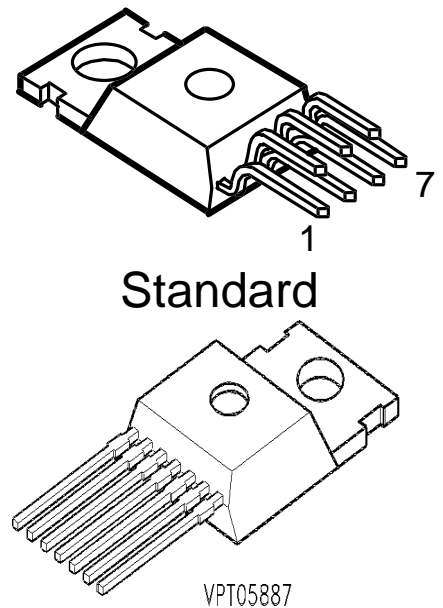


## PWM Power Unit

The device allows continuous power control for lamps, LEDs or inductive loads.

- Highside switch
- Overtemperature protection
- Short circuit / overload protection through pulse width reduction and overload shutdown
- Load dump protection
- Undervoltage and overvoltage shutdown with auto-restart and hysteresis
- Reverse battery protection 1)
- Timing frequency adjustable
- Controlled switching rise and fall times
- Maximum current internally limited
- Protection against loss of GND 2)
- Electrostatic discharge (ESD) protection
- Package: TO220/7 and TO220/7 E3128 (SMD), Pin 4 is shorted to the mounting flange



**Note:** Switching frequency is programmed with an external capacitor.

Type	Ordering Code	Marking	Package
BTS630 (Standard)	Q67060-S6305-A2	-	TO220/7
BTS630	Q67060-S6305-A3	-	TO220/7, E3230

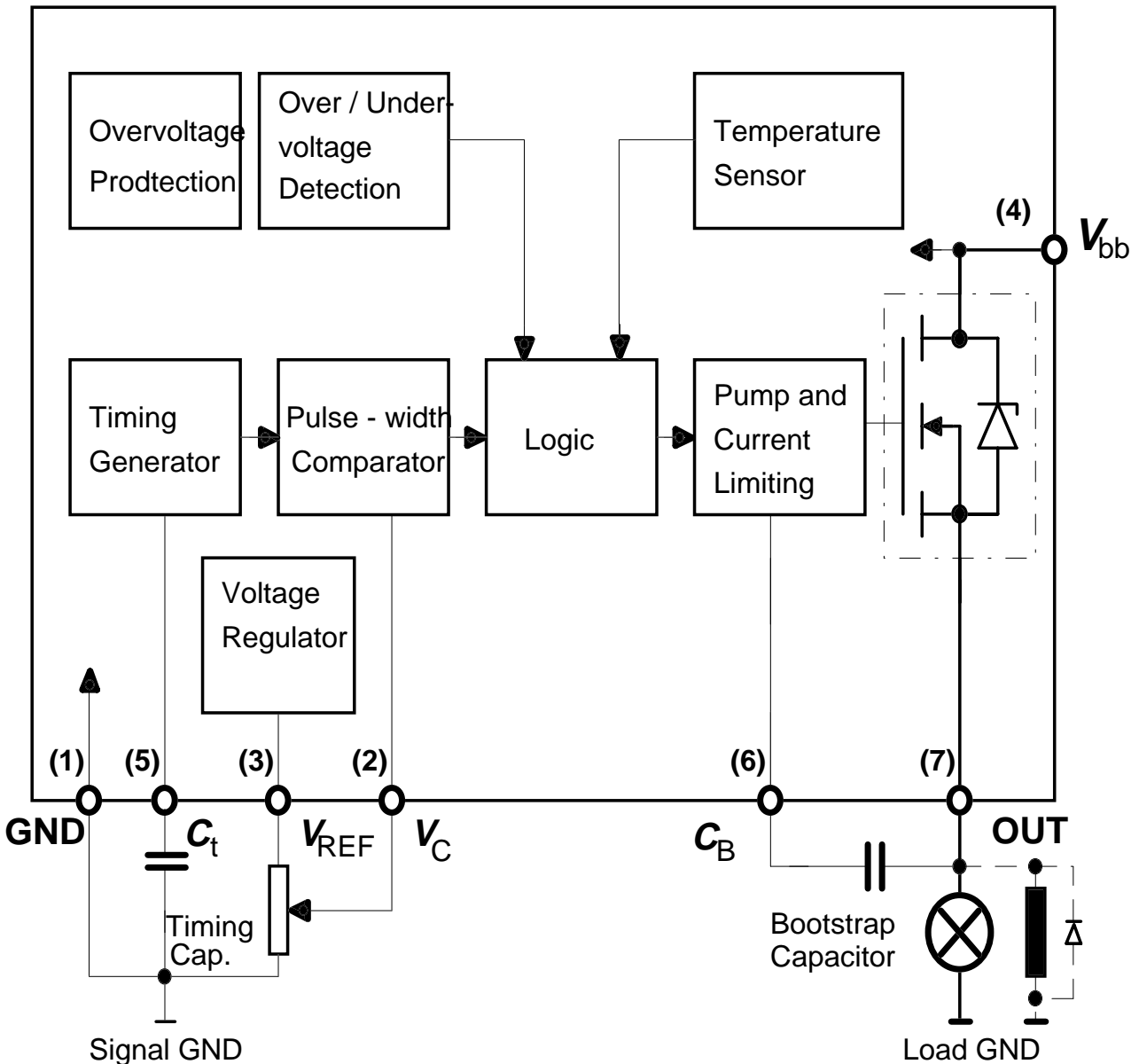
### Maximum Ratings

Parameter	Symbol	Values	Unit
Active overvoltage protection	$V_{bb(AZ)}$	>40	V
Short circuit current	$I_{SC}$	self-limited	-
Input current (DC)	$I_{Ct}$	2	mA
Pin1 ( $C_t$ ) and pin19 ( $V_C$ )	$I_{Vc}$	2	mA
Operating temperature range	$T_j$	-40...+150	°C
Storage temperature range	$T_{stg}$	-50...+150	
Power dissipation $T_a=25^\circ\text{C}$	$P_{tot}$	75	W
Thermal resistance chip-case	$R_{th JC}$	$\leq 1.67$	K/W
chip-ambient	$R_{th JA}$	$\leq 75$	

<sup>1)</sup> With 150Ω resistor in signal GND connection.

<sup>2)</sup> Potential between signal GND and load GND >0.5V

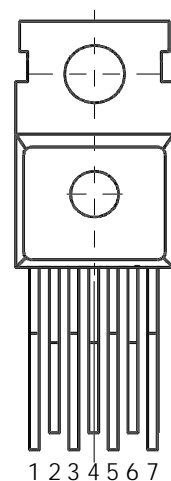
## Block Diagram



### Pin Definitions and Funktionen

Pin	Symbol	Funktionen
1	GND	Ground
2	$V_C$	Voltage for PWM-Control
3	$V_{REF}$	Reference Voltage
4	$V_{bb}$	Supply voltage
5	$C_t$	Timing capacitor for frequency
6	$C_B$	Bootstrap capacitor
7	OUT	Output

### Pin Configuration (top view)



## Electrical Characteristics

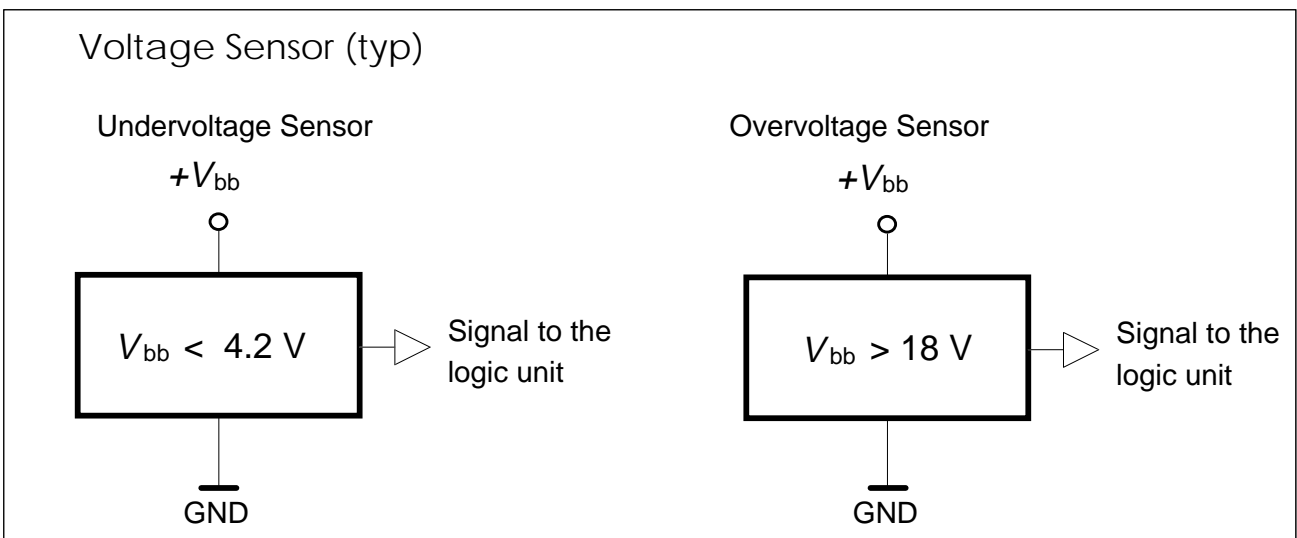
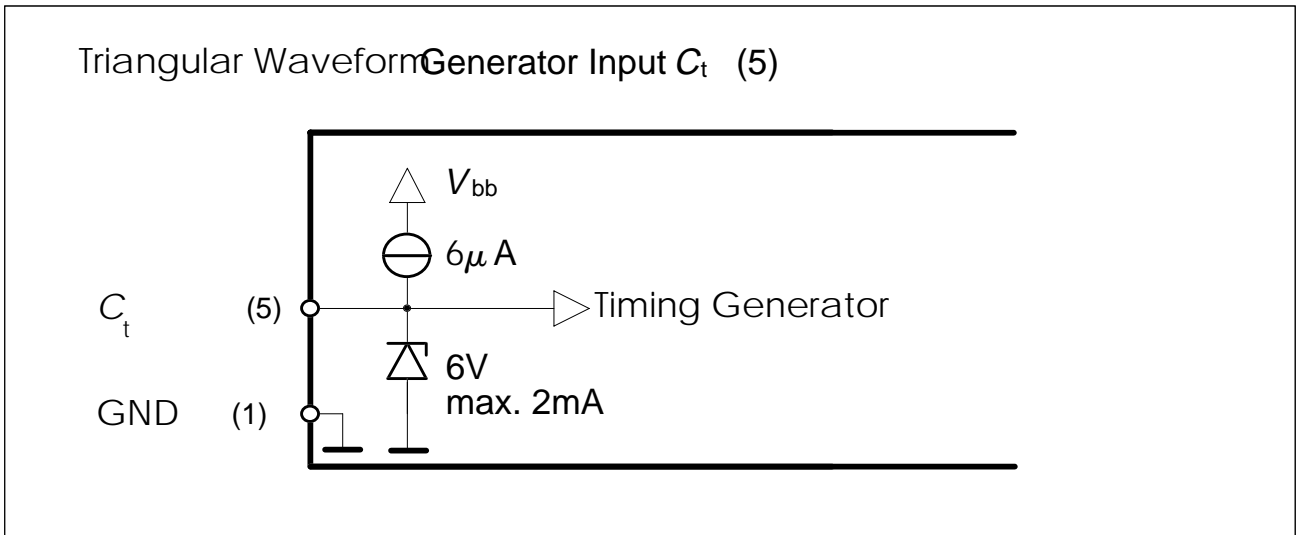
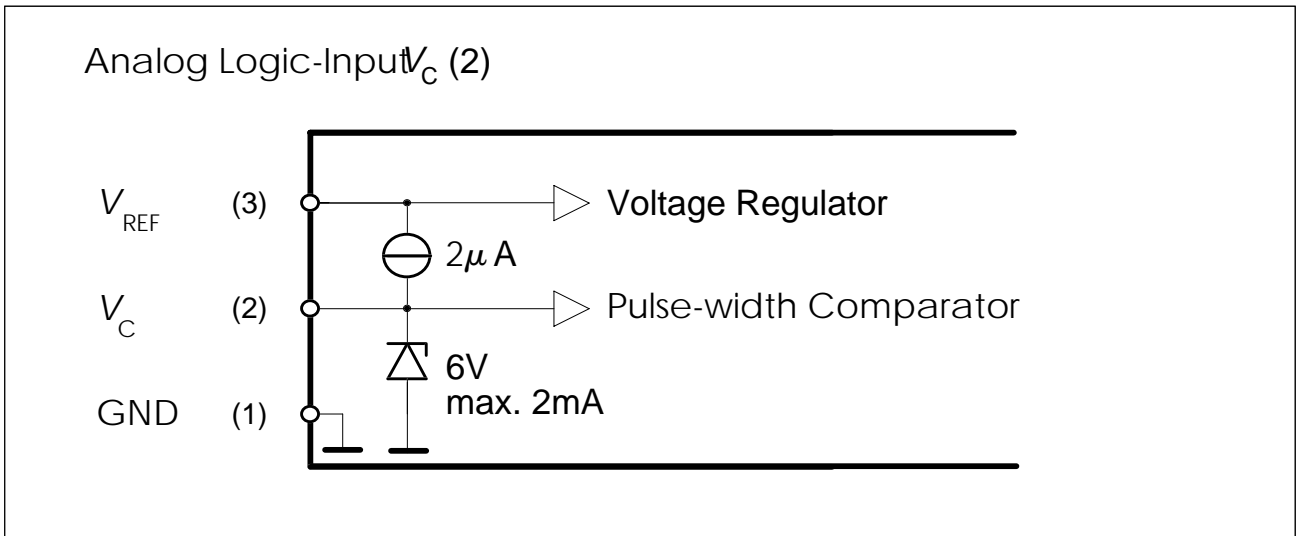
at  $T_j = 25\text{ °C}$ , unless otherwise specified.  $C_{\text{Bootstrap}} = 22\text{ nF}$

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
On-state resistance $I_L = 3\text{ A}$ , $V_{\text{bb}} = 12\text{ V}$	$R_{\text{ON}}$	-	-	70	$\text{m}\Omega$
Operating voltage $T_j = -40 \dots +150\text{ °C}$	$V_{\text{bb}}$	5.9 <sup>1)</sup>		16.9 <sup>2)</sup>	V
Nominal current, calculated value ISO-standard: $V_{\text{bb}} - V_{\text{OUT}} \leq 0.5\text{ V}$ , $T_c = 85\text{ °C}$	$I_L\text{-ISO}$	5.8	-	-	A
Load current limit $V_{\text{bb}} - V_{\text{OUT}} > 1\text{ V}$	$I_{\text{LLim}}$	-	20	-	A
Undervoltage shutdown $I_L = 3\text{ A}$	$V_{\text{bb(LOW)}}$	3	4.2	5.4	V
Overvoltage shutdown $I_L = 3\text{ A}$	$V_{\text{bb(HI)}}$	17	18	19	V
Max. output voltage (RMS) $I_L = 3\text{ A}$ , $V_{\text{bb}} > 12\text{ V}$	$V_{\text{RMSmax}}$	12	-	14	V
Reference voltage $I_{\text{REF}} = 10\text{ mA}$	$V_{\text{REF}}$	2		3	V
Reference current pin 18 (GND) to pin 20 ( $V_{\text{REF}}$ ) short	$I_{\text{REF}}$	-	150	-	mA
Internal current consumption during operation, measured in PWM gap	$I_{\text{R}}$	-		5	mA
Bootstrap voltage, pin 2 ( $C_{\text{B1}}$ ) to pin 3 ( $C_{\text{B2}}$ ) $V_{\text{bb}} = 12\text{ V}$ ,	$V_{\text{B}}$	-	10	-	V
PWM frequency $T_c = -40 \dots +150\text{ °C}$ , $C_t = 68\text{ nF}$	$f_{\text{PWM}}$	50	-	100	Hz
Max. pulse duty factor $I_L = 3\text{ A}$ , $V_{\text{C}} = 0\text{ V}$ , (50% $V_{\text{OUT}}$ )	$D_{\text{imax}}$	95	98	-	%
Min. pulse duty factor $I_L = 3\text{ A}$ , $V_{\text{C}} = 0\text{ V}$ , (50% $V_{\text{OUT}}$ )	$D_{\text{imin}}$	-	8	14	%
Slew rate "on" 10 ... 90% $I_{\text{OUT}}$	$du/dt_{\text{(on)}}$	20	-	120	$\text{mV}/\mu\text{s}$
Slew rate "off" 90 ... 10% $I_{\text{OUT}}$	$du/dt_{\text{(off)}}$	20	-	120	$\text{mV}/\mu\text{s}$
Thermal overload trip temperature	$T_j$	150	-	-	$\text{°C}$

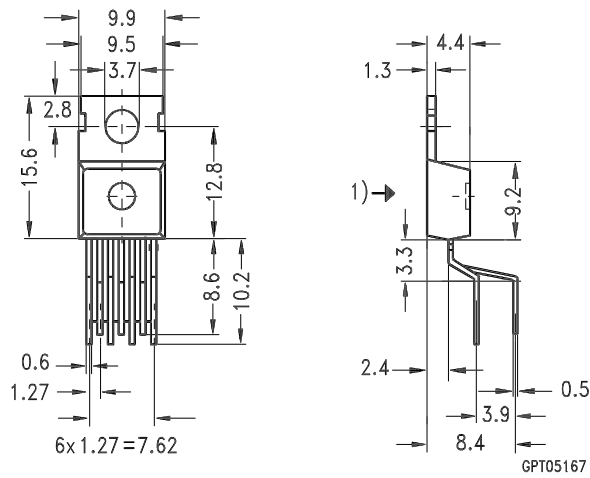
1) **Note:** undervoltage shutdown

2) **Note:** overvoltage shutdown

Circuits



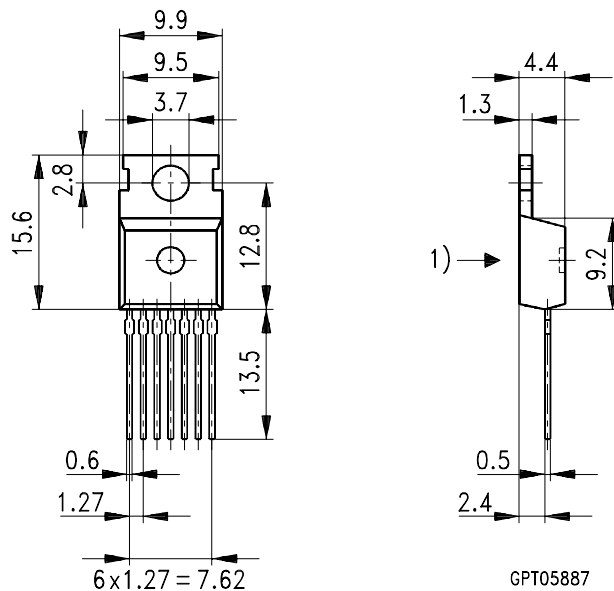
## Package Outline TO220/7



1) shear and punch direction no burrs this surface

Dimensions in mm

## Package Outline TO220/7 E3230



1) Shear and punch direction no burrs this surface

Dimensions in mm

## Application Note

