

TOSHIBA Photocoupler GaAs Ired & Photo-Transistor

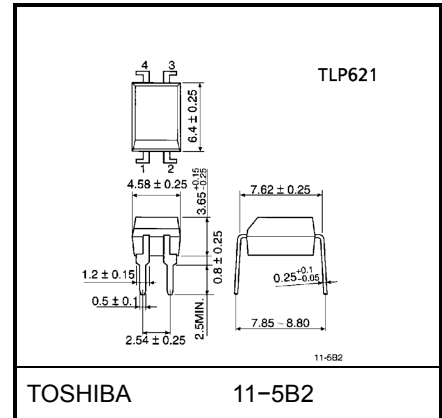
# TLP621, TLP621-2, TLP621-4

Programmable Controller  
AC / DC-Input Module  
Solid State Relay

The TOSHIBA TLP621, -2 and -4 consists of a photo-transistor optically coupled to a gallium arsenide infrared emitting diode. The TLP621-2 offers two isolated channels in an eight lead plastic DIP, which the TLP621-4 provides four isolated channels in a sixteen plastic DIP.

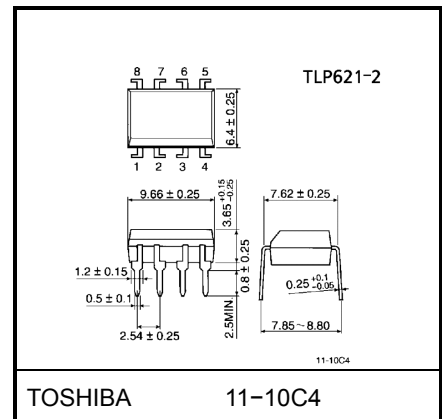
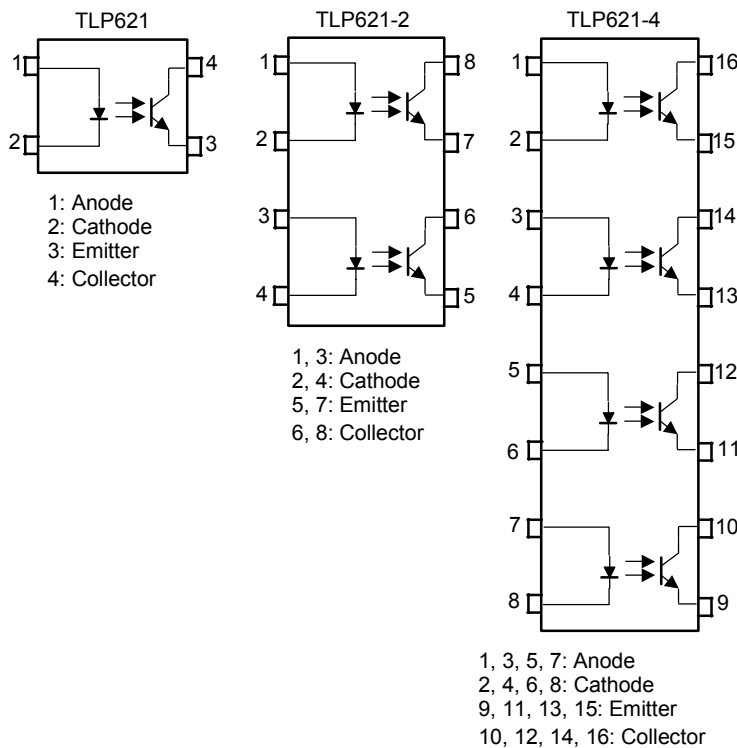
- Collector-emitter voltage: 55 V (min.)
- Current transfer ratio: 50% (min.)  
Rank GB: 100% (min.)

Unit in mm

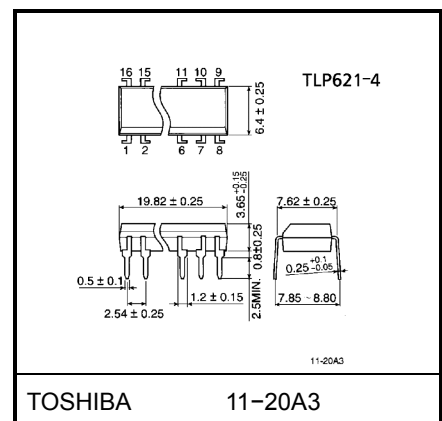


Weight: 0.26 g

## Pin Configurations (top view)



Weight: 0.54 g



Weight: 1.1 g

## • Current Transfer Ratio

Type	Classi- fication *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.	
TLP621	(None)	50	600	Blank, Y, Y <sup>■</sup> , G, G <sup>■</sup> , B, B <sup>■</sup> , GB
	Rank Y	50	150	Y, Y <sup>■</sup>
	Rank GR	100	300	G, G <sup>■</sup>
	Rank BL	200	600	B, B <sup>■</sup>
	Rank GB	100	600	G, G <sup>■</sup> , B, B <sup>■</sup> , GB
TLP621-2 TLP621-4	(None)	50	600	Blank, GR, BL, GB
	Rank GB	100	600	GR, BL, GB

\*1: Ex. rank GB: TLP621 (GB)

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

TLP621 (GB): TLP621

TLP621-2 (GB): TLP621-2

	Made In Japan		Made In Thailand	
UL recognized	E67349	*2	E152349	*2
BSI approved	6508, 7445	*3	6505, 7445	*3
SEMKO approved	9735090 / 01	*4	—	

\*2 UL1577

\*3 BS EN60065: 1994, BS EN60950: 1992

\*4 EN60950 (approved is TLP621 only)

- Option (D4) type  
VDE approved: DIN VDE0884 / 06.92, certificate no. 68384  
Maximum operating insulation voltage: 890 V<sub>PK</sub>  
Highest permissible over voltage: 8000 V<sub>PK</sub>

(Note) When a VIDE0884 approved type is needed, please designate the “Option (D4)”

	7.62 mm pich standard type	10.16 mm pich (LF2) type
• Creepage distance	: 6.4 mm (min.)	8.0 mm (min)
Clearance	: 6.4 mm (min.)	8.0 mm (min)
Insulation thickness	: 0.4 mm (min.)	0.4 mm (min)

## Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating		Unit	
		TLP621	TLP621-2 TLP621-4		
LED	Forward current	I <sub>F</sub>	60	50	mA
	Forward current derating	ΔI <sub>F</sub> / °C	-0.7 (Ta > 39°C)	-0.5 (Ta = 25°C)	mA / °C
	Pulse forward current	I <sub>FP</sub>	1 (100μs pulse, 100pps)		A
	Power dissipation	P <sub>D</sub>	100	70	mW
	Power dissipation derating	ΔP <sub>D</sub> / °C	-1.0	-0.7	mW / °C
	Reverse voltage	V <sub>R</sub>	5		V
	Junction temperature	T <sub>j</sub>	125		°C
Detector	Collector-emitter voltage	V <sub>CEO</sub>	55		V
	Emitter-collector voltage	V <sub>ECO</sub>	7		V
	Collector current	I <sub>C</sub>	50		mA
	Collector power dissipation (1 circuit)	P <sub>C</sub>	150	100	mW
	Collector power dissipation derating (1 circuit, Ta ≥ 25°C)	ΔP <sub>C</sub> / °C	-1.5	-1.0	mW / °C
	Junction temperature	T <sub>j</sub>	125		°C
Storage temperature range	T <sub>stg</sub>	-55~125		°C	
Operating temperature range	T <sub>opr</sub>	-55~100		°C	
Lead soldering temperature	T <sub>sol</sub>	260 (10 s)		°C	
Total package power dissipation	P <sub>T</sub>	250	150	mW	
Total package power dissipation derating (Ta ≥ 25°C)	ΔP <sub>T</sub> / °C	-2.5	-1.5	mW / °C	
Isolation voltage (Note 1)	BV <sub>S</sub>	5000 (AC, 1min., R.H. ≤ 60%)		V <sub>rms</sub>	

(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 <sub>CC</sub>	—	5	24	V
Forward current	I <sub>F</sub>	—	16	20	mA
Collector current	I <sub>C</sub>	—	1	10	mA
Operating temperature	T <sub>opr</sub>	-25	—	85	°C

## Individual Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	$V_F$	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse current	$I_R$	$V_R = 5 \text{ V}$	—	—	10	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 0.5 \text{ mA}$	55	—	—	V
	Emitter-collector breakdown voltage	$V_{(BR)ECO}$	$I_E = 0.1 \text{ mA}$	7	—	—	V
	Collector dark current	$I_{CEO}$	$V_{CE} = 24 \text{ V}$	—	10	100	nA
			$V_{CE} = 24 \text{ V}, T_a = 85^\circ\text{C}$	—	2	50	$\mu\text{A}$
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	—	600	%
			100	—	600	
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	$V_{CE} (\text{sat})$	$I_C = 2.4 \text{ mA}, I_F = 8 \text{ mA}$	—	—	0.4	V
		$I_C = 0.2 \text{ mA}, I_F = 1 \text{ mA}$ Rank GB	—	0.2	—	
			—	—	0.4	

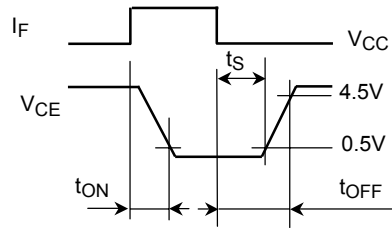
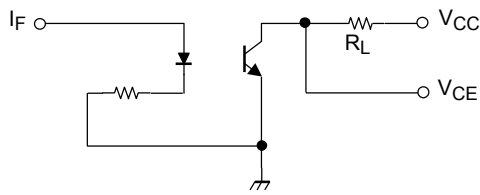
## Isolation Characteristics (Ta = 25°C)

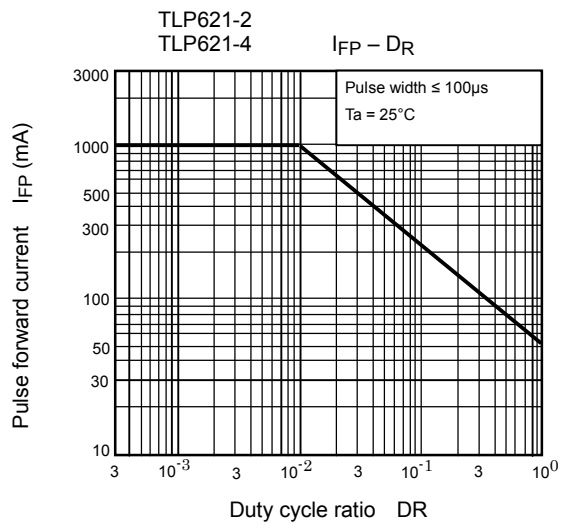
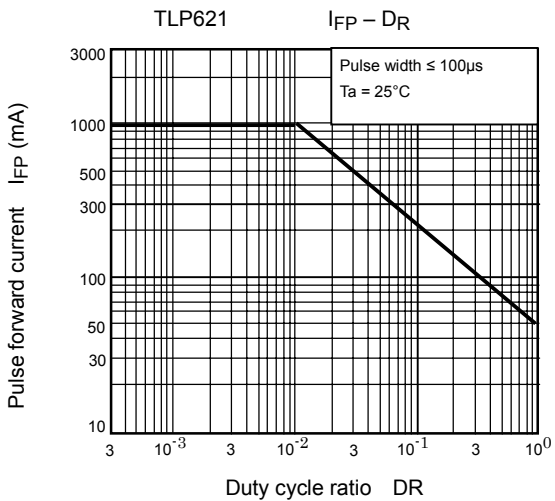
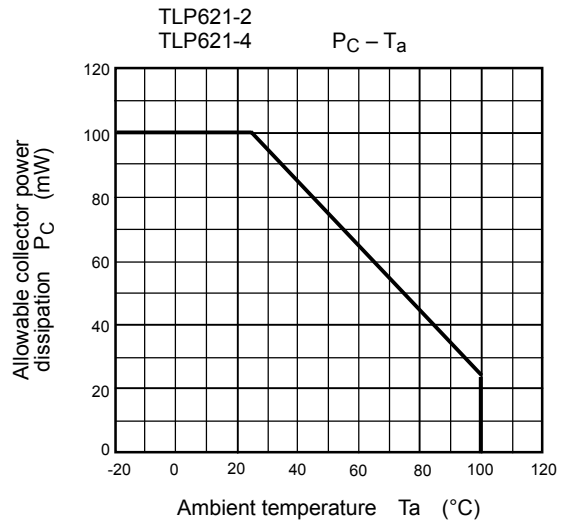
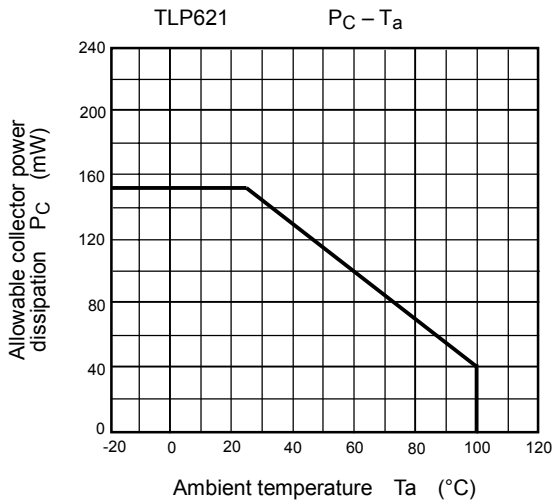
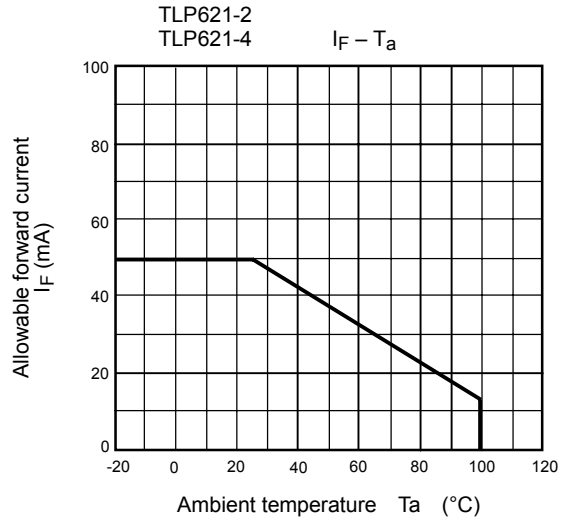
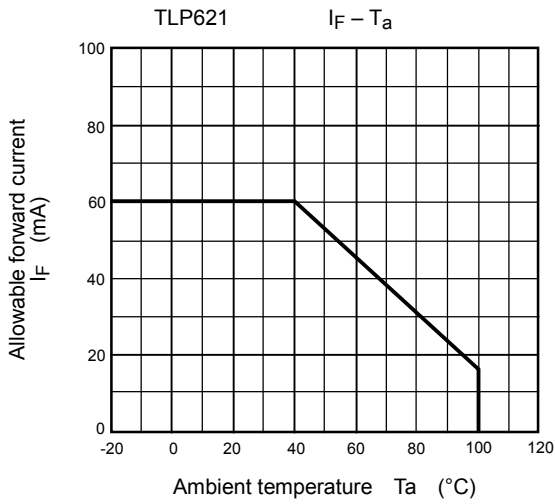
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance (input to output)	$C_S$	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	$R_S$	$V_S = 500 \text{ V}$	$1 \times 10^{12}$	$10^{14}$	—	$\Omega$
Isolation voltage	$BV_S$	AC, 1 minute	5000	—	—	$V_{\text{rms}}$
		AC, 1 second, in oil	—	10000	—	$V_{\text{dc}}$
		DC, 1 minute, in oil	—	10000	—	

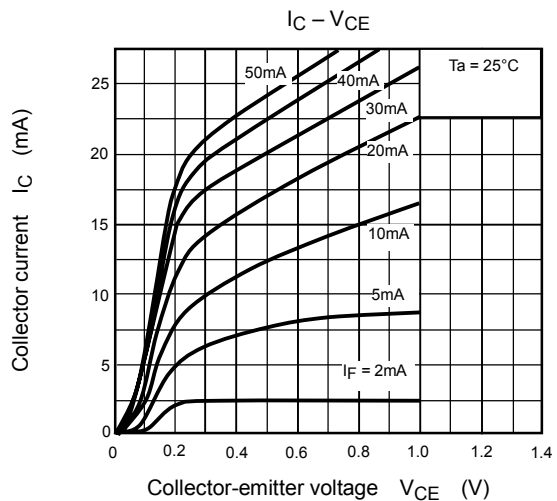
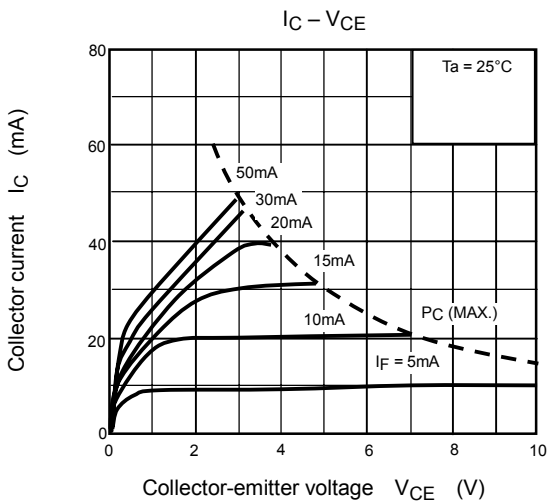
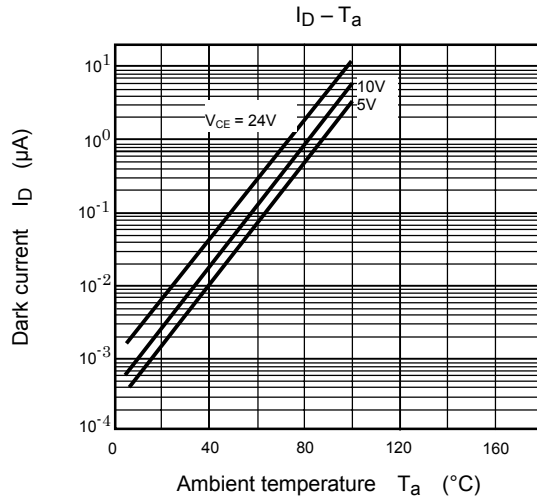
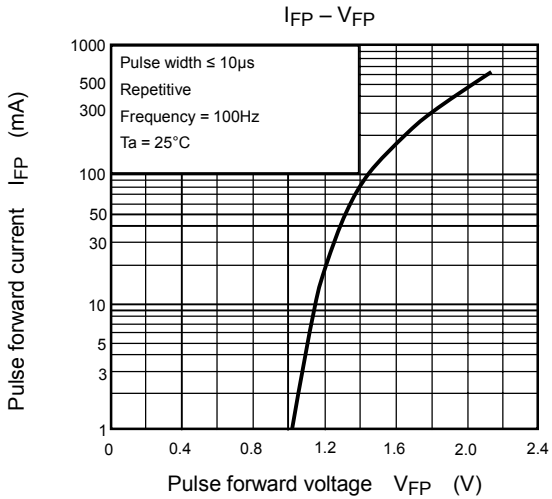
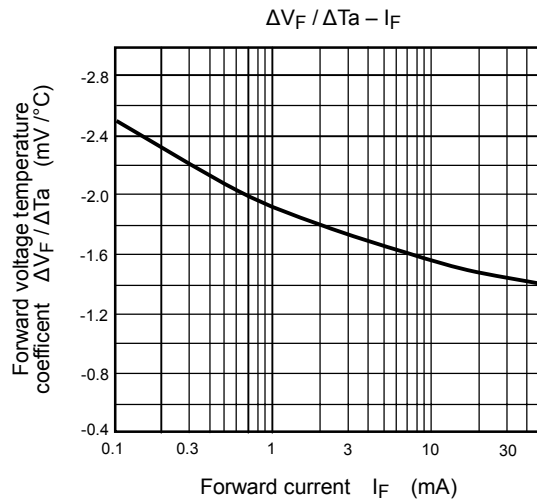
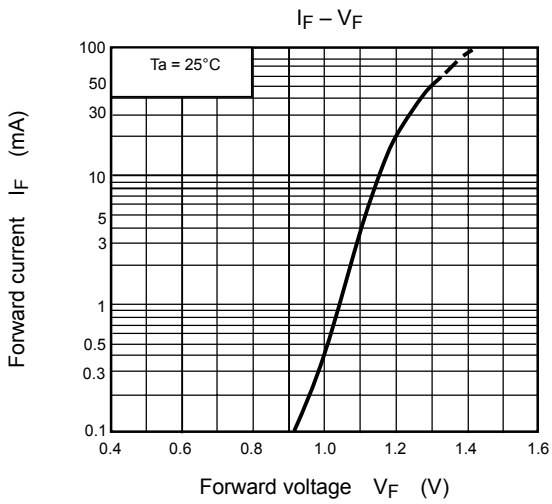
**Switching Characteristics (Ta = 25°C)**

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	—	$\mu\text{s}$
Fall time	$t_f$		—	3	—	
Turn-on time	$t_{on}$		—	3	—	
Turn-off time	$t_{off}$		—	3	—	
Turn-on time	$t_{ON}$	$R_L = 1.9\text{ k}\Omega$ (Fig.1) $V_{CC} = 5\text{ V}, I_F = 16\text{ mA}$	—	2	—	$\mu\text{s}$
Storage time	$t_s$		—	15	—	
Turn-off time	$t_{OFF}$		—	25	—	

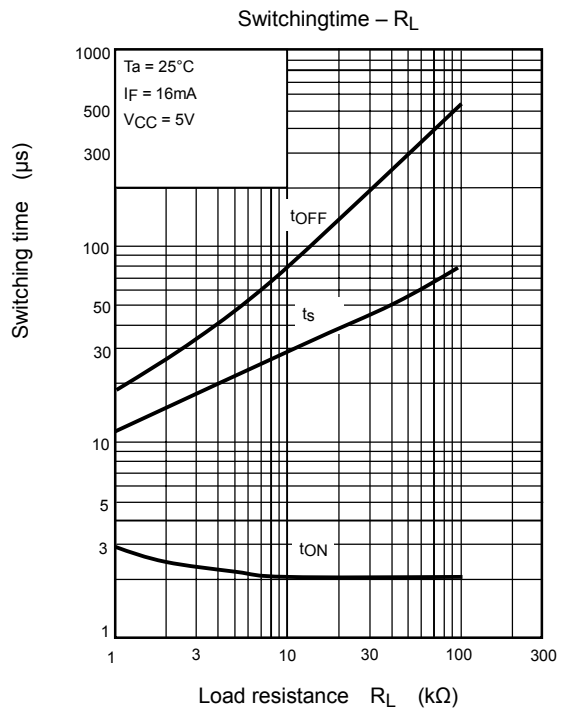
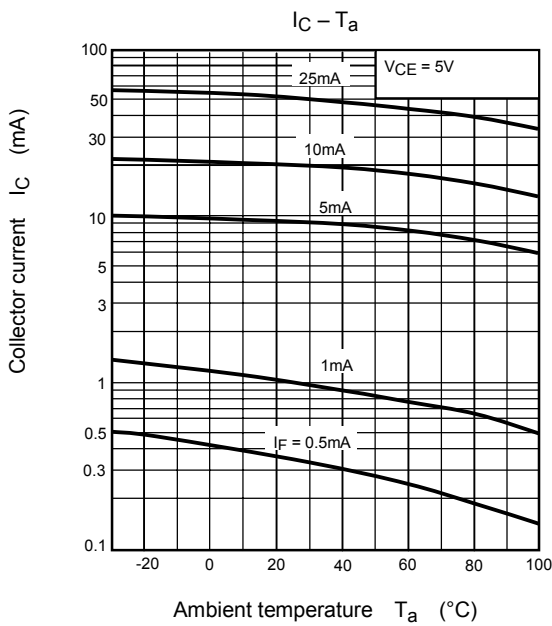
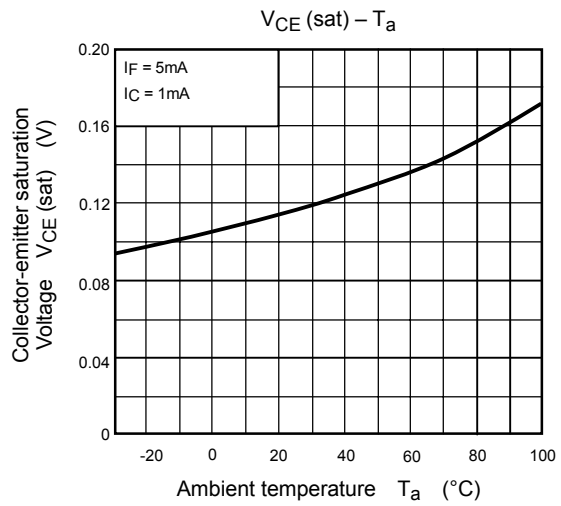
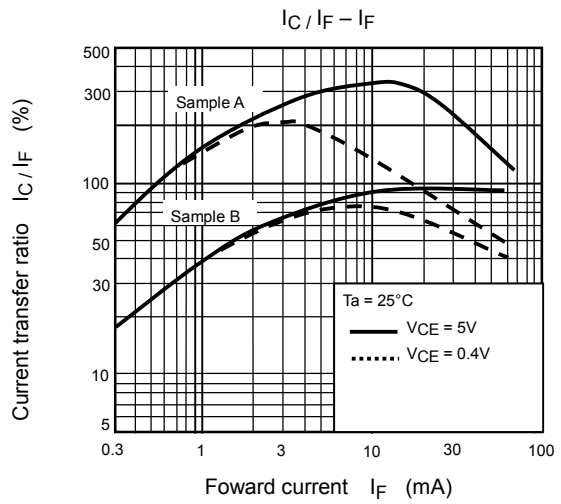
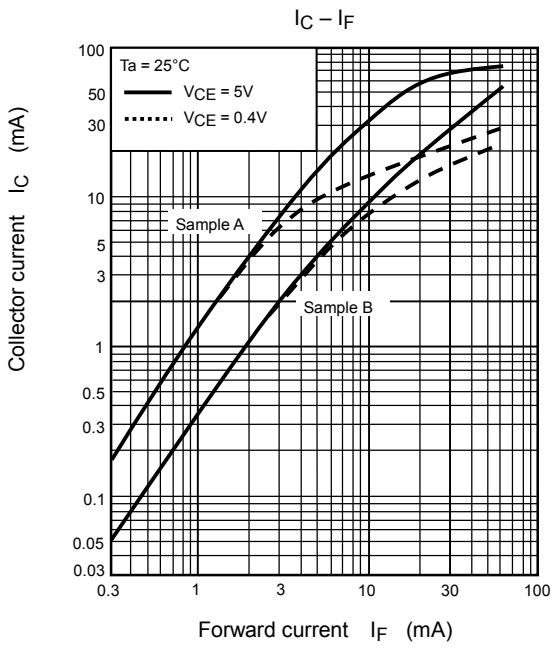
Fig. 1 Switching time test circuit











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