TOSHIBA Photocoupler GaAs IRED & Photo-Transistor

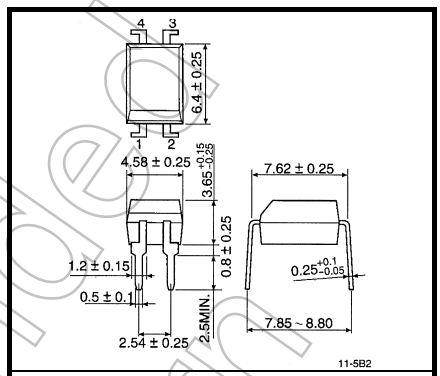
TLP627,TLP627-2,TLP627-4

Programmable Controllers

DC-output Module

Telecommunication

Unit in mm



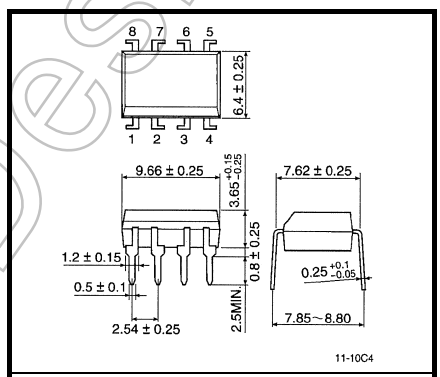
TOSHIBA 11−5B2

Weight: 0.26 g (typ.)

The TOSHIBA TLP627,-2 and -4 consists of a gallium arsenide infrared emitting diode optically coupled to a darlington connected phototransistor which has an integral base-emitter resistor to optimize switching speed and elevated temperature characteristics.

The TLP627-2 offers two isolated channels in a eight lead plastic DIP, while the TLP627-4 provide four isolated channels per package.

- Collector-Emitter Voltage : 300V(Min)
- Current Transfer Ratio : 1000%(Min)
- Isolation Voltage : 5000Vrms(Min)
- UL Recognized : UL1577,File No.E67349



TOSHIBA 11−10C4

Weight: 0.54 g (typ.)

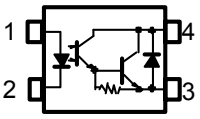
	Made in Japan		Made in Thailand	
UL Recognized	E67349	*1	E152349	*1
BSI Approved	7426, 7427	*2	7426, 7427	*2

*1 UL1577

*2 BS EN60065: 2002, BS EN60950-1: 2002

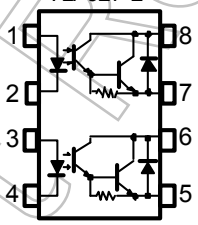
Pin Configuration (top view)

TLP627



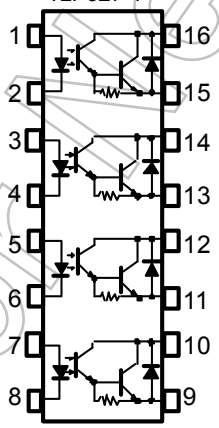
1: ANODE
2: CATHODE
3: EMITTER
4:COLLECTOR

TLP627-2

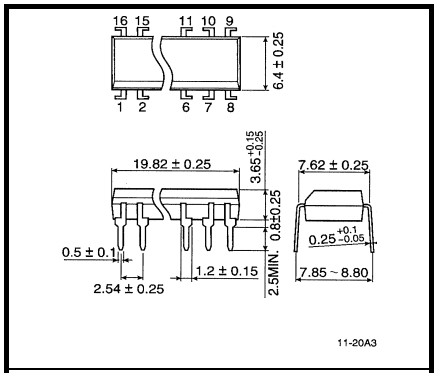


1,3: ANODE
2,4: CATHODE
5,7: EMITTER
6,8:COLLECTOR

TLP627-4



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



TOSHIBA 11−20A3

Weight: 1.1 g (typ.)

Absolute Maximum Ratings (Ta=25°C)

Characteristics			Symbol	Rating		Unit
				TLP627	TLP627-2 TLP627-4	
LED	Forward Current		I_F	60	50	mA
	Forward Current Derating		ΔI_F /°C	−0.7(Ta≥39°C)	−0.5(Ta≥25°C)	mA /°C
	Pulse Forward 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		Tj	125		°C
Detector	Collector-Emitter Voltage		V_{CEO}	300		V
	Emitter -Collector Voltage		V_{ECO}	0.3		V
	Collector Current		I_C	150		mA
	Collector Power Dissipation	(1 Circuit)	P_C	150(*300)	100	mW
	Collector Power Dissipation Derating	(Ta≥25°C,1 Circuit)	ΔP_C /°C	-1.5(*-3.5)	-1.0	mW /°C
	Junction Temperature		T_j	125		°C
Operating Temperature Range			T_{opr}	−55~100		°C
Storage Temperature Range			T_{stg}	−55~125		°C
Lead Soldering Temperature (10s)			T_{sold}	260(10sec)		°C
Total Package Power Dissipation			P_T	250(*320)	150	mW
Total Package Power Dissipation Derating		(Ta≥25°C,1 Circuit)	ΔP_T/°C	-2.5(*-3.2)	-1.5	mW /°C
Isolation Voltage	(AC,1min. , R.H.≤60%)	(Note1)	BV_S	5000		Vrms

*IF=20mA Max

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

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	V_{CC}	—	—	200	V
Forward Current	I_F	—	16	25	mA
Collector Current	I_C	—	—	120	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 (Ta=25°C)

	Characteristics	Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward Voltage	V_F	I_F = 10 mA	1.0	1.15	1.3	V
	Reverse Current	I_R	V_R = 5 V	—	—	10	μA
	Capacitance	C_T	V = 0 , f=1MHz	—	30	—	pF
Detector	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	IC = 0.1mA	300	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	IE = 0.1mA	0.3	—	—	V
	Collector Dark Current	I_{CEO}	V_{CE} = 200V	—	10	200	nA
			V_{CE} = 200V , Ta = 85°C	—	—	20	μA
	Capacitance Collector to Emitter	C_{CE}	V=0 , f=1MHz	—	10	—	pF

Coupled Electrical Characteristics (Ta=25°C)

Characteristics	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Current Transfer Ratio	I_C/I_F	I_F=1mA , V_{CE}=1V	1000	4000	—	%
Saturated CTR	I_C/I_F(sat)	I_F=10mA , V_{CE}=1V	500	—	—	%
Collector-Emitter Saturation Voltage	V_{CE}(sat)	I_C=10mA , I_F=1mA	—	—	1.0	V
		I_C=100mA , I_F=10mA	0.3	—	1.2	

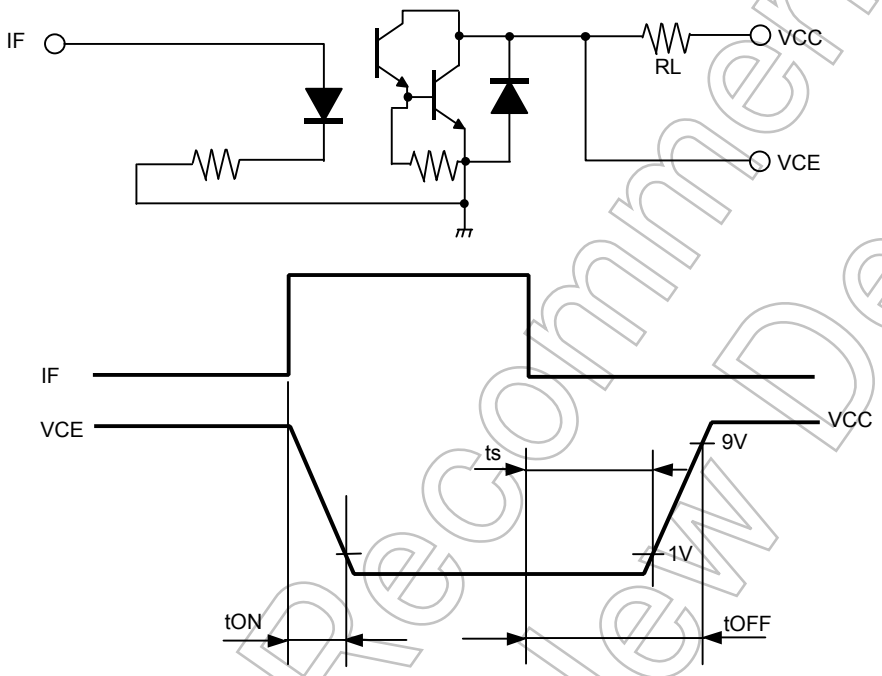
Isolation Electrical Characteristics (Ta=25°C)

Characteristics	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 , R.H.≤60%	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BVs	AC, 1minute	5000	—	—	Vrms
		AC, 1second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

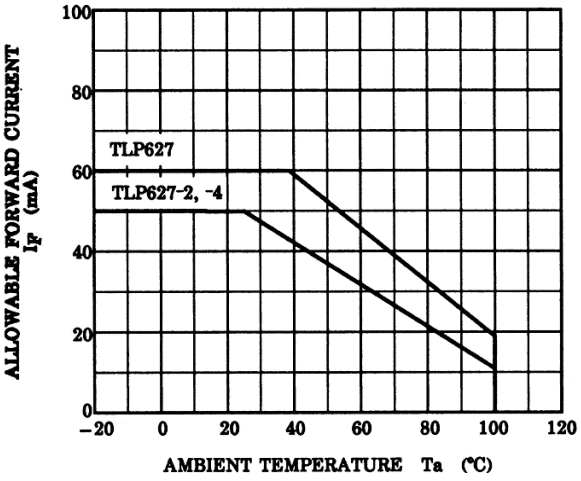
Switching Characteristics (Ta=25°C)

Characteristics	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Rise Time	tr	V_{CC}=10V I_C=10mA R_L=100Ω	—	40	—	μs
Fall Time	tf		—	15	—	
Turn-on Time	ton		—	50	—	
Turn-off Time	toff		—	15	—	
Turn-on Time	tON	R_L=180Ω (Fig.1) V_{CC}=10V , I_F=16mA	—	5	—	
Strage Time	ts		—	40	—	
Turn-off Time	tOFF		—	80	—	

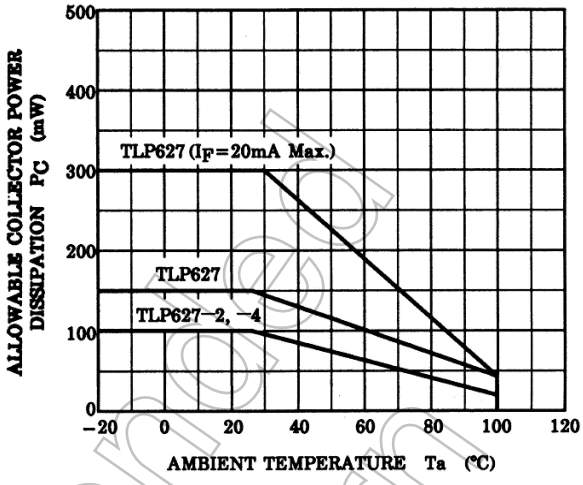
Fig.1 Switching Time Test Circuit



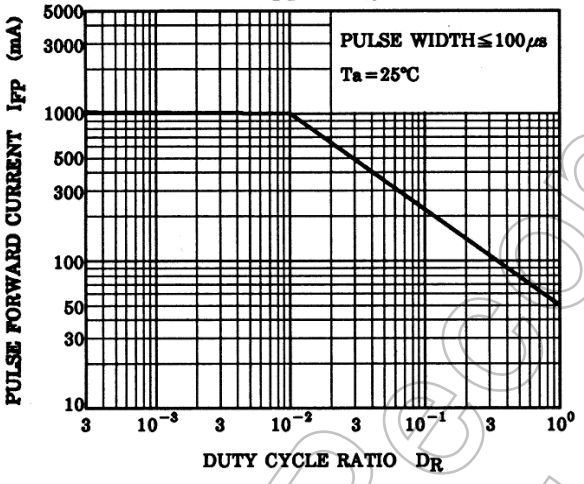
I_F – Ta



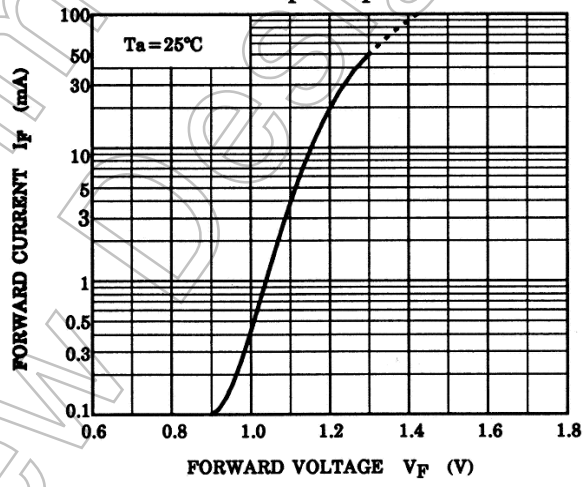
P_C – Ta



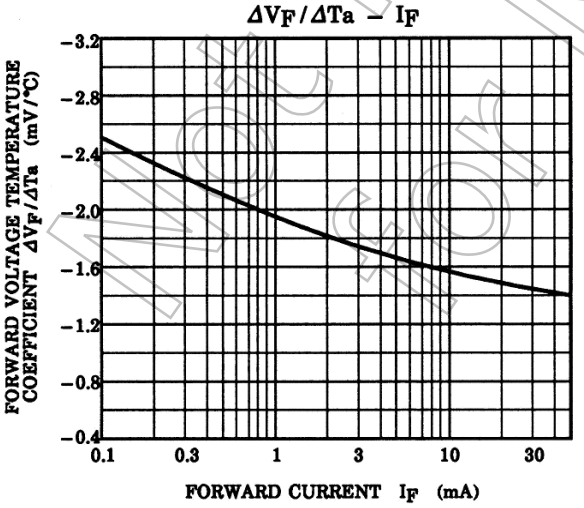
I_{FP} – D_R



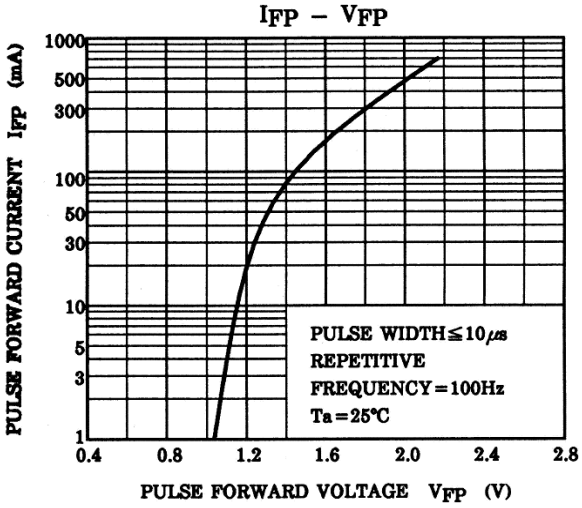
I_F – V_F



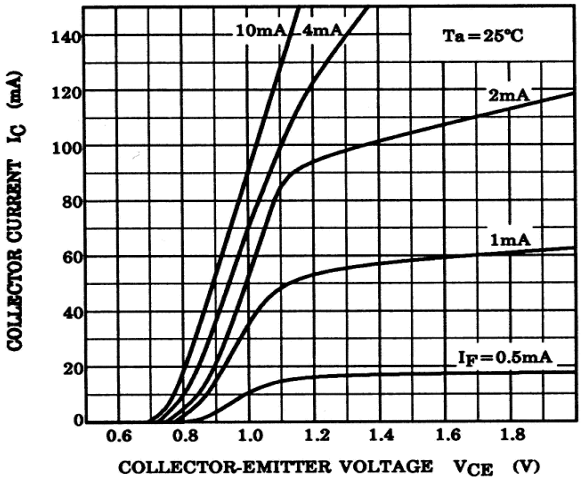
$\Delta V_F / \Delta Ta$ – I_F



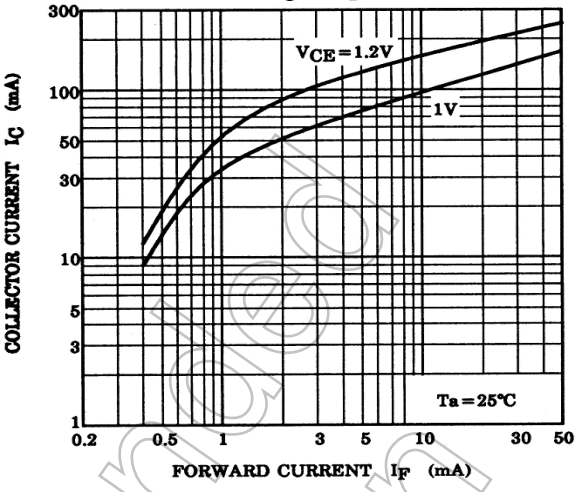
I_{FP} – V_{FP}



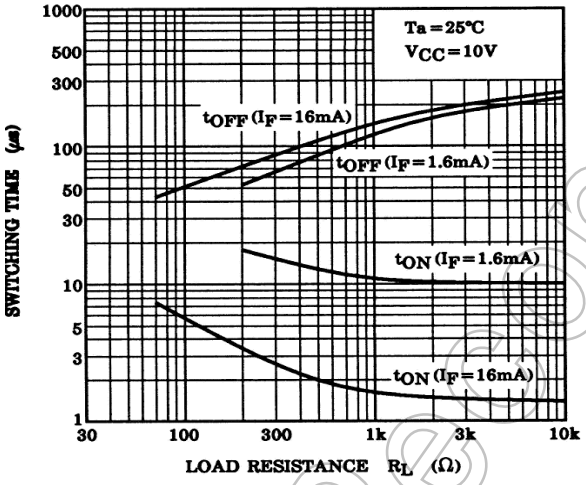
I_C – V_{CE}



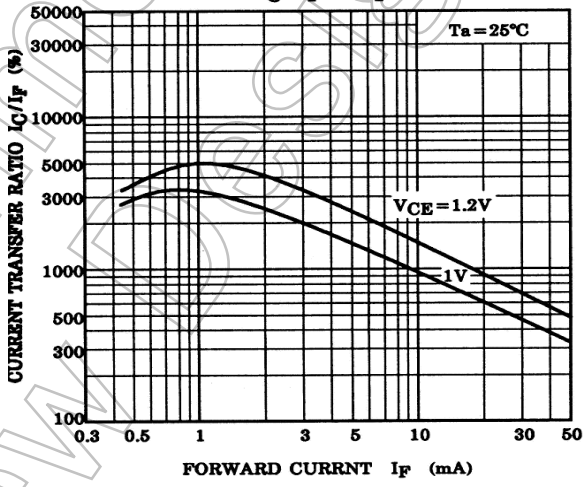
I_C – I_F



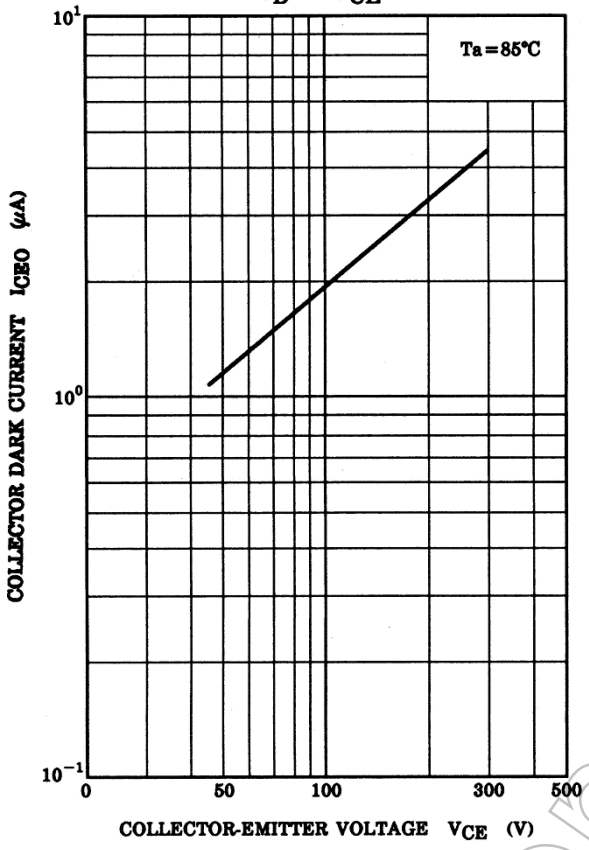
SWITCHING TIME – R_L



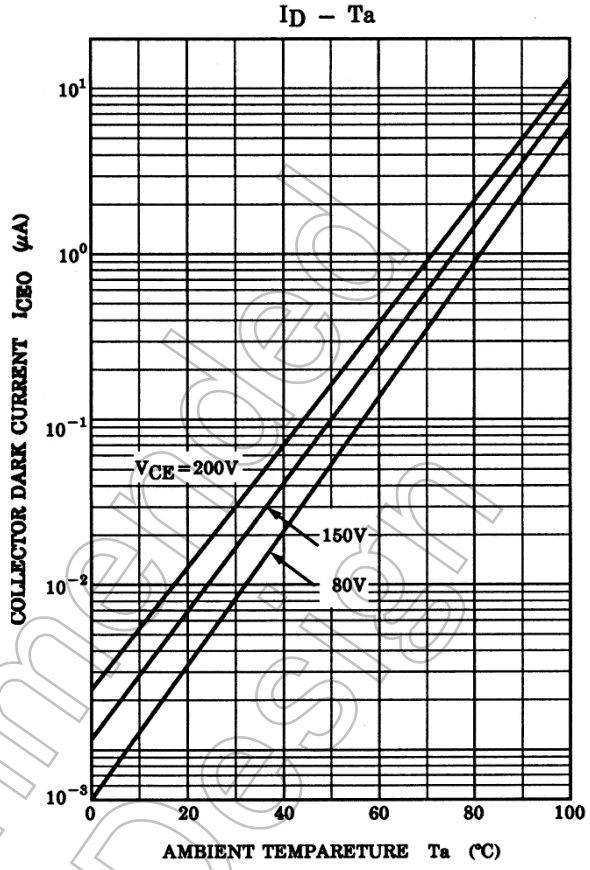
I_C/I_F – I_F



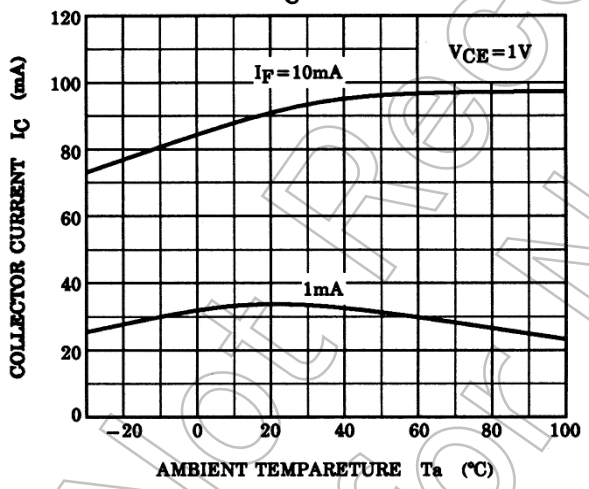
$I_D - V_{CE}$



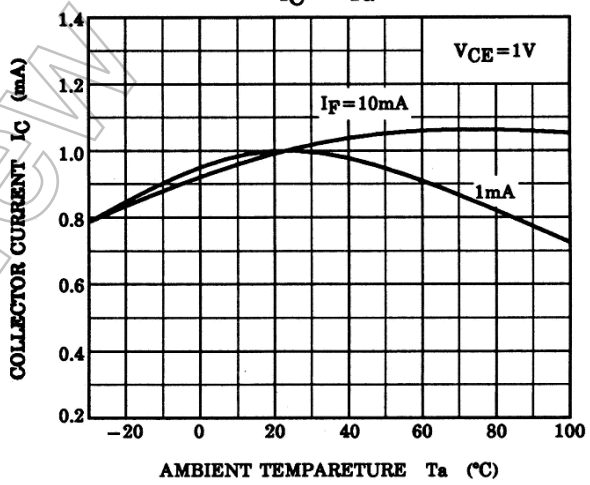
$I_D - Ta$



$I_C - Ta$



$I_C - Ta$



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