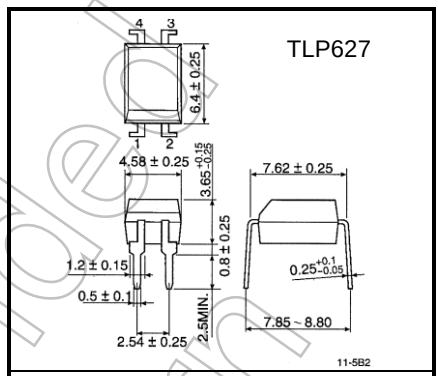
TOSHIBA Photocoupler GaAs IRED & Photo-Transistor

TLP627, TLP627-2, TLP627-4

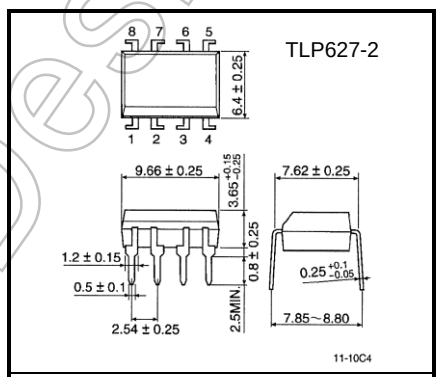
Programmable Controllers
DC-output Module
Telecommunication

Unit: mm



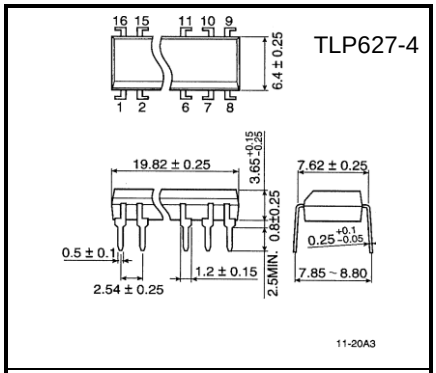
TOSHIBA 11-5B2

Weight: 0.26 g (typ.)



TOSHIBA 11-10C4

Weight: 0.54 g (typ.)



TOSHIBA 11-20A3

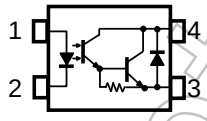
Weight: 1.1 g (typ.)

- Collector-Emitter Voltage : 300 V (min)
- Current Transfer Ratio : 1000 % (min)
- UL recognized : UL1577, File No. E67349
- cUL recognized : CSA Component Acceptance Service No. 5A
  File No.E67349
- SEMKO approved :9808210/01-03
  EN60065,EN60950
  (approved TLP627 and TLP627-2)
- Option (D4) type
  VDE approved : EN60747-5-5
  Maximum operating insulation voltage: 890V_{PK}
  Highest permissible over voltage: 8000V_{PK}

Note: When an EN 60747-5-5 approved type is needed, please designate the "Option(D4)".

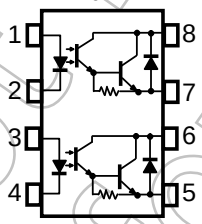
Pin Configuration (top view)

TLP627



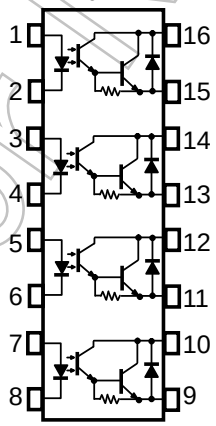
1: ANODE
2: CATHODE
3: EMITTER
4:COLLECTOR

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

Start of commercial production
1984-08

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
	Reverse Voltage		V_R	5		V
	Diode Power Dissipation	(1 Circuit)	P_D	100	70	mW
	Diode Power Dissipation Derating	(1 Circuit)	ΔP_D /°C	-1.2 (Ta≥39°C)	-0.7 (Ta≥25°C)	mW /°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(Note 1))	100	mW
	Collector Power Dissipation Derating	(Ta≥25°C,1 Circuit)	ΔP_C /°C	-1.5(-3.5(Note 1))	-1.0	mW /°C
Operating Temperature Range			T_{opr}	-55 to 100		°C
Storage Temperature Range			T_{stg}	-55 to 125		°C
Lead Soldering Temperature			T_{sol}	260(10s)		°C
Total Package Power Dissipation		(1 Circuit)	P_T	250(320(Note 1))	150	mW
Total Package Power Dissipation Derating (Ta≥25°C,1 Circuit)			ΔP_T/°C	-2.5(-3.2(Note 1))	-1.5	mW /°C
Isolation Voltage	(AC,60 s, R.H. ≤ 60%)	(Note 2)	BV_S	5000		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).

Note 1: I_F=20mA Max

Note 2: 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.

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 V, f=1MHz	—	30	—	pF
Detector	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 0.1mA	300	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	I_E = 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 V, 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	

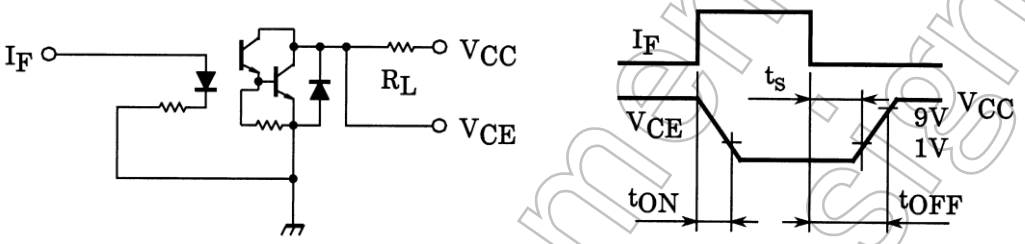
Isolation Electrical Characteristics (Ta=25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance Input to Output	C_S	V_S=0 V, f=1MHz	—	0.8	—	pF
Isolation Resistance	R_S	V_S=500V, R.H.≤60%	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 60 s	5000	—	—	Vrms
		AC, 1s, in oil	—	10000	—	
		DC, 60 s, in oil	—	10000	—	Vdc

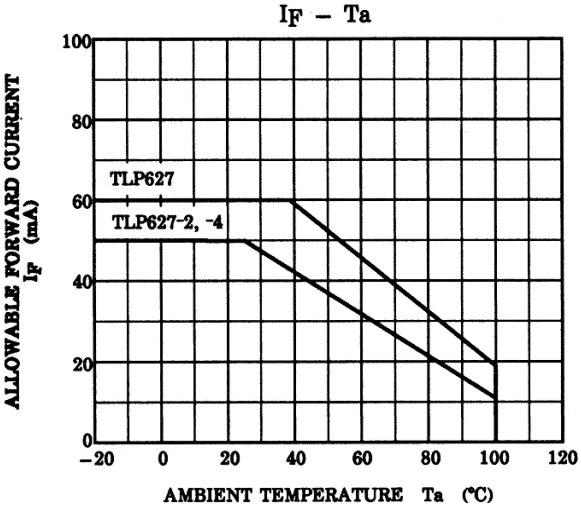
Switching Characteristics (Ta=25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Rise Time	t_r	V_{CC}=10V I_C=10mA R_L=100Ω	—	40	—	μs
Fall Time	t_f		—	15	—	
Turn-on Time	t_{on}		—	50	—	
Turn-off Time	t_{off}		—	15	—	
Turn-on Time	t_{ON}	R_L=180Ω (Fig.1) V_{CC}=10V, I_F=16mA	—	5	—	
Strage Time	t_S		—	40	—	
Turn-off Time	t_{OFF}		—	80	—	

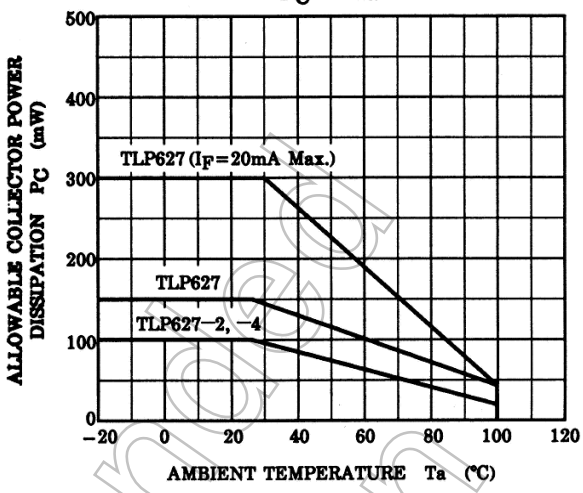
Fig.1 Switching Time Test Circuit



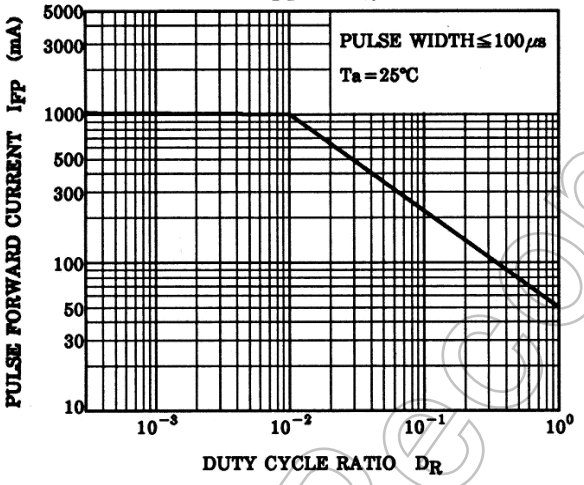
I_F – Ta



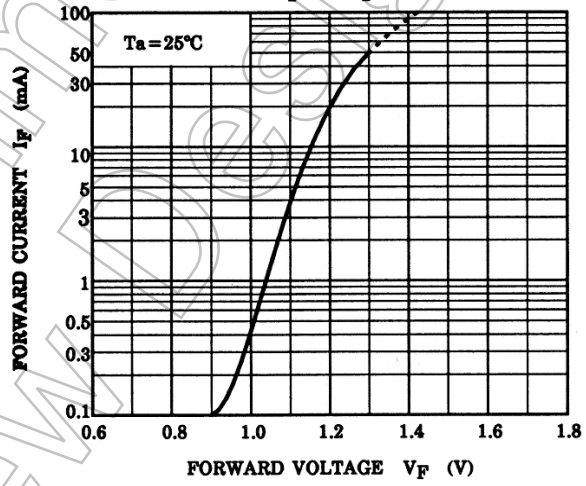
P_C – Ta



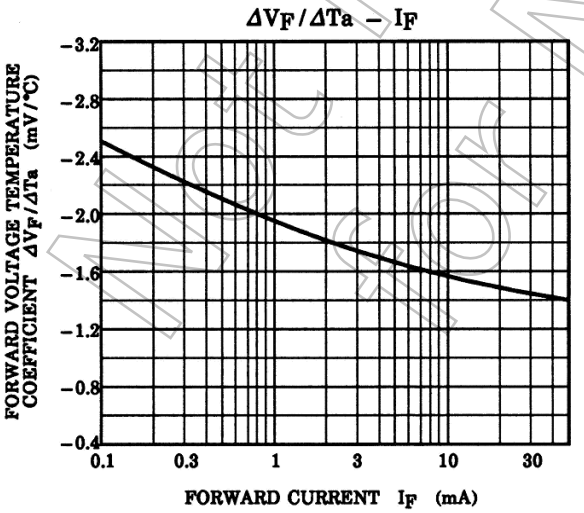
I_{FP} – D_R



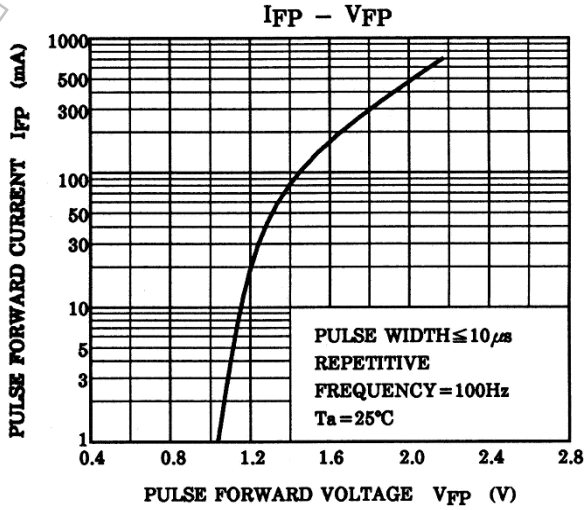
I_F – V_F



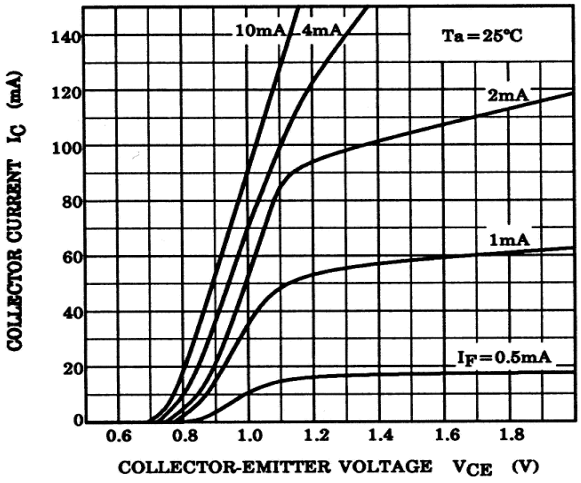
$\Delta V_F / \Delta Ta$ – I_F



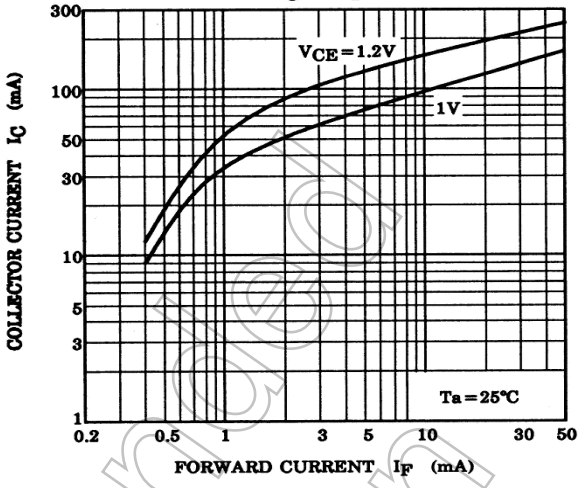
I_{FP} – V_{FP}



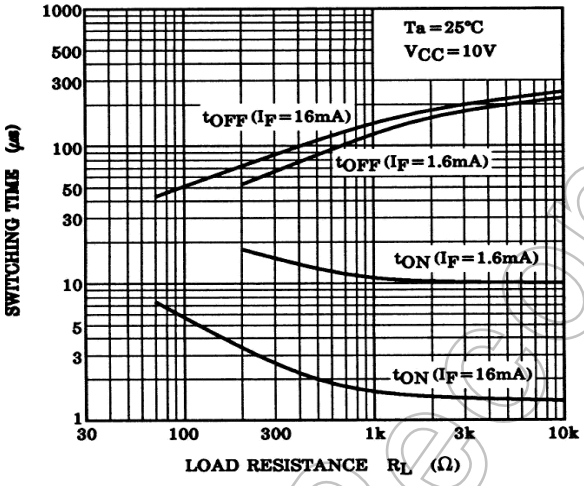
I_C – V_{CE}



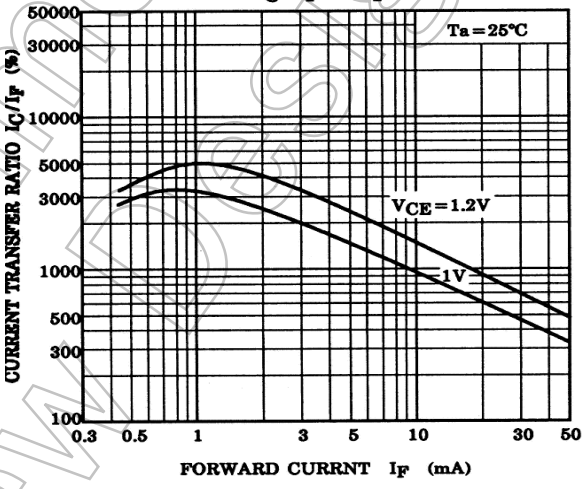
I_C – I_F



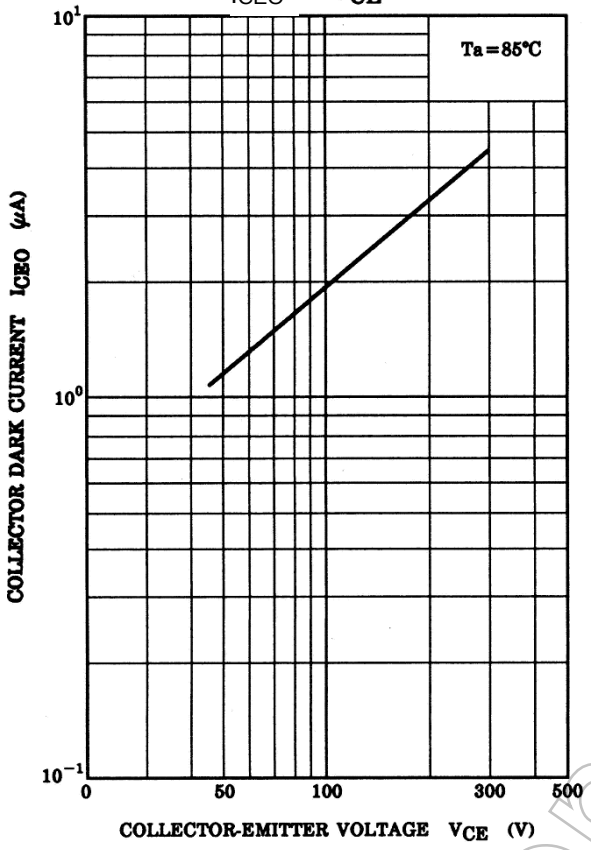
SWITCHING TIME – R_L



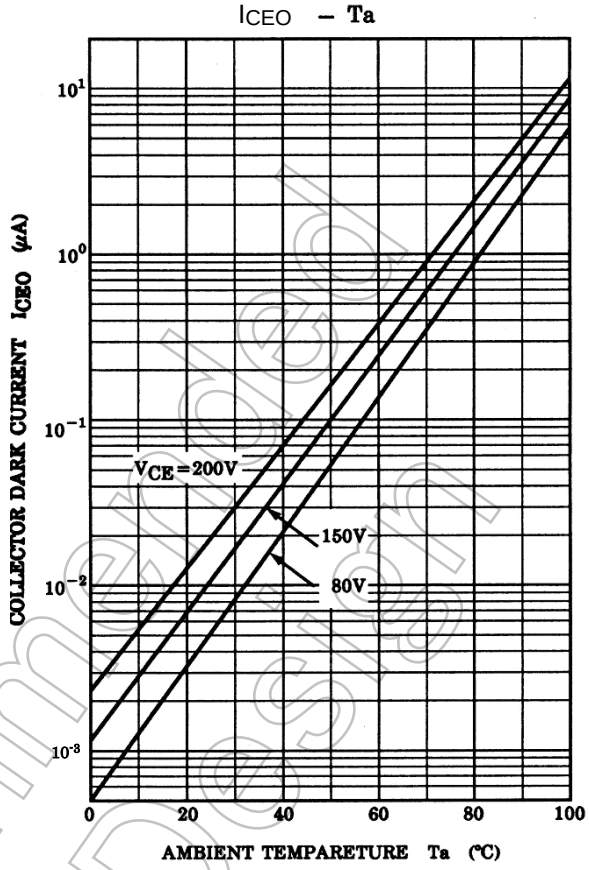
I_C/I_F – I_F



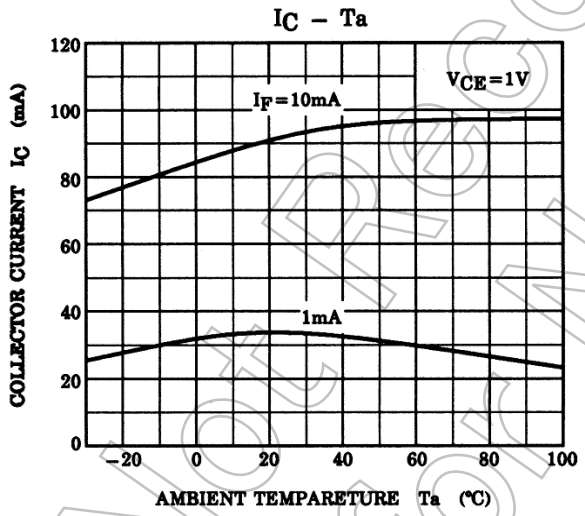
I_{CEO} – V_{CE}



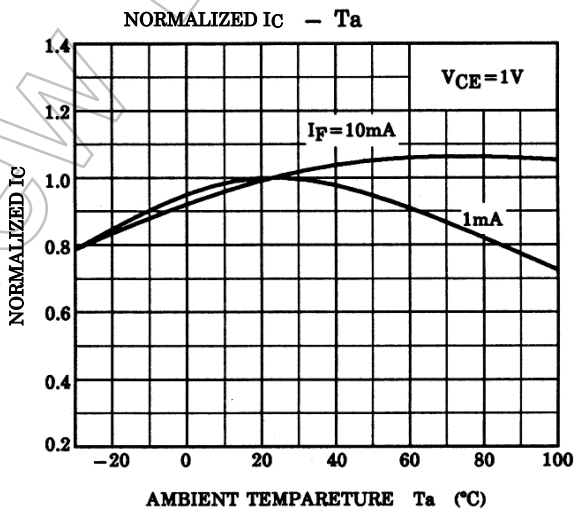
I_{CEO} – Ta



I_C – Ta



NORMALIZED I_C – Ta



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