TOSHIBA Photocoupler GaAs Ired & Photo−Transistor

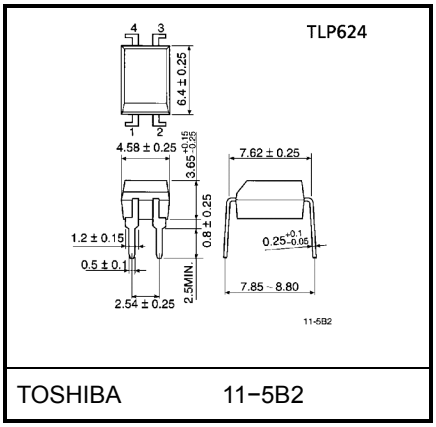
TLP624,TLP624−2,TLP624−4

Programmable Controllers

AC/DC−Input Module

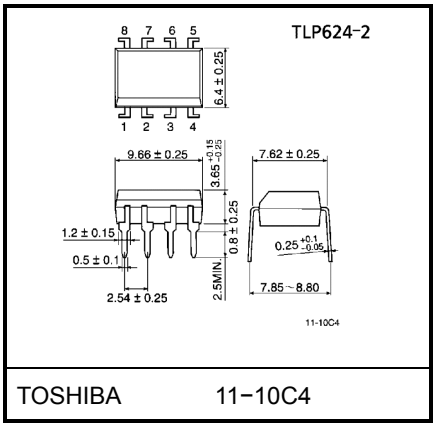
Telecommunication

Unit in mm



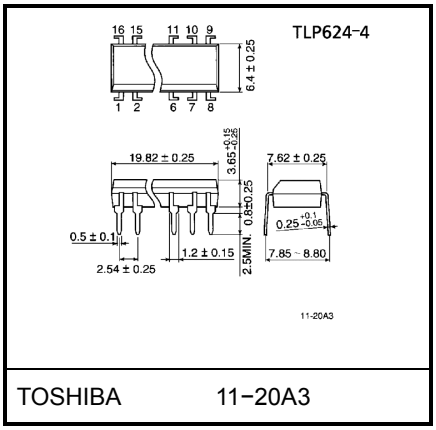
TOSHIBA 11−5B2

Weight: 0.26 g



TOSHIBA 11−10C4

Weight: 0.54 g



TOSHIBA 11−20A3

Weight: 1.1 g

The TOSHIBA TLP624, −2 and −4 consist of a gallium arsenide infrared emitting diode optically coupled to a photo−transistor.
The TLP624−2 offers two isolated cahnnels in an eight lead plastic DIP,while the TLP624−4 provides four isolated channels in a sixteen plastic DIP.

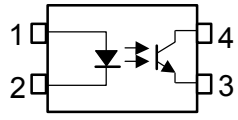
- Collector−emitter voltage: 55V min.
- Current transfer ratio

Classi−fication	Current Transfer Ratio(min)			Marking of classi−fication
	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 porduct type name,i.e.
  TLP624(BV): TLP624
  TLP624−2(BV): TLP624−2

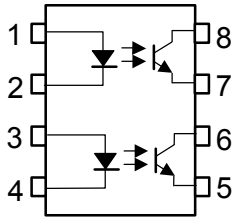
Pin Configurations(top view)

TLP624



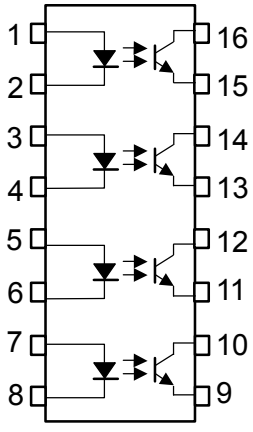
1. Anode
2. Cathode
3. Emitter
4. Collector

TLP624−2



1,3 : Anode
2,4 : Cathode
5,7 : Emitter
6,8 : Collector

TLP624−4



1,3,5,7: Anode
2,4,6,8: Cathode
9,11,13,15: Emitter
10,12,14,16: Collector

Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating		Unit
			TLP624	TLP624−2 TLP624−4	
LED	Forward current	I_F	60	50	mA
	Forward current detating	ΔI_F / °C	−0.7(Ta ≥ 39°C)	−0.5(Ta ≥ 25°C)	mA / °C
	Pulse forwaed 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
	Reverse voltage	V_R	5		V
	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 device: 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	—	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 = 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	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 = 1mA, V_{CE} = 0.5V	100	—	1200	%
		Rank BV	200	—	1200	
Low input CTR	I_C / I_F (low)	I_F = 0.5mA, V_{CE} = 1.5V	50	—	—	%
		Rank BV	100	—	—	
Collector−emitter saturation voltage	V_{CE} (sat)	I_C = 0.5mA, I_F = 1mA	—	—	0.4	V
		I_C = 1mA, I_F = 1mA	—	0.2	—	
		Rank BV	—	—	0.4	

Coupled Electrical Characteristics (Ta = −25°C~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	—	

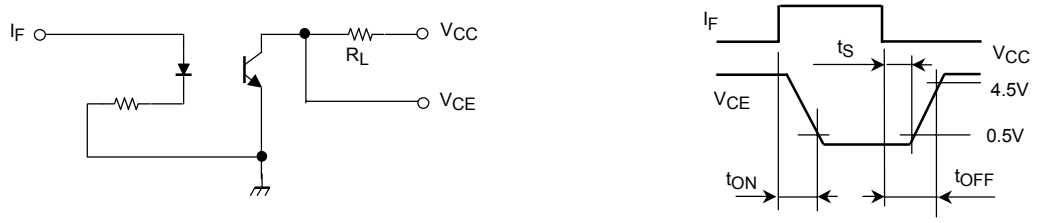
Isolation Characteristics (Ta = 25°C)

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, 1minute	5000	—	—	Vrms
		AC, 1second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

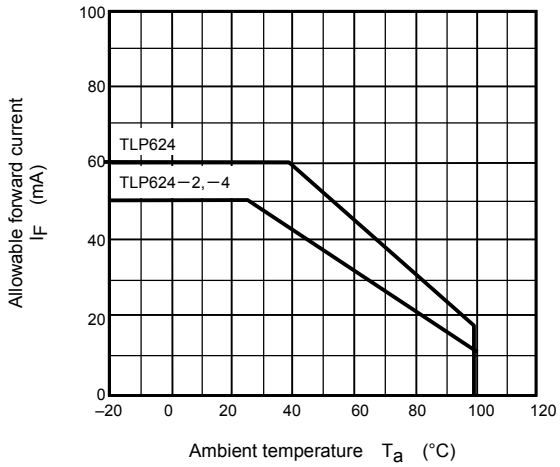
Switching Characteristics (Ta = 25°C)

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 = 4.7 kΩ (Fig.1) V_{CC} = 5 V, I_F = 1.6mA	—	10	—	μs
Storage time	t_S		—	50	—	
Turn−off time	T_{OFF}		—	300	—	

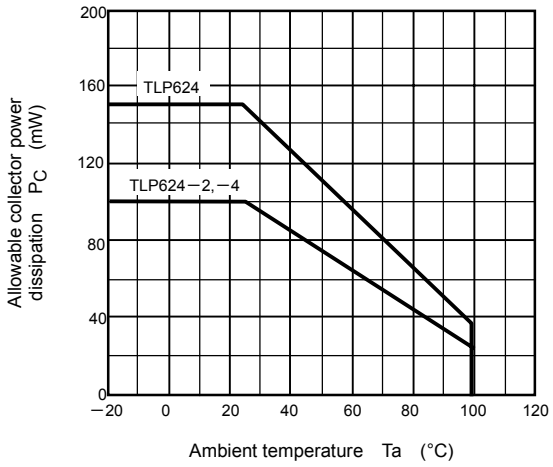
Fig. 1 Switching time test circuit



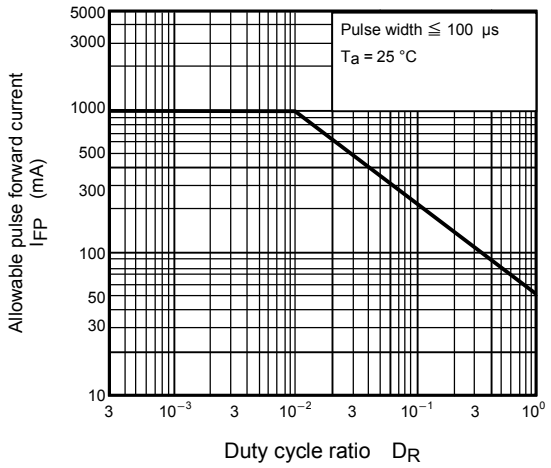
$I_F - T_a$



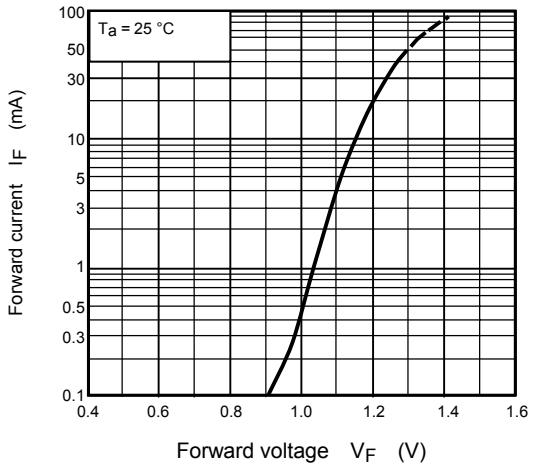
$P_C - T_a$



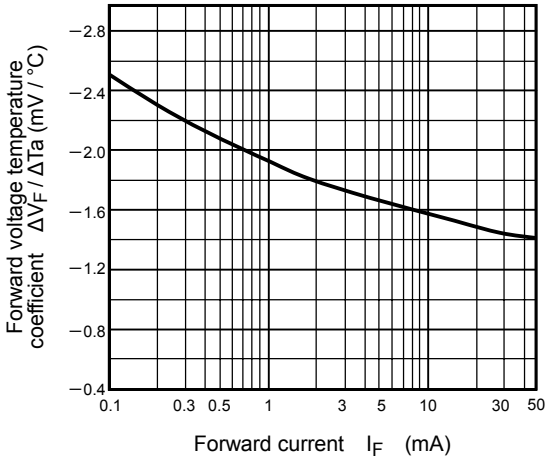
$I_{FP} - D_R$



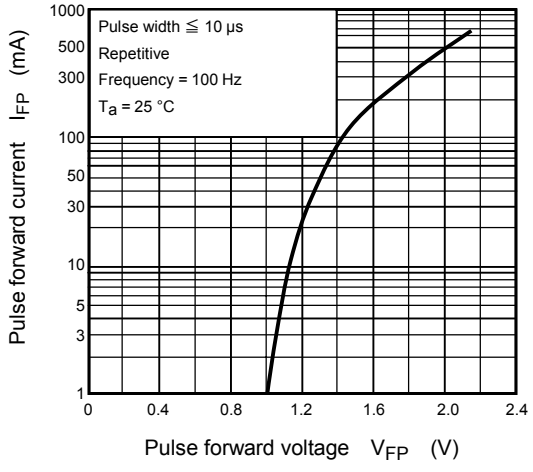
$I_F - V_F$



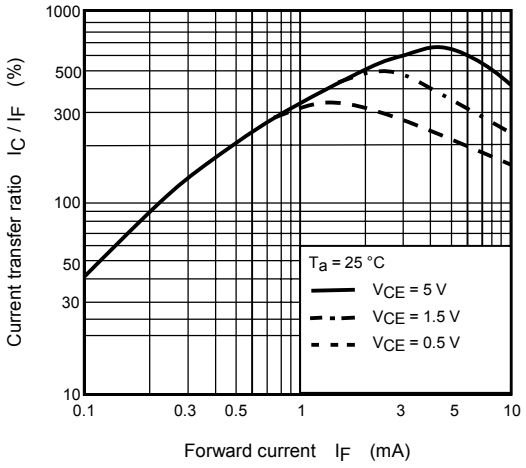
$\Delta V_F / \Delta Ta - I_F$



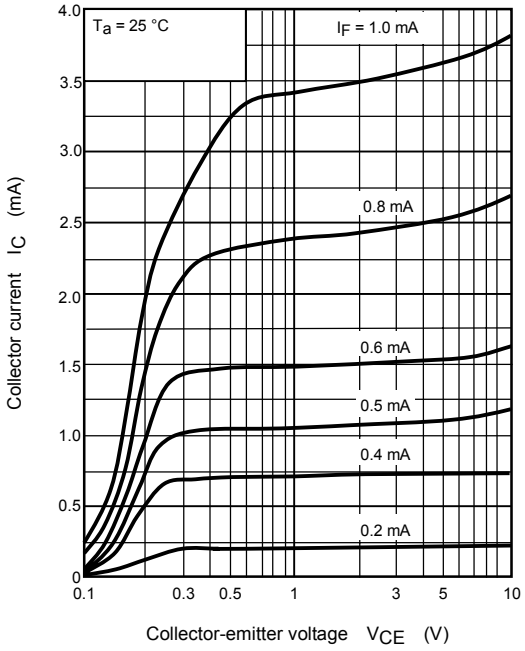
$I_{FP} - V_{FP}$



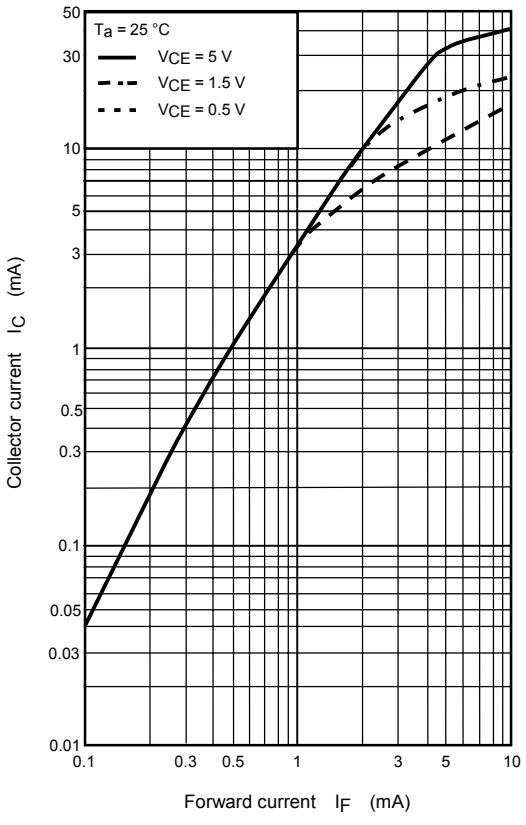
$I_C / I_F - I_F$



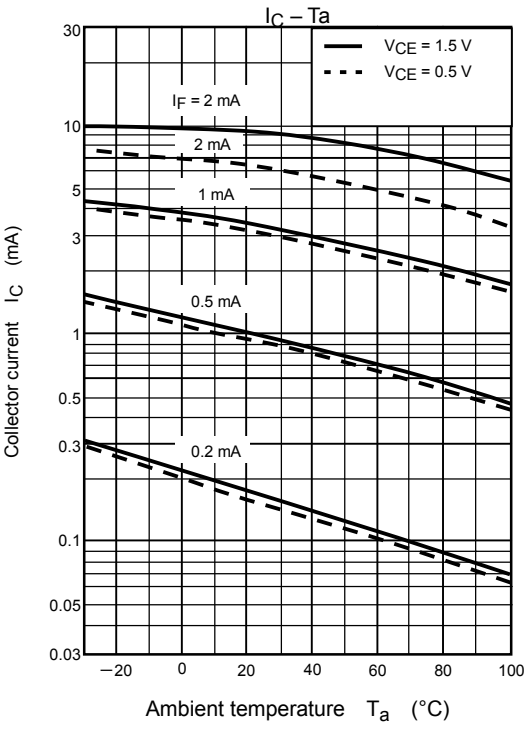
$I_C - V_{CE}$



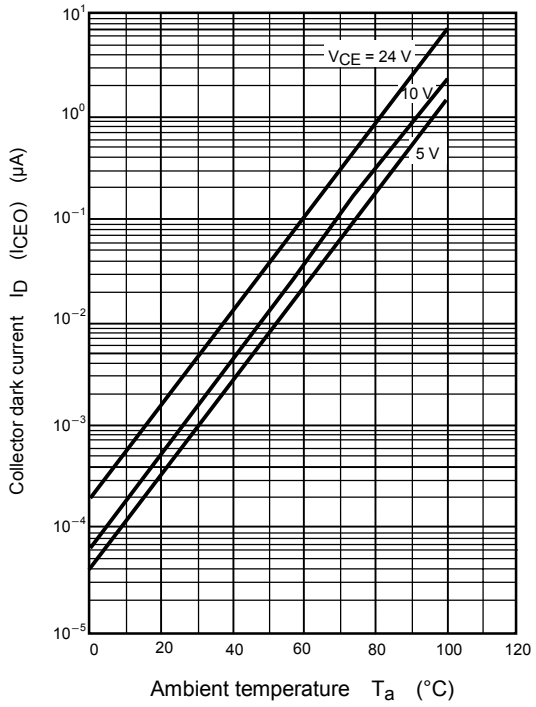
$I_C - I_F$



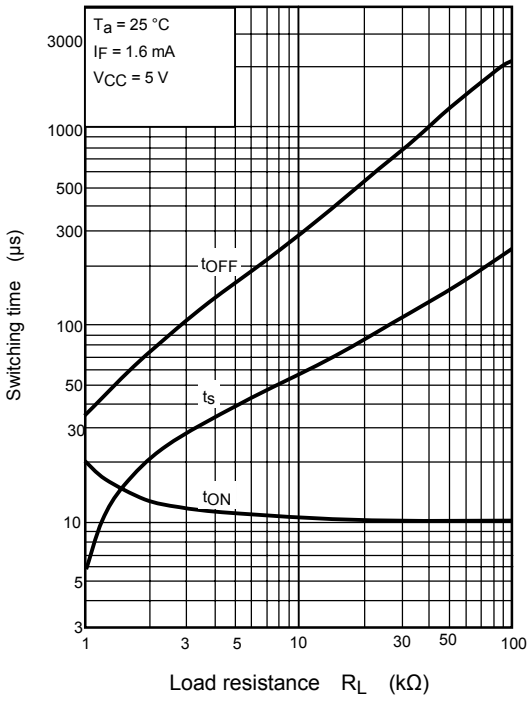
$I_C - Ta$



$I_D - T_a$



Switching Time – R_L



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000707EBC

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