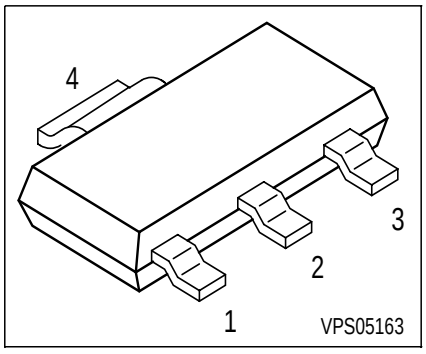
Smart High-Side Power Switch
One Channel: 1 x 1Ω

Features

- Current controlled input
- Short circuit protection
- Current limitation
- Overload protection
- Overvoltage protection (including load dump)
- Switching inductive loads
- Clamp of negative voltage at output with inductive loads
- Thermal shutdown with restart
- ESD - Protection
- Loss of GND and loss of V_{bb} protection
- Reverse battery protection

Product Summary

Overvoltage protection	$V_{bbin(AZ)}$	65	V
Operating voltage	$V_{bb(on)}$	4.9...60	V
On-state resistance	R_{ON}	1	Ω



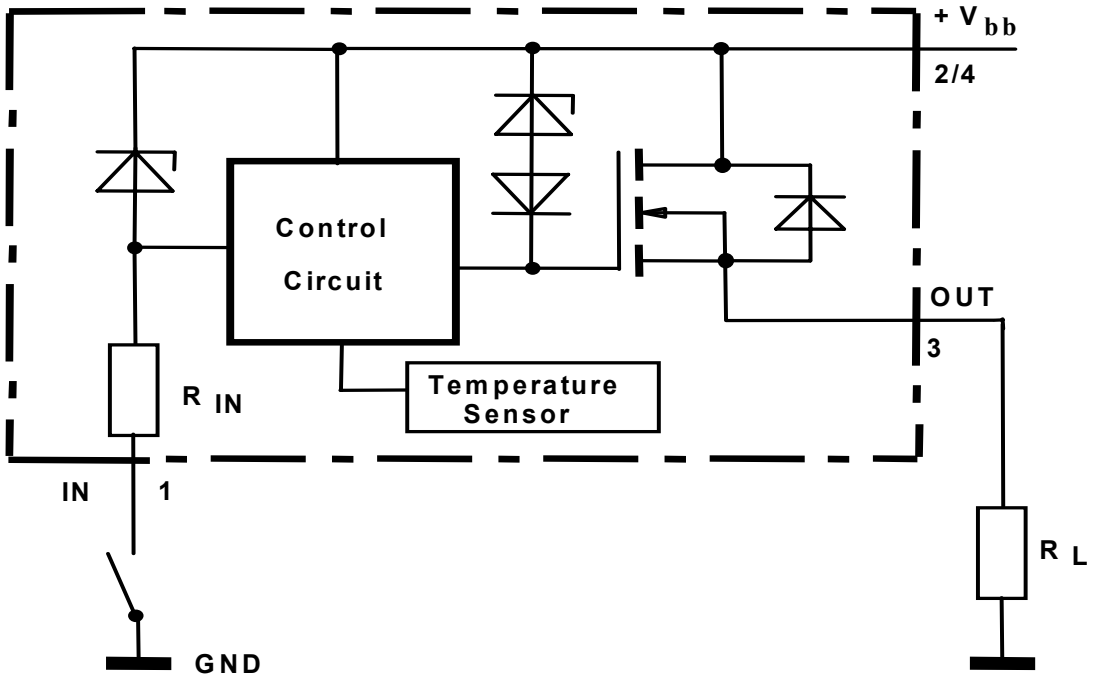
Application

- All types of resistive, inductive and capacitive loads
- Current controlled power switch for 12 V, 24 V and 42 V DC applications
- Driver for electromechanical relays
- Signal amplifier

General Description

N channel vertical power MOSFET with charge pump and current controlled input, monolithically integrated in Smart SIPMOS®technology.
Fully protected by embedded protection functions.

Block Diagram



Pin	Symbol	Function
1	IN	Input, activates the power switch in case of connection to GND
2	Vbb	Positive power supply voltage
3	OUT	Output to the load
4	Vbb	Positive power supply voltage

Maximum Ratings

Parameter at T_j = 25°C, unless otherwise specified	**Symbol**	**Value**	**Unit**
Supply voltage	V_{bb}	65	V
Load current (Short - circuit current, see page 5)	I_L	self limited	A
Maximum current through the input pin (DC)	I_{IN}	±15	mA
Operating temperature	T_j	-40 ...+150	°C
Storage temperature	T_{stg}	-55 ... +150	
Power dissipation[1)] T_A = 25 °C	P_{tot}	1.7	W
Inductive load switch-off energy dissipation[1)2)] single pulse T_j = 150 °C, I_L = tbd A	E_{AS}	>5	mJ
Load dump protection $V_{LoadDump}$[3)] = V_A + V_S t_d = 400 ms, R_I = 2 Ω, R_L = tbd Ω	$V_{Loaddump}$	tbd	V
Electro**s**tatic **d**ischarge voltage (Human Body Model) according to ANSI EOS/ESD - S5.1 - 1993 ESD STM5.1 - 1998 Input pin all other pins	V_{ESD}	 ±1 ±5	kV

[1]Device on 50mm*50mm*1.5mm epoxy PCB FR4 with 6 cm2 (one layer, 70µm thick) copper area for V_{bb} connection. PCB is vertical without blown air.

[2]not tested, specified by design

[3]$V_{Loaddump}$ is setup without the DUT connected to the generator per ISO 7637-1 and DIN 40839

Electrical Characteristics

Parameter at T_j = 25 °C, V_{bb} = 24 V unless otherwise specified	Symbol	Values			Unit
		min.	typ.	max.	
Thermal Characteristics					
Thermal resistance @ min. footprint	$R_{th(JA)}$	-	-	125	K/W
Thermal resistance @ 6 cm^2 cooling area [1)]	$R_{th(JA)}$	-	-	70	
Thermal resistance, junction - soldering point	R_{thJS}	-	-	17	K/W

Load Switching Capabilities and Characteristics

On-state resistance	R_{ON}				Ω
T_j = 25 °C, Pin1 connencted to GND		-	1	-	
T_j = 150 °C		-	1.5	-	
Nominal load current Device on PCB [1)]	$I_{L(nom)}$	>70	-	-	mA
Turn-on time to 90% V_{OUT} V_{IN} = 0 to 10 V	t_{on}	-	80	tbd	µs
Turn-off time to 10% V_{OUT} V_{IN} = 10 to 0 V	t_{off}	-	80	tbd	
Slew rate on 10 to 30% V_{OUT},	dV/dt_{on}	-	4	tbd	V/µs
Slew rate off 70 to 40% V_{OUT},	$-dV/dt_{off}$	-	4	tbd	

[1]Device on 50mm*50mm*1.5mm epoxy PCB FR4 with 6 cm2 (one layer, 70µm thick) copper area for V_{bb} connection. PCB is vertical without blown air.

Electrical Characteristics

Parameter at T_j = 25 °C, V_{bb} = 24 V unless otherwise specified	Symbol	Values			Unit
		min.	typ.	max.	
Operating Parameters					
Operating voltage T_j = -40...150 °C	$V_{bb(on)}$	4.9	-	60	V
Standby current T_j = -40...150 °C, Pin1 = open	$I_{bb(off)}$	-	-	10	µA
Protection Functions					
Initial peak short circuit current limit T_j = -40 °C T_j = 25 °C T_j = 150 °C	$I_{L(SCp)}$	 - - 0.2	 - 0.5 -	 tbd - -	A
Repetitive short circuit current limit $T_j = T_{jt}$ (see timing diagrams)	$I_{L(SCr)}$	-	tbd	-	
Output clamp (inductive load switch off) at $V_{OUT} = V_{bb} - V_{ON(CL)}$,	$V_{ON(CL)}$	65	-	-	V
Overvoltage protection[1)] T_j = -40...150 °C	$V_{bbin(AZ)}$	65	72	-	
Thermal overload trip temperature	T_{jt}	150	-	-	°C
Thermal hysteresis	ΔT_{jt}	-	10	-	K

[1] see also $V_{ON(CL)}$ in circuit diagram

Electrical Characteristics

Parameter at T_j = 25 °C, V_{bb} = 24 V unless otherwise specified	Symbol	Values			Unit
		min.	typ.	max.	
Input					
Off state input current T_j = -40...150 °C	$I_{IN(off)}$	-	-	0.05	mA
On state input current (Pin1 grounded)[1)] T_j = -40...150 °C	$I_{IN(on)}$	-	0.3	1	
Input resistance	R_I	-	1	-	kΩ
Reverse Battery					
Continuous reverse drain current T_C = 25 °C	I_S	-	-	0.2	A
Drain-source diode voltage	$-V_{ON}$	-	600	-	mV

[1] Driver circuit must be able to drive currents > 1mA.

Package and ordering code

all dimensions in mm

Ordering code:

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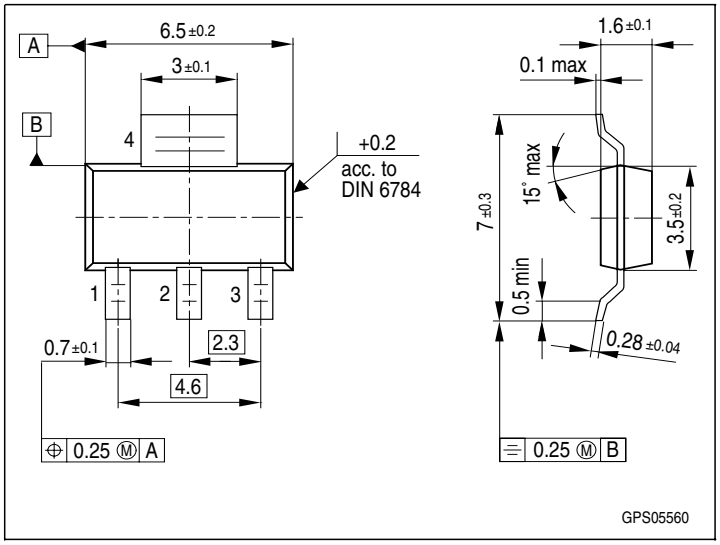

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