



Pricing Supplement

Dated February 24, 2023

To the Prospectus dated September 14, 2021, the Prospectus Supplement dated September 14, 2021, and the Product Prospectus Supplement dated March 3, 2022

\$430,000

Auto-Callable Cumulative Barrier Notes Linked to the VanEck® Semiconductor ETF, Due February 27, 2025
Royal Bank of Canada

Royal Bank of Canada is offering Auto-Callable Cumulative Barrier Notes (the "Notes") linked to the performance of the VanEck® Semiconductor ETF (the "Reference Asset").

Reference Asset	Initial Price	Barrier Price*
VanEck® Semiconductor ETF ("SMH")	\$238.21	\$166.75, which is 70% of its Initial Price

*Rounded to two decimal places.

- The Notes will be automatically called at the applicable Call Amount if the Observation Price (as defined below) of the Reference Asset is greater than or equal to the Initial Price on any quarterly Observation Date, beginning in March 2024.
- The Call Amounts are based on a rate of return of approximately 13.50% per annum (the "Call Return Rate"). The Call Amounts will increase on each Observation Date to reflect that rate of return, as set forth in the "Summary" section below.
- If the Notes are not automatically called, and the Final Price is less than the Initial Price, but is greater than or equal to the Barrier Price, we will pay you a cash payment at maturity equal to the principal amount.
- If the Final Price is less than the Barrier Price, investors will lose 1% of the principal amount for each 1% that the Final Price has decreased from the Initial Price.
- Any payments on the Notes are subject to our credit risk.
- The Notes do not pay interest.
- The Notes will not be listed on any securities exchange.

Issue Date: March 1, 2023

Maturity Date: February 27, 2025

CUSIP: 78016HSF8

Investing in the Notes involves a number of risks. See "Selected Risk Considerations" beginning on page P-7 of this pricing supplement, "Additional Risk Factors Specific to the Notes" beginning on page PS-6 of the product prospectus supplement dated March 3, 2022, and "Risk Factors" on page S-2 of the prospectus supplement dated September 14, 2021.

The Notes will not constitute deposits insured by the Canada Deposit Insurance Corporation, the U.S. Federal Deposit Insurance Corporation or any other Canadian or U.S. government agency or instrumentality.

The Notes are not subject to conversion into our common shares under subsection 39.2(2.3) of the Canada Deposit Insurance Corporation Act.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of the Notes or determined that this pricing supplement is truthful or complete. Any representation to the contrary is a criminal offense.

	Per Note	Total
Price to public	100.00%	\$430,000
Underwriting discounts and commissions ⁽¹⁾	2.50%	\$10,750
Proceeds to Royal Bank of Canada	97.50%	\$419,250

⁽¹⁾ RBC Capital Markets, LLC ("RBCCM"), acting as our agent, will receive a commission of \$25.00 per \$1,000 in principal amount of the Notes and will use a portion of that commission to allow selling concessions to other dealers of up to \$25.00 per \$1,000 in principal amount of the Notes. The other dealers may forgo, in their sole discretion, some or all of their selling concessions. See "Supplemental Plan of Distribution (Conflicts of Interest)" below.

The initial estimated value of the Notes as of the Trade Date was \$952.17 per \$1,000 in principal amount, which is less than the price to public. The actual value of the Notes at any time will reflect many factors, cannot be predicted with accuracy, and may be less than this amount. We describe our determination of the initial estimated value in more detail below.

SUMMARY

The information in this “Summary” section is qualified by the more detailed information set forth in this pricing supplement, the product prospectus supplement, the prospectus supplement, and the prospectus.

General:	This pricing supplement relates to an offering of Auto-Callable Cumulative Barrier Notes (the “Notes”) linked to the VanEck® Semiconductor ETF (the “Reference Asset”).																			
Issuer:	Royal Bank of Canada (“Royal Bank”)																			
Trade Date (Pricing Date):	February 24, 2023																			
Issue Date:	March 1, 2023																			
Valuation Date:	February 24, 2025																			
Maturity Date:	February 27, 2025																			
Denominations:	Minimum denomination of \$1,000, and integral multiples of \$1,000 thereafter.																			
Interest Payments:	None. No payments on the Notes will be made prior to maturity or automatic call.																			
Call Feature:	If, on any Observation Date (which begin in March 2024), the Observation Price of the Reference Asset is greater than or equal to the Initial Price, then the Notes will be automatically called and, for each \$1,000 in principal amount, the applicable Call Amount will be paid on the corresponding Call Settlement Date. The Call Amounts are set forth in the table below.																			
Observation Price:	The “Observation Price” will be the closing price of the Reference Asset as of the applicable Observation Date, as determined by the Calculation Agent, subject to adjustment as set forth in the product prospectus supplement.																			
Initial Price:	The closing price of the Reference Asset on the Trade Date, as determined by the Calculation Agent, and set forth on the cover page of this document, subject to adjustment as set forth in the product prospectus supplement.																			
Call Return Rate:	Approximately 13.50% per annum																			
Observation Dates/Call Settlement Dates/Call Amounts:	<table border="1"> <thead> <tr> <th>Observation Dates</th><th>Call Settlement Dates</th><th>Call Amounts⁽¹⁾</th></tr> </thead> <tbody> <tr> <td>March 1, 2024</td><td>March 6, 2024</td><td>\$1,135.00</td></tr> <tr> <td>May 24, 2024</td><td>May 30, 2024</td><td>\$1,168.75</td></tr> <tr> <td>August 26, 2024</td><td>August 29, 2024</td><td>\$1,202.50</td></tr> <tr> <td>November 25, 2024</td><td>November 29, 2024</td><td>\$1,236.25</td></tr> <tr> <td>February 24, 2025 (the "Valuation Date")</td><td>February 27, 2025 (the "Maturity Date")</td><td>\$1,270.00</td></tr> </tbody> </table>		Observation Dates	Call Settlement Dates	Call Amounts ⁽¹⁾	March 1, 2024	March 6, 2024	\$1,135.00	May 24, 2024	May 30, 2024	\$1,168.75	August 26, 2024	August 29, 2024	\$1,202.50	November 25, 2024	November 29, 2024	\$1,236.25	February 24, 2025 (the "Valuation Date")	February 27, 2025 (the "Maturity Date")	\$1,270.00
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February 24, 2025 (the "Valuation Date")	February 27, 2025 (the "Maturity Date")	\$1,270.00																		
Final Price:	The closing price of the Reference Asset on the Valuation Date.																			
Barrier Price:	70% of the Initial Price, as set forth on the cover page of this document.																			

Payment at Maturity (if not previously called and held to maturity):	<p>If the Notes are not called on any Observation Date (including the Valuation Date), we will pay you at maturity an amount based on the Final Price:</p> <ul style="list-style-type: none"> • If the Final Price is greater than or equal to the Barrier Price, we will pay you a cash payment equal to the principal amount. • If the Final Price is less than the Barrier Price, you will receive at maturity, for each \$1,000 in principal amount, a cash payment equal to: $\\$1,000 + (\\$1,000 \times \text{Percentage Change})$ <p>The amount of cash that you will receive in this case will be less than your principal amount, if anything, resulting in a loss that is proportionate to the decline in the price of the Reference Asset from the Trade Date to the Valuation Date. Investors in the Notes could lose some or all of their investment if the Final Price is less than the Barrier Price.</p>
Percentage Change:	$\frac{\text{Final Price} - \text{Initial Price}}{\text{Initial Price}}$
Stock Settlement:	Not applicable. Payments on the Notes will be made solely in cash.
Market Disruption Events:	The occurrence of a market disruption event (or a non-trading day) as to the Reference Asset will result in the postponement of an Observation Date or the Valuation Date, as described in the product prospectus supplement.
Calculation Agent:	RBC Capital Markets, LLC ("RBCCM")
U.S. Tax Treatment:	By purchasing a Note, each holder agrees (in the absence of a change in law, an administrative determination or a judicial ruling to the contrary) to treat the Notes as a callable pre-paid cash-settled derivative contract linked to the Reference Asset for U.S. federal income tax purposes. However, the U.S. federal income tax consequences of your investment in the Notes are uncertain and the Internal Revenue Service could assert that the Notes should be taxed in a manner that is different from that described in the preceding sentence. Please see the section below, "Supplemental Discussion of U.S. Federal Income Tax Consequences," and the discussion (including the opinion of Ashurst LLP, our special U.S. tax counsel) in the product prospectus supplement dated March 3, 2022 under "Supplemental Discussion of U.S. Federal Income Tax Consequences," which apply to the Notes.
Secondary Market:	RBCCM (or one of its affiliates), though not obligated to do so, may maintain a secondary market in the Notes after the issue date. The amount that you may receive upon sale of your Notes prior to maturity may be less than the principal amount of your Notes.
Listing:	The Notes will not be listed on any securities exchange.
Clearance and Settlement:	DTC global (including through its indirect participants Euroclear and Clearstream, Luxembourg as described under "Ownership and Book-Entry Issuance" in the prospectus dated September 14, 2021).
Terms Incorporated in the Master Note:	All of the terms appearing above the item captioned "Secondary Market" on pages P-2 and P-3 of this pricing supplement, and the applicable terms appearing under the captions "General Terms of the Notes" and "Supplemental Discussion of U.S. Federal Income Tax Consequences" in the product prospectus supplement dated March 3, 2022, as modified by this pricing supplement.

ADDITIONAL TERMS OF YOUR NOTES

You should read this pricing supplement together with the prospectus dated September 14, 2021, as supplemented by the prospectus supplement dated September 14, 2021 and the product prospectus supplement dated March 3, 2022, relating to our Senior Global Medium-Term Notes, Series I, of which these Notes are a part. Capitalized terms used but not defined in this pricing supplement will have the meanings given to them in the product prospectus supplement. In the event of any conflict, this pricing supplement will control. ***The Notes vary from the terms described in the product prospectus supplement in several important ways. You should read this pricing supplement carefully.***

This pricing supplement, together with the documents listed below, contains the terms of the Notes and supersedes all prior or contemporaneous oral statements as well as any other written materials including preliminary or indicative pricing terms, correspondence, trade ideas, structures for implementation, sample structures, brochures or other educational materials of ours. You should carefully consider, among other things, the matters set forth in “Risk Factors” in the prospectus supplement dated September 14, 2021 and “Additional Risk Factors Specific to the Notes” in the product prospectus supplement dated March 3, 2022, as the Notes involve risks not associated with conventional debt securities. We urge you to consult your investment, legal, tax, accounting and other advisors before you invest in the Notes. You may access these documents on the Securities and Exchange Commission (the “SEC”) website at www.sec.gov as follows (or if that address has changed, by reviewing our filings for the relevant date on the SEC website):

Prospectus dated September 14, 2021:

<https://www.sec.gov/Archives/edgar/data/1000275/000121465921009470/rbc911212424b3.htm>

Prospectus Supplement dated September 14, 2021:

<https://www.sec.gov/Archives/edgar/data/1000275/000121465921009472/rbcsupp911210424b3.htm>

Product Prospectus Supplement ERN-ETF-1 dated March 3, 2022:

https://www.sec.gov/Archives/edgar/data/1000275/000114036122007839/brhc10034774_424b5.htm

Our Central Index Key, or CIK, on the SEC website is 1000275. As used in this pricing supplement, “we,” “us,” or “our” refers to Royal Bank of Canada.

HYPOTHETICAL EXAMPLES

The table set out below is included for illustration purposes only. The table is based on a hypothetical Initial Price of \$100; the actual Initial Price is set forth on the cover page of this pricing supplement relating. The table illustrates payment upon an automatic call and the Payment at Maturity of the Notes for a hypothetical range of performance for the Reference Asset, assuming the following terms:

Hypothetical Initial Price:	\$100.00
Hypothetical Barrier Price:	\$70.00, which is 70% of the hypothetical Initial Price
Principal Amount:	\$1,000 per Note
Call Return Rate:	Approximately 13.50% per annum.
Call Amounts:	\$1,135 if called on the first Observation Date, increasing by \$33.75 on each subsequent Observation Date, as set forth in the table above.

Summary of the Hypothetical Examples

	Notes Are Called on an Observation Date			Notes Are Not Called on Any Observation Date	
	Example 1	Example 2	Example 3	Example 4	Example 5
Initial Price	\$100.00	\$100.00	\$100.00	\$100.00	\$100.00
Observation Price on the First Observation Date	\$125.00	\$90.00	\$95.00	\$97.50	\$95.00
Observation Price on the Second Observation Date	N/A	\$110.00	\$97.50	\$95.00	\$55.00
Observation Price on the Third and Fourth Observation Dates	N/A	N/A	Less than \$100.00	Less than \$100.00	Less than \$100.00
Observation Price on the Final Observation Date	N/A	N/A	\$110.00	\$90.00	\$50.00
Percentage Change	N/A	N/A	N/A	-10%	-50%
Call Amount	\$1,135.00	\$1,168.75	\$1,270.00 (paid on the maturity date)	N/A	N/A
Payment at Maturity (if not previously called)	N/A	N/A	N/A	\$1,000	\$500

Hypothetical Examples of Amounts Payable Upon an Automatic Call

The following hypothetical examples illustrate payments of the Call Amounts set forth in the table in the “Summary” section above.

Example 1: The closing price of the Reference Asset increases as of the first Observation Date. Because the Observation Price on the first Observation Date is greater than the Initial Price, the investor receives on the applicable Call Settlement Date a cash payment of \$1,135, representing the corresponding Call Amount. After the Notes are called, they will no longer remain outstanding and there will be no further payments on the Notes.

Example 2: The closing price of the Reference Asset decreases from the Initial Price to its Observation Price on the first Observation Date, but the price of the Reference Asset increases from the Initial Price as of the second Observation Date. Because the Reference Asset's closing price on the first Observation Date is less than the Initial Price, the Notes are not called on the first Observation Date. Because the Observation Price on the second Observation Date is greater than the Initial Price, the investor receives on the applicable Call Settlement Date a cash payment of \$1,168.75, representing the corresponding Call Amount. After the Notes are called, they will no longer remain outstanding and there will be no further payments on the Notes.

Example 3: The Notes are not called on any of the first 4 Observation Dates, but the Final Price has increased by 10% as of the Valuation Date. Because the Notes are not called on any of the preceding Observation Dates and the Observation Price on the Valuation Date is greater than the Initial Price, the investor receives on the Maturity Date a cash payment of \$1,270.00, representing the corresponding Call Amount for the final Observation Date.

Hypothetical Examples of Amounts Payable at Maturity

The following hypothetical examples illustrate how the payments at maturity set forth in the table above are calculated, **assuming the Notes have not been called.**

Example 4: The price of the Reference Asset decreases by 10% from the Initial Price to a Final Price of \$90. The Notes are not called on any Observation Date because the Observation Price is less than the Initial Price on each Observation Date (including the Valuation Date). Because the Final Price is less than the Initial Price, but is greater than the Barrier Price, the investor receives at maturity a cash payment of \$1,000 per Note, despite the decline in the price of the Reference Asset.

Example 5: The closing price of the Reference Asset is \$50 on the Valuation Date, which is less than the Barrier Price. The Notes are not called on any Observation Date because the Observation Price is less than the Initial Price on each Observation Date (including the Valuation Date). Because the Final Price is less than the Barrier Price, we will pay only \$500 for each \$1,000 in the principal amount of the Notes, calculated as follows:

$$\text{Principal Amount} + (\text{Principal Amount} \times \text{Percentage Change})$$

$$= \$1,000 + (\$1,000 \times -50\%) = \$1,000 - \$500 = \$500$$

* * *

The payments shown above are entirely hypothetical; they are based on prices of the Reference Asset that may not be achieved and on assumptions that may prove to be erroneous. The actual market value of your Notes on the Maturity Date or at any other time, including any time you may wish to sell your Notes, may bear little relation to the hypothetical payments shown above, and those amounts should not be viewed as an indication of the financial return on an investment in the Notes or on an investment in the Reference Asset.

SELECTED RISK CONSIDERATIONS

An investment in the Notes involves significant risks. Investing in the Notes is not equivalent to investing directly in the Reference Asset. These risks are explained in more detail in the section “Risk Factors” in the product prospectus supplement. In addition to the risks described in the prospectus supplement and the product prospectus supplement, you should consider the following:

Risks Relating to the Terms of the Notes

- **You May Lose Some or All of the Principal Amount at Maturity** — Investors in the Notes could lose all or a substantial portion of their principal amount if there is a decline in the price of the Reference Asset between the Trade Date and the Valuation Date. If the Notes are not automatically called and the Final Price on the Valuation Date is less than the Barrier Price, the amount of cash that you receive at maturity will represent a loss of your principal that is proportionate to the decline in the price of the Reference Asset from the Trade Date to the Valuation Date.
- **The Notes Are Subject to an Automatic Call** — If, on any Observation Date, the Observation Price is greater than or equal to the Initial Price, then the Notes will be automatically called. If the Notes are automatically called, then, on the applicable Call Settlement Date, for each \$1,000 in principal amount, you will receive the applicable Call Amount on the corresponding Call Settlement Date. You will not receive any payments after the Call Settlement Date and you will not receive any return on the Notes that exceeds the applicable Call Amount set forth above, even if the price of the Reference Asset increases substantially. You may be unable to reinvest your proceeds from the automatic call in an investment with a return that is as high as the return on the Notes.
- **The Return on the Notes Will Be Limited to the Call Return Rate** — You will only receive a positive return on the Notes if the Observation Price of the Reference Asset on an Observation Date is greater than or equal to the Initial Price. Even in such a case, your return on the Notes will not exceed the return represented by the Call Return Rate, even if the price of the Reference Asset exceeds that return.
- **The Notes Do Not Pay Interest and Your Return May Be Lower than the Return on a Conventional Debt Security of Comparable Maturity** — There will be no periodic interest payments on the Notes as there would be on a conventional fixed-rate or floating-rate debt security having the same maturity. The return that you will receive on the Notes, which could be negative, may be less than the return you could earn on other investments. Your return may be less than the return you would earn if you purchased one of our conventional senior interest bearing debt securities.
- **Payments on the Notes Are Subject to Our Credit Risk, and Changes in Our Credit Ratings Are Expected to Affect the Market Value of the Notes** — The Notes are our senior unsecured debt securities. As a result, your receipt of any Call Amounts, if payable, and the amount due on the maturity date, is dependent upon our ability to repay our obligations on the applicable payment date. This will be the case even if the price of the Reference Asset increases after the Trade Date. No assurance can be given as to what our financial condition will be at any time during the term of the Notes.
- **You Will Not Have Any Rights to the Securities Included in the Reference Asset** — As a holder of the Notes, you will not have voting rights or rights to receive cash dividends or other distributions or other rights that holders of securities included in the Reference Asset would have. The Final Price will not reflect any dividends paid on the securities included in the Reference Asset, and accordingly, any positive return on the Notes may be less than the potential positive return on those securities.
- **The Payments on the Notes Are Subject to Postponement Due to Market Disruption Events and Adjustments** — The payment at maturity, each Observation Date and the Valuation Date are subject to adjustment as described in the product prospectus supplement. For a description of what constitutes a market disruption event as well as the consequences of that market disruption event, see “General Terms of the Notes—Market Disruption Events” in the product prospectus supplement.

Risks Relating to the Secondary Market for the Notes

- **There May Not Be an Active Trading Market for the Notes-Sales in the Secondary Market May Result in Significant Losses** — There may be little or no secondary market for the Notes. The Notes will not be listed on any securities exchange. RBCCM and our other affiliates may make a market for the Notes; however, they are not required to do so. RBCCM or any of our other affiliates may stop any market-making activities at any time. Even if a secondary market for the Notes develops, it may not provide significant liquidity or trade at prices advantageous to you. We expect that transaction costs in any secondary market would be high. As a result, the difference between bid and asked prices for your Notes in any secondary market could be substantial.

Risks Relating to the Initial Estimated Value of the Notes

- **The Initial Estimated Value of the Notes Is Less than the Price to the Public** — The initial estimated value that is set forth on the cover page of this pricing supplement does not represent a minimum price at which we, RBCCM or any of our affiliates would be willing to purchase the Notes in any secondary market (if any exists) at any time. If you attempt to sell the Notes prior to maturity, their market value may be lower than the price you paid for them and the initial estimated value. This is due to, among other things, changes in the price of the Reference Asset, the borrowing rate we pay to issue securities of this kind, and the inclusion in the price to the public of the underwriting discount and the estimated costs relating to our hedging of the Notes. These factors, together with various credit, market and economic factors over the term of the Notes, are expected to reduce the price at which you may be able to sell the Notes in any secondary market and will affect the value of the Notes in complex and unpredictable ways. Assuming no change in market conditions or any other relevant factors, the price, if any, at which you may be able to sell your Notes prior to maturity may be less than your original purchase price, as any such sale price would not be expected to include the underwriting discount or the hedging costs relating to the Notes. In addition to bid-ask spreads, the value of the Notes determined by RBCCM for any secondary market price is expected to be based on the secondary rate rather than the internal funding rate used to price the Notes and determine the initial estimated value. As a result, the secondary price will be less than if the internal funding rate was used. The Notes are not designed to be short-term trading instruments. Accordingly, you should be able and willing to hold your Notes to maturity.
- **The Initial Estimated Value of the Notes that Is Set Forth on the Cover Page of This Pricing Supplement Is an Estimate Only, Calculated as of the Time the Terms of the Notes Were Set** — The initial estimated value of the Notes is based on the value of our obligation to make the payments on the Notes, together with the mid-market value of the derivative embedded in the terms of the Notes. See “Structuring the Notes” below. Our estimate is based on a variety of assumptions, including our credit spreads, expectations as to dividends, interest rates and volatility, and the expected term of the Notes. These assumptions are based on certain forecasts about future events, which may prove to be incorrect. Other entities may value the Notes or similar securities at a price that is significantly different than we do.

The value of the Notes at any time after the Trade Date will vary based on many factors, including changes in market conditions, and cannot be predicted with accuracy. As a result, the actual value you would receive if you sold the Notes in any secondary market, if any, should be expected to differ materially from the initial estimated value of your Notes.

Risks Relating to the Reference Asset

- **The Reference Asset and its Underlying Index Are Different** — The performance of the Reference Asset may not exactly replicate the performance of its underlying index, because the Reference Asset will reflect transaction costs and fees that are not included in the calculation of its underlying index. It is also possible that the performance of the Reference Asset may not fully replicate or may in certain circumstances diverge significantly from the performance of its underlying index due to the temporary unavailability of certain securities in the secondary market, the performance of any derivative instruments contained in the Reference Asset, or due to other circumstances. The Reference Asset may use futures contracts, options, swap agreements, currency forwards and repurchase agreements in seeking performance that corresponds to its underlying index and in managing cash flows.

During periods of market volatility, securities held by the Reference Asset may be unavailable in the secondary market, market participants may be unable to calculate accurately the net asset value per share of the Reference

Asset and the liquidity of the Reference Asset may be adversely affected. This kind of market volatility may also disrupt the ability of market participants to create and redeem shares of the Reference Asset. Further, market volatility may adversely affect, sometimes materially, the prices at which market participants are willing to buy and sell shares of the Reference Asset. As a result, under these circumstances, the market value of shares of the Reference Asset may vary substantially from its net asset value per share. For all of the foregoing reasons, the performance of the Reference Asset may not correlate with the performance of its underlying index as well as its net asset value per share, which could materially and adversely affect the value of the Notes in the secondary market and/or reduce the payments on the Notes.

- **Management Risk** — The Reference Asset is not managed according to traditional methods of “active” investment management, which involve the buying and selling of securities based on economic financial and market analysis and investment judgment. Instead, the Reference Asset, utilizing a “passive” or indexing investment approach, attempts to approximate the investment performance of its underlying index by investing in a portfolio of securities that generally replicate its underlying index. Therefore, unless a specific security is removed from its underlying index, the Reference Asset generally would not sell a security because the security’s issuer was in financial trouble. In addition, the Reference Asset is subject to the risk that the investment strategy of its investment advisor (the “Advisor”) may not produce the intended results.
- **An Investment in the Notes Is Subject to Risks Relating to Non-U.S. Securities Markets** — Because foreign companies or foreign equity securities included in the Reference Asset are publicly traded in the applicable foreign countries and are denominated in non-U.S. currencies, an investment in the Notes involves particular risks. For example, the non-U.S. securities markets may be more volatile than the U.S. securities markets, and market developments may affect these markets differently from the U.S. or other securities markets. Direct or indirect government intervention to stabilize the securities markets outside the U.S., as well as cross-shareholdings in certain companies, may affect trading prices and trading volumes in those markets.
- **All of the Securities Held by the Reference Asset Are Concentrated in One Sector** — All of the securities held by the Reference Asset are issued by companies in the semiconductor production and equipment sector. As a result, the securities that will determine the performance of the Notes are concentrated in one sector. Although an investment in the Notes will not give holders any ownership or other direct interests in the securities held by the Reference Asset, the return on an investment in the Notes will be subject to certain risks similar to those associated with direct equity investments in the semiconductor production and equipment sector. The Notes may be subject to greater volatility and be more adversely affected by a single positive or negative economic, political or regulatory occurrence affecting this industry than a different investment linked to securities of a more broadly diversified group of issuers.

In addition, as of the date of this document, the securities of only four companies accounted for more than 30% of the Reference Asset’s holdings. Adverse changes in the stock prices of a limited number of companies may substantially impact the return on the Notes.

- **Adverse Conditions in the Semiconductor Production and Equipment Sector May Reduce Your Return on the Notes** — All or substantially all of the stocks held by the Reference Asset are issued by companies whose primary line of business is directly associated with the semiconductor production and equipment sector. The Reference Asset is subject to the risk that companies that are in the semiconductor production and equipment sector may be similarly affected by particular economic or market events. As product cycles shorten and manufacturing capacity increases, these companies may become increasingly subject to aggressive pricing, which hampers profitability. Semiconductor companies are vulnerable to wide fluctuations in securities prices due to rapid product obsolescence. Many semiconductor companies may not successfully introduce new products, develop and maintain a loyal customer base or achieve general market acceptance for their products, and failure to do so could have a material adverse effect on their business, results of operations and financial condition. Reduced demand for end-user products, underutilization of manufacturing capacity, and other factors could adversely impact the operating results of companies in the semiconductor production and equipment sector. Semiconductor companies typically face high capital costs and such companies may need additional financing, which may be difficult to obtain. They also may be subject to risks relating to research and development costs and the availability and price of components. Moreover, they may be heavily dependent on intellectual property rights and may be adversely affected by loss or impairment of those rights.

- **Changes that Affect the Underlying Index Will Affect the Market Value of the Notes and the Amount You Will Receive on the Notes** — The policies of the sponsor of the underlying index (the “Index Sponsor”), concerning the calculation of the underlying index, additions, deletions or substitutions of the components of the underlying index and the manner in which changes affecting those components, such as stock dividends, reorganizations or mergers, may be reflected in the underlying index and, therefore, could affect the share price of the Reference Asset, whether the Notes are automatically called, the amount payable on the Notes at maturity, and the market value of the Notes prior to maturity. The amount payable on the Notes and their market value could also be affected if the Index Sponsor changes these policies, for example, by changing the manner in which it calculates the underlying index, or if the sponsor discontinues or suspends the calculation or publication of the underlying index.
- **We Have No Affiliation with the Index Sponsor and Will Not Be Responsible for Any Actions Taken by the Index Sponsor** — The Index Sponsor is not our affiliate and will not be involved in the offering of the Notes in any way. Consequently, we have no control over the actions of the Index Sponsor, including any actions of the type that would require the calculation agent to adjust the payment to you on the Notes. The Index Sponsor has no obligation of any sort with respect to the Notes. Thus, the Index Sponsor has no obligation to take your interests into consideration for any reason, including in taking any actions that might affect the value of the Notes. None of our proceeds from the issuance of the Notes will be delivered to the Index Sponsor.
- **We and Our Affiliates Do Not Have Any Affiliation with the Advisor and Are Not Responsible for its Public Disclosure of Information** — We and our affiliates are not affiliated with the Advisor in any way and have no ability to control or predict its actions, including any errors in or discontinuance of disclosure regarding its methods or policies relating to the Reference Asset. The Advisor is not involved in the offering of the Notes in any way and has no obligation to consider your interests as an owner of the Notes in taking any actions relating to the Reference Asset that might affect the value of the Notes. Neither we nor any of our affiliates has independently verified the adequacy or accuracy of the information about the Advisor or the Reference Asset contained in any public disclosure of information. You, as an investor in the Notes, should make your own investigation into the Reference Asset.
- **The Correlation Between the Performance of the Reference Asset and the Performance of the Underlying Index May Be Imperfect** — The performance of the Reference Asset is linked principally to the performance of the Underlying Index. However, because of the potential discrepancies identified in more detail in the product prospectus supplement, the return on the Reference Asset may correlate imperfectly with the return on the Underlying Index.

Risks Relating to Conflicts of Interest

- **Our Business Activities May Create Conflicts of Interest** — We and our affiliates expect to engage in trading activities related to the Reference Asset or the securities that it holds that are not for the account of holders of the Notes or on their behalf. These trading activities may present a conflict between the holders’ interests in the Notes and the interests we and our affiliates will have in their proprietary accounts, in facilitating transactions, including options and other derivatives transactions, for their customers and in accounts under their management. These trading activities, if they influence the share price of the Reference Asset, could be adverse to the interests of the holders of the Notes. We and one or more of our affiliates may, at present or in the future, engage in business with the issuers of the securities held by the Reference Asset, including making loans to or providing advisory services. These services could include investment banking and merger and acquisition advisory services. These activities may present a conflict between our or one or more of our affiliates’ obligations and your interests as a holder of the Notes. Moreover, we, and our affiliates may have published, and in the future expect to publish, research reports with respect to the Reference Asset. This research is modified from time to time without notice and may express opinions or provide recommendations that are inconsistent with purchasing or holding the Notes. Any of these activities by us or one or more of our affiliates may affect the share price of the Reference Asset, and therefore, the market value of the Notes.

INFORMATION REGARDING THE REFERENCE ASSET

Information filed with the SEC relating to the VanEck® Semiconductor ETF under the Securities Exchange Act of 1934, as amended, and the Investment Company Act of 1940, as amended, can be obtained through the SEC's website at <http://www.sec.gov>. In addition, information regarding the Reference Asset may be obtained from other sources including, but not limited to, press releases, newspaper articles and other publicly disseminated documents. We have not participated in the preparation of, or verified, such publicly available information. None of the forgoing documents or filings are incorporated by reference in, and should not be considered part of, this document.

The following information regarding the Reference Asset is derived from publicly available information.

We have not independently verified the accuracy or completeness of reports filed by the Reference Asset with the SEC, information published by it on its website or in any other format, information about it obtained from any other source or the information provided below.

We have not independently verified the accuracy or completeness of the information obtained from Bloomberg Financial Markets. The historical performance of the Reference Asset should not be taken as an indication of its future performance, and no assurance can be given as to the market price of the Reference Asset at any time during the term of the Notes. We cannot give you assurance that the performance of the Reference Asset will not result in the loss of all or part of your investment.

VanEck® Semiconductor ETF ("SMH")

The SMH seeks to replicate, before fees and expenses, the price and yield performance of the MVIS® US Listed Semiconductor 25 Index (the "MVSMHTR"). The MVSMHTR is intended to track the overall performance of companies involved in semiconductor production and equipment. The SMH is advised by Van Eck Associates Corporation (the "Advisor"). The SMH commenced trading in December 2011. The SMH trades on the Nasdaq under the ticker symbol "SMH."

The MVSMHTR

The MVSMHTR includes U.S. listed companies that derive at least 50% (25% for current components) of their revenues from semiconductors. This includes companies engaged primarily in the production of semiconductors and semiconductor equipment. The index includes both common stocks and depositary receipts of U.S.-listed companies. To be included in the index, a stock must have a market capitalization of greater than \$150 million as of the end of the month prior to the month in which a rebalancing date occurs. Of the largest 50 stocks in the semiconductor industry by full market capitalization, the top 25 by free-float market capitalization (i.e., includes only shares that are readily available for trading in the market) and three month average daily trading volume are included in the index. The highest ranked 10 companies are included in the index. The remaining 15 companies are selected from the highest ranked remaining index components ranked between 11 and 40; if the number of companies is less than 25, then the highest ranked remaining stocks are included in the index until 25 companies are selected.

The components of this index are reviewed on a semi-annual basis in March and September, and the index typically includes 25 components. The index is rebalanced on a quarterly basis.

The index employs a "4.5%/20%/50%-Cap". This weighting scheme is designed to ensure diversification by assigning weights to components which cannot exceed 20%, but still ensures larger sizes of larger companies. To effect this:

1. All index components are weighted by their free-float market capitalization.
2. All companies exceeding 4.5% but at least the largest 5 and at the maximum the largest 10 companies are grouped together (so called "Large-Weights"). All other companies are grouped together as well (so called "Small-Weights").
3. The aggregated weighting of the Large-Weights is capped at 50%:
 - Large-Weights: If the aggregated weighting of all companies in Large-Weight exceeds 50%, then a capping factor is calculated to reduce the weighting to 50% - at the same time, a second capping factor for the Small-Weights is calculated to increase the aggregated weight to 50%. These two factors are then applied to all companies in the Large-Weights or the Small-Weights, respectively.

- Large-Weights: The maximum weight for any single stock is 20% and the minimum weighting is 5%. If a stock is above the maximum or below the minimum weight, then the weight will be reduced to the maximum weight or increased to the minimum weight, and the excess weight shall be redistributed proportionally across all other remaining index constituents in the Large Weights. Then
- Small-Weights: The maximum weight for any single stock is 4.5%. If a stock is above the maximum weight, then the weight will be reduced to the maximum weight and the excess weight shall be redistributed proportionally across all other remaining index constituents in the Small-Weights.

Additional information about this index and its methodology may be found on the website of its sponsor, MVIS® Global Equity Indices. However, information on that website shall not be deemed to be included or incorporated by reference in this document.

HISTORICAL INFORMATION

The graph below illustrates the performance of the Reference Asset from January 1, 2013 to February 24, 2023, reflecting its Initial Price of \$238.21. The red line represents the Barrier Price of \$166.75, which is equal to 70% of its Initial Price (rounded to two decimal places).



SUPPLEMENTAL DISCUSSION OF U.S. FEDERAL INCOME TAX CONSEQUENCES

The following disclosure supplements, and to the extent inconsistent supersedes, the discussion in the product prospectus supplement dated March 3, 2022 under “Supplemental Discussion of U.S. Federal Income Tax Consequences.”

Under Section 871(m) of the Code, a “dividend equivalent” payment is treated as a dividend from sources within the United States. Such payments generally would be subject to a 30% U.S. withholding tax if paid to a non-U.S. holder. Under U.S. Treasury Department regulations, payments (including deemed payments) with respect to equity-linked instruments (“ELIs”) that are “specified ELIs” may be treated as dividend equivalents if such specified ELIs reference, directly or indirectly, an interest in an “underlying security,” which is generally any interest in an entity taxable as a corporation for U.S. federal income tax purposes if a payment with respect to such interest could give rise to a U.S. source dividend. However, the IRS has issued guidance that states that the U.S. Treasury Department and the IRS intend to amend the effective dates of the U.S. Treasury Department regulations to provide that withholding on dividend equivalent payments will not apply to specified ELIs that are not delta-one instruments and that are issued before January 1, 2025. Based on our determination that the Notes are not delta-one instruments, non-U.S. holders should not be subject to withholding on dividend equivalent payments, if any, under the Notes. However, it is possible that the Notes could be treated as deemed reissued for U.S. federal income tax purposes upon the occurrence of certain events affecting the Reference Asset or the Notes (for example, upon the Reference Asset rebalancing), and following such occurrence the Notes could be treated as subject to withholding on dividend equivalent payments. Non-U.S. holders that enter, or have entered, into other transactions in respect of the Reference Asset or the Notes should consult their tax advisors as to the application of the dividend equivalent withholding tax in the context of the Notes and their other transactions. If any payments are treated as dividend equivalents subject to withholding, we (or the applicable withholding agent) would be entitled to withhold taxes without being required to pay any additional amounts with respect to amounts so withheld.

SUPPLEMENTAL PLAN OF DISTRIBUTION (CONFLICTS OF INTEREST)

Delivery of the Notes will be made against payment for the Notes on March 1, 2023, which is the third (3rd) business day following the Trade Date (this settlement cycle being referred to as “T+3”). See “Plan of Distribution” in the prospectus dated September 14, 2021. For additional information as to the relationship between us and RBCCM, please see the section “Plan of Distribution—Conflicts of Interest” in the prospectus dated September 14, 2021.

We will deliver the Notes on a date that is greater than two business days following the Trade Date. Under Rule 15c6-1 of the Exchange Act, trades in the secondary market generally are required to settle in two business days, unless the parties to any such trade expressly agree otherwise. Accordingly, purchasers who wish to trade the Notes more than two business days prior to the original issue date will be required to specify alternative arrangements to prevent a failed settlement.

In addition to the underwriting discount set forth on the cover page, we or one of our affiliates will also pay an expected fee to a broker-dealer that is unaffiliated with us for providing certain electronic platform services with respect to this offering.

The value of the Notes shown on your account statement may be based on RBCCM's estimate of the value of the Notes if RBCCM or another of our affiliates were to make a market in the Notes (which it is not obligated to do). That estimate will be based upon the price that RBCCM may pay for the Notes in light of then prevailing market conditions, our creditworthiness and transaction costs. For a period of approximately three months after the issue date of the Notes, the value of the Notes that may be shown on your account statement may be higher than RBCCM's estimated value of the Notes at that time. This is because the estimated value of the Notes will not include the underwriting discount or our hedging costs and profits; however, the value of the Notes shown on your account statement during that period may initially be a higher amount, reflecting the addition of RBCCM's underwriting discount and our estimated costs and profits from hedging the Notes. This excess is expected to decrease over time until the end of this period. After this period, if RBCCM repurchases your Notes, it expects to do so at prices that reflect their estimated value.

We may use this pricing supplement in the initial sale of the Notes. In addition, RBCCM or another of our affiliates may use this pricing supplement in a market-making transaction in the Notes after their initial sale. ***Unless we or our agent informs the purchaser otherwise in the confirmation of sale, this pricing supplement is being used in a market-making transaction.***

STRUCTURING THE NOTES

The Notes are our debt securities, the return on which is linked to the performance of the Reference Asset. As is the case for all of our debt securities, including our structured notes, the economic terms of the Notes reflect our actual or perceived creditworthiness at the time of pricing. In addition, because structured notes result in increased operational, funding and liability management costs to us, we typically borrow the funds under these Notes at a rate that is more favorable to us than the rate that we might pay for a conventional fixed or floating rate debt security of comparable maturity. Using this relatively lower implied borrowing rate rather than the secondary market rate, is a factor that reduced the initial estimated value of the Notes at the time their terms were set. Unlike the estimated value that is set forth on the cover page of this pricing supplement, any value of the Notes determined for purposes of a secondary market transaction may be based on a different funding rate, which may result in a lower value for the Notes than if our initial internal funding rate were used.

In order to satisfy our payment obligations under the Notes, we may choose to enter into certain hedging arrangements (which may include call options, put options or other derivatives) on the issue date with RBCCM or one of our other subsidiaries. The terms of these hedging arrangements take into account a number of factors, including our creditworthiness, interest rate movements, the volatility of the Reference Asset, and the tenor of the Notes. The economic terms of the Notes and their initial estimated value depend in part on the terms of these hedging arrangements.

The lower implied borrowing rate is a factor that reduced the economic terms of the Notes to you. The initial offering price of the Notes also reflects the underwriting discount and our estimated hedging costs. These factors resulted in the initial estimated value for the Notes on the Trade Date being less than their public offering price. See “Selected Risk Considerations—The Initial Estimated Value of the Notes Is Less than the Price to the Public” above.

VALIDITY OF THE NOTES

In the opinion of Norton Rose Fulbright Canada LLP, the issue and sale of the Notes has been duly authorized by all necessary corporate action of the Bank in conformity with the Indenture, and when the Notes have been duly executed, authenticated and issued in accordance with the Indenture and delivered against payment therefor, the Notes will be validly issued and, to the extent validity of the Notes is a matter governed by the laws of the Province of Ontario or Québec, or the laws of Canada applicable therein, will be valid obligations of the Bank, subject to equitable remedies which may only be granted at the discretion of a court of competent authority, subject to applicable bankruptcy, to rights to indemnity and contribution under the Notes or the Indenture which may be limited by applicable law, to insolvency and other laws of general application affecting creditors' rights, to limitations under applicable limitations statutes, and to limitations as to the currency in which judgments in Canada may be rendered, as prescribed by the Currency Act (Canada). This opinion is given as of the date hereof and is limited to the laws of the Provinces of Ontario and Québec and the federal laws of Canada applicable thereto. In addition, this opinion is subject to customary assumptions about the Trustee's authorization, execution and delivery of the Indenture and the genuineness of signatures and certain factual matters, all as stated in the letter of such counsel dated September 14, 2021, which has been filed as Exhibit 5.3 to Royal Bank's Form 6-K filed with the SEC dated September 14, 2021.

In the opinion of Ashurst LLP, when the Notes have been duly completed in accordance with the Indenture and issued and sold as contemplated by the prospectus supplement and the prospectus, the Notes will be valid, binding and enforceable obligations of the Bank, entitled to the benefits of the Indenture, subject to applicable bankruptcy, insolvency, fraudulent transfer, reorganization, moratorium and similar laws of general applicability relating to or affecting creditors' rights and subject to general principles of equity, public policy considerations and the discretion of the court before which any suit or proceeding may be brought. This opinion is given as of the date hereof and is limited to the laws of the State of New York. This opinion is subject to customary assumptions about the Trustee's authorization, execution and delivery of the Indenture and the genuineness of signatures and to such counsel's reliance on the Bank and other sources as to certain factual matters, all as stated in the legal opinion dated September 14, 2021, which has been filed as Exhibit 5.4 to the Bank's Form 6-K dated September 14, 2021.