TOSHIBA Photocoupler GaAs Ired & Photo-Transistor

TLP126

Programmable Controllers AC / DC-Input Module Telecommunication

The TOSHIBA mini flat coupler TLP126 is a small outline coupler, suitable for surface mount assembly. TLP126 consists of a photo transistor, optically coupled to a gallium arsenide infrared emitting diode connected inverse parallel, and provides high CTR at low AC input current.

- Collector-emitter voltage: 80 V (min.)
- Current transfer ratio: 100% (min.)
- Isolation voltage: 3750Vrms (min.)
- UL recognized: UL1577, file No. E67349





Pin Configurations (top view)



1 : Anode, Cathode

3 : Cathode, Anode 4 : Emitter

6 : Collector

Unit in mm

Absolute Maximum Ratings (Ta = 25°C)

	Characteristic	Symbol	Rating	Unit
	Forward current	I _{F(RMS)}	50	mA
Q	Forward current derating (Ta≥ 53°C) Δ		-0.7	mA / °C
Ш	Peak forward current(100µs pulse,100pps)		1	А
	Junction temperature	Tj	125	°C
	Collector-emitter voltage	V _{CEO}	80	V
	Emitter-collector voltage	V _{ECO}	7	V
Ŀ	Collector current	Ι _C	50	mA
etect	Peak collector current(10ms pulse,100pps)	I _{CP}	100	mA
ă	Power dissipation	P _C	150	mW
	Power dissipation derating (Ta ≥ 25°C)	ΔP _C / °C	-1.5	mW / °C
	Junction temperature	Tj	125	°C
Stor	rage temperature range	T _{stg}	-55~125	°C
Ope	erating temperature range	T _{opr}	-55~100	°C
Lea	d soldering temperature(10 sec.)	T _{sold}	260	°C
Tota	al package power dissipation	Ρ _T	200	mW
Tota	al package power dissipation derating (Ta≥25°C)	ΔP _T / °C	-2.0	mW / °C
Isol	ation voltage (AC, 1min., RH ≤ 60%) (Note 1)	BVS	3750	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).

(Note 1) Device considered a two terminal device: Pins1, and 3 shorted together and 4 and 6 shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min.	Тур.	Max.	Unit
Supply voltage	V _{CC}	_	5	48	V
Forward current	I _{F(RMS)}	_	1.6	20	mA
Collector current	ΙC	_	1	10	mA
Operating temperature	T _{opr}	-25	_	75	°C

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.	Тур.	Max.	Unit
Q	Forward voltage	VF	I _F = ±10 mA	1.0	1.15	1.3	V
Щ	Capacitance	CT	V = 0, f = 1 MHz	_	60	—	pF
Detector	Collector–emitter breakdown voltage	V _(BR) CEO	I _C = 0.5 mA	80	-	-	V
	Emitter–collector breakdown voltage	V _{(BR) ECO}	I _E = 0.1 mA	7	_	_	V
		1050	V _{CE} = 48 V	_	10	100	nA
		ICEO	V _{CE} = 48 V, Ta = 85°C	_	2	50	μA
	Capacitance collector to emitter	C _{CE}	V = 0, f = 1 MHz	_	12	_	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Mln.	Тур.	Max.	Unit
Current transfer ratio	I _C / I _F	$I_{F} = \pm 1 \text{ mA}, V_{CE} = 0.5 \text{ V}$	100	—	1200	%
Low input CTR	I _C / I _{F (low)}	IF = ± 0.5 mA, V _{CE} = 1.5 V	50	_	_	%
Collector-emitter		I _C = 0.5 mA, I _F = ±1 mA	_	_	0.4	V
saturation voltage	VCE (sat)	I _C = 1 mA, I _F = ±1 mA	_	0.2	_	v
Off-state collector current	I _{C(off)}	V _F = ± 0.7V, V _{CE} = 48 V	_	1	10	μA
CTR symmetry	I _{C (ratio)}	$I_{C} (I_{F} = -1mA) / I_{C} (I_{F} = 1mA)$	0.3		3	

Coupled Electrical Characteristics (Ta = -25~75°C)

Characteristic	Symbol	Test Condition	Mln.	Тур.	Max.	Unit
Current transfer ratio	I _C / I _F	I _F = 1 mA, V _{CE} = 0.5 V	50	_	_	%
Low input CTR	I _C / I _{F (low)}	IF = 0.5 mA, V _{CE} = 1.5 V	-	50		%

Isolation characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Capacitance input to output	CS	V _S = 0, f = 1 MHz	_	0.8	_	pF
Isolation resistance	R _S	V _S = 500 V	5×10 ¹⁰	10 ¹⁴	_	Ω
		AC, 1 minute	3750	—	_	Vrma
Isolation voltage	BVS	AC, 1 second, in oil —	—	10000	_	VIIIIS
		DC, 1 minute, in oil	-	10000		Vdc

Switching Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Rise time	tr	V _{CC} = 10 V, I _C = 2 mA R _I = 100Ω	_	8	_	
Fall time	t _f		_	8	_	μs
Turn–on time	t _{on}	R _L = 100Ω	_	10	_	
Turn-off time	t _{off}		_	8	_	
Turn–on time	t _{ON}		—	10	_	
Storage time	ts	$R_L = 4.7 k\Omega$ (Fig.1) V _{CC} = 5 V, I _F = ±1.6 mA	_	50	_	μs
Turn-off time	tOFF		_	300	-	

Fig. 1 Switching time test circuit





















Ambient temperature Ta (°C)





Ambient temperature Ta (°C)



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