

TLP185

Technical Information

This material is technological examination material to aim at the product introduction. The change in the content of the characteristic might be accompanied at the final specification process. The final specification will be able to be gotten in the brokerage department when the product is designed and to get the confirmation.

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Toshiba Corporation Semiconductor & Storage Products Company
Optoelectronics Device Marketing & Engineering Group 1

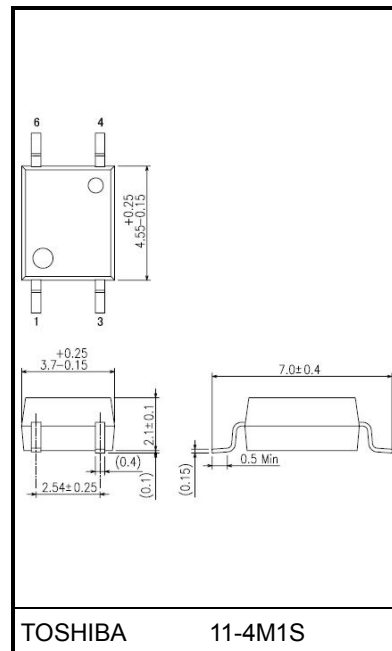
TLP185

Office Machine
 Programmable Controllers
 AC Adapter
 I/O Interface Board

The TOSHIBA mini flat coupler TLP185 is a small outline coupler, suitable for surface mount assembly. TLP185 consist of a photo transistor optically coupled to a gallium arsenide infrared emitting diode. Since TLP185 is smaller than DIP package, it's suitable for high-density surface mounting applications such as programmable controllers

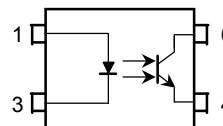
- Collector-emitter voltage: 80V (min)
- Current transfer ratio: 50% (min)
 Rank GB: 100% (min)
- Isolation voltage: 3750Vrms (min)
- Operation Temperature:-55 to 110 °C
- Safety Standards
 UL(under application): UL1577, File No. E67349
 cUL(under application): CSA Component Acceptance Service No. 5A
 File No.E67349
- BSI(under application): BS EN60065:2002, certificate No.8285
 BS EN60950-1:2006 certificate No.8286
- Option (V4) type
 VDE (under application) : EN60747-5-2
 (Note) : When a EN60747-5-2 approved type is needed,
 Please designate "Option(V4)"
- Construction mechanical rating
 Creepage distance : 5.0 mm(min)
 Clearance : 5.0 mm(min)
 Insulation thickness : 0.4 mm(min)

Unit: mm



Weight: 0.08 g (Typ.)

Pin Configuration(top view)



- 1: Anode
- 3: Cathode
- 4: Emitter
- 6: Collector

Current Transfer Ratio

Type	Classification *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	
TLP185	Blank	50	400	Blank
	Rank Y	50	150	YE
	Rank GR	100	300	GR
	Rank GB	100	400	GB
	Rank YH	75	150	Y+
	Rank GRL	100	200	G
	Rank GRH	150	300	G+
	Rank BLL	200	400	B

*1: EX, Rank GB: TLP185 (GB,E

(Note) Application, type name for certification test, please use standard product type name, i. e.
TLP185(GB,E: TLP185

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	I _F	50	mA
	Forward current derating (Ta ≥ 90°C)	ΔI _F / °C	-1.5	mA / °C
	Pulse forward current (Note1)	I _{FP}	1	A
	Reverse voltage	V _R	5	V
	Input power dissipation	P _D	100	mW
	Input power dissipation derating (Ta ≥ 90°C)	ΔP _D /ΔTa	-3.0	mW/°C
	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	P _C	150	mW
	Collector power dissipation derating (Ta ≥ 25°C)	ΔP _C / °C	-1.5	mW / °C
	Junction temperature	T _j	125	°C
Operating temperature range		T _{opr}	-55 to 110	°C
Storage temperature range		T _{stg}	-55 to 125	°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 (AC, 1min., R.H. ≤ 60%) (Note 2)		BV _S	3750	V _{rms}

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).

Note 1: Pulse width ≤ 100 μs, f=100 Hz

Note 2: Device considered a two terminal device: Pins 1 and 3 shorted together and 4 and 6 shorted together.

Recommended Operating Conditions (Note)

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

Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

Individual Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V_F	$I_F = 10 \text{ mA}$	1.1	1.25	1.4	V
	Reverse current	I_R	$V_R = 5 \text{ V}$	—	—	5	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	I_{CEO}	$V_{CE} = 48 \text{ V}$	—	0.01	0.08	μA
			$V_{CE} = 48 \text{ V}, T_a = 85^\circ\text{C}$	—	2	50	μA
Capacitance (collector to emitter)	C_{CE}	$V = 0, f = 1 \text{ MHz}$	—	10	—	pF	

Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Current transfer ratio	I_C / I_F	$I_F = 5 \text{ mA}, V_{CE} = 5 \text{ V}$ Rank GB	50	—	400	%
			100	—	400	
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	—	—	0.3	V
			—	0.2	—	
			—	—	0.3	
Off-state collector current	$I_C (\text{off})$	$V_F = 0.7 \text{ V}, V_{CE} = 48 \text{ V}$	—	1	10	μA

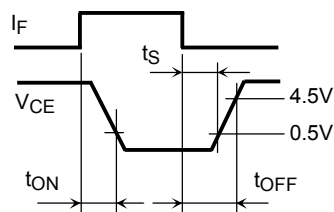
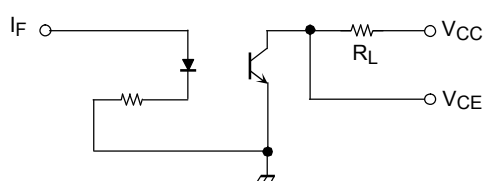
Isolation Characteristics (Ta = 25°C)

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	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	1×10^{12}	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}

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}	$R_L = 1.9\text{ k}\Omega$ $V_{CC} = 5\text{ V}, I_F = 16\text{ mA}$ (Fig.1)	—	2	—	μs
Storage time	t_s		—	25	—	
Turn-off time	t_{OFF}		—	40	—	

Fig. 1 Switching time test circuit



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