TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

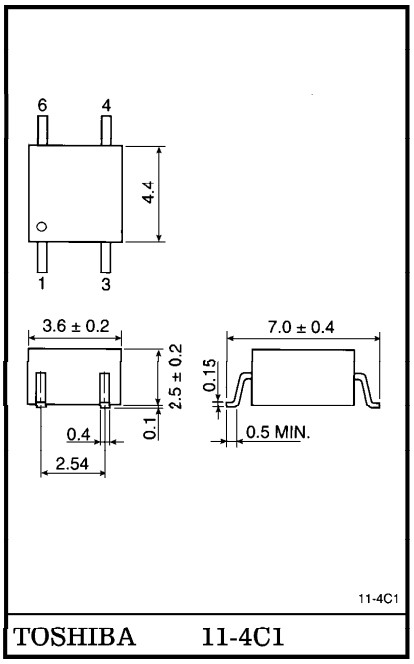
TLP126

PROGRAMMABLE CONTROLLERS

AC / DC-INPUT MODULE

TELECOMMUNICATION

Unit in mm



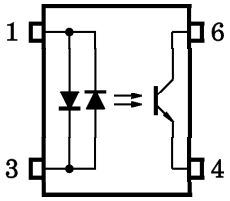
TOSHIBA 11-4C1

Weight : 0.09g

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 : 80V (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

961001EBC2

MAXIMUM RATINGS (Ta = 25°C)

	CHARACTERISTIC	SYMBOL	RATING	UNIT
LED	Forward Current	$I_{F(RMS)}$	50	mA
	Forward Current Derating (Ta ≧ 53°C)	ΔI_F / °C	−0.7	mA / °C
	Peak Forward Current (100 μs pulse, 100pps)	I_{FP}	1	A
	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
	Peak Collector Current (10ms pulse, 100pps)	I_{CP}	100	mA
	Power Dissipation	P_C	150	mW
	Power Dissipation Derating (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 (10 sec.)		T_{sold}	260	°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, 1 min., RH ≦ 60%) (Note 1)		BV_S	3750	Vrms

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

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	—	5	48	V
Forward Current	$I_{F(RMS)}$	—	1.6	20	mA
Collector Current	I_C	—	1	10	mA
Operating Temperature	T_{opr}	−25	—	75	°C

INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

	CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	$I_F = \pm 10mA$	1.0	1.15	1.3	V
	Capacitance	C_T	V = 0, f = 1MHz	—	60	—	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}	$V_{CE} = 48V$	—	10	100	nA
			$V_{CE} = 48V$, Ta = 85°C	—	2	50	μA
	Capacitance Collector to Emitter	C_{CE}	V = 0, f = 1MHz	—	12	—	pF

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C / I_F	$I_F = \pm 1mA$, $V_{CE} = 0.5V$	100	—	1200	%
Low Input CTR	$I_C / I_{F(low)}$	$I_F = \pm 0.5mA$, $V_{CE} = 1.5V$	50	—	—	%
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 0.5mA$ $I_F = \pm 1mA$	—	—	0.4	V
		$I_C = 1mA$ $I_F = \pm 1mA$	—	0.2	—	
Off-State Collector Current	$I_{C(off)}$	$V_F = \pm 0.7V$, $V_{CE} = 48V$	—	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	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C / I_F	$I_F = 1mA$, $V_{CE} = 0.5V$	50	—	—	%
Low Input CTR	$I_C / I_{F(low)}$	$I_F = 0.5mA$, $V_{CE} = 1.5V$	—	50	—	%

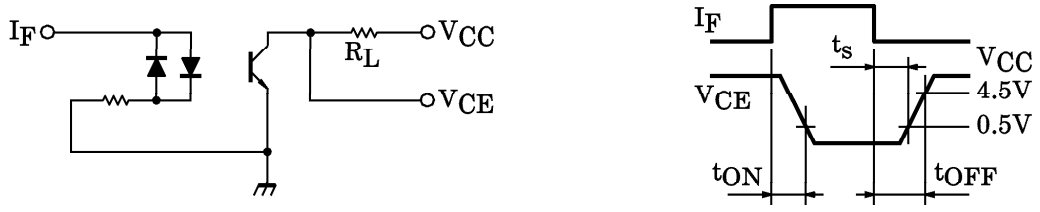
ISOLATION CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	C_S	$V_S = 0$, 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	—	—	Vrms
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

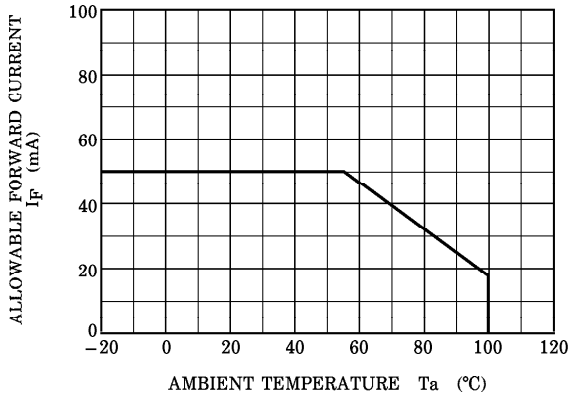
SWITCHING CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t_r	$V_{CC} = 10V$, $I_C = 2mA$ $R_L = 100\Omega$	—	8	—	μs
Fall Time	t_f		—	8	—	
Turn-on Time	t_{on}		—	10	—	
Turn-off Time	t_{off}		—	8	—	
Turn-on Time	t_{ON}	$R_L = 4.7k\Omega$ (Fig.1) $V_{CC} = 5V$, $I_F = \pm 1.6mA$	—	10	—	μs
Storage Time	t_S		—	50	—	
Turn-off Time	t_{OFF}		—	300	—	

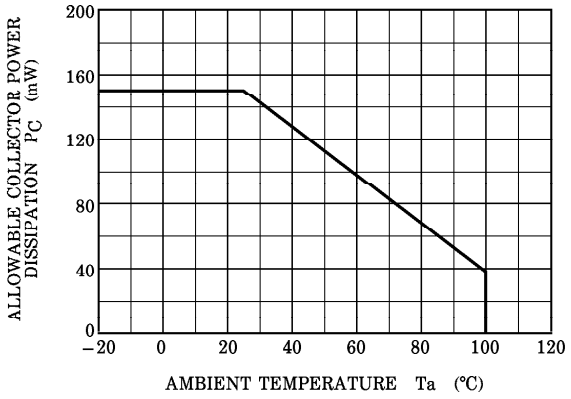
Fig.1 SWITCHING TIME TEST CIRCUIT



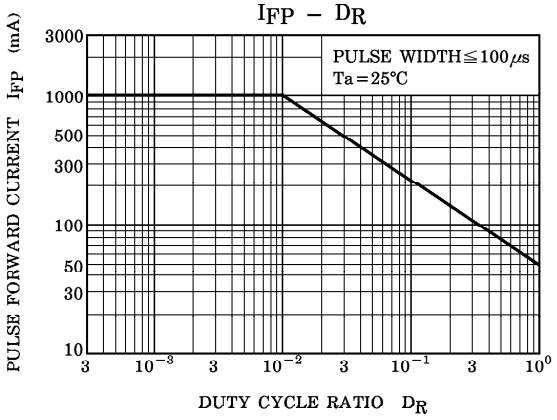
I_F – Ta



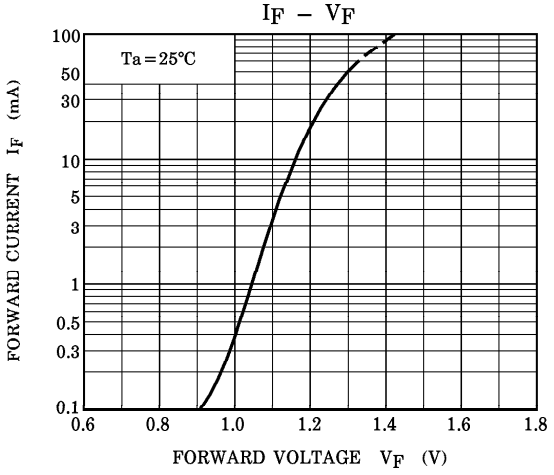
P_C – Ta



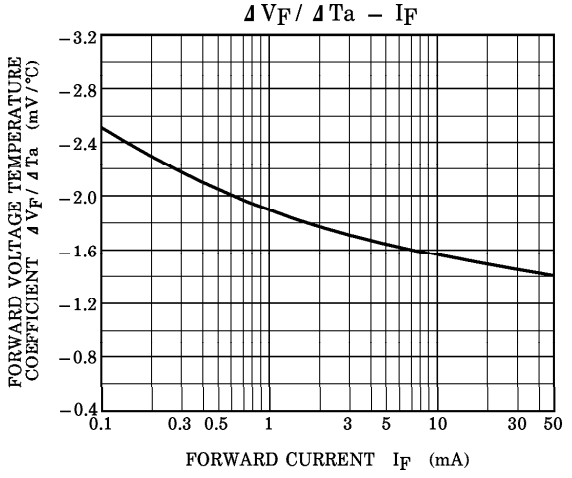
I_{FP} – D_R



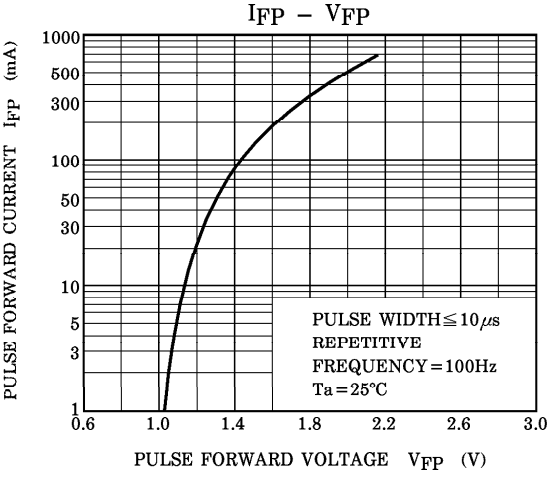
I_F – V_F



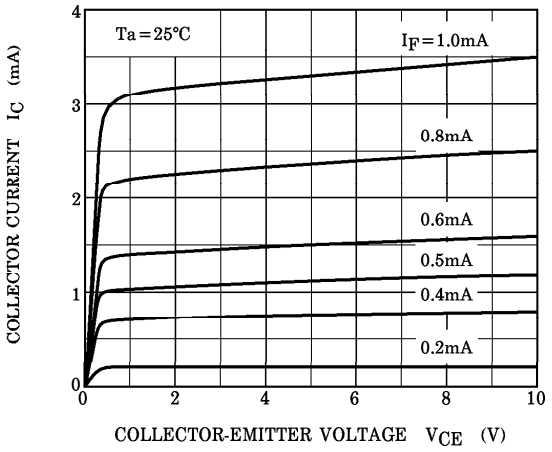
$\Delta V_F / \Delta Ta$ – I_F



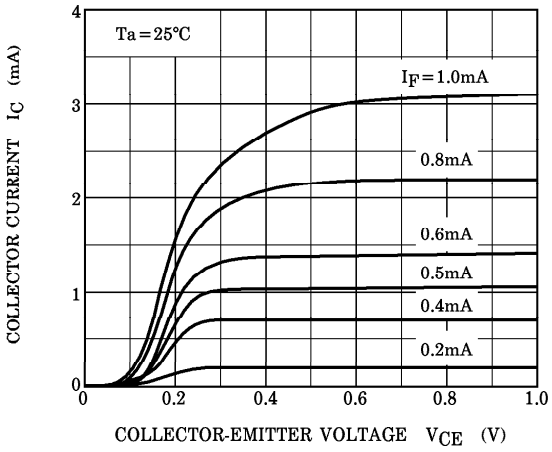
I_{FP} – V_{FP}



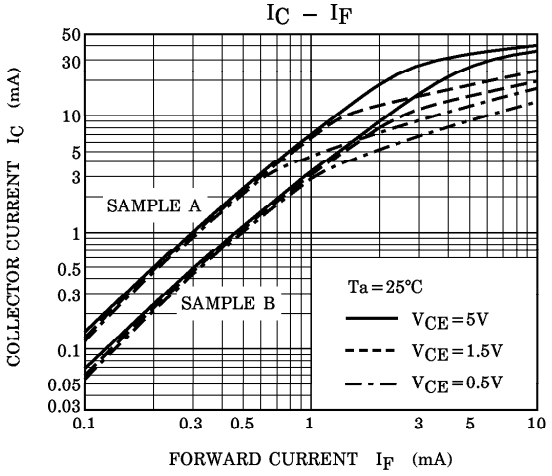
$I_C - V_{CE}$



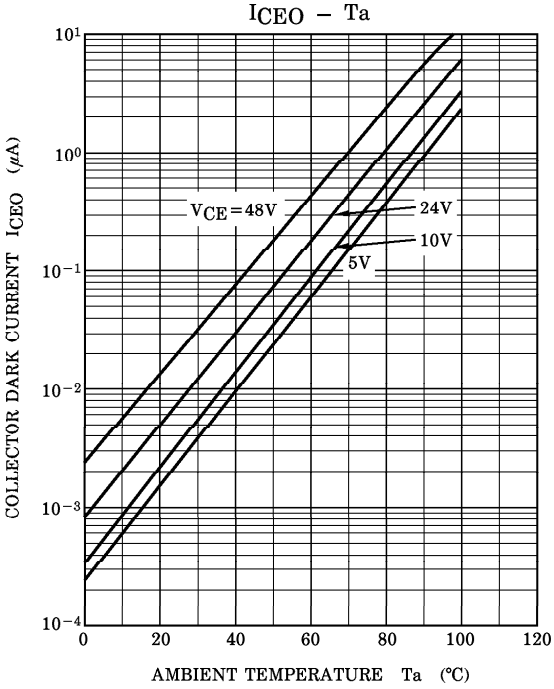
$I_C - V_{CE}$



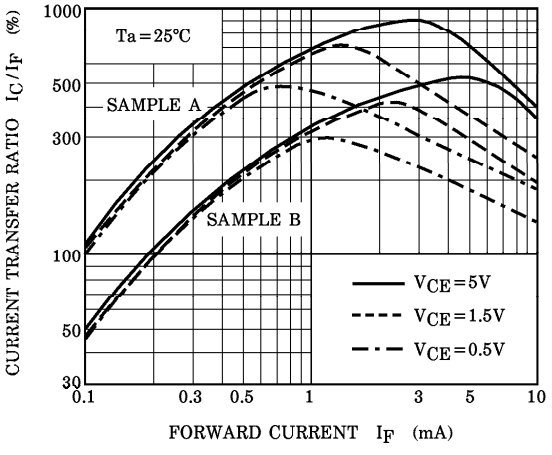
$I_C - I_F$



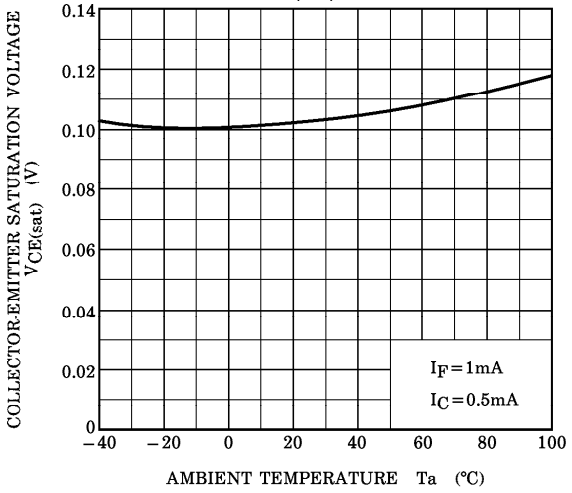
$I_{CEO} - Ta$



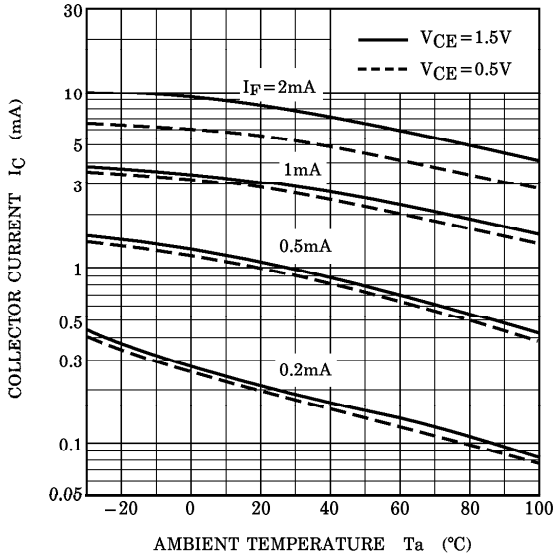
$I_C / I_F - I_F$



$V_{CE(sat)}$ – Ta



I_C – Ta



SWITCHING TIME – R_L