

# Low-side Switch ICs [Surface-mount 4-circuits] **SPF5002A**

## Features

- DMOS 4ch output
- Allows ON/OFF using C-MOS logic level
- Built-in overcurrent, overvoltage and thermal protection circuits

## Absolute Maximum Ratings

(Ta=25°C)

Parameter	Symbol	Ratings	Unit	Conditions
Power supply voltage	V <sub>B</sub>	40	V	
Output terminal voltage	V <sub>OUT</sub>	37	V	*
Input terminal voltage	V <sub>IN</sub>	-0.5 to +7.5	V	
Output current	I <sub>O</sub>	1.8	A	
Power Dissipation	P <sub>D</sub>	2	W	
Storage temperature	T <sub>stg</sub>	-40 to +150	°C	
Channel temperature	T <sub>ch</sub>	150	°C	
Output avalanche capability	E <sub>AV</sub>	50	mJ	Single pulse

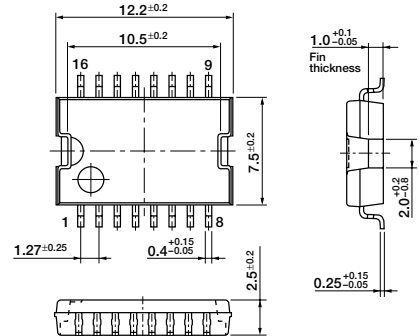
Note: \* At the clamping operation, refer to V<sub>OUT</sub> (clamp) in the section of electrical characteristics.

## Electrical Characteristics

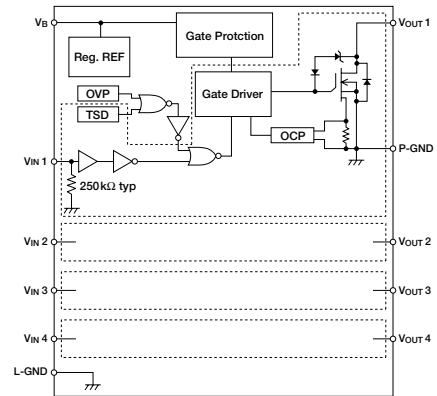
(V<sub>B</sub>=14V, Ta=25°C unless otherwise specified)

Parameter	Symbol	Ratings			Unit	Conditions
		min	typ	max		
Power supply voltage	V <sub>Boppr</sub>	5.5		25	V	
Quiescent circuit current	I <sub>q</sub>		5	7	mA	V <sub>IN</sub> =0V (all inputs)
Operating circuit current	I <sub>CC</sub>		8	12	mA	V <sub>IN</sub> =5V (all inputs)
Input voltage	Hi output V <sub>IN</sub>	3.5		5.5	V	I <sub>O</sub> =1A
	Lo output V <sub>IN</sub>	-0.5		1.5	V	
Input current	Hi output I <sub>IN</sub>			50	μA	V <sub>IN</sub> =5V
	Lo output I <sub>IN</sub>			30	μA	V <sub>IN</sub> =0V
Output ON resistance	R <sub>DS(on)</sub>		0.4	0.6	Ω	
			0.5	0.7	Ω	V <sub>B</sub> =5.5V
Output clamp voltage	V <sub>OUT(clamp)</sub>	41	50	55	V	I <sub>O</sub> =1A
Output leak current	I <sub>OH</sub>			10	μA	V <sub>O</sub> =37V
Forward voltage of output stage diode	V <sub>F</sub>			1.6	V	I <sub>F</sub> =0.5A
Overvoltage protection starting voltage	V <sub>B(ovp)</sub>	25		40	V	
Thermal protection starting temperature	T <sub>TSD</sub>	151	165		°C	
Overcurrent protection starting current	I <sub>S</sub>	1.1			A	
Output transfer time	T <sub>ON</sub>			12	μs	R <sub>L</sub> =14Ω, I <sub>O</sub> =1A
	T <sub>OFF</sub>			8	μs	R <sub>L</sub> =14Ω, I <sub>O</sub> =1A
Output rise time	T <sub>r</sub>			5	μs	R <sub>L</sub> =14Ω, I <sub>O</sub> =1A
Output fall time	T <sub>f</sub>			10	μs	R <sub>L</sub> =14Ω, I <sub>O</sub> =1A

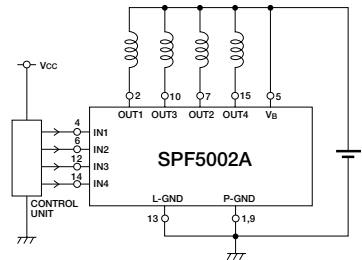
## External Dimensions (unit: mm)



## Equivalent Circuit Diagram



## Circuit Example

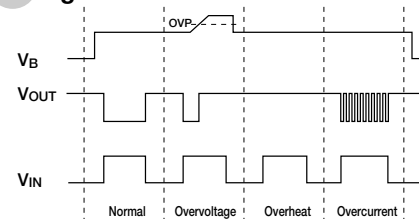


Use L-GND and P-GND being connected.

### Truth table

V <sub>IN</sub>	V <sub>O</sub>
H	L
L	H

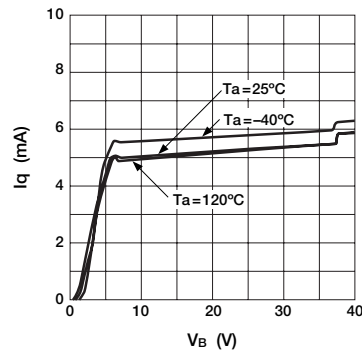
## Timing Chart



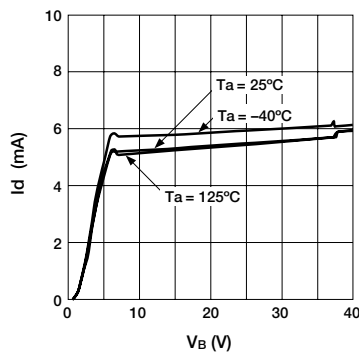
\* Self-excited frequency is used in the overcurrent protection.

**Electrical Characteristics**

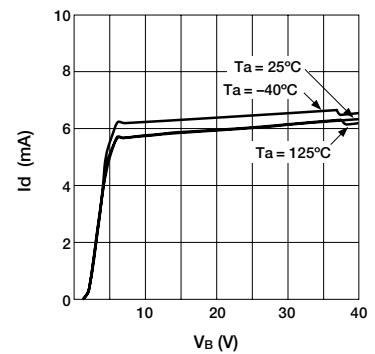
■ Quiescent Circuit Current



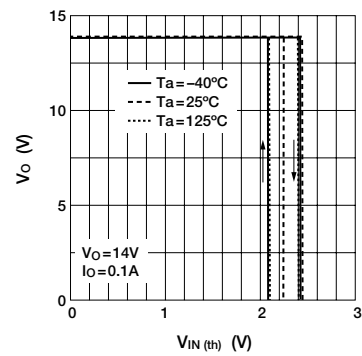
■ Circuit Current (single circuit)



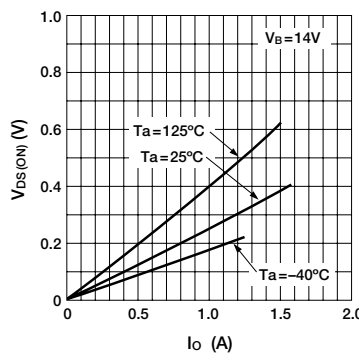
■ Circuit Current (4 circuits)



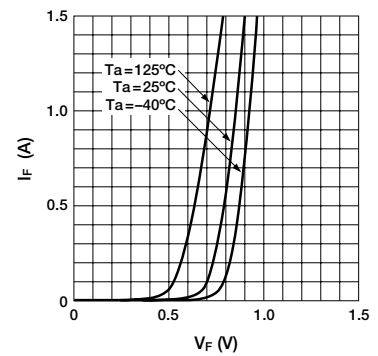
■ Threshold Input Voltage



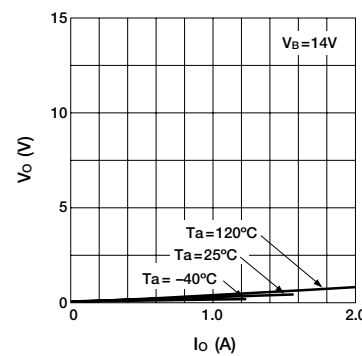
■ Output ON Voltage



■ Forward Voltage of Output Stage Diode



■ Overcurrent Protection Characteristics



■ Overvoltage Protection Starting Voltage

