

Avoiding Excessive Supply Current in the HS-1840ARH During Start-Up

TB402 Rev.1.0 Feb 9, 2021

Description

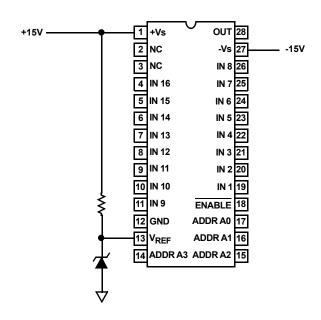
If the supply voltages (+Vs and -Vs) and reference voltage (Vref) to the HS-1840ARH are not sequenced properly, it is possible that excessive supply current will flow during start-up. The maximum current that can flow from either supply is 30mA as long as the supply voltages are limited to ±16.5V. Up to 40mA can flow from either supply if the supply voltages reach ±20V. Although this condition is not harmful to the part, it can cause system problems if this current is not included in the power supply budget.

The internal level-shifter in the HS-1840ARH is referenced to the negative supply and requires a voltage on Vref of at least 1.2V to initialize its state. If the level-shifter circuitry is not initialized, the part can start drawing excessive supply current once the supply voltages reach about ± 5 V. With the previous generation HS-1840RH, the level-shifter was referenced to ground and did not require a voltage on Vref in order to initialize.

The voltage on the Vref pin sets the logic threshold level of the input address decode circuitry and should be set to 5V $\pm 10\%$. Under recommended operating conditions, Vref typically consumes about $22\mu A$ of current, but to account for variations over voltage, temperature and radiation, we recommend that $50\mu A$ be allocated.

The easiest way to prevent excessive supply current during start-up is to derive the reference voltage from the positive supply voltage. This can easily be accomplished using a zener diode and a resistor as shown in the schematic diagram.

Schematic



Revision History

Rev.	Date	Description
1.0	Feb 9, 2021	Updated description. Added Revision History section
0.0	Jan 23, 2003	Initial release

IMPORTANT NOTICE AND DISCLAIMER

RENESAS ELECTRONICS CORPORATION AND ITS SUBSIDIARIES ("RENESAS") PROVIDES TECHNICAL SPECIFICATIONS AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for developers skilled in the art designing with Renesas products. You are solely responsible for (1) selecting the appropriate products for your application, (2) designing, validating, and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. Renesas grants you permission to use these resources only for development of an application that uses Renesas products. Other reproduction or use of these resources is strictly prohibited. No license is granted to any other Renesas intellectual property or to any third party intellectual property. Renesas disclaims responsibility for, and you will fully indemnify Renesas and its representatives against, any claims, damages, costs, losses, or liabilities arising out of your use of these resources. Renesas' products are provided only subject to Renesas' Terms and Conditions of Sale or other applicable terms agreed to in writing. No use of any Renesas resources expands or otherwise alters any applicable warranties or warranty disclaimers for these products.

(Rev.1.0 Mar 2020)

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu, Koto-ku, Tokyo 135-0061, Japan www.renesas.com

Trademarks

Renesas and the Renesas logo are trademarks of Renesas Electronics Corporation. All trademarks and registered trademarks are the property of their respective owners.

Contact Information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit:

www.renesas.com/contact/