# **Best Selection**

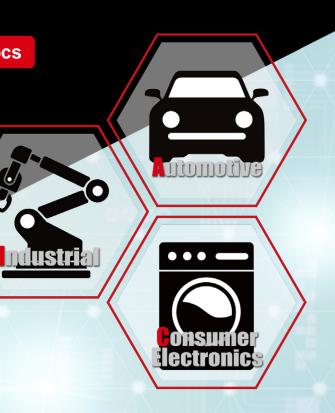
**Electronics for the Future** 



Reliable supply record with shipments totaling over 60 billion pcs

# **Small-Signal Discrete Devices** (Long-Selling Products)

Switching Diodes/Schottky Barrier Diodes/ Zener Diodes/Bipolar Transistors/ **Digital Transistors/MOSFETs** 



g

# **ROHM's Long-Selling Small-Signal Discrete Devices Overview**



With shipments totaling over 60 billion pcs, ROHM's long-selling small-signal discrete devices have enjoyed a long history in the market and boast a top-tier track record in the industry. Stable supply and production ensure worry-free adoption even in applications with long life cycles.

## Features

• Production for over 5 years (with over 60 billion pcs shipped) results in among the industry leading supply record Production is achieved using high quality, high efficiency lines developed through continuous investment in production equipment and improvements in production technology

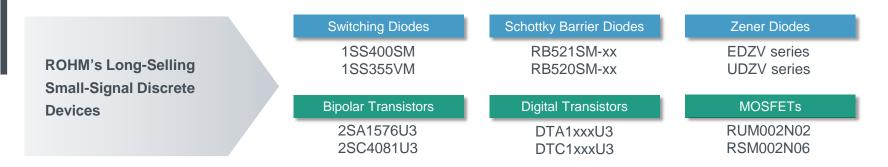
### Stable production ensured through a robust BCM system

Based on a vertical integration strategy (also incorporating external production) makes it possible to hedge against various risks

## ROHM's Product Longevity Program ensures worry-free adoption

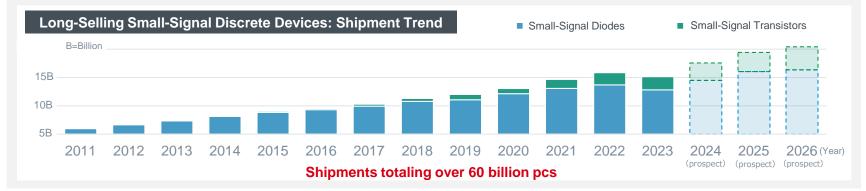
Can be adopted for applications with long life cycles, including industrial equipment

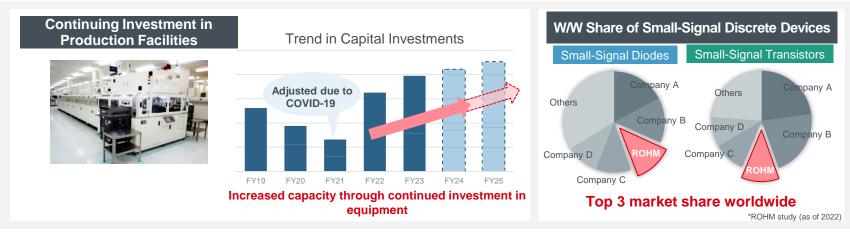
\*ROHM study (as of 2022)



# Industry-Leading Supply Record with Total Shipments Exceeding 60 billion from Over 5 Years of Production ①



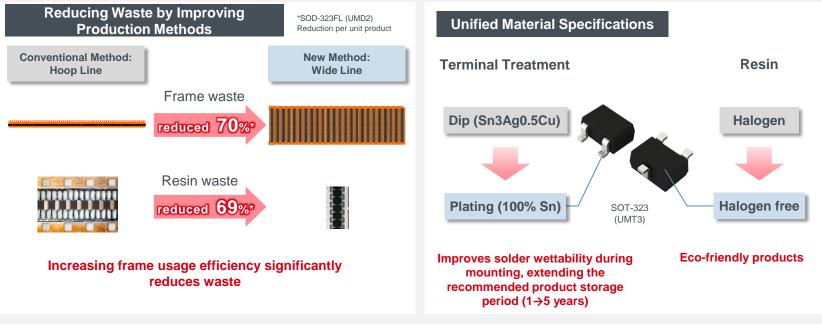




Continued investment in production facilities allows ROHM to secure a top 3 market share within the industry by establishing a top-tier track record for shipments

## Industry-Leading Supply Record with Total Shipments Exceeding 60 billion from Over 5 Years of Production ②



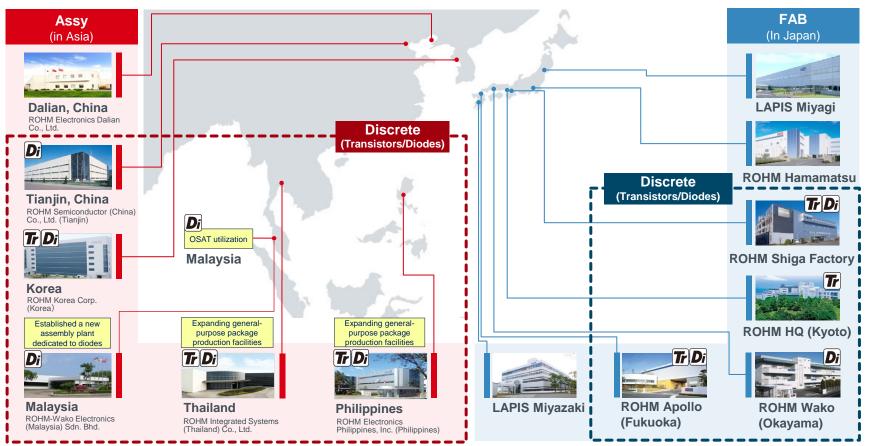


Note: Packages in parenthesis ( ) denotes the ROHM package type.

Improved production technology allows us to achieve greater quality and manufacturing efficiency while minimizing environmental impact

# **Robust BCM System Ensures Stable Production**





ROHM has established a robust BCM system that incorporates multiple production sites (including OSAT) based on a vertical integration strategy to hedge against various risks



#### Product Longevity Program (PLP)

Small-Signal Discrete Devices (Long-Selling Products)

A supply period of 10 to 20 years is established for products requiring longterm supply, with relevant information regarding supply status and estimated supply duration posted on ROHM's website.

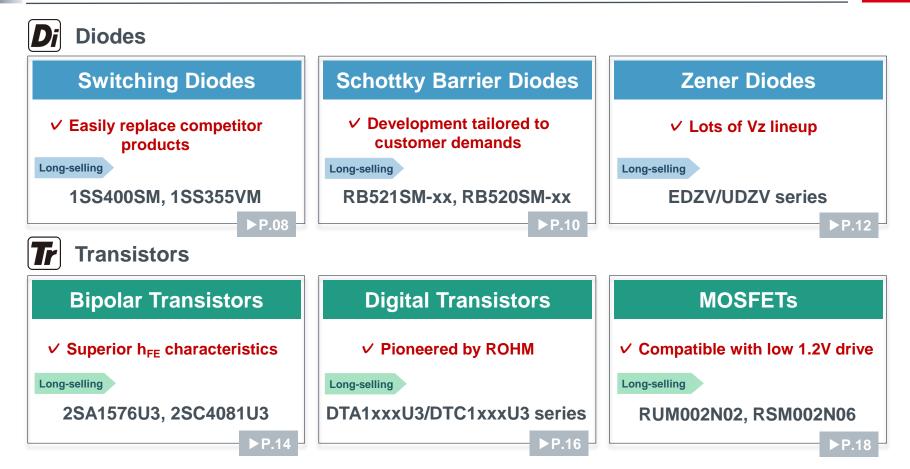
Long-selling small discrete diodes and transistors are also eligible under the Product Longevity Program.

Product Category	Part Number	Features	Support Period (Year)
Switching Diodes	1SS355VM	High-speed 80V/100mA switching diode	10
Switching Diodes	1SS400SM	High-speed 80V/100mA switching diode	10
Zener Diodes	UDZV10B	200mW/10V SOD-323FL Zener diode	10
Zener Diodes	EDZV10B	150mW/10V SOD-523 Zener diode	10
Schottky Barrier Diodes	RB520SM-30	30V/200mA SOD-523 Schottky barrier diode	10
Schottky Barrier Diodes	RB521SM-30	30V/200mA SOD-523 Schottky barrier diode	10
Schottky Barrier Diodes	RB520SM-40	40V/200mA SOD-523 Schottky barrier diode	10
Schottky Barrier Diodes	RB521SM-40	40V/200mA SOD-523 Schottky barrier diode	10
Bipolar Transistors	2SC4081U3	NPN SOT-323 50V/150mA general small-signal amplification transistor	10
Bipolar Transistors	2SA1576U3	PNP SOT-323 -50V/-150mA general amplification transistor	10
Digital Transistors	DTC113ZU3	NPN SOT-323 R1≠R2 digital transistor (with internal bias resistor)	10
Digital Transistors	DTA113ZU3	PNP SOT-323 R1≠R2 digital transistor (with internal bias resistor)	10
12 to 150V MOSFETs	RUM002N02	1.2V drive type Nch MOSFET	10
12 to 150V MOSFETs	RSM002N06	2.5V drive type Nch MOSFET	10

As of July 2023

### ROHM long-selling small-signal discrete devices can be confidently adopted in applications with long life cycles





# Long-Selling Small-Signal Switching Diodes: 1SS400SM, 1SS355VM

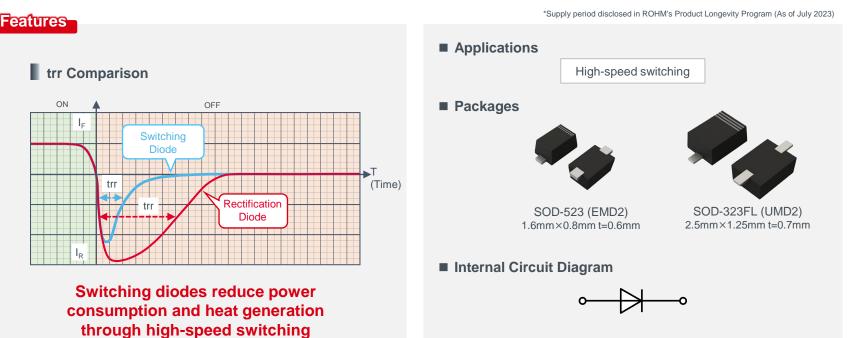


## Selling Points

Long-Term Supply\*: 10 years

Cumulative Shipments: 21 billion pcs

- Enables easy replacement and operation in applications using 1608 and 25125 packages
- We have more than sufficient capacity



Note: Packages in parenthesis ( ) denotes the ROHM package type.



#### Product Specifications: 1SS400SM, 1SS355VM

	Product N	0.		Absol	ute Ma	k Rating	gs (T <sub>a</sub> =	25°C)*1		Electric	al Chara	acteristi	cs (T <sub>a</sub> = 2	25°C)*1			
Part No.	Grade	Grade Code		V <sub>RM</sub> V <sub>R</sub> I <sub>FM</sub>		I <sub>o</sub>				I <sub>R</sub> [µA]		trr [ns]			Package [mm]	Automotive Grade AEC-Q101	
	General	Automotive	code	[V]	[V]	[mA]	[mA]	[mA]	[V] Max	l <sub>F</sub> [mA]	Max	V <sub>R</sub> [V]	Max	V <sub>R</sub> [V]	l <sub>F</sub> [mA]		
1SS400SM	* 🌐 🗐	ғн 🌐 🗐	T2R	90	80	225	100	500(1s)	1.2	100	0.1	80	4	6	10	SOD-523 (EMD2) 1.6×0.8 t=0.6	YES
1SS355VM	* 🌐 🗐	FH 🌐 🗐	TE-17	90	80	225	100	500(1s)	1.2	100	0.1	80	4	6	10	SOD-323FL (UMD2) 2.5×1.25 t=0.7	YES
* The Grade Code is le	ft blank for General	products. *1: Stand	lard per ele	ment.		C	lick on the	icon to ac	cess the p	roduct page	e on ROHN	's website	. Click on the	icon t	o access ti	he product datasheet on	ROHM's website.

Note: Packages in parenthesis ( ) denotes the ROHM package type.

#### Additional Information Available on ROHM's Website

Reference designs also offered

►Web

Reference Design	/ Appli	cation Evaluation Kit		
		and discrete products. We have already solved not only the e reduction of development time for our customers.	Search from her	hat may occur when combining
Search	Q	Application Market	Key Product Product Group ProductFamily	•

#### Learn the basics

**Electronics Basics** 

► What is a diode? <u>Switching Diodes</u>

Many products are listed in addition to long-selling products

ROHM Switching Diodes

# Long-Selling Small-Signal Schottky Barrier Diodes: RB521SM-xx, RB520SM-xx



## Selling Points

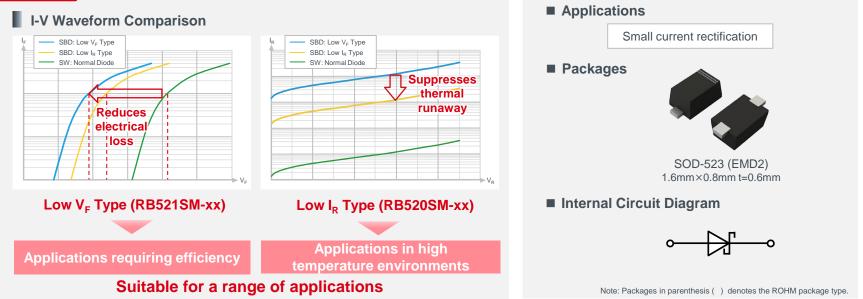
Long-Term Supply\*: **10** years

Cumulative Shipments: 5.5 billion pcs

- Select between low V<sub>F</sub> and I<sub>R</sub> types to suit application needs
- Easy-to-use 1608 size package ideal for computers and portable devices
- We have more than sufficient capacity

## Features

\*Supply period disclosed in ROHM's Product Longevity Program (As of July 2023)





#### Product Specifications: RB521SM-xx, RB520SM-xx

		Product No			Absolu	ute Max R	atings (T <sub>c</sub> :	=25ºC)	Electrica	l Characte	eristics (T <sub>j</sub> :	=25°C)*2		
Туре		Grade	Taping	V	V <sub>R</sub>	ا <sub>0</sub> *1	I <sub>FSM</sub> *² [A]	V <sub>F</sub>		I <sub>R</sub>		Package	Automotive Grade	
	Part No.	General	Automotive	code	V <sub>RM</sub> [V]	v <sub>R</sub> [V]	'o [mA]	رہے 60Hz. 1Cycle	[V] Max	l <sub>F</sub> [mA]	[µA] <sub>V<sub>R</sub> Max [V]</sub>		[mm]	AEC-Q101
Low V <sub>F</sub> Type	RB521SM-30	* 🌐 🗐	FH 🌐 🗐	T2R	_	30	200	1	0.41	100	30	10		YES
LOW V <sub>F</sub> Type	RB521SM-40	* 🌐 🗐	ғн 🋞 🗐	T2R	45	40	200	1	0.45	100	20	10	SOD-523	YES
Low L. Turne	RB520SM-30	* 🌐 🗐	ғн 🌐 🗐	T2R	—	30	200	1	0.51	100	1	10	(EMD2) 1.6×0.8 t=0.6	YES
Low I <sub>R</sub> Type	RB520SM-40	* 🌐 🗐	ғн 🌐 🗐	T2R	45	40	200	1	0.55	100	1	10		YES

\*The Grade Code is left blank for General products.

\*1: Average rectification per element is Io (with one element).

\*2: Standard per element.

Note: Packages in parenthesis (  $\ ) \$ denotes the ROHM package type.

#### Additional Information Available on ROHM's Website

Learn the basics

**Electronics Basics** 

What is a diode? <u>Schottky Barrier Diodes</u>

Click on the Elicon to access the product page on ROHM's website. Click on the 🛞 icon to access the product datasheet on ROHM's website.

Many products are listed in addition to long-selling products

ROHM Schottky Barrier Diodes

# Long-Selling Small-Signal Zener Diodes: EDZV/UDZV series

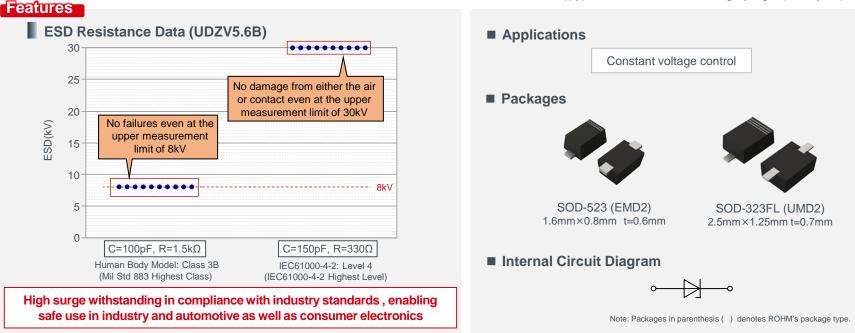


## Selling Points

Long-Term Supply\*: **10** years

Cumulative Shipments: 33.1 billion pcs

- Extensive Vz lineup with guaranteed narrow Vz range enables high quality circuit configurations
- Excellent anti-surge current performance
- We have more than sufficient capacity



\*Supply period disclosed in ROHM's Product Longevity Program (As of July 2023)

# Long-Selling Small-Signal Zener Diodes: Specifications



Series Name		EDZ	ZV			UD2	ZV				
				-							
Package			<b>?</b>								
[mm]		SOD-523 1.6 × 0.8				SOD-323F 2.5×1.2					
ower dissipation P <sub>D</sub> (mW)		15	0			20	0				
Electrical Characteristics		Vz	Ιz	Automotive Grade		Vz	Iz	Automotive Grade			
$(T_a=25^{\circ}C)$		[V]	[mA]	AEC-Q101		[V]	[mA]	AEC-Q101			
	2.0B	2.02 to 2.20	5	—	2.0B	2.02 to 2.20	5	YES			
	2.2B	2.22 to 2.41	5	_	2.2B	2.22 to 2.41	5	YES			
	2.4B	2.43 to 2.63	5	_	2.4B	2.43 to 2.63	5	YES			
	2.7B	2.69 to 2.91	5	_	2.7B	2.69 to 2.91	5	YES			
	3.0B	3.01 to 3.22	5	_	3.0B	3.01 to 3.22	5	YES			
	3.3B	3.32 to 3.53	5	_	3.3B	3.32 to 3.53	5	YES			
	3.6B	3.600 to 3.845	5	YES	3.6B	3.600 to 3.845	5	YES			
	3.9B	3.89 to 4.16	5	YES	3.9B	3.89 to 4.16	5	YES			
	4.3B	4.17 to 4.43	5	YES	4.3B	4.17 to 4.43	5	YES			
	4.7B	4.55 to 4.75	5	YES	4.7B	4.55 to 4.75	5	YES			
	5.1B	4.98 to 5.20	5	YES	5.1B	4.98 to 5.20	5	YES			
	5.6B	5.49 to 5.73	5	YES	5.6B	5.49 to 5.73	5	YES			
	6.2B	6.06 to 6.33	5	YES	6.2B	6.06 to 6.33	5	YES			
	6.8B	6.65 to 6.93	5	YES	6.8B	6.65 to 6.93	5	YES			
	7.5B	7.28 to 7.60	5	YES	7.5B	7.28 to 7.60	5	YES			
	8.2B	8.02 to 8.36	5	YES	8.2B	8.02 to 8.36	5	YES			
/oltage Category	9.1B	8.85 to 9.23	5	YES	9.1B	8.85 to 9.23	5	YES			
rollage oulogoly	10B	9.77 to 10.21	5	YES	10B	9.77 to 10.21	5	YES			
	11B	10.76 to 11.22	5	YES	11B	10.76 to 11.22	5	YES			
	12B	11.74 to 12.24	5	YES	12B	11.74 to 12.24	5	YES			
	13B	12.91 to 13.49	5	YES	13B	12.91 to 13.49	5	YES			
	15B	14.34 to 14.98	5	YES	15B	14.34 to 14.98	5	YES			
	16B	15.85 to 16.51	5	YES	16B	15.85 to 16.51	5	YES			
	18B	17.56 to 18.35	5	YES	18B	17.56 to 18.35	5	YES			
	20B	19.52 to 20.39	5	YES	20B	19.52 to 20.39	5	YES			
	22B	21.54 to 22.47	5	YES	22B	21.54 to 22.47	5	YES			
	24B	23.72 to 24.78	5	YES	24B	23.72 to 24.78	5	YES			
	27B	26.19 to 27.53	2	YES	27B	26.19 to 27.53		YES			
	30B	29.19 to 30.69	2	YES	30B	29.19 to 30.69	5	YES			
	33B	32.15 to 33.79	2	YES	33B	32.15 to 33.79	5	YES			
	36B	35.07 to 36.87	2	YES	36B	35.07 to 36.87	5	YES			
						38.02 to 39.98					
	-	-		-	43	40.00 to 45.00	2	YES			
	-		_	_	47	44.00 to 49.00	2	YES			

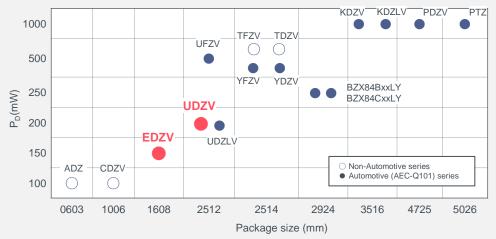
# Product Specifications: EDZV/UDZV series More Information is Available on ROHM's website

Learn the basics

## Electronics Basics

►What is a diode? Zener Diodes

Many products are listed in addition to long-selling products



#### Lots of lineup (16series, 642models)

Detailed information on each product and series is available here

ROHM Zener Diodes

# Long-Selling Small-Signal Bipolar Transistors: 2SA1576U3, 2SC4081U3



#### Selling Points

Features

Long-Term Supply\*: 10 years

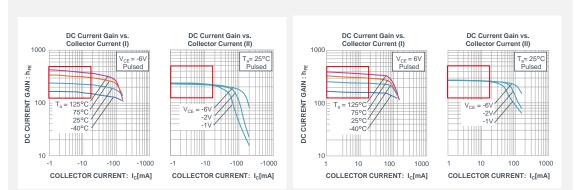
Cumulative Shipments: 1 billion pcs

Very popular in both the consumer and automotive sectors due to the versatile 2021 size package

2SC4081U3 (NPN)

- Excellent linearity of the DC current gain h<sub>FE</sub> allow for safe use in both analog and digital designs
- We have more than sufficient capacity

2SA1576U3 (PNP)



Excellent linearity of the DC current gain  $h_{FE}$  allow for safe use in both analog and digital designs

• Applications General small-signal amplification • Packages SOT-323 (UMT3) 2.0mm×2.1mm t=0.9mm • Internal Circuit Diagram 2SA1576U3 (PNP)  $(2) \downarrow \downarrow (3)$   $(2) \downarrow \downarrow (1)$   $(2) \downarrow \downarrow (1)$  $(2) \downarrow \downarrow (1)$ 

(1) Emitter (2) Base (3) Collector

Note: Packages in parenthesis ( ) denotes ROHM's package type.

\*Supply period disclosed in ROHM's Product Longevity Program (As of July 2023)



#### Product Specifications: 2SA1576U3, 2SC4081U3

	Pro	oduct No.										Automotive	
Dart Na	Grade	e Code	Taping	ping h <sub>FE</sub> *2		Polarity [ch]	P <sub>D</sub> *1 [W]	V <sub>CEO</sub> [V]	I <sub>C</sub> [A]	h <sub>FE</sub> *2	Package [mm]	Grade	
Part No.	General	Automotive	code		Symbol							AEC-Q101	
2SA1576U3	* 🌐 🗐	HZG 🌐 🗐	T106	Q	R	PNP	0.2	-50	-0.15	120 to 390	SOT-323 (UMT3)	YES	
2SC4081U3	*	HZG 🌐 🗐	T106	Q	R	NPN	0.2	50	0.15	120 to 390	2.0×2.1 t=0.9	YES	

\* The Grade Code is left blank for General products.

\*1: Reference land pattern during mounting

\*2: h<sub>FE</sub> is Q=120 to 270, R=180-390 Please refer to the specifications for details.

Notes: Package names in parenthesis ( ) denotes ROHM's package type.

#### Additional Information Available on ROHM's Website

Learn the basics

Electronics Basics

▶ What is a transistor? Outline of a Transistor

Many products are listed in addition to long-selling products

► <u>ROHM Bipolar Transistors</u>

Click on the file icon to access the product page on ROHM's website. Click on the 🌐 icon to access the product datasheet on ROHM's website.

# Long-Selling Small-Signal Digital Transistors: DTA1xxxU3, DTC1xxxU3



## Selling Points

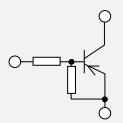
Long-Term Supply\*: 10 years

Cumulative Shipments: 700 million pcs

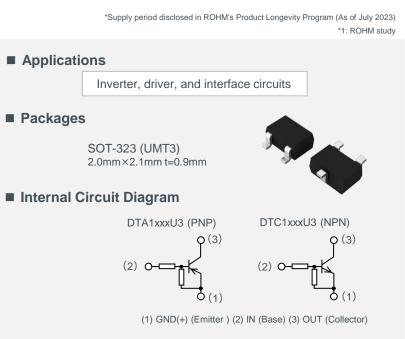
- The first company<sup>\*1</sup> to develop digital transistors(transistors with built-in resistors), ROHM has been supplying them for many years
- Lots of lineup supports various applications
- We have more than sufficient capacity

## Features

Integrates resistors and a bipolar transistor in a single package



- Contributes to a smaller mounting area and fewer design resources
- Built-in bias resistors make it possible to configure inverter circuits without external resistors on the input side



Note: Packages in parenthesis ( ) denotes ROHM's package type.

# Long-Selling Small-Signal Digital Transistors: Specifications

# 

#### Product Specifications: DTA1xxxU3, DTC1xxxU3 series

Click on the () icon to access the product page on ROHM's website.

	Par	t No.				$V_{CC}$ or $V_{CBO}$							ΒV <sub>ΕΒΟ</sub>					
Specifications	DTA1xxxU3 (PNP)	DTC1xxxU3 (NPN)	Taping code	R <sub>1</sub> [kΩ]	R <sub>2</sub> [kΩ]	V <sub>CC</sub> СГ V <sub>СВО</sub> [V]	I <sub>O</sub> [A]	V <sub>I(OFF)</sub> [V]	V <sub>I(ON)</sub> [V]	V <sub>O(ON)</sub> [V]	יו [mA]	I <sub>O(OFF)</sub> [nA]	[V]	I <sub>СВО</sub> [nA]	ι <sub>Ει</sub> [μ.	во А]	V <sub>CE(sat)</sub> [mV]	Package [mm]
						Max	Max	Max	Min	Max	Max	Max	Min	Max	Min	Max	Max	
	DTA123EU3	DTC123EU3	T106	2.2	2.2	50	0.1	0.5	3	0.3	3.8	500	-	—	-	-	-	
	DTA143EU3	DTC143EU3	T106	4.7	4.7	50	0.1	0.5	3	0.3	1.8	500	-	—	-	-	-	
$R_1 = R_2$	DTA114EU3	DTC114EU3	T106	10	10	50	0.05	0.5	3	0.3	0.88	500	-	—	-	-	-	
11-12	DTA124EU3	DTC124EU3	T106	22	22	50	0.03	0.5	3	0.3	0.36	500	-	—	-	-	-	
	DTA144EU3	DTC144EU3	T106	47	47	50	0.03	0.5	3	0.3	0.18	500	-	—	-	-	—	
	DTA115EU3	DTC115EU3	T106	100	100	50	0.02	0.5	3	0.3	0.15	500	-	—	—	-	-	
	DTA113ZU3	DTC113ZU3	T106	1	10	50	0.1	0.3	3	0.3	7.2	500	-	—	—	-	-	
	DTA123YU3	DTC123YU3	T106	2.2	10	50	0.1	0.3	3	0.3	3.8	500	-	—	—	—	—	SOT-323
	DTA123JU3	DTC123JU3	T106	2.2	47	50	0.1	0.5	1.1	0.3	3.6	500	-	—	—	-	—	(UMT3)
R₁≠R₂	DTA143XU3	DTC143XU3	T106	4.7	10	50	0.1	0.3	2.5	0.3	1.8	500	-	—	-	-	—	2.0×2.1 t=0.9
	DTA143ZU3	DTC143ZU3	T106	4.7	47	50	0.1	0.5	1.3	0.3	1.8	500	-	—	—	-	—	
	DTA114YU3	DTC114YU3	T106	10	47	50	0.07	0.3	1.4	0.3	0.88	500	-	—	-	-	-	
	DTA124XU3	DTC124XU3	T106	22	47	50	0.05	0.4	2.5	0.3	0.36	500	-	_	-	-	-	
R₁ Alone	DTA143TU3	DTC143TU3	T106	4.7	-	50	0.1	-	-	-	-	—	5	500	-	500	300	
R <sub>1</sub> Alone	DTA114TU3	DTC114TU3	T106	10	—	50	0.1	_	-	-	-	—	5	500	—	500	300	
R <sub>2</sub> Alone	-	DTC114GU3	T106	—	10	50	0.1	_	—	-	—	—	5	500	300	580	300	
R <sub>2</sub> Alone	-	DTC115GU3	T106	-	100	50	0.1	-	—	-	—	-	5	500	30	58	300	

Note1: The '-' is omitted for PNP types.

Note2: Packages in parenthesis ( ) denotes ROHM's package type.

Additional Information Available on ROHM's Website

Learn the basics

**Electronics Basics** 

What is a transistor? <u>Digital Transistor</u>

Many products are listed in addition to long-selling products

ROHM Digital Transistors

# Long-Selling Small-Signal MOSFETs: RUM002N02, RSM002N06

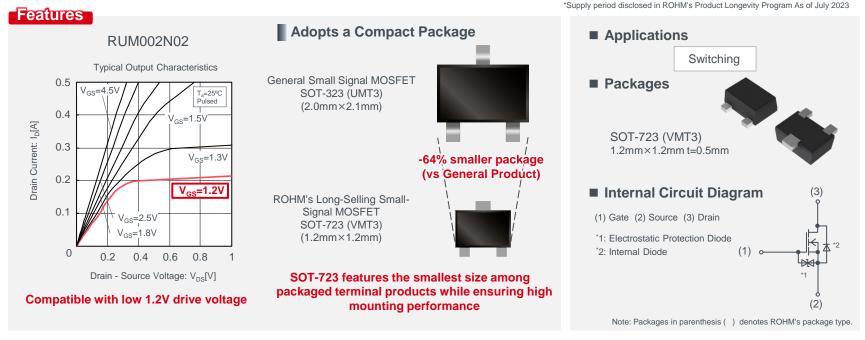


## Selling Points

Long-Term Supply\*: **10 years** 

Cumulative Shipments: 2.2 billion pcs

- Low 1.2V drive voltage ideal for compact applications
- The micro-processing technologies achieves low ON resistance in a small size
- We have more than sufficient capacity





#### Product Specifications: RUM002N02, RSM002N06

Product No.					Pn						R <sub>DS(0</sub>	<sub>on)</sub> [Ω]						
F Part No.		Polarity [ch]	V <sub>DSS</sub> [V]	I <sub>D</sub> [A]	[Ŵ]	V <sub>GS</sub> =10V		V <sub>GS</sub> =4.5V		V <sub>GS</sub> =4.0V		V <sub>GS</sub> =2.5V		V <sub>GS</sub> =1.5V		V <sub>GS</sub> =1.2V		Package [mm]
Part No.	code				(T <sub>a</sub> =25°C)	Тур	Max	Тур	Max	Тур	Max	Тур	Max	Тур	Max	Тур	Max	
RUM002N02 🍈 🗐	T2L	N	20	0.20	0.15	_	_	_	_	_	_	0.80	1.20	1.20	2.40	1.60	4.80	SOT-723 (VMT3)
RSM002N06 🌐 🗐	T2L	IN	60	0.25	0.15	1.70	2.40	2.10	3.00	2.30	3.20	3.00	12.00	_	_	_	_	1.2×1.2 t=0.5

Note: Packages in parenthesis ( ) denotes ROHM's package type.

Click on the control of the product page on ROHM's website. Click on the the control of the product datasheet on ROHM's website.

## Additional Information Available on ROHM's Website

Learn the basics

Electronics Basics

What is a transistor? MOSFET

Many products are listed in addition to long-selling products

ROHM MOSFETs

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