

(TLP181)

OFFICE MACHINE

PROGRAMMABLE CONTROLLERS

AC / DC-INPUT MODULE

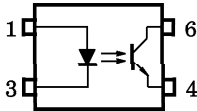
TELECOMMUNICATION

The TOSHIBA MINI FLAT COUPLER TLP181 is a small outline coupler, suitable for surface mount assembly.

TLP181 consist of a photo transistor optically coupled to a gallium arsenide infrared emitting diode in a four lead plastic DIP package.

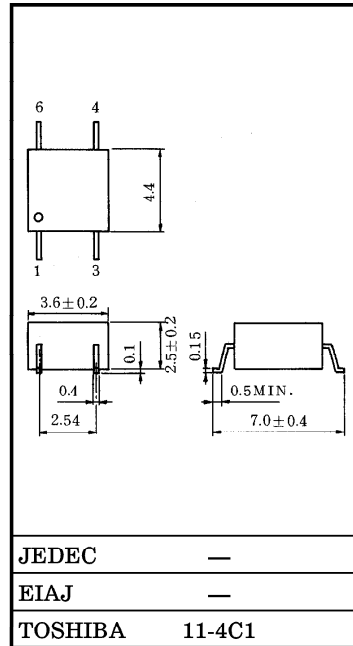
- Collector-Emitter Voltage : 80V (Min.)
- Current Transfer Ratio : 50% (Min.)
Rank GB : 100% (Min.)
- Isolation Voltage : 3750V_{rms} (Min.)
- UL Recognized : UL1577, File No. E67349

PIN CONFIGURATION (TOP VIEW)



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

Unit in mm



Weight : 0.09g

© The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.

© These TOSHIBA products are intended for use in general commercial applications (office equipment, communication equipment, measuring equipment, domestic appliances, etc.), please make sure that you consult with us before you use these TOSHIBA products in equipment which requires extraordinarily high quality and/or reliability, and in equipment which may involve life threatening or critical application, including but not limited to such uses as atomic energy control, airplane or spaceship instrumentation, traffic signals, medical instrumentation, combustion control, all types of safety devices, etc. TOSHIBA cannot accept and hereby disclaims liability for any damage which may occur in case the TOSHIBA products are used in such equipment or applications without prior consultation with TOSHIBA.

④

(TLP181)

CURRENT TRANSFER RATIO

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.	
TLP181	(None)	50	600	BLANK, Y, Y [■] , G, G [■] , B, B [■] , GB
	Rank Y	50	150	Y, Y [■]
	Rank GR	100	300	G, G [■]
	Rank BL	200	600	B, B [■]
	Rank GB	100	600	G, G [■] , B, B [■] , GB

*1 : EX, Rank GB : TLP181 (GB)

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

TLP181 (GB) : TLP181

TLP181 - 2

1996 - 1 - 8

TOSHIBA CORPORATION

(TLP181)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I _F	50	mA
	Forward Current Derating	ΔI _F / °C	-0.7 (Ta ≥ 53°C)	mA / °C
	Pulse Forward Current	I _{FP}	1 (100 μs pulse, 100pps)	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	mW
	Collector Power Dissipation Derating (1 Circuit Ta ≥ 25°C)	ΔP _C / °C	-1.5	mW / °C
	Junction Temperature	T _j	125	°C
Storage Temperature Range		T _{stg}	-55~125	°C
Operating Temperature Range		T _{opr}	-55~100	°C
Lead Soldering Temperature		T _{sol}	260 (10s)	°C
Total Package Power Dissipation		P _T	200	mW
Total Package Power Dissipation Derating (Ta ≥ 25°C)		ΔP _T / °C	-2.0	mW / °C
Isolation Voltage (Note 1)		BV _S	3750 (AC, 1min., RH ≤ 60%)	V _{rms}

Note 1 Device considered a two-terminal device : Pin 1, 3 shorted together and pins 4, 6 shorted together

TLP181 - 3

1996 - 1 - 8

TOSHIBA CORPORATION

(TLP181)

INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V _F	I _F = 10mA	1.0	1.15	1.3	V
	Reverse Current	I _R	V _R = 5V	—	—	10	μA
	Capacitance	C _T	V = 0, f = 1MHz	—	30	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	V (BR) CEO	I _C = 0.5mA	80	—	—	V
	Emitter-Collector Breakdown Voltage	V (BR) ECO	I _E = 0.1mA	7	—	—	V
	Collector Dark Current	I _{CEO}	V _{CE} = 48V, (Ambient Light Below 1000 lx)	—	0.01 (2)	0.1 (10)	μA
			V _{CE} = 48V, Ta = 85°C, (Ambient Light Below 1000 lx)	—	2 (4)	50 (50)	μA
Capacitance (Collector to Emitter)	C _{CE}	V = 0, f = 1MHz	—	10	—	pF	

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I _C / I _F	I _F = 5mA, V _{CE} = 5V Rank GB	50	—	600	%
			100	—	600	
Saturated CTR	I _C / I _F (sat)	I _F = 1mA, V _{CE} = 0.4V Rank GB	—	60	—	%
			30	—	—	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C = 2.4mA, I _F = 8mA	—	—	0.4	V
		I _C = 0.2mA, I _F = 1mA Rank GB	—	0.2	—	
Off-State Collector Current	I _C (off)	V _F = 0.7V, V _{CE} = 48V	—	1	10	μA

ISOLATION CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance (Input to Output)	C _S	V _S = 0V, f = 1MHz	—	0.8	—	pF
Isolation Resistance	R _S	V _S = 500V	5 × 10 ¹⁰	10 ¹⁴	—	Ω
Isolation Voltage	BV _S	AC, 1 minute	3750	—	—	V _{rms}
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	V _{dc}

TLP181 - 4

1996 - 1 - 8

TOSHIBA CORPORATION

(TLP181)

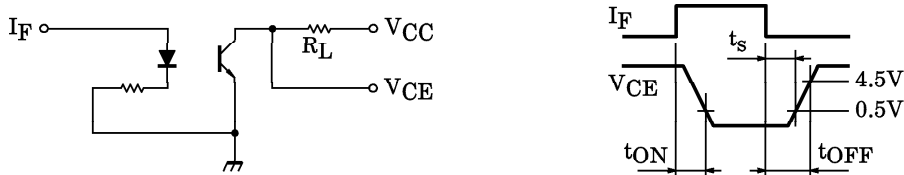
SWITCHING CHARACTERISTICS (Ta = 25°C)

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

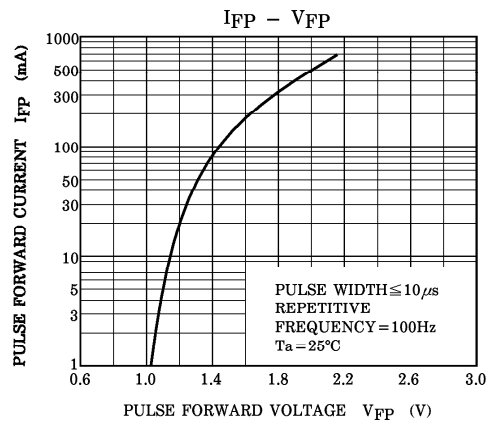
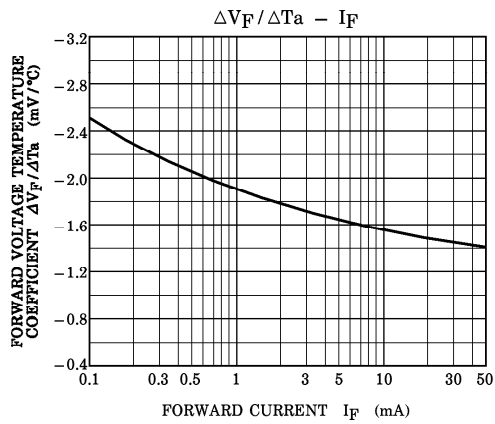
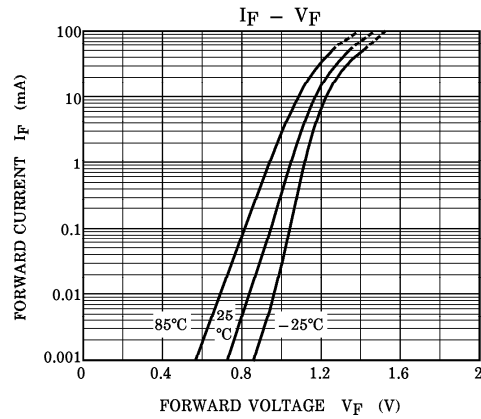
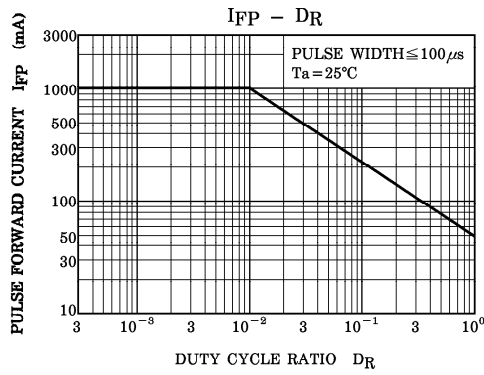
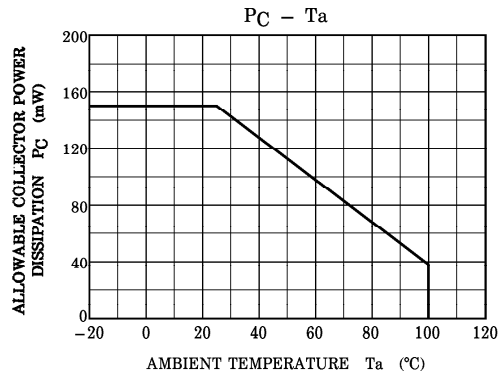
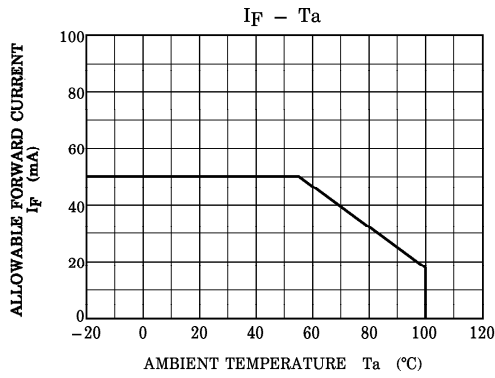
RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	—	5	48	V
Forward Current	I_F	—	16	20	mA
Collector Current	I_C	—	1	10	mA
Operating Temperature	T_{opr}	-25	—	85	°C

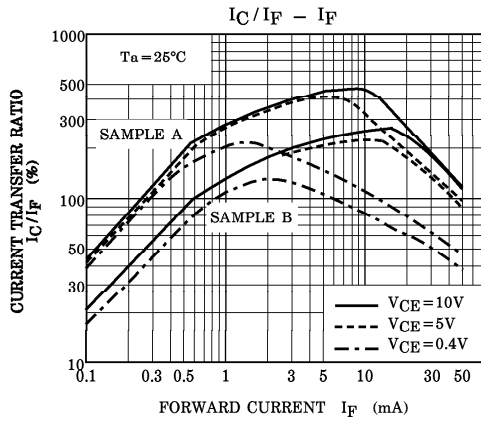
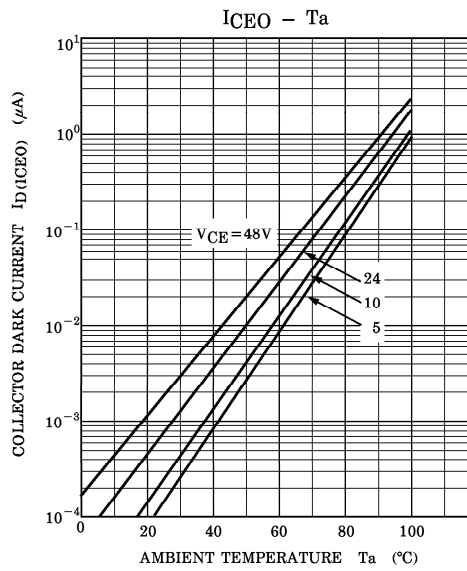
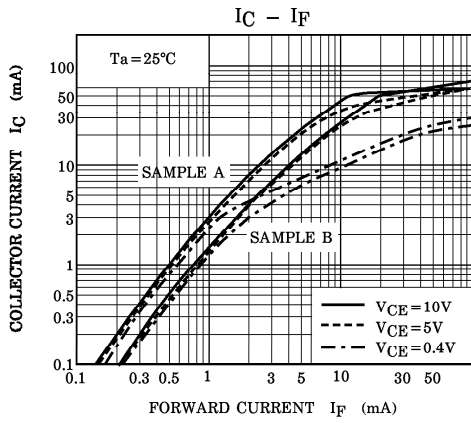
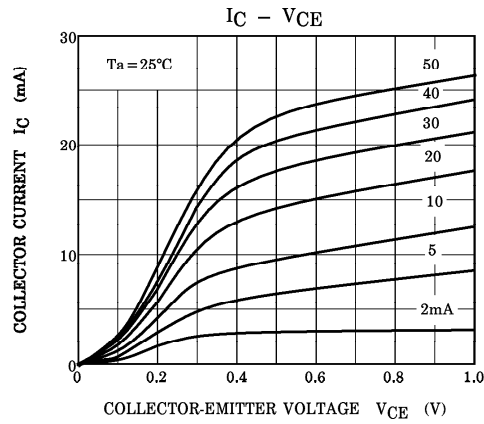
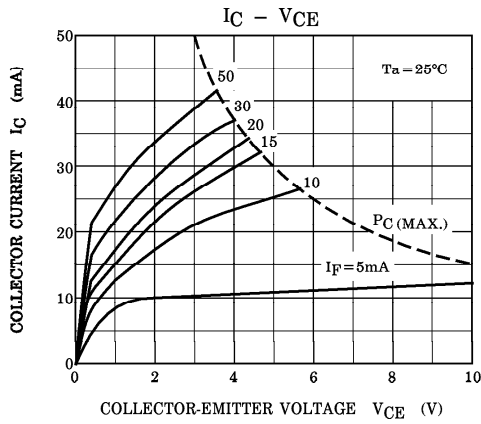
Fig.1 SWITCHING TIME TEST CIRCUIT



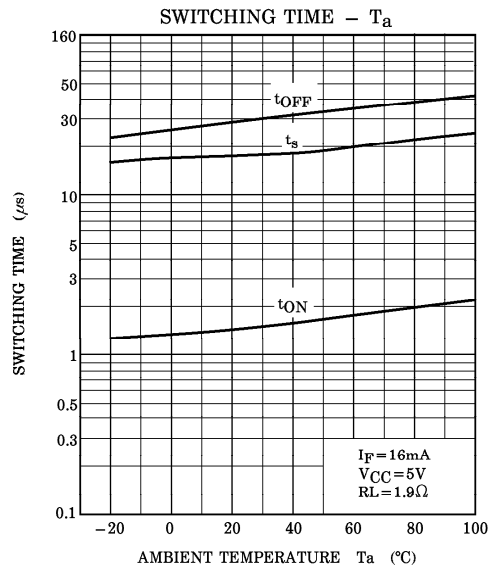
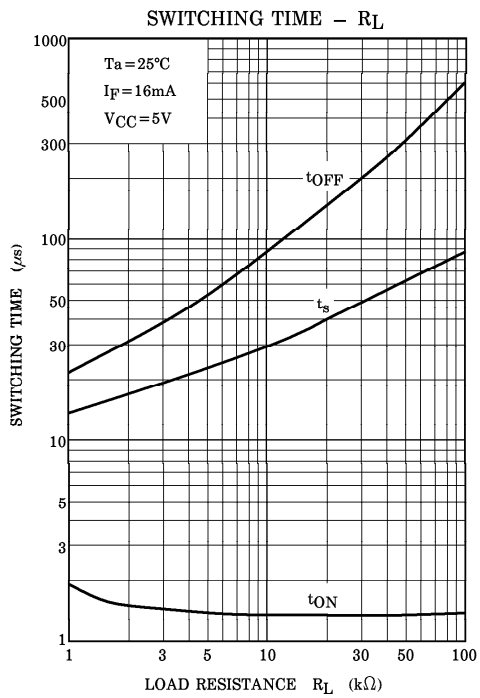
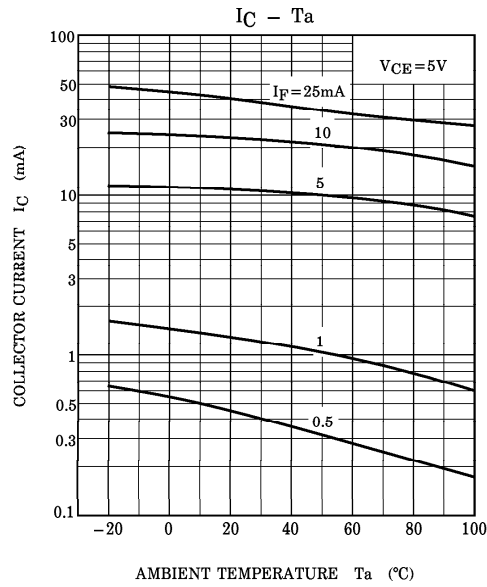
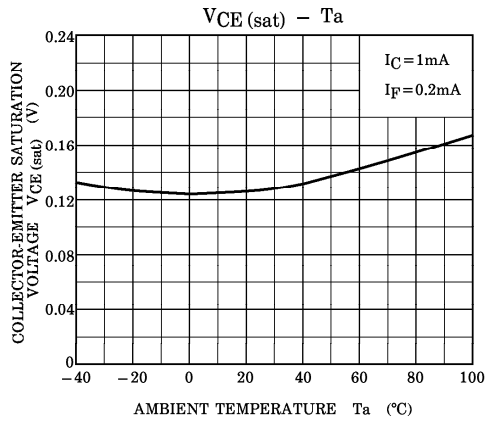
(TLP181)



(TLP181)



(TLP181)



TLP181 - 8*

1996 - 1 - 8

TOSHIBA CORPORATION