

Compact Photointerrupter with Connector

TLP1240/TLP1250

Overview

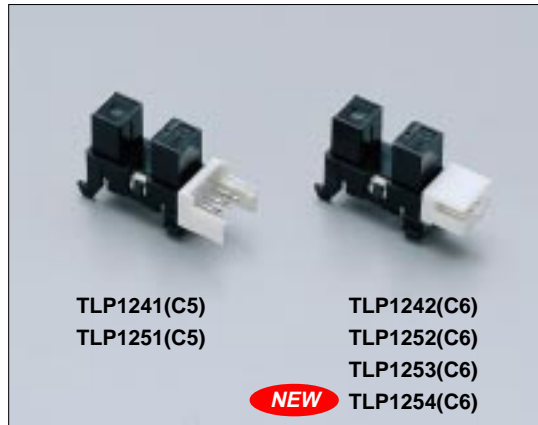
The TLP1240 series and TLP1250 series are small-size photointerrupters with built-in connectors. They feature enhanced mountability in a variety of equipment.

With unique new package style developed by Toshiba, these photointerrupters offer improved reliability and a high level of cost effectiveness.

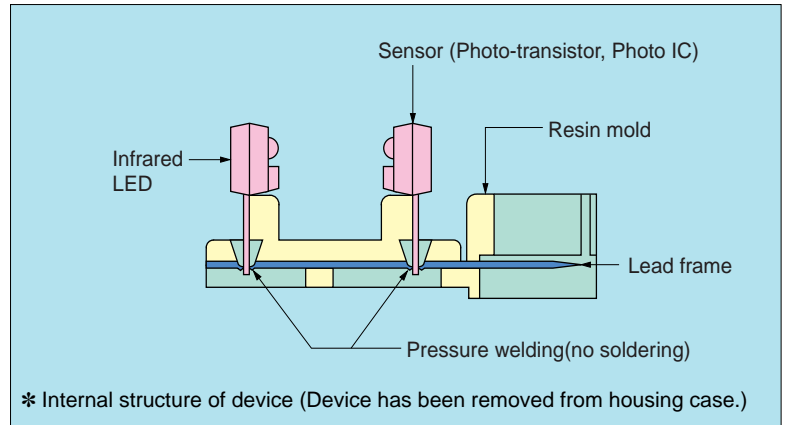
Toshiba have added the TLP1254(C6), a low voltage drive device, to the line-up. The device uses a photo-IC which supports 3.3-V systems, facilitating the design of low power dissipation systems.

Wide-range operating temperature ratings make them ideal for high-temperature operating environments such as paper ejection detectors in photocopiers and page printers and louver airflow direction detectors in fan-forced heaters.

Appearance



New Package



Features

NEW TLP1254(C6)

- Low-voltage drive, low current consumption
Operating voltage: $V_{cc} = 3.3\text{ V} \pm 10\%$
Current consumption: $I_{cc} = 11\text{ mA (max)}$, the lowest in the industry
- High-speed response: $f = 5\text{ kHz (min)}$
Highest speed of any 3.3-V photointerrupter
- Can be used in high-temperature environments.
 $T_{opr} = 95^\circ\text{C (max)}$, the industry's highest

- Highly reliable new package
(no printed circuit board or soldering required)
- Snap-in connector allows quick installation
- Board mounting supported for three thicknesses
(1.0 mm, 1.2 mm, 1.6 mm)
- High-performance detection: Detection gap 5 mm, slit width 0.5 mm
- High current transfer ratio: $I_C/I_F = 5\%(\text{min})$ for TLP1240 series
- Low current consumption: $I_{cc} = 14\text{ mA(max)}$ for TLP1251(C5)/TLP1252(C6)/TLP1253(C6)

Device	Detection Gap	Slit Width	Operating Voltage	Output when ON(lit)	Operating Temperature	Compatible Connector AMP(Japan),Ltd.CT
TLP1241(C5)	5mm	0.5mm	5V±10%	Photo-transistor ON	-30 to 95°C	2 mm pitch MT receptacle connector
TLP1242(C6)						2 mm pitch MT receptacle connector 2 mm pitch MT crimp receptacle connector type II
TLP1251(C5)				Low	-25 to 95°C	2 mm pitch MT receptacle connector
TLP1252(C6)				High	-30 to 95°C	2 mm pitch MT receptacle connector 2 mm pitch MT crimp receptacle connector type II
TLP1253(C6)			Low			
TLP1254(C6)				3.3V±10%		

Maximum Ratings (Ta=25°C)

TLP1240 Series

Rating	Symbol	Value	Unit
DC Forward current	I_F	50	mA
DC Reverse voltage	V_R	6	V
Collector-emitter voltage	V_{CEO}	35	
Emitter-collector voltage	V_{ECO}	5	
Collector power dissipation	P_C	75	mW
Collector current	I_C	50	mA
Operating temperature	T_{opr}	-30 to 95	°C
Storage temperature	T_{stg}	-40 to 100	

TLP1250 Series

Rating	Symbol	Value	Unit
Power supply voltage	V_{CC}	7.5 (5)	V
Output current	V_O	15	
Low-level output current	I_{OL}	16 (8)	mA
Operating temperature	T_{opr}	(Note) -30 to 95	°C
Storage temperature	T_{stg}	-40 to 100	

Note: For the TLP1251(C5) $T_{opr} = -25^\circ$ to 95°C

Values in parentheses () are ratings for the TLP1254(C6).

Electrical and Optical characteristics

TLP1240 Series (Ta = 25°C)

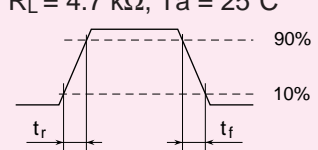
Characteristics	Symbol	Test Conditions	Min	Typ.	Max	Unit
Forward voltage	V_F	$I_F = 10\text{ mA}$	1.00	1.15	1.30	V
Reverse current	I_R	$V_R = 5\text{ V}$	—	—	10	μA
Peak emission wavelength	λ_p	$I_F = 10\text{ mA}$	—	940	—	nm
Dark current	I_D	$V_{CE} = 24\text{ V}, I_F = 0$	—	0.001	0.1	μA
Peak sensitivity wavelength	λ_p	—	—	870	—	nm
Current transfer ratio	I_C/I_F	$V_{CE} = 2\text{ V}, I_F = 10\text{ mA}$	5	—	100	%
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_F = 20\text{ mA}, I_C = 0.5\text{ mA}$	—	0.1	0.35	V
Rise time	t_r	$V_{CC} = 5\text{ V}, I_C = 1\text{ mA}$ $R_L = 1\text{ k}\Omega$	—	15	50	μs
Fall time	t_f		—	15	50	

TLP1250 Series

Unless otherwise specified, TLP1251(C5) : $V_{CC} = 5\text{ V} \pm 10\%$, $T_a = -25$ to 95°C

TLP1252(C6) / TLP1253(C6) : $V_{CC} = 5\text{ V} \pm 10\%$, $T_a = -30$ to 95°C

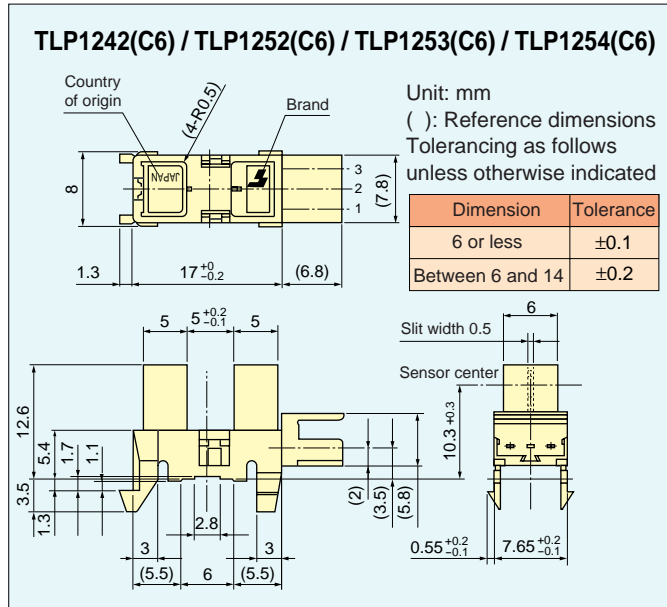
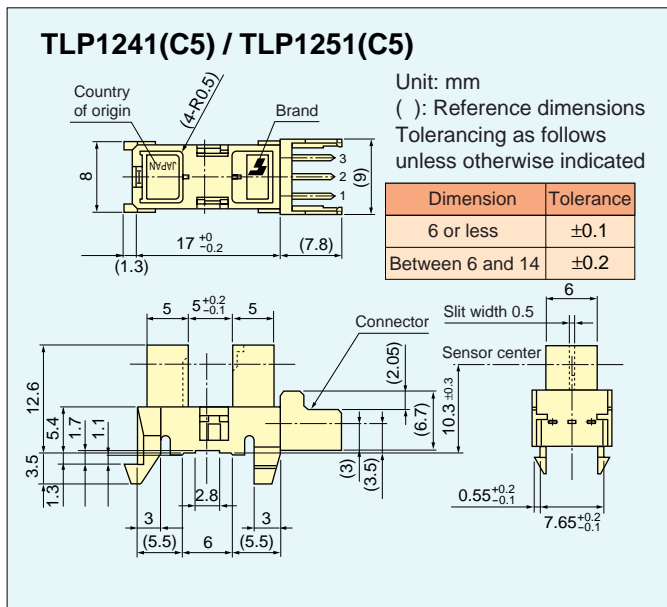
TLP1254(C6) : $V_{CC} = 3.3\text{ V} \pm 10\%$, $T_a = -30$ to 95°C

Characteristics	Symbol	Test Conditions	Min	Typ.	Max	Unit
Operating power supply voltage	V_{CC}		4.5	5	5.5	V
		TLP1254(C6)	2.97	3.3	3.63	
Supply current	I_{CC}	(Note 1)	—	—	14	mA
		TLP1254(C6)	—	—	11	
High-level output voltage	V_{OH}	$R_L = 47\text{ k}\Omega$, (Note 1)	$V_{CC} \times 0.9$	—	—	V
Low-level output voltage	V_{OL}	$T_a = 25^\circ\text{C}$, (Note 2)	—	0.07	0.35	
		(Note 2)	—	—	0.4	
Peak emission wavelength	λ_p	$T_a = 25^\circ\text{C}$	—	940	—	nm
Peak sensitivity wavelength	λ_p	$T_a = 25^\circ\text{C}$	—	900	—	
Response frequency	f	$R_L = 4.7\text{ k}\Omega$, $T_a = 25^\circ\text{C}$	5	—	—	kHz
Rise time	t_r		—	0.5	—	
Fall time	t_f		—	0.02	—	

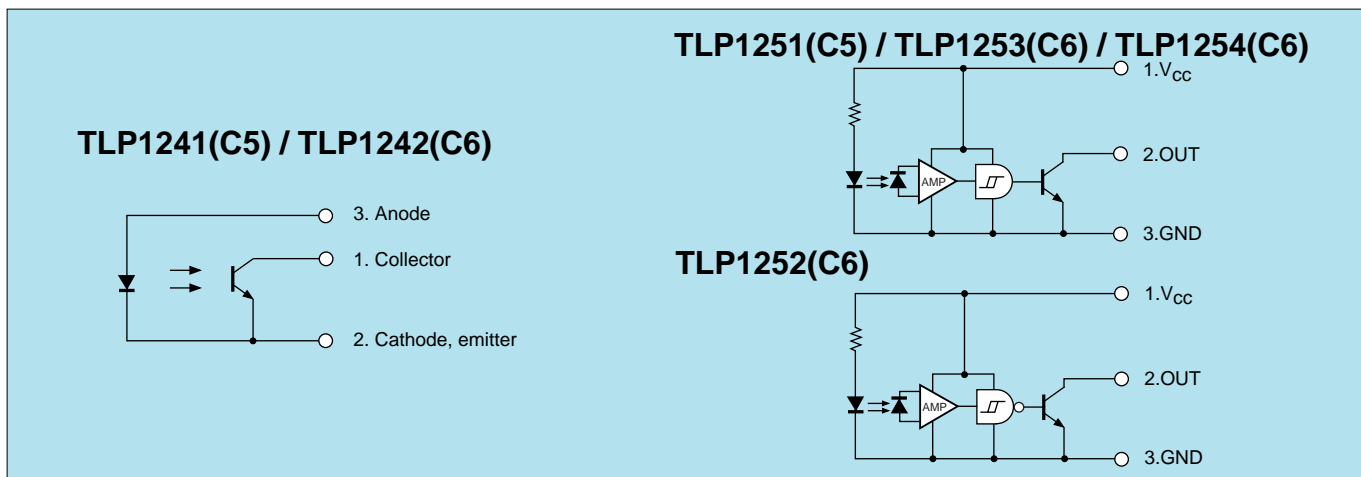
Notes: 1. TLP1252(C6) when lit and TLP1251(C5)/TLP1253(C6)/TLP1254(C6) when not lit.

2. TLP1252(C6): $I_{OL} = 16\text{ mA}$ when not lit. TLP1251(C6)/TLP1253(C6): $I_{OL} = 16\text{ mA}$ when lit. TLP1254(C6): $I_{OL} = 8\text{ mA}$ when lit.

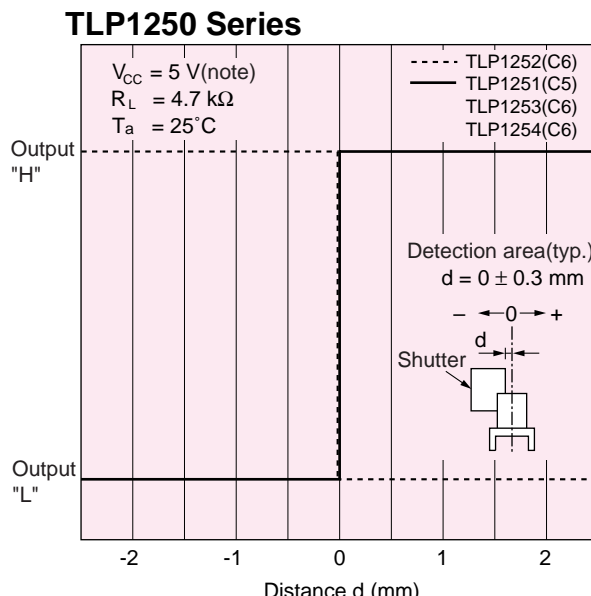
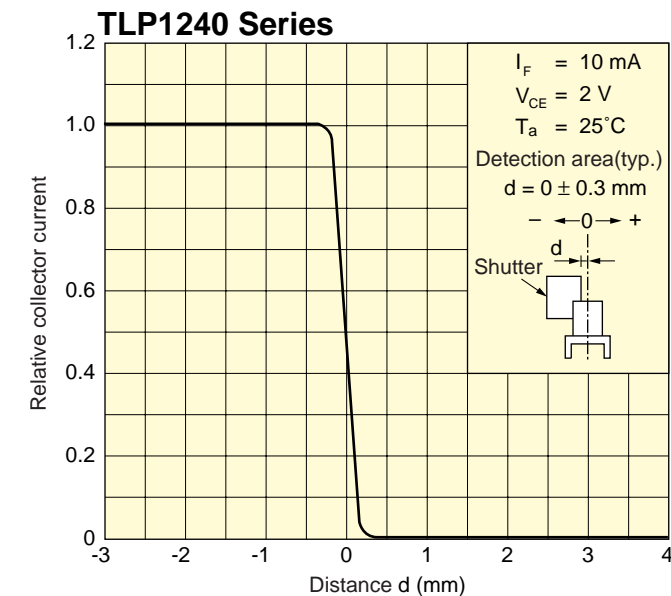
Package Dimensions



Pin Connection Diagram



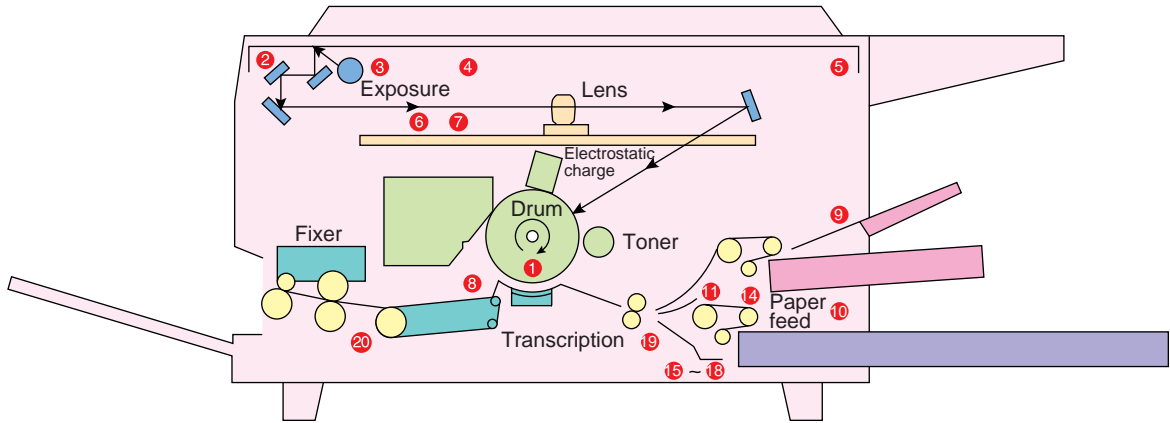
Detection versus Position Characteristics



Note: TLP1254(C6) $V_{CC} = 3.3 \text{ V}$

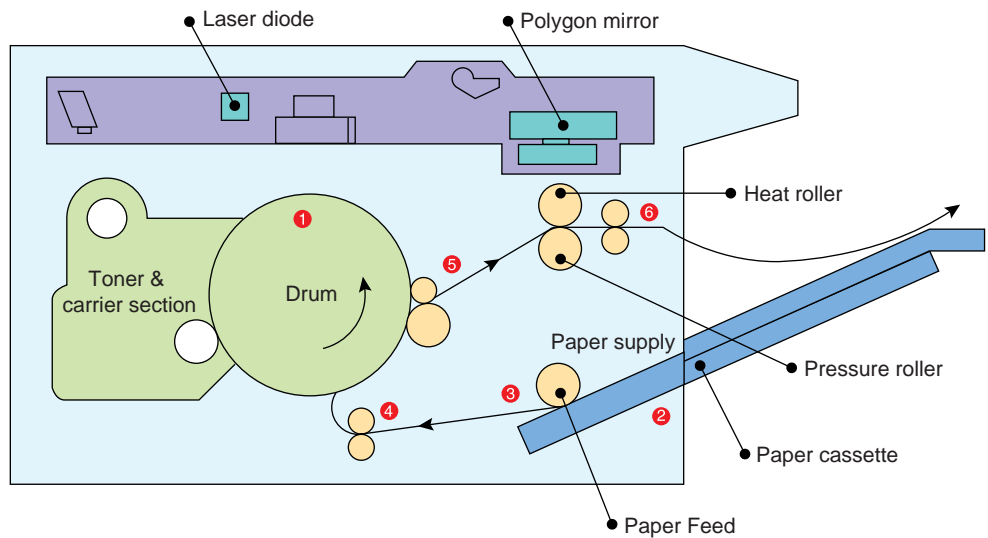
Application Examples

Copier



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|--------|----------------------------------|----------|-------------------------------------|
| 1 | Drum position detection | 9, 10 | No-paper detection |
| 2 to 5 | Optical bench position detection | 11 to 14 | Upper cassette paper feed detection |
| 6, 7 | Lens position detection | 15 to 18 | Lower cassette paper feed detection |
| 8 | Paper separation detection | 19, 20 | Paper feed and ejection detection |

Page Printer



- | | | | |
|------|-------------------------|---|----------------------------|
| 1 | Drum rotation detection | 5 | Paper separation detection |
| 2 | No-paper detection | 6 | Paper ejection detection |
| 3, 4 | Paper feed detection | | |

**Toshiba America
Electronic Components, Inc.****Headquarters-Irvine, CA**

9775 Toledo Way, Irvine, CA 92618, U.S.A.
Tel: (949)455-2000 Fax: (949)859-3963

Boulder, CO

3100 Arapahoe Avenue, Ste. 500,
Boulder, CO 80303, U.S.A.
Tel: (303)442-3801 Fax: (303)442-7216

Boynton Beach, FL(Orlando)

11924 W. Forest Hill Blvd., Ste. 22-337,
Boynton Beach, FL 33414, U.S.A.
Tel: (561)374-6193 Fax: (561)374-6194

Deerfield, IL(Chicago)

One Pkwy., North, Suite 500, Deerfield,
IL 60015-2547, U.S.A.
Tel: (847)945-1500 Fax: (847)945-1044

Duluth, GA(Atlanta)

3700 Crestwood Parkway, Ste. 460,
Duluth, GA 30096, U.S.A.
Tel: (770)931-3363 Fax: (770)931-7602

Edison, NJ

2035 Lincoln Hwy. Ste. #3000, Edison
NJ 08817, U.S.A.
Tel: (732)248-8070 Fax: (732)248-8030

Orange County, CA

2 Venture Plaza, #500 Irvine, CA 92618, U.S.A.
Tel: (949)453-0224 Fax: (949)453-0125

Portland, OR

1700 NW 167th Place, #240,
Beaverton, OR 97006, U.S.A.
Tel: (503)629-0818 Fax: (503)629-0827

Richardson, TX(Dallas)

777 East Campbell Rd., Suite 650, Richardson,
TX 75081, U.S.A.
Tel: (972)480-0470 Fax: (972)235-4114

San Jose Engineering Center, CA

1060 Rincon Circle, San Jose, CA 95131, U.S.A.
Tel: (408)526-2400 Fax: (408)526-2410

Wakefield, MA(Boston)

401 Edgewater Place, Suite #360, Wakefield,
MA 01880-6229, U.S.A.
Tel: (781)224-0074 Fax: (781)224-1095

Toshiba Electronics Europe GmbH**Düsseldorf Head Office**

Hansaallee 181, D-40549 Düsseldorf
Germany
Tel: (0211)5296-0 Fax: (0211)5296-400

München Office

Büro München Hofmannstrasse 52,
D-81378, München, Germany
Tel: (089)748595-0 Fax: (089)748595-42

Toshiba Electronics France S.A.R.L.

Immeuble Robert Schumann 3 Rue de Rome,
F-93561, Rosny-Sous-Bois, Cedex, France
Tel: (1)48-12-48-12 Fax: (1)48-94-51-15

Toshiba Electronics Italiana S.R.L.

Centro Direzionale Colleoni
Palazzo Perseo Ingr. 2-Piano 6,
Via Paracelso n.12,
1-20041 Agrate Brianza Milan, Italy
Tel: (039)68701 Fax: (039)6870205

Toshiba Electronics España, S.A.

Parque Empresarial San Fernando Edificio Europa,
1ª Planta, ES-28831 Madrid, Spain
Tel: (91)660-6700 Fax: (91)660-6799

Toshiba Electronics(UK) Limited

Riverside Way, Camberley Surrey,
GU15 3YA, U.K.
Tel: (01276)69-4600 Fax: (01276)69-4800

Toshiba Electronics Scandinavia AB

Gustavslundsvägen 12, 2nd Floor
S-161 15 Bromma, Sweden
Tel: (08)704-0900 Fax: (08)80-8459

**Toshiba Electronics Asia
(Singapore) Pte. Ltd.**

Singapore Head Office
438B Alexandra Road, #06-08/12 Alexandra
Technopark, Singapore 119968
Tel: (278)5252 Fax: (271)5155, (270)6056

Bangkok Office

135 Moo 5 Bangkadi Industrial Park, Tivanon Rd.,
Bangkadi Amphur Muang Pathumthani, Bangkok,
12000, Thailand
Tel: (02)501-1635 Fax: (02)501-1638

**Toshiba Electronics Trading
(Malaysia)Sdn. Bhd.**

Kuala Lumpur Head Office
Suite W1203, Wisma Consplant, No.2,
Jalan SS 16/4, Subang Jaya, 47500 Petaling Jaya,
Selangor Darul Ehsan, Malaysia
Tel: (3)731-6311 Fax: (3)731-6307

Penang Office

Suite 13-1, 13th Floor, Menard Penang Garden,
42-A, Jalan Sultan Ahmad Shah,
100 50 Penang, Malaysia
Tel: 4-226-8523 Fax: 4-226-8515

Toshiba Electronics Philippines, Inc.

26th Floor, Citibank Tower, Valero Street, Makati,
Manila, Philippines
Tel: (02)750-5510 Fax: (02)750-5511

Toshiba Electronics Asia, Ltd.**Hong Kong Head Office**

Level 11, Top Glory Insurance Building, Grand Century
Place, No.193, Prince Edward Road West,
Mong Kok, Kowloon, Hong Kong
Tel: 2375-6111 Fax: 2375-0969

Beijing Office

Rm 714, Beijing Fortune Building,
No.5 Dong San Huan Bei-Lu, Chao Yang District,
Beijing, 100004, China
Tel: (010)6590-8795 Fax: (010)6590-8791

Chengdu Office

Unit F, 18th Floor, New Times Plaza, 42 Wenwu Road,
Xinhua Avenue, Chengdu, 610017, China
Tel: (028)675-1773 Fax: (028)675-1065

Shenzhen Office

Rm 3010-3012, Office Tower Shun Hing Square,
Di Wang Commercial Centre, 333 ShenNan
East Road, Shenzhen, 518008, China
Tel: (0755)246-1582 Fax: (0755)246-1581

Toshiba Electronics Korea Corporation**Seoul Head Office**

14/F, KEC B/D, 257-7 Yangjae-Dong,
Seocho-ku, Seoul, Korea
Tel: (02)589-4334 Fax: (02)589-4302

Kumi Office

6/F, Ssangyong Investment Securities B/D,
56 Songjung-Dong, Kumi City
Kyeongbuk, Korea
Tel: (82)546-456-7613 Fax: (82)546-456-7617

**Toshiba Technology Development
(Shanghai) Co., Ltd.**

23F, Shanghai Senmao International Building, 101
Yin Cheng East Road, Pudong New Area, Shanghai,
200120, China
Tel: (021)6841-0666 Fax: (021)6841-5002

**Tsurong Xiamen Xiangyu Trading
Co., Ltd.**

8N, Xiamen SEZ Bonded Goods Market Building,
Xiamen, Fujian, 361006, China
Tel: (0592)562-3798 Fax: (0592)562-3799

**Toshiba Electronics Taiwan
Corporation****Taipei Head Office**

17F, Union Enterprise Plaza Bldg. 109
Min Sheng East Rd., Section 3, 0446 Taipei,
Taiwan
Tel: (02)514-9988 Fax: (02)514-7892

Kaohsiung Office

16F-A, Chung-Cheng Bldg., Chung-Cheng 3Rd.,
80027, Kaohsiung, Taiwan
Tel: (07)222-0826 Fax: (07)223-0046

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In Touch with Tomorrow
TOSHIBA

TOSHIBA CORPORATION

Electronic Devices Sales & Marketing Group
1-1, Shibaura 1-chome, Minato-ku, Tokyo, 105-8001, Japan
Tel: (03)3457-3405 Fax: (03)5444-9431