

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP281, TLP281-4

PROGRAMMABLE CONTROLLERS

AC/DC-INPUT MODULE

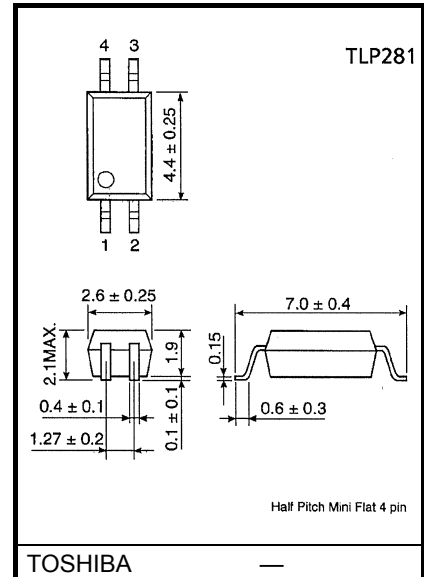
PC CARD MODEM(PCMCIA)

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.

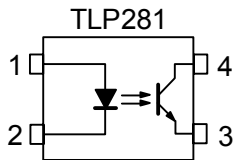
- Collector-Emitter Voltage : 80 V (MIN)
- Current Transfer Ratio : 50% (MIN)
Rank GB : 100% (MIN)
- Isolation Voltage : 2500 Vrms (MIN)
- UL Recognized : UL1577 , File No. E67349
- BSI Approved : BS EN 60065: 2002,
: BS EN 60950-1: 2002
Certificate No. 8143, 8144

Unit in mm

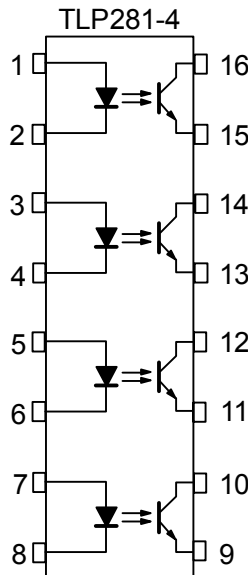


TOSHIBA
Weight: 0.05 g

Pin Configuration (top view)

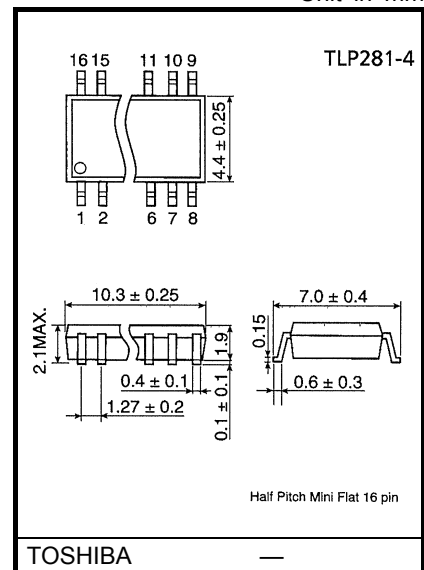


- 1: ANODE
2: CATHODE
3: EMITTER
4: COLLECTOR



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

Unit in mm



TOSHIBA
Weight: 0.19 g

TYPE	Classi- Fication(*1)	Current Transfer Ratio (%) (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 [■] , YE, G, G [■] , 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 [■]
	Rank GRL	100	200	G
	Rank GRH	150	300	G [■]
	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

Absolute 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

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).

(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	μA
	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)	μA
			$V_{CE} = 48 \text{ V}, T_a = 85^\circ\text{C}$ Ambient Light Below (100 lx)	—	2 (4)	50 (50)	μA
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	$V_{CE} (\text{sat})$	$I_C = 2.4 \text{ mA}, I_F = 8 \text{ mA}$ $I_C = 0.2 \text{ mA}, I_F = 1 \text{ mA}$ Rank GB	—	—	0.4	V
			—	0.2	—	
Off-State Collector Current	$I_C (\text{off})$	$V_F = 0.7 \text{ V}, V_{CE} = 48 \text{ V}$	—	—	10	μA

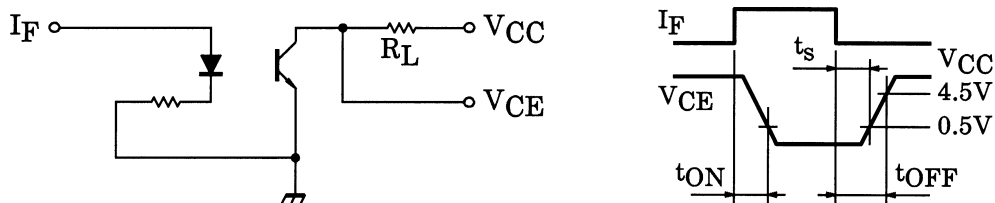
Isolation Characteristics (Ta = 25°C)

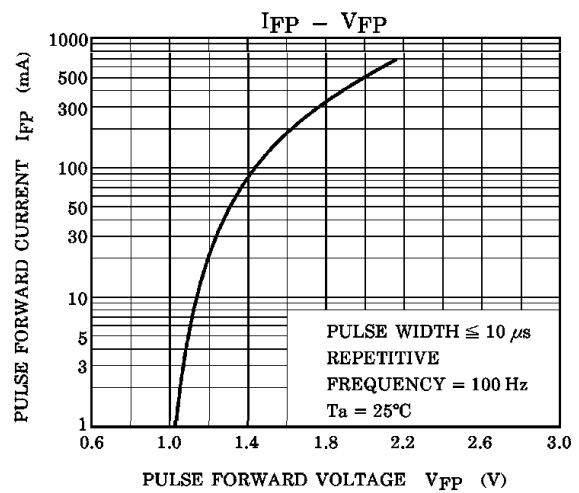
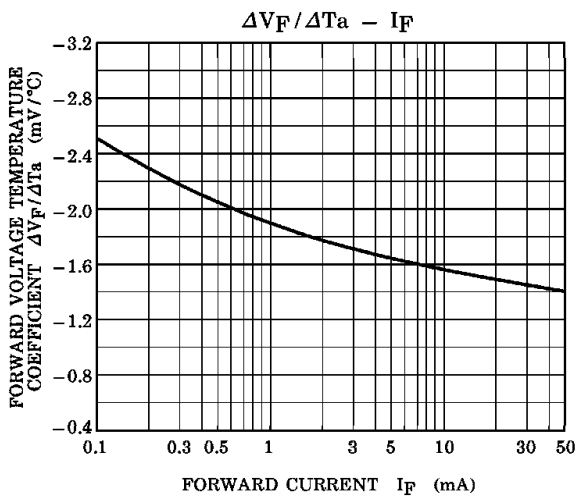
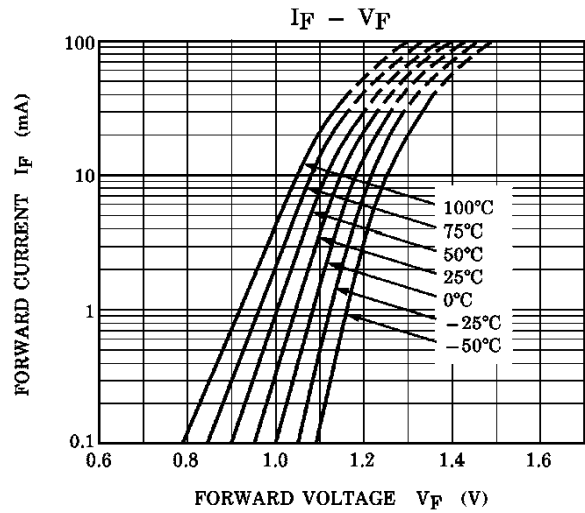
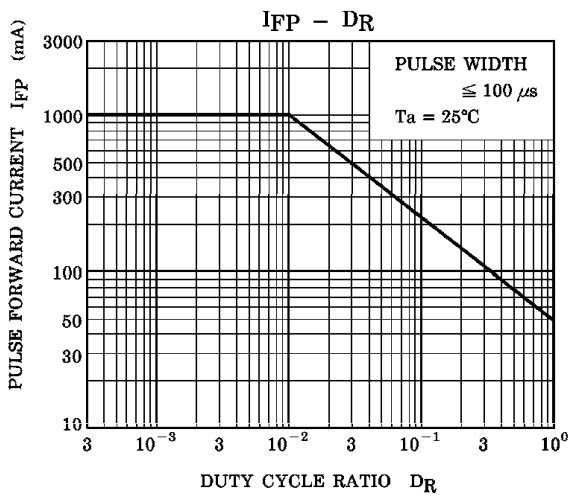
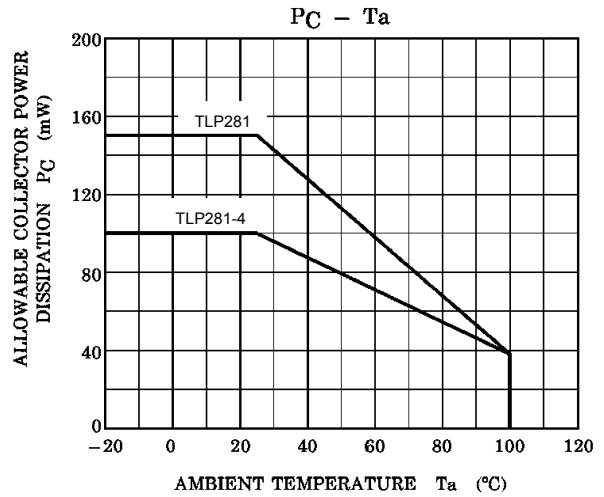
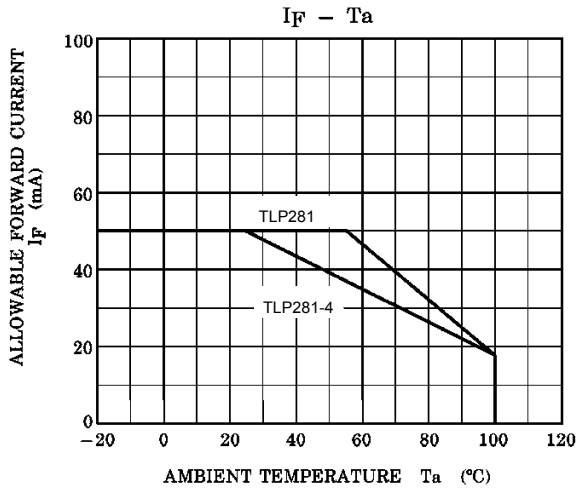
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance (Input to Output)	C_S	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation Resistance	R_S	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 1 minute	2500	—	—	Vrms
		AC, 1 second, in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

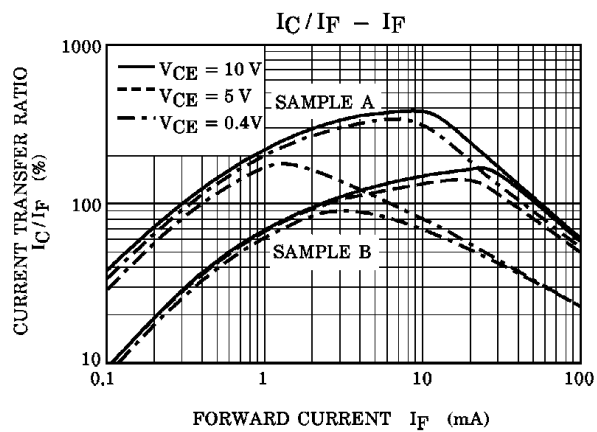
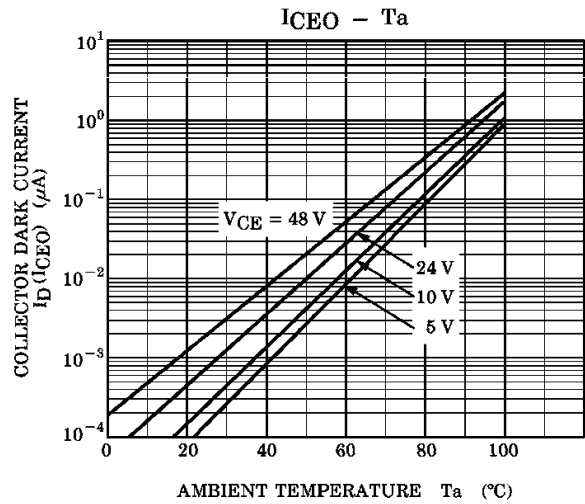
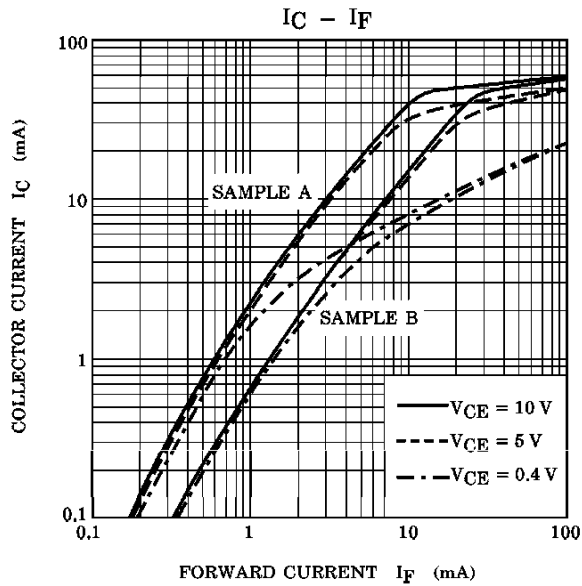
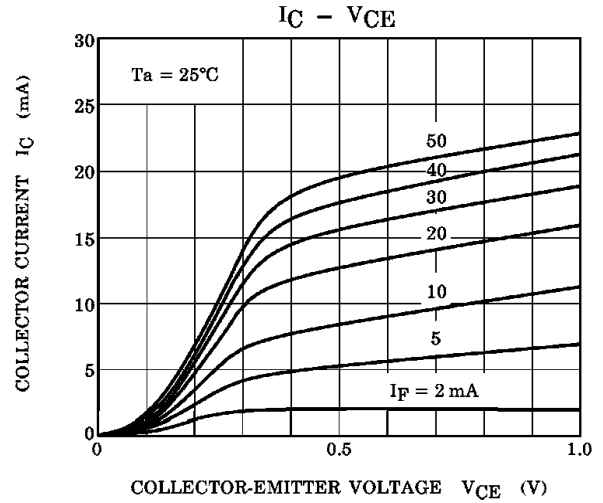
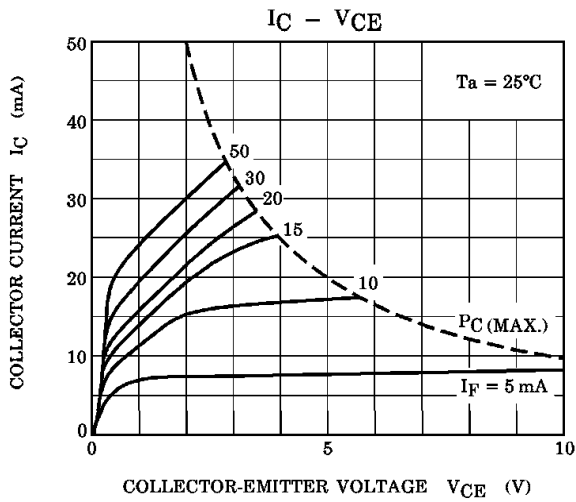
Switching Characteristics (Ta = 25°C)

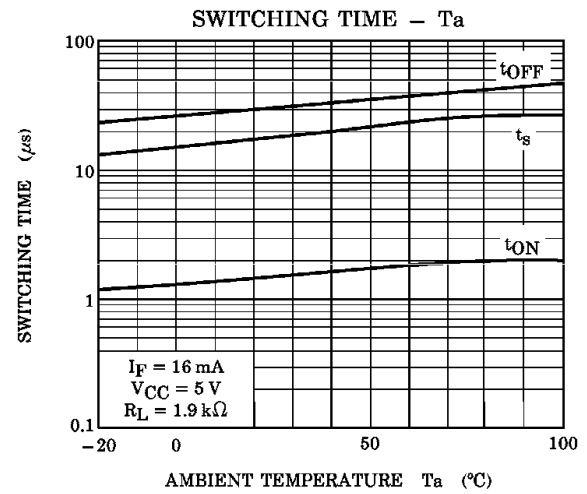
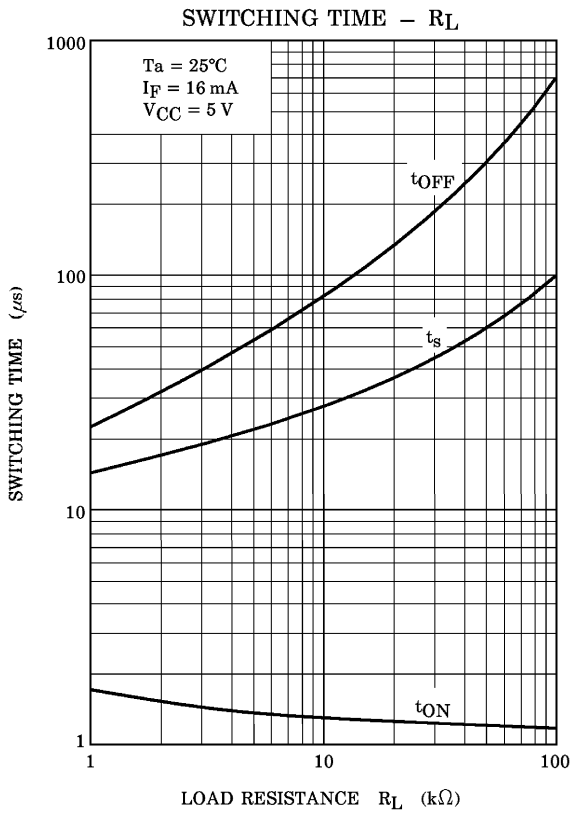
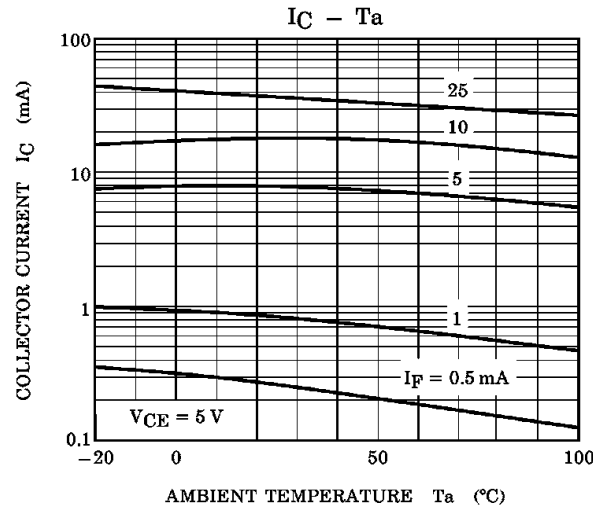
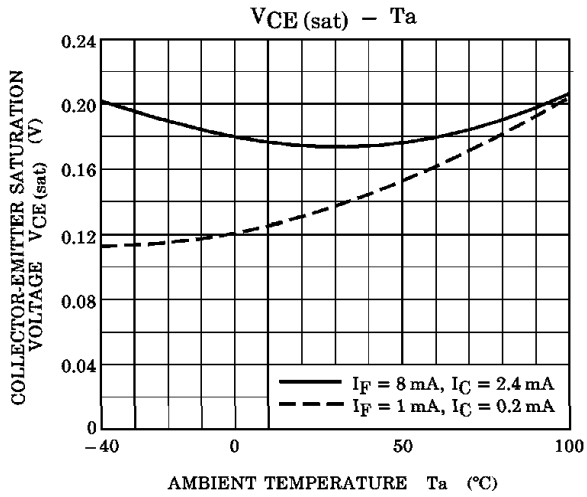
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t_r	$V_{CC} = 10 \text{ V}, I_C = 2 \text{ mA}$ $R_L = 100 \Omega$	—	2	—	μs
Fall Time	t_f		—	3	—	
Turn-On Time	t_{on}		—	3	—	
Turn-Off Time	t_{off}		—	3	—	
Turn-On Time	t_{ON}	$R_L = 1.9 \text{ k}\Omega$ (Fig.1) $V_{CC} = 5 \text{ V},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

(Fig.1) SWITCHING TIME TEST CIRCUIT









RESTRICTIONS ON PRODUCT USE

20070701-EN

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