Product Group: DD/Thu Nov 9, 2023/PCN-DD-031-2023-REV-0

Additional In-House Backend Assembly Site for Commercial Rectifier Products in SMA Package

For further information, please contact your regional Vishay office.

CONTACT INFORMATION

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Shelton CT United States 06484	Heilbronn Germany D-74072	Shanghai China 200030
Phone: +1-402-563-6866	Phone: +49 7131 7498 656 (715)	Phone: +86 138 1787 2112
Fax: +1-402-563-6296	Fax: +49 7131 67 2938	Fax: +86 21 5258 7979
Diodes-Americas@vishay.com	Diodes-Europe@vishay.com	Diodes-Asia@vishay.com

Description of Change: To support BCP (Business Continuity Program), Vishay Diodes Division is introducing an additional in-house back-end manufacturing site for Commercial Grade products in SMA package (Case Outline: DO-214AC). This assembly site is located in Kaohsiung, Taiwan, and already has manufacturing experience in surface mount packaged products. There is no change in form, fit and function on all involved part numbers. Upon the approval of this PCN, all future and customized part number for related product in the same package will adopt the same change.

Reason for Change: Capacity expansion and risk management

Expected Influence on Quality/Reliability/Performance: No change in quality and reliability performance

Part Numbers/Series/Families Affected: Please see materials list on the succeeding page.

Vishay Brand(S): Vishay General Semiconductor

Time Schedule:

Start Shipment Date: Wed Jan 10, 2024

Sample Availability: Available upon request

Product Identification: The new manufacturing code “K” will be marked next to the date code of device marking for identification, for example, “3BK” (3 - 2023, B - November, K – Kaohsiung, Taiwan)

Qualification Data: Available upon request

This PCN is considered approved, without further notification, unless we receive specific customer concerns before Tue Jan 9, 2024 or as specified by contract.

Issued By: Eddie Hwang, Jill Li

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B230LA-E3/5AT	B230LA-E3/61T	B230LA-M3/5AT	B230LA-M3/61T	B240A-E3/5AT
B240A-E3/61T	B240A-E3D/H	B240A-M3/5AT	B240A-M3/61T	B330LA-E3/5AT
B330LA-E3/61T	B330LA-M3/5AT	B330LA-M3/61T	B340A-E3/5AT	B340A-E3/61T
B340A-E3D/H	B340A-M3/5AT	B340A-M3/61T	B340A-M3D/H	B350A-E3/5AT
B350A-E3/61T	B350A-M3/5AT	B350A-M3/61T	B360A-E3/5AT	B360A-E3/61T
B360A-M3/5AT	B360A-M3/61T	BYG10D-E3/TR	BYG10D-E3/TR3	BYG10D-M3/TR
BYG10D-M3/TR3	BYG10G-E3/TR	BYG10G-E3/TR3	BYG10G-M3/TR	BYG10G-M3/TR3
BYG10J-E3/TR	BYG10J-E3/TR3	BYG10J-M3/TR	BYG10J-M3/TR3	BYG10K-E3/TR
BYG10K-E3/TR3	BYG10K-M3/TR	BYG10K-M3/TR3	BYG10M-E3/TR	BYG10M-E3/TR3
BYG10M-M3/TR	BYG10M-M3/TR3	BYG10Y-E3/TR	BYG10Y-E3/TR3	BYG10Y-M3/TR
BYG10Y-M3/TR3	BYG20D-E3/TR	BYG20D-E3/TR3	BYG20D-M3/TR	BYG20D-M3/TR3
BYG20G-E3/TR	BYG20G-E3/TR3	BYG20G-M3/TR	BYG20G-M3/TR3	BYG20J-01E3/I
BYG20J-E3/TR	BYG20J-E3/TR3	BYG20J-M3/TR	BYG20J-M3/TR3	BYG21K-E3/TR
BYG21K-E3/TR3	BYG21K-M3/TR	BYG21K-M3/TR3	BYG21M-01E3/I	BYG21M-E3/TR
BYG21M-E3/TR3	BYG21M-M3/TR	BYG21M-M3/TR3	BYG22A-E3/TR	BYG22A-E3/TR3
BYG22A-M3/TR	BYG22A-M3/TR3	BYG22B-E3/TR	BYG22B-E3/TR3	BYG22B-M3/TR
BYG22B-M3/TR3	BYG22D-E3/TR	BYG22D-E3/TR3	BYG22D-M3/TR	BYG22D-M3/TR3
BYG23M-7000E3/TR3	BYG23M-E3/TR	BYG23M-E3/TR3	BYG23M-M3/TR	BYG23M-M3/TR3
BYG23T-M3/TR	BYG23T-M3/TR3	BYG23T-M3H/I	BYG24D-E3/TR	BYG24D-E3/TR3
BYG24D-M3/TR	BYG24D-M3/TR3	BYG24G-E3/TR	BYG24G-E3/TR3	BYG24G-M3/TR
BYG24G-M3/TR3	BYG24J-E3/TR	BYG24J-E3/TR3	BYG24J-M3/TR	BYG24J-M3/TR3
BYS10-25-E3/TR	BYS10-25-E3/TR3	BYS10-25-M3/TR	BYS10-25-M3/TR3	BYS10-35-E3/TR
BYS10-35-E3/TR3	BYS10-35-M3/TR	BYS10-35-M3/TR3	BYS10-45-E3/TR	BYS10-45-E3/TR3
BYS10-45-E3D/H	BYS10-45-M3/TR	BYS10-45-M3/TR3	BYS11-90-E3/TR	BYS11-90-E3/TR3
BYS11-90-M3/TR	BYS11-90-M3/TR3	BYS12-90-E3/TR	BYS12-90-E3/TR3	BYS12-90-M3/TR
BYS12-90-M3/TR3	SL12-E3/5AT	SL12-E3/61T	SL12-M3/5AT	SL12-M3/61T
SL13-E3/5AT	SL13-E3/61T	SL13-M3/5AT	SL13-M3/61T	SS12-E3/5AT
SS12-E3/61T	SS12-E3D/H	SS12-E3H/H	SS12-M3/5AT	SS12-M3/61T
SS13-E3/5AT	SS13-E3/61T	SS13-M3/5AT	SS13-M3/61T	SS14-E3/5AT
SS14-E3/61T	SS14-E3D/H	SS14-M3/5AT	SS14-M3/61T	SS15-E3/5AT
SS15-E3/61T	SS15-M3/5AT	SS15-M3/61T	SS16-E3/5AT	SS16-E3/61T
SS16-M3/5AT	SS16-M3/61T	SS1H10-E3/5AT	SS1H10-E3/61T	SS1H10-M3/5AT
SS1H10-M3/61T	SS1H9-E3/5AT	SS1H9-E3/61T	SS1H9-M3/5AT	SS1H9-M3/61T
SS22S-E3/61T	SS22S-E3/5AT	SS22S-M3/5AT	SS22S-M3/61T	SS23S-E3/5AT
SS23S-E3/61T	SS23S-M3/5AT	SS23S-M3/61T	SS24S-E3/5AT	SS24S-E3/61T
SS24S-E3H/H	SS24S-M3/5AT	SS24S-M3/61T	SS25S-E3/5AT	SS25S-E3/61T
SS25S-M3/5AT	SS25S-M3/61T	SS26S-E3/5AT	SS26S-E3/61T	SS26S-M3/5AT
SS26S-M3/61T	SSA23L-E3/5AT	SSA23L-E3/61T	SSA23L-M3/5AT	SSA23L-M3/61T
SSA24-E3/5AT	SSA24-E3/61T	SSA24-M3/5AT	SSA24-M3/61T	SSA33L-E3/5AT
SSA33L-E3/61T	SSA33L-M3/5AT	SSA33L-M3/61T	SSA34-E3/5AT	SSA34-E3/61T
SSA34-E3D/H	SSA34-M3/5AT	SSA34-M3/61T	VSSA210-E3/5AT	VSSA210-E3/61T
VSSA210-M3/5AT	VSSA210-M3/61T	VSSA310S-E3/5AT	VSSA310S-E3/61T	VSSA310S-M3/5AT
VSSA310S-M3/61T	VSSA36S-M3/5AT	VSSA36S-M3/61T	VSSA3L6S-M3/5AT	VSSA3L6S-M3/61T

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Qual Pack

INNOVATIVE PACKAGES

eSMP® Series

MicroSMF (DO-219AC) | MicroSMP (DO-219AD) | SlimDPAK (TO-252AE) | SlimSMA (DO-221AC) | SlimSMAW (DO-221AD)

SMF (DO-219AB) | SMP (DO-220AA) | SMPA (DO-221BC) | SMPC (TO-277A) | SMPD (TO-263AC)

iSoCinK+

BU Bridge | PB Bridge

FlatPAK 5 × 6

FlatPAK 5 × 6 Dual | FlatPAK 5 × 6 Single

DFN Series

DFN3820A | DFN33A | DFN1006-2A | DFN1110-3A

CONVENTIONAL PACKAGES

Surface-Mount

SMA (DO-214AC) | SMB (DO-214AA) | SMC (DO-214AB)

DPAK (TO-252AA) | D²PAK (TO-263AB)

Power Pack

TO-220 FullPAK 2L | TO-220AC 2L

TO-247AC 3L | TO-247AD 2L

Content

1. Certificate of Design and Construction
2. Product Description
3. Data Sheet
4. Body Marking
5. Process Flow
6. Unit Pack Specifications
7. Reliability Qualification Report
8. Soldering Profile
9. Materials Declaration Report
10. Certificates

1. CDC (Certificate of Design Construction)

Item Name	Supplier Response
1. Supplier Part Number/Generic Part Number:	SS14-M3
2. Device Description:	SKY
3. Wafer/Die Fab Location: a. Facility name/plant #: b. Country:	Vishay General Semiconductor Taiwan Ltd Subcon Taiwan/China
4. Assembly Location: a. Facility name/plant #: b. Country:	Vishay General Semiconductor China Co., Ltd. Vishay General Semiconductor Taiwan Ltd. ,Nanzi Branch China/Taiwan
5. Final Quality Control A (Test) Location: a. Facility name/plant #: b. Country:	Vishay General Semiconductor China Co., Ltd. Vishay General Semiconductor Taiwan Ltd. ,Nanzi Branch China/Taiwan
6. Wafer/Die: a. Wafer size: b. Die family:	 6 inch SKY
7. Die (frontside) Metallization: a. Die metallization material(s):	 Ti/Ni/Ag
8. Die Passivation: a. Die passivation material(s):	 Oxide
9. Die Overcoat Material (e.g., Polyimide):	N/A
10. Die Prep Backside: a. Die metallization:	 Ti/Ni/Ag
11. Die Separation Method:	Blade saw
12. Die Attach: a. Die attach method:	 Reflow soldering
13. Package: a. Type of package (e.g., plastic, ceramic, unpackaged): b. JEDEC designation (e.g., MS029, MS034, etc.):	 Plastic SMA (DO-214AC)
14. Mold Compound: a. Mold compound type: b. Flammability rating: c. Tg (glass transition temperature) (°C):	 Halogen-free Epoxy Compound UL 94 V1 ☐ UL 94 V0 ☑ Typ. 135°C
15. Wire Bond: a. Wire bond material:	 N/A
16. Leadframe (if applicable): a. Header material: b. Leadframe material: c. Leadframe bonding plating composition: d. External lead plating composition: e. External lead plating thickness (μinch):	 Copper Copper None Pure Sn Min. 8um
17. Thermal Resistance: a. θ_{JA} °C/W (approx): b. θ_{JC} °C/W (approx): c. θ_{JL} junction-to-lead °C/W (approx): d. θ_{JM} junction-to-mounting base °C/W (approx):	 88°C/W N/A 28°C/W N/A
18. Maximum Process Exposure Conditions: a. MSL @ rated SnPb temperature: b. MSL @ rated Pb-free temperature:	** Note: Temperatures are as measured on the center of the plastic package body top surface.* 1 at 235 °C (SnPb) 1 at 260 °C (Pb-free)

Generic QualPack for PCN-DD-031-2023 of Additional in-house Backend Assembly Site for Commercial Grade Rectifier Products in SMA Package

Item Name	Supplier Response
1. Supplier Part Number/Generic Part Number:	SSA34-E3
2. Device Description:	SKY
3. Wafer/Die Fab Location: a. Facility name/plant #: b. Country:	 Vishay General Semiconductor Taiwan Ltd Subcon Taiwan/China
4. Assembly Location: a. Facility name/plant #: b. Country:	 Vishay General Semiconductor China Co., Ltd. Vishay General Semiconductor Taiwan Ltd. ,Nanzi Branch China/Taiwan
5. Final Quality Control A (Test) Location: a. Facility name/plant #: b. Country:	 Vishay General Semiconductor China Co., Ltd. Vishay General Semiconductor Taiwan Ltd. ,Nanzi Branch China/Taiwan
6. Wafer/Die: a. Wafer size: b. Die family:	 6 inch SKY
7. Die (frontside) Metallization: a. Die metallization material(s):	 Ti/Ni/Ag
8. Die Passivation: a. Die passivation material(s):	 Oxide
9. Die Overcoat Material (e.g., Polyimide):	N/A
10. Die Prep Backside: a. Die metallization:	 Ti/Ni/Ag
11. Die Separation Method:	Blade saw
12. Die Attach: a. Die attach method:	 Reflow soldering
13. Package: a. Type of package (e.g., plastic, ceramic, unpackaged): b. JEDEC designation (e.g., MS029, MS034, etc.):	 Plastic SMA (DO-214AC)
14. Mold Compound: a. Mold compound type: b. Flammability rating: c. Tg (glass transition temperature) (°C):	 Epoxy Compound UL 94 V1 ☐ UL 94 V0 ☑ Min. 150°C
15. Wire Bond: a. Wire bond material:	 N/A
16. Leadframe (if applicable): a. Header material: b. Leadframe material: c. Leadframe bonding plating composition: d. External lead plating composition: e. External lead plating thickness (µinch):	 Copper Copper None Pure Sn Min. 8um
17. Thermal Resistance: a. θ_{JA} °C/W (approx): b. θ_{JC} °C/W (approx): c. θ_{JL} junction-to-lead °C/W (approx): d. θ_{JM} junction-to-mounting base °C/W (approx):	 110°C/W N/A 28°C/W N/A
18. Maximum Process Exposure Conditions: a. MSL @ rated SnPb temperature: b. MSL @ rated Pb-free temperature:	** Note: Temperatures are as measured on the center of the plastic package body top surface.* 1 at 235 °C (SnPb) 1 at 260 °C (Pb-free)

Generic QualPack for PCN-DD-031-2023 of Additional in-house Backend Assembly Site for Commercial Grade Rectifier Products in SMA Package

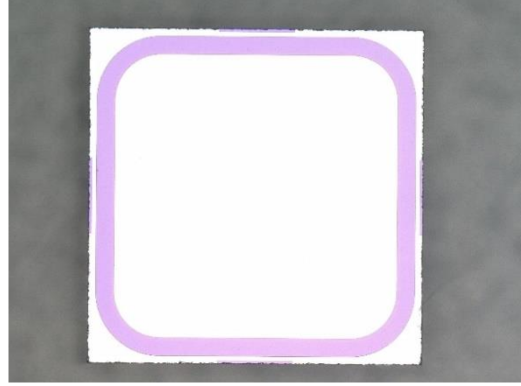
Item Name	Supplier Response
1. Supplier Part Number/Generic Part Number:	BYG10Y-E3
2. Device Description:	STD
3. Wafer/Die Fab Location: a. Facility name/plant #: b. Country:	 Vishay Semiconductor Austria Ges.m.b.H Austria
4. Assembly Location: a. Facility name/plant #: b. Country:	Vishay General Semiconductor China Co., Ltd. Vishay General Semiconductor Taiwan Ltd. ,Nanzi Branch China/Taiwan
5. Final Quality Control A (Test) Location: a. Facility name/plant #: b. Country:	Vishay General Semiconductor China Co., Ltd. Vishay General Semiconductor Taiwan Ltd. ,Nanzi Branch China/Taiwan
6. Wafer/Die: a. Wafer size: b. Die family:	 4 inch STD
7. Die (frontside) Metallization: a. Die metallization material(s):	 Mo/Ni/Ag
8. Die Passivation: a. Die passivation material(s):	 Glass
9. Die Overcoat Material (e.g., Polyimide):	N/A
10. Die Prep Backside: a. Die metallization:	 Mo/Ni/Ag
11. Die Separation Method:	Blade saw
12. Die Attach: a. Die attach method:	 Reflow soldering
13. Package: a. Type of package (e.g., plastic, ceramic, unpackaged): b. JEDEC designation (e.g., MS029, MS034, etc.):	 Plastic SMA (DO-214AC)
14. Mold Compound: a. Mold compound type: b. Flammability rating: c. Tg (glass transition temperature) (°C):	 Epoxy Compound UL 94 V1 ☐ UL 94 V0 ☑ Min. 150°C
15. Wire Bond: a. Wire bond material:	 N/A
16. Leadframe (if applicable): a. Header material: b. Leadframe material: c. Leadframe bonding plating composition: d. External lead plating composition: e. External lead plating thickness (µinch):	 Copper Copper None Pure Sn Min. 8um
17. Thermal Resistance: a. θ_{JA} °C/W (approx): b. θ_{JC} °C/W (approx): c. θ_{JL} junction-to-lead °C/W (approx): d. θ_{JM} junction-to-mounting base °C/W (approx):	 125°C/W N/A 25°C/W N/A
18. Maximum Process Exposure Conditions: a. MSL @ rated SnPb temperature: b. MSL @ rated Pb-free temperature:	** Note: Temperatures are as measured on the center of the plastic package body top surface.* 1 at 235 °C (SnPb) 1 at 260 °C (Pb-free)

2. *Product Description*

Product Description					
Product:	SS14-M3	Package:	SMA(DO-214AC)	Issued by:	Yan Zhang
Technology:		SKY		Date:	10/19/2023
Function Description:	1A/40V Surface Mount Schottky Barrier Rectifier				
Fab Factory China/Taiwan	Assembly Factory China/Taiwan	Testing Factory China/Taiwan			

Product:

Chip



Sub-assembly (Top View)

Sub-assembly (Side View)

Finish Goods

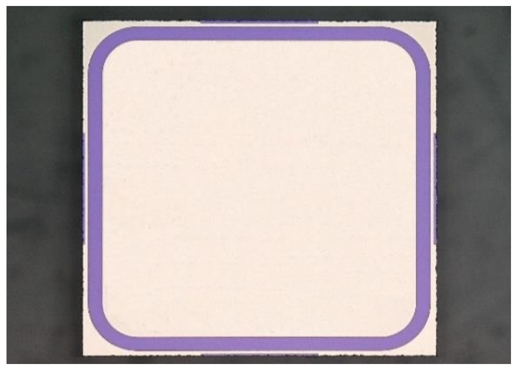
Product Description

Product:	SSA34-E3	Package:	SMA(DO-214AC)	Issued by:	Yan Zhang
Technology:		SKY		Date:	10/19/2023
Function Description:	3A 40V High-Current Density Surface Mount Schottky Rectifier				

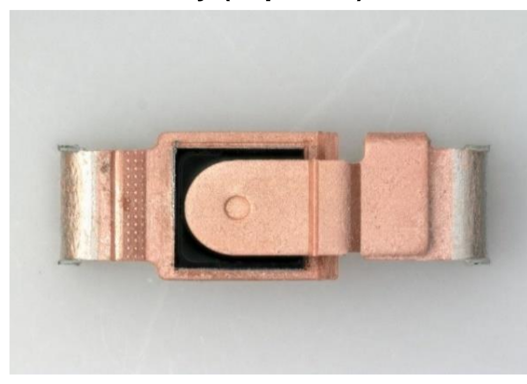
Fab Factory	Assembly Factory	Testing Factory	
China/Taiwan	China/Taiwan	China/Taiwan	

Product:

Chip



Sub-assembly (Top View)



Sub-assembly (Side View)

Finish Goods

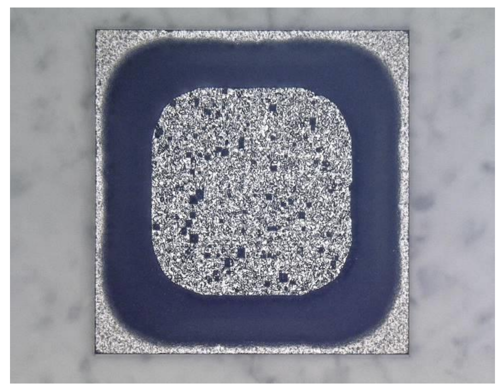
Product Description

Product:	BYG10Y-E3	Package:	SMA(DO-214AC)	Issued by:	Yan Zhang
Technology:		STD		Date:	10/19/2023
Function Description:	1.5A 1600V Standard Avalanche SMD Rectifier				

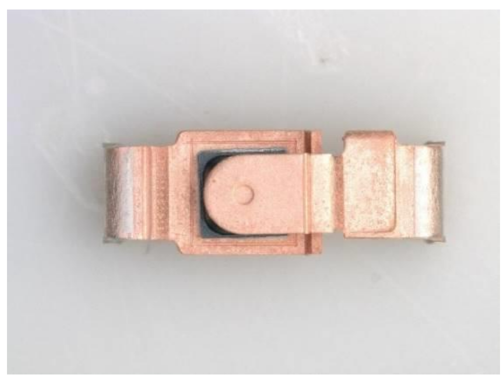
Fab Factory	Assembly Factory	Testing Factory	
Austria	China/Taiwan	China/Taiwan	

Product:

Chip

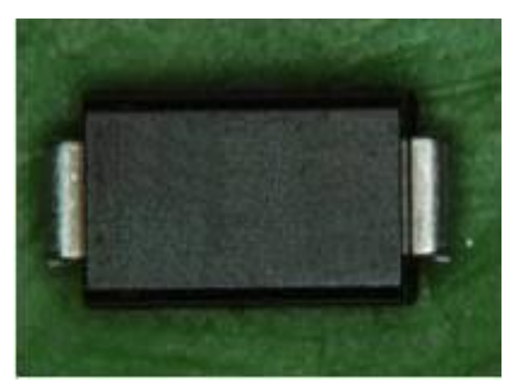


Sub-assembly (Top View)



Sub-assembly (Side View)

Finish Goods



3. Data Sheet

- please see the next pages

SS12~SS16

- Visit ss12.pdf (vishay.com) for the latest version

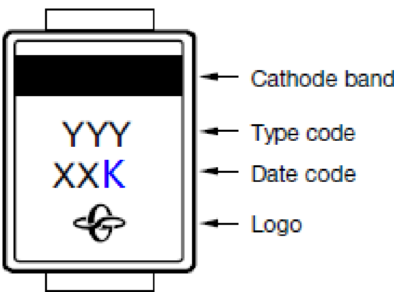
SSA33L, SSA34

- Visit ssa33l.pdf (vishay.com) for the latest version

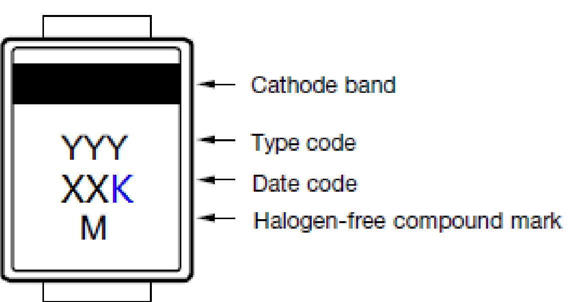
BYG10D~BYG10Y

- Visit byg10.pdf (vishay.com) for the latest version

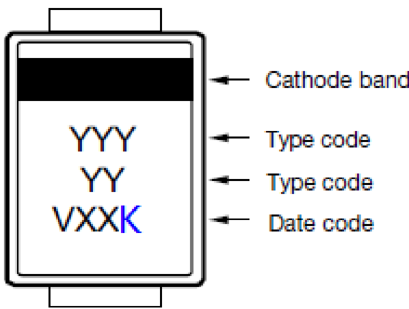
4. Body Marking



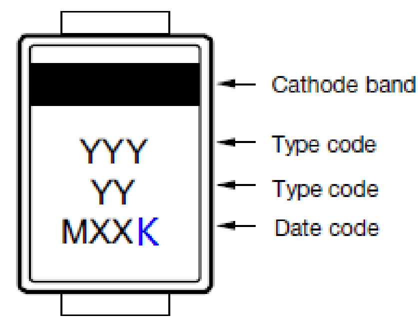
For Schottky products



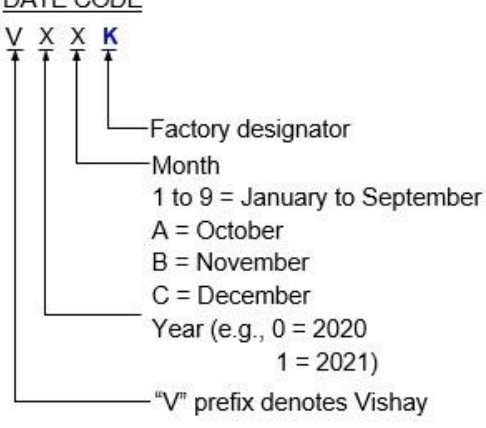
For Schottky products

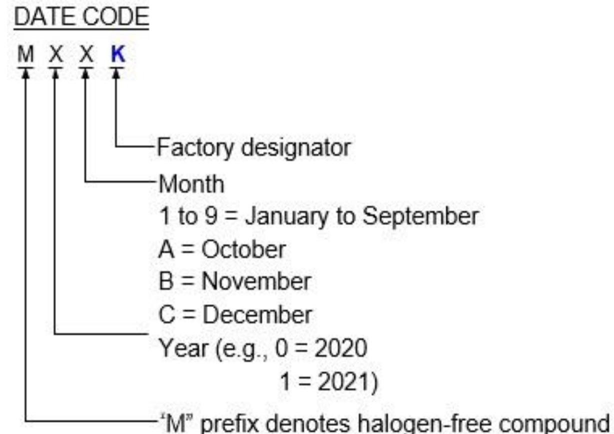


For BYGxx series products



For BYGxx series products





5. Back-End Process Flow

Changeover Key	Inspection Key
P=Product	A=Automatic
T=Tooling	M=Manual
S=Software	V=Visual
D=Dunnage	Q=Quality Audit
L=Label	

For Process: Folded SMA&SMB&SMC Process
For Sites: VGSK
Prepared By: Kent Chen

Doc. #: KHFC-055F-
Rev. #: 10
Rev. Date : 2023/11/1
Vishay GS Part #: FSMX Process
Customer Part #:

Op-Seq	Symbol Instructions (Fab/Assem, Move, Store/Get, Inspect, Rework, Scrap/Contain)	Changeover	Operation Description	Special Char. Class	Significant Product Characteristics (Outputs)	Special Char. Class	Significant Process Characteristics (Inputs)
	◇ ○ △ ▣ ⬠ ●						
KHOP-049			Lead Frame				
			Solder Paste				
			Die				
			Flux (Only for products with pre-bump dice, for example, it's not required for the BYG series with Non-bump dice)				
			Auto Soldering	DD	Bottom solder area and position		AOI 100% Vision
KHOP-515			Post Cleaning				
KHOP-206			Molding compound				
			Transfer molding				
KHOP-221			Trimming				
KHOP-215			Post molding curing				
KHOP-340			Pure tin solder ball				
			Pure tin strip plating	DT	PB content in pure-tin plating layer		PB content in pure-tin plating bath
	M		Plating solderability test Plating thickness measurement	DD	Plating solderability Plating thickness Aging test		1.Plating current 2.Solution concentriation
KHOP-220			Forming				
	M		Forming dimension measurement	DD	Forming dimension		Tool life
KHOP-535 or Subcon (None-automotive)			Carrier Tape				
			Cover Tape				
			Reel				
			Test/Mark/Tape or Sub-con(Only for None automotive)	DD	Elec:IR/BVR/VF/TRR(FER)		Tester accuracy
	M		Tape peeling force test	DD	Tape peeling force		Sealing temperature
KHOP-550	V		Final inspection				
GSK-4676	V		Outgoing quality control (Elec.&Mech.)				
L-006, OP-700K			Packing				

6. Unit Pack Specifications (Insert the Vishay Website Doc#88869/84082/95404 by completed pages or cut out suitable content as below example)

SURFACE MOUNT TAPE AND REEL PACKAGING

Top Cover Tape Thickness: 0.10 mm (0.004") Max.

Embossed Carrier Tape

Component Cavity

Fig. 5

Tape with Components shall Pass Around Bending Radius without Damage, for Reels with Hub Diameters Approaching Minimum Dimension

Bending Radius

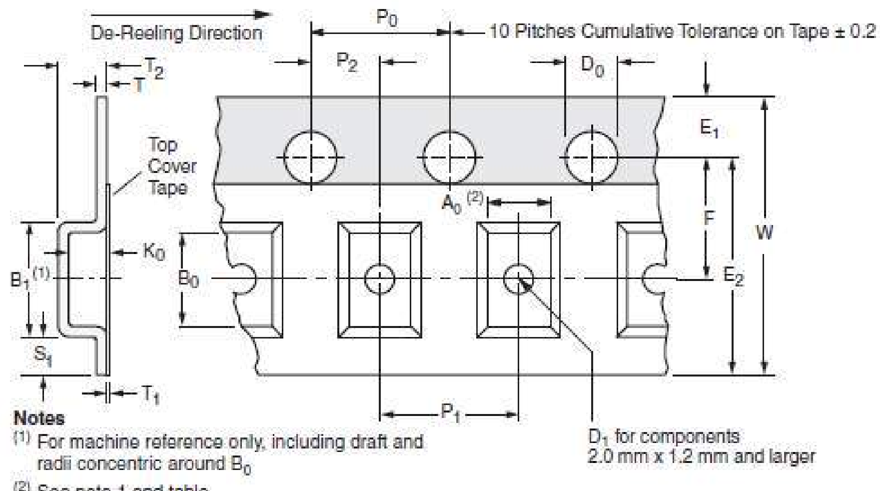
R Ref.

Fig. 6

Fig. 7

DIMENSIONS in millimeters (inches)							
TAPE SIZE	A MAX.	B MIN.	C	D MIN.	N MIN.	G MAX.	T MAX.
8 mm (0.315)	330 ± 2.0 (13.0 ± 0.079) 178 ± 2.0 (7.0 ± 0.079)	1.5 (0.059)	13.0 ± 0.20 (0.51 ± 0.008)	20.2 (0.795)	50 (1.97)	9.9 (0.389)	14.4 (0.567)
12 mm (0.472)	330 ± 2.0 (13.0 ± 0.079) 178 ± 2.0 (7.0 ± 0.079)	1.5 (0.059)	13.0 ± 0.20 (0.51 ± 0.008)	20.2 (0.795)	50 (1.97)	14.4 (0.567)	18.4 (0.724)
16 mm (0.630)	330 ± 2.0 (13.0 ± 0.079) 178 ± 2.0 (7.0 ± 0.079)	1.5 (0.059)	13.0 ± 0.20 (0.51 ± 0.008)	20.2 (0.795)	50 (1.97)	18.4 (0.724)	22.4 (0.802)
24 mm (0.945)	330 ± 2.0 (13.0 ± 0.079) 178 ± 2.0 (7.0 ± 0.079)	1.5 (0.059)	13.0 ± 0.20 (0.51 ± 0.008)	20.2 (0.795)	50 (1.97)	26.4 (1.039)	30.4 (1.197)

SURFACE MOUNT TAPE AND REEL PACKAGING



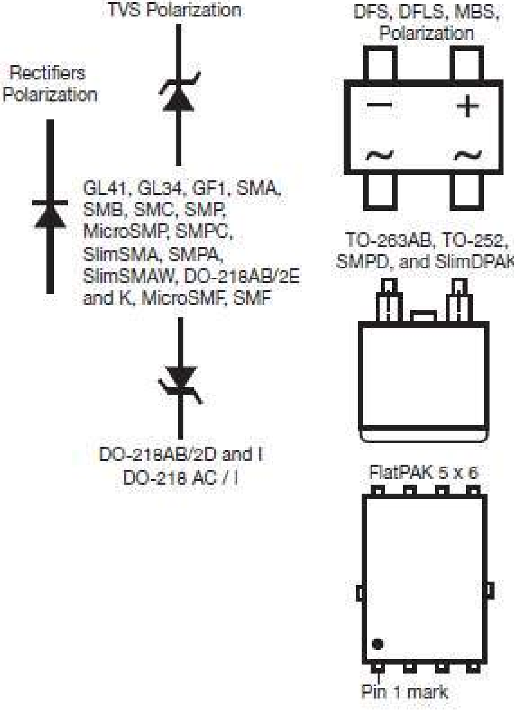


Fig. 8

8 mm, 12 mm, 16 mm, AND 24 mm EMBOSSED TAPE in millimeters (inches)								
TAPE SIZE	D_0	E_1	P_0	P_2	A_0, B_0, K_0	S_1 MIN.	T MAX.	T_1 MAX.
8 mm, 12 mm	1.5 ± 0.1 (0.059 ± 0.004)	1.75 ± 0.1 (0.069 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	2.0 ± 0.05 (0.079 ± 0.002)	(1)	0.6 (0.024)	0.600 (0.024)	0.1 (0.004)
16 mm, 24 mm				2.0 ± 0.1 (0.079 ± 0.004)				

DIMENSIONS in millimeters (inches)

CASE TYPE	TAPE SIZE	B_1 MAX.	D_1 MIN.	E_2 MIN.	F	P_1	R REF.	T_2 MAX.	W MAX.
GL34 (DO-213AA)	8 (0.315)	4.2 (0.165)	1.0 (0.039)	6.25 (0.246)	3.5 ± 0.05 (0.138 ± 0.002)	4.0 ± 0.10 (0.157 ± 0.004)	20 (0.787)	2.4 (0.094)	8.3 (0.327)
MicroSMP (DO-219AB) / MicroSMF (DO-219AD)		3.28 (0.129)		6.05 (0.238)				1.919 (0.076)	
SMF (DO-219AB)		-						1.8 (0.07)	8.2 (0.322)
GL34 (DO-213AA)	12 (0.472)	8.2 (0.323)	1.5 (0.059)	10.25 (0.404)	5.5 ± 0.05 (0.217 ± 0.002)		25 (0.984)	4.5 (0.177)	12.3 (0.484)
GF1 (DO-214BA)								3.25 (0.128)	
SMA (DO-214AC)								2.64 (0.104)	
SMP (DO-220AA)								1.84 (0.072)	
SMPC (TO-277A)		7.0 (0.276)				8.0 ± 0.10 (0.315 ± 0.004)		1.43 (0.056)	
SMB (DO-214AA) / SMBG (DO-215AA)		8.2 (0.323)						2.77 (0.109)	
SMC (DO-214AB) / SMCG (DO-215AB)	16 (0.630)	12.1 (0.476)		14.25 (0.561)	7.5 ± 0.1 (0.295 ± 0.004)			2.64 (0.104)	16.3 (0.642)
SlimDPAK (TO-252AE)								2.0 (0.079)	
DFS						12.0 ± 0.10 (0.472 ± 0.004)		3.91 (0.154)	
D²PAK (TO-263AB) DO-218AB / AC	24 (0.945)	20.1 (0.791)		22.25 (0.876)	11.5 ± 0.1 (0.453 ± 0.004)	16.0 ± 0.10 (0.630 ± 0.004)		5.31 (0.209)	24.3 (0.957)
SMPD (TO-263AC)						12.0 ± 0.10 (0.472 ± 0.004)		2.35 (0.093)	
SlimSMA (DO-221AC) / SMPA (DO-221BC)	12 (0.472)	6.2 (0.244)		10.25 (0.404)	5.5 ± 0.05 (0.217 ± 0.002)	4.0 ± 0.10 (0.157 ± 0.004)		1.53 (0.060)	12.3 (0.484)
SlimSMAW (DO-221AD)								1.61 (0.063)	
FlatPAK 5 x 6		6.4 (0.252)				8.0 ± 0.10 (0.315 ± 0.004)		1.20 ± 0.10 (0.047 ± 0.004)	

Notes

(1) A_0, B_0, and K_0 are determined by the maximum dimensions of the component size. The clearance between the component and the cavity must be within 0.05 mm (0.002") min. to 0.5 mm (0.02") max. for 8 mm tape and 12 mm tape, 0.15 mm (0.066") min. to 0.90 mm (0.035") max. for 16 mm tape and 0.15 mm (0.006") min. to 1.0 mm (0.59") max. for 24 mm tape

(2) All surface mount components are packed in accordance with EIA standard 481-E

Production Part Approval -

Environmental Test Summary (Folded SMA)

Request Part Number		xxx-E3 , xxx-M3	
	Package	DO-214AC	92.5Pb/5Sn/2.5Ag
	FAB	STD, SKY	

Package Qualification:	DO-214AC	
Die attach	92.5PB / 5SN / 2.5Ag	
Package Process Used	SS14-M3	DO-214AC
	SSA34-E3	DO-214AC
	BYG10Y-E3	DO-214AC

FAB Process:	Requested	STD, SKY	
FAB Process Used		SS14-M3	SKY
		SSA34-E3	SKY
		BYG10Y-E3	STD

Test Item & Condition	Duration	SS14-M3	SSA34-E3	BYG10Y-E3
HTRB	Ta / Bias	95°C / 40V	85°C / 40V	125°C / 1600V
	168 Hrs	0 / 77	0 / 77	0 / 77
	500 Hrs	0 / 77	0 / 77	0 / 77
	1000 Hrs	0 / 77	0 / 77	0 / 77
ESD(HBM)	2KV	0 / 10	0 / 10	0 / 10
@ 100pF / 1500 Ω	4KV			
	6KV	0 / 10	0 / 10	
	8KV	0 / 10	0 / 10	
ESD(CDM)	500V	0 / 10	0 / 10	0 / 10
	1000V	0 / 10	0 / 10	0 / 10
Solder Dip	Post	0 / 30	0 / 30	0 / 30
@Bake:130°C/24H→Moisture Soak:85°C/85%RH/168H→265°C/10sec				
Solderability @245°C/5sec	Post	0 / 10	0 / 10	0 / 10
Terminal Strength @2.2LB/60sec	Post	0 / 30	0 / 30	0 / 30
Pre-conditioning		0 / 308	0 / 308	0 / 308
@Bake:125°C/24H → Moisture Soak:85°C/85%RH/168H→ Reflow 3 times:TP=260℃				
Temperature Cycling	168 Cycs	0 / 77	0 / 77	0 / 77
@-55°C / +150°C / 30min.	500 Cycs	0 / 77	0 / 77	0 / 77
	1000 Cycs	0 / 77	0 / 77	0 / 77
UHAST	48 Hrs	0 / 77	0 / 77	0 / 77
@Ta= 130°C , 85%RH ; 33.3Psia	96 Hrs	0 / 77	0 / 77	0 / 77
IOL	2520 Cycs	0 / 77	0 / 77	0 / 77
@DTj=100°C / Ton=Toff=2min	7500 Cycs	0 / 77	0 / 77	0 / 77
	15000 Cycs	0 / 77	0 / 77	0 / 77
HAST	48 Hrs			0 / 77
@130°C / 85%R.H. / 80%VR (max42V)/33.3Psia	96 Hrs			0 / 77
H3TRB	168 Hrs	0 / 77	0 / 77	
@85°C / 85%R.H. / 80%VR (max100V)	500 Hrs	0 / 77	0 / 77	
	1000 Hrs	0 / 77	0 / 77	

8. Soldering Profile (Insert the Vishay Website Doc#88854 by completed pages or cut out its content as below)

Soldering Process

VISHAY GENERAL SEMICONDUCTOR RECOMMENDED SOLDERING PROCESS

Through hole device (THD) and surface mount device (SMD) imply different soldering technologies leading to different constraints.

In THD, the package body is exposed to relatively low temperatures (< 150 °C) because the lead extremeties are only dipped in the soldering alloy, whereas in SMD the whole package body is exposed to a very high temperature (> 240 °C) during reflow soldering process.

In addition, molding compounds used for encapsulation absorb moisture from the ambient medium. During rapid heating in solder reflow process; this absorbed moisture can vaporize, generating pressure at lead frame pad/silicon to plastic interfaces in the package, with a risk of package cracking and potential degradation of device reliability.

Wave soldering with SMD packages is not recommended because the thermal shock associated with package body solder dipping may induce internal structural damage to the package (interface delamination) that may affect long term reliability.

SMD package characterizations performed as a standard by Vishay only induce Solder Reflow Resistance assessment.

JEDEC® JESD A111 recommends that wave soldering of SMD packages should be evaluated by the USER, because the stress induced inside the package is very dependant of solder process parameters.

Due to the higher melting point of lead (Pb)-free alloys, the temperature of the solder pot will also increase to improve solderability and shorten contact times. For AgSnCu with melting point of 217 °C, the solder pot temperature will be between 250 °C to 270 °C or as high as 260 °C to 280 °C for SnCu.

RECOMMENDED WAVE SOLDERING PROFILE FOR THROUGH HOLE COMPONENTS

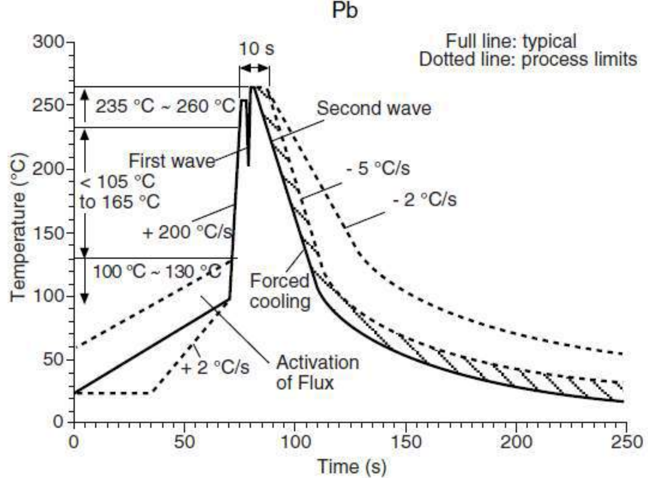
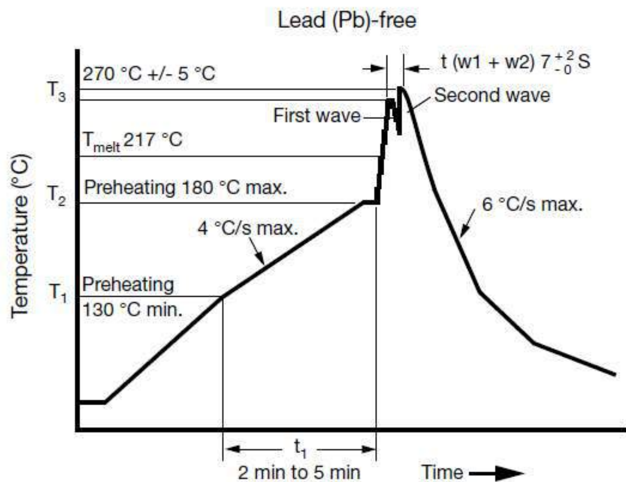


Fig. 1



Notes

- Temperature jump from T_2 to T_3 (w1): 150 °C max.
- Time from 25 °C to T_3 (wave temp.): 8 min max.

Fig. 2

REFLOW FOR SURFACE MOUNTED COMPONENTS

TABLE 1 - CLASSIFICATION REFLOW PROFILE

PROFILE FEATURE	Sn-Pb EUTECTIC ASSEMBLY	LEAD (Pb)-FREE ASSEMBLY
Preheat and soak		
Temperature min. ($T_{Smin.}$)	100 °C	150 °C
Temperature max. ($T_{Smax.}$)	150 °C	200 °C
Time ($T_{Smin.}$ to $T_{Smax.}$) (t_S)	60 s to 120 s	60 s to 120 s
Average ramp-up rate ($T_{Smax.}$ to T_p)	3 °C/s maximum	
Liquidus temperature (T_L)	183 °C	217 °C
Time to liquidus (t_L)	60 s to 150 s	60 s to 150 s
Peak package temperature (T_p) (1)	See classification temperature in table 2	See classification temperature in table 3
Time (t_p) (2) with 5 °C of the specified classification temperature (T_C)	20 s (2)	30 s (2)
Average ramp-down rate (T_p to $T_{Smax.}$)	6 °C/s maximum	
Time 25 °C to peak temperature	6 min maximum	8 min maximum

Notes

(1) Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and user maximum

(2) Tolerance for time at peak profile temperature (T_p) is defined as a supplier minimum and user maximum

REFLOW PROFILE

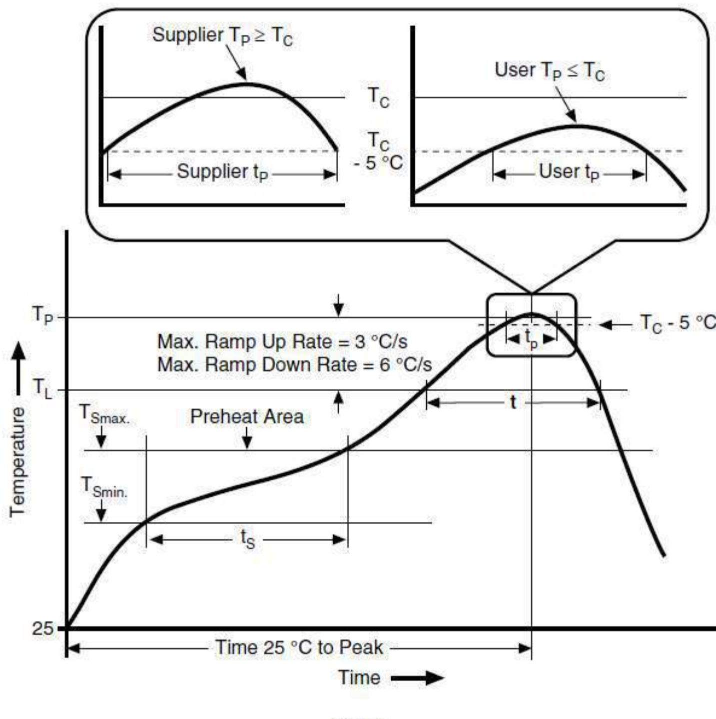


Fig. 3

TABLE 2 - Sn-Pb EUTECTIC PROCESS PACKAGE PEAK REFLOW TEMPERATURES		
PACKAGE THICKNESS	VOLUME mm³ < 350	VOLUME mm³ ≥ 350
< 2.5 mm	235 °C	220 °C
≥ 2.5 mm	220 °C	220 °C

TABLE 3 - LEAD (Pb) - FREE PROCESS PACKAGE CLASSIFICATION REFLOW TEMPERATURES			
PACKAGE THICKNESS	VOLUME mm³ < 350	VOLUME mm³ 350 TO 2000	VOLUME mm³ > 2000
< 1.6 mm	260 °C	260 °C	260 °C
1.6 mm to 2.5 mm	260 °C	250 °C	245 °C
≥ 2.5 mm	250 °C	245 °C	245 °C

Tolerance: The device manufacturer / supplier shall assure process compatibility up to and including the stated classification temperature at the rated MSL level.

Notes

- Package volume excludes external terminals (balls, bumps, lands, leads) and/or non-integral heatsinks
- The maximum component temperature reached during reflow depends on package thickness and volume. The use of convection reflow processes reduces the thermal gradients between packages. However, thermal gradients due to differences in thermal mass of SMD packages may still exist
- Recommended soldering process is accordance with J-STD-020D

9. Materials Declaration Report

VISHAY.

Material Declaration Sheet

Vishay General Semiconductor - VGSK

Date	28/Jul/23

Part / Product Family Details

Vishay Part Number	RoHS Compliance Status	RoHS Compliance Date Code dd-mm-yyyy	Total product Weight (gm)	Resistance value	3rd Party Lab ICP Test Report Available	Manufacturing Location	Number of Exemptions Used
BS1A-(H)E3 to BS1K-(H)E3 BSH1A-(H)E3 to BSH1D-(H)E3 RS1A-(H)E3 to RS1K-(H)E3 S1A-(H)E3 to S1M-(H)E3 S1BA-(H)E3 to S1MA-(H)E3 SA2B-E3 to SA2M-E3 SML4728-(H)E3 to SML4764A-(H)E3 US1A-(H)E3 to US1G-(H)E3 US1J-(H)E3 to US1M-(H)E3 CS1D, CS1G, CS1J, CS1K, CS1M-(H)E3 CSA2D, CSA2G, CSA2J, CSA2K, CSA2M-(H)E3	YES WITH EXEMPTION	01-12-2004	0.064	N/A	Yes	Taiwan	Two

Technical Information: refer to http://www.vishay.com/how/leadfree/#summary

Terminal Plating / Grid Array Material	Terminal Base Alloy	JESD-97 Pb-Free Material Code Marking	J-STD-20D MSL Rating	Reflow Peak Process Body Temperature	Reflow Maximum number of cycles	Reflow Max. Time at Peak Temperature (sec)	Soldering Compatibility (SnPb/Pb-Free)

Material Composition

Homogenous Material Name	Material Classification	Substance Name	CAS number	Weight of Substance (gm)	With respect to Homogenous Material %	With respect to Homogenous Material ppm	% with respect to Total Product Weight	RoHS Exemptions Used
Chip	Electronics (e.g. pc boards, displays)	Silicon and others (business secret)	-	0.00130	100.00	1000000	2.03	Exemption No:7(c)-I
Lead Frame	Copper (e.g. copper amounts in cable harnesses	Copper	7440-50-8	0.02300	100.00	1000000	35.94	
Solder 92.5	Other special metals	Lead	7439-92-1	0.00231	92.50	925000	3.61	Exemption No:7(a)
		Tin	7440-31-5	0.00013	5.00	50000	0.20	
		Silver	7440-22-4	0.00006	2.50	25000	0.10	
Encapsulation	Other duromers	Quartz (Si02)	14808-60-7	0.02492	70.00	700000	38.93	
		Epichlorohydrin, o-cresol, formalde polyme	29690-82-2	0.00569	16.00	160000	8.89	
		Phenol-formaldehyde resin	9003-35-4	0.00427	12.00	120000	6.68	
		Antimony oxide (Sb2-03)	1309-64-4	0.00036	1.00	10000	0.56	
		Carbon-Black	1333-86-4	0.00009	0.25	2500	0.14	
		Additive & know-how	-	0.00027	0.75	7500	0.42	
Surface finish	Other special metals	Tin	7440-31-5	0.00160	100.00	1000000	2.50	

EU-RoHS Directive-2015/863/EU MCV of 0.1% by mass (1000 PPM) in homogeneous material for: Lead (Pb), Mercury, Hexavalent Chromium, Polybrominated Biphenyls (PBB), Polybrominated Diphenyl Ethers (PBDE) and MCV of 0.01% by mass cadmium ,Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP)

This MDS vaild for List of PN's

Exemption Used 7(a) - Lead in high melting temperature type solders (i.e. lead- based alloys containing 85 % by weight or more lead)

2nd Exemption Used 7(c)-I - Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound

Note :- (i) All information is based on data received from our vendors & subjected to change without prior notice.
(ii) Substance weight are derived from MSDS.

Build Vishay into your Design

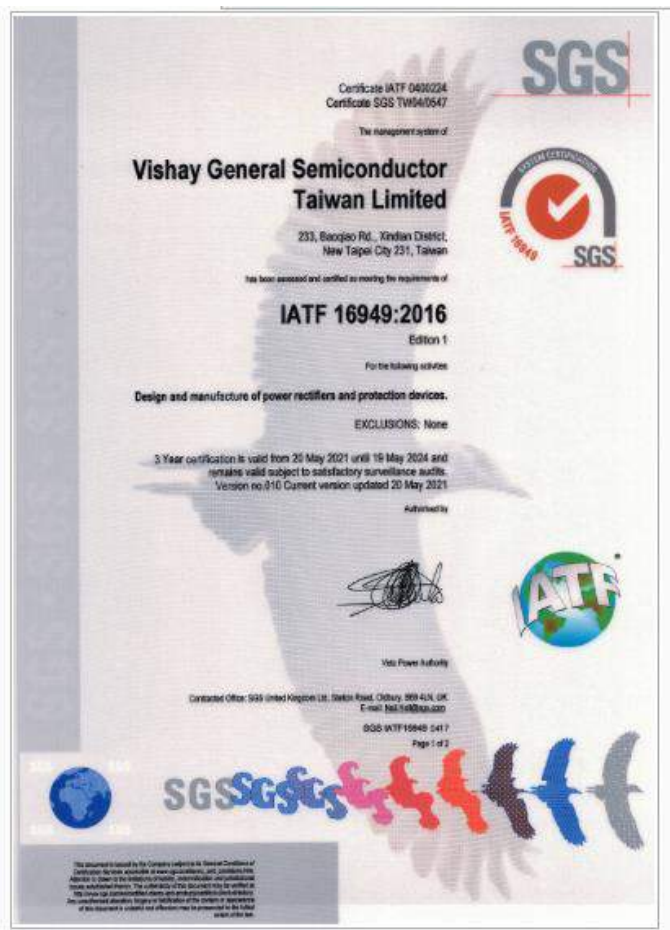
Vishay General Semiconductor Taiwan Ltd.
No. 40, Zhongyang Rd., Nanzi Dist., Kaohsiung City 811, Taiwan (R.O.C.)
ONE OF THE WORLD'S LARGEST MANUFACTURERS OF DISCRETE SEMICONDUCTORS AND PASSIVE COMPONENTS

One of the World's Largest Manufacturers of Discrete Semiconductors and Passive Components

第1頁

10. Certificates

Locations		Country	City	Certificates	
Front-End	Vishay Taipei	Taiwan	Taipei	IATF16949	ISO9001
Back-End	Vishay Kaohsiung	Taiwan	Kaohsiung	IATF16949	ISO9001



Certificate IATF 0400224
Certificate SGS TW04/0547

The management system of

Vishay General Semiconductor Taiwan Limited

233, Baoqiao Rd., Xindian District,
New Taipei City 231, Taiwan

has been assessed and certified as meeting the requirements of

IATF 16949:2016

Edition 1

For the following activities

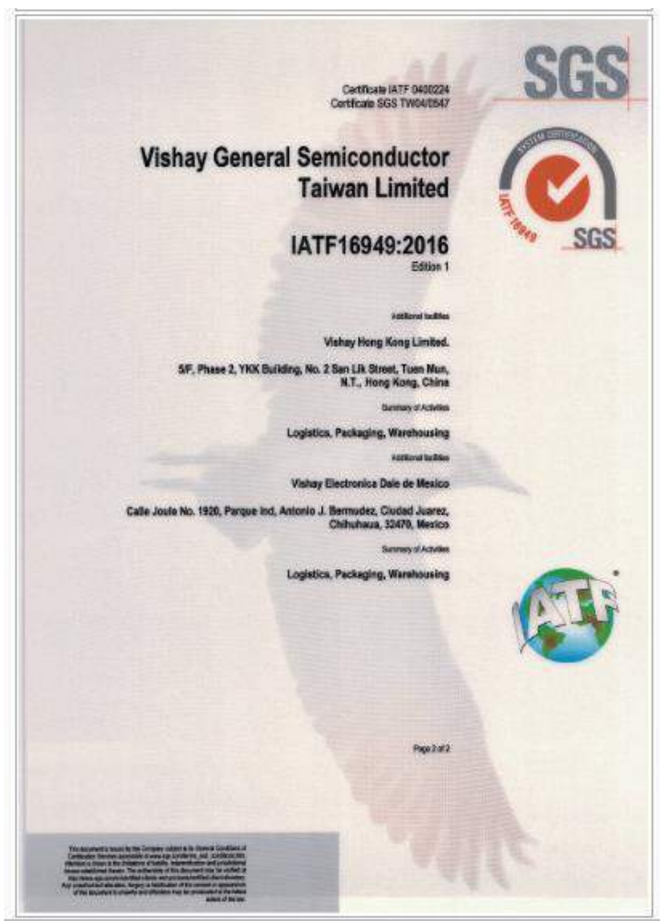
Design and manufacture of power rectifiers and protection devices.

EXCLUSIONS: None

3 Year certification is valid from 20 May 2021 until 19 May 2024 and remains valid subject to satisfactory surveillance audits.
Version no.010 Current version updated 20 May 2021

Authorised by

Page 1 of 2



Certificate IATF 0400224
Certificate SGS TW04/0547

Vishay General Semiconductor Taiwan Limited

IATF16949:2016

Edition 1

Additional facilities

Vishay Hong Kong Limited.

5/F, Phase 2, YKK Building, No. 2 San Lik Street, Tuen Mun, N.T., Hong Kong, China

Summary of Activities

Logistics, Packaging, Warehousing

Additional facilities

Vishay Electronica Dale de Mexico

Calle Joule No. 1920, Parque Ind, Antonio J. Bermudez, Ciudad Juarez, Chihuahua, 32470, Mexico

Summary of Activities

Logistics, Packaging, Warehousing

Page 2 of 2

Certificate IATF 0470202
Certificate TW23/00000165
The management system of

Vishay General Semiconductor Taiwan Ltd. Nanzi Branch

40 Zhongyang Rd., Nanzi Dist., Kaohsiung City 81170, Taiwan

has been assessed and certified as meeting the requirements of

IATF 16949:2016
Edition 1

For the following Scope
Design and Manufacture of power rectifiers and protection devices.

EXCLUSIONS : None

3 Year certification is valid from 08 March 2023 until 07 March 2026 and remains valid subject to satisfactory surveillance audits.
Version no. 1. Current version updated 08 March 2023

Authorised by
Hank Yang
Veto Power Authority

Contracted Office : SGS United Kingdom Ltd, Station Road, Oldbury, B69 4LN, UK.
Email : Neil.Hall@sgs.com

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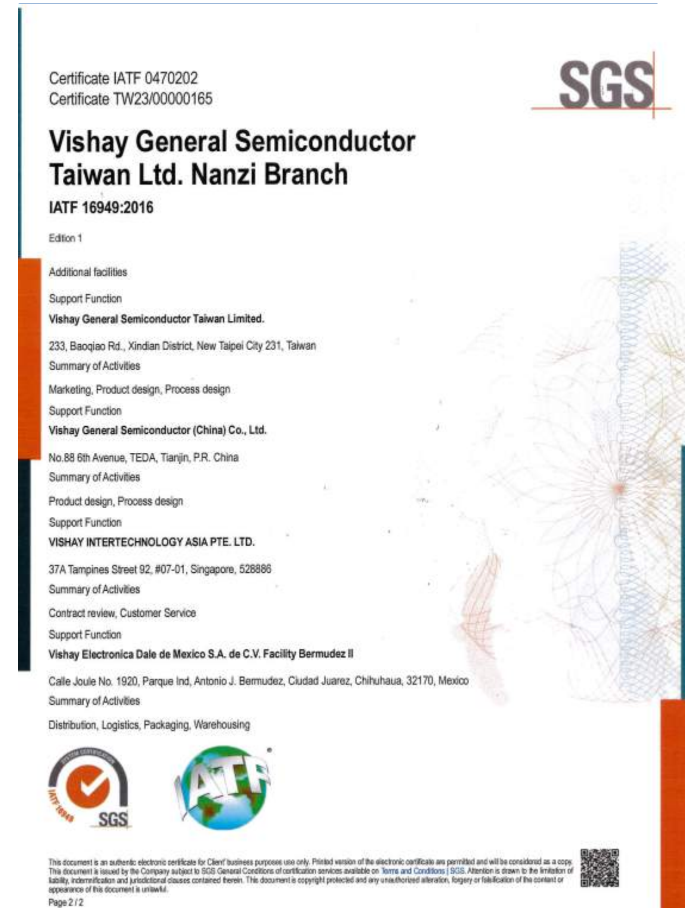

Certificate IATF 0470202
Certificate TW23/00000165

Vishay General Semiconductor Taiwan Ltd. Nanzi Branch

IATF 16949:2016

Edition 1

Additional facilities

Support Function
Vishay General Semiconductor Taiwan Limited.
233, Baoqiao Rd., Xindian District, New Taipei City 231, Taiwan
Summary of Activities
Marketing, Product design, Process design

Support Function
Vishay General Semiconductor (China) Co., Ltd.
No.88 6th Avenue, TEDA, Tianjin, P.R. China
Summary of Activities
Product design, Process design

Support Function
VISHAY INTERTECHNOLOGY ASIA PTE. LTD.
37A Tampines Street 92, #07-01, Singapore, 528886
Summary of Activities
Contract review, Customer Service

Support Function
Vishay Electronica Dale de Mexico S.A. de C.V. Facility Bermudez II
Calle Joule No. 1920, Parque Ind, Antonio J. Bermudez, Ciudad Juarez, Chihuahua, 32170, Mexico
Summary of Activities
Distribution, Logistics, Packaging, Warehousing

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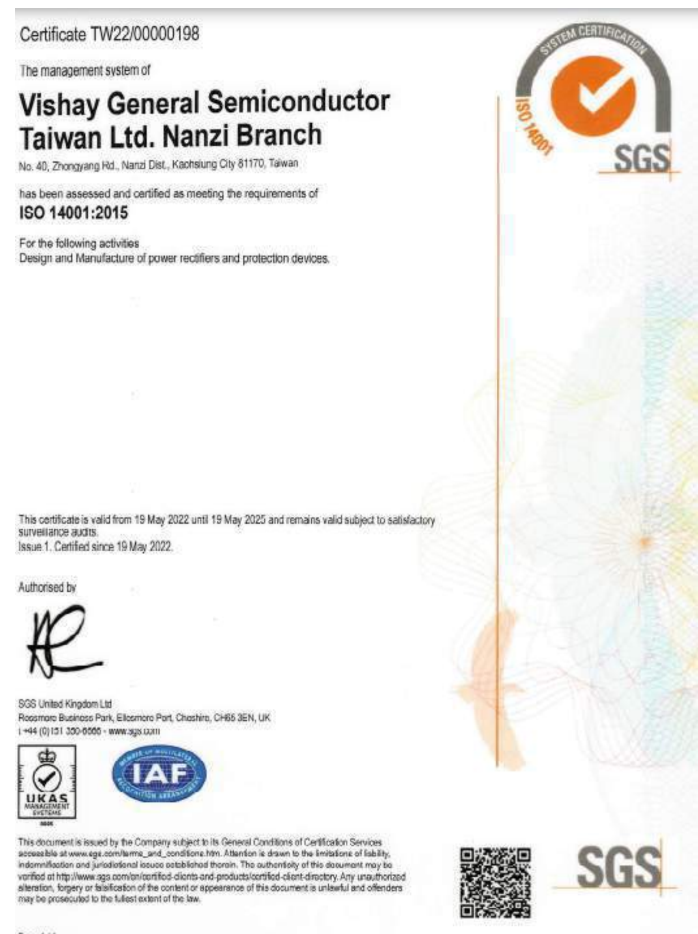

Certificate TW22/00000198

The management system of

Vishay General Semiconductor Taiwan Ltd. Nanzi Branch

No. 40, Zhongyang Rd., Nanzi Dist., Kaohsiung City 81170, Taiwan

has been assessed and certified as meeting the requirements of

ISO 14001:2015

For the following activities
Design and Manufacture of power rectifiers and protection devices.

This certificate is valid from 19 May 2022 until 19 May 2025 and remains valid subject to satisfactory surveillance audits.
Issue 1. Certified since 19 May 2022.

Authorised by

SGS United Kingdom Ltd
Rossmore Business Park, Ellesmere Port, Cheshire, CH65 3EN, UK
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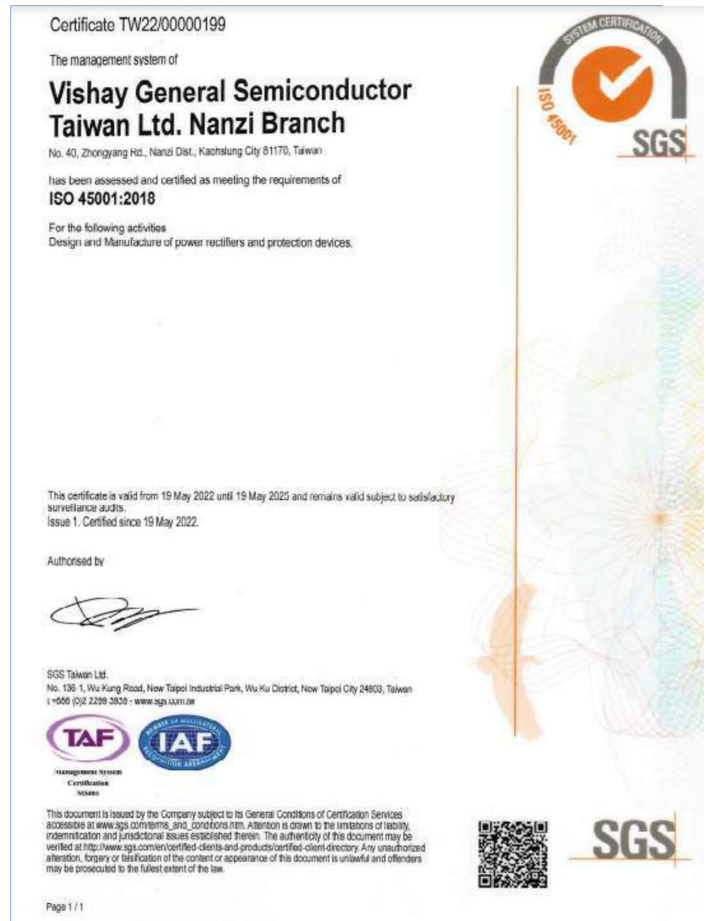

Certificate TW22/00000199

The management system of

Vishay General Semiconductor Taiwan Ltd. Nanzi Branch

No. 40, Zhongyang Rd., Nanzi Dist., Kaohsiung City 81170, Taiwan

has been assessed and certified as meeting the requirements of

ISO 45001:2018

For the following activities
Design and Manufacture of power rectifiers and protection devices.

This certificate is valid from 19 May 2022 until 19 May 2025 and remains valid subject to satisfactory surveillance audits.
Issue 1. Certified since 19 May 2022.

Authorised by

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11. Revision History

Rev#	Date	Revision history
1	2023/11/03	Convert to new QualPack format

--End of Report--