

ROTANODE™
E7864X  0197

Rotating Anode X-ray Tube Assembly

- ◆ High speed rotating anode X-ray tube assembly for high energy radiographic operations.
- ◆ For the purpose of general diagnostic X-ray procedures.
- ◆ This tube has foci 1.2 and 0.6, and is available for a maximum tube voltage 150 kV.
- ◆ This tube assembly has specially processed rhenium-tungsten faced molybdenum target of 100 mm diameter anode disc and is accommodated with IEC60526 high-voltage cable receptacles.



General Data

IEC Classification (IEC60601-1:2005) Class I ME EQUIPMENT

Electrical:

Circuit:

High Voltage Generator Constant Potential High-Voltage Generator
 Grounding Center-grounded

Nominal X-ray Tube Voltage (IEC60613:2010):

Radiographic 150 kV
 Fluoroscopic 125 kV

Nominal Focal Spot Value (IEC60336:2005):

Large Focus 1.2
 Small Focus 0.6

Nominal Anode Input Power (at 0.1s):

		60 Hz	180 Hz
Large Focus	.....	58 kW	100 kW
Small Focus	.....	23 kW	40 kW

Nominal Radiographic Anode Input Power (IEC60613:2010):

		60 Hz	180 Hz
Large Focus	.....	56 kW	94 kW
Small Focus	.....	23 kW	36 kW

★The information contained herein is presented only as a guide for the applications of our products.
 No Responsibility is assumed by TOSHIBA ELECTRON TUBES & DEVICES CO.,LTD.(TETD) for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TETD or others.
 ★The information contained herein may be changed without prior notice. It is therefore advisable to contact TETD before proceeding with the design of equipment incorporating this product.

Motor Ratings:

Stator: XS-AG

	Starting		Running	
	180	60	180	60
Driven Frequency [Hz]	180	60	180	60
Input Power [W]	3600	1500	200	100
Voltage ^{4) 6)} [V]	370	170	95	50
Current ⁵⁾ [A]	10.3	10.6	2.7	2.6
Min. Speed Up ^{2) 8)} [s]	1.2	0.8	-	-
Capacitor [μ F]	6	44	6	44
Min. Braking ^{3) 8)} [s]	3.0 (DC 80V)			

Note 1) To be obtained with TOSHIBA starter RS-200 or equivalent.

2) The speed up time from normal speed to high speed is 2/3 times of the specified speed up time from 0 to high speed, which is described on motor rating table.

3) To be applied for high speed rotation.

4) Applied voltage between common and main terminal.

5) Common current.

6) The every applied voltage must be never exceeded 110% of the above specification.

7) No more than two high speed starts per minute are permissible.

8) The speed-up time is allowed up to 110% of the above specification.

9) The generator manufacture may choose different values. The above table is one of the recommend conditions.

Anode Speed*:

60 Hz Minimum 3200 min⁻¹
 180 Hz Minimum 9700 min⁻¹

Stator Resistance:

Common-Main Winding 9.4 Ω
 Common-Auxiliary Winding 28.3 Ω

Resistance between Housing and Low Voltage Terminals Minimum 2 M Ω

Normal Operating Range of the Housing Temperature 16 ~ 75 °C

Mode of Operation Intermittent

*Note: The revolution acceleration must not exceed 150 revolutions per square second.

After high speed rotation, dynamic braking must slow anode rotor to less than 3000 min⁻¹ within 10 seconds, but not sooner than 2 seconds.

Mechanical:

Dimensions	See dimensional outline
Overall Length	496 mm
Maximum Diameter	195 mm
Target:	
Anode Angle	12 degrees
Diameter	100 mm
Construction	Rhenium-Tungsten-faced Molybdenum
Filtration:	
Permanent Filtration	1.1 mm Al / 75 kV IEC60522:1999
Available Additional Filter combination (0.4 - 1.5 mm)	Maximum 2.6 mm Al / 75 kV
Radiation Protection (In accordance with IEC60601-1-3:2008):	
Leakage Technique Factor	150 kV, 3.4 mA
X-ray Coverage	430 × 430 mm at SID 1000 mm
Weight (Approx.)	24 kg
High Voltage Receptacle	To meet the requirements of IEC60526 Corrigendum1:2010
Cooling Method	Natural or forced air
Tube Housing Model Number	XH-112V

Absolute Maximum and Minimum Ratings (At any time, these values must not be exceeded.)

Maximum X-ray Tube Voltage (IEC60613:2010):	
Radiographic	150 kV
Fluoroscopic	125 kV
Between Anode (or Cathode) and Ground	75 kV
Minimum X-ray Tube Voltage	40 kV
Maximum X-ray Tube Current (IEC60613:2010)	
Large Focus	See rating charts
Small Focus	400 mA
Maximum Filament Current:	
Large Focus	5.2 A
Small Focus	5.1 A
Filament Voltage:	
Large Focus (At maximum filament current 5.2 A)	11.3 ~ 15.4 V
Small Focus (At maximum filament current 5.1 A)	5.9 ~ 8.1 V
Filament Frequency Limits	0 ~ 25 kHz
Continuous Anode Input Power (IEC60613:2010)	300 W (420 HU/s)
(Fluoroscopic, repeated radiographic or mixed exposure)	
Thermal Characteristics:	
Anode Heat Content	285 kJ (400 kHU)
Maximum Anode Heat Dissipation	1200 W (1690 HU/s)
X-ray Tube Assembly Heat Content	1420 kJ (2000 kHU)
Nominal Continuous Input Power (IEC60613:2010):	
Without Air-circulator	278 W (23 kHU/min)

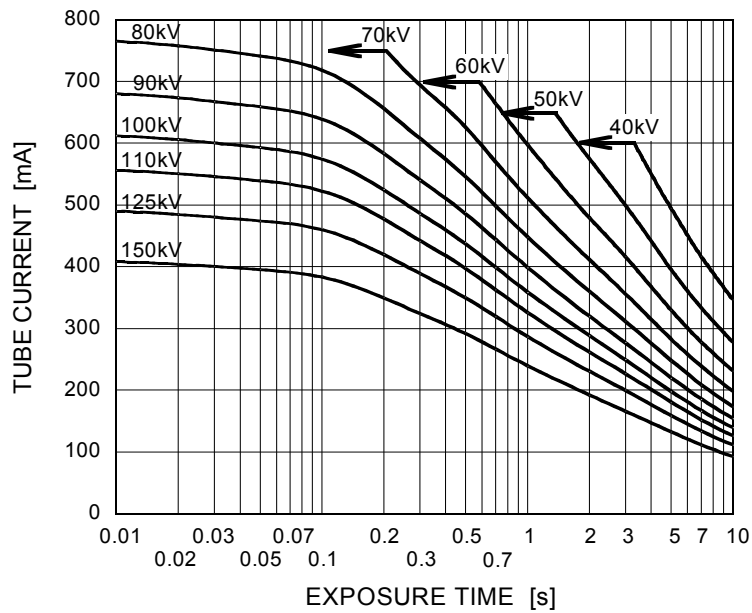
Environmental Limits

Operating Limits:	
Temperature	10 ~ 40 °C
Humidity	30 ~ 85 %
(No condensation)	
Atmospheric Pressure	70 ~ 106 kPa
Shipping and Storage Limits:	
Temperature	-20 ~ 70 °C
Humidity	20 ~ 90 %
(No condensation)	
Atmospheric Pressure	50 ~ 106 kPa

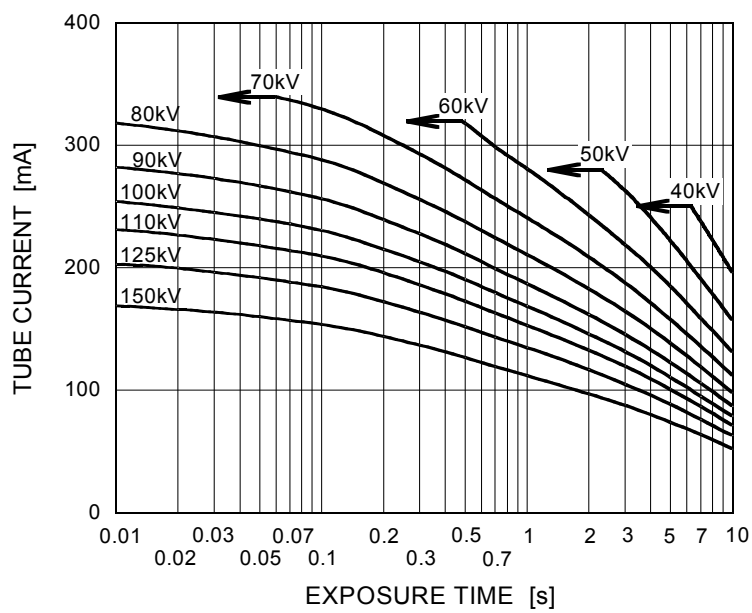
Maximum Rating Charts (Absolute Maximum Rating Charts)

Conditions: Tube Voltage
Constant Potential High-Voltage Generator
Stator Power Frequency 60Hz

Nominal Focal Spot Value: 1.2 ■



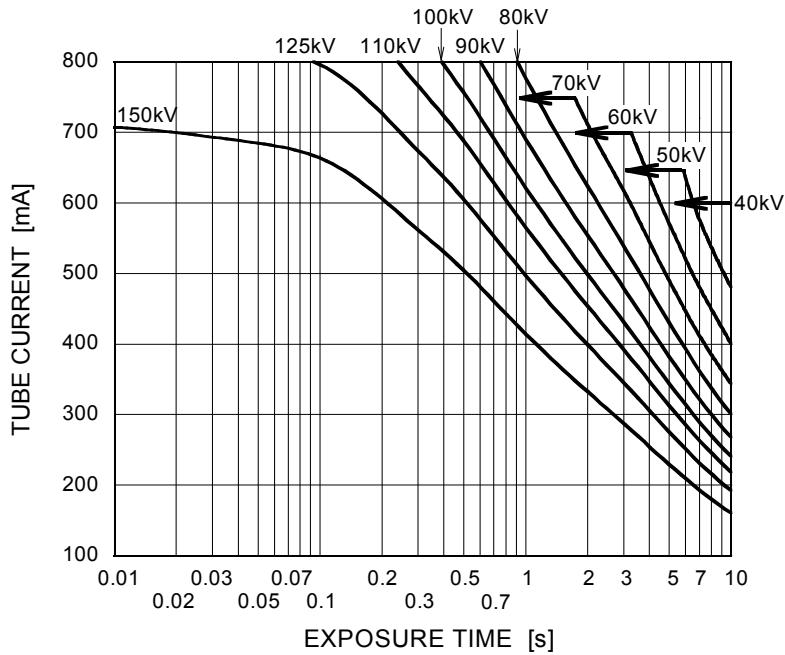
Nominal Focal Spot Value: 0.6 □



Maximum Rating Charts (Absolute Maximum Rating Charts)

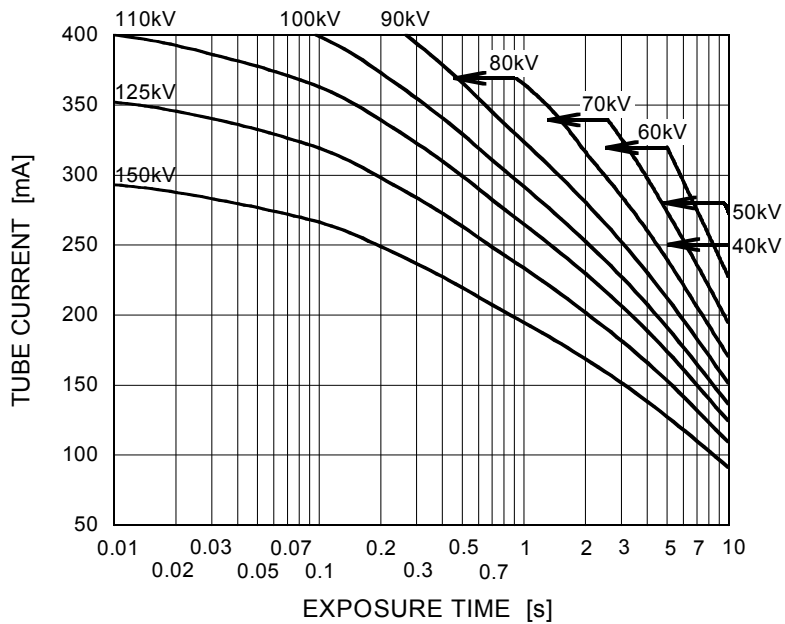
Conditions: Tube Voltage
Constant Potential High-Voltage Generator
Stator Power Frequency 180Hz

Nominal Focal Spot Value: 1.2 ■



Refer to IEC60613:2010

Nominal Focal Spot Value: 0.6 □

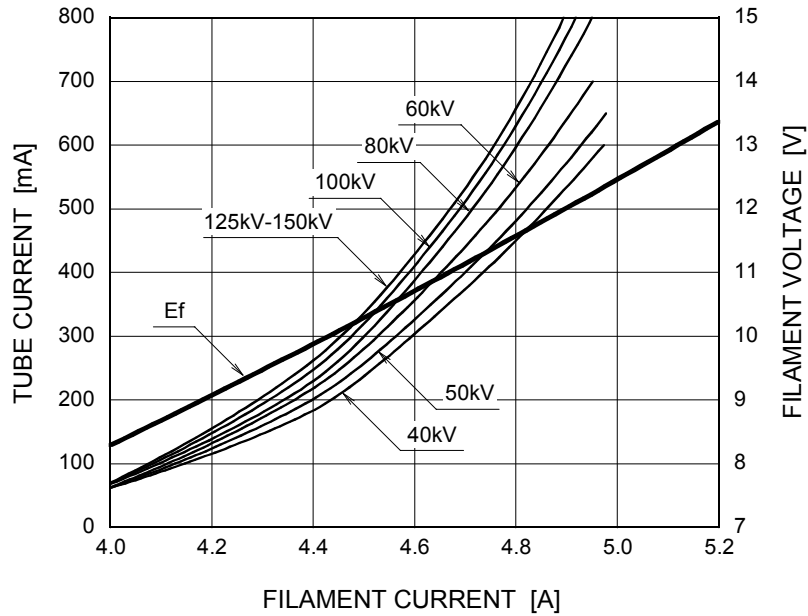


Refer to IEC60613:2010

Emission & Filament Characteristics

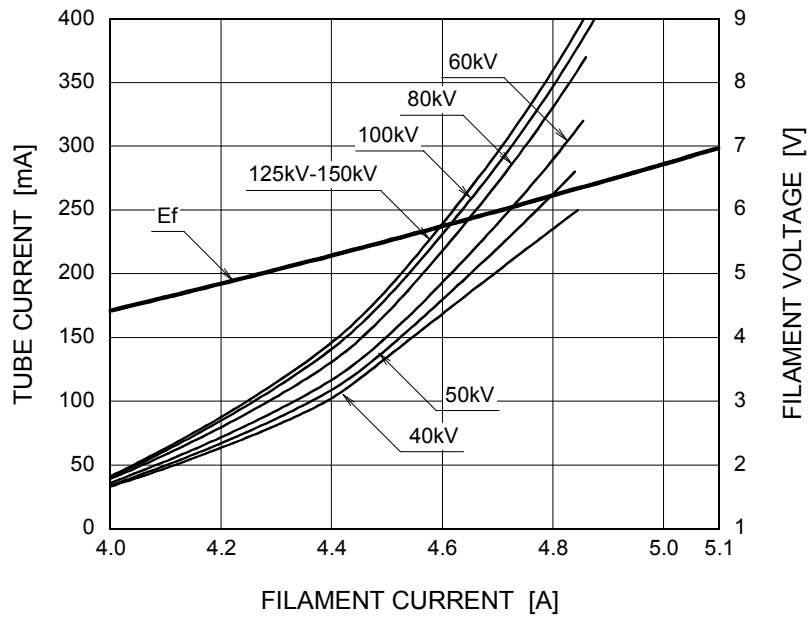
Constant Potential High-Voltage Generator

Nominal Focal Spot Value: 1.2 ■



Note 1) For Reference Only
 Note 2) Refer to IEC60613:2010

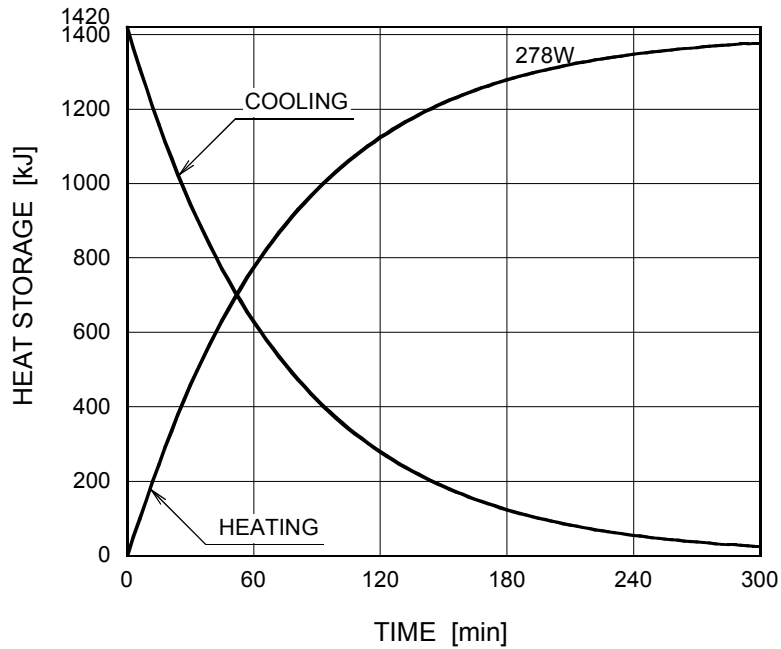
Nominal Focal Spot Value: 0.6 □



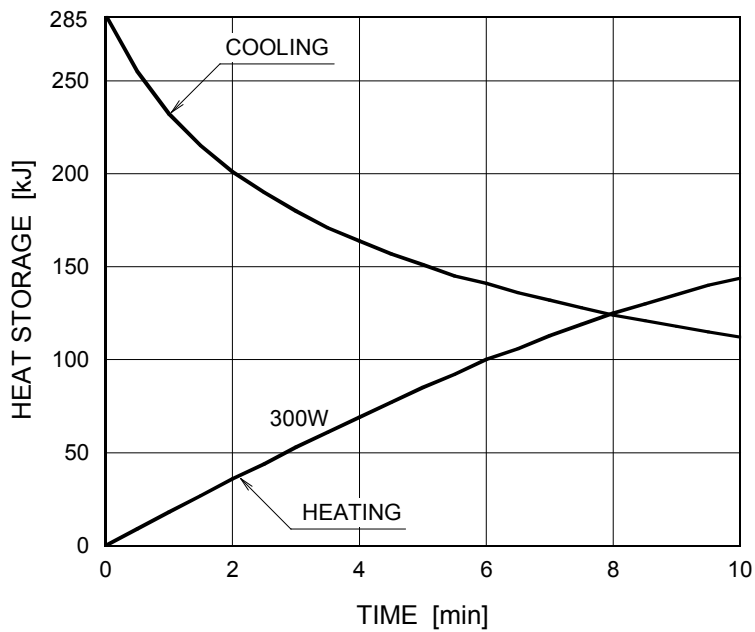
Note 1) For Reference Only
 Note 2) Refer to IEC60613:2010

Thermal Characteristics

X-ray Tube Assembly Heating / Cooling Curve



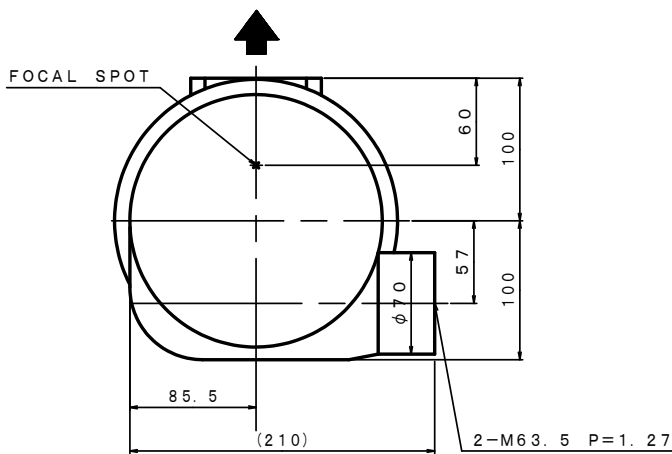
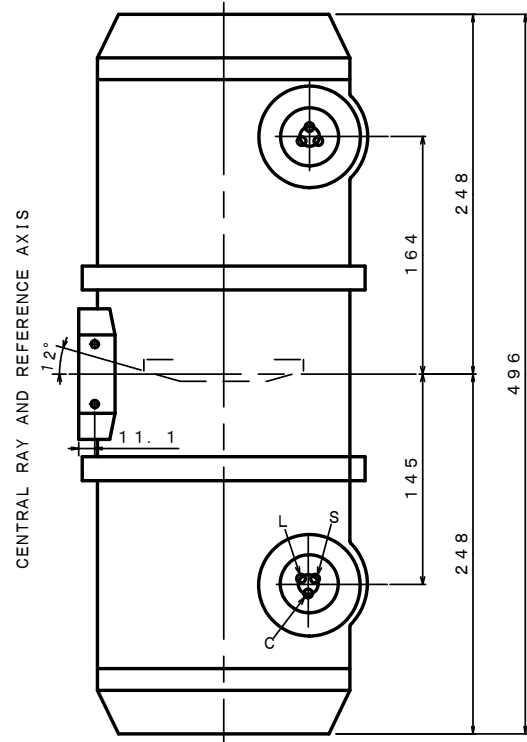
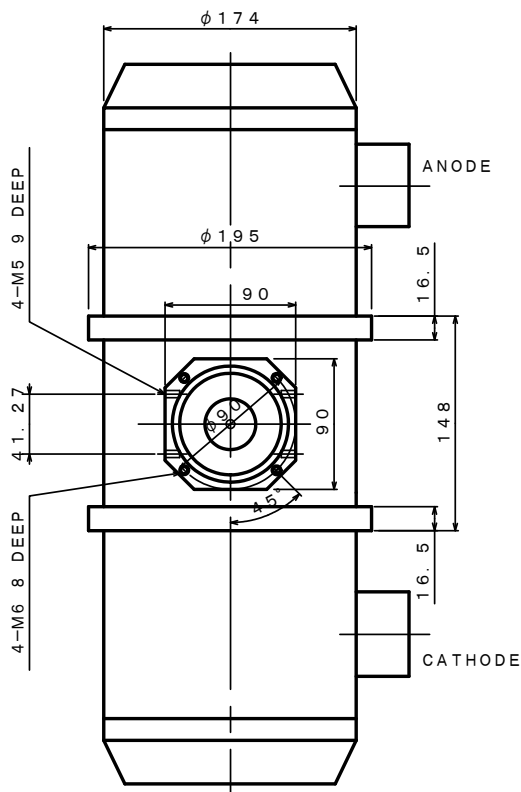
Anode Heating / Cooling Curve



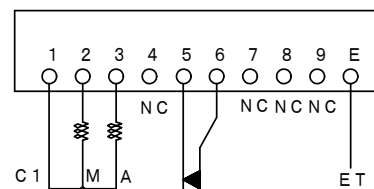
The heating curves are showing examples of average input power to the anode in operation.

Dimensional Outline

Unit mm

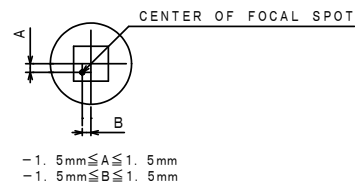


TERMINAL CONNECTIONS



TEMPERATURE RELAY
(NORMALLY CLOSED)

Note) Do not connect terminal No. 1 and No. 5 or No. 6 in series circuit.



EXPLANATION OF SYMBOLS

CATHODE TERMINAL

C : COMMON

L : LARGE FOCUS

S : SMALL FOCUS

TERMINAL CONNECTIONS

C1 : COMMON

M : MAIN WINDING OF THE STATOR

A : AUX. WINDING OF THE STATOR

NC : NON-CONNECTION

ET : EARTH TERMINAL

▲ : CENTRAL X-RAY
ANODE & CATHODE TERMINAL
: IEC60526 TYPE

OVERSEAS SUBSIDIARIES AND AFFILIATES



EU REPRESENTATIVE

- **TOSHIBA ELECTRONICS EUROPE GMBH**

HANSAALLEE 181 40549 DÜSSELDORF, GERMANY
PHONE +49 (211) 5296-107 FAX +49 (211) 5296-402

For Sales & Technical Services, please contact the following representative:

- **TOSHIBA ELECTRONICS EUROPE GMBH**

HANSAALLEE 181 40549 DÜSSELDORF, GERMANY
PHONE +49 (211) 5296-107 FAX +49 (211) 5296-402

- **TOSHIBA AMERICA ELECTRONIC COMPONENTS, INC.**

2150 EAST LAKE COOK ROAD, SUITE 310
BUFFALO GROVE, ILLINOIS 60089 USA
PHONE +1 (847) 484-2400 FAX +1 (847) 541-7287

- **TOSHIBA ELECTRON DEVICES & MATERIALS (SHANGHAI) CO., LTD. (TEMS)**

RM1606, SH-PLAZA,
No.336, XIZANG ROAD (MIDDLE), SHANGHAI, 200001, CHINA
PHONE +86 (21) 6361-0077 FAX +86 (21) 6351-5760