



New Product Announcement

CSP / DFN - Schottky Diodes

Schottky Diodes in Ultra-Small CSP / DFN Packages for Small Form-Factor IoTs and Mobile Electronics

Diodes Incorporated announces the introduction of a range of Schottky Diodes in minuscule CSP and DFN packages.

Featuring ultra-low forward voltage (V_F) and leakage current (I_R) at less than 0.35V and 200nA, these devices offer exceptional power efficiency.

To ensure long-term reliability, optimum electrical performance and package miniaturization, some of these devices are housed in the CSP packages which are as small as 0.6mm x 0.3mm with a height as low as 0.2mm.

This new release of ultra-small Schottky diodes facilitates varied applications such as blocking, electrical over-stress (EOS) and boost-strap diodes in many battery-powered products such as IoT (Internet of Things) wearables, smartphones, and virtual / augmented reality (VR/AR) headsets. Many of the devices in this release are also qualified to AEC-Q101 standards and are supported by the PPAP process.

The robustness of these devices also allows them to be used in the end systems under demanding operating environments such as infotainment and ADAS (Advanced Driver Assistance Systems).

The CSP and DFN packages are fully green and RoHS-compliant (visit www.diodes.com for further details).



The Diodes Advantage

▪ Minuscule Packages and Robustness

These ultra-low profile and small footprint surface mountable packages enable compact form-factors of the adopting end systems. Freeing of bond-wires inside the CSP package and the support of PPAP ensure long-term reliability.

▪ Low Forward Voltage

With the maximum forward voltage (V_F) as low as 0.35V, these CSP/DFN-packaged Schottky Diodes enable very low conduction losses to be realized. This results in lower operating temperatures and excellent long-term reliability.

▪ Low Leakage Current

The low leakage current (I_R) translates to low ambient temperature when the system is on standby mode. In battery-powered systems, the standby time is significantly extended.

▪ Wide Range of Reverse Breakdown Voltages and Output Currents

These devices offer a comprehensive range of reverse breakdown voltages ($V_{BR_MIN} = 20V$ to $70V$) and output currents ($I_{O_MAX} = 70mA$ to $2A$), meeting the expectation of many applications with demanding requirements.

Circuit Functions

- Rectification
- Reverse Polarity Protection
- Freewheeling Diode
- Electrical Over-stress Diode
- Blocking Diode
- Booststrap Diode

Target Markets

- Industrial Robotics
- IoT (Internet-of-Things)
- Infotainment / ADAS
- Portable Electronics
- Mobile Computing
- Mobile Communications
- VR/AR Headsets



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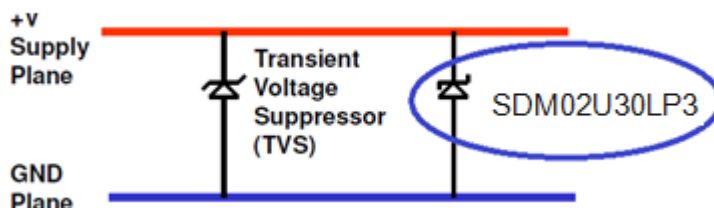
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Benefit of Schottky Diodes in Ultra-small CSP / DFN Packages

In wireless charging, the receiver inside an IoT wearable such as a smart watch, operates in a confined and hot environment. As such, thermal runaway in the bridge rectifier circuit can easily occur. Therefore, it is important to select a low reverse-current leakage (I_R) rectifier which can operate reliably under high ambient temperature. This is traded off against the forward-voltage drop (V_F) which needs to be minimized to increase the bridge rectifier efficiency. For example, the SDM02M30LP3 offers $I_R \ll 14\text{nA}$ typical while V_F is 0.3V typical at 125°C and T_{RR} is 1.6ns typical.

In applications where sensitive electronic components can be damaged by negative transients, the SDM02U30CSP with low V_F at typically 0.39V at $I_F=200\text{mA}$ and 125°C can significantly minimize the possible hazards such as EOS (electrical overstress) and latch-up to key components like the application processor and multi-band modem inside a smartphone.

Recommended EOS Protection across Board Supply / Ground Planes



Product Portfolio

Product Number	Qualified to AECQ101 / PPAP Capable	Peak Repetitive Reverse Voltage V_{RRM} (V)	Maximum Forward Voltage Drop V_F (V)	Average Rectified Output Current I_O (A)	Max Reverse Current I_R (μA)	Maximum Peak Forward Surge Current I_{FSM} (A)	Package
BAS40LP	Y	40	1	0.2	0.2	1	X1-DFN1006-2
BAS70LP	Y	70	0.96	0.07	10	0.8	X1-DFN1006-2
BAT54LP	Y	30	1	0.2	2	0.6	X1-DFN1006-2
BAT54LPS	Y	30	0.65	0.2	2	0.6	X2-DFN1006-2
SDM02M30LP3	N	30	0.45	0.1	0.4	2	X3-DFN0603-2
SDM02U30CSP	N	30	0.34	0.2	2	4.5	X3-WLB0603-2
SDM02U30LP3	N	30	0.37	0.1	7	2	X3-DFN0603-2
SDM05U20CSP	N	20	0.43	0.5	55	14	X3-WLB1006-2
SDM05U40CSP	N	40	0.46	0.5	75	14	X3-WLB1006-2
SDM10U45LP	Y	45	0.8	0.1	1	1	X1-DFN1006-2
SDM1A40CSP	N	40	0.56	1	75	14	X3-WLB1006-2
SDM1L30CSP	N	30	0.4	1	1000	25	X2-WLB2010-2
SDM1M40LP8	Y	40	0.66	1	20	8	U-DFN1608-2
SDM1U20CSP	N	20	0.44	1	100	18	X3-WLB1406-2
SDM1U40CSP	N	40	0.48	1	100	18	X3-WLB1406-2
SDM20U30LP	Y	30	0.575	0.2	150	1	X1-DFN1006-2
SDM2A20CSP	N	20	0.53	2	80	20	X3-WLB1406-2
SDM2U20CSP	N	20	0.47	2	150	20	X3-WLB1608-2
SDM2U30CSP	N	30	0.48	2	150	20	X3-WLB1608-2
SDM2U40CSP	N	40	0.53	2	150	28	X3-WLB1608-2