

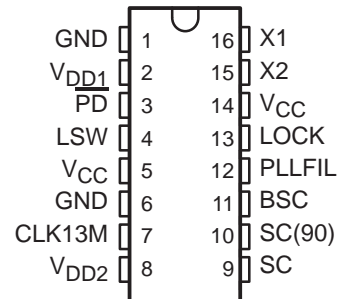
- Solid-State Reliability
- Surface-Mount Package

## description

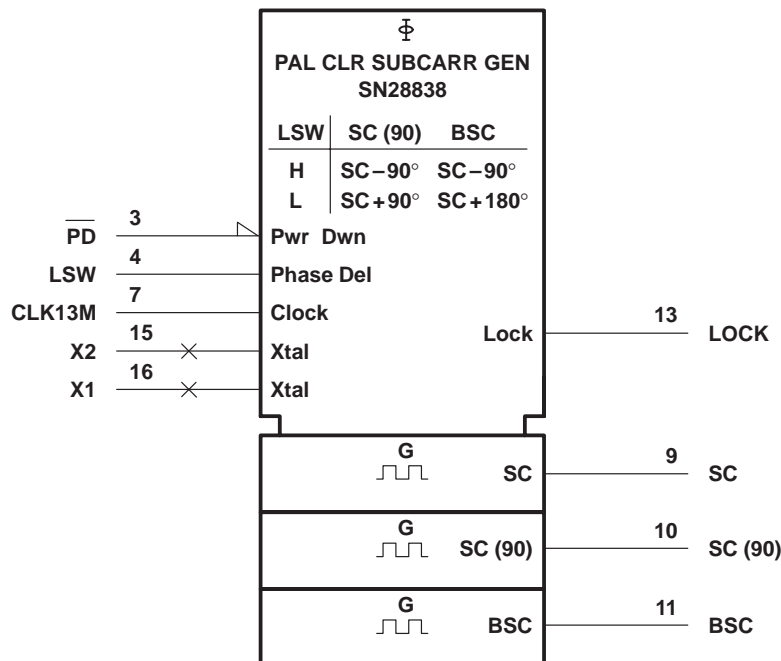
The SN28838 is a monolithic integrated circuit designed to interface with the SN28837 PAL-timing generator in order to generate the PAL-color timing signals. It receives inputs from the SN28837 and a 17-MHz oscillator and outputs the PAL-color subcarrier, color subcarrier delayed by 90 degrees, and burst-color subcarrier signals, which are all 4.43-MHz outputs.

The SN28838 is supplied in a 16-pin surface-mount package and is characterized for operation from 0°C to 40°C.

NS PACKAGE  
(TOP VIEW)



## logic symbol



This device contains circuits to protect its inputs and outputs against damage due to high static voltages or electrostatic fields. These circuits have been qualified to protect this device against electrostatic discharges (ESD) of up to 2 kV according to MIL-STD-883C, Method 3015; however, precautions should be taken to avoid application of any voltage higher than maximum-rated voltages to these high-impedance circuits. During storage or handling, the device leads should be shorted together or the device should be placed in conductive foam. In a circuit, unused inputs should always be connected to an appropriate logic voltage level, preferably either  $V_{CC}$  or ground. Specific guidelines for handling devices of this type are contained in the publication *Guidelines for Handling Electrostatic-Discharge-Sensitive (ESDS) Devices and Assemblies* available from Texas Instruments.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



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# SN28838 PAL-COLOR SUBCARRIER GENERATOR

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## Terminal Functions

TERMINAL NAME	NO.	I/O	DESCRIPTION
BSC	11	O	Burst subcarrier
CLK13M	7	I	13.34-MHz clock from SN28837
GND	1		Ground
GND	6		Ground
LOCK	13	O	PLL lock signal. LOCK is high when the phase-locked loop is locked.
LSW	4	I	Line switch (from SN28837)
$\overline{\text{PD}}$	3	I	Power down
PLLFIL	12		Terminal for PLL filter
SC	9	O	Subcarrier
SC(90)	10	O	Subcarrier 90° out of phase
$V_{CC}^{\dagger}$	5		Power supply voltage
$V_{CC}^{\dagger}$	14		Power supply voltage
$V_{DD1}$	2		Power supply voltage for X1
$V_{DD2}$	8		Power supply voltage for CLK13M
X1	16		Crystal oscillator
X2	15		

$\dagger$  These two terminals should be connected together externally.

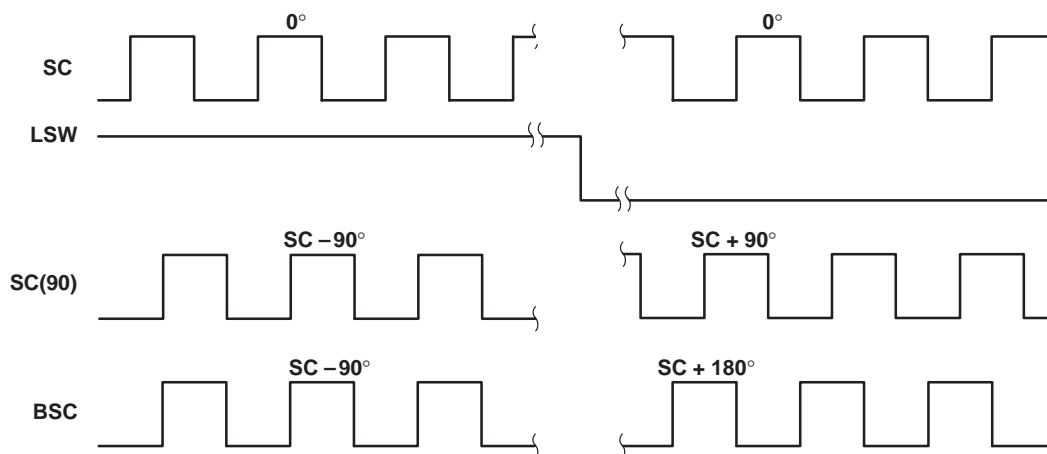


Figure 1. SC, SC(90), and BSC Timing

**absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†**

Supply voltage range, $V_{CC}$ (see Note 1)	–0.3 V to 7 V
Input voltage range, $V_I$	–0.3 V to $V_{CC} + 0.3$ V
Output voltage range, $V_O$	–0.3 V to $V_{CC} + 0.3$ V
Operating free-air temperature range, $T_A$	–30°C to 75°C
Storage temperature range	–55°C to 125°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°C
Continuous total power dissipation	200 mW

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. All voltage values are with respect to the GND terminal.

**recommended operating conditions**

	MIN	NOM	MAX	UNIT
Supply voltage, $V_{CC}$	4.5	5	5.5	V
High-level input voltage, $V_{IH}$	$V_{CC} \times 0.7$			V
Low-level input voltage, $V_{IL}$			0.8	V
Operating frequency		17.735		MHz
Power-up time		300		μs
Operating free-air temperature, $T_A$	–20		45	°C

**electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)**

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
$V_{OH}$	High-level output voltage	BSC, SC, SC(90) $V_{CC} = 4.5$ V, $I_{OH} = -2$ mA	3.5			V
$V_{OL}$	Low-level output voltage				0.5	V
$I_{IH}$	High-level input current (except X1)‡	$V_I = 5$ V			100	nA
$I_{IL}$	Low-level input current	$V_I = 0$	–30	–200	–370	μA
	Output frequency	BSC, SC, SC(90)		4.43		MHz
$I_{CC}$	Supply current			5	20	mA

‡ All inputs except X1 have pullup current sources.

**switching characteristics**

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$t_r$	Rise time		50		ns
$t_f$	Fall time		50		ns

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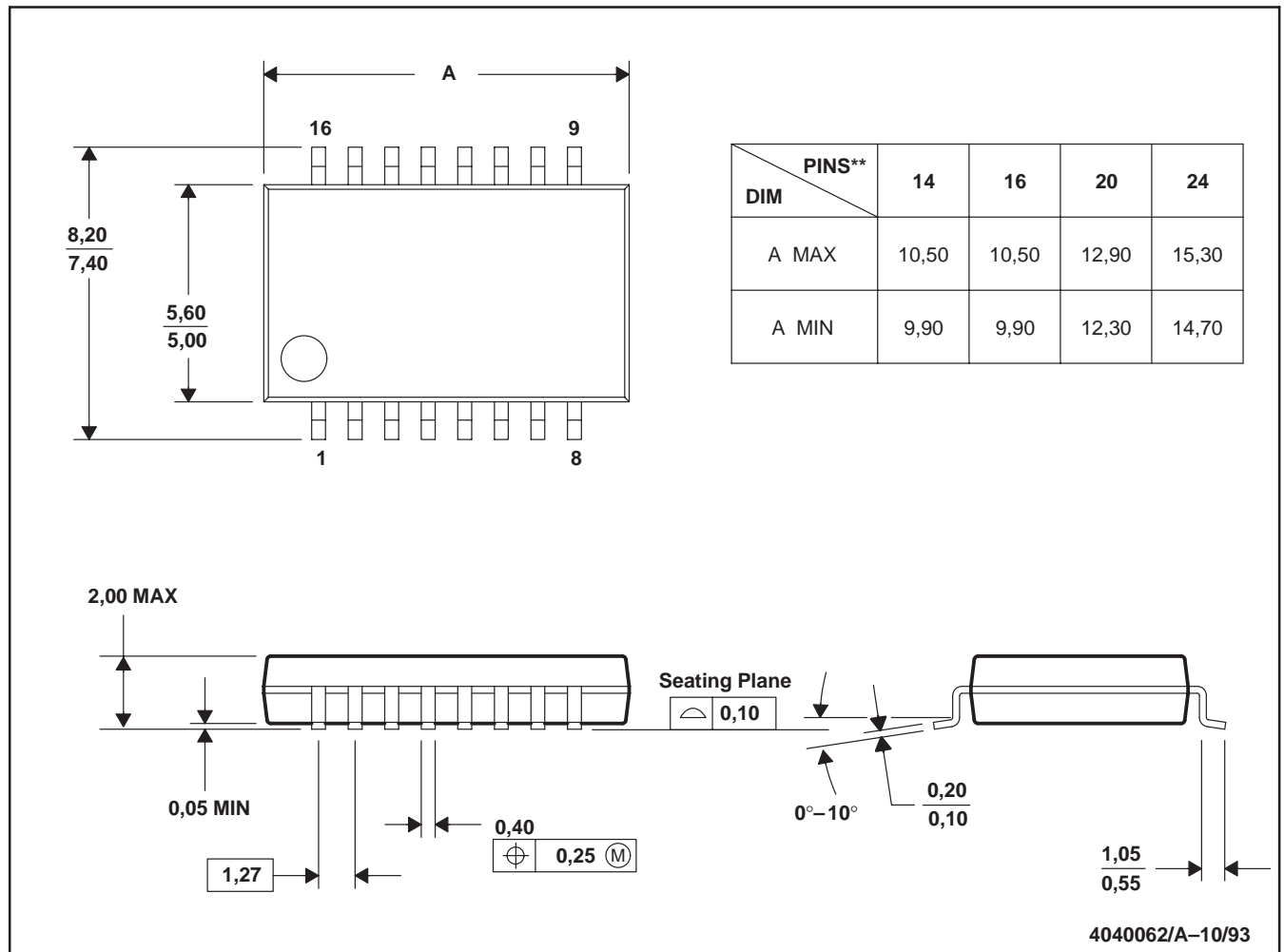
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## MECHANICAL DATA

NS/R-PDSO-G\*\*

PLASTIC SMALL-OUTLINE PACKAGE

16 PIN SHOWN



- NOTES: A. All linear dimensions are in millimeters.  
 B. This drawing is subject to change without notice.  
 C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.

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