

# TLP281,TLP281-4

## PROGRAMMABLE CONTROLLERS

### AC/DC-INPUT MODULE

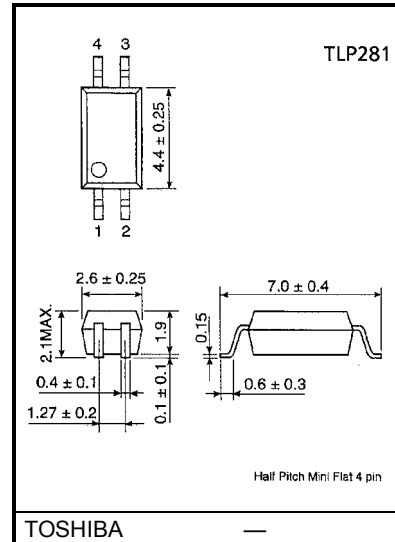
### PC CARD MODEM(PCMCIA)

TLP281 and TLP281-4 is a very small and thin coupler,suitable for surface mount assembly in applications such as PCMCIA Fax modem,programmable controllers.

TLP281 and TLP281-4 consist of photo transistor,optically coupled to a gallium arsenide infrared emitting diode.

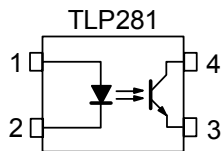
- Collector-Emitter Voltage : 80 V (MIN)
- Current Transfer Ratio : 50% (MIN)  
Rank GB : 100% (MIN)
- Isolation Voltage : 2500 Vrms (MIN)
- UL Recognized : UL1577 , File No. E67349
- BSI Approved : BS EN 60065: 1994,  
: BS EN 41003: 1997  
Certificate No. 8143, 8144

Unit in mm

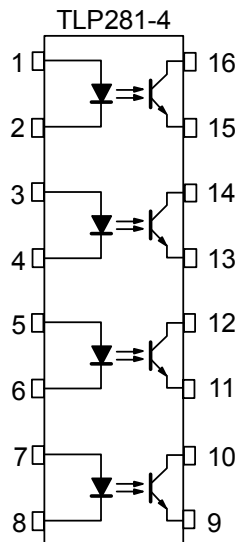


Weight: 0.05 g

## PIN CONFIGURATION(Top view)

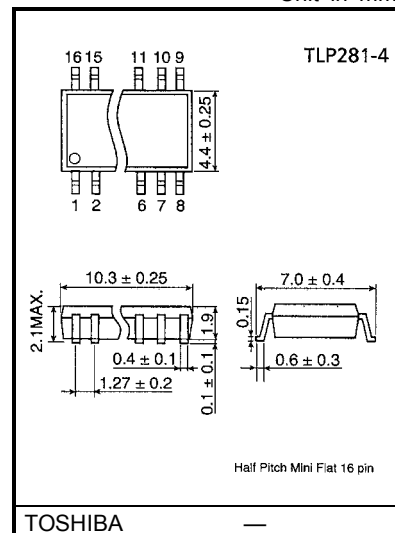


1:ANODE  
2:CATHODE  
3:EMITTER  
4:COLLECTOR



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

TYPE	Classi- Fication(*1)	Current Transfer Ration (%) ( $I_C / I_F$ )		Marking of Classification
		$I_F = 5 \text{ mA}, V_{CE} = 5 \text{ V}, T_a = 25^\circ\text{C}$		
		Min	Max	
TLP281	Blank	50	600	Blank ,Y <sup>■</sup> ,YE,G,G <sup>■</sup> ,GR,B,BL,GB
	Rank Y	50	150	YE
	Rank GR	100	300	GR
	Rank BL	200	600	BL
	Rank GB	100	600	GB
	Rank YH	75	150	Y <sup>■</sup>
	Rank GRL	100	200	G
	Rank GRH	150	300	G <sup>■</sup>
	Rank BLL	200	400	B
TLP281-4	Blank	50	600	Blank , GB
	Rank GB	100	600	GB

\*1: Ex. rank GB: TLP281 (GB)

(Note): Application type name for certification test, please use standard product type name, i.e.

TLP281 (GB): TLP281-1 , TLP281-4 (GB): TLP281-4

## MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			TLP281	TLP281-4	
LED	Forward Current	$I_F$	50		mA
	Forward Current Derating	$\Delta I_F / ^\circ\text{C}$	-0.7 (Ta $\geq$ 53°C)	-0.5 (Ta $\geq$ 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	$V_{CEO}$	80		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 $\geq$ 25°C) (1 Circuit)	$\Delta P_C / ^\circ\text{C}$	-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 $\geq$ 25°C) (1 Circuit)	$\Delta P_T / ^\circ\text{C}$	-2.0	-1.7	mW / °C	
Isolation Voltage (Note1)	$BV_S$	2500(AC, 1min, R.H. $\leq$ 60%)		Vrms	

(Note1) 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	$V_F$	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse Current	$I_R$	$V_R = 5 \text{ V}$	—	—	10	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 0.5 \text{ mA}$	80	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	$I_E = 0.1 \text{ mA}$	7	—	—	V
	Collector Dark Current (Note2)	$I_{CEO}$	$V_{CE} = 48 \text{ V},$ Ambient Light Below (100 lx)	—	0.01 (2)	0.1 (10)	$\mu\text{A}$
			$V_{CE} = 48 \text{ V}, T_a = 85^\circ\text{C}$ Ambient Light Below (100 lx)	—	2 (4)	50 (50)	$\mu\text{A}$
	Capacitance (Collector to Emitter)	$C_{CE}$	$V = 0, f = 1 \text{ MHz}$	—	10	—	pF

(Note 2) 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	$I_C / I_F$	$I_F = 5 \text{ mA}, V_{CE} = 5 \text{ V}$ Rank GB	50	—	600	%
			100	—	600	
Saturated CTR	$I_C / I_F (\text{sat})$	$I_F = 1 \text{ mA}, V_{CE} = 0.4 \text{ V}$ Rank GB	—	60	—	%
			30	—	—	
Collector-Emitter Saturation Voltage	$V_{CE} (\text{sat})$	$I_C = 2.4 \text{ mA}, I_F = 8 \text{ mA}$	—	—	0.4	V
			$I_C = 0.2 \text{ mA}, I_F = 1 \text{ mA}$ Rank GB	—	0.2	
		—		—	0.4	
Off-State Collector Current	$I_C (\text{off})$	$V_F = 0.7 \text{ V}, V_{CE} = 48 \text{ V}$	—	—	10	$\mu\text{A}$

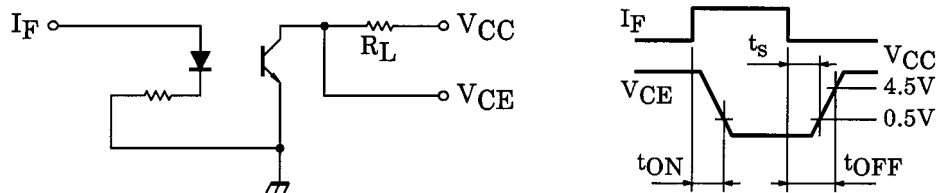
## ISOLATION CHARACTERISTICS (Ta = 25°C)

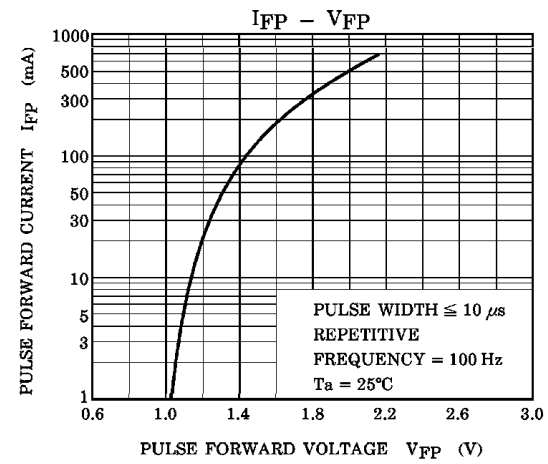
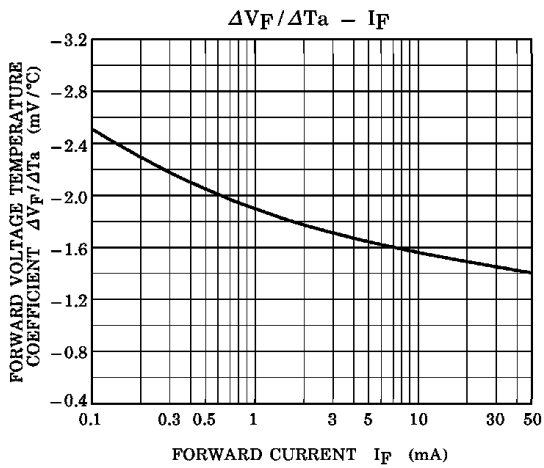
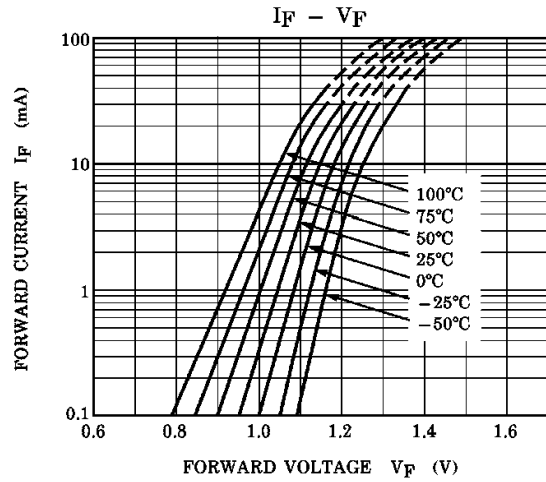
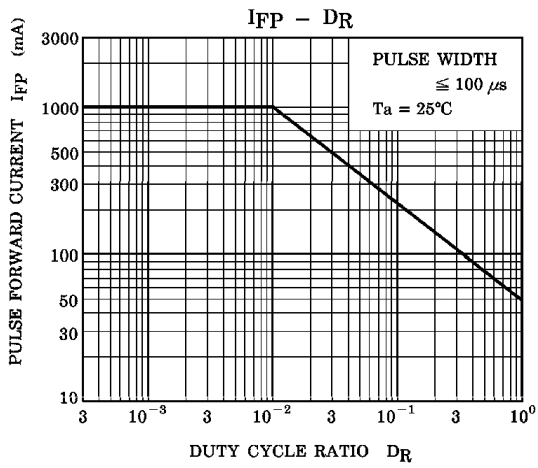
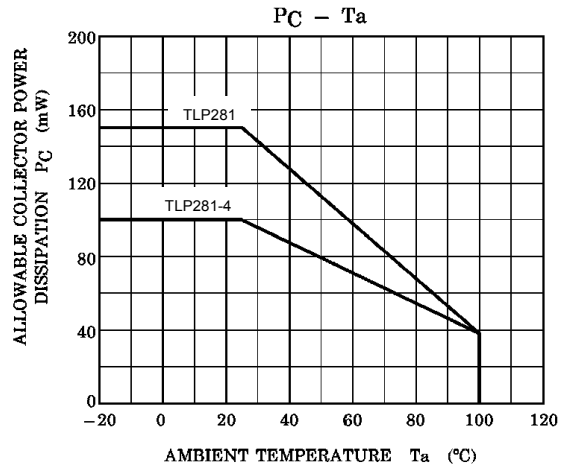
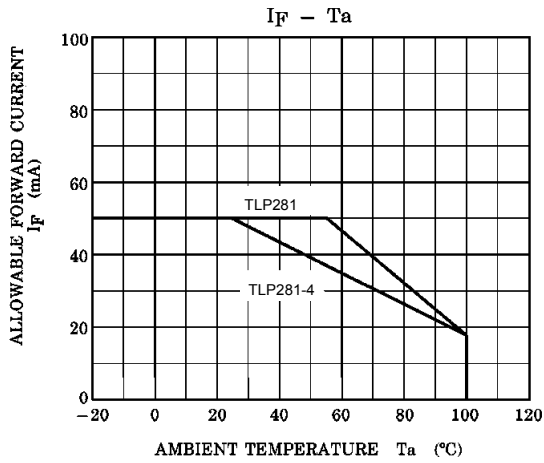
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance (Input to Output)	$C_S$	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation Resistance	$R_S$	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation Voltage	$BV_S$	AC, 1 minute	2500	—	—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

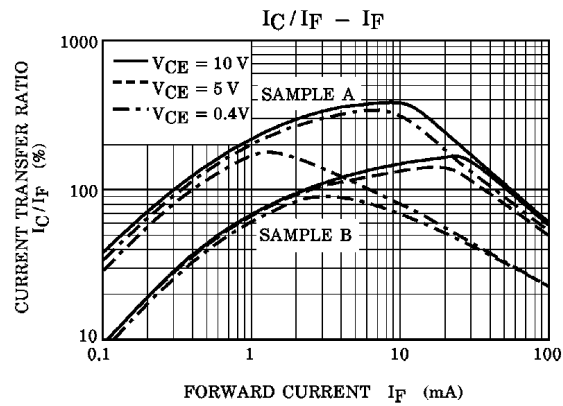
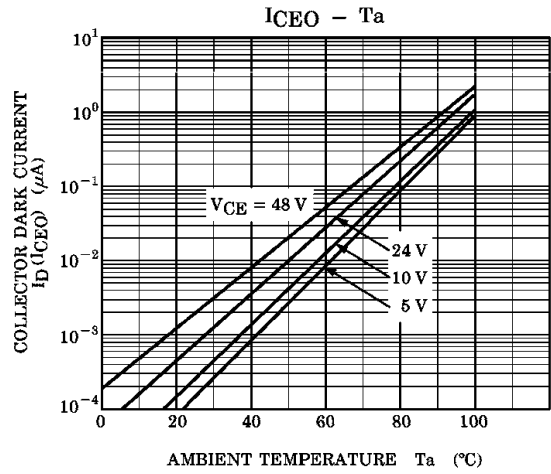
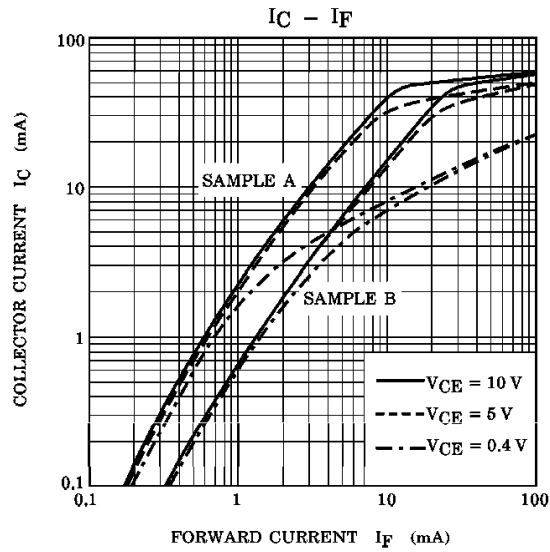
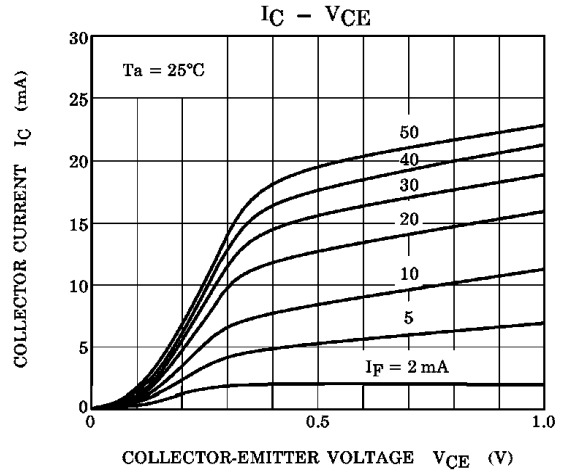
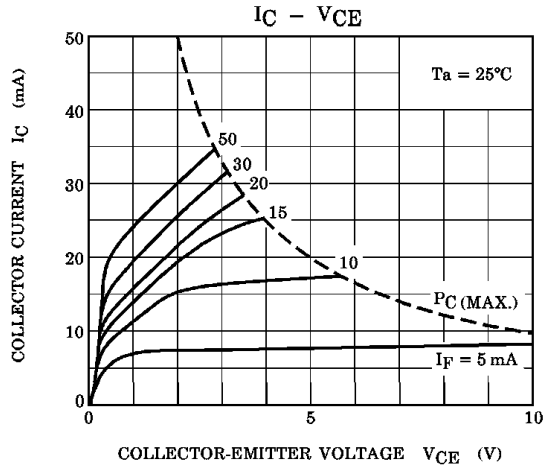
## SWITCHING CHARACTERISTICS (Ta = 25°C)

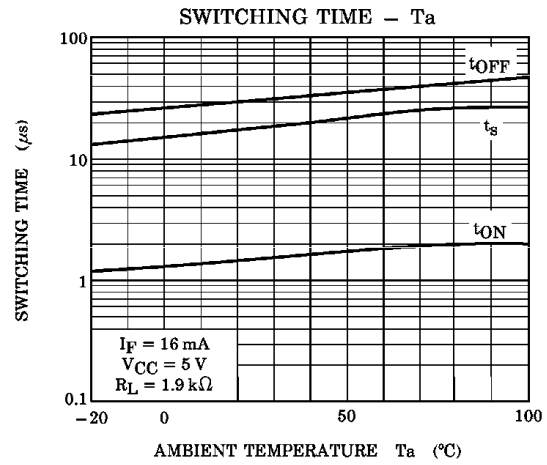
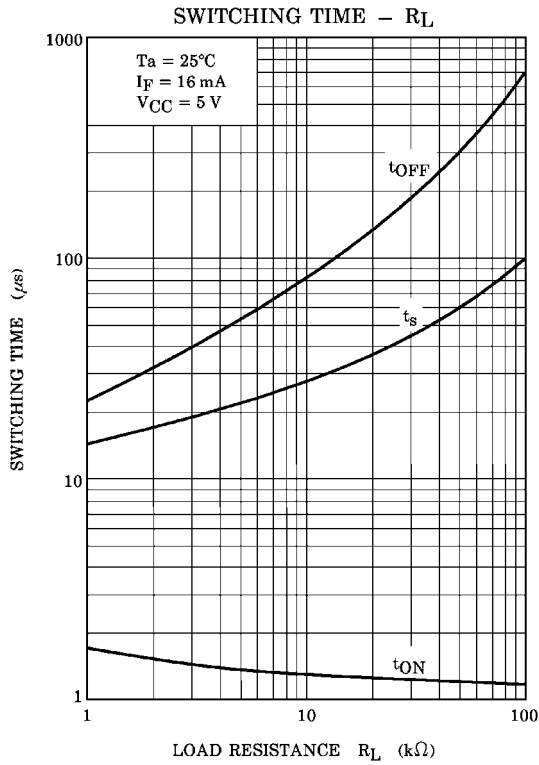
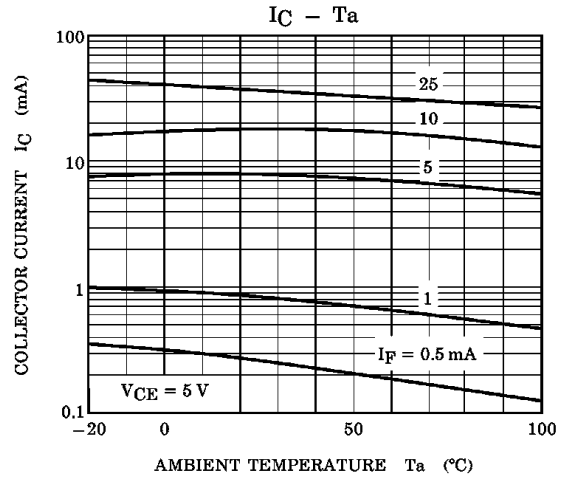
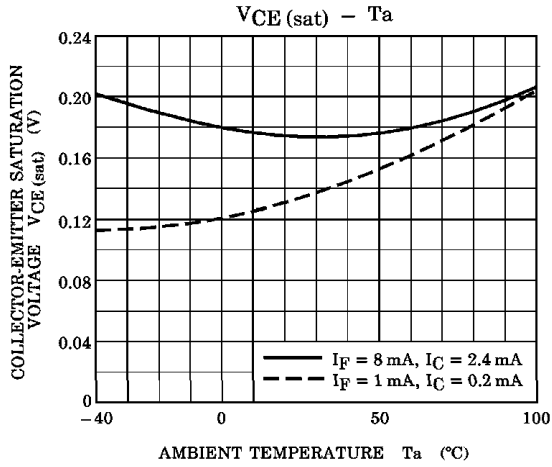
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	$t_r$	$V_{CC} = 10 \text{ V}, I_C = 2 \text{ mA}$ $R_L = 100 \Omega$	—	2	—	$\mu\text{s}$
Fall Time	$t_f$		—	3	—	
Turn-On Time	$t_{on}$		—	3	—	
Turn-Off Time	$t_{off}$		—	3	—	
Turn-On Time	$t_{ON}$	$R_L = 1.9 \text{ k}\Omega$ (Fig.1) $V_{CC} = 5 \text{ V}, I_F = 16 \text{ mA}$	—	2	—	$\mu\text{s}$
Storage Time	$t_s$		—	25	—	
Turn-Off Time	$t_{OFF}$		—	40	—	

(Fig.1) SWITCHING TIME TEST CIRCUIT









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