

STRUCTURE	Silicon Monolithic Integrated Circuit
TYPE	Power switch for ExpressCard™
PRODUCT SERIES	BD4155FV
FEATURE	<ul style="list-style-type: none"> •High Side switch for ExpressCard™ •Soft Start Circuit •Meets the ExpressCard™ Standard

○ ABSOLUTE MAXIMUM RATINGS (Ta=100°C)

Parameter	Symbol	Limit	Unit
Input Voltage	V3AUX_IN, V3_IN, V15_IN	-0.3~+5.0 * ¹	V
Logic Input Voltage	CPPE#,CPUSB#,SYSR,EC_CLKREQ#, EC_CLKEN#,EC_RST#,PLT_RST#	-0.3~V3AUX_IN+0.3 * ¹	V
Logic Output Voltage	PERST#	-0.3~V3AUX_IN+0.3	V
Logic Output applied Voltage	PLL_CLKREQ#	-0.3~+5.0	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 * 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).

○ RECOMMENDED 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	CPPE#,CPUSB#,SYSR,EC_CLKREQ#, EC_CLKEN#,EC_RST#,PLT_RST#	0	V3AUX_IN	V
Logic Output Voltage 1	PERST#	0	V3AUX_IN	V
Logic Output Voltage 2	PLL_CLKREQ#	0	3.6	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 designed for protection against radioactive rays.

Status of this document

The English version of this document is the formal specification.

A customer may use this translation version only for a reference to help reading the formal version.

If there are any differences in translation version of this document, formal version takes priority.

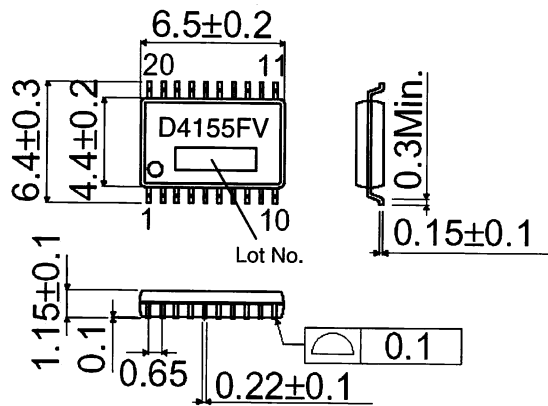
“ExpressCard™” is a trademark registered by PCMCIA(Personal Computer Memory Card International Association).

OELECTRICAL CHARACTERISTICS (unless otherwise noted, Ta=25°C V3AUX_IN =V3_IN=3.3V,V15_IN=1.5V)

Parameter	Symbol	Standard Value			Unit	Condition
		MIN	TYP	MAX		
Standby current	I _{cc1}	-	120	250	uA	VSYSR=0V
Bias current	I _{cc2}	-	250	500	uA	VSYSR=3.3V
[Logic]						
High Level Enable Input Voltage	V _{LHI}	2.0	-	-	V	
Low Level Enable Input Voltage	V _{LOW}	-	-	0.8	V	
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	-1	0	1	uA	SYSR=3.6V
	IEC_CLKEN#	5	0	20	uA	EC_CLKEN#=3.6V
	IEC_CLKREQ#	-1	0	1	uA	EC_CLKREQ#=3.6V
	IEC_RST#	-1	0	1	uA	EC_RST#=3.6V
	IPLT_RST#	-1	0	1	uA	PLT_RST#=3.6V
[Switch V3AUX]						
On Resistance	R _{V3AUX}	-	120	220	mΩ	Tj=-10~100°C *
Discharge On Resistance	R _{V3AUXDis}	-	60	150	Ω	
[Switch V3]						
On Resistance	R _{V3}	-	42	90	mΩ	Tj=-10~100°C *
Discharge On Resistance	R _{V3Dis}	-	60	150	Ω	
[Switch V15]						
On Resistance	R _{V15}	-	45	90	mΩ	Tj=-10~100°C *
Discharge On Resistance	R _{V15Dis}	-	60	150	Ω	
[Over Current Protection]						
V3 Over current	OCP _{V3}	1.6	-	-	A	
V3AUX Over current	OCP _{V3AUX}	0.35	-	-	A	
V15 Over current	OCP _{V15}	0.8	-	-	A	
[Low input miss operation prevent Block]						
V3_IN threshold voltage	VUVLO _{V3_IN}	2.70	2.80	2.90	V	sweep up
V3_IN hysteresis Voltage	ΔVUVLO _{V3_IN}	50	100	150	mV	sweep down
V3AUX_IN threshold voltage	VUVLO _{V3AUX_IN}	2.70	2.80	2.90	V	sweep up
V3AUX_IN hysteresis Voltage	ΔVUVLO _{V3AUX_IN}	50	100	150	mV	sweep down
V15_IN threshold voltage	VUVLO _{V15_IN}	1.15	1.20	1.25	V	sweep up
V15_IN hysteresis Voltage	ΔVUVLO _{V15_IN}	50	100	150	mV	sweep down
[POWER GOOD]						
V3 POWER GOOD Voltage	PG _{V3}	2.700	2.850	3.000	V	
V3AUX POWER GOOD Voltage	PG _{V3AUX}	2.700	2.850	3.000	V	
V15 POWER GOOD Voltage	PG _{V15}	1.200	1.275	1.350	V	
PERST# LOW Voltage	VPERST# _{LOW}	-	0.1	0.3	V	I _{PERST} =0.5mA
PERST# HIGH Voltage	VPERST# _{HIGH}	3.0	-	-	V	
PERST Delay	T _{PERST#}	4	10	20	ms	
PLL_CLKREQ# Low Voltage	V _{PLL}	-	0.1	0.2	V	I _{PLL_CLKREQ#} =0.5mA
PLL_CLKREQ# Leak Current	I _{PLL}	-	-	1	uA	V _{PLL_CLKREQ#} =3.6V
[WAKE UP TIME]						
V3_IN to V3	T _{V3}	0.1	-	3	ms	
V3AUX_IN to V3AUX	T _{V3AUX}	0.1	-	3	ms	
V15_IN to V15	T _{V15}	0.1	-	3	ms	

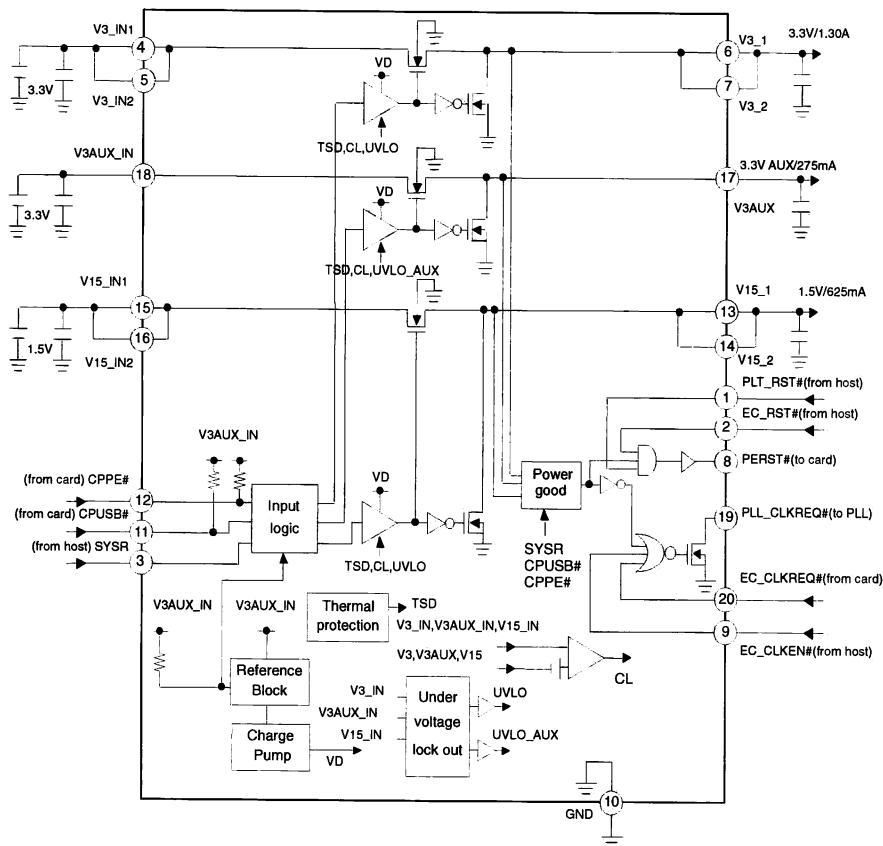
* Design Guarantee

○ PHYSICAL DIMENSION



SSOP-B20 (UNIT:mm)

○ BLOCK DIAGRAM



○ PIN DESCRIPTION

PIN No.	Pin name
1	PLT_RST#
2	EC_RST#
3	SYSR
4	V3_IN1
5	V3_IN2
6	V3_1
7	V3_2
8	PERST#
9	EC_CLKEN#
10	GND
11	CPUSB#
12	CPPE#
13	V15_1
14	V15_2
15	V15_IN1
16	V15_IN2
17	V3AUX
18	V3AUX_IN
19	PLL_CLKREQ#
20	EC_CLKREQ#

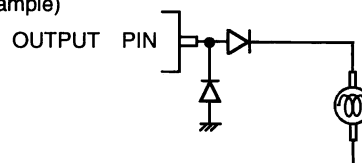
NOTES FOR USE

- (1) Absolute maximum range
Although the quality of this product is rigorously controlled, and circuit operation is guaranteed within the operation ambient temperature range, the device may be destroyed when applied voltage or operating temperature exceeds its absolute maximum rating. Because the failure mode (such as short mode or open mode) cannot be identified in this instance, it is important to take physical safety measures such as fusing if a specific mode in excess of absolute rating limits is considered for implementation.
- (2) Ground potential
Make sure the potential for the GND pin is always kept lower than the potentials of all other pins, regardless of the operating mode, including transient conditions.
- (3) Thermal Design
In order to build sufficient margin into the thermal design, give proper consideration to the allowable loss (Power Dissipation) in actual operation.
- (4) Using in the strong electromagnetic field
Use in strong electromagnetic fields may cause malfunctions.
- (5) ASO
Be sure that the output transistor for this IC does not exceed the absolute maximum ratings or ASO value.
- (6) 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

- (7) GND 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.
- (8) 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.
- (9) 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 0.1μF capacitor for the V3AUX_IN pin, and a 1μF 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.
- (10) Output Capacitor
Mount an output capacitor between output pin (V3, V3AUX, V15) and GND for stability purposes. A 10μF capacitor for the V3 and V15 pin, and a 1μF 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.
- (11) Short-circuits between pins 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.
- (12) 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.
- (13) Please add a protection diode when a large inductance component is connected to the output terminal, and reverse-polarity power is possible at startup or in output OFF condition.

(Example)



- (14) 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.
- (15) 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
Dalian	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
----------	-----------------------	------------------------