

The entire 178-product lineup contributes to lower power consumption, smaller size, and higher reliability in a wider range of applications

ROHM has recently expanded its portfolio of Schottky barrier diodes by 24 new compact high efficiency models (12 RBR series and 12 RBQ series). These devices – 178 in total – are ideal for protection and rectification circuits in automotive, industrial equipment, and consumer applications.

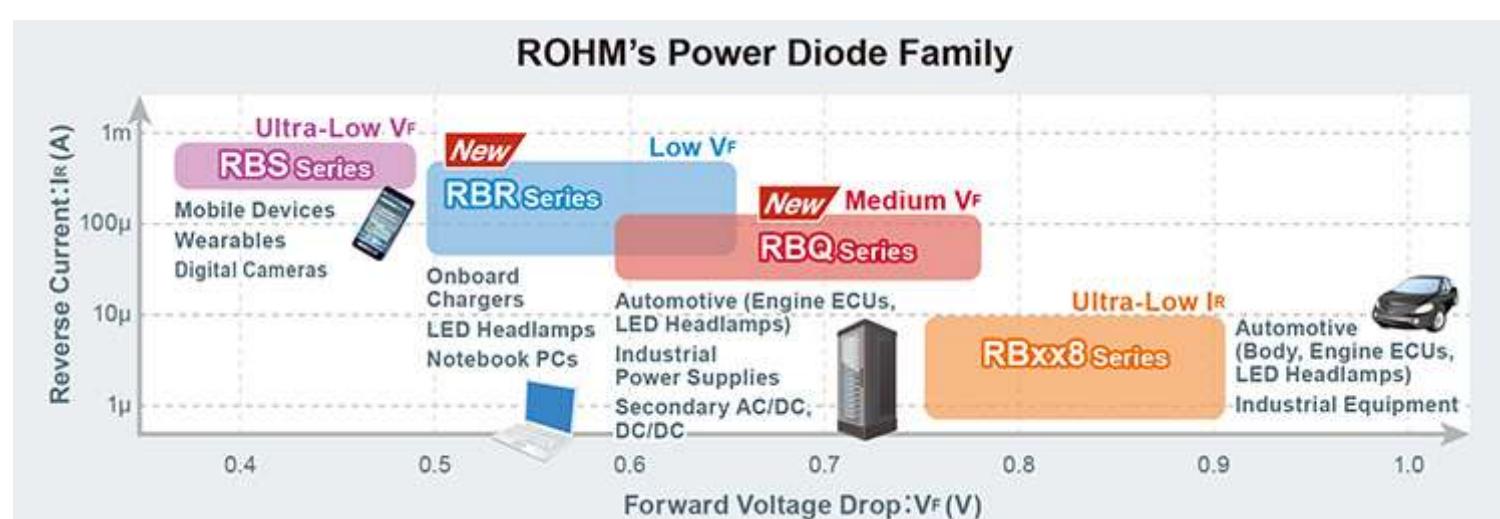
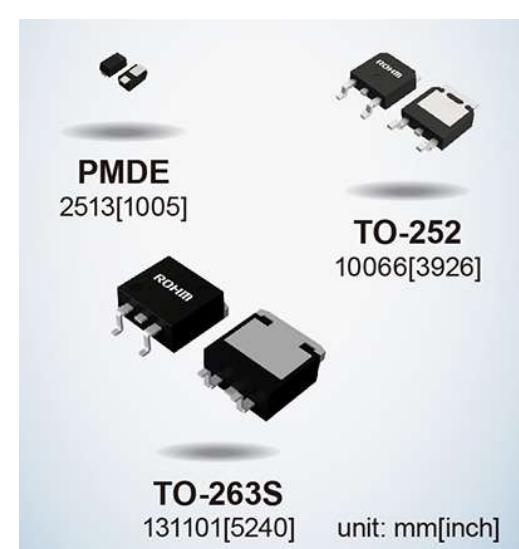
Diodes are commonly used in a variety of circuits for rectification and protection. Moreover, as lower power consumption is required in most applications, the adoption of SBDs – which are more efficient than other diodes – is on the rise. However, if VF is lowered to improve efficiency, IR which is inversely related to VF will become higher. This increases the risk of thermal runaway, so it is important to balance both VF and IR when selecting SBDs for circuit design.

In response, ROHM strengthened its lineup of SBDs that balances small size with low VF and IR – characteristics demanded by the automotive sector. The market-proven RBR and RBQ series have been further expanded to include a lineup of compact high current, high voltage products that enable rectification and protection in a wider range of applications.

Introducing a new process allows ROHM to improve the chip performance of both series by 25% (VF of RBR series in particular) over ROHM's conventional products. Furthermore, the RBR series features excellent low VF characteristics – key to improving efficiency and reducing loss. This makes them ideal for automotive applications as well as consumer electronics such as laptops where high efficiency is required. In fact, 12 of the products adopt a compact package (PMDE package) that reduces mounting area by 42% compared to existing products (PMDU package).

At the same time, the RBQ series delivers excellent low IR characteristics that enable stable operation in high temperature environments – significantly reducing the risk of thermal runaway which is a concern with SBDs. As such they are ideal for automotive powertrain applications and power supplies for industrial equipment that operate in high temperature environments. 12 new 100V products have been added to meet the need for higher voltages. And both series are qualified under the AEC-Q101 standard to ensure automotive-grade reliability.

Going forward, ROHM will continue to improve characteristics and efficiency of its semiconductor devices, from low to high voltages products while strengthening its distinctive lineup to further reduce power consumption and achieve greater miniaturization of applications.



Key Features

In addition to adopting a new process that increases efficiency by 25% in the same chip size as ROHM's conventional products, the RBR/RBQ series delivers the following features.

1. RBR Series

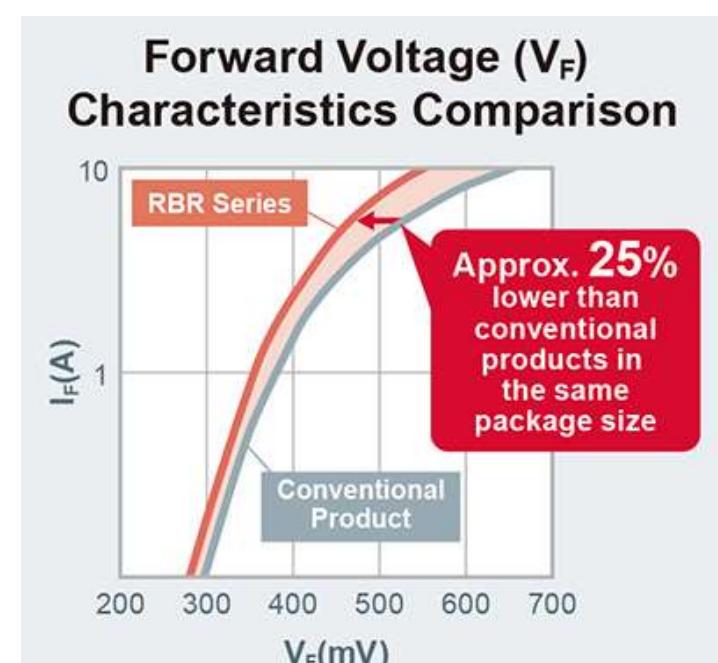
1-1. Low VF reduces loss

The RBR series achieves lower loss by reducing VF by 25% compared to ROHM conventional products of the same size while suppressing IR characteristics which is at tradeoff relation with low VF. This makes them ideal for automotive applications that require higher efficiency as well as laptops and other consumer electronics where greater energy savings are required.

In addition, chip size of RBR series is reduced while maintaining performance, resulting in a smaller package that minimizes footprint. For example, replacing the conventional 3.5mm×1.6mm size PMDU (SOD-123FL) package with the new 2.5mm×1.3mm PMDE decreases mounting area by approx. 42%.

1-2. New compact package added to ROHM's comprehensive lineup

The RBR series now includes 12 new 2.5mm×1.3mm PMDE package products (6 for consumer + 6 for automotive). This brings the total lineup to 140 products (30V/40V/60V withstand voltages, 1A to 40A current) that expands applicability to include both automotive and consumer applications.



RBR Series: Voltage/Current/Package Lineup

Package Name (JEDEC code) Package Size: mm[inch]	Part No. / No. of Products (140 in Total)	V _R (V)	Current (A)							Tc=25°C
			1	3	5	10	20	30	40	
PMDE 2513[1005]	New RBR1VWM30A	30	5							
	New RBR2VWM30A		10							
	New RBR1VWM40A	40	5							
	New RBR2VWM40A		10							
	New RBR1VWM60A	60	5							
	New RBR2VWM60A		10							
PMDU (SOD-123FL) 3516[1408]	8 Products	30	10							
	12 Products	40	10							
	12 Products	60	10							
PMDTM (SOD-128) 4725[1910]	12 Products	30	15							
	12 Products	40	15							
	12 Products	60	15							
PMDS (DO-214AC(SMA)) 5026[2010]	6 Products	30	15							
	6 Products	40	15							
	6 Products	60	15							
TO-252 (TO-252(DPAK)) 10066[3926]	6 Products	30	20							
	6 Products	40	20							
	6 Products	60	20							
TO-263S (TO-263S(D2PAK)) 131101[5240]	8 Products	30	30							
	8 Products	40	30							
	8 Products	60	30							

2. RBQ Series

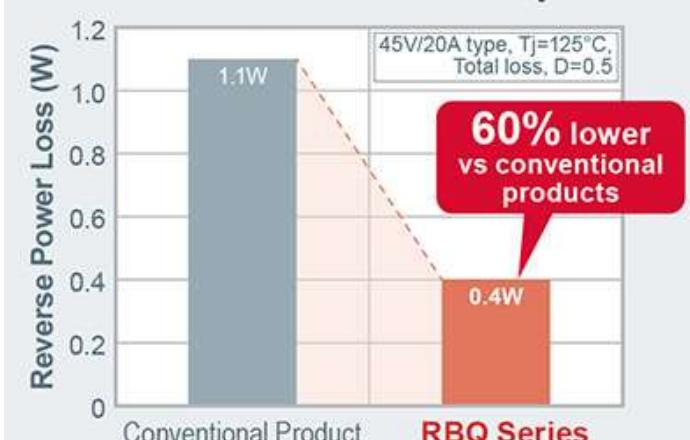
2-1. Low IR ensures stable operation at high temperatures

The RBQ series utilizes proprietary barrier formation technology to achieve the optimum balance between VF and IR for switching power supplies. As a result, reverse power loss is decreased by 60% compared to ROHM's conventional products, further reducing the risk of thermal runaway at high temperatures. This makes them ideal for automotive powertrain and industrial power supplies that operate in high temperature environments.

2-2. ROHM completes its lineup with new 100V products

The addition of 12 new 100V products (6 for consumer + 6 for automotive) to the RBQ series brings the total to 38 products comprised of both cathode common and single types in 45V/65V/100V withstand voltages and 10A to 30A of current.

Reverse Power Loss Comparison



RBQ Series: Voltage/Current/Package Lineup

Package Name (JEDEC code) Package Size: mm[inch]	Part No. / No. of Products (38 in Total)	V _R (V)	Current (A)							Tc=25°C
			5	10	15	20	25	30	35	
TO-252 (TO-252(DPAK)) 10066[3926]	6 Products	45	20							
	6 Products	65	20							
	New RBQ10BGE10A		10							
	New RBQ15BGE10A	100	15							
	New RBQ20BM100A		20							
TO-263S (TO-263S(D2PAK)) 131101[5240]	8 Products	45	30							
	6 Products	65	30							
	New RBQ10NS100A		10							
	New RBQ20NS100A	100	10							
	New RBQ30NS100A		30							

Pricing: \$1.50/unit (samples, excluding tax)

Availability: In mass production

Online Distributors



Application Examples

RBR Series

- Automotive Applications such as LED headlamps and car accessories

- Notebook PCs

RBQ Series

- Industrial power supplies
- Audio
- Laptops
- xEVs
- Engine ECUs
- Secondary rectification in AC/DC and DC/DC circuits

Terminology

Schottky Barrier Diodes

A type of diode that provides rectification (diode) characteristics by adopting a Schottky barrier formed through a metal-semiconductor junction. The lack of minority carrier effect results in superior high-speed performance.

Forward Voltage (V_F)

A voltage drop that occurs when electricity flows from the + to the - direction. The lower this value, the higher the efficiency.

Reverse Current (I_R)

Reverse current generated when reverse voltage is applied. The lower this value is, the smaller the power consumption (reverse power loss).

Thermal Runaway

When a diode is conducted in the reverse direction, heat generated within the chip may exceed the heat dissipation of the package, causing IR to increase and eventually lead to destruction, a phenomenon called thermal runaway. For SBDs with high IR values, thermal runaway is especially likely to occur, so care must be taken when designing circuits.

AEC-Q101 Automotive Reliability Standard

AEC stands for Automotive Electronics Council, an organization (comprised of major automotive manufacturers and component makers) responsible for establishing electronic reliability standards for automotive electronics. The Q101 standard specifically applies to discrete semiconductor components (i.e. transistors and diodes).