

# SIEMENS

## ICs for Communications

Prescaler Circuit 2.1 GHz

PMB 2314T Version 1.2

Preliminary Data Sheet 08.95

T2314-TV12-P1-7600

<b>PMB 2314T</b>	
<b>Revision History:</b>	<b>08.95</b>
Previous Releases:	none
Page	Subjects (changes since last revision)

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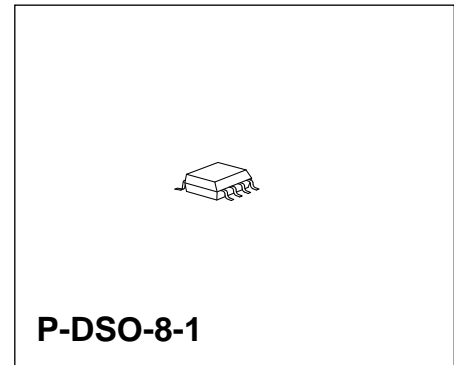
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#### Features

- Low power consumption
- TTL/CMOS compatible MOD input
- Low-power standby mode
- Switchable divider ratios 64/65 or 128/129
- Low supply voltage down to 2.7 V



#### Application

The IC is designed for use in mobile radio communication devices up to 2100 MHz and upconversion systems up to 2500 MHz.

Due to its low power consumption and low phase noise generation it is suitable for the use in battery powered handheld systems, e.g. PCN, DECT and wireless LANs.

Internal current source at the emitter follower output. No external resistor needed in typical applications.

The divider ratio is 1:64/65 or 1:128/129 depending on the external circuit configuration.

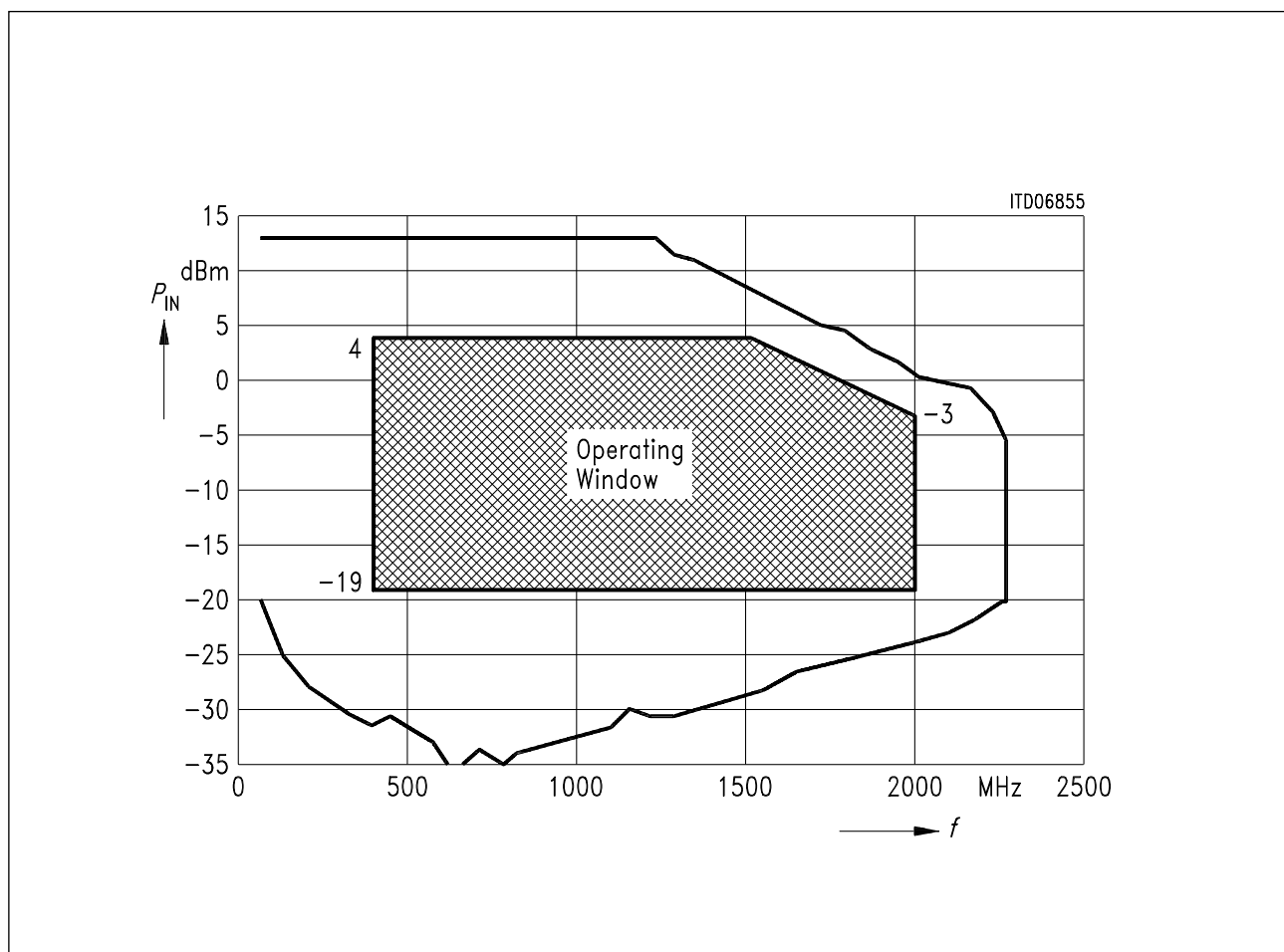
Type	Ordering Code	Package
PMB 2314T	Q67000-A6121	P-DSO-8-1 (SMD)
PMB 2314T	Q67006-A6121	P-DSO-8-1 (SMD, Tape & Reel)

**Important Notice (Errata)!**

**Based on the current measurements of the IC, the dynamic range of the input signal as well as maximum frequency of the operating window have been reduced with respect to the specification as given in the diagram.**

**It is recommended to use an input power level of about - 10 dBm**

**PMB 2314 Dynamic Range 2.7 V Ratio 65**



### Circuit Description

The differential inputs of the IC may be connected either balanced or single ended. In the latter case the unused input must be RF-grounded with a capacitor (about 10 pF depending on the application frequency) with a low serial inductance.

Depending on the logic level at SW input the basic divider ratio of the ECL-stages is fixed to 1:64/65 or 1:128/129. The MOD input determines whether modulus 1:n or 1:n + 1 (n = 64 or 128 according to SW-level) is active.

The IC can be switched to a low-power standby mode (input STB).

The MOD input is TTL/CMOS compatible.

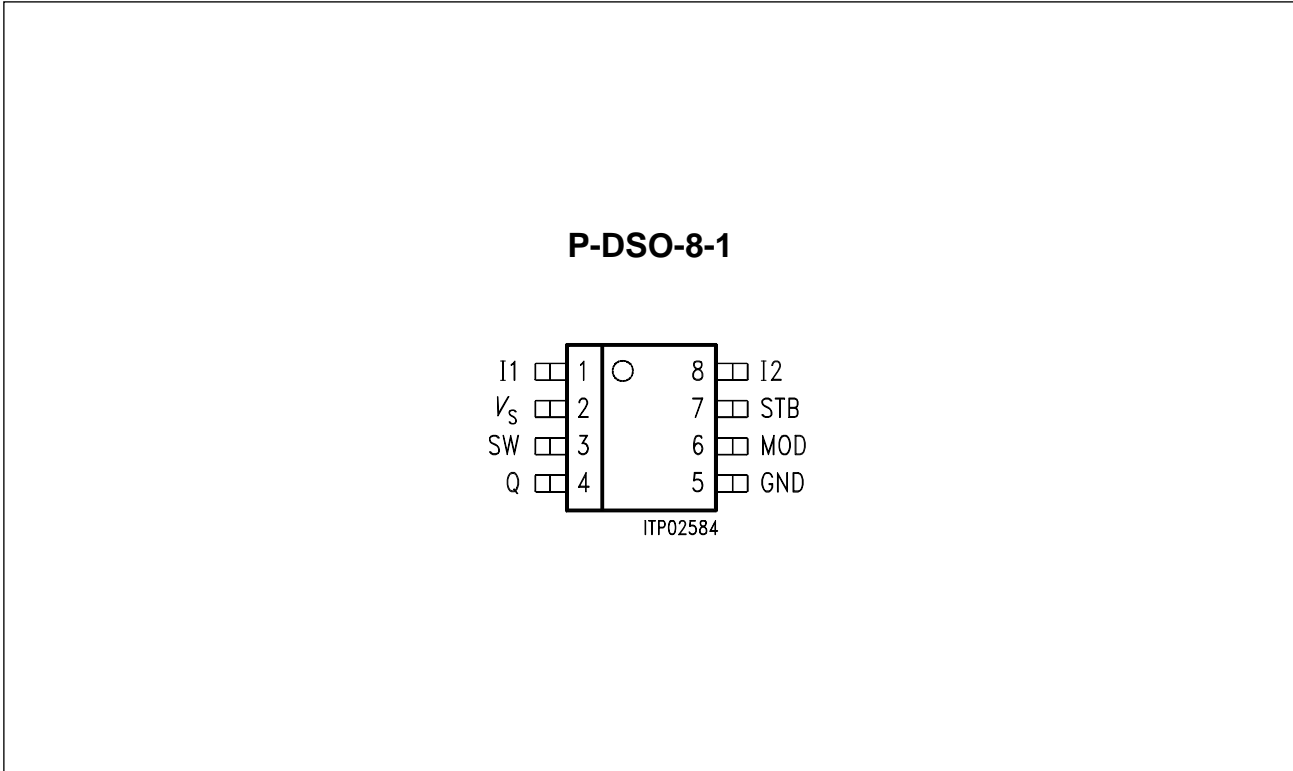
The emitter follower output is CMOS compatible according to the application circuit on **page 12**. The minimum logic swing is 0.8 Vpp.

### Function Table

Input Pin	Logic Level	Prescaler Function
<b>SW</b>	HIGH = $V_S - 0.1 \text{ V}$ to $V_S$	1:64/65
	LOW = GND to 0.8 V or open	1:128/129
<b>MOD</b>	HIGH = 2.0 V to $V_S$ or open	1:64/1:128
	LOW = GND to 0.8 V	1:65/1:129
<b>STB</b>	HIGH = $V_S - 0.1 \text{ V}$ to $V_S$	Divider
	LOW = GND to 0.8 V	Q = HIGH, STANDBY-mode

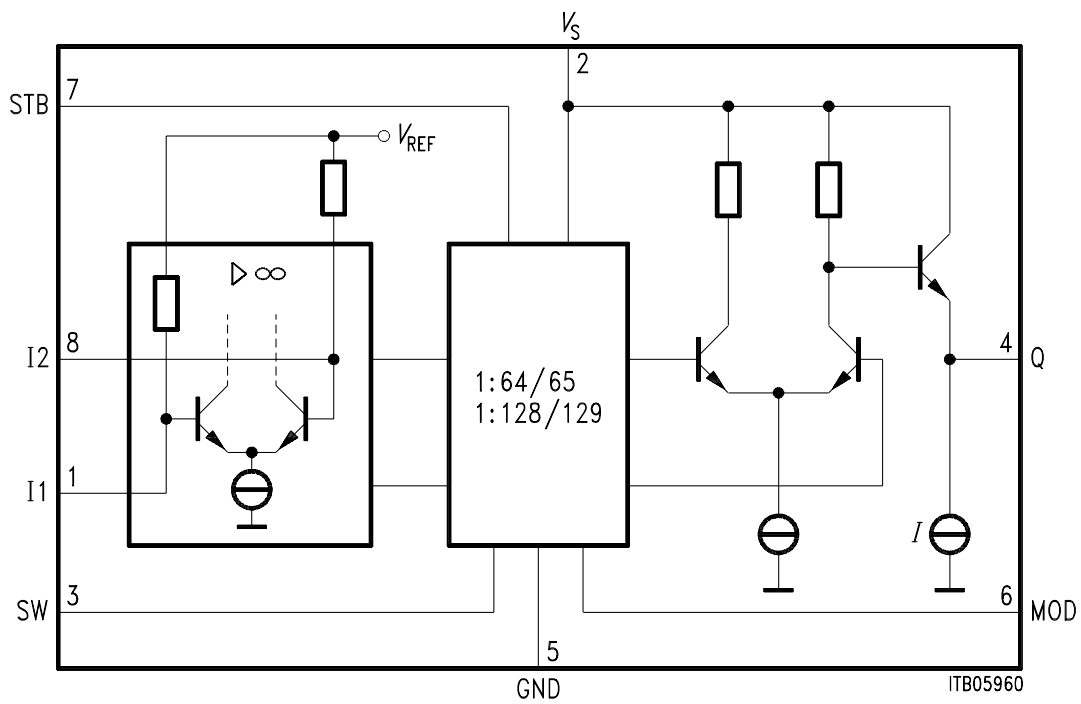
## Pin Configuration

(top view)



## Pin Definitions and Functions

Pin No.	Symbol	Function
1	I1	RF-input I1
2	$V_s$	Supply voltage $V_s$
3	SW	Divider ratio 1:64/65 - 1:128/129 control input (SW)
4	Q	Output Q
5	I2	GND
6	STB	Modulus 1:n/n + 1 (n = 64 or 128) control input (MOD)
7	MOD	Standby mode control input (STB)
8	GND	RF-input I2



Block Diagram

## Absolute Maximum Ratings

$T_A = -40$  to  $85$  °C

Parameter	Symbol	Limit Values		Unit	Remarks
		min.	max.		
Supply voltage	$V_S$	-0.3	6	V	
Input level (Pin 1; Pin 8)	$V_I$		2	V	$V_S = 0$ V
Voltage swing (Pin 1 to 8)	$V_{118}$	-2	2	V	
Input level (Pin 3; Pin 6; Pin 7)	$V_{SW},$ $V_{MOD},$ $V_{STB}$	-0.3	$V_S + 0.7$ V or 5.5 V if $V_S + 0.7$ V > 5.5 V	V	$V_S = 2.7 \dots 5.5$ V
Output level (Pin 4)	$V_Q$		$V_S$	V	
Output current (Pin 4)	$-I_Q$		5	mA	
Junction temperature	$T_j$		125	°C	
Storage temperature	$T_S$	-65	125	°C	
Thermal resistance system-ambient	$R_{thsa}$		185	K/W	

The maximum ratings may not be exceeded under any circumstances, not even momentarily and individually, as permanent damage to the IC will result.

**ESD-integrity (according MIL-STD 883D, Meth. 3015.7): 500 V**

## Operating Range

Parameter	Symbol	Limit Values		Unit	Remarks
		min.	max.		
Supply voltage	$V_S$	2.7	5.5	V	
Input frequency	$f$	100	2300	MHz	
Ambient temperature	$T_A$	-40	85	°C	

Within the operational range the IC operates as described in the circuit description. The AC / DC characteristic limits are not guaranteed.



## AC/DC Characteristics

$T_A = -20$  to  $85\text{ }^\circ\text{C}$

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		

**Supply voltage**  $V_S = 2.7$  to  $5.5\text{ V}$

**Ambient temperature**  $T_A = -20$  to  $85\text{ }^\circ\text{C}$  (referred to the test circuit)

Supply current	$I_S$		2.5	3.2	mA	Inputs RF-grounded, $V_S = 2.7$ , $T_A = 25\text{ }^\circ\text{C}$ , STB = $V_S$ output open
	$I_S$		2.6	3.3	mA	inputs RF-grounded, $V_S = 4.0$ , $T_A = 25\text{ }^\circ\text{C}$ , STB = $V_S$ output open
	$I_S$		2.7	3.4	mA	inputs RF-grounded, $V_S = 5.5$ , $T_A = 25\text{ }^\circ\text{C}$ , STB = $V_S$ output open
Supply current in standby-mode	$I_{STB}$			0.1	mA	inputs RF-grounded, output open, STB = GND
Input level	$V_{IN}$	35		350	mVrms	100-2100 MHz (sine wave)
dynamic range	$P_{IN}$	-16		4	dBm	100-2100 MHz (sine wave)
Output logic swing	$V_Q$	1	1.1		Vpp	$C_L \leq 12\text{ pF}$ , $R_L = 2\text{ k}\Omega$
	$V_Q$	0.8	1.1		Vpp	$C_L \leq 8\text{ pF}$
SW voltage High	$V_{SWH}$	$V_S$		$V_S$	V	
SW voltage Low	$V_{SWL}$	GND		0.8	V	
SW input current High	$I_{SWH}$			60	$\mu\text{A}$	SW = $V_S$
SW input current Low	$-I_{SWL}$			30	$\mu\text{A}$	SW = GND
MOD voltage High	$V_{MODH}$	2.3		$V_S$	V	
MOD voltage Low	$V_{MODL}$	GND		0.8	V	
MOD input current High	$I_{MODH}$			50	$\mu\text{A}$	MOD = $V_S$
MOD input current Low	$I_{MODL}$			120	$\mu\text{A}$	MOD = GND

AC/DC characteristics involve the spread of values guaranteed within the specified supply voltage and ambient temperature range. Typical characteristics are the median of the production.

## AC/DC Characteristics (cont'd)

$T_A = -20$  to  $85$  °C

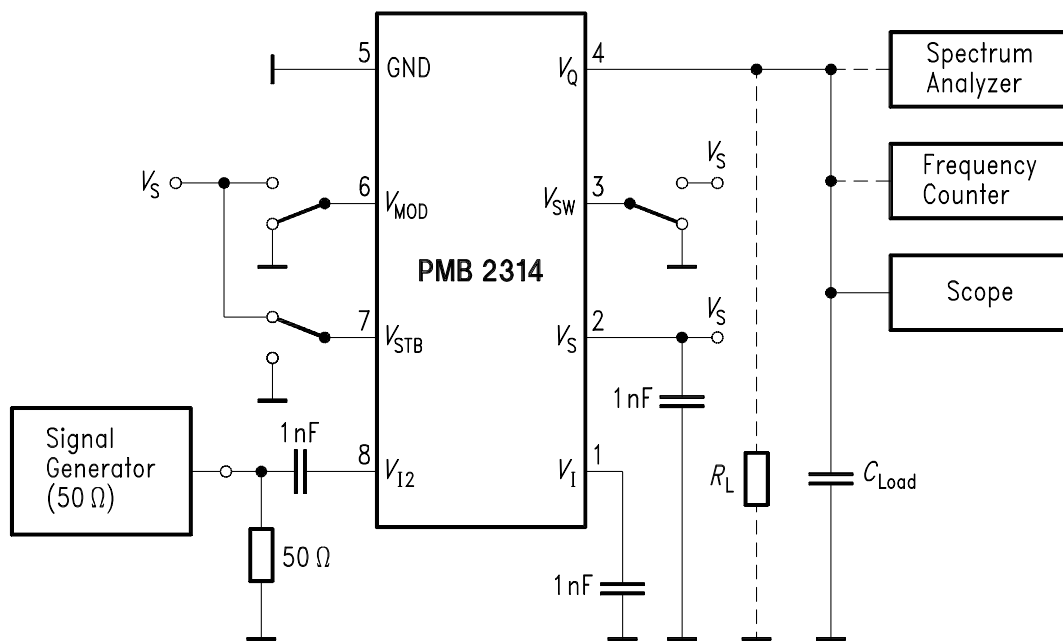
Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
STB voltage High	$V_{STBH}$	$V_S - 0.1$		$V_S$	V	STB = $V_S$
STB voltage Low	$V_{STBL}$	GND		0.8	V	
STB input current High	$I_{STBH}$			30	$\mu$ A	
STB input current Low	$-I_{STBL}$			60	$\mu$ A	STB = GND
Internal current source (see block diagram)	$I$		400		$\mu$ A	

## Delay Times

MOD setup time (diagram 1)	$t_{set}$		8	14	ns	
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AC/DC characteristics involve the spread of values guaranteed within the specified supply voltage and ambient temperature range. Typical characteristics are the median of the production.

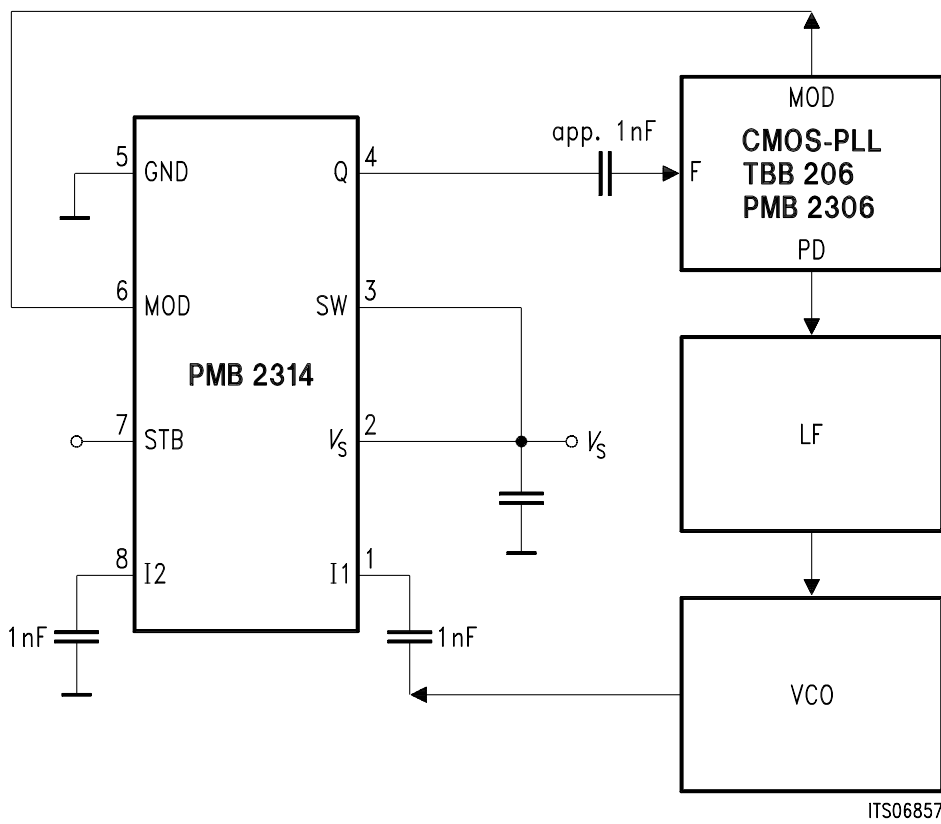
Input Sensitivity and Output Logic Swing Measurement



$C_{Load} \leq 8 \text{ pF}$  inc. jig and instrument input capacitance  
 $R_L$  only needed for enhanced driving capability

ITS06856

Test Circuit



(SW connected for 1:64/65 divider ratio)

**Application Circuit**

Definition of Modulus Setup Time

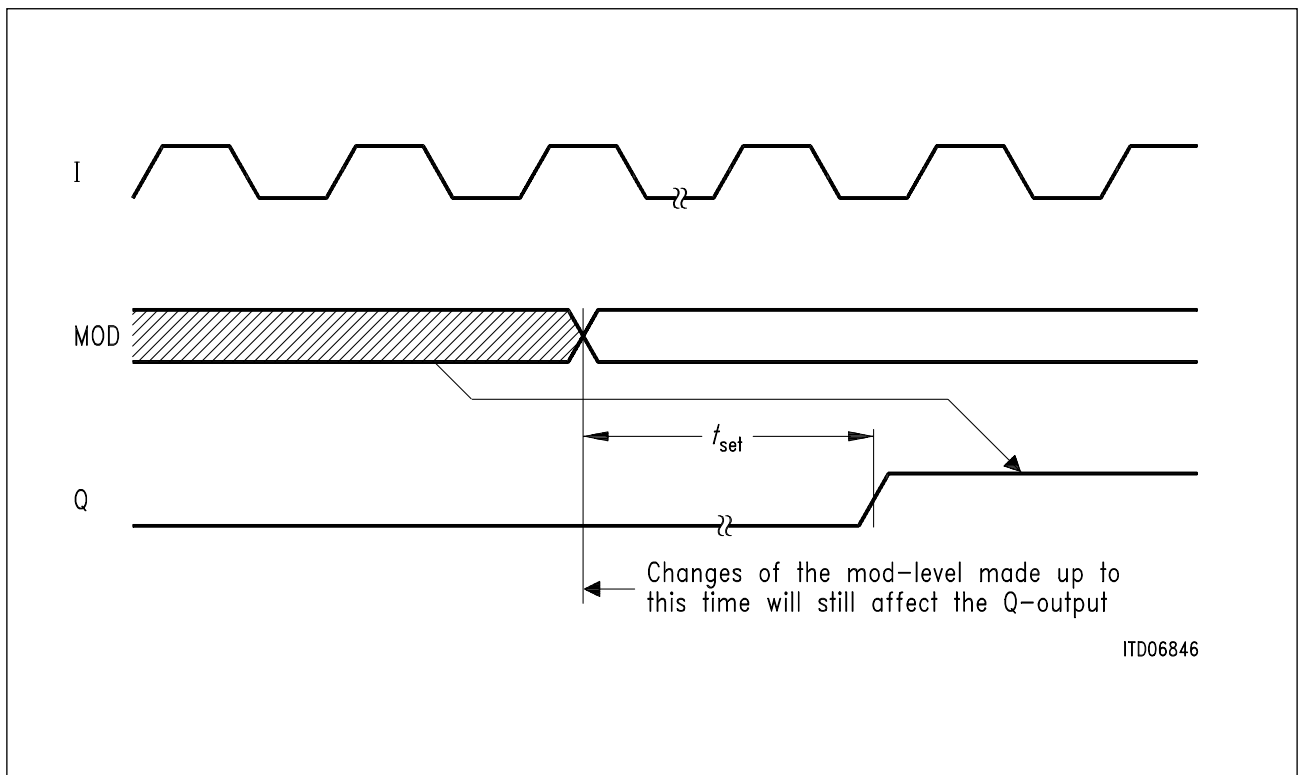
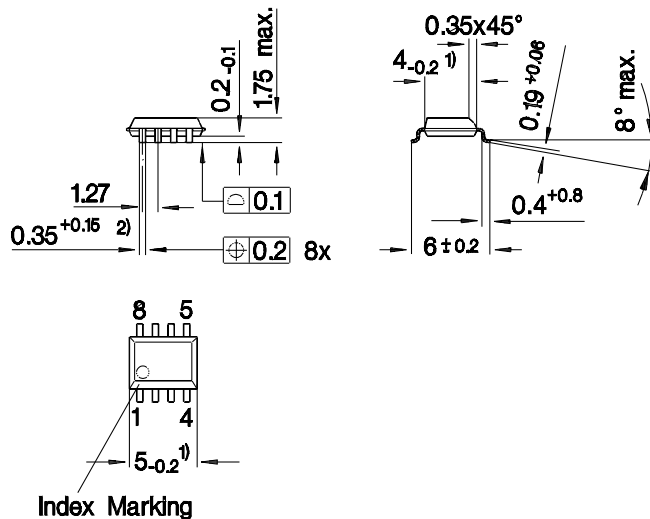


Diagram 1

Package Outlines

**P-DSO-8-1**  
(Plastic Dual Small Outline Package)



- 1) Does not include plastic or metal protrusion of 0.15 max. per side
- 2) Does not include dambar protrusion

GPS05121

**Sorts of Packing**

Package outlines for tubes, trays etc. are contained in our Data Book "Package Information".

SMD = Surface Mounted Device

Dimensions in mm