TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP626, TLP626-2, TLP626-4

PROGRAMMABLE CONTROLLERS
AC/DC-INPUT MODULE
TELECOMMUNICATION

The TOSHIBA TLP626, -2 and -4 consist of gallium arsenide infrared emitting diodes connected in inverse parallel, optically coupled to a photo-transistor.
The TLP626-2 offers two isolated channels in an eight lead plastic DIP, while the TLP626-4 provides four isolated channels in a sixteen plastic DIP.

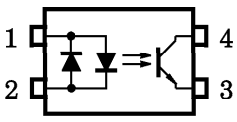
- Collector-Emitter Voltage : 55V (Min.)
- Current Transfer Ratio

CLASSIFICATION	CURRENT TRANSFER RATIO (Min.)			MARKING OF CLASSIFICATION
	Ta = 25°C		Ta = −25~75°C	
	I_F = ±1mA V_{CE} = 0.5V	I_F = ±0.5mA V_{CE} = 1.5V	I_F = ±1mA V_{CE} = 0.5V	
Rank BV	200%	100%	100%	BV
Standard	100%	50%	50%	BV, Blank

- Isolation Voltage : 5000V_{rms} Min.
- UL Recognized : UL1577, File No. E67349
- BSI Approved : BS EN60065 : 1994 Certificate No.7426
  BS EN60950 : 1992 Certificate No.7427
- Note : Application type name for certification test, please use standard product type name, i.e.
  TLP626 (BV) : TLP626

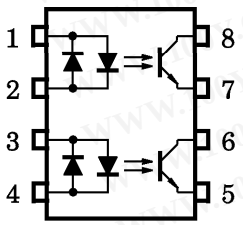
PIN CONFIGURATIONS (TOP VIEW)

TLP626



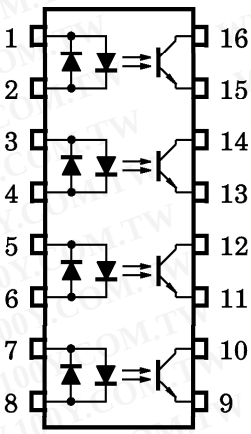
1 : ANODE
CATHODE
2 : CATHODE
ANODE
3 : EMITTER
4 : COLLECTOR

TLP626-2



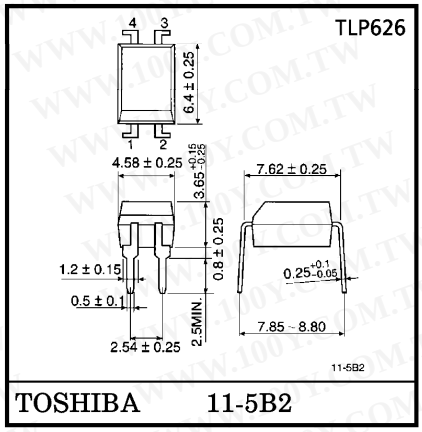
1, 3 : ANODE
CATHODE
2, 4 : CATHODE
ANODE
5, 7 : EMITTER
6, 8 : COLLECTOR

TLP626-4



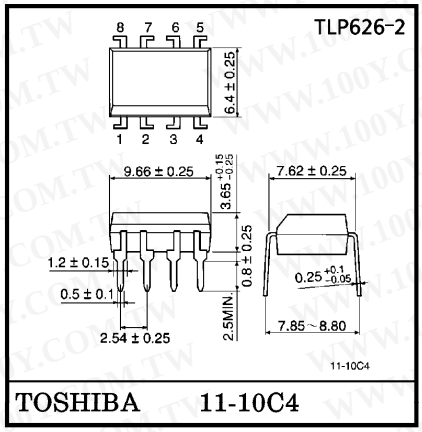
1, 3, 5, 7 : ANODE, CATHODE
2, 4, 6, 8 : CATHODE, ANODE
9, 11, 13, 15 : EMITTER
10, 12, 14, 16 : COLLECTOR

Unit in mm



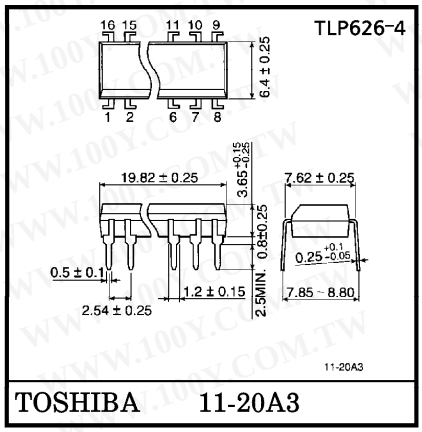
TOSHIBA 11-5B2

Weight : 0.26g



TOSHIBA 11-10C4

Weight : 0.54g



TOSHIBA 11-20A3

Weight : 1.1g

MAXIMUM RATINGS (Ta = 25°C)

	CHARACTERISTIC	SYMBOL	RATING		UNIT
			TLP626	TLP626-2 TLP626-4	
LED	Forward Current	I_F	60	50	mA
	Forward Current Derating	ΔI_F / °C	−0.7 (Ta≧39°C)	−0.5 (Ta≧25°C)	mA / °C
	Pulse Forward Current	I_{FP}	1 (100μs pulse, 100pps)		A
	Power Dissipation (1 Circuit)	P_D	100	70	mW
	Power Dissipation Derating (Ta≧25°C, 1 Circuit)	ΔP_D / °C	−1.0	−0.7	mW/°C
	Junction Temperature	T_j	125		°C
DETECTOR	Collector-Emitter Voltage	V_{CEO}	55		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≧25°C, 1 Circuit)	ΔP_C / °C	−1.5	−1.0	mW / °C
	Junction Temperature	T_j	125		°C
Storage Temperature Range		T_{stg}	−55~125		°C
Operating Temperature Range		P_{opr}	−55~100		°C
Lead Soldering Temperature		T_{sol}	260 (10s)		°C
Total Package Power Dissipation (1 Circuit)		P_T	250	150	mW
Total Package Power Dissipation Derating (Ta≧25°C, 1 Circuit)		ΔP_T / °C	−2.5	−1.5	mW / °C
Isolation Voltage	(Note 1)	BV_S	5000 (AC, 1min., RH≦60%)		Vrms

(Note 1) Device considered a two terminal : LED side pins shorted together, and DETECTOR side pins shorted together.

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	—	5	24	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
	Reverse Current	I_F	$V_F = \pm 0.7V$	—	2.5	20	μA
	Capacitance	C_T	V = 0, f = 1MHz	—	60	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	$V_{(BR)\,CEO}$	$I_C = 0.5mA$	55	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)\,ECO}$	$I_E = 0.1mA$	7	—	—	V
	Collector Dark Current	I_{CEO}	$V_{CE} = 24V$	—	10	100	nA
			$V_{CE} = 24V$, Ta = 85°C	—	2	50	μA
	Capacitance Collector to Emitter	C_{CE}	V = 0, f = 1MHz	—	12	—	pF

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

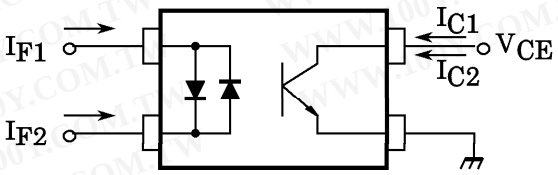
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C / I_F	$I_F = \pm 1mA$, $V_{CE} = 0.5V$	100	—	1200	%
		Rank BV	200	—	1200	
Low Input CTR	I_C / I_F (low)	$I_F = \pm 0.5mA$, $V_{CE} = 1.5V$	50	—	—	%
		Rank BV	100	—	—	
Collector-Emitter Saturation Voltage	V_{CE} (sat)	$I_C = 0.5mA$, $I_F = \pm 1mA$	—	—	0.4	V
		$I_C = 1mA$, $I_F = \pm 1mA$	—	0.2	—	
		Rank BV	—	—	0.4	
Off-State Collector Current	I_C (off)	$V_F = \pm 0.7V$, $V_{CE} = 24V$	—	1	10	μA
CTR Symmetry *1	I_C (ratio)	$I_C(I_F = -1mA) / I_C(I_F = 1mA)$	0.5	—	2	—

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	—	—	%
		Rank BV	100	—	—	
Low Input CTR	I_C / I_F (low)	$I_F = 0.5mA$, $V_{CE} = 1.5V$	—	50	—	%
		Rank BV	—	100	—	

*1

$$I_{C\,(ratio)} = \frac{I_{C2}\,(I_F = I_{F2},\ V_{CE} = 5V)}{I_{C1}\,(I_F = I_{F1},\ V_{CE} = 5V)}$$



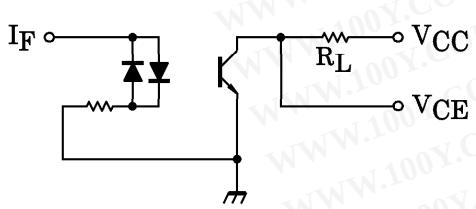
ISOLATION CHARACTERISTICS (Ta = 25°C)

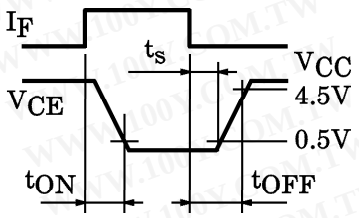
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	C_S	V_S=0, f=1MHz	—	0.8	—	pF
Isolation Resistance	R_S	V_S=500V	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 1 minute	5000	—	—	Vrms
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

SWITCHING CHARACTERISTICS (Ta = 25°C)

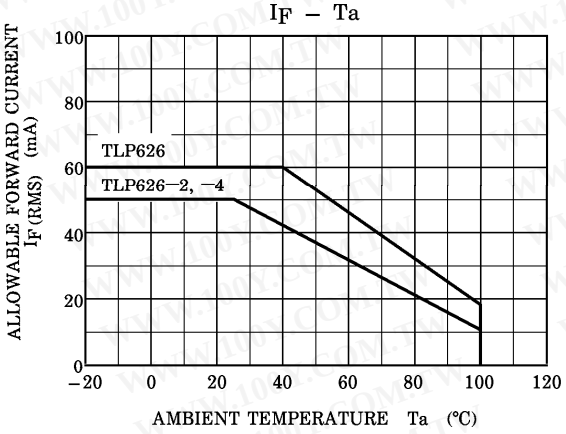
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t_r	V_{CC}=10V, I_C=2mA R_L=100Ω	—	8	—	μs
Fall Time	t_f		—	8	—	
Turn-on Time	t_{on}		—	10	—	
Turn-off Time	t_{off}		—	8	—	
Turn-on Time	t_{ON}	R_L=4.7kΩ (Fig.1) V_{CC}=5V, I_F=±1.6mA	—	10	—	μs
Storage Time	t_s		—	50	—	
Turn-off Time	T_{OFF}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

Fig. 1 SWITCHING OPERATING CONDITIONS

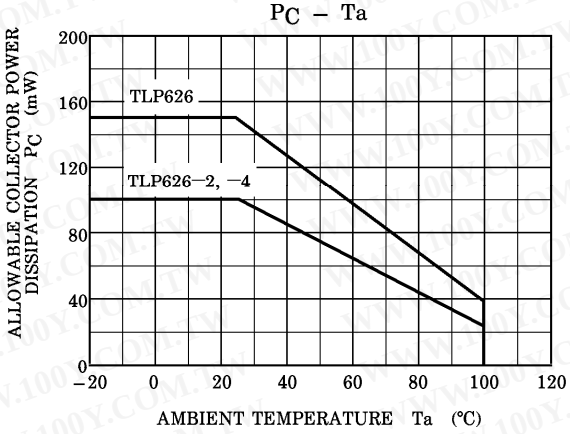




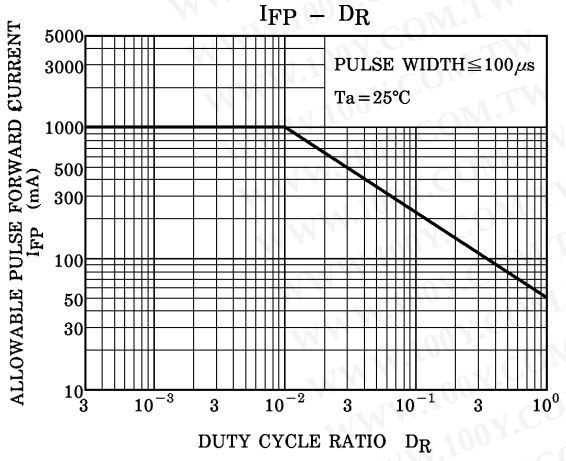
I_F – Ta



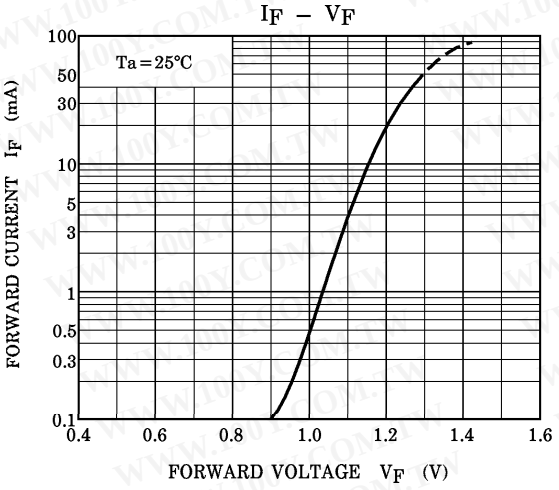
P_C – Ta



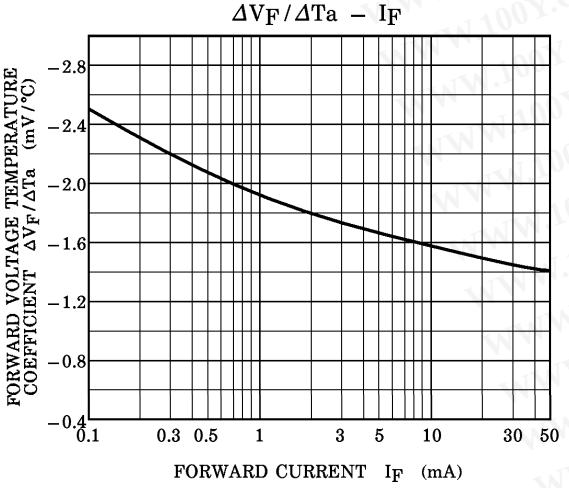
I_{FP} – D_R



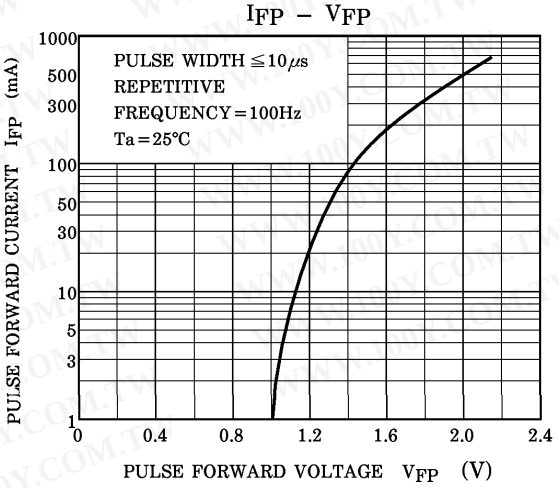
I_F – V_F



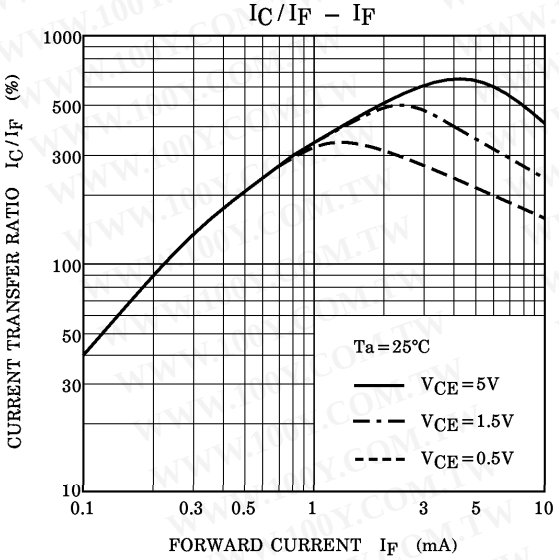
$\Delta V_F / \Delta Ta$ – I_F



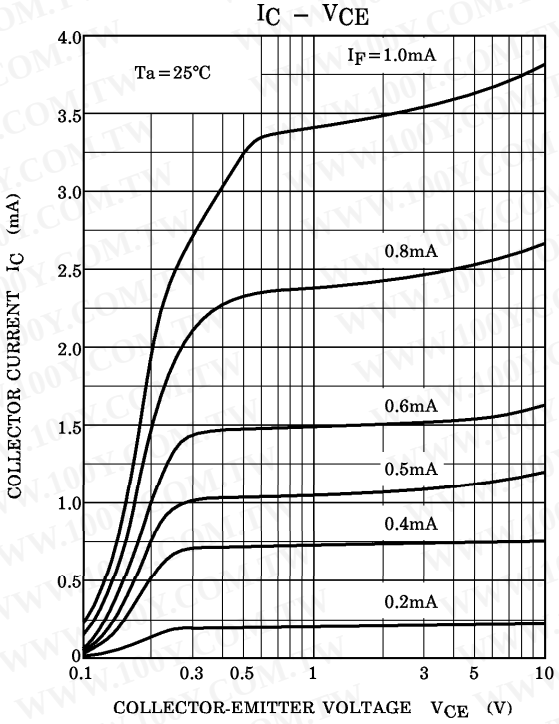
I_{FP} – V_{FP}



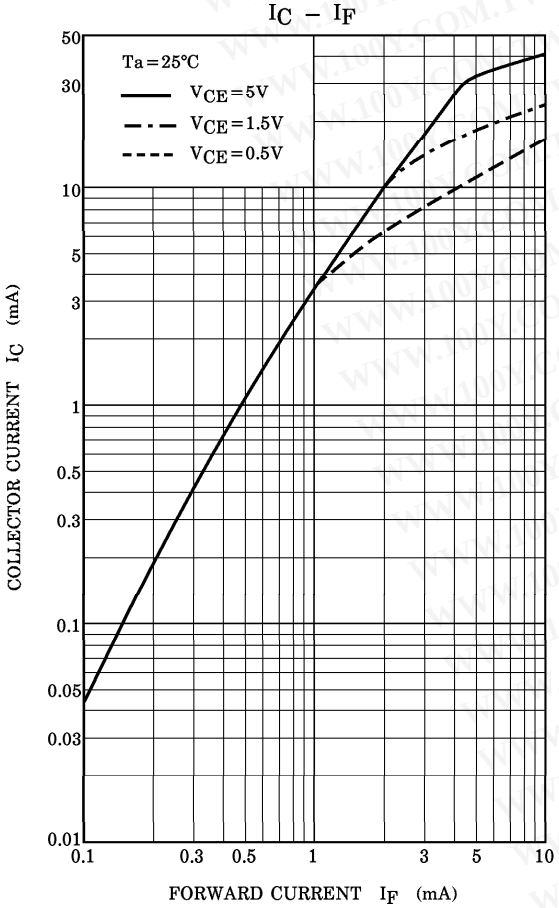
$I_C / I_F - I_F$



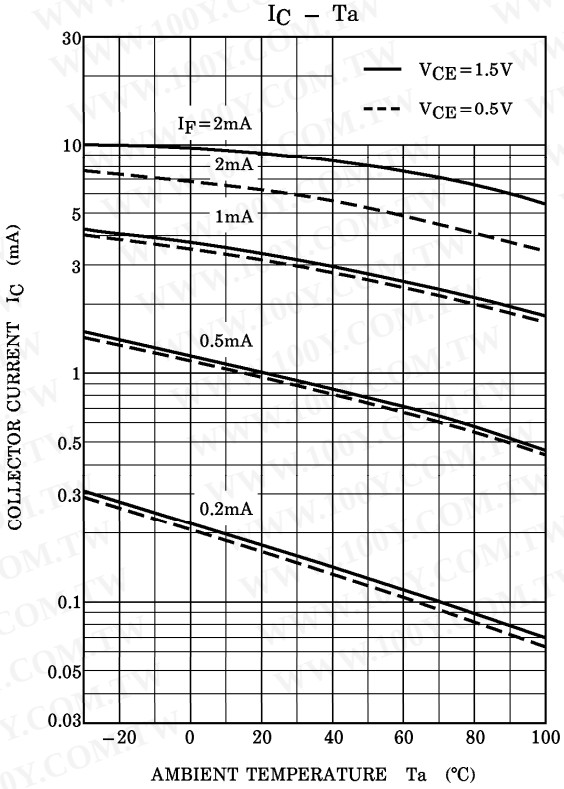
$I_C - V_{CE}$



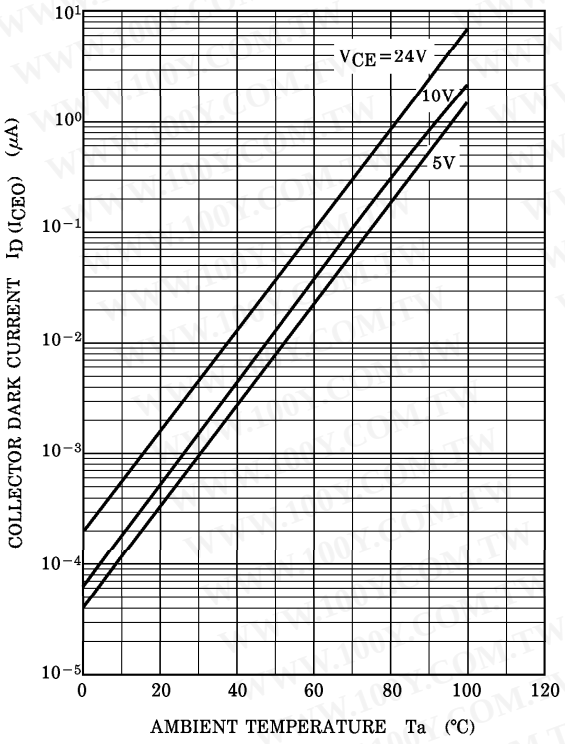
$I_C - I_F$



$I_C - Ta$



I_D – Ta



SWITCHING TIME – R_L