TOSHIBA Photocoupler GaAs IRed & Photo−Transistor

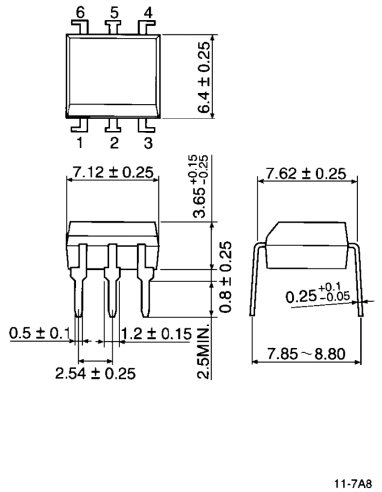
4N25(Short),4N25A(Short),4N26(Short),4N27(Short),4N28(Short)

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: $10^{11}\Omega$ (min.)
- Isolation voltage: 2500Vrms (min.)
- UL recognized: UL1577, file No. E67349

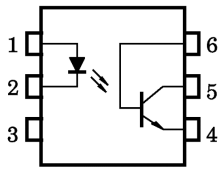
Unit in mm



TOSHIBA	11−7A8

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}	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		ΔP_C / °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		ΔP_T / °C	3.3 (*)	mW / °C

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

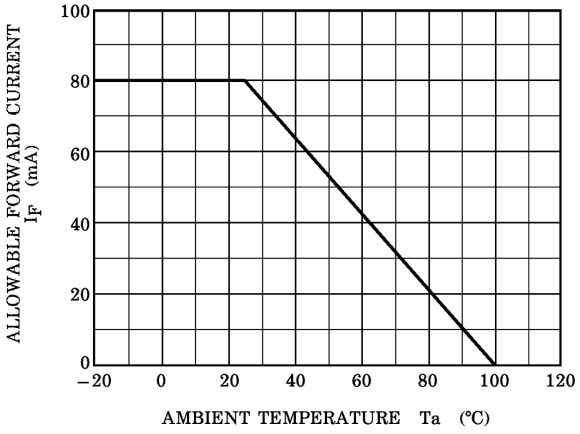
(*) Above 25°C ambient.

Electrical Characteristics (Ta = 25°C)

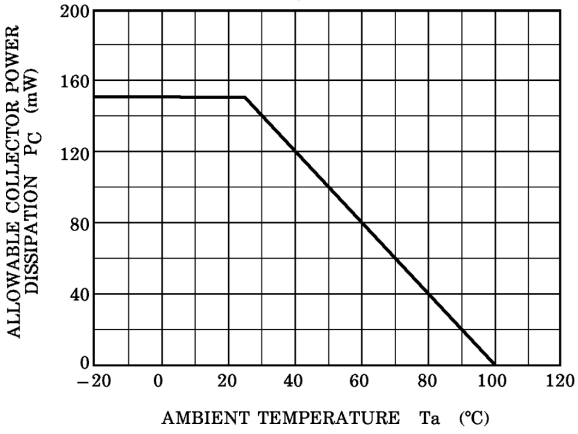
	Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage		V_F	I_F = 10 mA	—	1.15	1.5	V
	Reverse current		I_R	V_R = 3 V	—	—	100	μA
	Capacitance		C_D	V = 0, f = 1 MHz	—	30	—	pF
Detector	DC forward current gain		h_{FE}	V_{CE} = 5V, I_C = 500 μA	—	200	—	—
	Collector−emitter breakdown voltage		$V_{(BR)\ CEO}$	I_C = 1 mA, I_F = 0	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_{CBO}	V_{CB} = 10 V	—	0.1	20	nA
	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	20	100	—	%
	Collector−emitter saturation voltage		$V_{CE\ (sat)}$	I_F = 50 mA, I_C = 2 mA	—	0.1	0.5	V
	Capacitance input to output		C_S	V_S = 0, f = 1 MHz	—	0.8	—	pF
	Isolation resistance		R_S	V_S = 500 V, R.H. ≤ 60 %	10^{11}	—	—	Ω
	Isolation voltage		BV_S	AC, 1 minute	2500	—	—	Vrms
		4N25, 4N25A	BV_S (*)	AC, peak	2500	—	—	Vpk
		4N26, 4N27			1500	—	—	
		4N28			500	—	—	
		4N25A		AC, 1 second	1775	—	—	Vrms
	Rise / fall time		t_r / t_f	V_{CE} = 10 V, I_C = 2 mA R_L = 100 Ω	—	2	—	μs
	Rise / fall time		t_r / t_f	V_{CB} = 10 V, I_{CB} = 50 μA R_L = 100Ω	—	200	—	ns

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

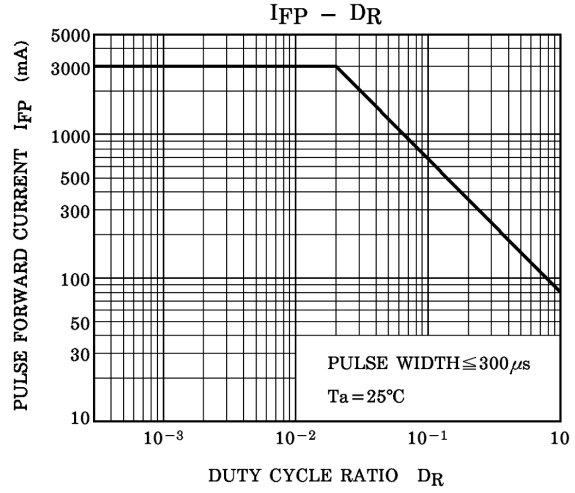
$I_F - T_a$



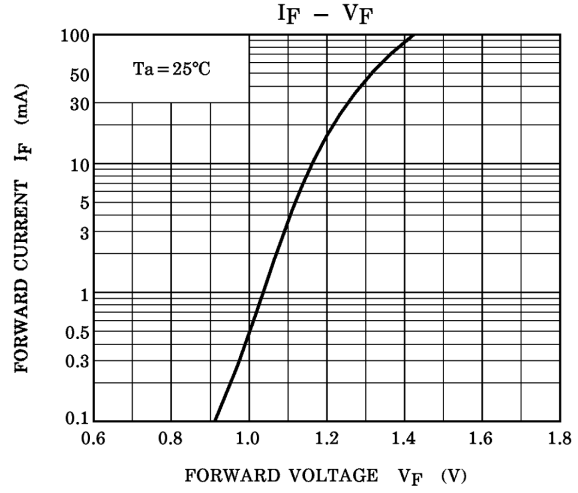
$P_C - T_a$



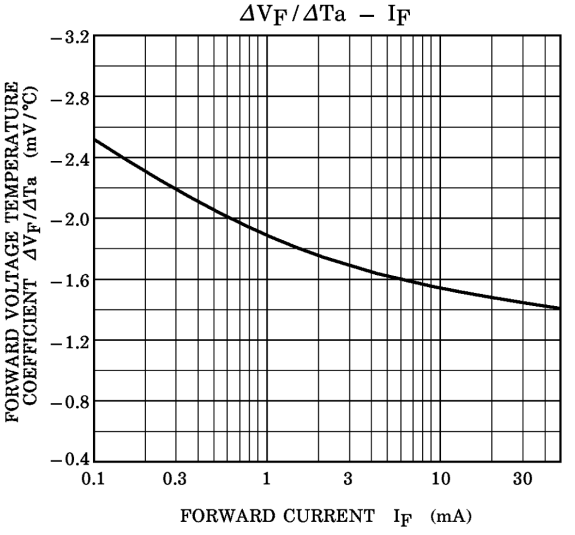
$I_{FP} - D_R$



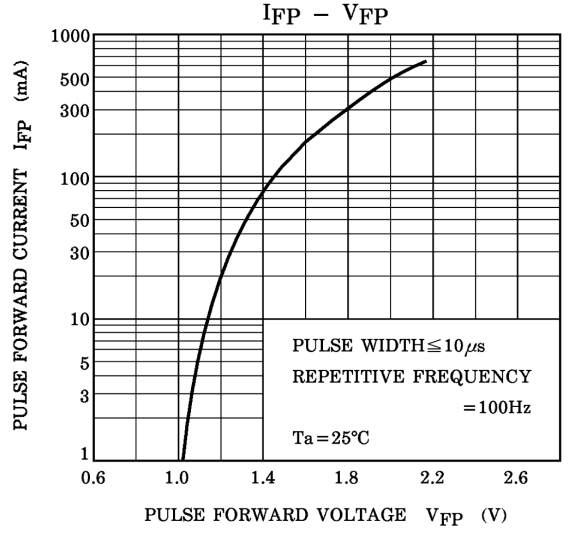
$I_F - V_F$



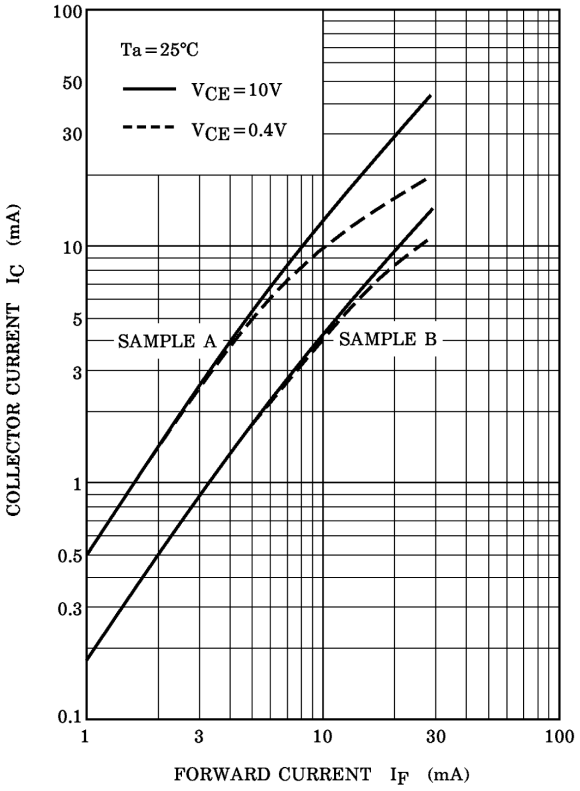
$\Delta V_F / \Delta Ta - I_F$



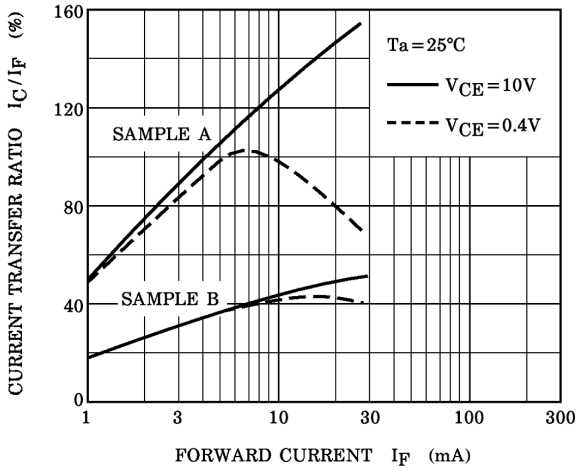
$I_{FP} - V_{FP}$



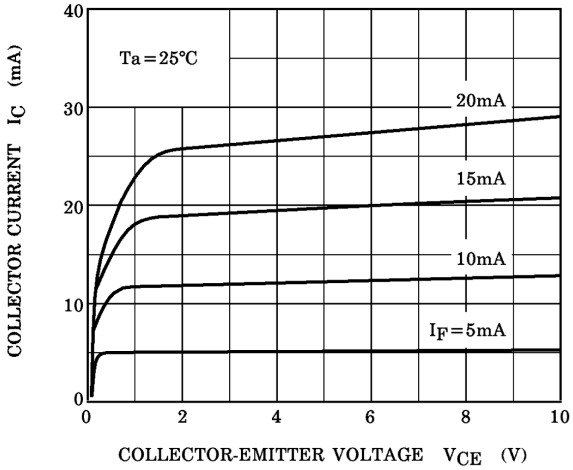
$I_C - I_F$



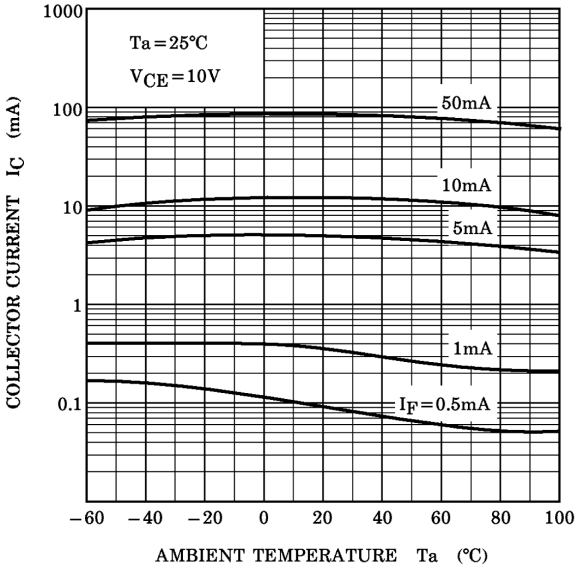
$I_C / I_F - I_F$



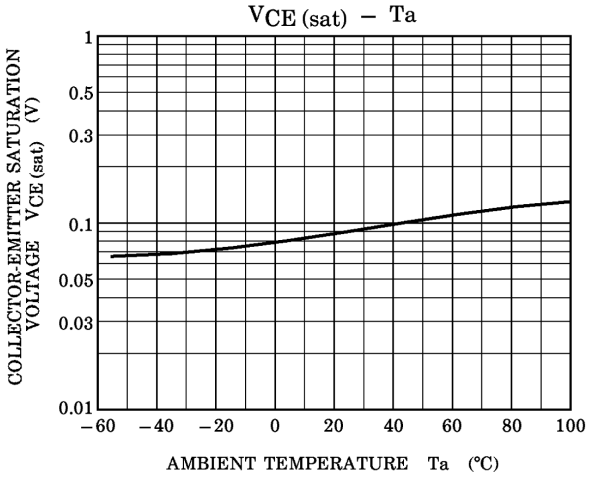
$I_C - V_{CE}$



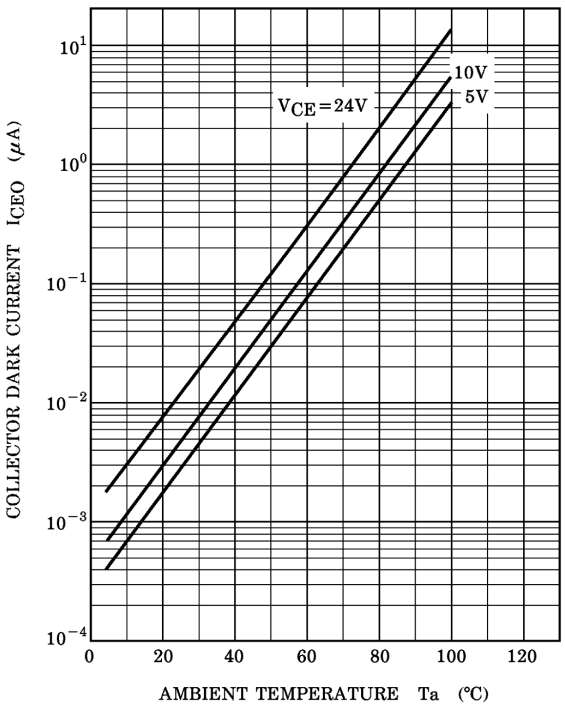
$I_C - Ta$



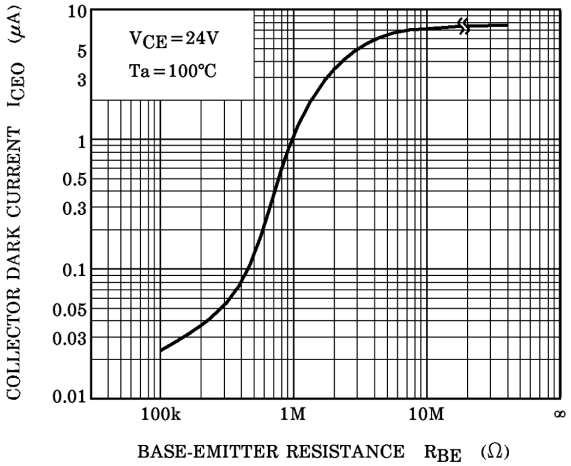
$V_{CE\,(sat)} - Ta$



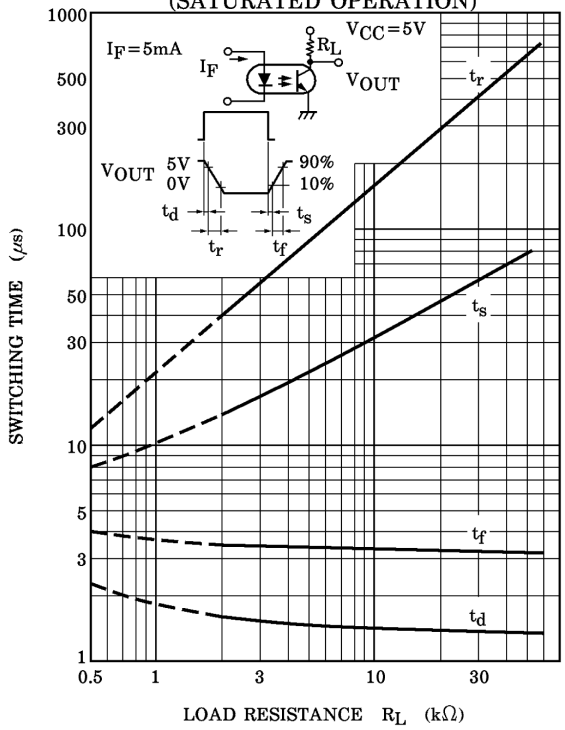
I_{CEO} – Ta



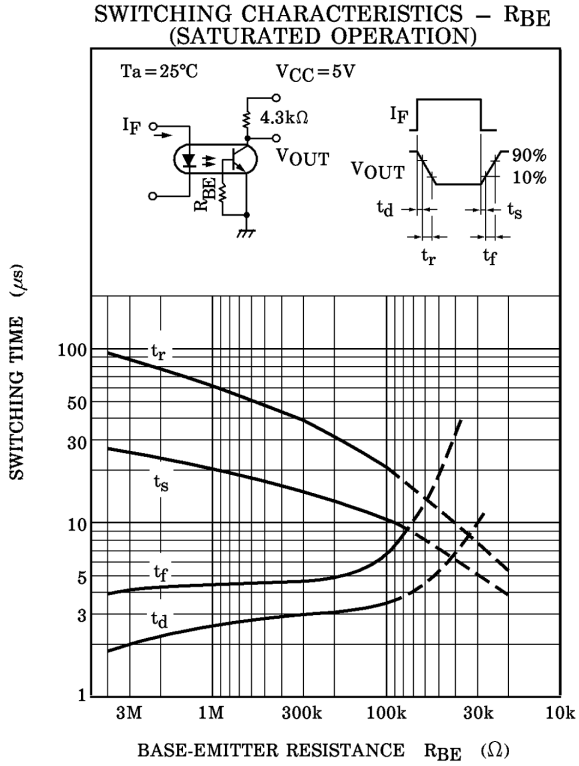
I_{CEO} – R_{BE}



SWITCHING CHARACTERISTICS – R_L
(SATURATED OPERATION)



SWITCHING CHARACTERISTICS – R_{BE}
(SATURATED OPERATION)



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