TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

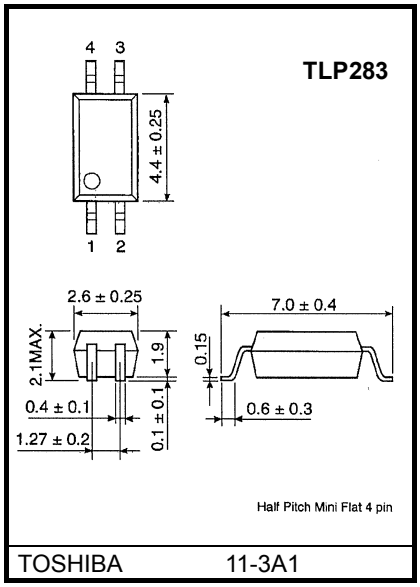
TLP283,TLP283-4

PROGRAMMABLE CONTROLLERS

AC adapters for PDAs/ on-board power supplies

I/O interface boards

Unit in mm



Weight: 0.05 g (typ.)

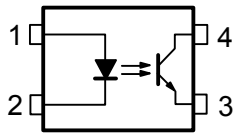
TLP283 and TLP283-4 is a very small and thin coupler,suitable for surface mount assembly in applications such as on-board power supplies,programmable controllers.
TLP283 and TLP283-4 consist of photo transistor,optically coupled to a gallium arsenide infrared emitting diode.

- Collector-Emitter Voltage : 100 V (MIN)
- Current Transfer Ratio : 100% (MIN)@IF=1mA
- 1 Pulse delay time(Note 1) : 100us(MAX)@IF=1mA,RL=10kΩ
- Isolation Voltage : 2500 Vrms (MIN)
- UL Recognized : UL1577 , File No. E67349

Note 1 : 1 Pulse delay time = tON+tOFF

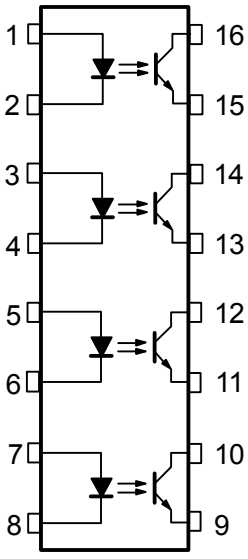
Pin Configuration (Top view)

TLP283



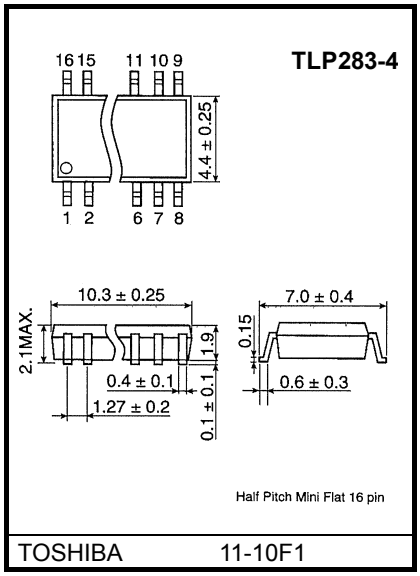
1:ANODE
2:CATHODE
3:EMITTER
4:COLLECTOR

TLP283-4



1,3,5,7 :ANODE
2,4,6,8 :CATHODE
9,11,13,15 :EMITTER
10,12,14,16 :COLLECTOR

Unit in mm



Weight: 0.19 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			TLP283	TLP283−4	
LED	Forward Current	I_F	50		mA
	Forward Current Derating	ΔI_F /°C	−0.7 (Ta≥53°C)	−0.5 (Ta≥25°C)	mA /°C
	Pulse Forward Current	I_{FP}	1		A
	Reverse Voltage	V_R	5		V
	Junction Temperature	T_j	125		°C
DETECTOR	Collector-Emitter Voltage	V_{CEO}	100		V
	Emitter-Collector Voltage	V_{ECO}	7		V
	Collector Current	I_C	50		mA
	Collector Power Dissipation (1 Circuit)	P_C	150	100	mW
	Collector Power Dissipation Derating(Ta≥25°C) (1 Circuit)	ΔP_C /°C	−1.5	−1.0	mW /°C
	Junction Temperature	T_j	125		°C
Operating Temperature Range		T_{opr}	−55~100		°C
Storage Temperature Range		T_{stg}	−55~125		°C
Lead Soldering Temperature		T_{sol}	260 (10s)		°C
Total Package Power Dissipation (1 Circuit)		P_T	200	170	mW
Total Package Power Dissipation Derating (Ta≥25°C) (1 Circuit)		ΔP_T /°C	−2.0	−1.7	mW /°C
Isolation Voltage (Note2)		BV_S	2500(AC,1min,R.H.≤60%)		Vrms

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

(Note2) Device considered a two terminal device : LED side pins shorted together and DETECTOR side pins shorted together.

Individual Electrical Characteristics (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	I_F = 10 mA	1.0	1.15	1.3	V
	Reverse Current	I_R	V_R = 5 V	—	—	10	μA
	Capacitance	C_T	V = 0, f = 1 MHz	—	30	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	$V_{(BR)\ CEO}$	I_C = 0.5 mA	100	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)\ ECO}$	I_E = 0.1 mA	7	—	—	V
	Collector Dark Current (Note3)	I_{CEO}	V_{CE} = 48 V, Ambient Light Below (100 ℓx)	—	0.01 (2)	0.1 (10)	μA
			V_{CE} = 48 V, Ta = 85°C Ambient Light Below (100 ℓx)	—	2 (4)	50 (50)	μA
	Capacitance (Collector to Emitter)	C_{CE}	V = 0, f = 1 MHz	—	10	—	pF

(Note3) Because of the construction,leak current might be increased by ambient light.
Please use photocoupler with less ambient light.

Coupled Electrical Characteristics (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C / I_F	I_F = 1 mA, V_{CE} = 5 V	100	—	400	%
Saturated CTR	I_C / $I_{F\ (sat)}$	IF = 1 mA, VCE = 0.4 V	50	—	—	%
Collector-Emitter Saturation Voltage	$V_{CE\ (sat)}$	I_C = 0.2 mA, I_F = 1 mA	—	0.2	0.4	V
Off-State Collector Current	$I_{C\ (off)}$	V_F = 0.7 V, V_{CE} = 48 V	—	—	10	μA

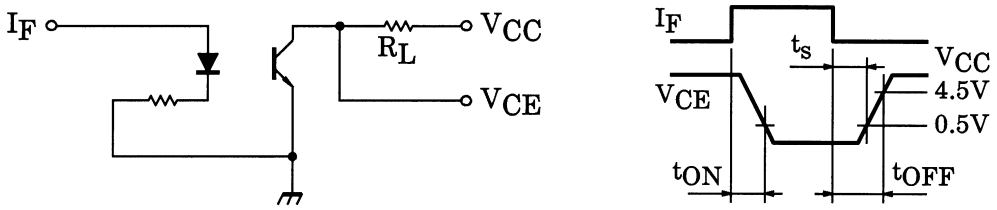
Isolation Characteristics (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance (Input to Output)	C_S	V_S = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation Resistance	R_S	V_S = 500 V, R.H.≤60%	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC , 1 minute	2500	—	—	Vrms
		AC , 1 second,in OIL	—	5000	—	
		DC , 1 minute, in OIL	—	5000	—	Vdc

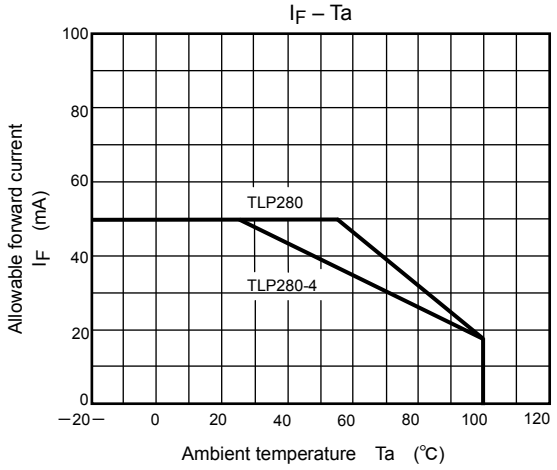
Switching Characteristics (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Turn-On Time	t_{ON}	V_{CC} = 5 V, IF = 1 mA R_L = 10kΩ	—	7.5	20	μs
Turn-Off Time	t_{OFF}		—	70	90	
1 Pulse delay time	t_{ON+} t_{OFF}		—	80	100	

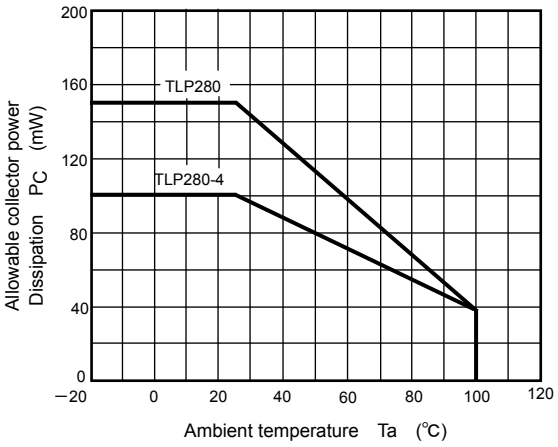
(Fig.1)SWITCHING TIME TEST CIRCUIT



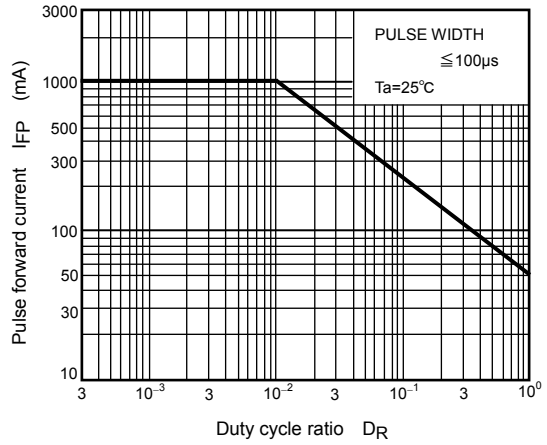
I_F – Ta



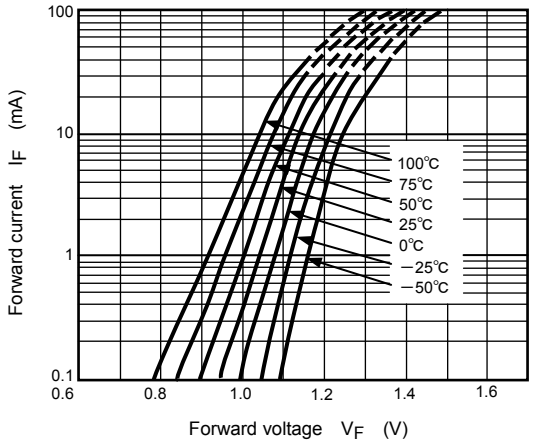
P_C – Ta



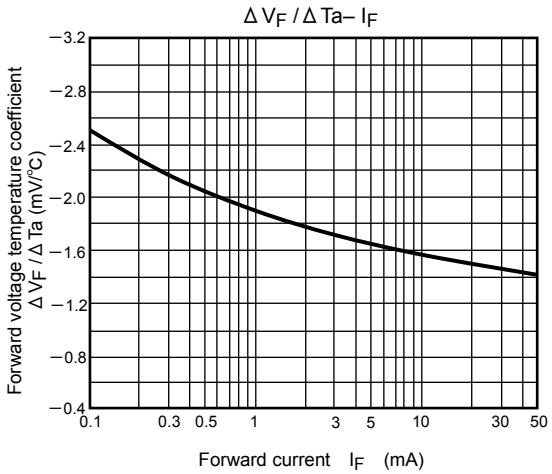
I_{FP} – D_R



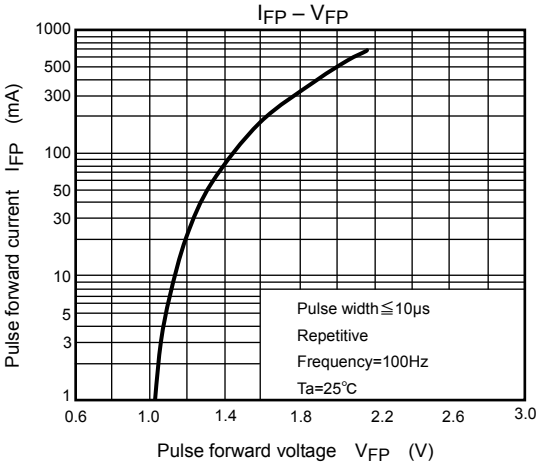
I_F – V_F



$\Delta V_F / \Delta Ta$ – I_F

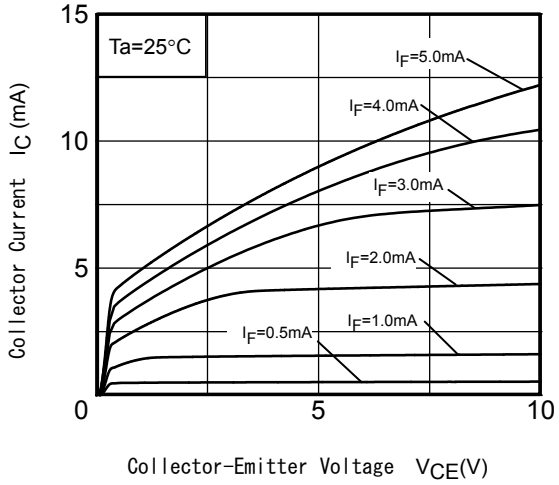


I_{FP} – V_{FP}

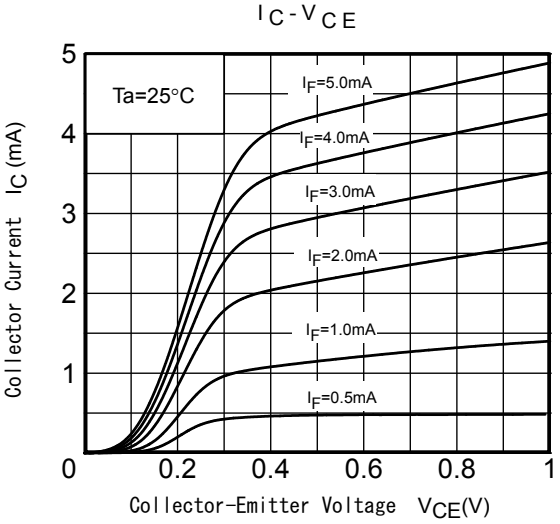


*: The above graphs show typical characteristics.

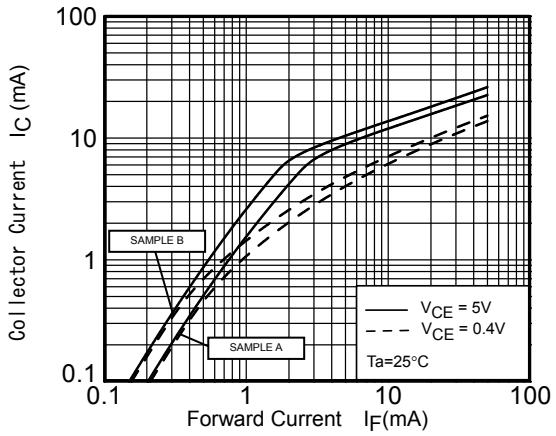
I_C - V_{CE}



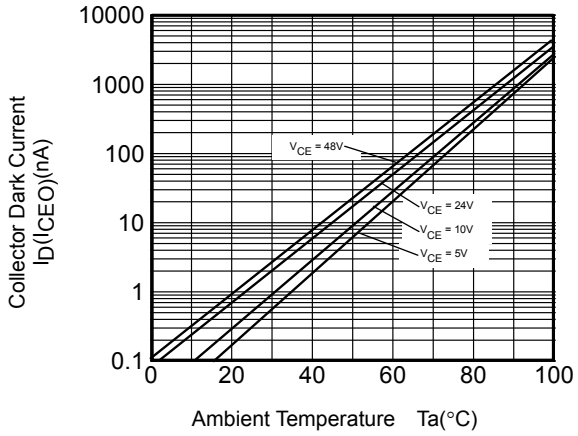
I_C - V_{CE}



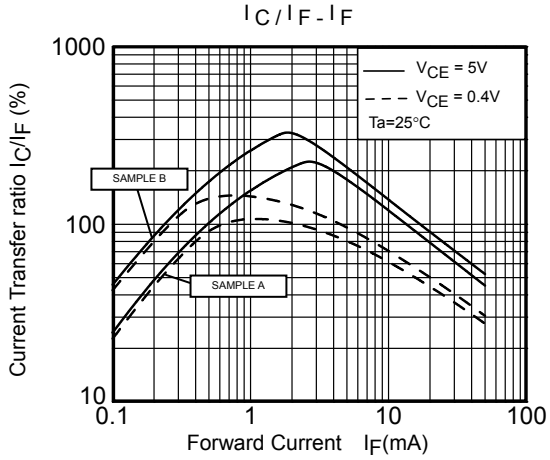
I_C - I_F



I_{CEO} - Ta

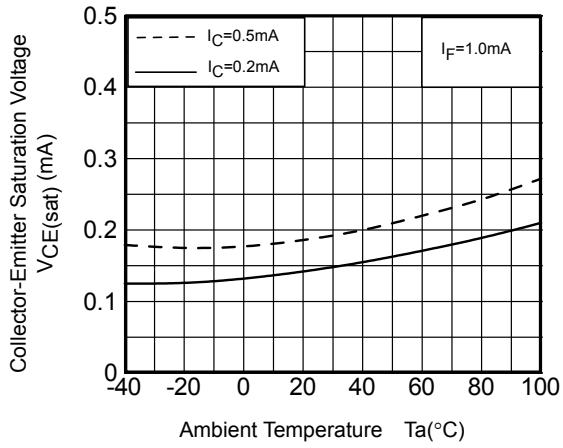


I_C / I_F - I_F

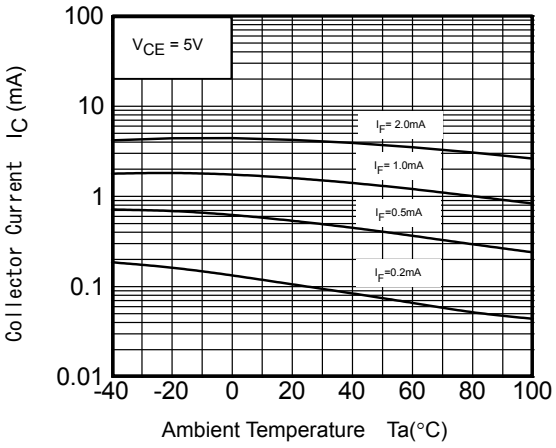


*: The above graphs show typical characteristics.

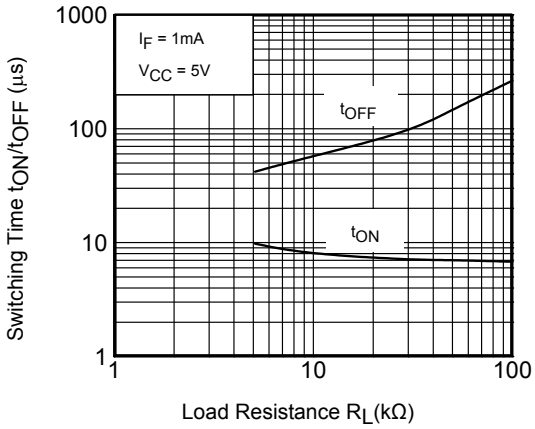
$V_{CE(sat)}$ - Ta



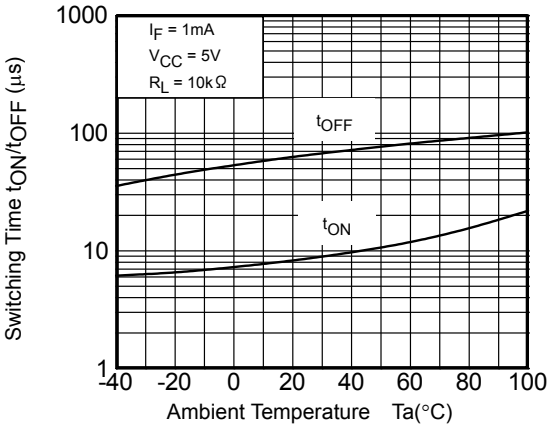
I_C - Ta



t_{ON}/t_{OFF} - RL



t_{ON}/t_{OFF} - Ta



*: The above graphs show typical characteristics.

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20070701-EN

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