

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

# TLP124

OFFICE MACHINE

PROGRAMMABLE CONTROLLERS

AC/DC - INPUT MODULE

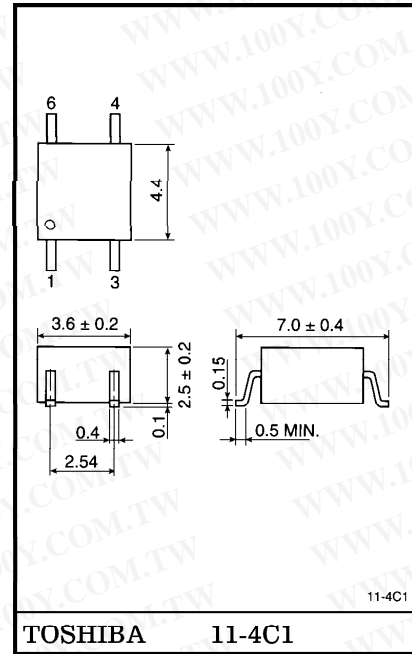
TELECOMMUNICATION

The TOSHIBA MINI FLAT COUPLER TLP124 is a small outline coupler, suitable for surface mount assembly.

TLP124 consists of a photo transistor optically coupled to a gallium arsenide infrared emitting diode.

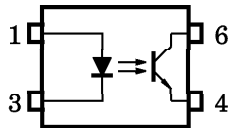
- Collector-Emitter Voltage : 80V Min.
- Current Transfer Ratio : 100% Min.  
Rank BV : 200% Min.
- Isolation Voltage : 3750 Vrms Min.
- UL Recognized : UL1577 File No. E67349

Unit in mm



Weight : 0.09g

**PIN CONFIGURATIONS (TOP VIEW)**



- 1 : ANODE
- 3 : CATHODE
- 4 : EMITTER
- 6 : COLLECTOR

**勝特力材料 886-3-5753170**  
**胜特力电子(上海) 86-21-54151736**  
**胜特力电子(深圳) 86-755-83298787**  
[Http://www.100y.com.tw](http://www.100y.com.tw)

961001EBC2

● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

● Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.

● The products described in this document are subject to foreign exchange and foreign trade control laws.

● The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.

● The information contained herein is subject to change without notice.

## CURRENT TRANSFER RATIO

CLASSIFI- CATION	CURRENT TRANSFER RATIO (Min.)			MARKING OF CLASSIFI- CATION
	Ta = 25°C		Ta = -25~75°C	
	I <sub>F</sub> = 1mA V <sub>CE</sub> = 0.5V	I <sub>F</sub> = 0.5mA V <sub>CE</sub> = 1.5V	I <sub>F</sub> = 1mA V <sub>CE</sub> = 0.5V	
Rank BV	200%	100%	100%	BV
Standard	100%	50%	50%	BV, Blank

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

(Note) Application type name for certification test, please use standard product type name, i. e. TLP124 (BV) : TLP124

## MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I <sub>F</sub>	50	mA
	Forward Current Derating	ΔI <sub>F</sub> / °C	-0.7 (Ta ≥ 53°C)	mA / °C
	Peak Forward Current (100μs pulse, 100pps)	I <sub>FP</sub>	1	A
	Reverse Voltage	V <sub>R</sub>	5	V
	Junction Temperature	T <sub>j</sub>	125	°C
DETECTOR	Collector - Emitter Voltage	V <sub>CEO</sub>	80	V
	Emitter - Collector Voltage	V <sub>ECO</sub>	7	V
	Collector Current	I <sub>C</sub>	50	mA
	Peak Collector Current (10ms pulse, 100pps)	I <sub>CP</sub>	100	mA
	Power Dissipation	P <sub>C</sub>	150	mW
	Power Dissipation Derating (Ta ≥ 25°C)	ΔP <sub>C</sub> / °C	-1.5	mA / °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 (10s)	T <sub>sol</sub>	260	°C	
Total Package Power Dissipation	P <sub>T</sub>	200	mW	
Total Package Power Dissipation Derating (Ta ≥ 25°C)	ΔP <sub>T</sub> / °C	-2.0	mW / °C	
Isolation Voltage (AC, 1min., R.H. ≤ 60%) (Note 1)	BV <sub>S</sub>	3750	V <sub>rms</sub>	

(Note 1) Device considered a two terminal device : Pins 1, 3 shorted together and pins 4, 6 shorted together.

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

## RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	$V_{CC}$	—	5	48	V
Forward Current	$I_F$	—	1.6	20	mA
Collector Current	$I_C$	—	1	10	mA
Operating Temperature	$T_{opr}$	-25	—	75	°C

INDIVIDUAL ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

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	$V_{(BR)CEO}$	$I_C = 0.5\text{mA}$	80	—	—	V
	Emitter - Collector Breakdown Voltage	$V_{(BR)ECO}$	$I_E = 0.1\text{mA}$	7	—	—	V
	Collector Dark Current	$I_D$	$V_{CE} = 48\text{V}$	—	10	100	nA
			$V_{CE} = 48\text{V}, T_a = 85^\circ\text{C}$	—	2	50	$\mu\text{A}$
Capacitance Collector to Emitter	$C_{CE}$	$V = 0, f = 1\text{MHz}$	—	12	—	pF	

COUPLED ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	$I_C / I_F$	$I_F = 1\text{mA}, V_{CE} = 0.5\text{V}$ Rank BV	100	—	1200	%
			200	—	1200	
Low Input CTR	$I_C / I_{F(\text{low})}$	$I_F = 0.5\text{mA}, V_{CE} = 1.5\text{V}$ Rank BV	50	—	—	%
			100	—	—	
Collector - Emitter Saturation Voltage	$V_{CE(\text{sat})}$	$I_C = 0.5\text{mA}, I_F = 1\text{mA}$ $I_C = 1\text{mA}, I_F = 1\text{mA}$ Rank BV	—	—	0.4	V
			—	0.2	—	
			—	—	0.4	
Off - State Collector Current	$I_{C(\text{off})}$	$V_F = 0.7\text{V}, V_{CE} = 48\text{V}$	—	—	10	$\mu\text{A}$

COUPLED ELECTRICAL CHARACTERISTICS ( $T_a = -25 \sim 75^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	$I_C / I_F$	$I_F = 1\text{mA}, V_{CE} = 0.5\text{V}$ Rank BV	50	—	—	%
			100	—	—	
Low Input CTR	$I_C / I_{F(\text{low})}$	$I_F = 0.5\text{mA}, V_{CE} = 1.5\text{V}$ Rank BV	—	50	—	%
			—	100	—	

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

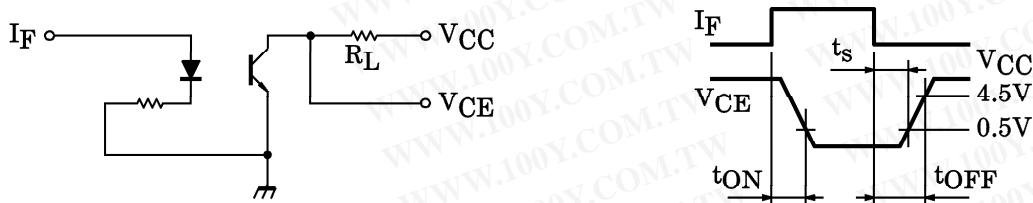
ISOLATION CHARACTERISTICS (Ta = 25°C)

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, R.H.≤60%	5×10 <sup>10</sup>	10 <sup>14</sup>	—	Ω
Isolation Voltage	BV <sub>S</sub>	AC, 1minute	3750	—	—	Vrms
		AC, 1s, in oil	—	10000	—	
		DC, 1minute, in oil	—	10000	—	Vdc

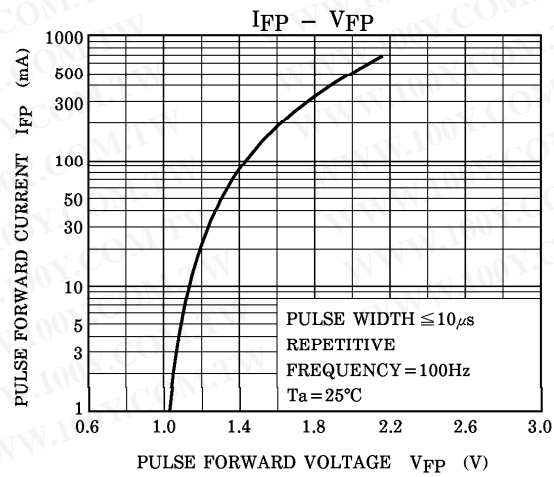
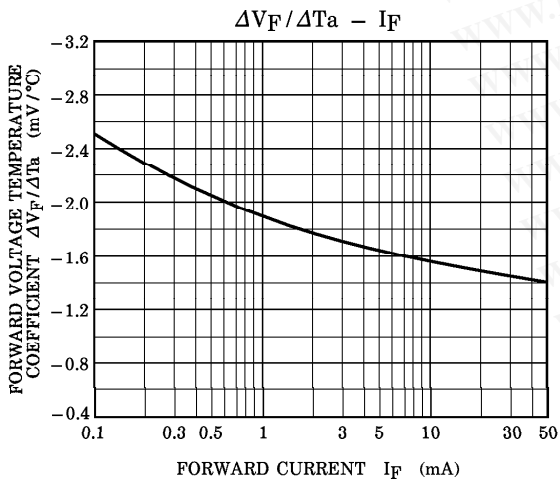
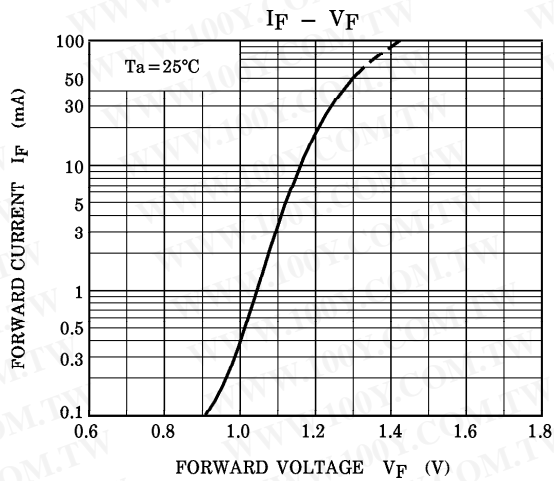
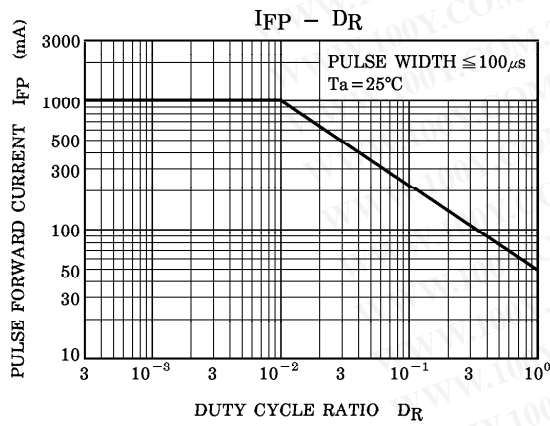
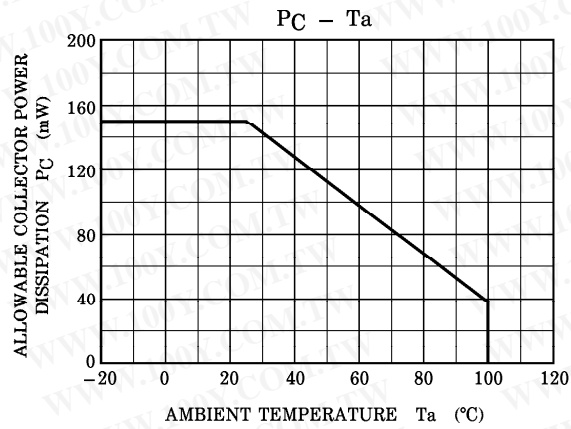
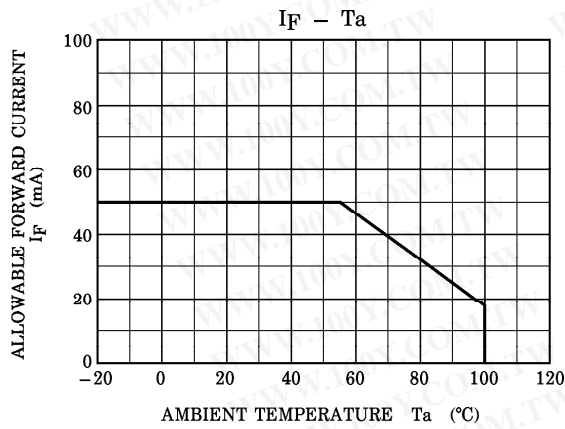
SWITCHING CHARACTERISTICS (Ta = 25°C)

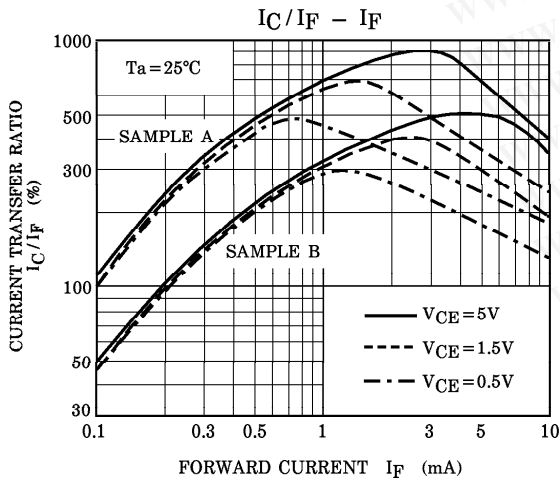
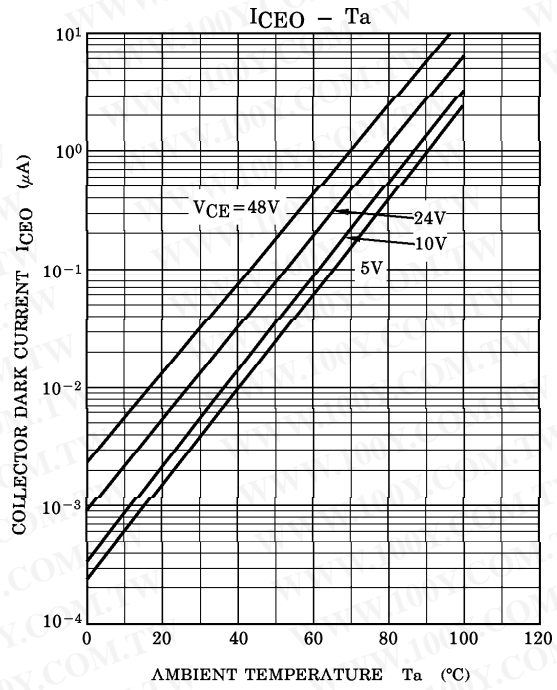
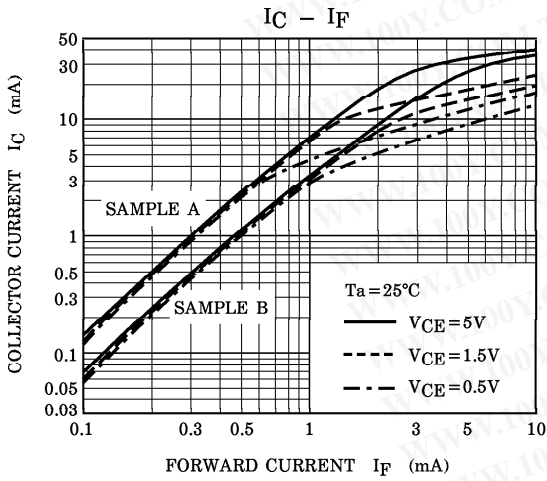
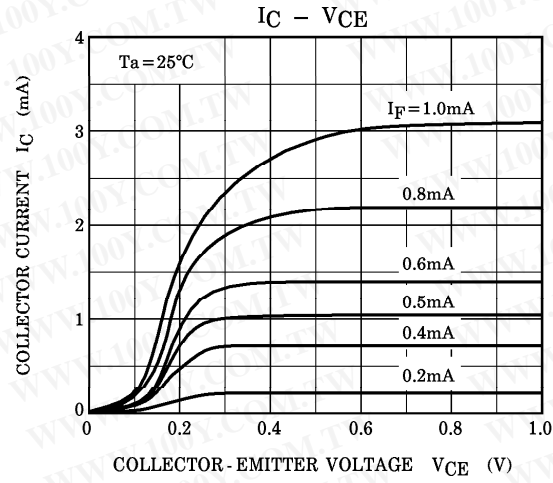
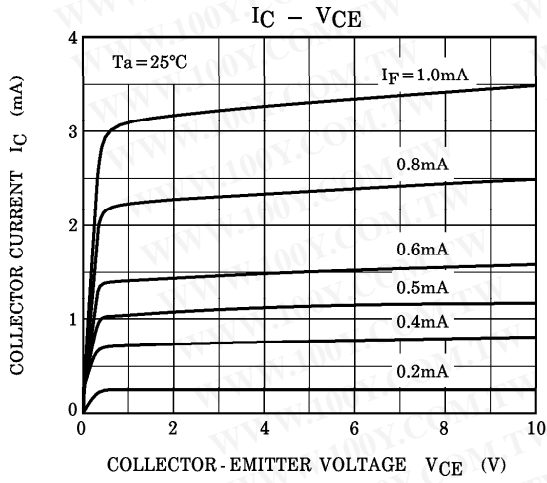
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t <sub>r</sub>	V <sub>CC</sub> =10V, I <sub>C</sub> =2mA R <sub>L</sub> =100Ω	—	8	—	μS
Fall Time	t <sub>f</sub>		—	8	—	
Turn - on Time	t <sub>ON</sub>		—	10	—	
Turn - off Time	t <sub>OFF</sub>		—	8	—	
Turn - on Time	t <sub>ON</sub>	R <sub>L</sub> =4.7kΩ (Fig.1) V <sub>CC</sub> =5V, I <sub>F</sub> =1.6mA	—	10	—	μS
Storage Time	t <sub>s</sub>		—	50	—	
Turn - off Time	t <sub>OFF</sub>		—	300	—	

Fig. 1 SWITCHING TIME TEST CIRCUIT

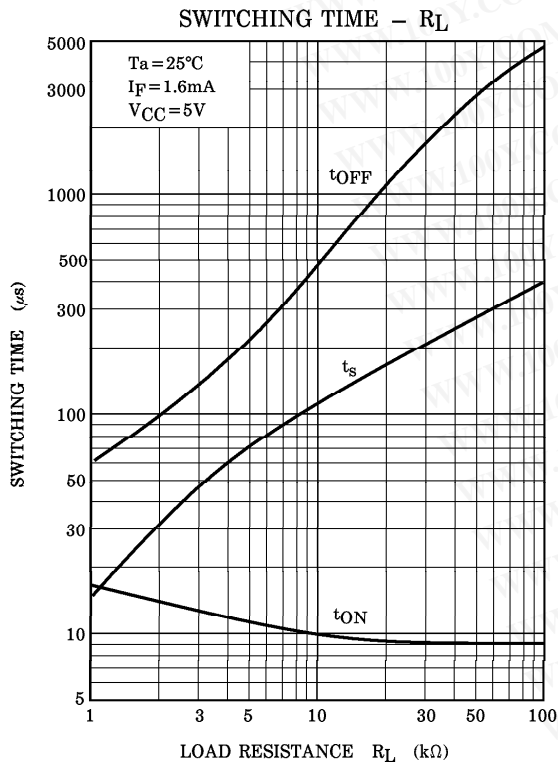
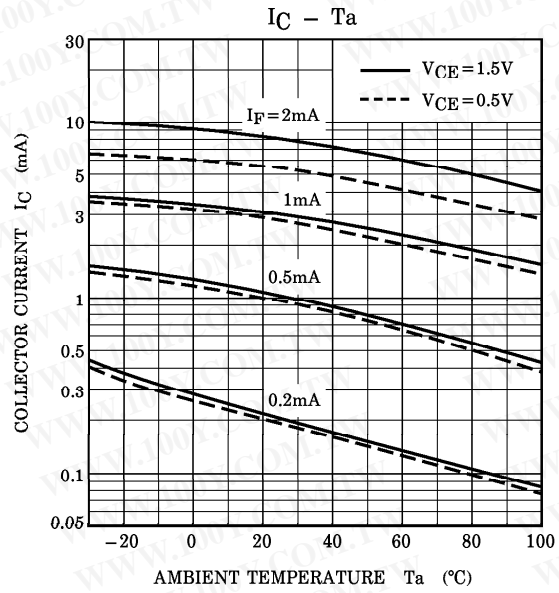
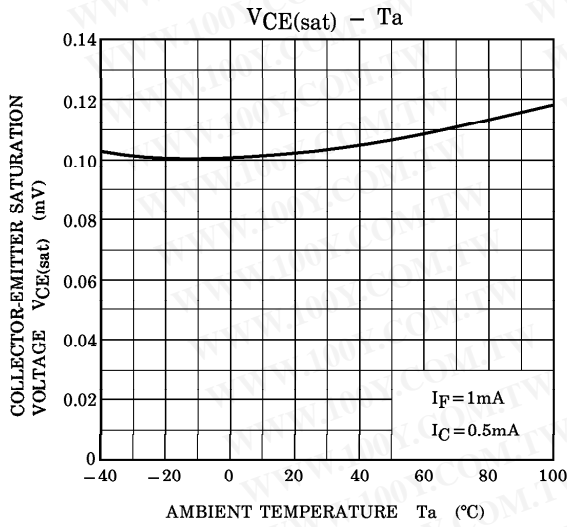


勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)





勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)



勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)