

Small signal Schottky diode

Features

- very low conduction losses
- negligible switching losses
- low capacitance diode
- Flip Chip, 2-bump package

Complies with the following standards

- IEC 61000-4-2 level 1:
 - ±2kV (air discharge)
 - ±2kV (contact discharge)

Description

The BAT30F3 is a Schottky diode in a 2-bump, Flip-Chip package.

This device is specially suited for switching mode applications needing a low forward voltage drop diode.

The electrical parameters are guaranteed across the operating temperature range (- 30 °C to 85 °C).

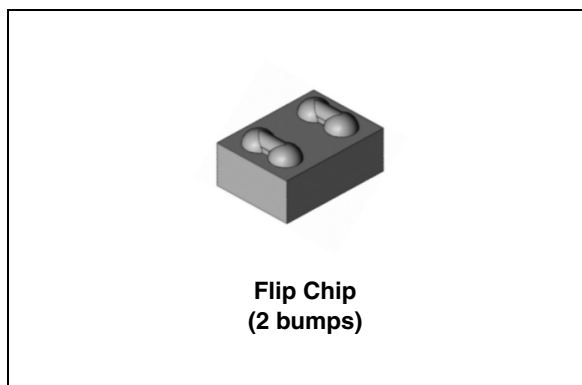


Figure 1. Pin configuration (bump side)

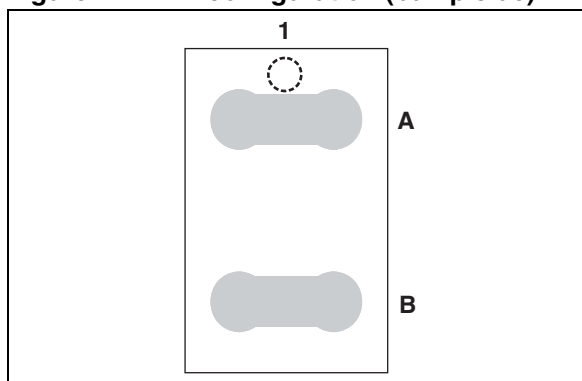
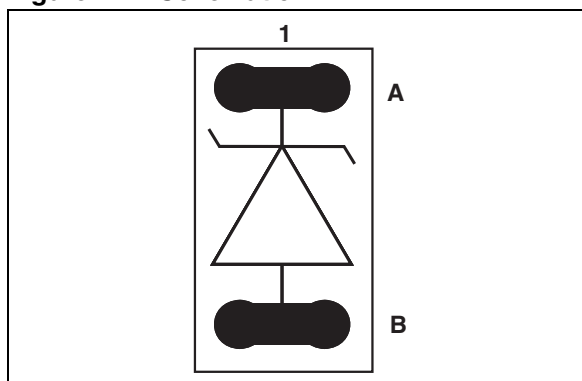


Figure 2. Schematic



1 Characteristics

Table 1. Absolute maximum ratings (T_{amb} = 25 °C)

Symbol	Parameter	Value	Unit
V _{PP}	Peak pulse voltage: IEC 61000-4-2 air discharge IEC 61000-4-2 contact discharge	±2 ±2	kV
V _{RRM}	Repetitive peak reverse voltage	20	V
T _{stg}	Storage temperature range ⁽¹⁾	-55 to +150	°C
T _{op}	Operating junction temperature range	-30 to +85	°C

1. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 2. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit	
I _R ⁽¹⁾	Reverse leakage current	25 °C	V _R = 6 V	-	-	2	µA
			V _R = 20 V	-	-	6	
		55 °C	V _R = 6 V	-	-	20	
			V _R = 20 V	-	-	55	
		85 °C	V _R = 6 V	-	-	145	
			V _R = 20 V	-	-	360	
V _F	Forward voltage drop	25 °C	I _F = 0.1 mA	-	-	200	mV
			I _F = 1 mA	-	-	270	
			I _F = 10 mA	-	-	340	
			I _F = 100 mA	-	-	440	
			I _F = 200 mA	-	-	500	
			I _F = 300 mA	-	-	560	
		- 30 °C	I _F = 0.1 mA	-	-	300	
			I _F = 1 mA	-	-	355	
			I _F = 10 mA	-	-	415	
			I _F = 100 mA	-	-	495	
			I _F = 200 mA	-	-	545	
			I _F = 300 mA	-	-	600	

1. Pulse test: t_p = 5 ms, δ < 2%

Figure 3. Leakage current versus reverse applied voltage (typical values)

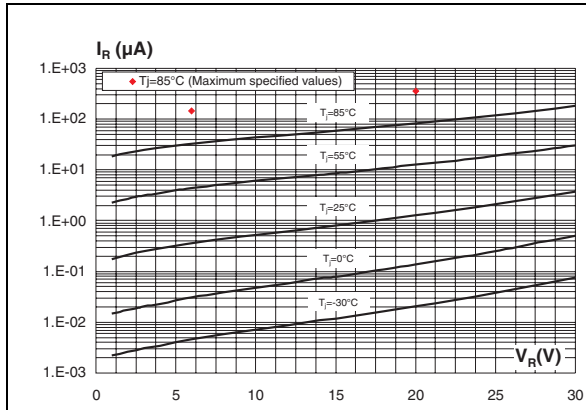


Figure 4. Forward voltage drop versus forward current (typical values, positive temperatures)

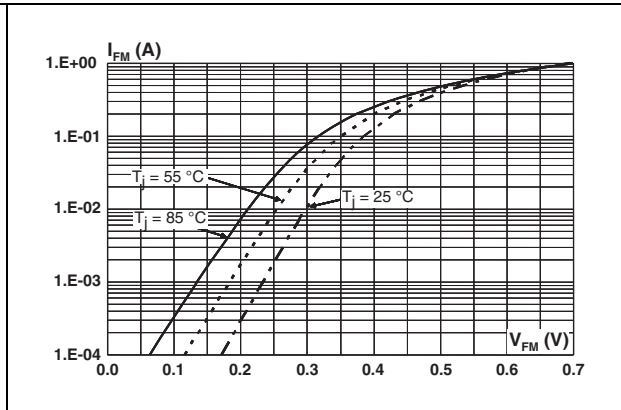


Figure 5. Forward voltage drop versus forward current (typical values, negative temperatures)

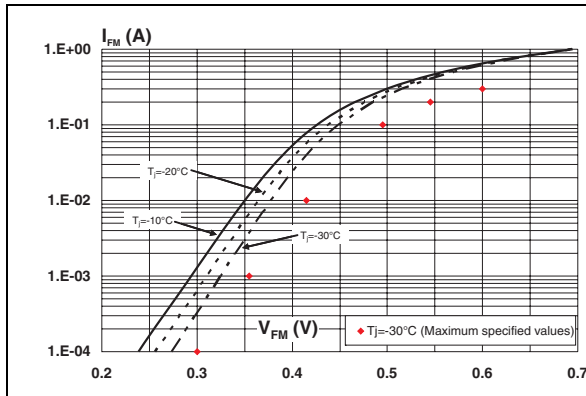
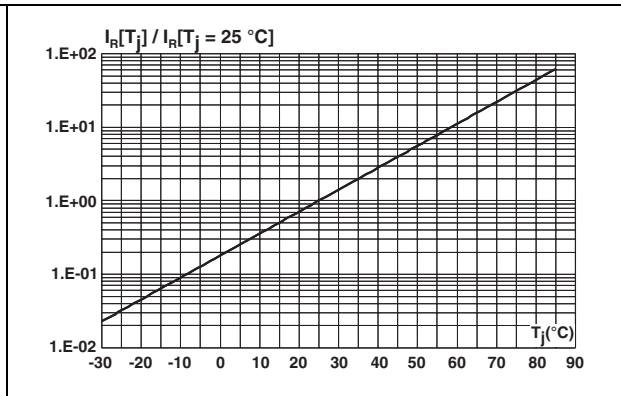
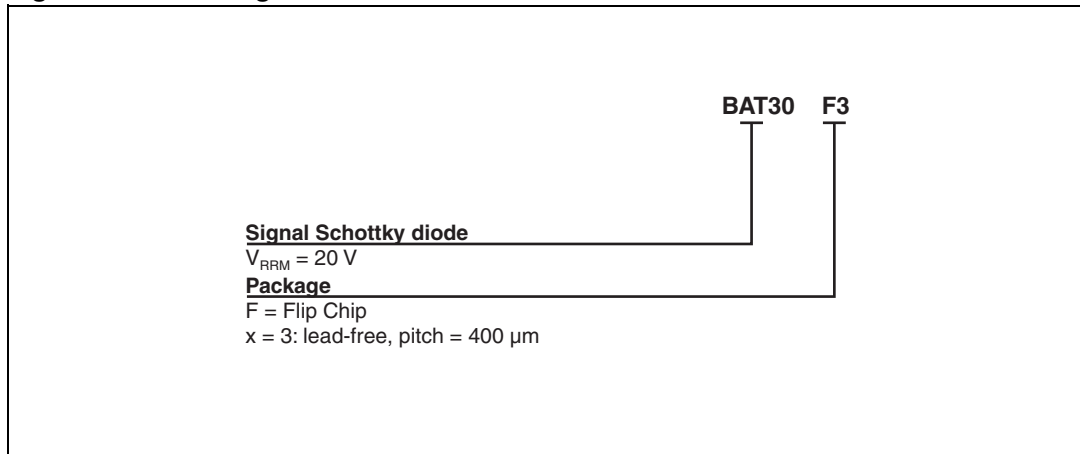


Figure 6. Relative variation of reverse leakage current versus junction temperature (typical values)



2 Ordering information scheme

Figure 7. Ordering information scheme



3 Package information

- Epoxy meets UL94, V0
- Lead-free packages

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Figure 8. Package dimensions (dimensions in mm)

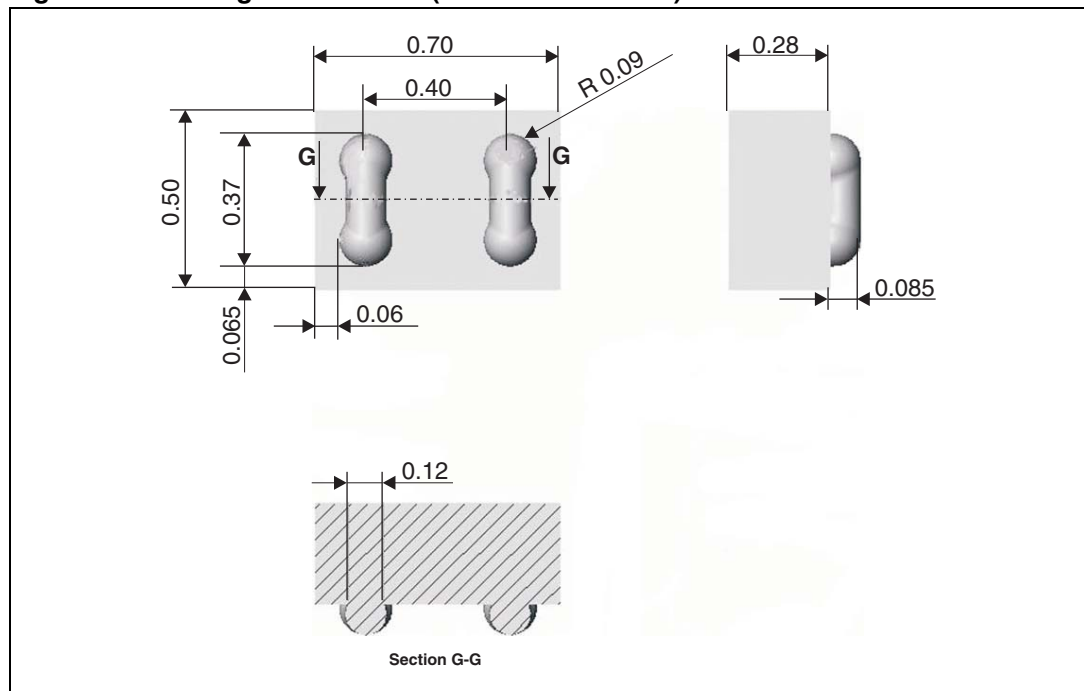
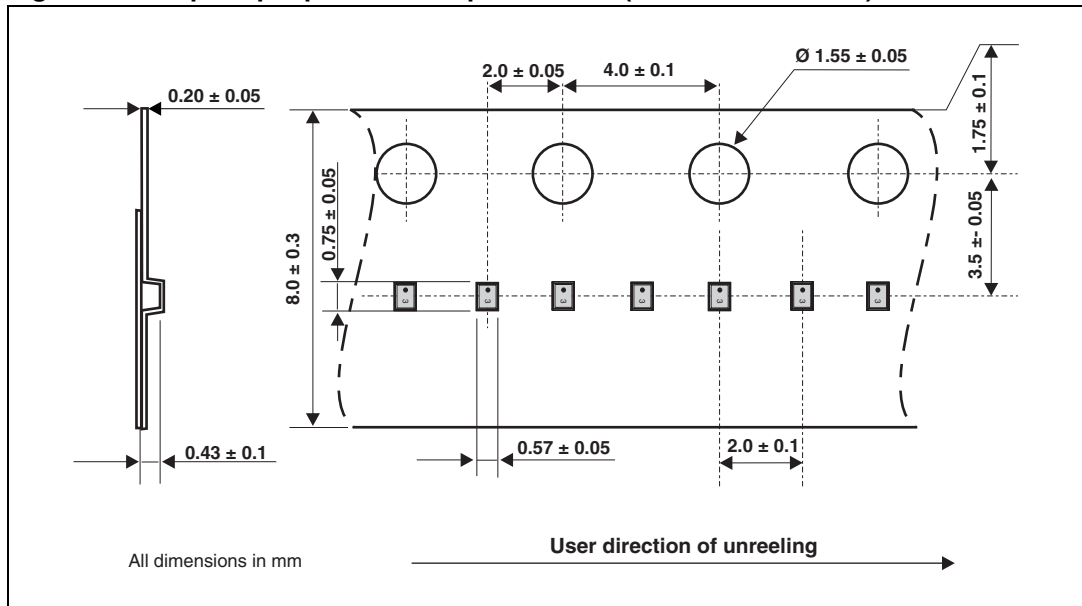


Figure 9. Flip Chip tape and reel specification (dimensions in mm)



4 PCB recommendations

4.1 Design

For optimum electrical performance and highly reliable solder joints, STMicroelectronics recommends the PCB design recommendations listed in [Table 3](#).

Table 3. PCB design recommendations for solder bar pitch 400 µm

For NSMD PCB non solder mask defined	Oblong pad: 370 x 180 µm – Micro via SSBU allowed – Micro via SBU to be avoided – Micro via SBU filled (under qualification)
	Track: – Only one track per pad – Maximum track width = 100 µm Track layout must be symmetrical to the die axis (to homogenize stress and welding attraction during reflow assembly)
For SMD PCB solder mask defined	Oblong pad: – Micro via SSBU allowed – Micro via SBU to be avoided – Micro via SBU filled (under qualification)
PCB Pad Finishing	Cu – Ni (2-6 µm) - Au (0.2 µm max)

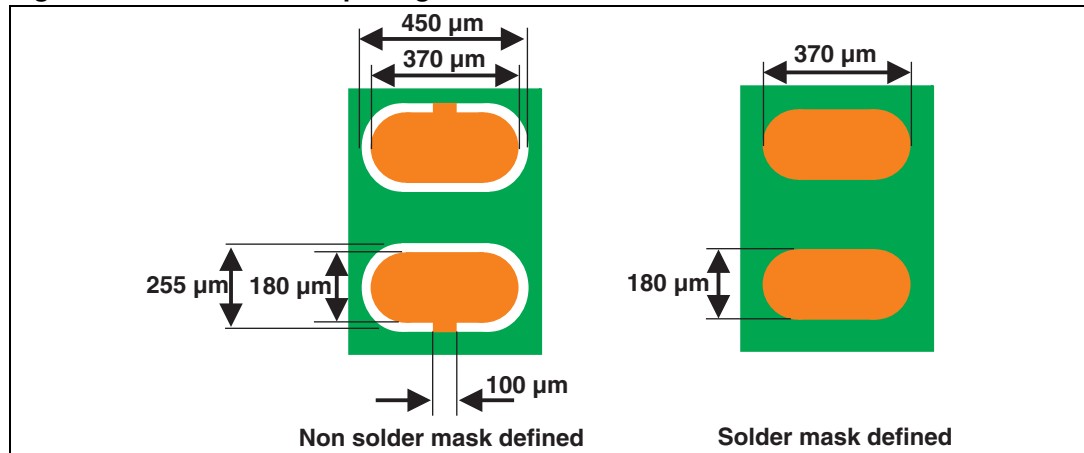
Note: A gold layer finishing on the PCB pad that is too thick (0.2 µm maximum) is not recommended (low joint reliability).

To optimize the natural self centering effect of CSP on the PCB, PCB pad positioning and size have to be properly designed (see [Figure 10](#))

Micro vias

An alternative to routing on the top surface is to route out on buried layers. To achieve this, the pads are connected to the lower layers using micro vias. Only SSBU via technology is approved.

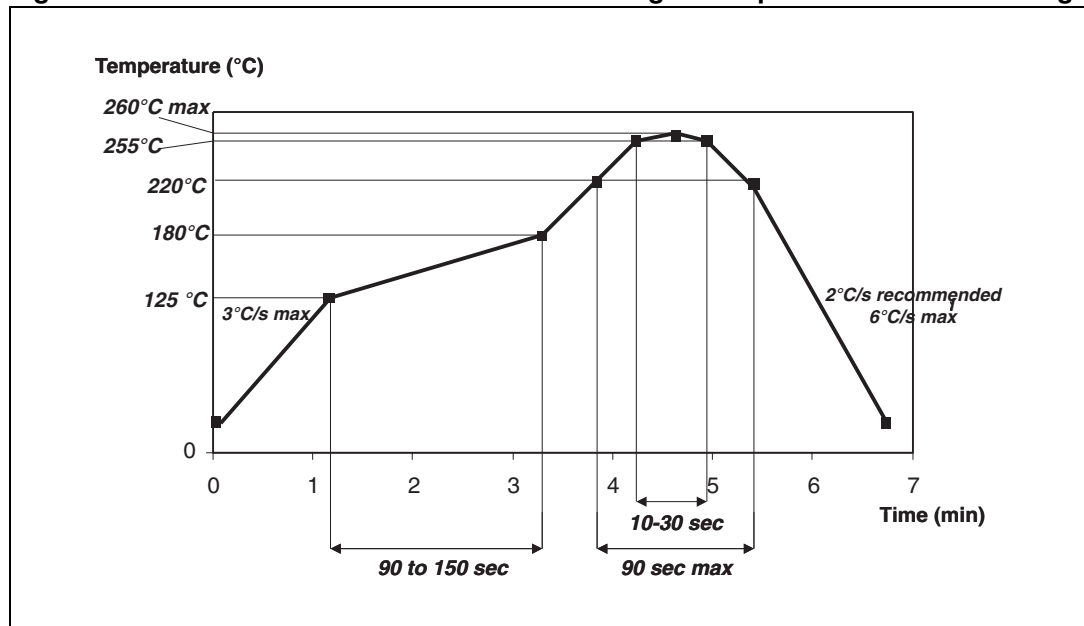
Figure 10. Solder mask opening



4.2 Assembly

For chip scale package mounting on the PCB, STMicroelectronics recommends the use of a solder stencil aperture of 330 x 330 µm maximum and a typical stencil thickness of 75 or 80 µm. Chip scale packages are fully compatible with the use of near eutectic 95.5 Sn, 4 Ag, 0.5 Cu solder paste with no-clean flux. ST's recommendations for chip scale package board mounting are illustrated on the soldering reflow profile shown in [Figure 11](#).

Figure 11. ST ECOPACK® recommended soldering reflow profile for PCB mounting



Dwell time in the soldering zone (with temperature higher than 220 °C) has to be kept as short as possible to prevent component and substrate damage. Peak temperature must not exceed 260 °C. Controlled atmosphere (N2 or N2H2) is recommended during the whole reflow, especially above 150 °C.

Chip scale packages are able to withstand three times the previous recommended reflow profile in order to be compatible with a double reflow when SMDs are mounted on both sides of the PCB and one additional repair.

A maximum of three soldering reflows are allowed for these lead-free packages (with repair step included).

The use of a no-clean flux is highly recommended to avoid any cleaning operation. To prevent any bump cracks, ultrasonic cleaning methods are not recommended.

5 Ordering information

Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
BAT30F3	3	Flip Chip	0.3 mg	15000	Tape and reel 7"

6 Revision history

Table 5. Document revision history

Date	Revision	Changes
14-Dec-2009	1	Initial release.
21-Oct-2010	2	Updated dot graphic in Figure 1 .

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2010 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [Schottky Diodes & Rectifiers](#) category:

Click to view products by [STMicroelectronics](#) manufacturer:

Other Similar products are found below :

[MA4E2039](#) [D1FH3-5063](#) [MBR0530L-TP](#) [MBR10100CT-BP](#) [MBR1545CT](#) [MMBD301M3T5G](#) [RB160M-50TR](#) [RB551V-30](#)
[BAS16E6433HTMA1](#) [BAT 54-02LRH E6327](#) [NSR05F40QNXT5G](#) [NTE555](#) [JANS1N6640](#) [SB07-03C-TB-H](#) [SB1003M3-TL-W](#) [SK310-T](#)
[SK32A-LTP](#) [SK33A-TP](#) [SK34B-TP](#) [SS3003CH-TL-E](#) [GA01SHT18](#) [CRS10I30A\(TE85L,QM](#) [MA4E2501L-1290](#) [MBRB30H30CT-1G](#)
[SB007-03C-TB-E](#) [SK32A-TP](#) [SK33B-TP](#) [SK35A-TP](#) [SK38B-TP](#) [NRVBM120LT1G](#) [NTE505](#) [NTSB30U100CT-1G](#) [SS15E-TP](#) [VS-](#)
[6CWQ10FNHM3](#) [ACDBA1100LR-HF](#) [ACDBA1200-HF](#) [ACDBA140-HF](#) [ACDBA2100-HF](#) [ACDBA3100-HF](#) [CDBQC0530L-HF](#)
[CDBQC0240LR-HF](#) [ACDBA340-HF](#) [ACDBA260LR-HF](#) [ACDBA1100-HF](#) [SK310B-TP](#) [MA4E2502L-1246](#) [MA4E2502H-1246](#)
[NRVBM120ET1G](#) [NSR01L30MXT5G](#) [NTE573](#)