

ICs for Communications

Prescaler Circuit 2.1 GHz

PMB 2314T Version 1.2

Preliminary Data Sheet 08.95

T2314-TV12-P1-7600

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

Edition 08.95

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Prescaler Circuit 2.1 GHz

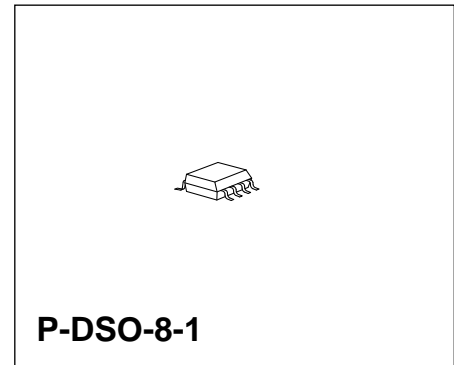
PMB 2314T

Version 1.2

Bipolar IC

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.

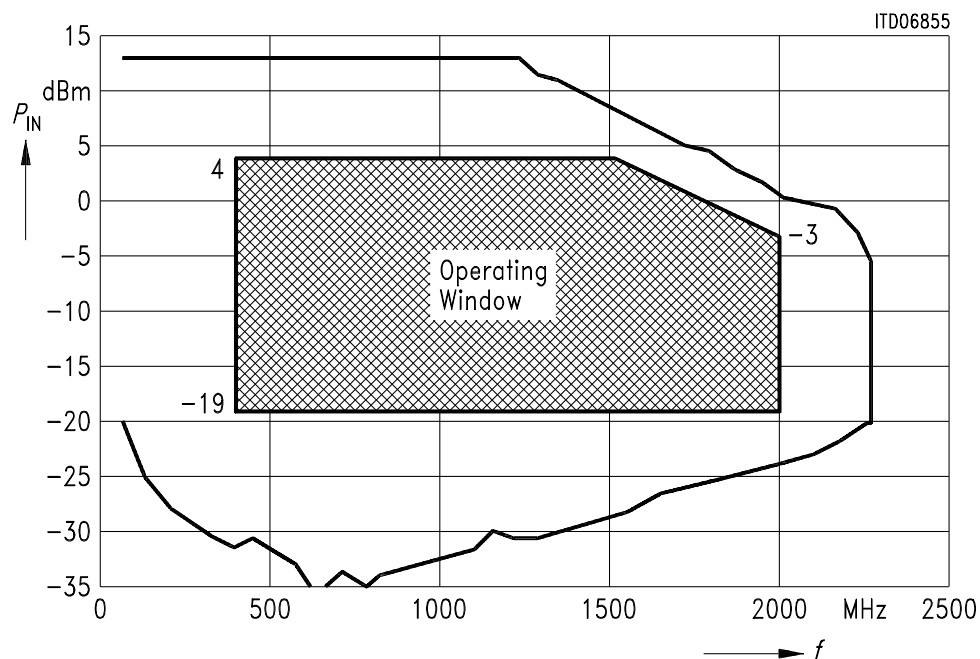
Type	Ordering Code	Package
PMB 2314T	Q67000-A6121	P-DSO-8-1 (SMD)
PMB 2314T	Q67006-A6121	P-DSO-8-1 (SMD, Tape & Reel)

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).

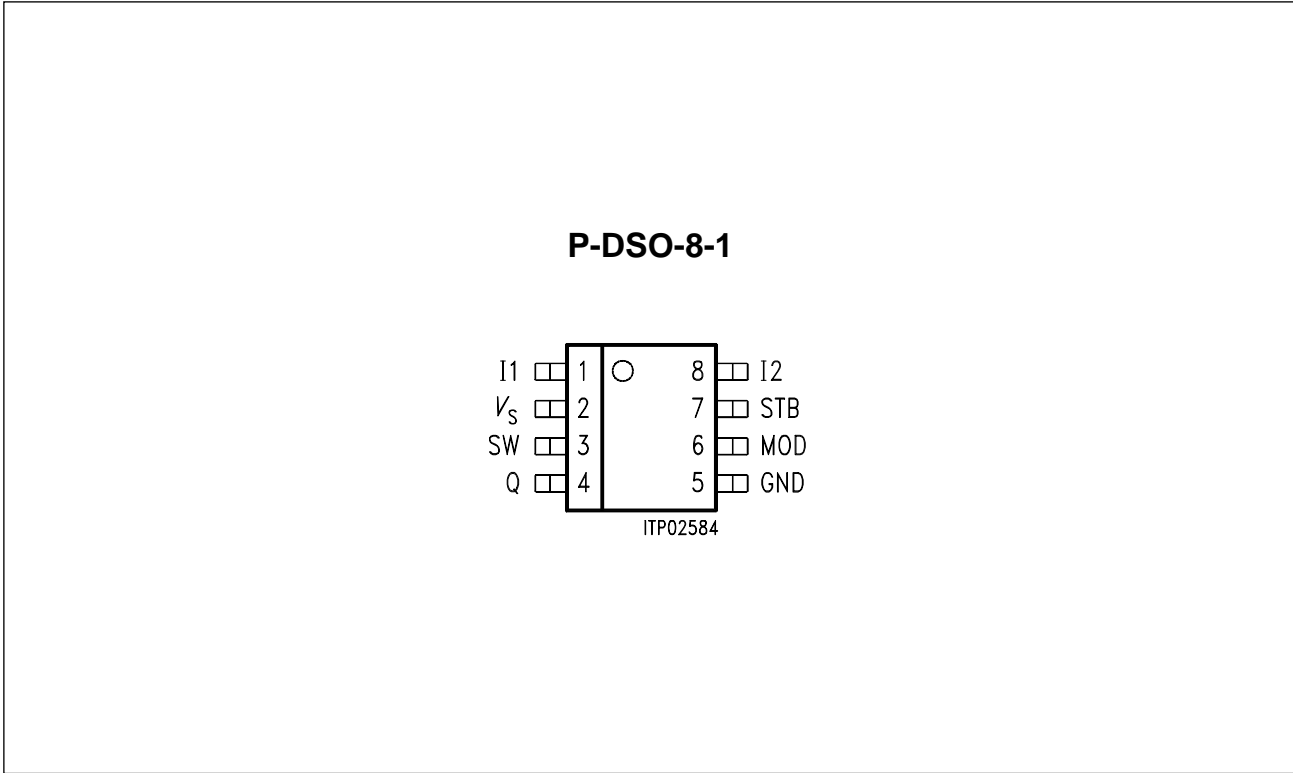
The MOD input is TTL/CMOS compatible.

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

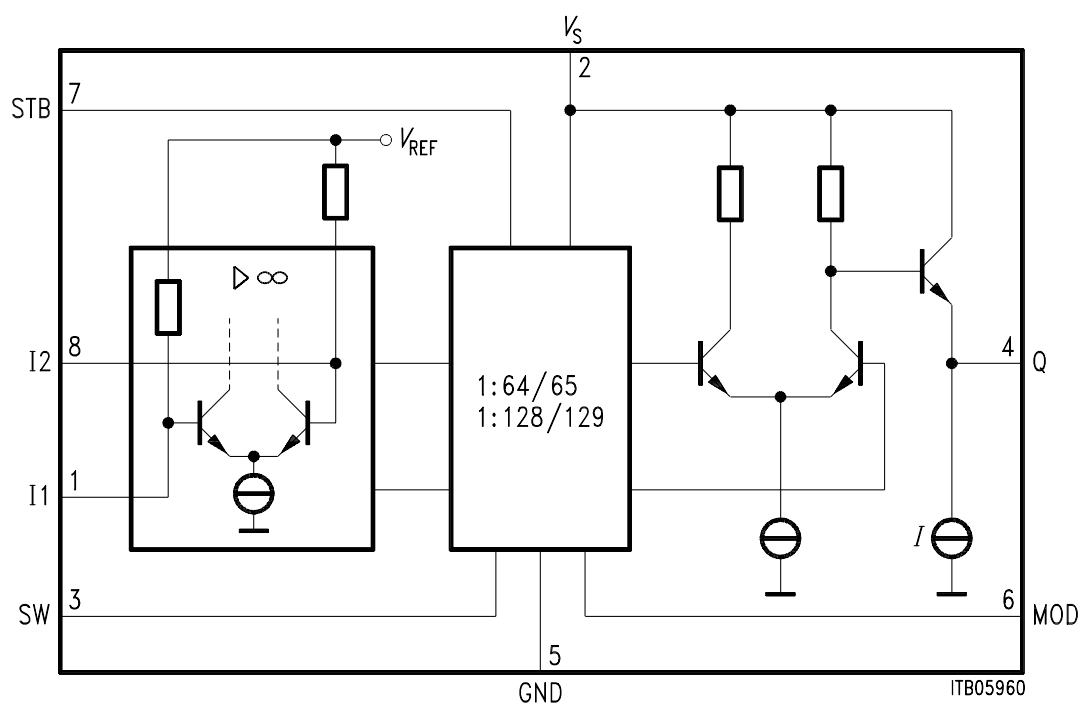
Input Pin	Logic Level	Prescaler Function
SW	HIGH = $V_S - 0.1\text{ V}$ to V_S LOW = GND to 0.8 V or open	1:64/65 1:128/129
MOD	HIGH = 2.0 V to V_S or open LOW = GND to 0.8 V	1:64/1:128 1:65/1:129
STB	HIGH = $V_S - 0.1\text{ V}$ to V_S LOW = GND to 0.8 V	Divider Q = HIGH, STANDBY-mode

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 $85\text{ }^{\circ}\text{C}$

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	$V_S = 0\text{ V}$
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	$V_S + 0.7\text{ V}$ or 5.5 V if $V_S + 0.7\text{ V}$ > 5.5 V	V	$V_S = 2.7 \dots 5.5\text{ V}$
Output level (Pin 4)	V_Q		V_S	V	
Output current (Pin 4)	$-I_Q$		5	mA	
Junction temperature	T_j		125	$^{\circ}\text{C}$	
Storage temperature	T_S	- 65	125	$^{\circ}\text{C}$	
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	$^{\circ}\text{C}$	

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 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	μA	SW = V_S
SW input current Low	$-I_{SWL}$			30	μA	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	μA	MOD = V_S
MOD input current Low	I_{MODL}			120	μA	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 $85\text{ }^{\circ}\text{C}$

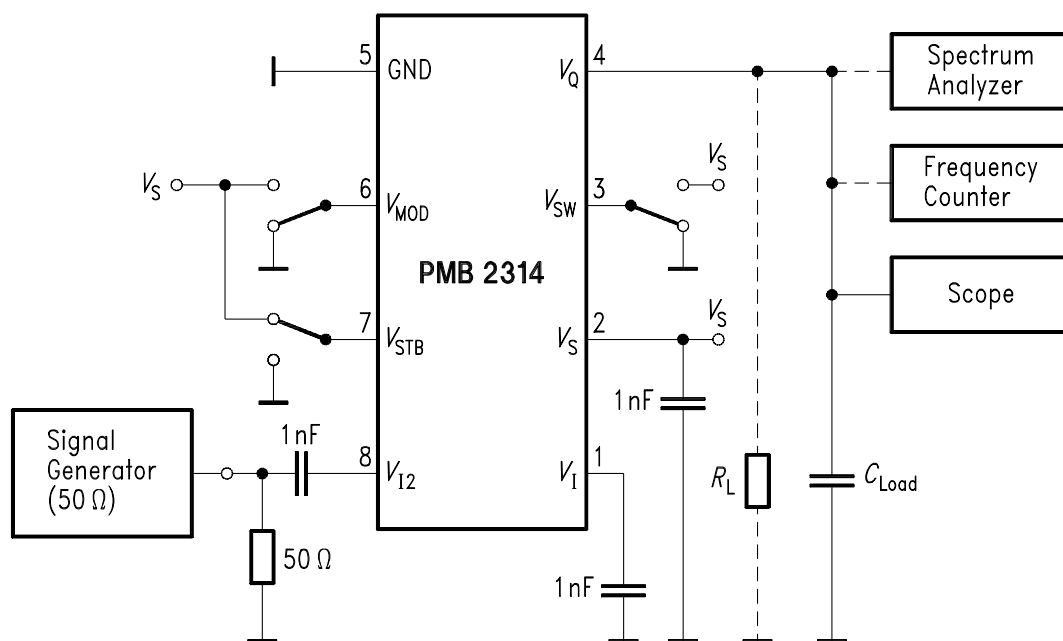
Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
STB voltage High	V_{STBH}	$V_S - 0.1$ GND		V_S	V	STB = V_S
STB voltage Low	V_{STBL}			0.8	V	
STB input current High	I_{STBH}			30	μA	STB = GND
STB input current Low	$-I_{\text{STBL}}$			60	μA	
Internal current source (see block diagram)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

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.

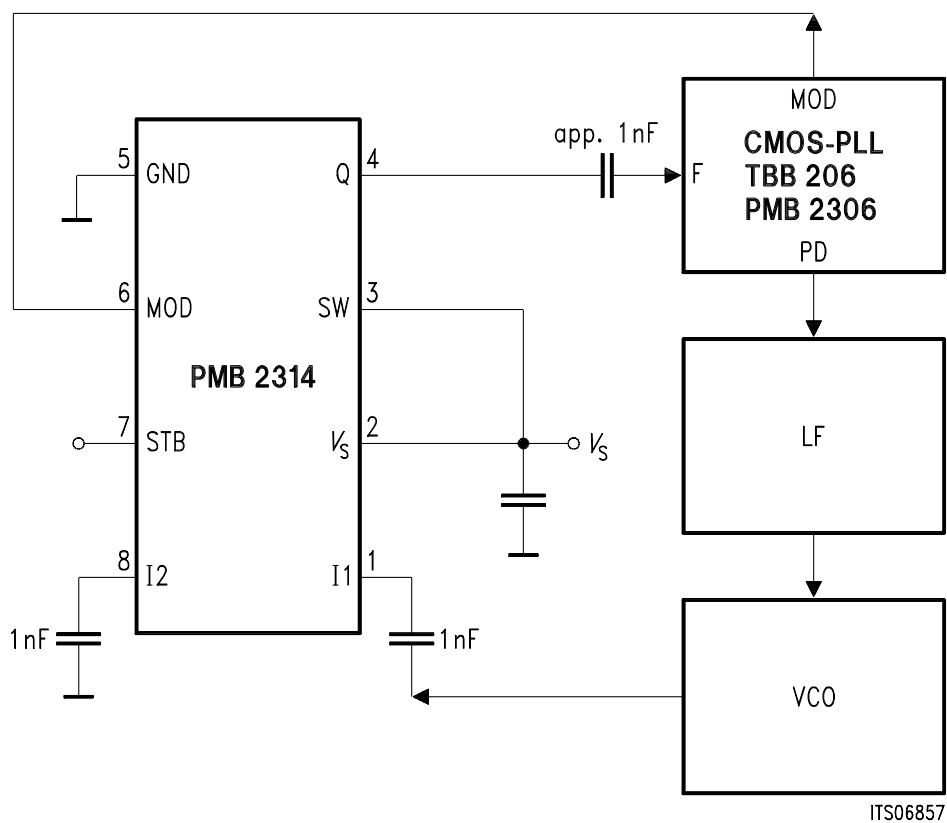
Input Sensitivity and Output Logic Swing Measurement



$C_{Load} \leq 8 \text{ pF}$ 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

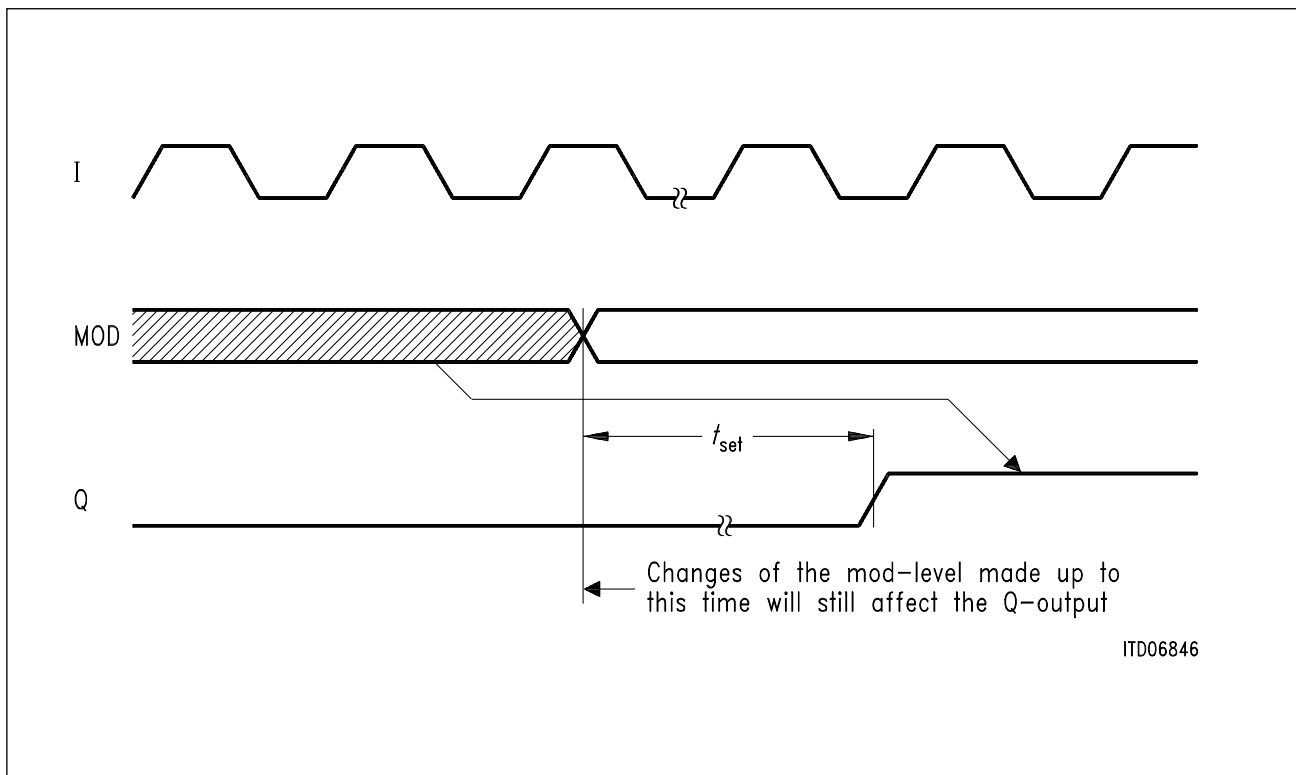
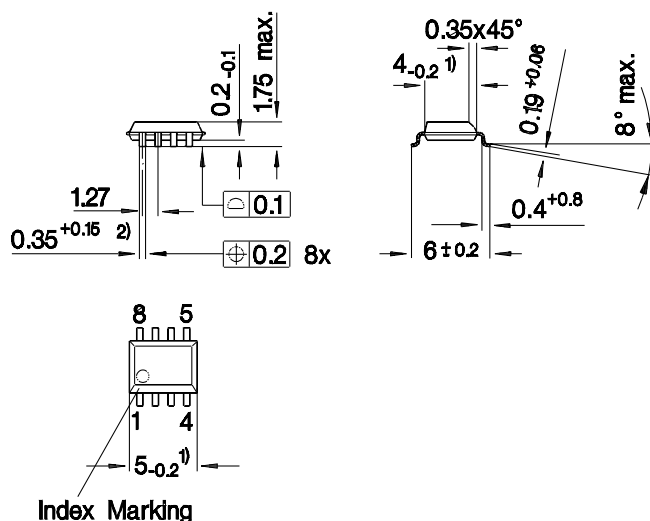


Diagram 1

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