

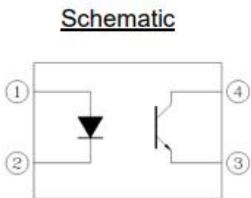
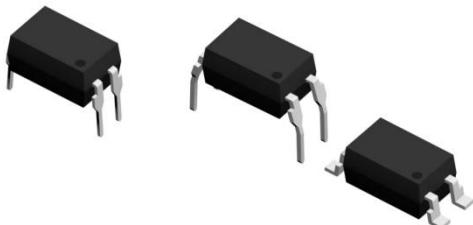


HT series

Photocoupler Product Data Sheet **HT-851X**

Spec No:HT-PC-851X-P-014-A1
Effective Date:07/03/2024

■ Package



Pin Configuration

1. Anode
2. Cathode
3. Emitter
4. Collector

■ Description

The HT-851X is a photoelectric coupler composed of light-emitting diode and phototransistor with high voltage resistance. It is packaged in a 4-pin package and in wide-lead spacing and SMD option.

■ Features

- Current transfer ratio(CTR : MIN. 50% at IF = 5mA, VCE = 5V)
- Collector - Emitter Voltage: $V_{CEO} \geq 350V$
- High input-output isolation voltage($V_{iso} = 5,000V_{rms}$)
- Operating Temperature: $-55^{\circ}C \sim 110^{\circ}C$
- Safety approval
(UL 1577, VDE DIN EN60747-5-5 (VDE 0884-5) , CQC11-471543-2022)
- RoHS
- MSL1

■ Applications

- Programmable controllers
- Switching power supply, intelligent meter
- Home appliances: such as air conditioners, fans, water heaters, etc

■ Product Nomenclature

The product name is designated as below:

HT -851 X -X X- X X X- XX

① ② ③ ④ ⑤ ⑥ ⑦

Designation:

HT =Hengtuo Technology Co.,LTD.

851= Product Series

- ① = Lead form option(S1,M,NONE)⁽¹⁾
- ② = CTR Rank(A,B,C,D,E)⁽²⁾
- ③ = Tape and Reel option(TP,TP1,NONE)⁽³⁾
- ④ = Lead frame Material(F,NONE)⁽⁴⁾
- ⑤ = VDE order option(fixed code “V”)
- ⑥ = Halogen free option(fixed code“G”)
- ⑦ = Customer code

Notes

1. Lead form option:

Symbol	Description
S1	DIP4-S1
M	DIP4-M
NONE	DIP4 Normal

2. CTR Rank:

Symbol	Description
A,B,C,D,E...	CTR Rank
NONE	No Rank

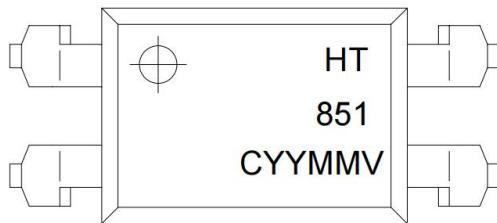
3. Tape and Reel option:

Symbol	Description
TP&TP1	Tape and Reel Type
NONE	DIP Type

4. Lead frame Material

Symbol	Description
F	Iron
NONE	Copper

■ Marking Information



Designation:

HT	denotes Hengtuo
851	denotes Device
C	denotes CTR Rank
YY	denotes year code
WW	denotes week code
V	denotes VDE

■ Maximum

	Parameter	Symbol	Values	Unit
Input	Forward Current	I_F	50	mA
	Reverse Voltage	V_R	6	V
	Power Dissipation	P	70	mw
	Peak Forward Current (100 μ s pulse, 100Hz)	I_{FP}	1	A
	Thermal Resistance Junction-Ambient	R_{thJ-A}	325	$^{\circ}\text{C}/\text{W}$
	Thermal Resistance Junction-Case	R_{thJ-C}	200	$^{\circ}\text{C}/\text{W}$
Output	Collector - Emitter Voltage	V_{CEO}	350	V
	Emitter - Collector Voltage	V_{ECO}	7	V
	Collector Current	I_C	50	mA
	Collector Power Dissipation	P_C	150	mw
Operating temperature range		T_{op}	-55 ~ 110	$^{\circ}\text{C}$
Storage temperature range		T_{stg}	-55 ~ 125	$^{\circ}\text{C}$
Total Power consumption		P(W)	200	mw
Isolation Voltage ⁽¹⁾		V_{ISO}	5000	Vrms
Soldering Temperature ⁽²⁾		T_{SOL}	260	$^{\circ}\text{C}$

Notes:

(1). AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 are shorted together, and pins 3, 4 are shorted together.

(2). For 10 seconds

■ Electronic Optical Characteristics (TA = 25°C)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
Input	Forward Voltage	V _F	-	1.2	1.4	V	I _F =20mA
	Reverse Current	I _R	-	-	10	μA	V _R =5V
	Terminal Capacitance	C _t	-	30	250	pF	V=0, f=1KHz
Output	Collector Dark Current	I _{CEO}	-	-	100	nA	V _{CE} =200V, IF=0
	Collector-Emitter Breakdown Voltage	BV _{CEO}	350	-	-	V	IC=0.1mA, IF=0
	Emitter-Collector Breakdown Voltage	BV _{ECO}	7	-	-	V	IE=0.1mA, IF=0
Collector-Emitter Saturation Voltage		V _{CE(sat)}	-	-	0.4	V	IF=20mA, IC=1mA
Isolation Resistance		R _{iso}	5×10 ¹⁰	1×10 ¹¹	-	Ω	DC500V, 40~60% R.H.
Floating Capacitance		C _f		0.6	1	pF	V=0, f=1MHz
Cut-off Frequency		f _c		80		kHz	V _{CE} =5V, IC=2mA RL=100Ω, -3dB
Response Time (Rise)		t _r		4	18	μs	V _{CE} =2V, IC=2mA
Response Time (Fall)		t _f		3	18	μs	RL=100Ω,

■ Rank Table Of Current Transfer Ratio (CTR=IC/IF × 100%)

Rank Code	Symbol	Min	Max	Condition
NONE	CTR	50	600	IF=5mA, V _{CE} =5V, Ta=25°C

■ Characteristics Curves

Fig.1 Relative Current Transfer Ratio vs. Forward Current

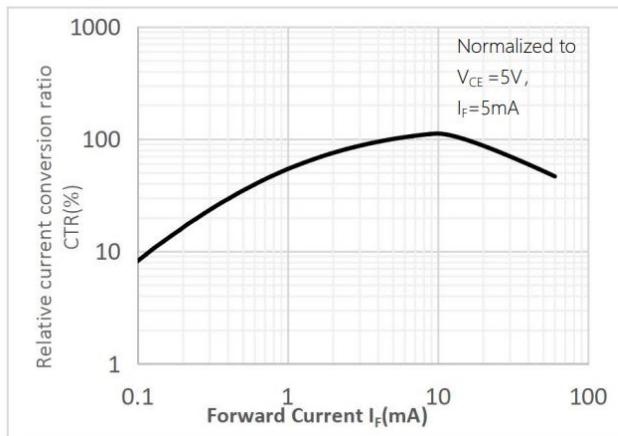


Fig.2 Forward Current vs. Forward Voltage

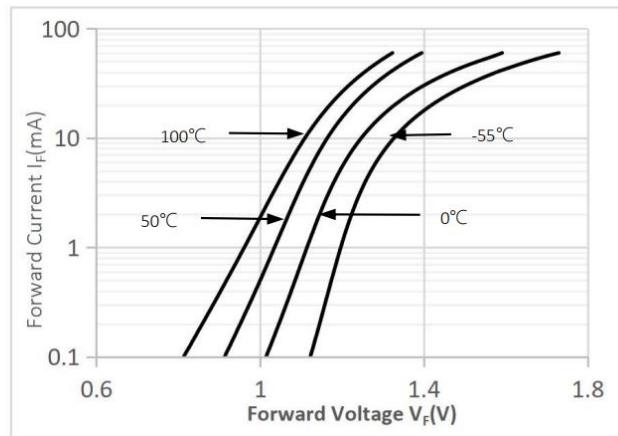


Fig.3 Collector Current vs. Collector-emitter Voltage

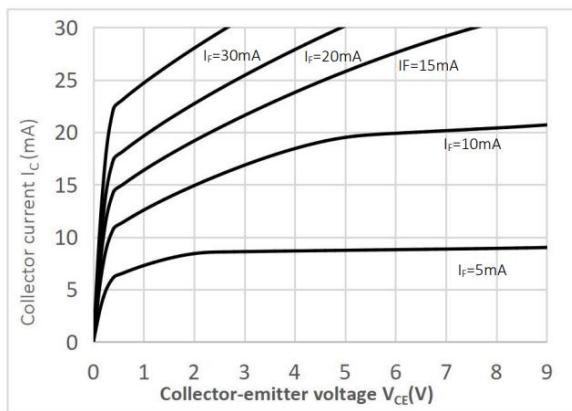


Fig.4 Relative Current Transfer Ratio vs. Ambient Temperature

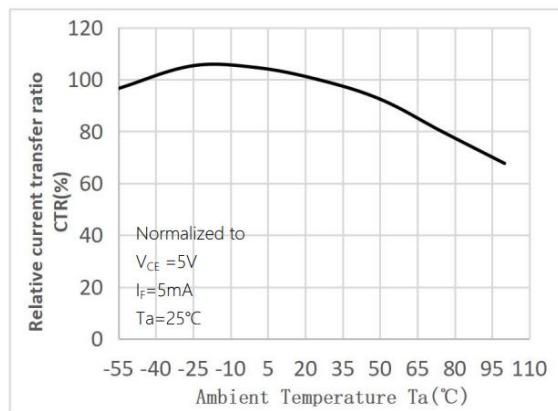


Fig.5 Collector-emitter Saturation Voltage vs. Ambient Temperature

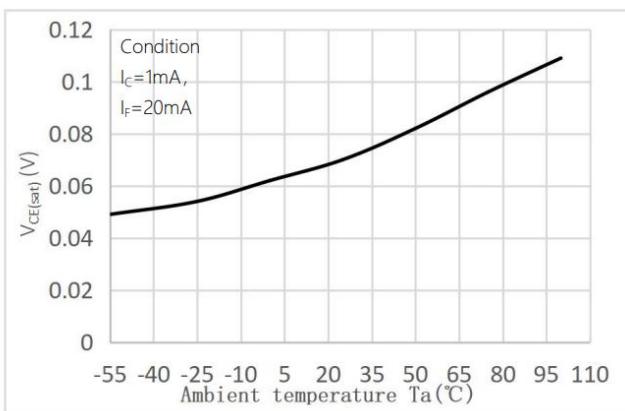


Fig.6 Collector Dark Current vs. Ambient Temperature

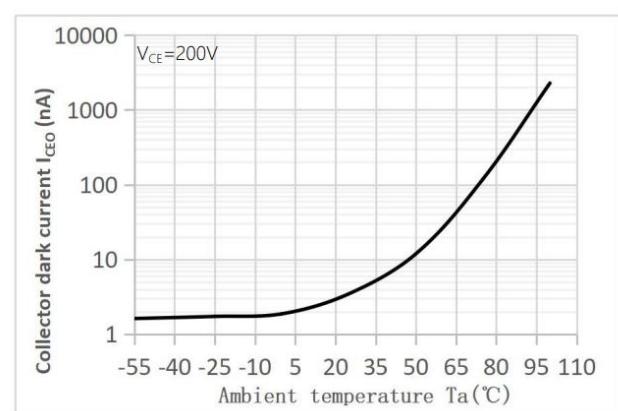


Fig.7 Collector-emitter Saturation Voltage vs Forward Current

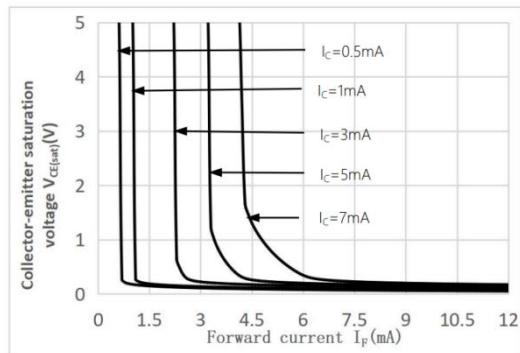
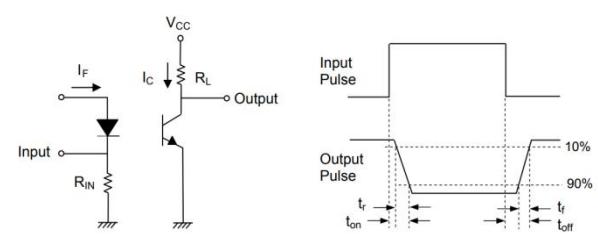
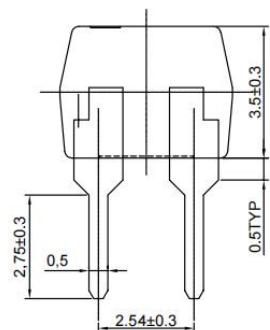
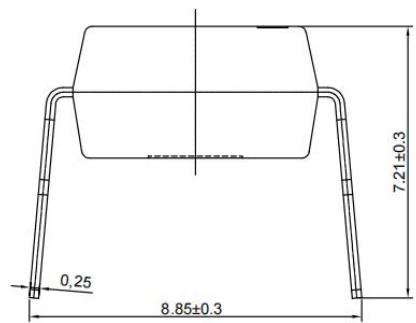
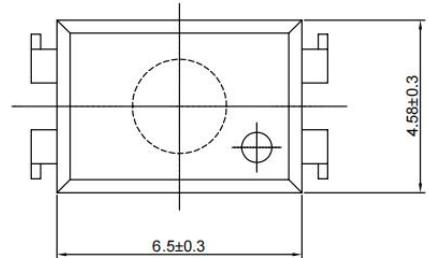


Fig.8 Switching Time Test Circuit & Waveforms

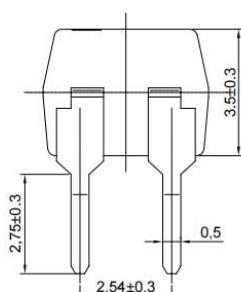
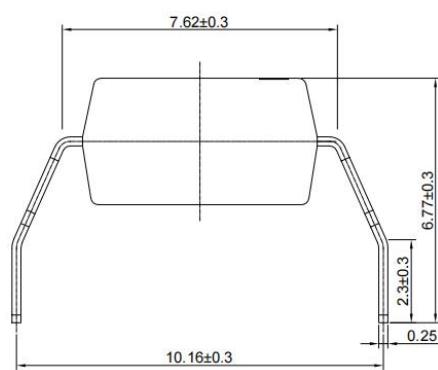
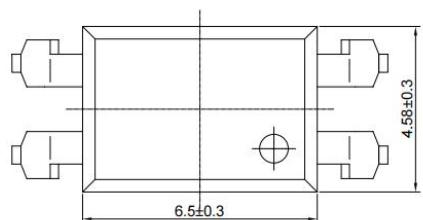


■ Outline Dimension

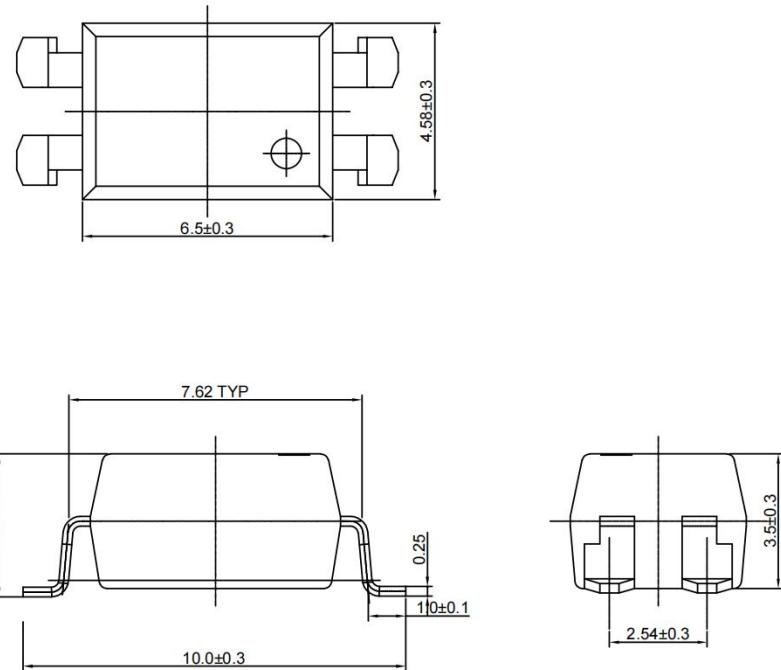
DIP Normal Type:



DIP M Type:



DIP S1 Type:

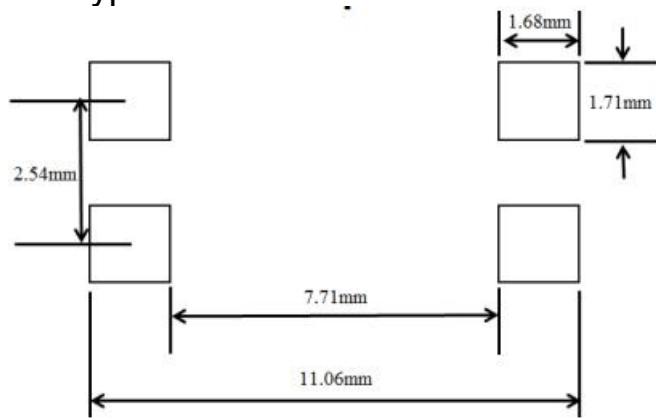


Unit: mm

Tolerance: ±0.1mm

■ Recommended solder pad Design

For S1 type:



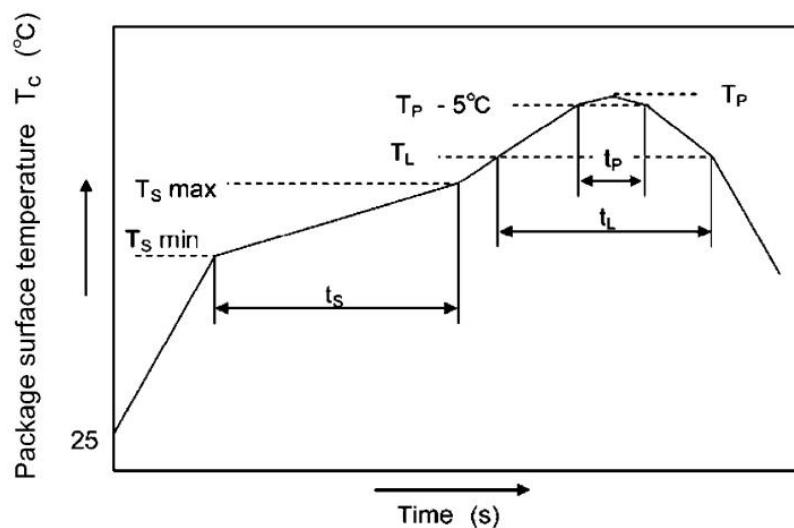
Unit: mm

Tolerance: ±0.1mm

■ Temperature Profile Of Soldering

1. IR Reflow soldering *(JEDEC-STD-020D compliant)*

Profile item	Condition
Preheat	
-Temperature Min (TSmin)	150°C
-Temperature Max (TSmax)	200°C
-Time (min to max) (ts)	90±30 sec
Soldering zone	
-Temperature (TL)	217°C
-Time (tL)	60-150 sec
Peak Temperature (TP)	260°C
-Time (TP-5°C to TP) (ts)	30 sec
Ramp-up rate	3°C / sec max
Ramp-down rate	3~6°C/ sec



Notes:

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

2. Wave soldering (JEDEC22A111 compliant)

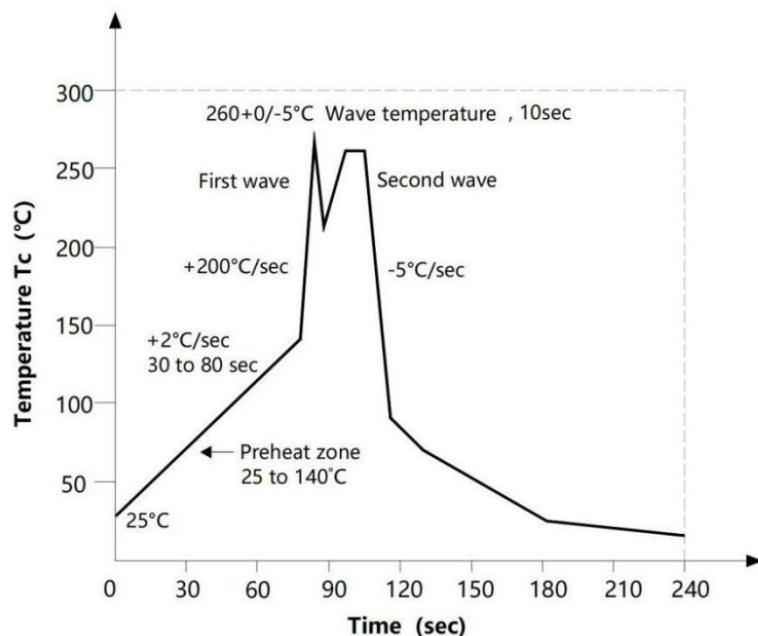
One time soldering is recommended within the condition.

Temperature: 260+0/-5°C.

Time: 10 sec.

Preheat temperature: 25 to 140°C.

Preheat time: 30 to 80 sec.



3. Hand soldering by soldering iron

Allow single lead soldering in every single process. One time soldering is recommended.

Temperature: 380+0/-5°C

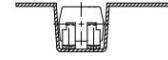
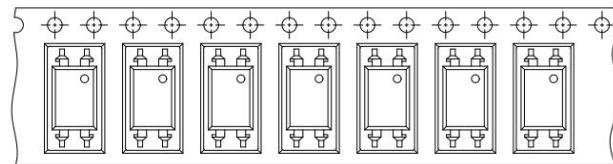
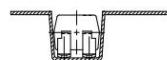
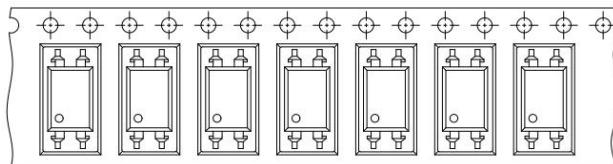
Time: 3 sec max.

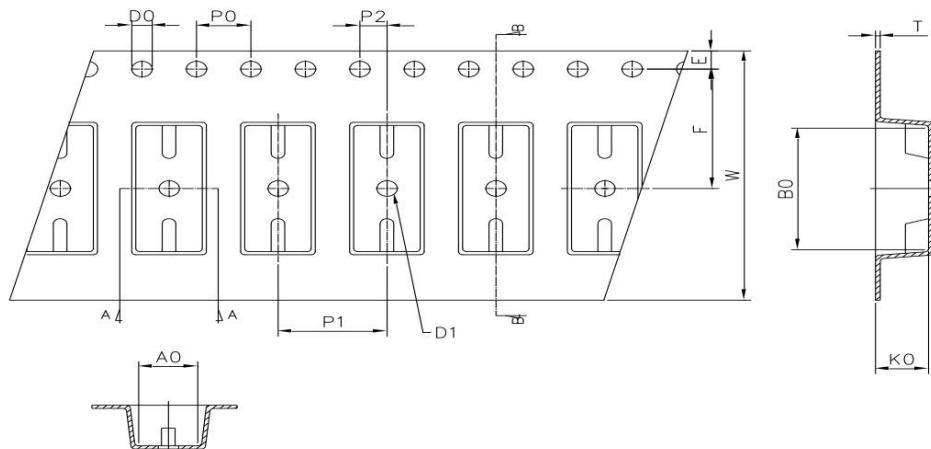
■ Packing

1. Tape and Reel

Option TP:

Option TP1:





Deminsion/mm	W	E	F	P0	P1	P2
Packagetype:DIP S1	16 ± 0.2	1.75 ± 0.1	7.5 ± 0.1	4 ± 0.1	8 ± 0.1	2 ± 0.1

Deminsion/mm	A0	B0	D0	D1	K0	T
Packagetype:DIP S1	4.6 ± 0.1	10.4 ± 0.1	1.5 ± 0.1	1.5 ± 0.1	4.2 ± 0.1	0.4 ± 0.1

Packagetype:DIP S1	Reel	Inner carton	Outer carton
QTY/PCS	2K/reel	4K(2 reels)	40K

2. Tape and Tube

Packagetype:Normal&M	Tube	Inner carton	Outer carton
QTY/PCS	100	5K(50 Tubes)	50K

■ Attention:

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- The products shown in this publication are designed for the general use in electronic applications such as office automation equipment, communications devices, audio/visual equipment, electrical application and instrumentation.
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