

TLP620, TLP620-2, TLP620-4

Programmable Controllers

AC / DC-Input Module

Telecommunication

The TOSHIBA TLP620, -2 and -4 consists of a photo-transistor optically coupled to two infrared emitting diode connected in inverse parallel.

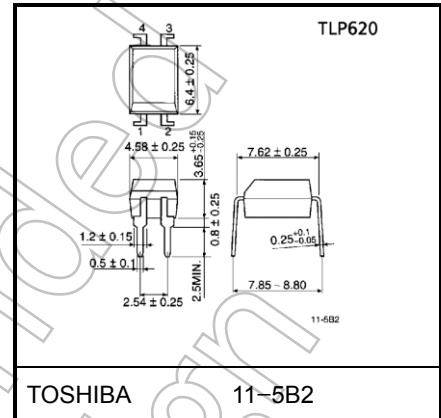
The TLP620-2 offers two isolated channels in an eight lead plastic DIP, while the TLP620-4 provides four isolated channels in a sixteen plastic DIP.

- Collector-emitter voltage: 55V (min.)
- Current transfer ratio: 50% (min.)
Rank GB: 100% (min.)
- Isolation voltage: 5000V_{rms} (min.)
- Safety Standards
- UL-recognized: UL 1577, File No.E67349
- cUL-recognized: CSA Component Acceptance Service No.5A
File No.E67349
- VDE-approved: EN 60747-5-5 (Note 1)

Note 1: When an VDE approved type is needed,
please designate the **Option(D4)**.

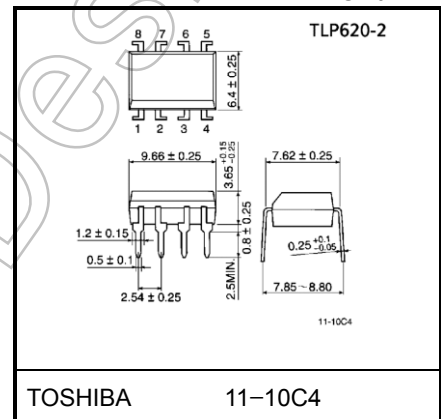
- | | 7.62 mm pitch
standard type | 10.16 mm pitch
TLP×××F type |
|----------------------|--------------------------------|--------------------------------|
| Creepage distance | : 6.4 mm (min) | 8.0 mm (min) |
| Clearance | : 6.4 mm (min) | 8.0 mm (min) |
| Insulation thickness | : 0.4 mm (min) | 0.4 mm (min) |

Unit: mm



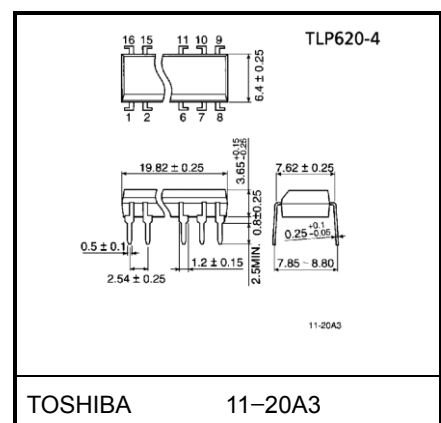
Weight: 0.26 g (typ.)

Unit: mm



Weight: 0.54 g (typ.)

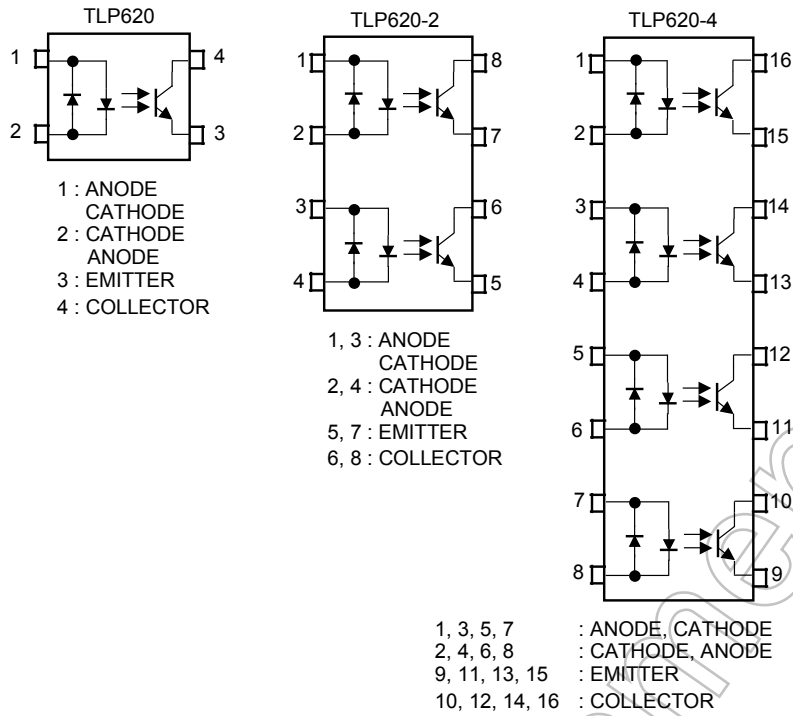
Unit: mm



Weight: 1.1 g (typ.)

Start of commercial production
1984-01

Pin Configurations (top view)



Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating		Unit
			TLP620	TLP620-2 TLP620-4	
LED	Forward current	IF (RMS)	60	50	mA
	Forward current derating	$\Delta I_F / ^\circ\text{C}$	-0.7 (Ta $\geq 39^\circ\text{C}$)	-0.5 (Ta $\geq 25^\circ\text{C}$)	mA / $^\circ\text{C}$
	Pulse forward current	IFP	± 1 (100 μs pulse, 100pps)		A
	Power dissipation (1 circuit)	PD	100	70	mW
	Power dissipation derating (1 circuit)	$\Delta P_D / ^\circ\text{C}$	-1.2 (Ta $\geq 39^\circ\text{C}$)	-0.7 (Ta $\geq 25^\circ\text{C}$)	mW / $^\circ\text{C}$
	Junction temperature	Tj	125		$^\circ\text{C}$
Detector	Collector-emitter voltage	VCEO	55		V
	Emitter-collector voltage	VECO	7		V
	Collector current	IC	50		mA
	Collector power dissipation (1 circuit)	PC	150	100	mW
	Collector power dissipation derating (1 circuit) (Ta $\geq 25^\circ\text{C}$)	$\Delta P_C / ^\circ\text{C}$	-1.5	-1.0	mW / $^\circ\text{C}$
	Junction temperature	Tj	125		$^\circ\text{C}$
Storage temperature range		Tstg	-55~125		$^\circ\text{C}$
Operating temperature range		Topr	-55~100		$^\circ\text{C}$
Lead soldering temperature		Tsold	260 (10 s)		$^\circ\text{C}$
Total package power dissipation (1 circuit)		PT	250	150	mW
Total package power dissipation derating (Ta $\geq 25^\circ\text{C}$, 1 circuit)		$\Delta P_T / ^\circ\text{C}$	-2.5	-1.5	mW / $^\circ\text{C}$
Isolation voltage (Note1)		BVs	5000 (AC, 60 s., RH $\leq 60\%$)		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.).

Note1: 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 (RMS)	—	16	25	mA
Collector current	I_C	—	1	10	mA
Operating temperature	T_{opr}	-25	—	85	°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.

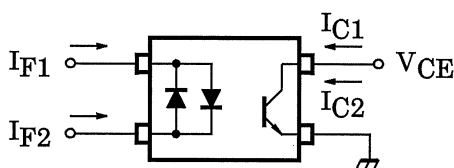
Individual Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	$I_F = \pm 10 \text{ mA}$	1.0	1.15	1.3	V
	Forward current	$V_F = \pm 0.7 \text{ V}$	—	2.5	20	μA
	Capacitance	$V = 0 \text{ V}, f = 1 \text{ MHz}$	—	60	—	pF
Detector	Collector-emitter breakdown voltage	$I_C = 0.5 \text{ mA}$	55	—	—	V
	Emitter-collector breakdown voltage	$I_E = 0.1 \text{ mA}$	7	—	—	V
	Collector dark current	$V_{CE} = 24 \text{ V}$	—	10	100	nA
		$V_{CE} = 24 \text{ V}, T_a = 85^\circ\text{C}$	—	2	50	μA
	Capacitance (collector to emitter)	$V_{CE} = 0 \text{ V}, f = 1 \text{ MHz}$	—	10	—	pF

Coupled Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Current transfer ratio	I_C / I_F	$I_F = \pm 5 \text{ mA}, V_{CE} = 5 \text{ V}$ Rank GB	50	—	600	%
			100	—	600	
Saturated CTR	I_C / I_F (sat)	$I_F = \pm 1 \text{ mA}, V_{CE} = 0.4 \text{ V}$ Rank GB	—	60	—	%
			30	—	—	
Collector-emitter saturation voltage	V_{CE} (sat)	$I_C = 2.4 \text{ mA}, I_F = \pm 8 \text{ mA}$	—	—	0.4	V
		$I_C = 0.2 \text{ mA}, I_F = \pm 1 \text{ mA}$ Rank GB	—	0.2	—	
			—	—	0.4	
Off-state collector current	I_C (off)	$V_F = \pm 0.7 \text{ V}, V_{CE} = 24 \text{ V}$	—	1	10	μA
CTR symmetry (Note.)	I_C (ratio)	$I_C (I_F = -5 \text{ mA}) / I_C (I_F = +5 \text{ mA})$	0.33	—	3	—

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



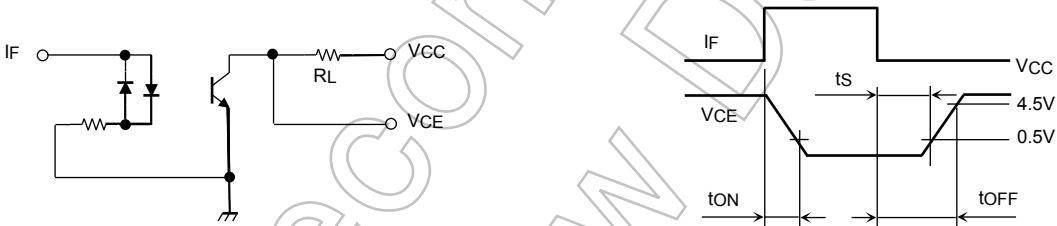
Isolation Characteristics (Ta = 25°C)

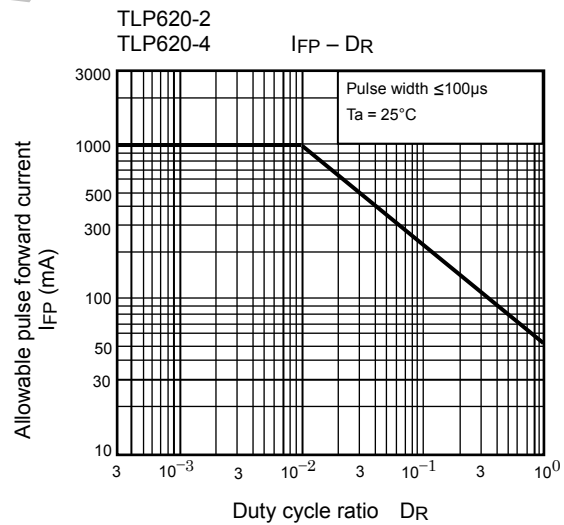
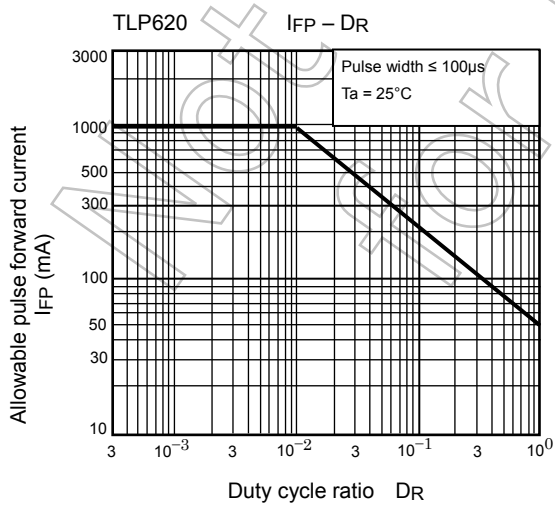
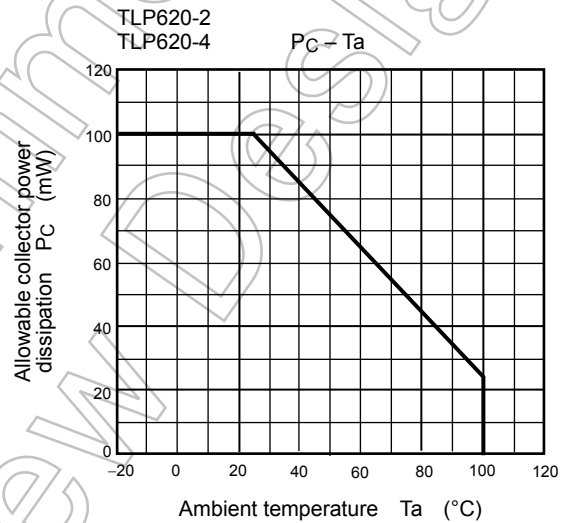
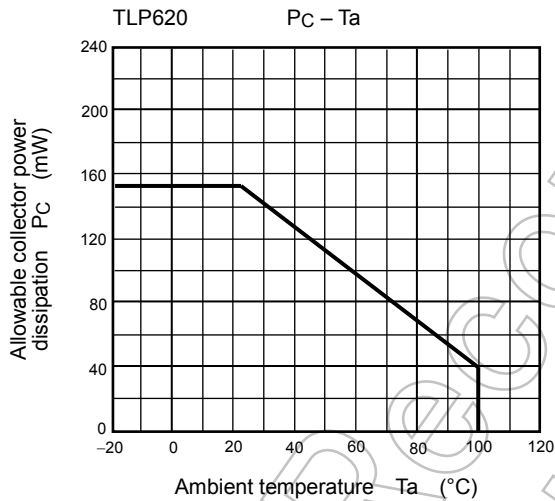
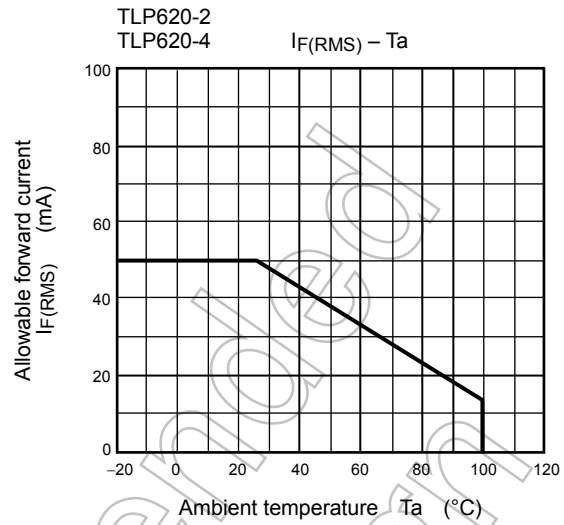
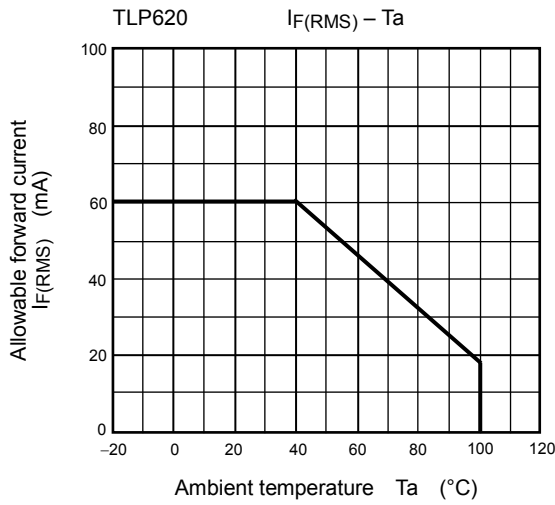
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	CS	VS = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance	RS	VS = 500 V, R.H. ≤ 60 %	1×10 ¹²	10 ¹⁴	—	Ω
Isolation voltage	BVS	AC, 60 s	5000	—	—	Vrms

Switching Characteristics (Ta = 25°C)

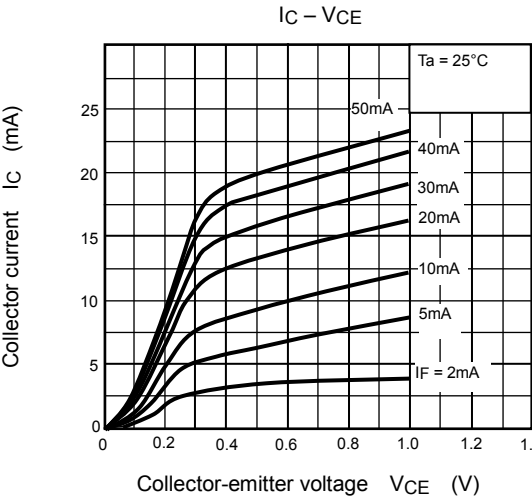
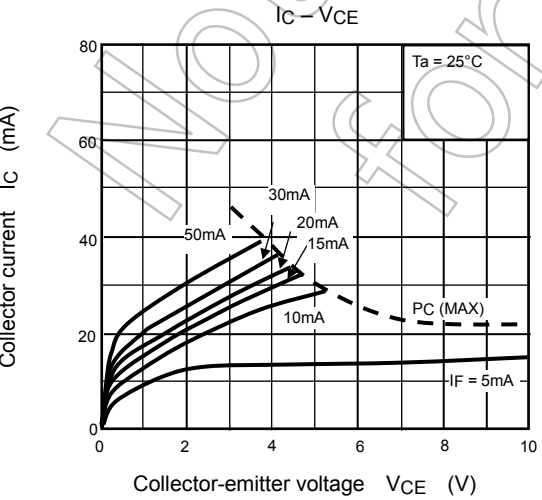
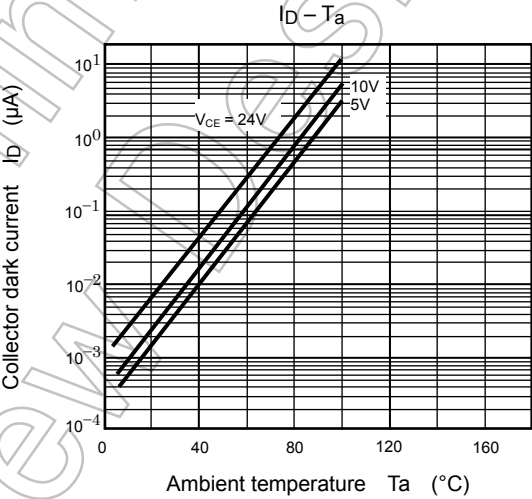
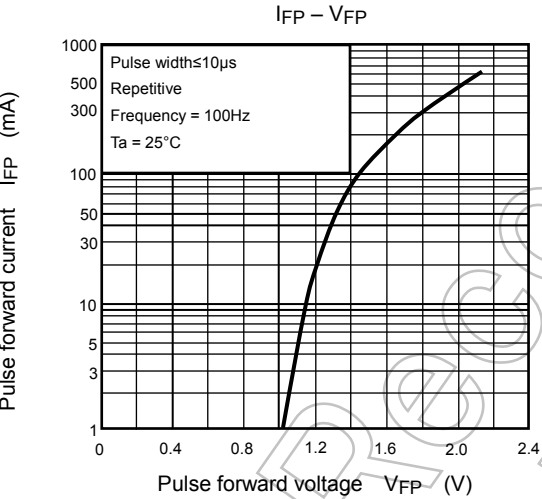
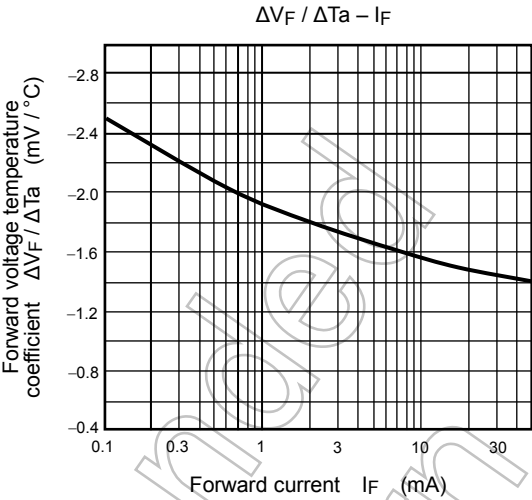
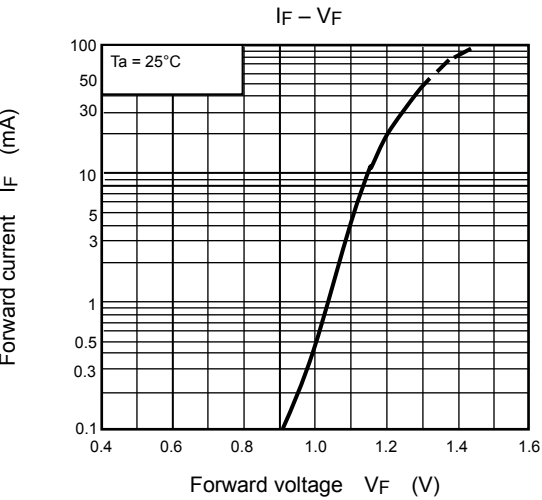
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Rise time	tr	VCC = 10 V IC = 2 mA RL = 100 Ω	—	2	—	μs
Fall time	tf		—	3	—	
Turn-on time	ton		—	3	—	
Turn-off time	toff		—	3	—	
Turn-on time	ton	RL = 1.9 kΩ VCC = 5 V, IF = ±16 mA (Fig.1)	—	2	—	μs
Storage time	ts		—	15	—	
Turn-off time	toff		—	25	—	

Fig. 1 Switching time test circuit

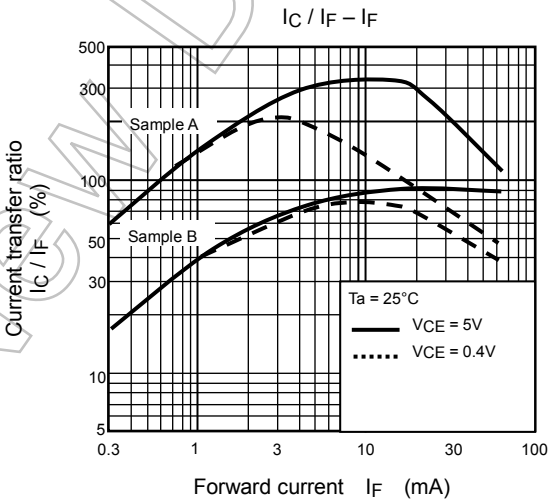
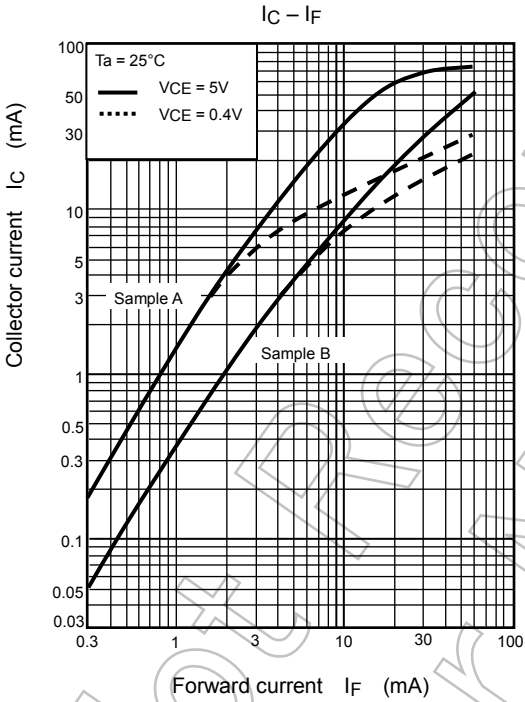
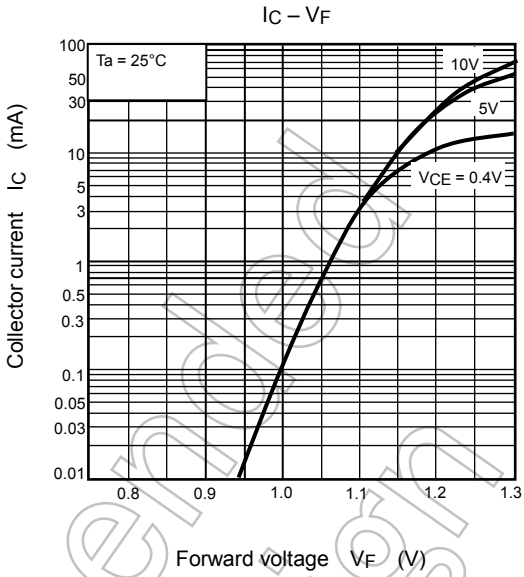
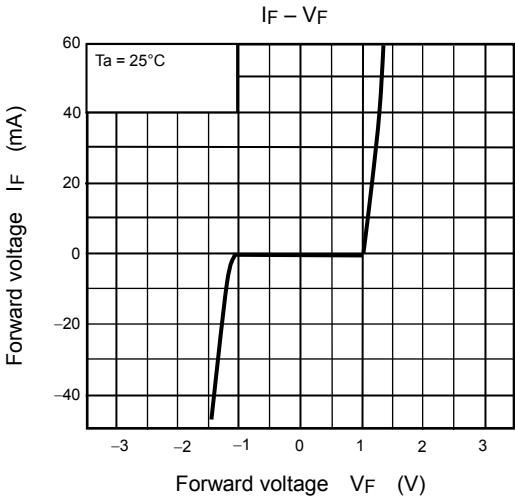




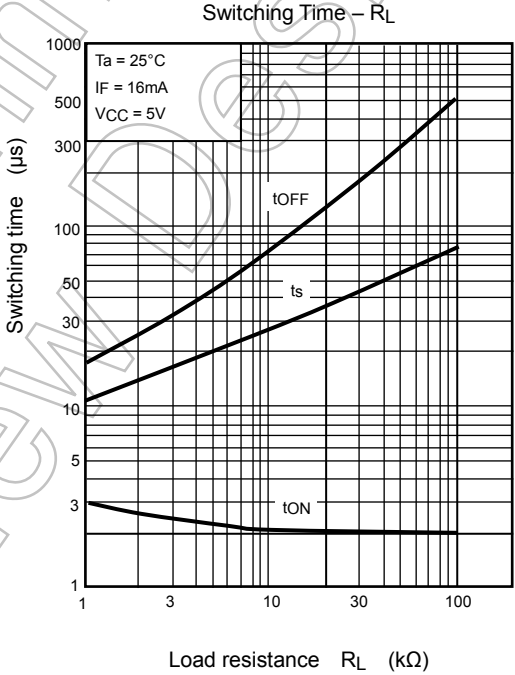
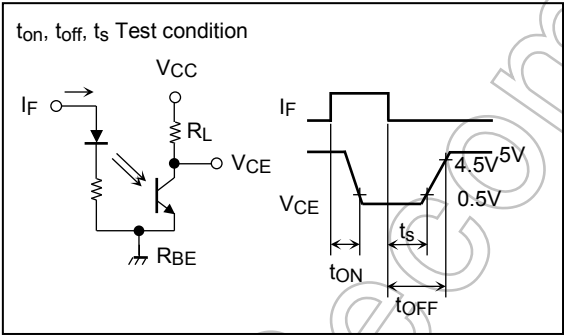
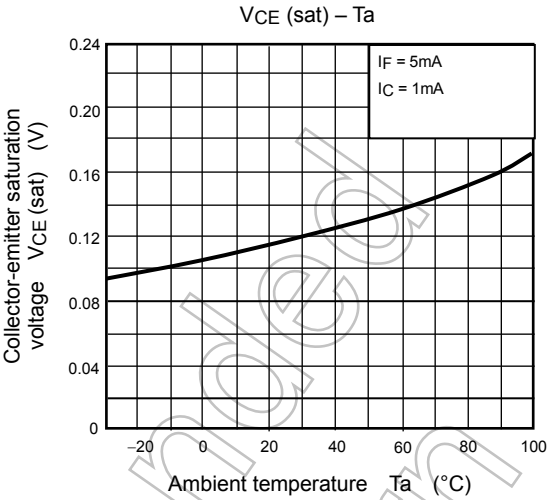
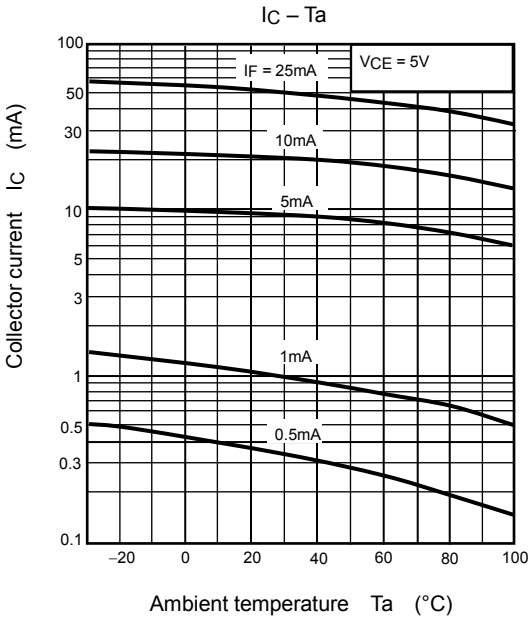
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