

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

# TLP620, TLP620-2, TLP620-4

PROGRAMMABLE CONTROLLERS

AC / DC-INPUT MODULE

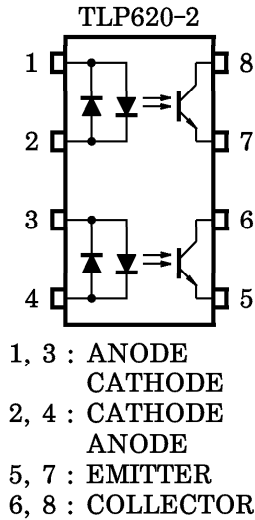
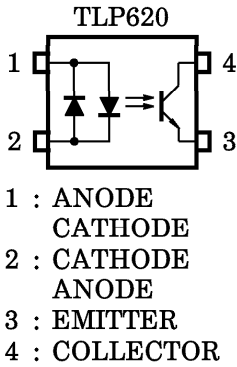
TELECOMMUNICATION

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

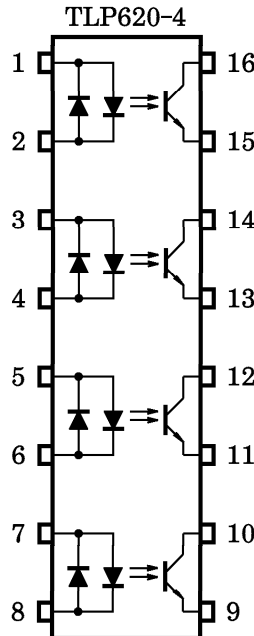
The TLP620-2 offers two isolated channels in an eight lead plastic DIP, while the TLP620-4 provides four isolated channels in a sixteen plastic DIP.

- Collector-Emitter Voltage : 55V (Min.)
  - Current Transfer Ratio : 50% (Min.)
- Rank GB : 100% (Min.)

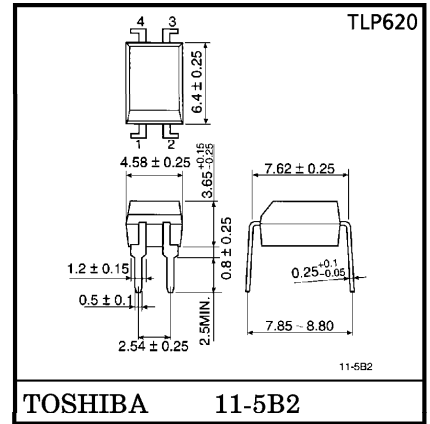
PIN CONFIGURATIONS (TOP VIEW)



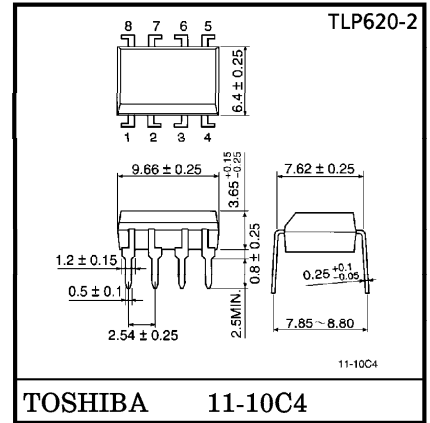
- 1, 3, 5, 7 : ANODE, CATHODE  
2, 4, 6, 8 : CATHODE, ANODE  
9, 11, 13, 15 : EMITTER  
10, 12, 14, 16 : COLLECTOR



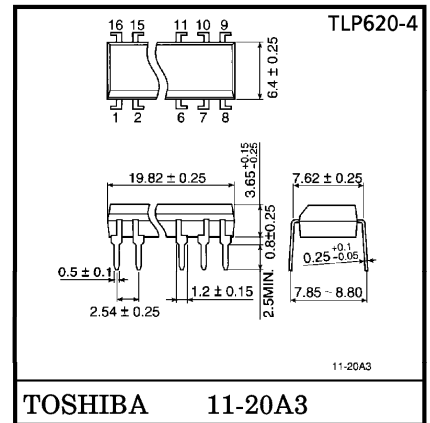
Unit in mm



Weight : 0.26g



Weight : 0.54g



Weight : 1.1g

	MADE IN JAPAN	MADE IN THAILAND
UL Recognized	E67349 *1	E152349 *1
BSI Approved	7426, 7427 *2	7426, 7427 *2

\*1 UL1577

\*2 BS EN60065 : 1994, BS EN60950 : 1992

- Isolation Voltage : 5000V<sub>rms</sub> (Min.)
- Option (D4) type  
VDE Approved : DIN VDE0884 / 06.92, Certificate No. 68384  
Maximum Operating Insulation Voltage : 890V<sub>PK</sub>  
Highest Permissible Over Voltage : 8000V<sub>PK</sub>

(Note) When a VDE0884 approved type is needed, please designate the "Option (D4)".

- Creepage Distance : 6.4mm (Min.)  
Clearance : 6.4mm (Min.)  
Insulation Thickness : 0.4mm (Min.)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			TLP620	TLP620-2 TLP620-4	
LED	Forward Current	I <sub>F</sub> (RMS)	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 (1 Circuit)	P <sub>D</sub>	100	70	mW
	Power Dissipation Derating	ΔP <sub>D</sub> / °C	-1.0	-0.7	mW / °C
	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>sold</sub>	260 (10s)		°C
Total Package Power Dissipation		P <sub>T</sub>	250	150	mW
Total Package Power Dissipation Derating (Ta ≥ 25°C, 1 Circuit)		ΔP <sub>T</sub> / °C	-2.5	-1.5	mW / °C
Isolation Voltage		BV <sub>S</sub>	5000 (AC, 1 min., RH ≤ 60%)		V <sub>rms</sub>

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V <sub>CC</sub>	—	5	24	V
Forward Current	I <sub>F</sub> (RMS)	—	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 <sub>F</sub>	I <sub>F</sub> = ±10mA	1.0	1.15	1.3	V
	Forward Current	I <sub>F</sub>	V <sub>F</sub> = ±0.7V	—	2.5	20	μA
	Capacitance	C <sub>T</sub>	V = 0, f = 1MHz	—	60	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	V (BR) CEO	I <sub>C</sub> = 0.5mA	55	—	—	V
	Emitter-Collector Breakdown Voltage	V (BR) ECO	I <sub>E</sub> = 0.1mA	7	—	—	V
	Collector Dark Current	I <sub>CEO</sub>	V <sub>CE</sub> = 24V	—	10	100	nA
			V <sub>CE</sub> = 24V, Ta = 85°C	—	2	50	μA
Capacitance (Collector to Emitter)	C <sub>CE</sub>	V <sub>CE</sub> = 0, f = 1MHz	—	10	—	pF	

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I <sub>C</sub> / I <sub>F</sub>	I <sub>F</sub> = ±5mA, V <sub>CE</sub> = 5V Rank GB	50	—	600	%
			100	—	600	
Saturated CTR	I <sub>C</sub> / I <sub>F</sub> (sat)	I <sub>F</sub> = ±1mA, V <sub>CE</sub> = 0.4V Rank GB	—	60	—	%
			30	—	—	
Collector-Emitter Saturation Voltage	V <sub>CE</sub> (sat)	I <sub>C</sub> = 2.4mA, I <sub>F</sub> = ±8mA I <sub>C</sub> = 0.2mA, I <sub>F</sub> = ±1mA Rank GB	—	—	0.4	V
			—	0.2	—	
			—	—	0.4	
Off-State Collector Current	I <sub>C</sub> (off)	V <sub>F</sub> = ±0.7V, V <sub>CE</sub> = 24V	—	1	10	μA
CTR Symmetry	I <sub>C</sub> (ratio)	I <sub>C</sub> (I <sub>F</sub> = -5mA) / I <sub>C</sub> (I <sub>F</sub> = +5mA)	0.33	1	3	—

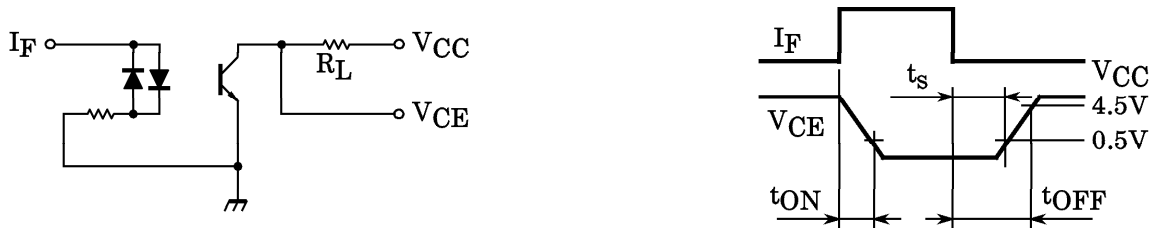
ISOLATION CHARACTERISTICS (Ta = 25°C)

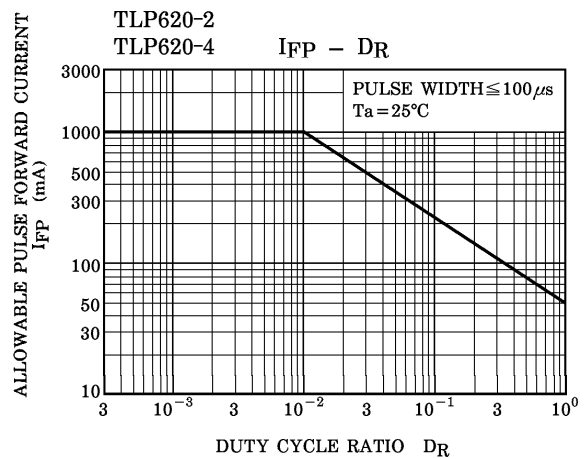
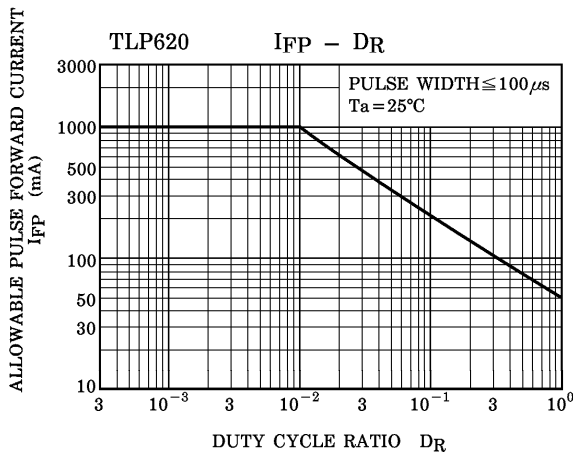
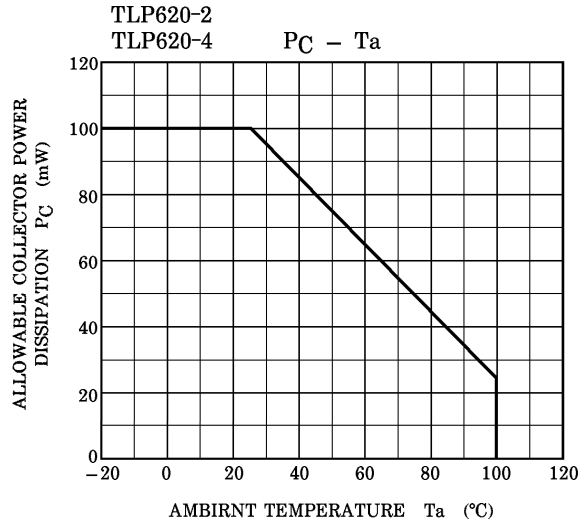
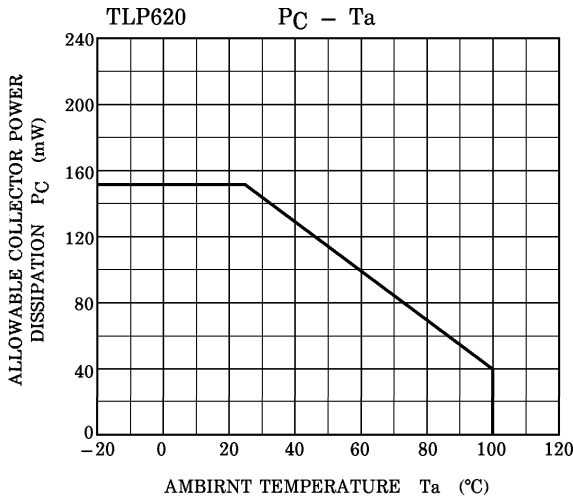
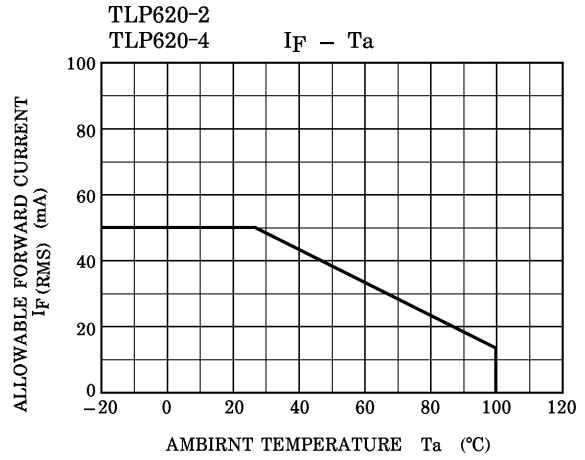
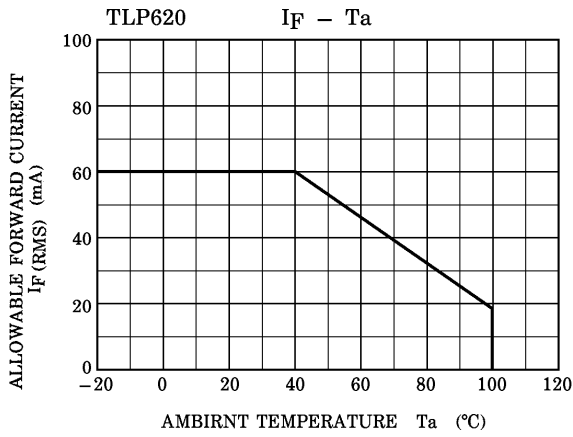
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	C <sub>S</sub>	V <sub>S</sub> =0, f=1MHz	—	0.8	—	pF
Isolation Resistance	R <sub>S</sub>	V <sub>S</sub> =500V	1×10 <sup>12</sup>	10 <sup>14</sup>	—	Ω
Isolation Voltage	BV <sub>S</sub>	AC, 1 minute	5000	—	—	V <sub>rms</sub>
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	V <sub>dc</sub>

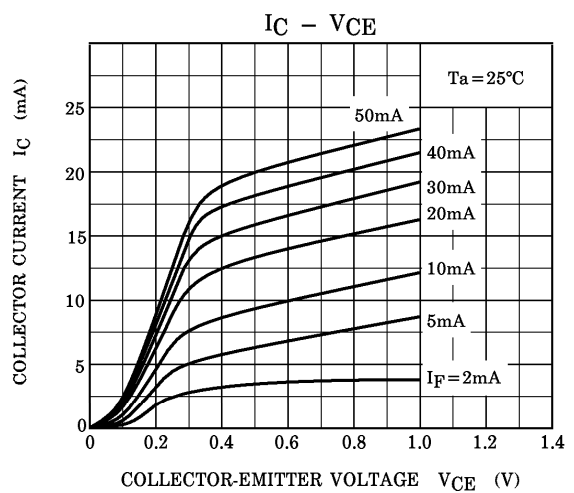
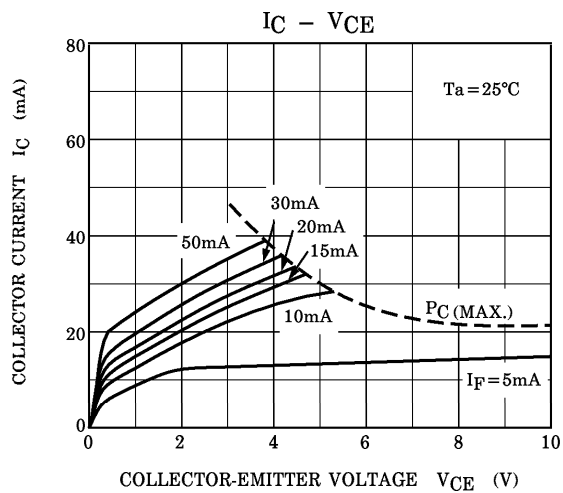
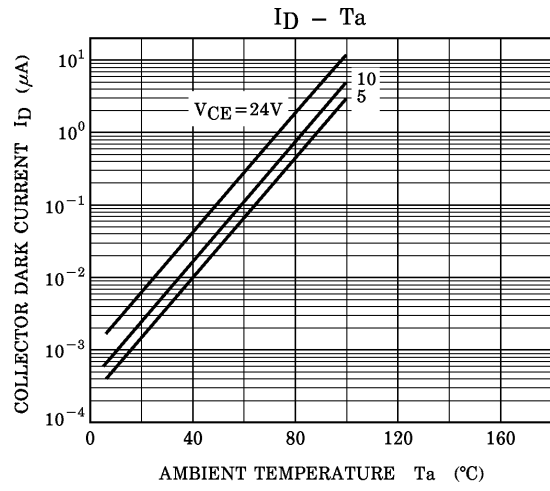
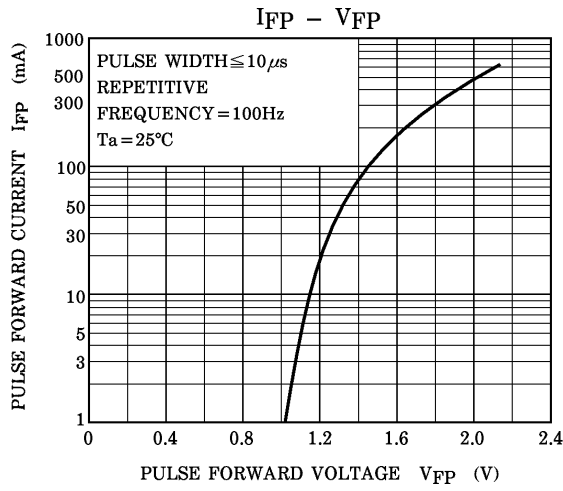
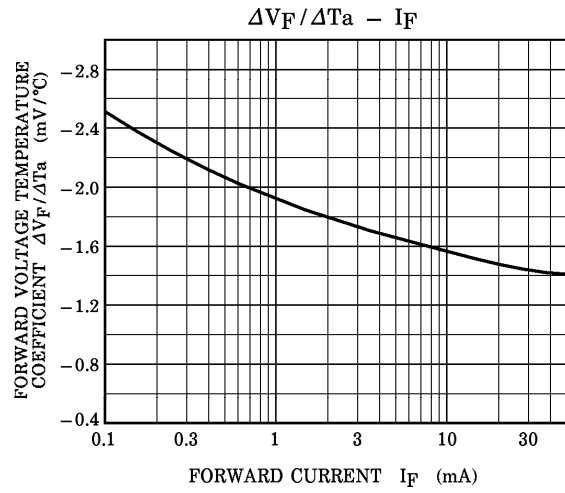
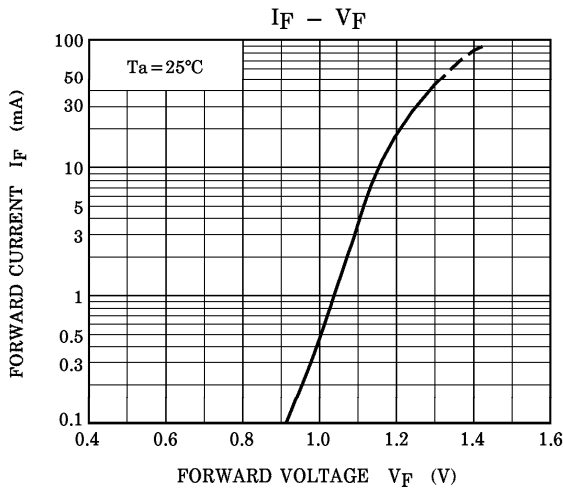
SWITCHING CHARACTERISTICS (Ta = 25°C)

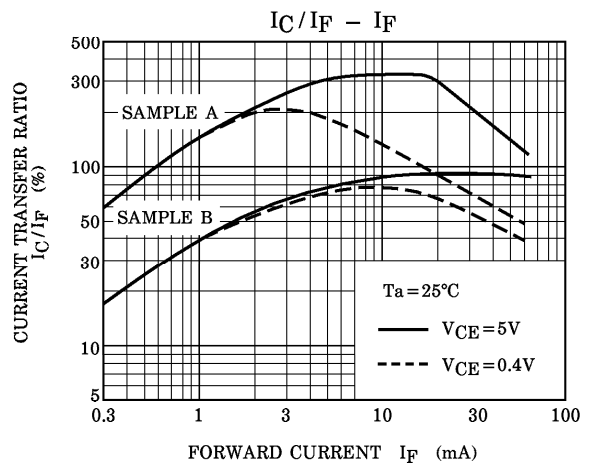
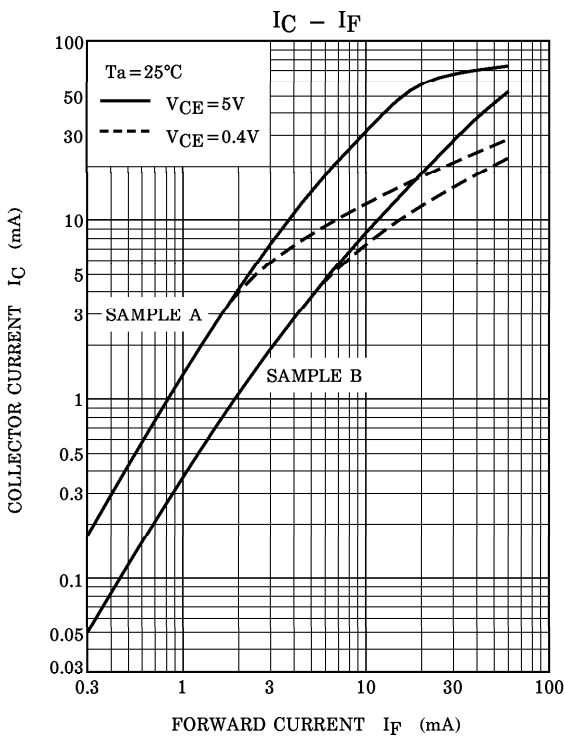
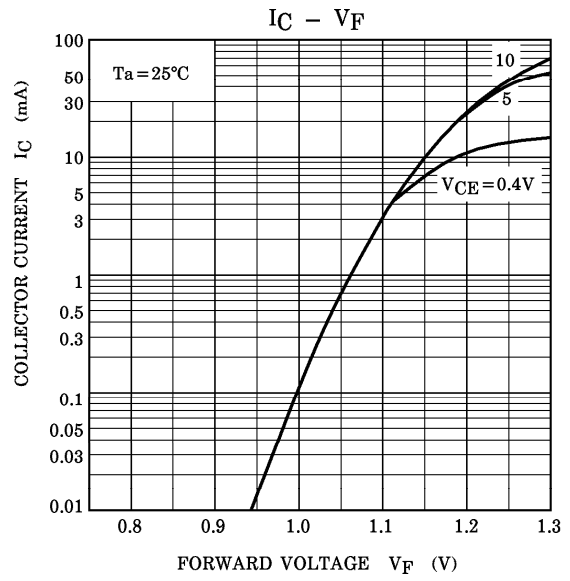
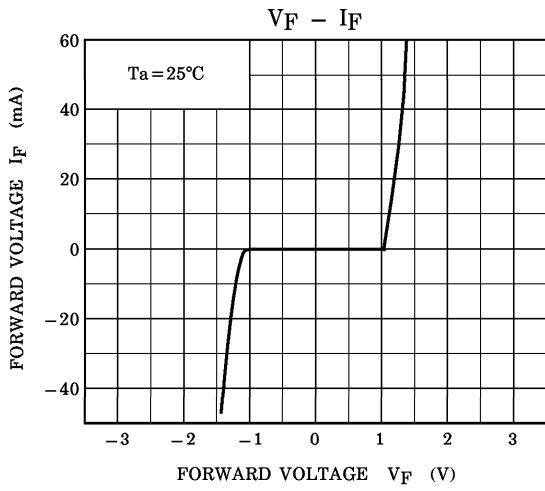
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t <sub>r</sub>	V <sub>CC</sub> =10V I <sub>C</sub> =2mA R <sub>L</sub> =100Ω	—	2	—	μs
Fall Time	t <sub>f</sub>		—	3	—	
Turn-on Time	t <sub>on</sub>		—	3	—	
Turn-off Time	t <sub>off</sub>		—	3	—	
Turn-on Time	t <sub>ON</sub>	R <sub>L</sub> =1.9kΩ (Fig.1) V <sub>CC</sub> =5V, I <sub>F</sub> =±16mA	—	2	—	μs
Storage Time	t <sub>s</sub>		—	15	—	
Turn-off Time	t <sub>OFF</sub>		—	25	—	

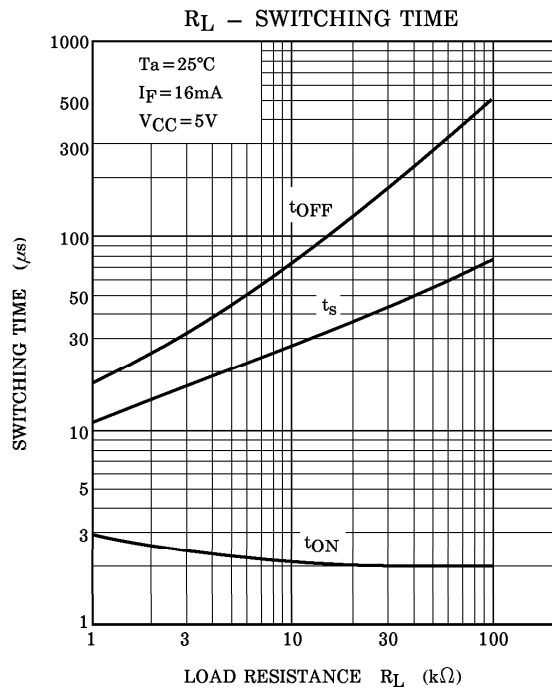
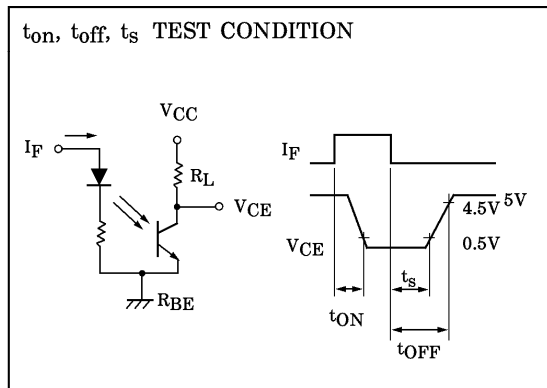
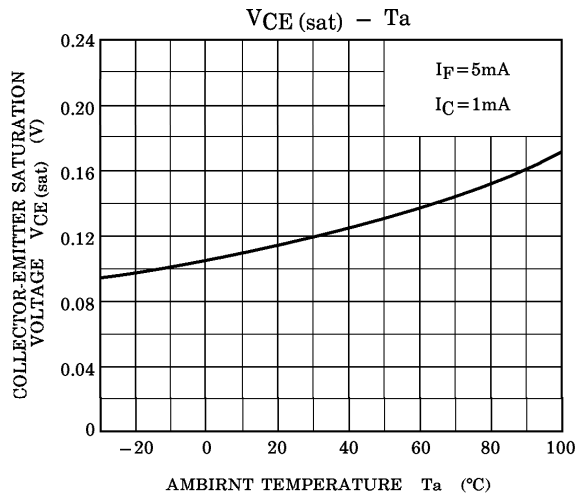
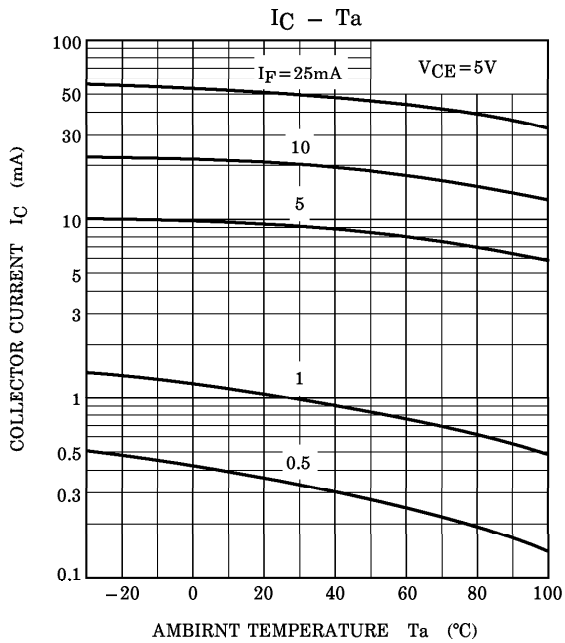
Fig.1 Switching Time Test Circuit













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