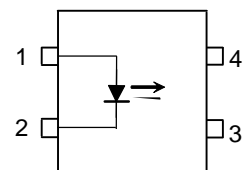


The TOSHIBA TLP785 is a silicon NPN transistor coupled to a gallium arsenide diode in a lead plastic DIP (DIP) package (AC: $5kV_{RMS}$ (min)). TLP785F is a lead free version of TLP785.

- TLP785: 7.62mm
- TLP785F: 10.16mm
- Collector-emitter voltage: V_{CE}
- Current transfer ratio: β
- Rank GB: 100%
- Isolation voltage: V_{iso}
- UL approved: UL
- BSI under application
- SEMKO under application
- Option(D4)type
- VDE approved: D
- (Note): When an option is specified, please refer to the data sheet.

- Construction method

Creepage distance
Clearance
Insulation thickness
Inner creepage distance



- 1 : Anode
- 2 : Cathode
- 3 : Emitter
- 4 : Collector

Current Transfer Ratio

Type	Classification (Note 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	
TLP785	None	50	600	Blank
	Rank Y	50	150	YE
	Rank GR	100	300	GR
	Rank BL	200	600	BL
	Rank GB	100	600	GB
	Rank YH	75	150	Y+
	Rank GRL	100	200	G
	Rank GRH	150	300	G+
	Rank BLL	200	400	B

(Note 1): Ex. rank GB: TLP785 (GB)

(Note 2): Application type name for certification test, please use standard product type name, i. e. TLP785 (GB): TLP785

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristic	Symbol	Rating	Unit
Forward current	I_F	60	mA
Forward current derating ($T_a > 39^\circ\text{C}$)	$I_F / ^\circ\text{C}$	-0.7	mA / $^\circ\text{C}$
Pulse forward current (Note 3)	I_{FP}	1	A
Power dissipation	P_D	90	mW
Power dissipation derating	$P_D / ^\circ\text{C}$	-0.9	mW / $^\circ\text{C}$
Reverse voltage	V_R	5	V
Junction temperature	T_j	125	$^\circ\text{C}$
Collector-emitter voltage	V_{CEO}	80	V

Recommended Operating Conditions (Note)

Characteristic	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{CC}		5	24	V
Forward current	I_F		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.

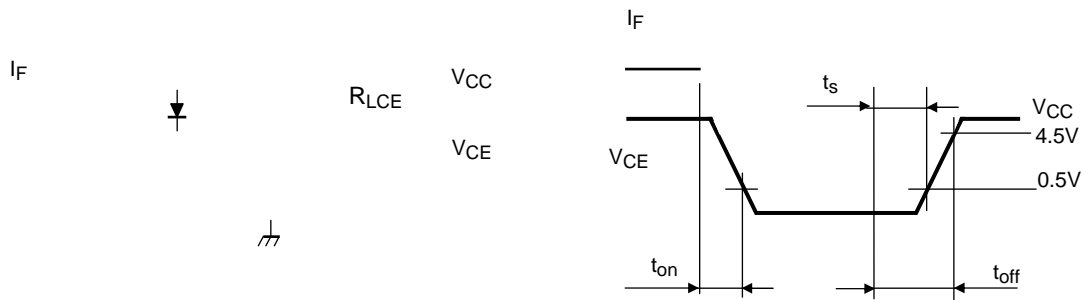
Individual Electrical Characteristics (Ta = 25°C)

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	μA
	Capacitance	C_T	$V = 0\text{V}, f = 1 \text{ MHz}$		30		pF
Detector	Collector-emitter breakdown voltage	$V_{(BR) CEO}$	$I_C = 0.5 \text{ mA}$	80			V
	Emitter-collector breakdown voltage	$V_{(BR) ECO}$	$I_E = 0.1 \text{ mA}$	7			V
	Collector dark current	$I_D(I_{CEO})$	$V_{CE} = 24 \text{ V}$		0.01	0.1	μA
			$V_{CE} = 24 \text{ V}, T_a = 85^\circ\text{C}$		0.6	50	μA
Capacitance (collector to emitter)	C_{CE}	$V = 0\text{V}, f = 1 \text{ MHz}$		6		pF	

Coupled Electrical Characteristics

Switching Characteristics (Ta = 25°C)

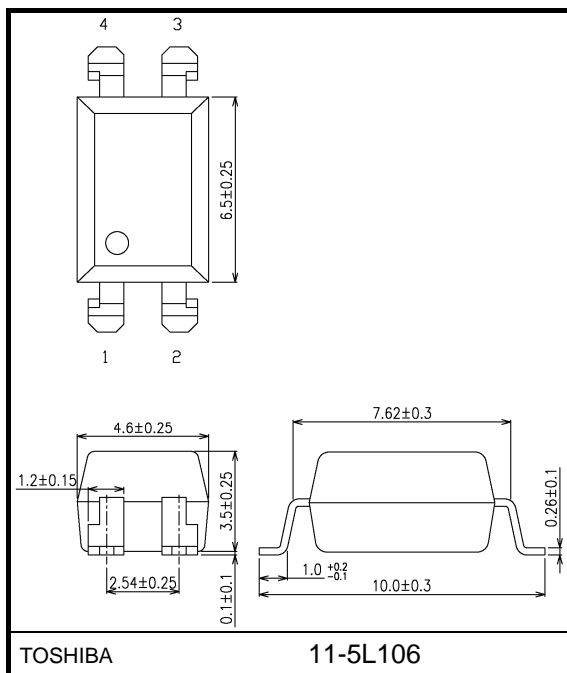
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Rise time	t_r	$V_{CC} = 10\text{ V}, I_C = 2\text{ mA}$ $R_L = 100$		2		μs
Fall time	t_f			3		
Turn-on time	t_{on}			3		
Turn-off time	t_{off}			3		
Turn-on time	t_{on}	$R_L = 1.9\text{ k}$ $V_{CC} = 5\text{ V}, I_F = 16\text{ mA}$ (fig. 1)		1.5		μs
Storage time	t_s			25		
Turn-off time	t_{off}			50		



Surface-Mount Lead Form Option

TLP785(LF6)

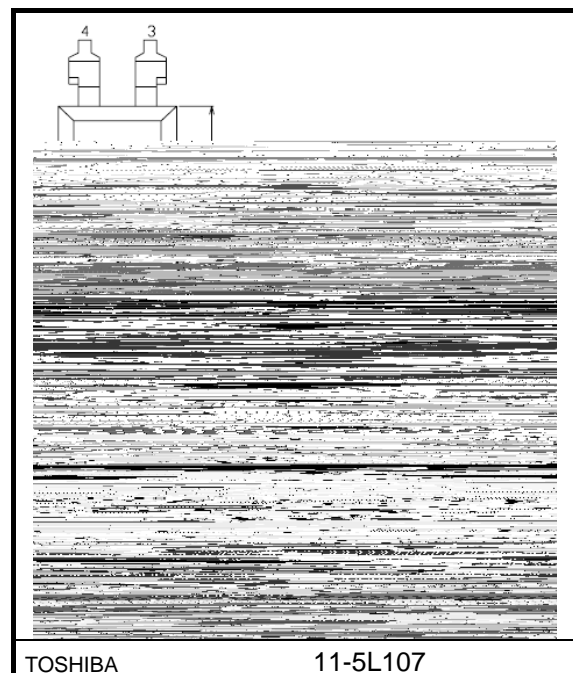
Unit: mm



Weight: 0.31g (typ.)

TLP785F(LF7)

Unit: mm



Weight: 0.31g (typ.)

Option: Specifications for Embossed-Tape Packing; (TP6)/(TP7)**1. Applicable Package**

Package Name	Product Type
DIP4LF6	TLP785

DIP4LF7

TLP785F

u2

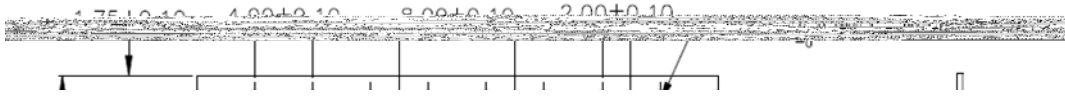
1.5

3.5 Tape Specification

[1] TLP785(TP6) / TLP785F(TP7)

(1)Tape material: Plastic

(2)Dimensions: The tape dimensions are as shown in Figure 3.



	TP6 Type	TP7Type
A	5.1±0.1	5.05±0.1
B	10.6±0.1	12.35±0.1
W	16.0±0.3	24.0±0.3
F	7.5±0.1	11.5±0.1
T	4.2±0.15	4.4±0.1

Figure 3 Tape Forms

3.6 Reel Specification

[1] TLP785(TP6) / TLP785F(TP7)

(1)Material: Plastic

(2)Dimensions: The reel dimensions are as shown in Figure 4.

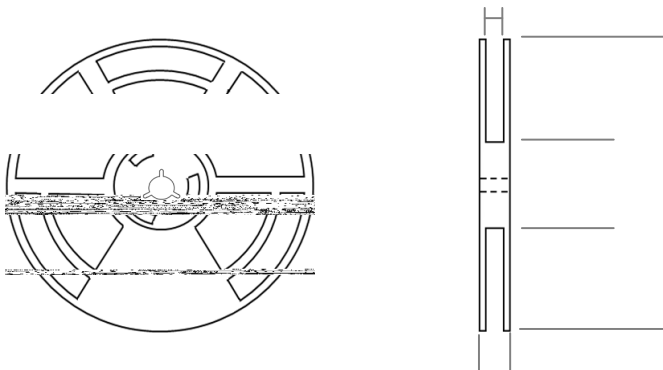


Figure 4 Reel Forms

4. Packing

Two reels of photocouplers are packed in a shipping carton.

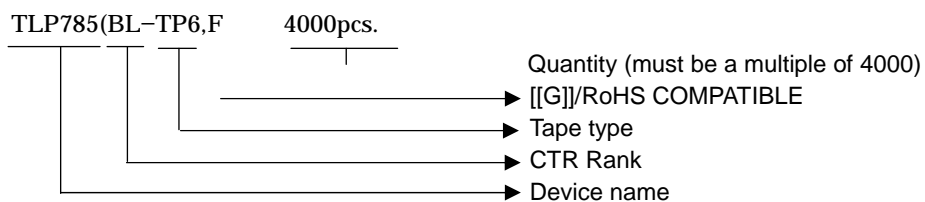
5. Label Indication

The carton bears a label indicating the product number, the symbol representing classification of standard, the quantity, the lot number and the Toshiba company name.

6. Ordering Information

When placing an order, please specify the product number, the CTR rank, the tape type and the quantity as shown in the following example.

(Example)



(Note): The order code may be suffixed with a letter or a digit.

Please contact your nearest Toshiba sales representative for more details.

Soldering and Storage

2. Storage

- 1) Avoid storage locations where devices may be exposed to moisture or direct sunlight.
- 2) Follow the precautions printed on the packing label of the device for transportation and storage.
- 3) Keep the storage location temperature and humidity within a range of 5°C to 35°C and 45% to 75%, respectively.
- 4) Do not store the products in locations with poisonous gases (especially corrosive gases) or in dusty conditions.
- 5) Store the products in locations with minimal temperature fluctuations. Rapid temperature changes during storage can cause condensation, resulting in lead oxidation or corrosion, which will deteriorate the solderability of the leads.
- 6) When restoring devices after removal from their packing, use anti-static containers.
- 7) Do not allow loads to be applied directly to devices while they are in storage.
- 8) If devices have been stored for more than two years under normal storage conditions, it is recommended that you check the leads for ease of soldering prior to use.

Insulation Related Specifications

		7.62mm pitch TLPxxx type	10.16mm pitch TLPxxxF type
Minimum creepage distance	Cr	7.0mm	8.0mm
Minimum clearance	Cl	7.0mm	8.0mm
Minimum insulation thickness	ti	0.4 mm	
Comparative tracking index	CTI	175	

(1) If a printed circuit is incorporated, the creepage distance and clearance may be reduced below this

Figure 1 Partial discharge measurement procedure according to EN60747
Destructive test for qualification and sampling tests.

Method A

(for type and sampling tests,
destructive tests)

t_1, t_2 = 1 to 10 s
 t_3, t_4 = 1 s
 t_p (Measuring time for
 partial discharge) = 10 s
 t_b = 12 s
 t_{ini} = 60 s

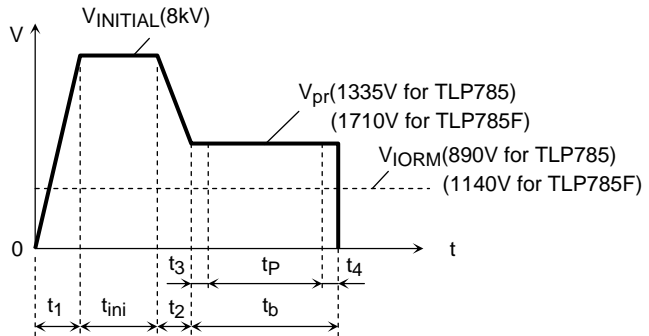


Figure 2 Partial discharge measurement procedure according to EN60747
Non-destructive test for 100% inspection.

Method B

(for sample test, non-
destructive test)

t_3, t_4 = 0.1 s
 t_p (Measuring time for
 partial discharge) = 1 s
 t_b = 1.2 s

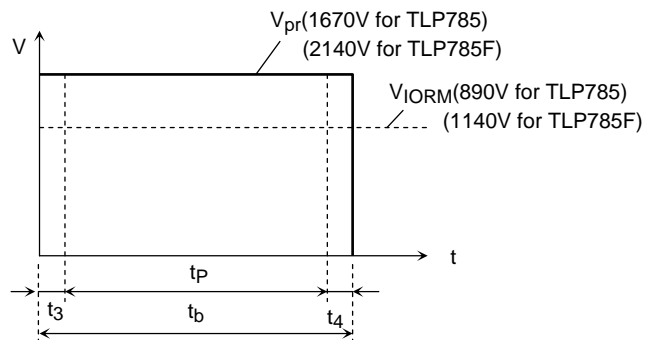
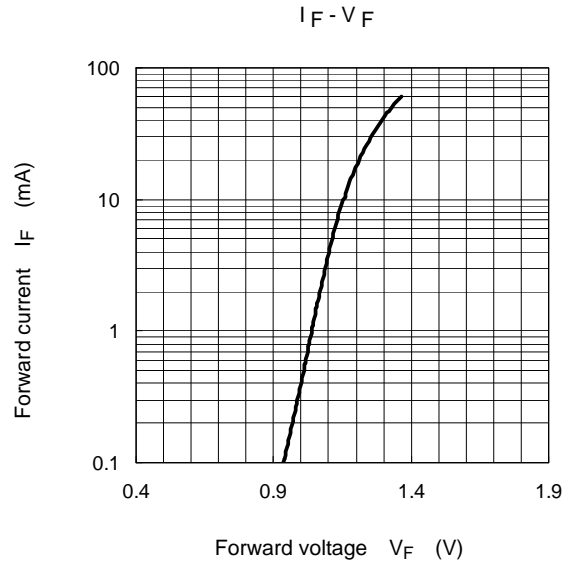
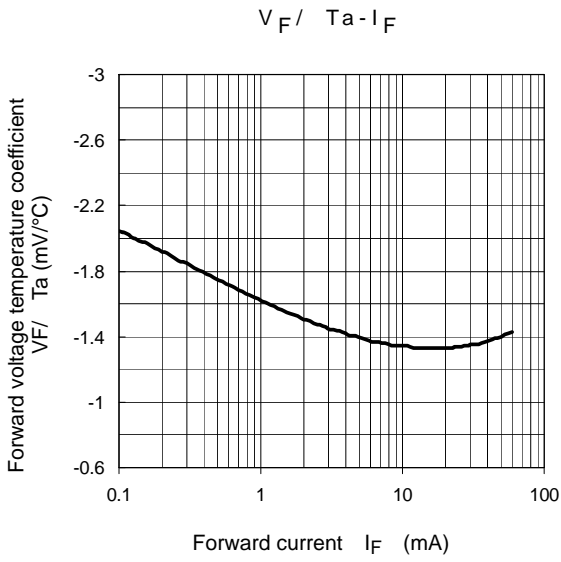
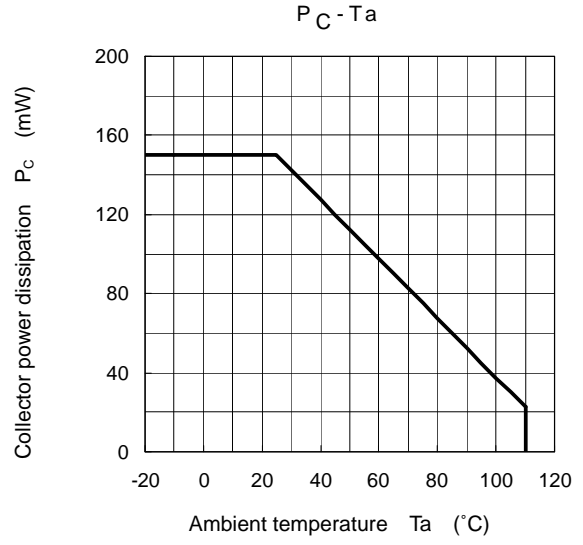
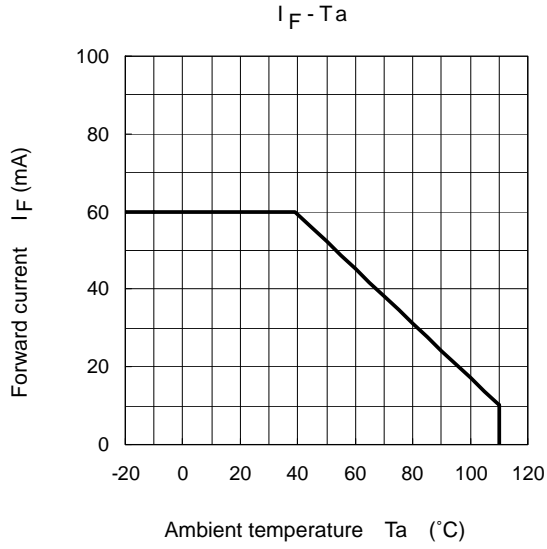
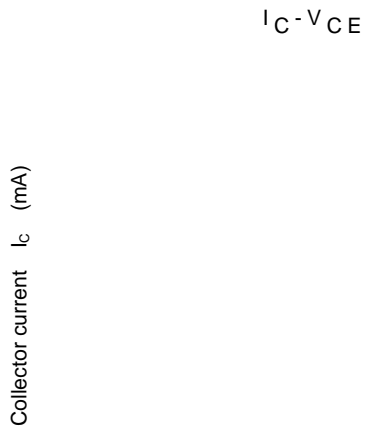
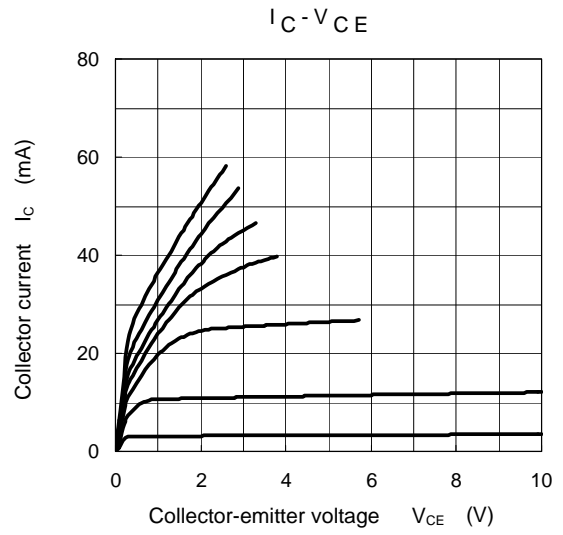
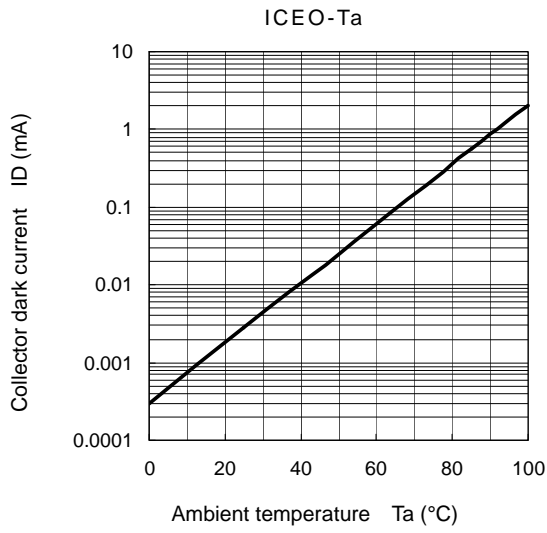


Figure 3 Dependency of maximum safety ratings on ambient temperature

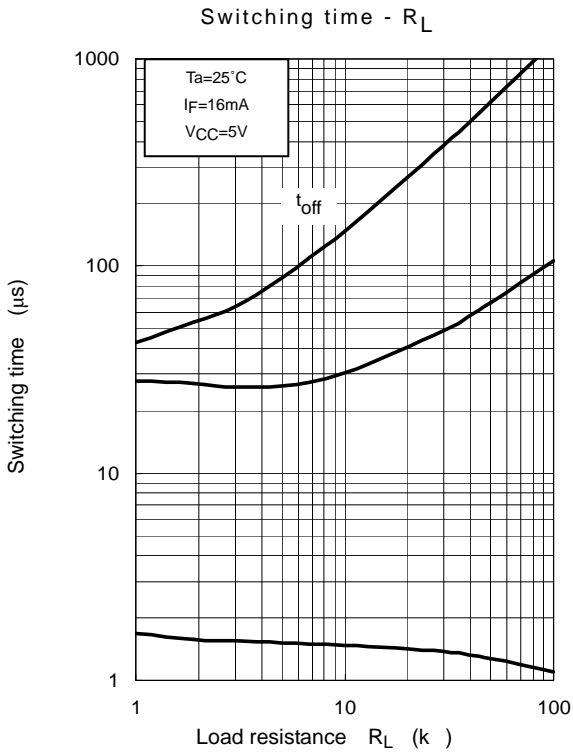
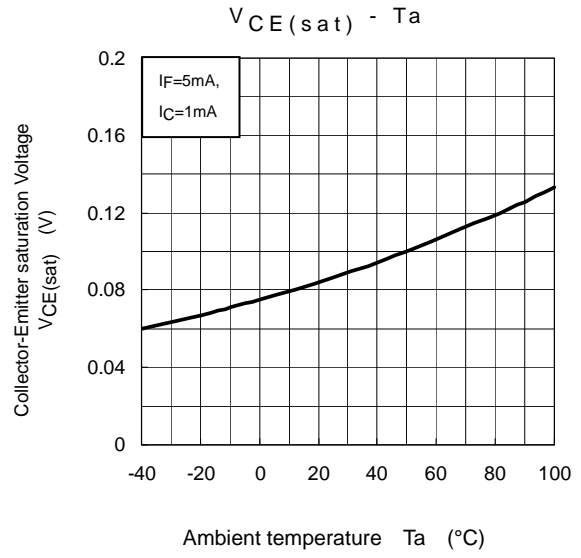
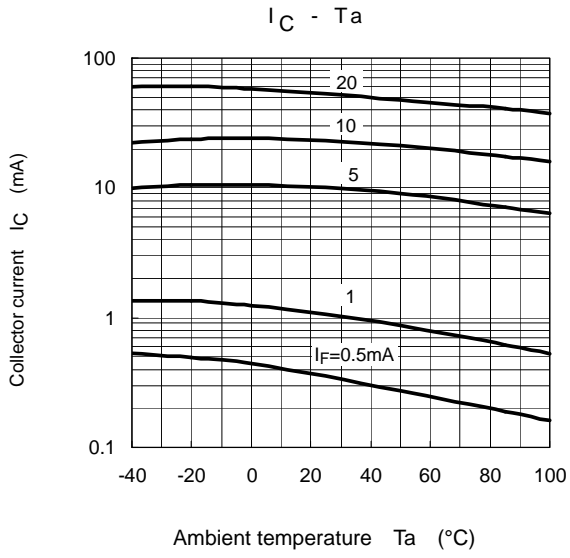
500
 400
 300
 200
 100



I_{FP}



I_C-I_F



*The above graphs show typical characteristic.

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