

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

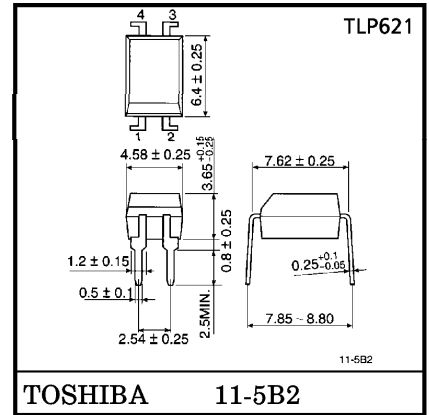
# TLP621, TLP621-2, TLP621-4

PROGRAMMABLE CONTROLLER  
AC / DC - INPUT MODULE  
SOLID STATE RELAY

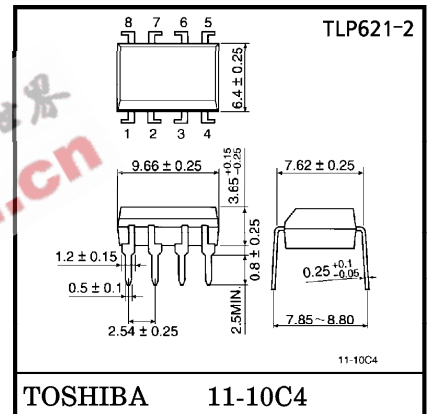
The TOSHIBA TLP621, -2, and -4 consists of a photo-transistor optically coupled to a gallium arsenide infrared emitting diode. The TLP621-2 offers two isolated channels in an eight lead plastic DIP, which the TLP621-4 provides four isolated channels in a sixteen plastic DIP.

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

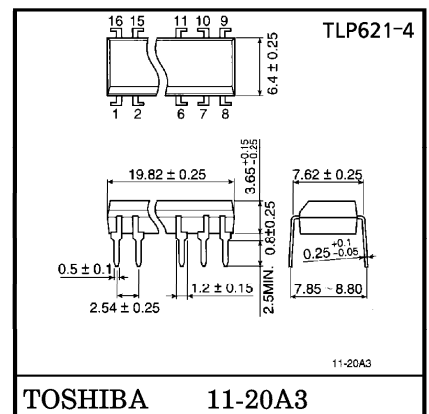
Unit in mm



Weight : 0.26g

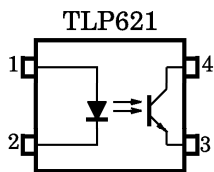


Weight : 0.54g

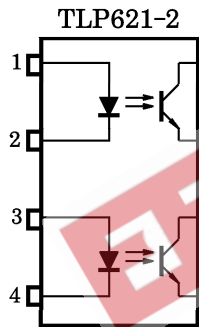


Weight : 1.1g

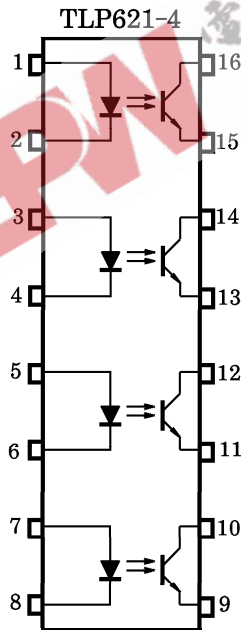
PIN CONFIGURATIONS (TOP VIEW)



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



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



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

● 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	(None)	50	600	BLANK, GR, BL, GB
TLP621-4	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 : 890V<sub>PK</sub>  
Highest Permissible Over Voltage : 8000V<sub>PK</sub>

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

	7.62mm pich standard type	10.16mm pich (LF2) type
● Creepage Distance	: 6.4mm (Min.)	8.0mm (Min)
Clearance	: 6.4mm (Min.)	8.0mm (Min)
Insulation Thickness	: 0.4mm (Min.)	0.4mm (Min)

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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 (10s)		°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	

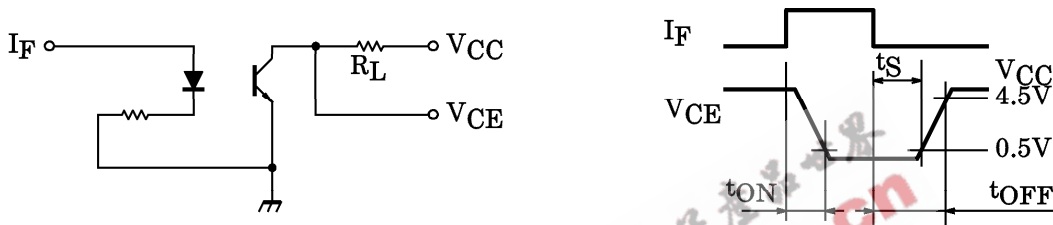
ISOLATION CHARACTERISTICS (Ta = 25°C)

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	—	
		DC, 1 minute, in oil	—	10000	—	$V_{\text{dc}}$

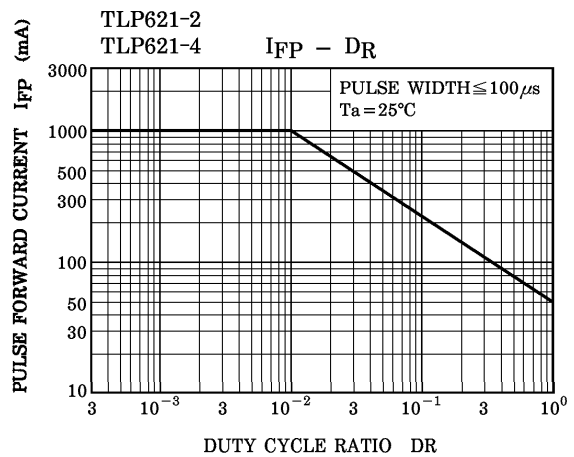
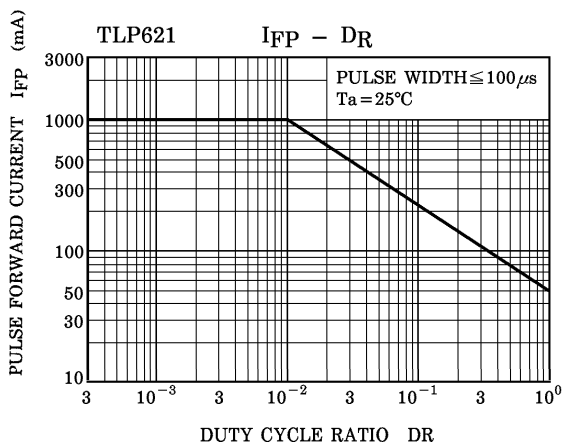
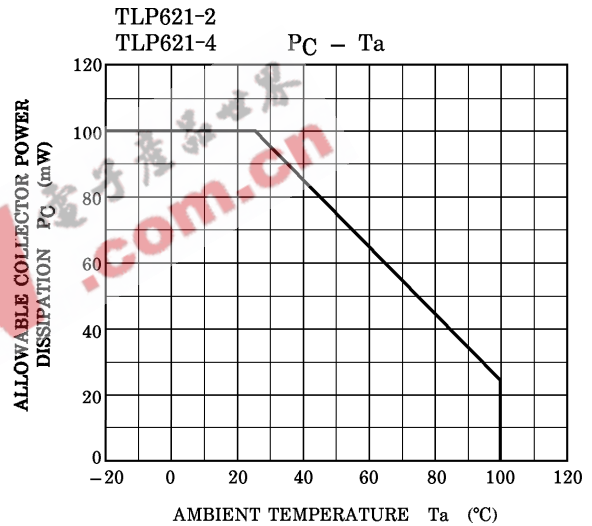
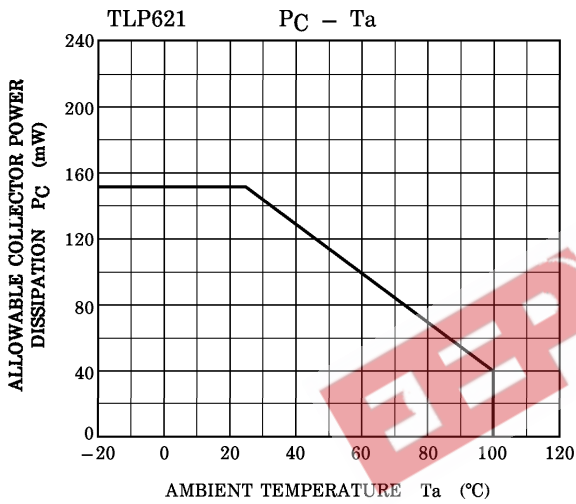
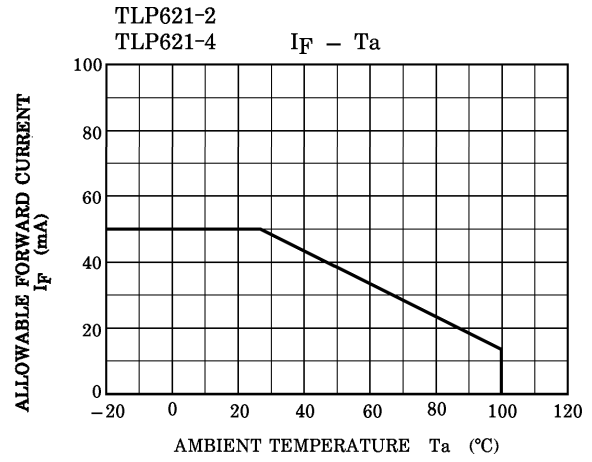
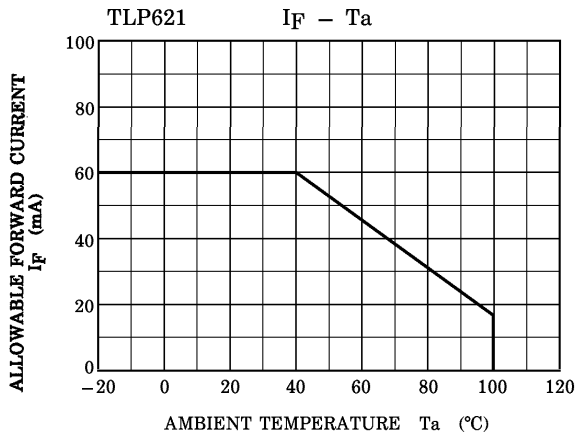
SWITCHING CHARACTERISTICS (Ta = 25°C)

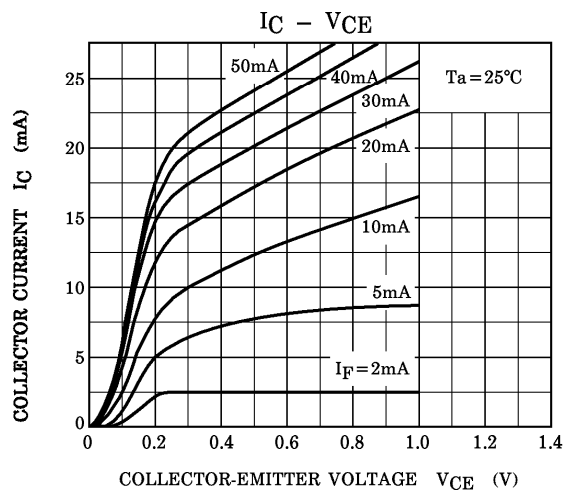
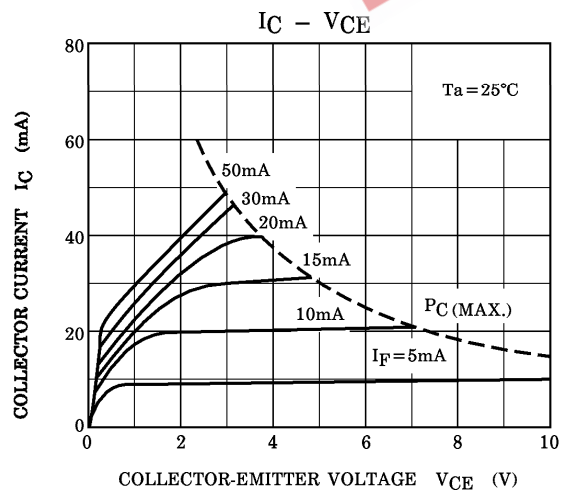
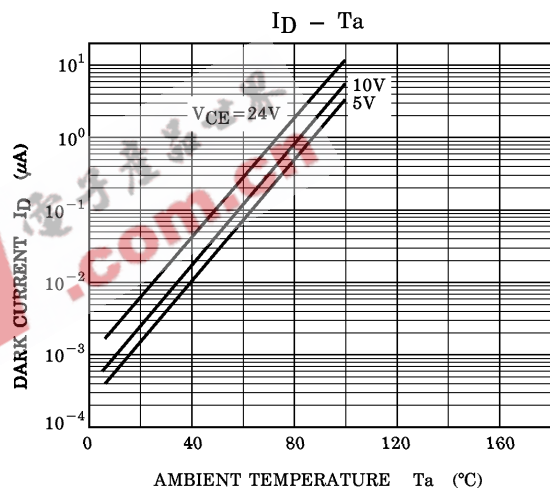
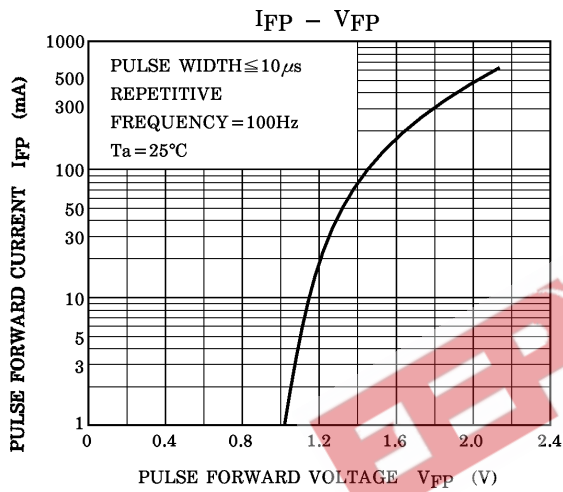
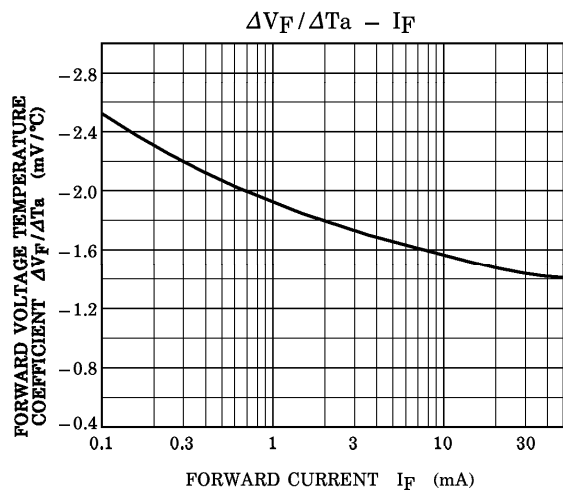
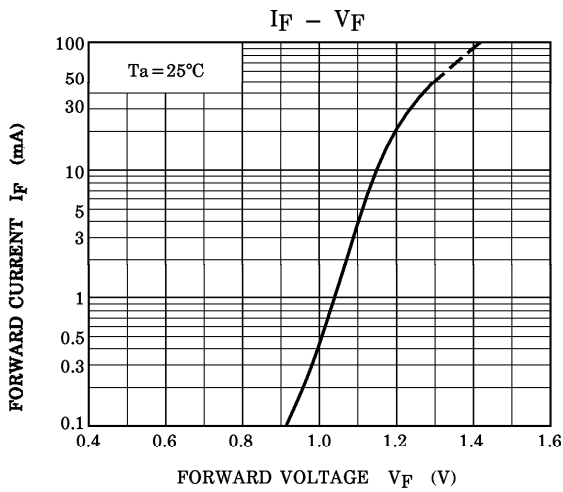
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	$t_r$	$V_{CC} = 10V, I_C = 2mA$ $R_L = 100\Omega$	—	2	—	$\mu s$
Fall Time	$t_f$		—	3	—	
Turn-on Time	$t_{on}$		—	3	—	
Turn-off Time	$t_{off}$		—	3	—	
Turn-on Time	$t_{ON}$	$R_L = 1.9k\Omega$ (Fig.1) $V_{CC} = 5V, I_F = 16mA$	—	2	—	$\mu s$
Storage Time	$t_S$		—	15	—	
Turn-off Time	$t_{OFF}$		—	25	—	

Fig.1 SWITCHING TIME TEST CIRCUIT

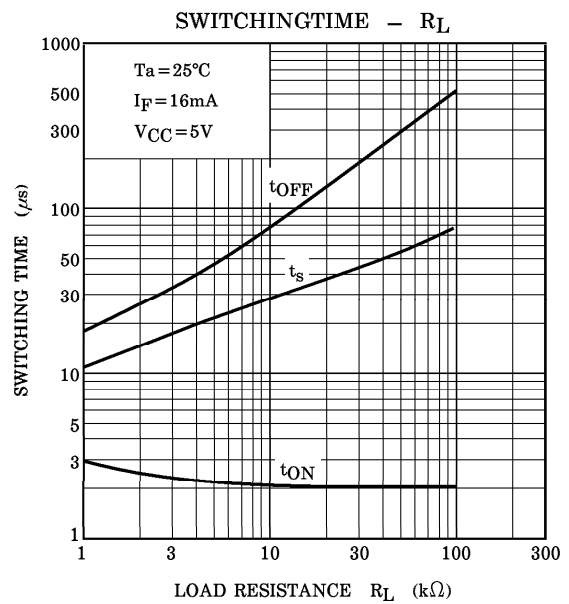
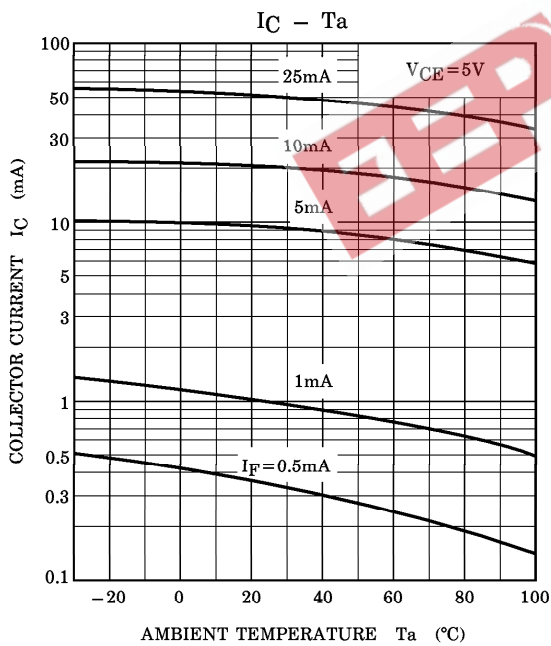
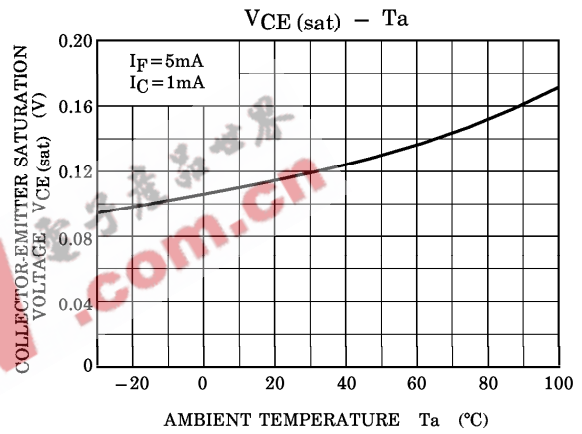
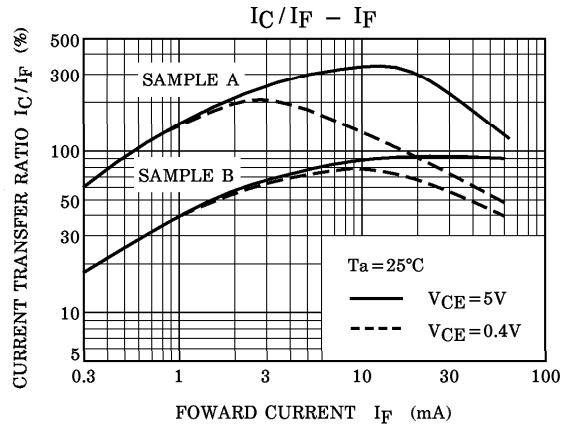
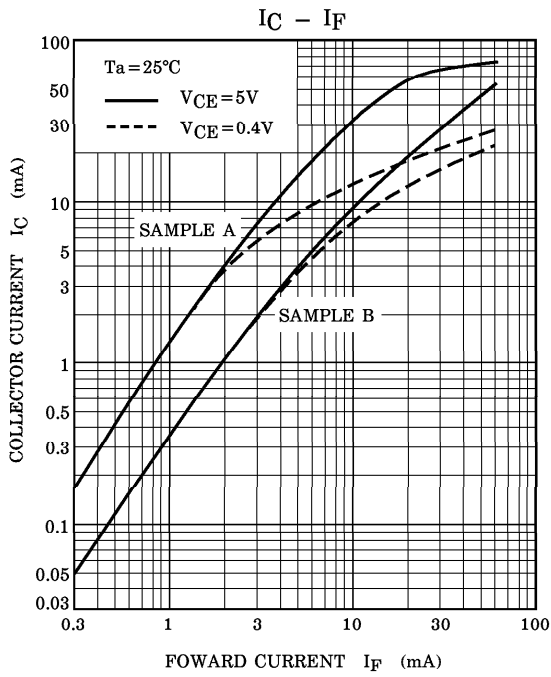


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