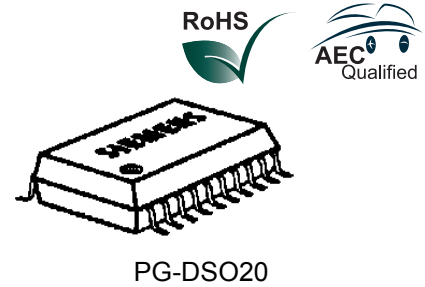


The device allows continuous power control for lamps, LEDs or inductive loads.

- Highside switch (Bootstrap)
- 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 <sup>1)</sup>
- Timing frequency adjustable
- Controlled switching rise and fall times
- Maximum current internally limited
- Protection against loss of GND <sup>2)</sup>
- Electrostatic discharge (ESD) protection
- Package: P-DSO-20-6 (SMD)



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

- RoHS compliant (green product)
- AEC qualified

#### Maximum Ratings

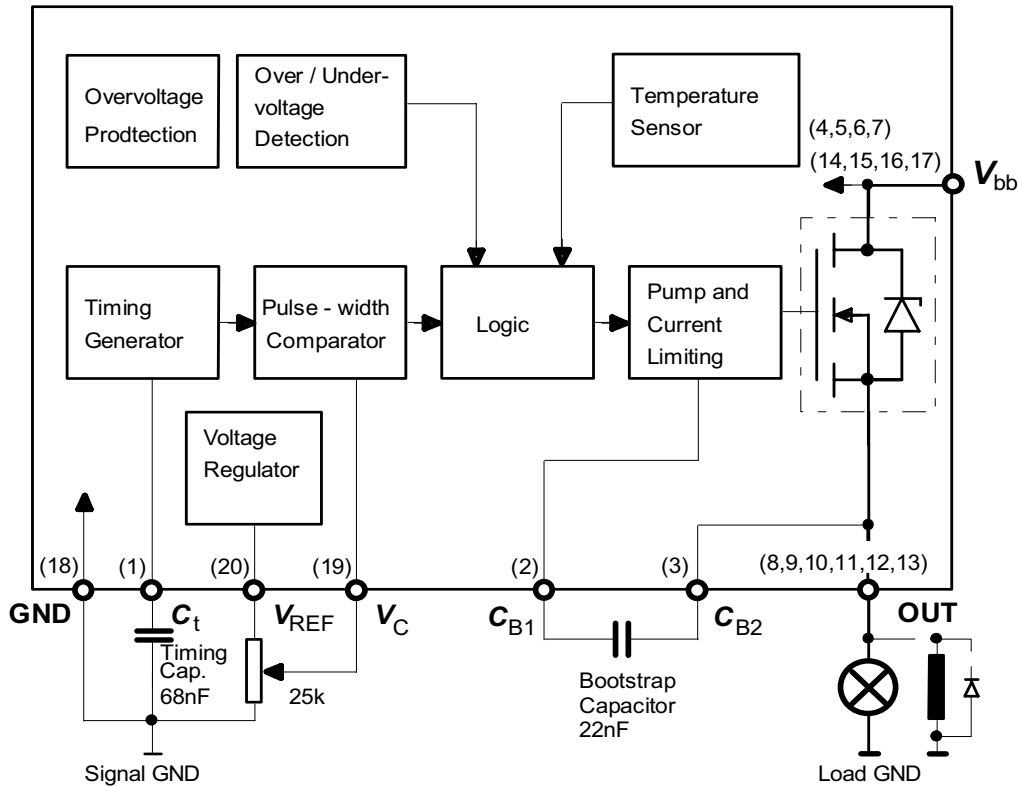
Parameter	Symbol	Values	Unit
Active overvoltage protection	$V_{bb(AZ)}$	>40	V
Short circuit current	$I_{SC}$	self-limited	-
Input current (DC)	$I_{Ct}$	2	mA
Pin1 ( $C_t$ ) and pin19 ( $V_C$ )	$I_{VC}$	2	mA
Operating temperature range	$T_j$	-40...+150	°C
Storage temperature range	$T_{stg}$	-50...+150	
Power dissipation <sup>3)</sup>	$T_a=25^\circ\text{C}$	3	W
	$T_a=85^\circ\text{C}$	2	W
Thermal resistance chip-case <sup>3)</sup>	$R_{th JC}$	≤35	K/W
	chip-ambient	$R_{th JA}$	≤75
Electrostatic discharge capability (ESD) (Human Body Model) acc. MIL-STD883D, method 3015.7 and ESD assn. std. S5.1-1993; R=1.5KΩ; C=100pF	$V_{ESD}$	≤ 1	kV

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

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

<sup>3)</sup> Device on 50mm×50mm×1.5mm epoxy PCB FR4 with 6 cm<sup>2</sup> (one layer, 70μm thick) copper area for  $V_{bb}$  connection, PCB is vertical without air blowing.

**Block Diagram**



**Pin Definitions and Funktionen**

Pin	Symbol	Funktionen
1	$C_t$	Timing capacitor for frequency
2	$C_{B1}$	Bootstrap capacitor
3	$C_{B2}$	
4,5,6,7	$V_{bb}$	Supply voltage (Leadframe connected)
14,15,16,17		
8,9,10	OUT	Output
11,12,13		
18	GND	Ground
19	$V_C$	Voltage for PWM-Control
20	$V_{REF}$	Reference Voltage

**Pin Configuration (top view)**

$C_t$	1	20	$V_{REF}$
$C_{B1}$	2	19	$V_C$
$C_{B2}$	3	18	GND
$V_{bb}$	4	17	$V_{bb}$
$V_{bb}$	5	16	$V_{bb}$
$V_{bb}$	6	15	$V_{bb}$
$V_{bb}$	7	14	$V_{bb}$
OUT	8	13	OUT
OUT	9	12	OUT
OUT	10	11	OUT

**Electrical Characteristics**

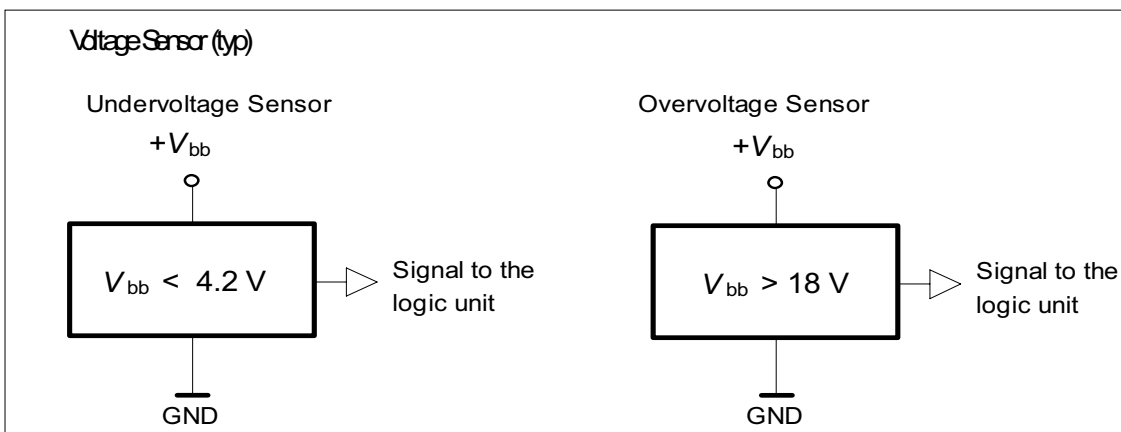
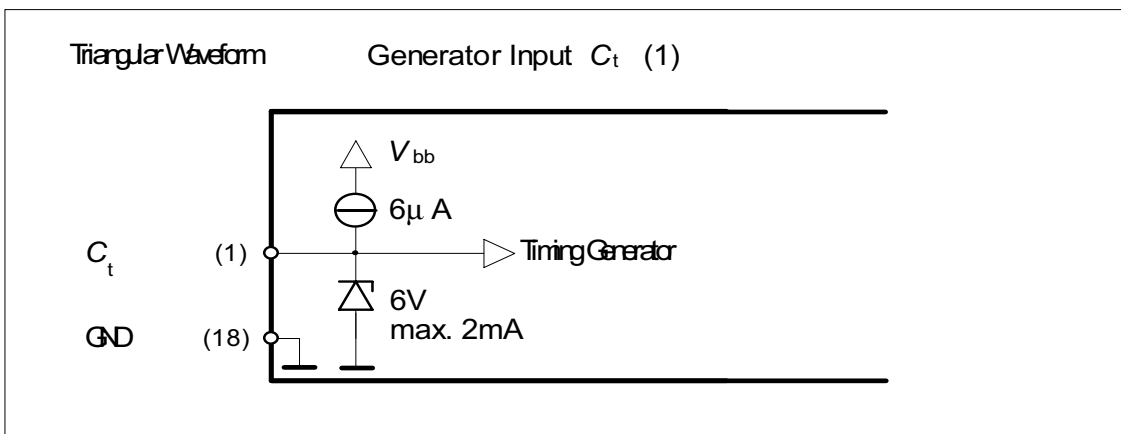
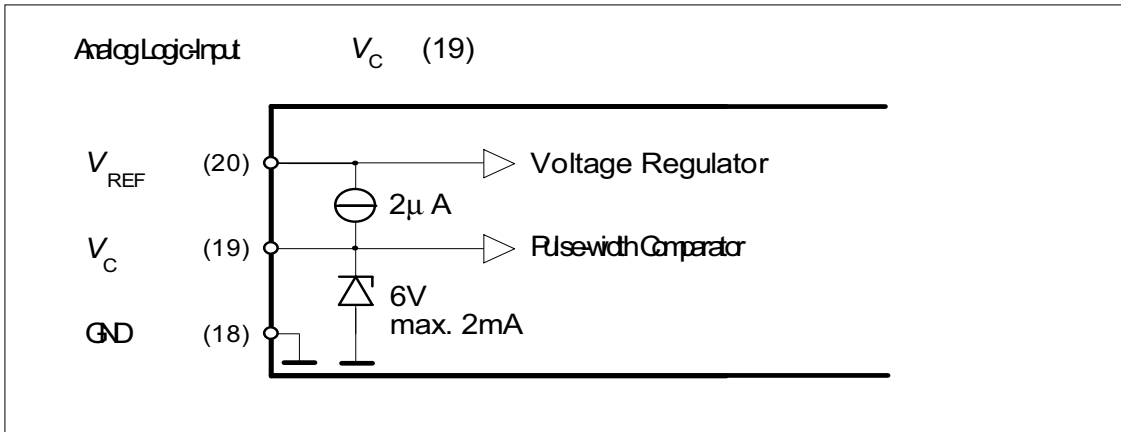
 at  $T_C = 25\text{ }^\circ\text{C}$ ,  $V_{bb} = 12\text{ V}$ , unless otherwise specified.  $C_{\text{Bootstrap}} = 22\text{ nF}$ 

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

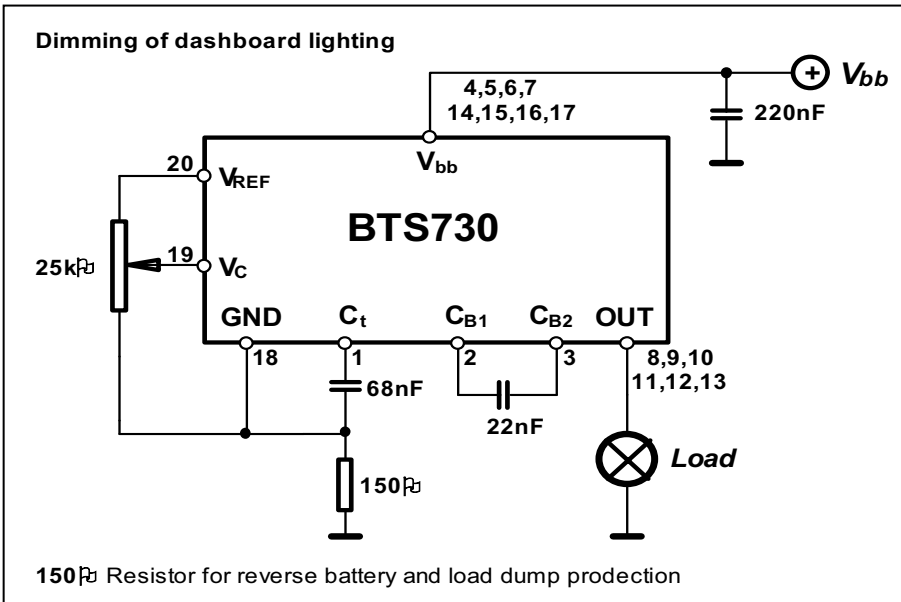
<sup>1)</sup> **Note:** undervoltage shutdown

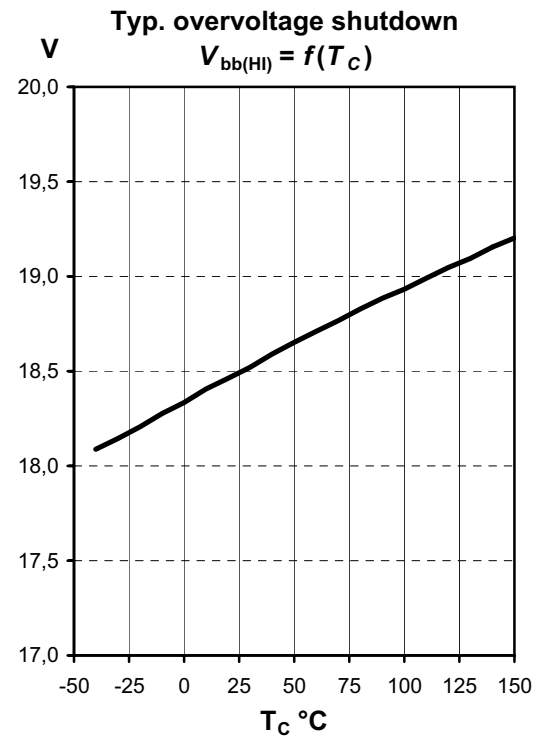
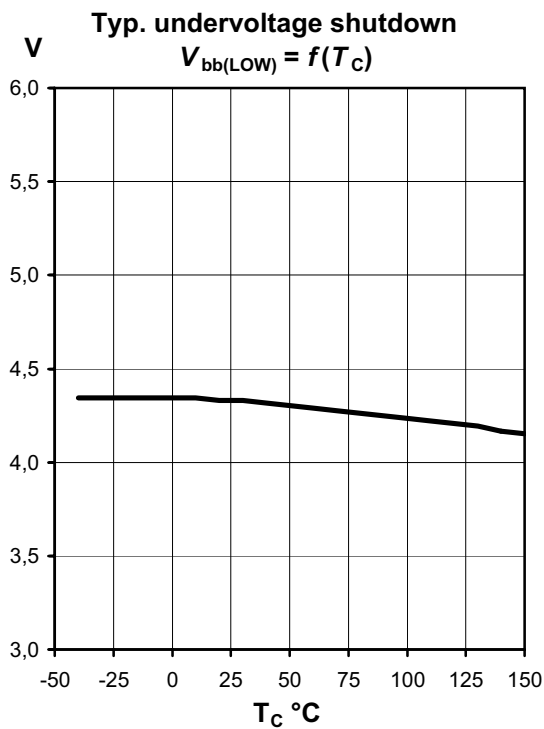
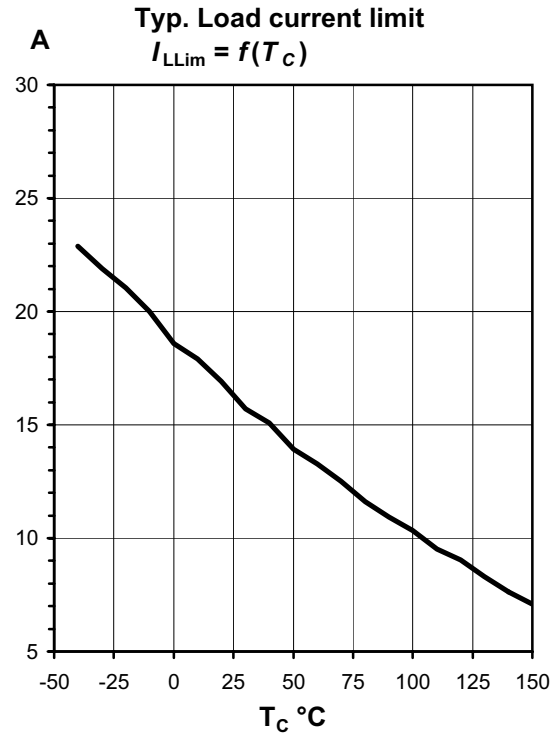
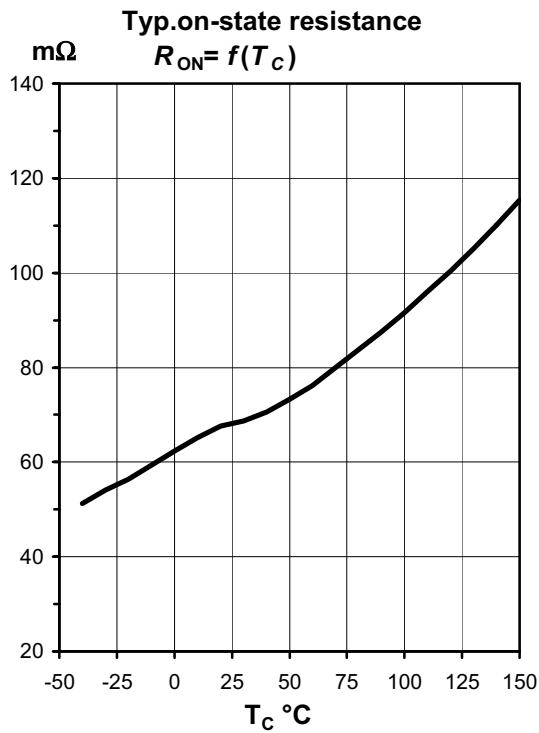
<sup>2)</sup> **Note:** overvoltage shutdown

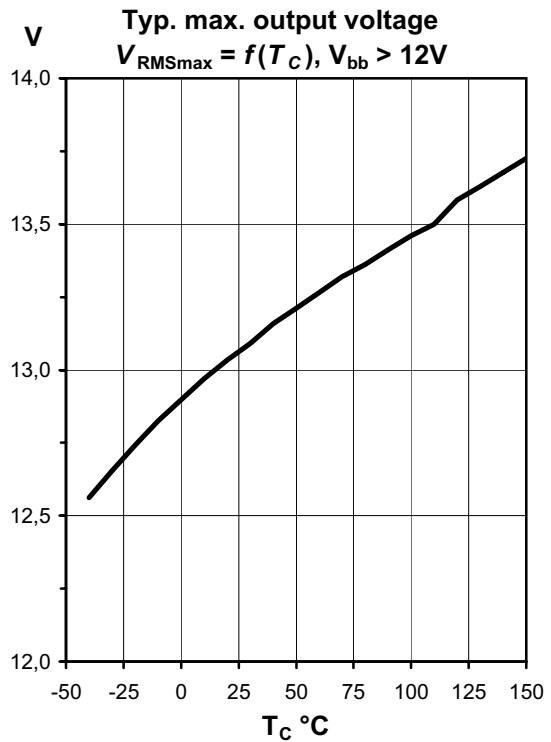
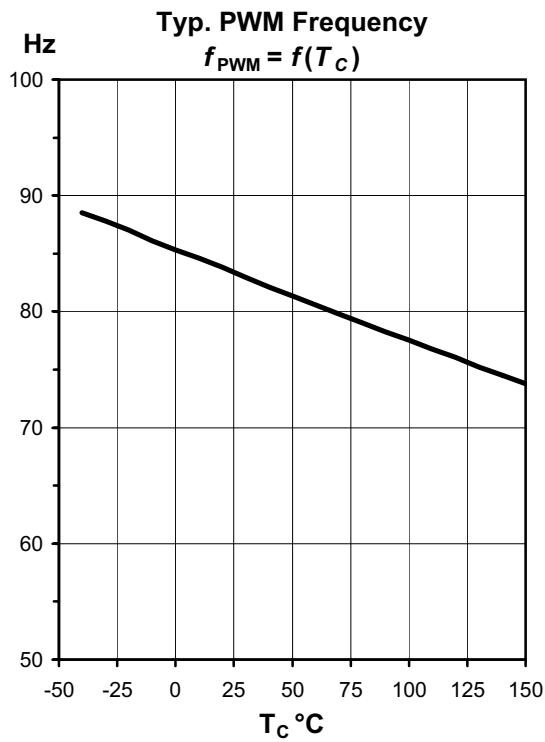
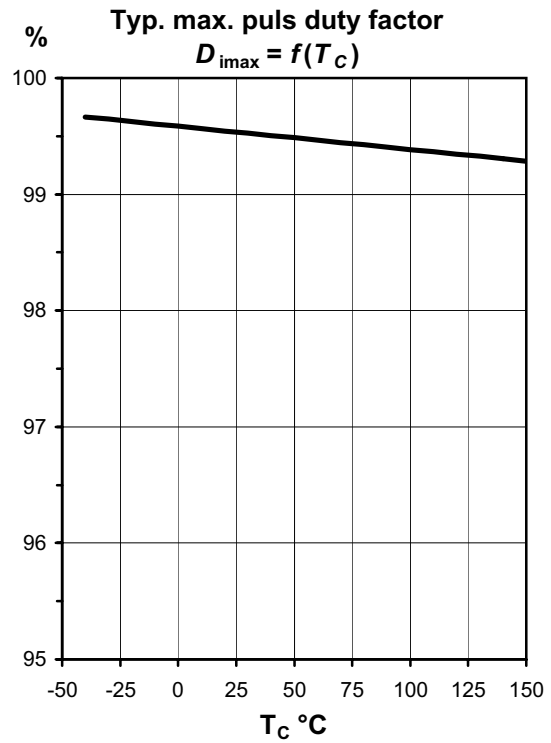
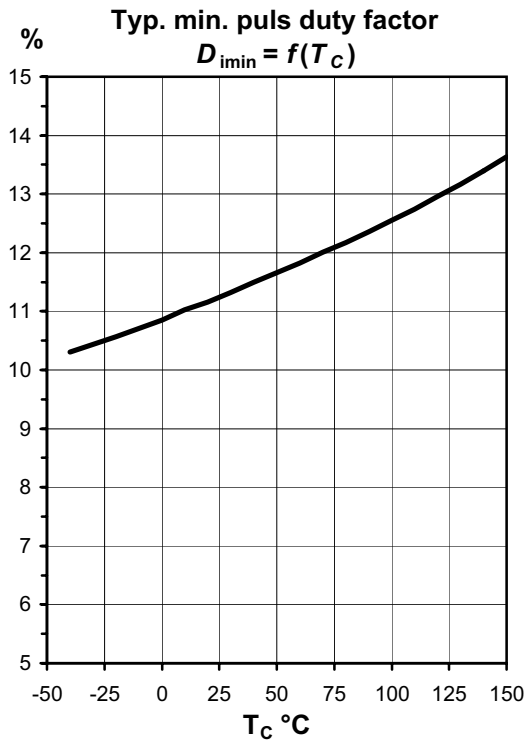
Circuits



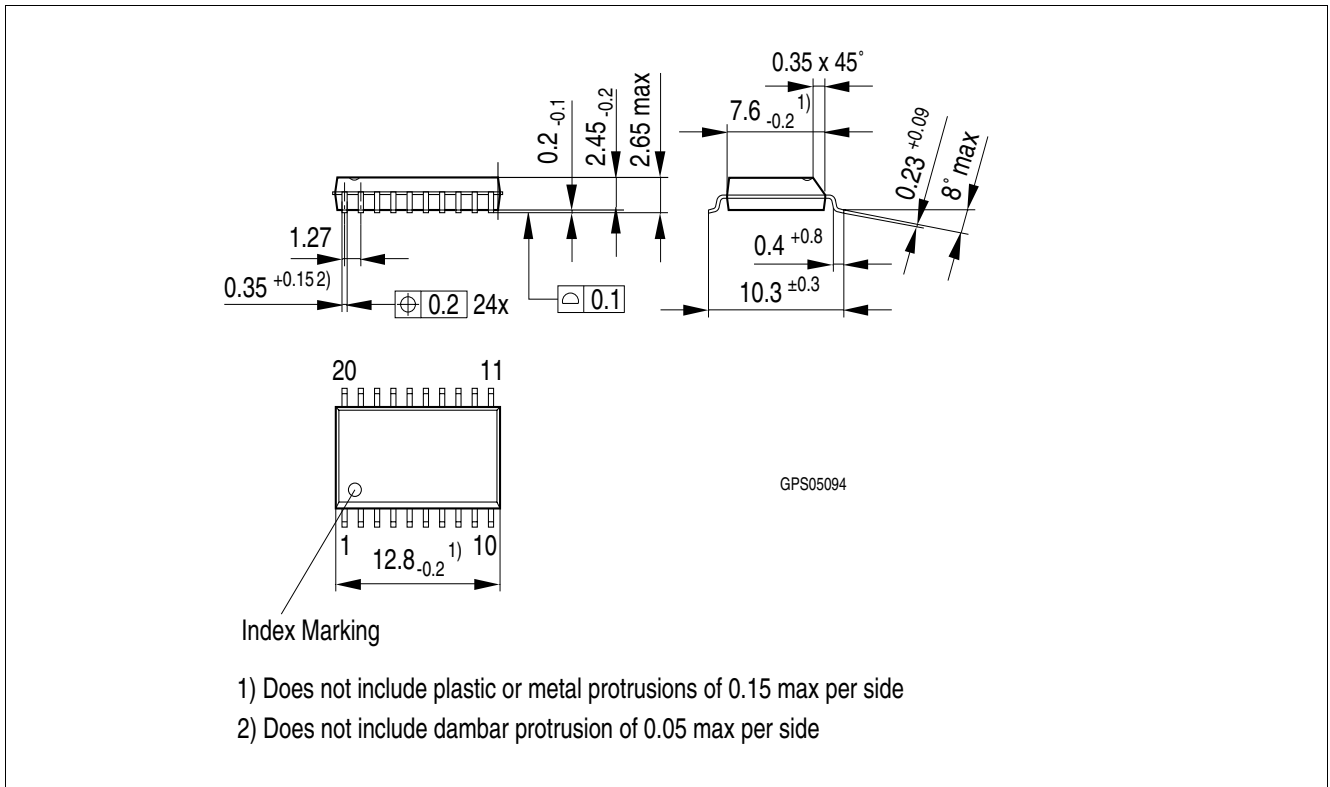
Application Note







## Package Outlines



**Figure 1** PG-DSO-20 (Plastic Dual Small Outline Package) (RoHS-compliant)

To meet the world-wide customer requirements for environmentally friendly products and to be compliant with government regulations the device is available as a green product. Green products are RoHS-Compliant (i.e Pb-free finish on leads and suitable for Pb-free soldering according to IPC/JEDEC J-STD-020).

Please specify the package needed (e.g. green package) when placing an order



## Revision History

Version	Date	Changes
V1.0	2007-12-17	Creation of the green datasheet. First page : Adding the green logo and the AEC qualified Adding the bullet AEC qualified and the RoHS compliant features Package page Modification of the package to be green.

**Edition 2007-12-17**

**Published by  
Infineon Technologies AG  
81726 Munich, Germany**

**© Infineon Technologies AG 12/17/07.  
All Rights Reserved.**

### **Legal Disclaimer**

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenhheitsgarantie"). With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

### **Information**

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office ([www.infineon.com](http://www.infineon.com)).

### **Warnings**

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.

Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.