Issue Number | 001
June 2016

New Product Announcement

SBRT3M40P1

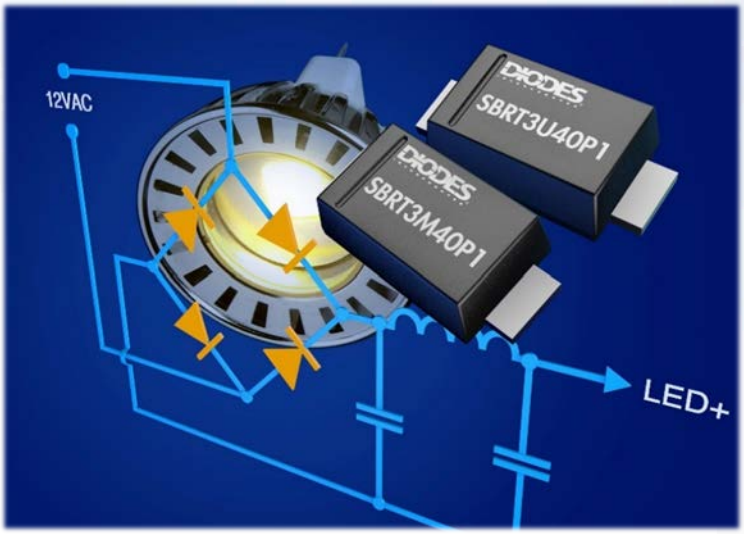
Trench SBR® Optimized for Bridge Rectifier in Retrofit MR16 LED Lamps

The SBRT3M40P1 Trench Super Barrier Rectifier (SBR®) is optimized to give a low reverse-current leakage combined with a low forward-voltage drop in a small form factor.

This capability addresses requirements for input bridge rectifiers in solid-state lighting (SSL) applications focussed on 12V AC LED retrofit lamps that provide a more efficient and longer life alternative to popular MR16 halogen bulbs.

These 40V rated Trench SBRs maximize the 1A bridge rectifier efficiency and power density with only a 0.29V forward-voltage drop in a compact PowerDI®123 footprint of 6.75mm^2.

For samples and quotations please contact your nearest Diodes sales office or representative.



The Diodes Advantage

SBRT3M40P1 and SBRT3U40P1 are 40V 3A rated Trench SBRs.

- **Low Reverse-Current Leakage (I_R)**
  At +125ºC, the SBRT3M40P1 has a I_R of 1.2mA (12V) giving immunity to thermal runaway under high ambient temperature environment.
- **PowerDI®123 Package Reduces Footprint**
  6.75mm^2 footprint and <1mm height, compared to SMA of 16mm^2 and 2mm, respectively, which significantly saves space in the MR16 retrofit.
- **Low Forward-Voltage Drop (V_F)**
  Only 0.29V V_F increases the bridge rectifier efficiency.
- **Sufficient Blocking Voltage (V_{RRM})**
  40V provides sufficient headroom for the intended 12V AC input supply. If poor line regulation, then 60V SBRT3M60P1 / SBRT3U60P1 are available.

Target Application

Intended for 12V AC bridge rectifier input of retrofit MR16 LED bulbs. By replacing the halogen incandescent filament with LED lighting offers greater efficiency and a longer lifespan, overall reducing the total cost of ownership.

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Trench SBR® Advantage in MR16 Bridge Rectifier

The MR16 retrofit LED bulb is a hot environment and this can cause thermal runaway in the bridge rectifier. Therefore, it is important to select a low reverse-current leakage (I_R) rectifier at the 12V AC input while operating under high ambient temperatures. This is traded off against the forward-voltage drop (V_F) which needs to be minimized to increase the bridge rectifier efficiency.

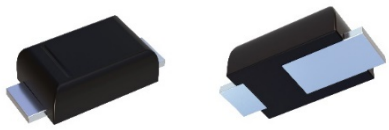
The portfolio table below gives the typical I_R and V_F under the MR16 bridge rectifier operating conditions of 12V and 1A at +125ºC. With different options of I_R and V_F then the rectification circuit can be optimized depending on the waveform's duty cycle requirements and operating temperature.

Compared to other rectifiers, the Trench SBR offers a lower I_R at high temperatures, while also minimizing the V_F in a small footprint. Under evaluation, the SBRT3M40P1 offers the optimum performance with the low I_R at an elevated temperature in the MR16 environment.

Trench SBR Portfolio for MR16 Bridge Rectifier

Part Number	V_{RRM} Max (V)	I_O Max (A)	V_F Typical @ 1A & 125ºC (V)	I_R Typical @ 12V & 125ºC (mA)	Package
SBRT3M40P1	40	3	0.29	1.2	PowerDI®123
SBRT3U40P1	40	3	0.25	4	PowerDI®123
SBRT3M60P1	60	3	0.34	0.7	PowerDI®123
SBRT3U60P1	60	3	0.28	3	PowerDI®123
SBRT3M40SA	40	3	0.29	1.2	SMA
SBRT3M60SA	60	3	0.34	0.7	SMA
SBRT3U60SA	60	3	0.28	3	SMA

PowerDI®123 Package



- Higher power density package
- Small footprint of 3.8 x 1.8 mm
- Lower profile height < 1mm

SMA Package

- Industry standard SMA package
- Footprint of 5.5 x 2.9 mm
- Height about 2mm