

**STRUCTURE** Silicon Monolithic Integrated Circuit  
**TYPE** Power switch for ExpressCard™  
**PRODUCT SERIES** **BD4154FV**  
**FEATURES**

- High Side Switch for ExpressCard™
- Soft Start Circuit
- Meets the ExpressCard™ Standard

### ○ ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Limit	Unit
Input Voltage	V3AUX_IN, V3_IN, V15_IN	-0.3~5.0 *1	V
Logic Input Voltage 1	EN,CPPE#,CPUSB#,SYSR,PERST_IN#,RCLKEN	-0.3~V3AUX_IN+0.3 *1	V
Logic Output Voltage 1	RCLKEN	-0.3~V3AUX_IN+0.3 *1	V
Logic Output Voltage 2	PERST#	-0.3~V3AUX_IN+0.3	V
Output Voltage	V3AUX,V3, V15	-0.3~5.0 *1	V
Output Current 1	IOV3AUX	1.0	A
Output Current 2	IOV3	2.0	A
Output Current 3	IOV15	2.0	A
Power Dissipation 1	Pd1	500.0 *2	mW
Power Dissipation 2	Pd2	812.5 *3	mW
Operating Temperature Range	Topr	-40~+100	°C
Storage Temperature Range	Tstg	-55~+150	°C
Maximum Junction Temperature	Tjmax	+150	°C

\*1 Not to exceed Pd.

\*2 Reduced by 4.0mW for each increase in Ta of 1°C over 25°C

\*3 Reduced by 6.5mW for each increase in Ta of 1°C over 25°C (When mounted on a board 70mm × 70mm × 1.6mm Glass-epoxy PCB)

### ○ OPERATING CONDITIONS (Ta=25°C)

Parameter	Symbol	MIN	MAX	Unit
Input Voltage 1	V3AUX_IN	3.0	3.6	V
Input Voltage 2	V3_IN	3.0	3.6	V
Input Voltage 3	V15_IN	1.35	1.65	V
Logic Input Voltage 1	EN	-0.3	3.6	V
Logic Input Voltage 2	CPPE#,CPUSB#,SYSR,PERST_IN#,RCLKEN	0	V3AUX_IN	V
Logic Output Voltage 1	RCLKEN	0	V3AUX_IN	V
Logic Output Voltage 2	PERST#	0	V3AUX_IN	V
Output Current 1	IOV3AUX	0	275	mA
Output Current 2	IOV3	0	1.3	A
Output Current 3	IOV15	0	650	mA

★ This product is not designed for protection against radioactive rays.

Status of this document

The Japanese version of this document is the official specification.

This translated version is intended only as a reference, to aid in understanding the official version.

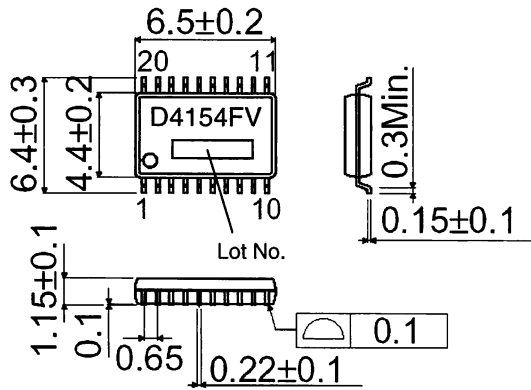
If there are any differences between the original and translated versions of this document, the official Japanese language version takes priority.

“ExpressCard™” is a trademark registered by PCMCIA(Personal Computer Memory Card International Association).

○ ELECTRICAL CHARACTERISTICS (unless otherwise noted, Ta=25°C VEN=3.3V V3AUX\_IN =V3\_IN=3.3V,V15\_IN=1.5V)

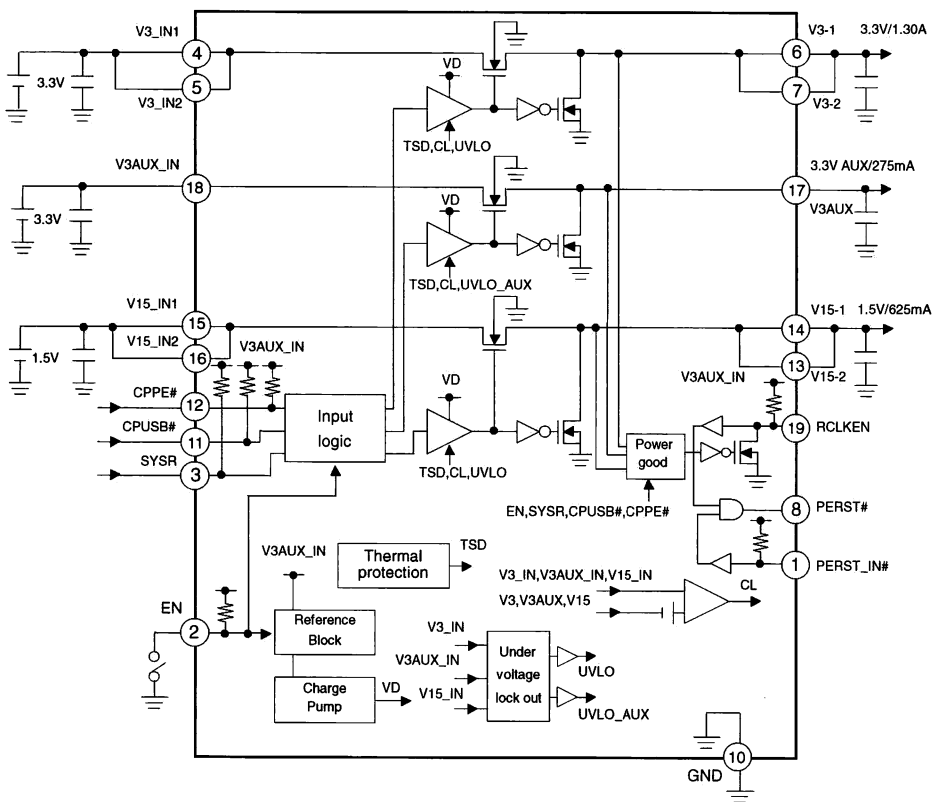
Parameter	Symbol	Standard Value			Unit	Condition	
		MIN	TYP	MAX			
Standby Current	IST	-	40	80	uA	VEN=0V (Include IEN, IRCLKEN)	
Bias Current 1	Icc1	-	120	250	uA	VSYSR=0V	
Bias Current 2	Icc2	-	250	500	uA	VSYSR=3.3V	
[Enable]							
High Level Enable Input Voltage	VENHI	2.0	-	5.5	V		
Low Level Enable Input Voltage	VENLOW	-0.2	-	0.8	V		
Enable Pin Input Current	IEN	10	-	30	uA	VEN=0V	
[Logic]							
High Level Logic Input Voltage	VLHI	2.0	-	-	V		
Low Level Logic Input Voltage	VLLOW	-	-	0.8	V		
Logic Pin Input Current	ICPPE#	-	0	1	uA	CPPE#=3.6V	
		10	-	30	uA	CPPE#=0V	
	ICPUSB#	-	0	1	uA	CPUSB#=3.6V	
		10	-	30	uA	CPUSB#=0V	
	ISYSR	-	0	1	uA	SYSR=3.6V	
		10	-	30	uA	SYSR=0V	
	IPRT_IN#	-	0	1	uA	PERST_IN#=3.6V	
		10	-	30	uA	PERST_IN#=0V	
	IRCLKEN	-	0	1	uA	RCLKEN=3.6V	
		10	-	30	uA	RCLKEN=0V	
	RCLKEN Low Voltage	VRCLKEN	-	0.1	0.3	V	IRCLKEN=0.5mA
	RCLKEN Leak Current	IRCLKEN	-	-	1	uA	VRCLKEN=3.65V
[Switch V3AUX]							
On Resistance	R <sub>V3AUX</sub>	-	120	220	mΩ	Tj=-10~100°C	
Discharge On Resistance	R <sub>V3AUX Dis</sub>	-	60	150	Ω		
[Switch V3]							
On Resistance	R <sub>V3</sub>	-	42	90	mΩ	Tj=-10~100°C	
Discharge On Resistance	R <sub>V3Dis</sub>	-	60	150	Ω		
[Switch V15]							
On Resistance	R <sub>V15</sub>	-	45	90	mΩ	Tj=-10~100°C	
Discharge On Resistance	R <sub>V15Dis</sub>	-	60	150	Ω		
[Over Current Protection]							
V3 Over Current	OCP <sub>V3</sub>	1.3	-	-	A		
V3AUX Over Current	OCP <sub>V3AUX</sub>	0.275	-	-	A		
V15 Over Current	OCP <sub>V15</sub>	0.65	-	-	A		
[Under Voltage Lockout]							
V3_IN UVLO OFF Voltage	VUVLO <sub>V3_IN</sub>	2.70	2.80	2.90	V	sweep up	
V3_IN Hysteresis Voltage	ΔVUVLO <sub>V3_IN</sub>	50	100	150	mV	sweep down	
V3AUX_IN UVLO OFF Voltage	VUVLO <sub>V3AUX_IN</sub>	2.70	2.80	2.90	V	sweep up	
V3AUX_IN Hysteresis Voltage	ΔVUVLO <sub>V3AUX_IN</sub>	50	100	150	mV	sweep down	
V15_IN UVLO OFF Voltage	VUVLO <sub>V15_IN</sub>	1.15	1.20	1.25	V	sweep up	
V15_IN Hysteresis Voltage	ΔVUVLO <sub>V15_IN</sub>	50	100	150	mV	sweep down	
[POWER GOOD]							
V3 POWER GOOD Voltage	PG <sub>V3</sub>	2.700	2.850	3.000	V		
V3AUX POWER GOOD Voltage	PG <sub>V3AUX</sub>	2.700	2.850	3.000	V		
V15 POWER GOOD Voltage	PG <sub>V15</sub>	1.200	1.275	1.350	V		
PERST# LOW Voltage	VPERST# <sub>LOW</sub>	-	0.1	0.3	V	I <sub>PERST</sub> =0.5mA	
PERST# HIGH Voltage	VPERST# <sub>HIGH</sub>	3.0	-	-	V		
PERST# Delay Time	T <sub>PERST#</sub>	4	-	20	ms		
PERST# assertion time	T <sub>ast</sub>	-	-	500	ns		
[OUTPUT RISE TIME]							
V3_IN to V3	T <sub>V3</sub>	0.1	-	3	ms		
V3AUX_IN to V3AUX	T <sub>V3AUX</sub>	0.1	-	3	ms		
V15_IN to V15	T <sub>V15</sub>	0.1	-	3	ms		

○ PHYSICAL DIMENSIONS



(UNIT:mm)  
**SSOP-B20**

○ BLOCK DIAGRAM



○ PIN DESCRIPTION

Pin number	Pin name
1	PERST_IN#
2	EN
3	SYSR
4	V3_IN1
5	V3_IN2
6	V3_1
7	V3_2
8	PERST#
9	TEST
10	GND
11	CPUSB#
12	CPPE#
13	V15_1
14	V15_2
15	V15_IN1
16	V15_IN2
17	V3AUX
18	V3AUX_IN
19	RCLKEN
20	NC

ONOTES FOR USE

(1) Absolute maximum ratings

Exceeding the absolute maximum ratings, including applied voltage and operating temperature range, may damage or destroy the IC. Since the cause of the damage cannot be conclusively identified (as, for example, a short or open mode), be sure to take appropriate physical safety measures, such as incorporating fuses, whenever a special mode anticipated to exceed absolute maximum ratings is employed.

(2) Thermal design

Provide sufficient margin in the thermal design to account for the allowable power dissipation (Pd) expected in actual use.

(3) Electromagnetic fields

Use in strong electromagnetic fields may cause malfunctions. Be careful operating in electromagnetic fields.

(4) Thermal shutdown circuit

The IC is provided with a built-in thermal shutdown (TSD) circuit. When chip temperature reaches the threshold temperature shown below, output goes to a cut-off (open) state. Note that the TSD circuit is designed exclusively to shut down the IC in abnormal thermal conditions. It is not intended to protect the IC per se or guarantee performance when extreme heat occurs. Therefore, the TSD circuit should not be employed with the expectation of continued use or subsequent operation once TSD is operated.

TSD ON temperature [°C] (typ.)	Hysteresis temperature [°C] (typ.)
175	15

(5) Ground wiring pattern

When both a small-signal GND and high current GND are present, single-point grounding (at the set standard point) is recommended, in order to separate the small-signal and high current patterns, and to be sure the voltage change stemming from the wiring resistance and high current does not cause any voltage change in the small-signal GND. In the same way, care must be taken to avoid wiring pattern fluctuations in any connected external component GND.

(6) Electrical Characteristics

Be sure to check the electrical characteristics, such as transient characteristics in the present specification, since these can be changed by temperature, supply voltage, and external circuits.

(7) Input Capacitor

The input capacitor reduces the output impedance of the voltage supply source. If the output impedance of this power supply increases, the input voltage (V3\_IN,V3AUX\_IN,V15\_IN) may become unstable. A 0.1uF capacitor for the V3AUX\_IN pin, and a 1uF capacitor for V3\_IN and V15\_IN pin are recommended. A low ESR capacitor with minimal susceptibility to temperature is preferable, but stability depends on power supply characteristics and the substrate wiring pattern. Please confirm operation across a variety of temperature and load conditions.

(8) Output Capacitor

Mount an output capacitor between output pin (V3,V3AUX,V15)and GND for stability purposes. A 10uF capacitor for the V3 and V15 pin, and a 1uF capacitor for the V3AUX pin are recommended. A low ESR capacitor with minimal susceptibility to temperature is preferable, but stability depends on power supply characteristics and the substrate wiring pattern. Please confirm operation across a variety of temperature and load conditions.

(9) Short-circuits between pins and and mounting errors

When mounting the IC onto a set substrate or circuit board, be careful to avoid incorrect orientation or mis-positioning of the IC, as such mounting errors may cause device malfunctions. Similar damage may occur when the power supply connection is reversed. Also, note that the introduction of foreign material between pins and the GND, or between the pins themselves may cause shorts and destroy the IC.

(10) Power dissipation

When exercising modes that exceed Pd, there is a risk that IC characteristics, such as current capability, may be negatively impacted by the rise in chip temperature. Provide sufficient margin in the thermal design to account for the allowable power dissipation (Pd) expected in actual use.

(11) Operating Conditions

The circuit functionality is guaranteed within the operating ambient temperature range. The standard electrical characteristics cannot be guaranteed, except at Ta=25°C. However, any variation will be small.

(12) Operating stability depends on the layout pattern. Make sure the wiring pattern for the input (V3\_IN, V3AUX\_IN, V15\_IN) and the output (V3, V3AUX, V15) on the application board is designed wide and short , in order to minimize layout impedance.

### Notes

- No technical content pages of this document may be reproduced in any form or transmitted by any means without prior permission of ROHM CO.,LTD.
- The contents described herein are subject to change without notice. The specifications for the product described in this document are for reference only. Upon actual use, therefore, please request that specifications to be separately delivered.
- Application circuit diagrams and circuit constants contained herein are shown as examples of standard use and operation. Please pay careful attention to the peripheral conditions when designing circuits and deciding upon circuit constants in the set.
- Any data, including, but not limited to application circuit diagrams information, described herein are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO.,LTD. disclaims any warranty that any use of such devices shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes no liability of whatsoever nature in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices, other than for buyer's right to use such devices itself, resell or otherwise dispose of the same, no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by
- ROHM CO., LTD. is granted to any such buyer.
- Products listed in this document are no antiradiation design.

The products listed in this document are designed to be used with ordinary electronic equipment or devices (such as audio visual equipment, office-automation equipment, communications devices, electrical appliances and electronic toys).

Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

#### About Export Control Order in Japan

Products described herein are the objects of controlled goods in Annex 1 (Item 16) of Export Trade Control Order in Japan.

In case of export from Japan, please confirm if it applies to "objective" criteria or an "informed" (by MITI clause) on the basis of "catch all controls for Non-Proliferation of Weapons of Mass Destruction.

Thank you for your accessing to ROHM product informations.  
More detail product informations and catalogs are available,  
please contact your nearest sales office.

Please contact our sales offices for details ;

U.S.A / San Diego	TEL : +1(858)625-3630	FAX : +1(858)625-3670
Atlanta	TEL : +1(770)754-5972	FAX : +1(770)754-0691
Dallas	TEL : +1(972)312-8818	FAX : +1(972)312-0330
Germany / Dusseldorf	TEL : +49(2154)9210	FAX : +49(2154)921400
United Kingdom / London	TEL : +44(1)908-282-666	FAX : +44(1)908-282-528
France / Paris	TEL : +33(0)1 56 97 30 60	FAX : +33(0) 1 56 97 30 80
China / Hong Kong	TEL : +852(2)740-6262	FAX : +852(2)375-8971
Shanghai	TEL : +86(21)6279-2727	FAX : +86(21)6247-2066
Dilian	TEL : +86(411)8230-8549	FAX : +86(411)8230-8537
Beijing	TEL : +86(10)8525-2483	FAX : +86(10)8525-2489
Taiwan / Taipei	TEL : +866(2)2500-6956	FAX : +866(2)2503-2869
Korea / Seoul	TEL : +82(2)8182-700	FAX : +82(2)8182-715
Singapore	TEL : +65-6332-2322	FAX : +65-6332-5662
Malaysia / Kuala Lumpur	TEL : +60(3)7958-8355	FAX : +60(3)7958-8377
Philippines / Manila	TEL : +63(2)807-6872	FAX : +63(2)809-1422
Thailand / Bangkok	TEL : +66(2)254-4890	FAX : +66(2)256-6334

Japan /  
(Internal Sales)

Tokyo	2-1-1, Yaesu, Chuo-ku, Tokyo 104-0082	TEL : +81(3)5203-0321	FAX : +81(3)5203-0300
Yokohama	2-4-8, Shin Yokohama, Kohoku-ku, Yokohama, Kanagawa 222-8575	TEL : +81(45)476-2131	FAX : +81(45)476-2128
Nagoya	Dainagayo Building 9F 3-28-12, Meieki, Nakamura-ku, Nagoya, Aichi 450-0002	TEL : +81(52)581-8521	FAX : +81(52)561-2173
Kyoto	579-32 Higashi Shiokouji-cho, Karasuma Nishi-iru, Shiokoujidori, Shimogyo-ku, Kyoto 600-8216	TEL : +81(75)311-2121	FAX : +81(75)314-6559

(Contact address for overseas customers in Japan)

Yokohama	TEL : +81(45)476-9270	FAX : +81(045)476-9271
----------	-----------------------	------------------------