



Electronics for the Future

Additional approval application of GEM's TO-252 package assembly plant (Hefei plant)

September 1, 2022
Power Discrete Business Unit
Package Development Division

Appl No.3022002_Rev.0

Summary of application

For the purpose of a stable supply of TO-252 package's products from the outsourcing company GEM Services, Inc., we apply for the addition of the production factory "Hefei Factory(China)" to the current production factory "Shanghai Factory(China)".

Purpose of application

To guarantee the stable supply in the future

- Make Hefei Factory become the main production factory following the policy of GEM.
- Take BCP measures by separating the production factory into 2 factories.

Change points

Only change the production factory. No other change points.

- There is no difference in production facility and material because they are using the same thing. In addition, there is no difference in production method, method of construction, and human education nor the country of origin because they are both China.

Target Product No.

Target products are all mass-produced GEM TO-252 products except high-voltage MOSFET.
(For details, please refer to the attached document)

- Regarding the high-voltage MOS products that were excluded, we will announce again as soon as its ready.

GEM Hefei plant

(data) item	Contents	MAP
Company name (Head office)	GEM Services, Inc (Taiwan, Taipei)	
Company name	GEM Electronics (Hefei) Co.,Ltd.	
address (e.g. of house)	NO. 77 JinXiu Blv. Hefei 230601, Anhui Province, China	
Phone number	+86-(0)551-63369977	
capital stock	1,290,474 thousand Taiwan dollars (for the year ending December 31, 2020)	
representative	CL. Cheng	
Sales Scale	3,750,121 thousand Taiwan dollars (for the year ending December 31, 2020)	
Export Ratio	Approx. 95	
exporting country	U.S.A., Taiwan, Japan, Europe	
Year of Factory Establishment	September 2006	
Site area and building area	Site: 69,812 square meters, Building: 15,198 square meters	
Number of Employees	Approx. 864 (206 engineers)	
Plant employee retention rate	Approx. 90	
Production Items (All Packages)	MOS, Diode, IGBT	
TO-252 Year of production	March 2021 (ROHM has no mass production record at this time)	
outsourcing process	None	
Main Suppliers	China	
ISO	ISO 14001:2015 (130370-2013-AE-RGC-RvA) Certification Date: Mar 01, 2013 Valid till: Mar 01, 2025 ISO 9001:2015 (130365-2013-AQ-RGC-RvA) Certification Date: Mar 01, 2013 Valid till: Feb 24, 2024 IATF 16949:2016 (252268-2017-AQ-RGC-IATF) Certification Date: Apr 06, 2018 Valid till: Mar 31, 2024	

- ROHM is currently supporting mass production at Hefei plant with TO-220FP, TO-220AB and TO-247 packages. (Released in 2020)
- The factory audit of the Hefei plant was passed by the Subcontract Audit Section. No problems with periodic audits. (Passed audit as a TO-252 production plant)

Difference between Shanghai and Hefei plants (5M+1E change point)



Item	Shanghai Plant	Hefei Plant	Variation	Remarks
	TO-252			
Name of production plant	GEM Electronics (Shanghai) Co.,Ltd.	GEM Electronics (Hefei) Co.,Ltd.	having	The production site was changed to another plant of GEM.
The country of origin	China		None	The country of origin is the same in China.
Man	Workers certified by the contractor		None	Education is conducted in the same program. No difference in competence.
Material	Wafers are supplied by ROHM		None	Uses the same elements. No difference in elements.
	Materials used by contractors		None	Use of identical assembly materials. (Manufacturer, part number, and production location are also identical)
Machine	Use of contractor's equipment		None	The same manufacturer's machine is used. No difference with the production machine.
Method	Contractor's work standards		None	Use the same work standards. No difference in production methods.
Measurement	Measured with a program determined by ROHM		None	Use the same program/measuring device. No difference in measurement process.
Environment	Production process clean room management Temperature: 20 to 28°C Humidity: 40-60% RH Clean room class: 10,000		None	The same management is implemented. No difference with respect to environment.

➤ Production equipment, materials, production method and education program used at the Hefei plant are identical to those used at the Shanghai plant. The only change is a change in production location.

Difference between Shanghai and Hefei Plants (Product Change Points)

Item	Shanghai Plant	Hefei Plant	Variation	Remarks
	TO-252			
Absolute maximum ratings	Identity (No difference)		None	For details, please refer to the individual datasheets.
Electrical Characteristics	Identity (No difference)		None	For details, please refer to the individual datasheets.
Dimensions	Identity (No difference)		None	For details, please refer to the individual datasheets.
Reference Land Pattern	Identity (No difference)		None	For details, please refer to the individual datasheets.
Terminal processing	Identity (Electroplating : Sn)		None	Generation method/material/thickness No difference.
Marking method	Identity (Scanning laser marking)		None	Printing method/size/font No difference.
Contents of Marking	Identity (No difference in description)		None	For details of the description, please refer to the Appendix of 【Identification(Traceability)】section.
Packing	Identity (No difference in taping and packaging specifications)		None	For details, please refer to the individual datasheets.
Label	Identity (No difference in description)		None	For details of the description, please refer to the Appendix of 【Identification(Traceability)】section.

➤ Product electrical Characteristics, specification and dimensions are same, there is no difference.

Identification (Traceability) of Shanghai and Hefei Plants

Item	Shanghai Plant	Hefei Plant	Variation	Remarks
	TO-252			
Marking			having	<p>The production plant can be identified by the marking (④ with or without dots).</p> <p>【Without dots: Made at Shanghai Plant】, 【With dots: Made at Hefei Plant】</p>
	<p>①: Indicate part number ②: Y=end of production year, WW=week of production. ③: XXX = Serial No.</p>			
Label (Lot No.)			having	<p>The last two digits of the Lot No. can be used to identify the production plant.</p> <p>【EG: made in Shanghai plant】 【FG: made in Hefei plant】. (Country of origin: China, no difference)</p>
	Lot No. end = EG	Lot No. end = FG		

Evaluation results

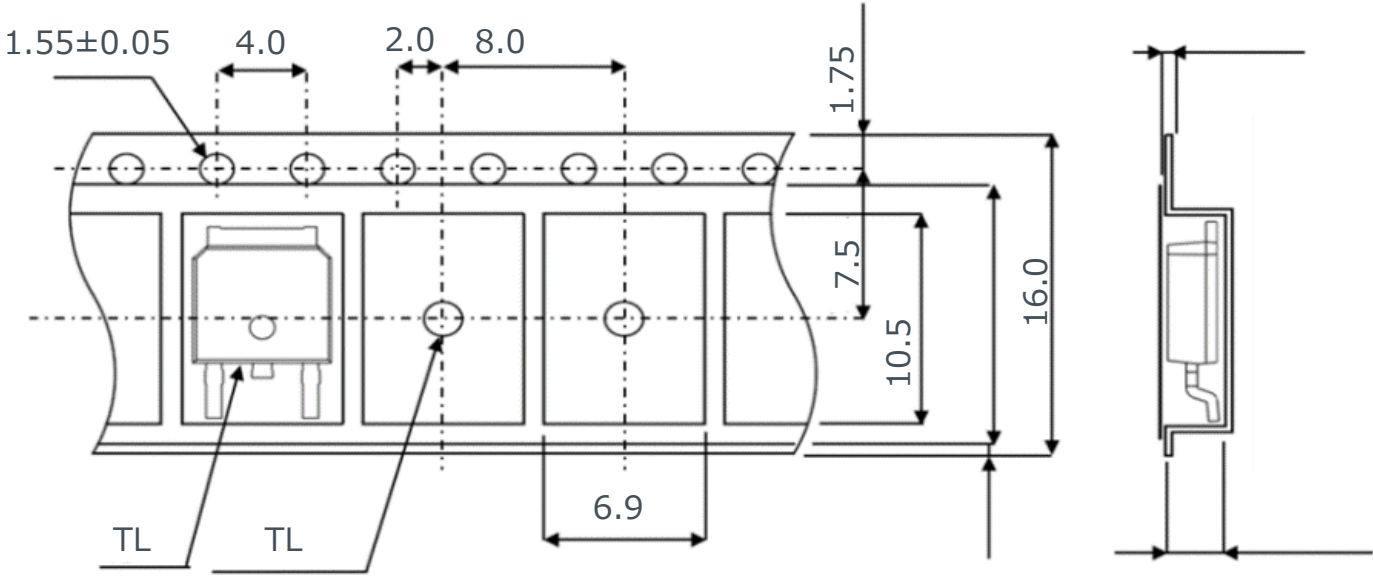
No.	Evaluation item	Evaluation Method (Reference Standard)	Judgment Criteria	Results
1	Topside chipping size	Measurement Microscope	According to internal standards. n=20pcs	PASS
2	Backside chipping size	Measurement Microscope	According to internal standards. n=20pcs	PASS
3	Bond line thickness	Measurement Microscope (MIL-STD-750)	According to internal standards. n=20pcs	PASS
4	Die shear	Die shear tester	According to internal standards. n=20pcs	PASS
5	Chip misalignment	Measurement Microscope	According to internal standards(limited sample). n=20pcs	PASS
6	Appearance check after die bonding	Microscope	No chip cracks and chips. n=20pcs	PASS
7	Dimensions	Measurement Microscope	According to internal standards. n=5pcs	PASS
8	Solder void	X-ray	According to internal standards. n=20pcs	PASS
9	Wire pull, Wedge shear	Pull tester, Shear tester (MIL-STD-750)	According to internal standards. n=20pcs	PASS
10	Loop height	Measurement Microscope	According to internal standards. n=20pcs	PASS
11	Stitch Shape	Measurement Microscope	According to internal standards. n=20pcs	PASS
12	Stitch thickness measurement	Measurement Microscope	According to internal standards. n=20pcs	PASS
13	crack under pad	Wire, Top metal removal → Microscope	No cracks in the element under the pad. n=20pcs	PASS
14	Wire sweep	Resin opening → Microscope	According to internal standards. n=20pcs	PASS
15	Chip observation after resin opening	Resin opening → Microscope	No chip cracks and chips. n=20pcs	PASS
16	Appearance check after molding	Microscope	According to internal standards(limited sample). n=20pcs	PASS
17	SAT	Ultrasonic Testing, Ultrasonic Inspection	According to internal standards. n=20pcs	PASS
18	SAT after MSL	Ultrasonic Testing, Ultrasonic Inspection(JSTD-020E)	By JSTD-020E. n=20pcs	PASS
19	Plating Thickness	X-ray Fluorescence	According to internal standards. n=20pcs	PASS
20	Terminal appearance check	Microscope	According to internal standards(limited sample). n=20pcs	PASS
21	solderability test	According to internal standards	According to internal standards. n=22pcs	PASS
22	Solder mounting evaluation	According to internal standards (JSTD022-B102)	According to internal standards. n=22pcs	PASS
23	terminal strength and static load test	pressurized testing machine (ET-7409-105A)	According to internal standards. n=20pcs	PASS
24	Appearance of the mark	Microscope	According to internal standards(limited sample). n=20pcs	PASS
25	Marking quality	Microscope	According to internal standards(limited sample). n=20pcs	PASS
26	Electrical Characteristics	Each characteristic evaluation device	Depends on product standard n=Determined by evaluation items	PASS
27	Thermal Resistance	Thermal resistance measurement device		PASS
28	Charge measurement	Charge measuring instrument		PASS
29	Peel strength test	Peel strength tester	n=Depends on internal rules	PASS

➤ All evaluation items of each production process satisfy the judgment criteria.
There is no problem regarding the production at the Hefei plant.

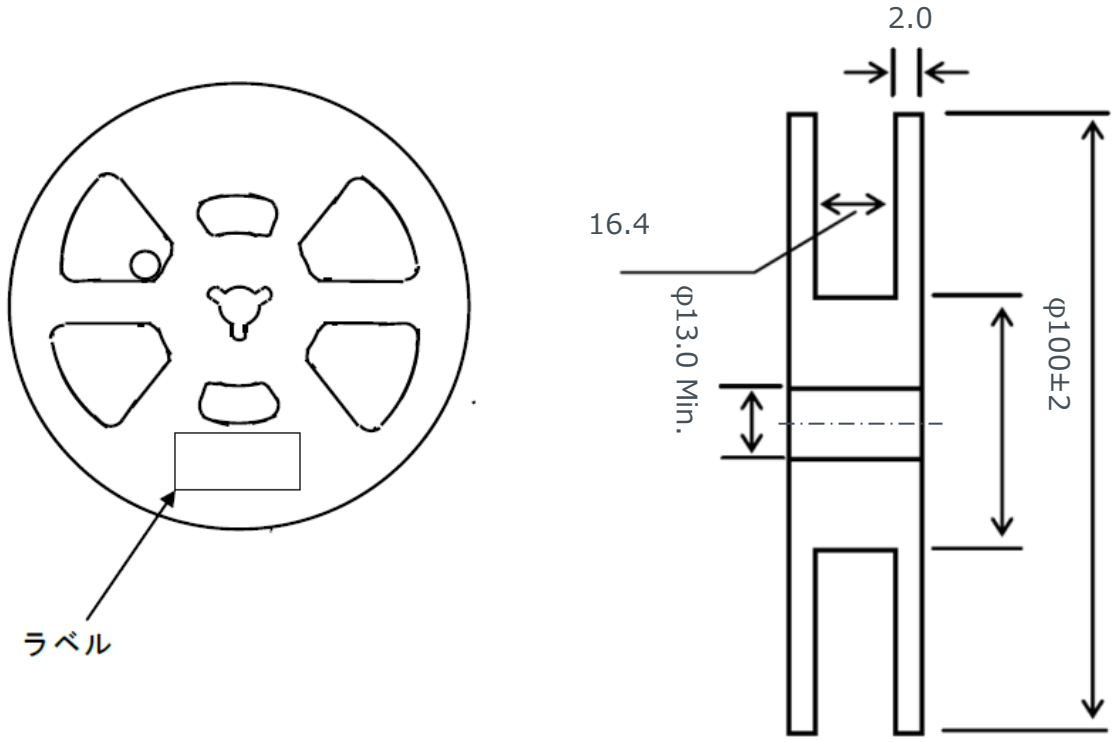
【Reference】 Dimensions / Reference Land Pattern

Item	Shanghai Plant	Hefei Plant
Dimensions	<p style="text-align: center;">TO-252</p> <p style="text-align: right;">[unit:mm]</p>	
Reference Land Pattern		

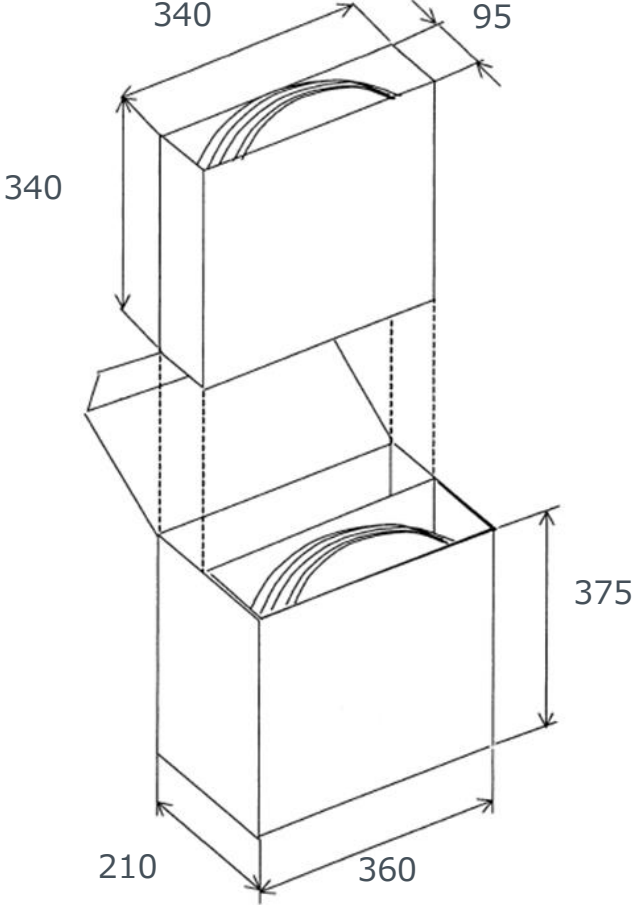
【Reference】 Taping

Item	Shanghai Plant	Hefei Plant
Taping	<p style="text-align: center;">TO-252</p> <p style="text-align: right;">[unit:mm]</p>  <p>Note:</p> <ol style="list-style-type: none">1. At the top, the reel tape has an adhesive tape-only section (38±2 pockets) and a carrier tape section (28±3 pockets) that does not contain any product.2. A carrier tape section (40±2 pockets) is provided at the end of the volume that does not contain any product.	

【Reference】 Reel

Item	Shanghai Plant	Hefei Plant
	TO-252	
Reel	<p data-bbox="1888 354 2015 382">[unit:mm]</p>  <p data-bbox="886 1203 1312 1286">Quantity: 2500pcs/reel Color: White</p>	

【Reference】 Packing

Item	Shanghai Plant	Hefei Plant
Packing	<p data-bbox="1327 279 1454 311">TO-252</p> <p data-bbox="2023 358 2142 386">[unit:mm]</p>  <p data-bbox="1727 1139 2104 1278">Standard Quantity TL: 1 Reel x 4 x 2 = 8Reel (20,000pcs)</p>	



Electronics for the Future



Dear Valued Customer

Doc. No.: 3022002
Issue date: September 1, 2022

Toshio Nakajima
General Manager

Power Transistor Division
Power Discrete Business Unit
ROHM Co., Ltd.

Notification of Product/Process Change

This is an announcement of change(s) to the process of the products currently supplied by ROHM Co., Ltd.

We request your acknowledgement of the receipt of this notification within the given period.

Please provide your your reply by April 1, 2023

Title of change	Application for additional approval of GEM's TO-252 transistor products assembly plant (Hefei)		
Affected product(s)	Manufacturer part number		Customer part number
	Please refer to the attachment.		
Detailed description of change	Now		After
	Assembly plant : GEM's Shanghai plant (China)		Assembly plant : GEM's Shanghai plant (China) GEM's Hefei plant (China)
Reason for change	In order to ensure a stable supply in the future, we apply for the additional approval for the Hefei Plant.		
Anticipated impact on quality	Since the materials, mounted die and manufacturing equipments are same as Shanghai plant use, we judged that the electrical characteristics and quality of products at Hefei plant is same as those assembled at Shanghai plant.		
Identification of change	Products manufactured at the Hefei Plant can be identified by dot marking. (Please refer to the 4M change materials)		
Planned first ship date :	October 1 (Consultation required after approval)		Sample available schedule : Respond in about 4 weeks from request
Attachments (data, report)	yes	4M 3022002-2_4ME	R1b1 3022002-3_R1b1
Comments	-		

	Reply date	
Customer reply	<input type="checkbox"/> 1. Approved. <input type="checkbox"/> 2. Accepted with conditions. <input type="checkbox"/> 3. Rejected.	
Condition for approval / reason for rejection		
Comments		
Customer company name		
Customer signature	Department	
Customer signature	Department	