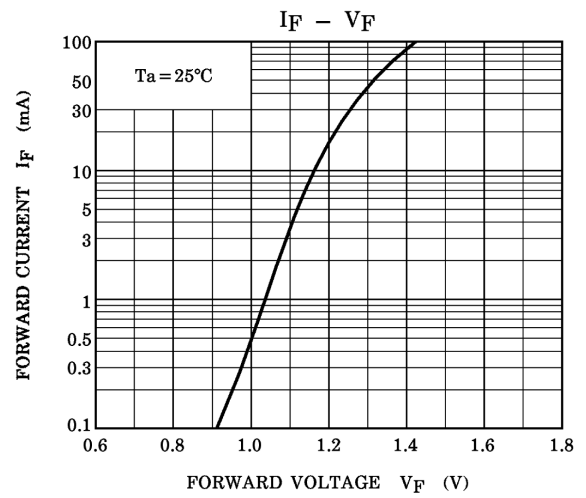
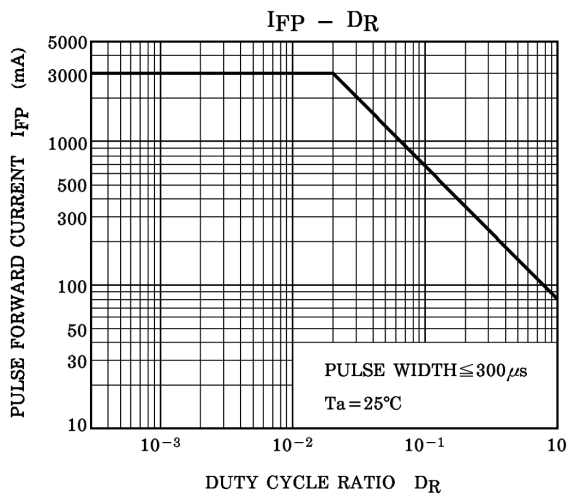
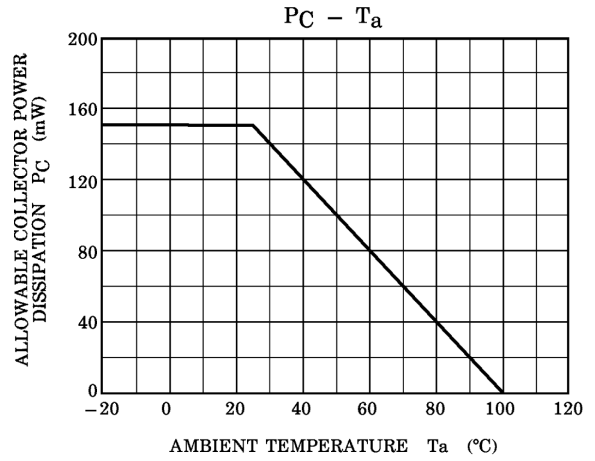
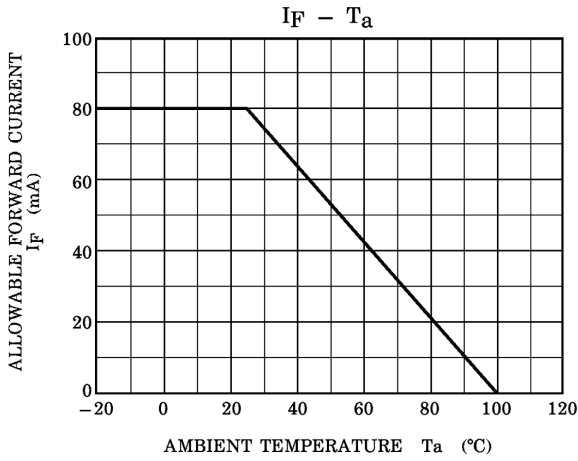
(Note 1) Pulse width 300μs, 2% duty cycle.

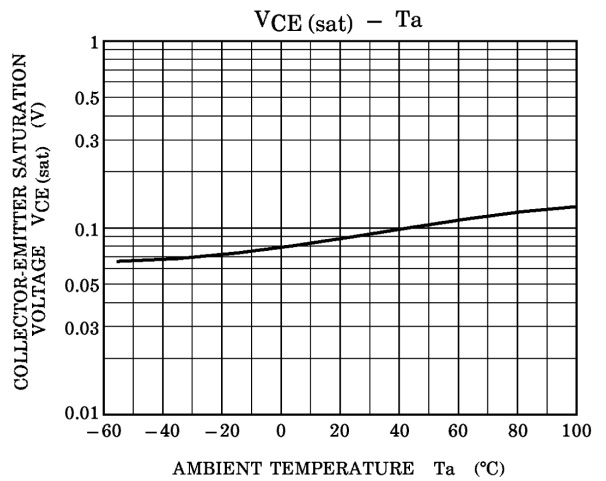
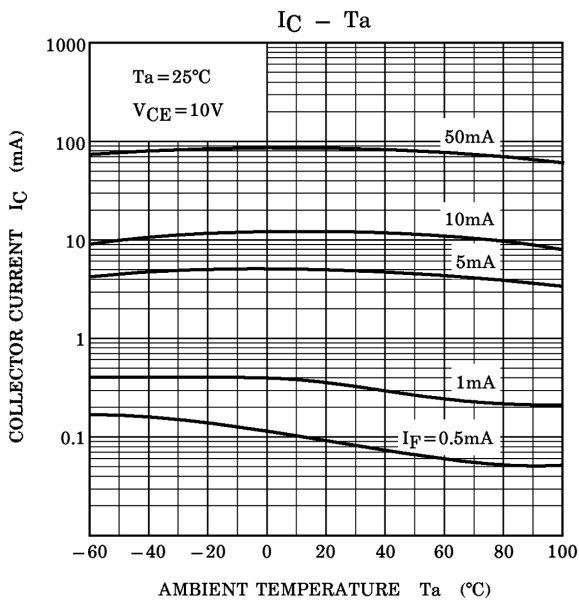
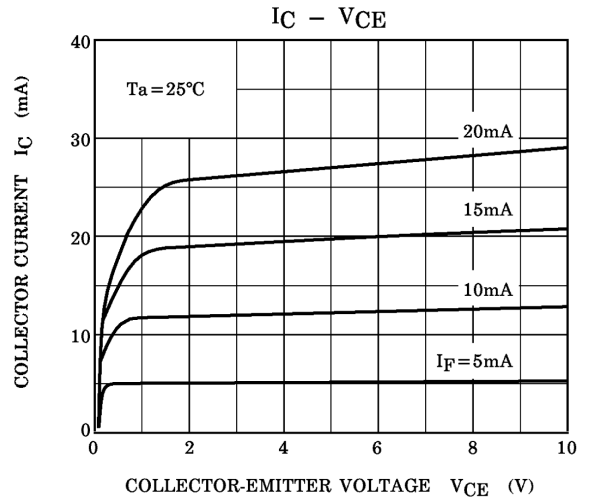
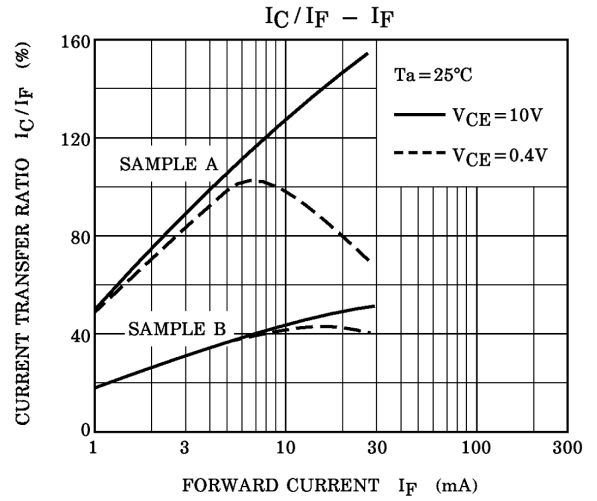
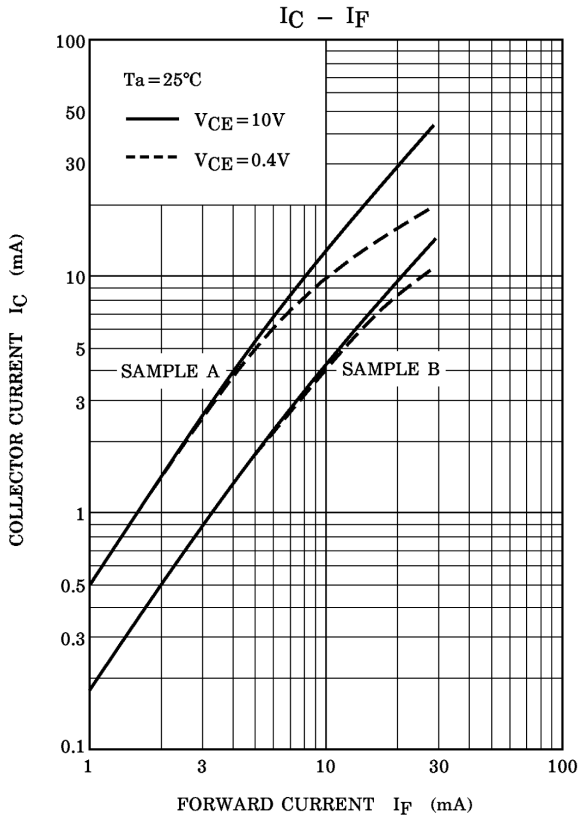
(\*) Above 25°C ambient.

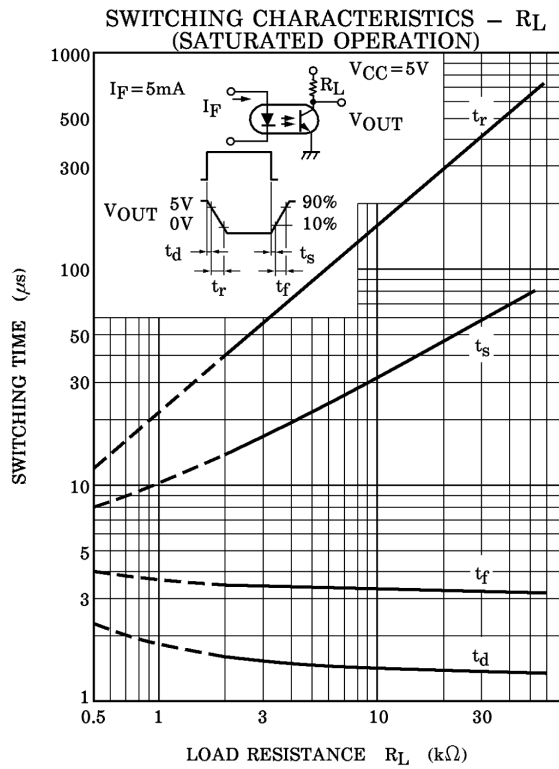
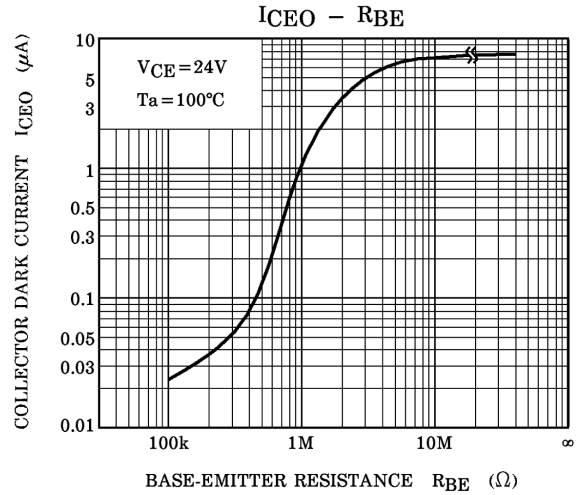
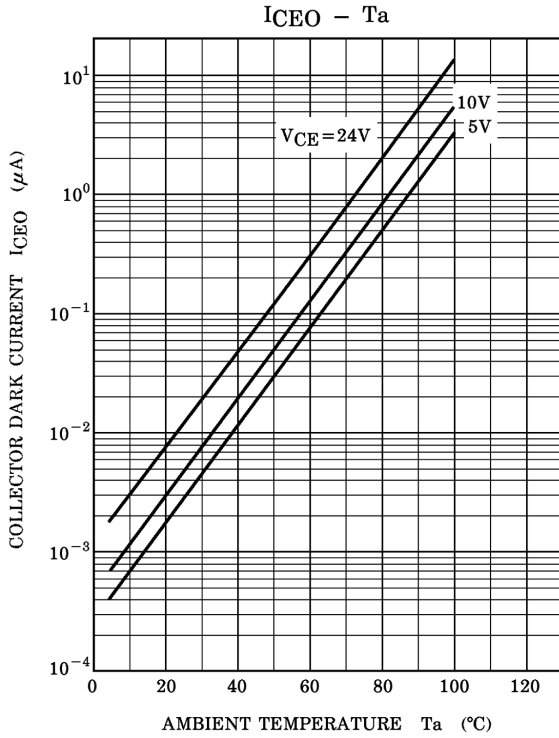
## Electrical Characteristics (Ta = 25°C)

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	$h_{FE}$	$V_{CE} = 5 \text{ V}, I_C = 500 \mu\text{A}$	—	200	—	—	
	Collector-emitter breakdown voltage	$V_{(BR) CEO}$	$I_C = 1 \text{ mA}, I_F = 0$	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	$I_{CBO}$	$V_{CB} = 10 \text{ V}$	—	0.1	20	nA	
	Collector-emitter capacitance	$C_{CE}$	$V = 0, f = 1 \text{ MHz}$	—	10	—	pF	
	Coupled	Current transfer ratio	$I_C / I_F$	$I_F = 10 \text{ mA}, V_{CE} = 10 \text{ V}$	20	100	—	%
Collector-emitter saturation voltage		$V_{CE (sat)}$	$I_F = 50 \text{ mA}, I_C = 2 \text{ mA}$	—	0.1	0.5	V	
Capacitance input to output		$C_S$	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF	
Isolation resistance		$R_S$	$V_S = 500 \text{ V}, \text{R.H.} \leq 60 \%$	$10^{11}$	—	—	$\Omega$	
Isolation voltage			$BV_S$	AC, 1 minute	2500	—	—	Vrms
			$BV_S (*)$	AC, peak	2500	—	—	Vpk
					1500	—	—	
					500	—	—	
				AC, 1 second	1775	—	—	Vrms
Rise / fall time		$t_r / t_f$	$V_{CE} = 10 \text{ V}, I_C = 2 \text{ mA}$ $R_L = 100 \Omega$	—	2	—	$\mu\text{s}$	
Rise / fall time	$t_r / t_f$	$V_{CB} = 10 \text{ V}, I_{CB} = 50 \mu\text{A}$ $R_L = 100 \Omega$	—	200	—	ns		

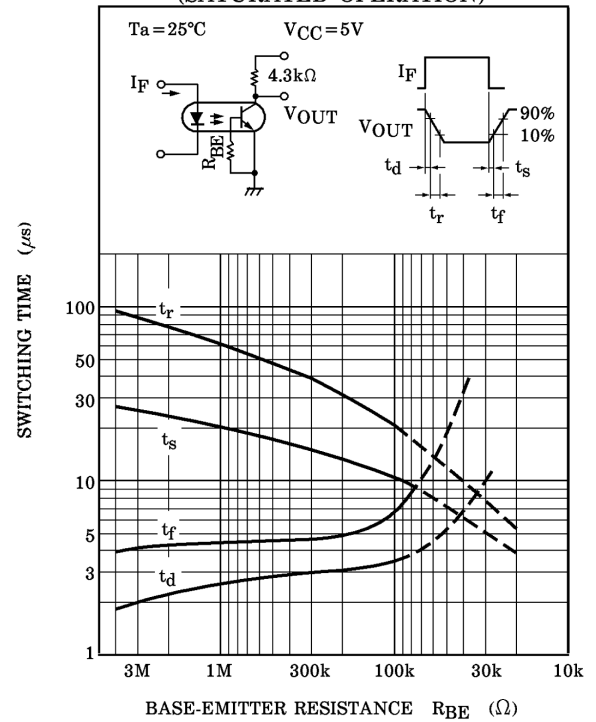
(\*) JEDEC registered minimum  $BV_S$ , however, TOSHIBA specifies a minimum  $BV_S$  of 2500 Vrms, 1 minute.







**SWITCHING CHARACTERISTICS -  $R_{BE}$  (SATURATED OPERATION)**



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