



General Purpose Peak EMI Reduction IC

General Features

- 1x, LVCMOS Peak EMI Reduction
- Input frequency:
 - 15MHz - 40MHz @ 2.5V
 - 15MHz - 50MHz @ 3.3V
- Output frequency :
 - 15MHz - 40MHz @ 2.5V
 - 15MHz - 50MHz @ 3.3V
- Analog Deviation Selection
- ModRate selection option
- Spread Spectrum Enable/Disable
- Supply Voltage: 2.5V \pm 0.2V
3.3V \pm 0.3V
- 8pin TSSOP, TDFN (2mmX2mm) Packages
- Commercial and Industrial temperature range

Functional Description

PCS3P8504A is a versatile, 3.3V/2.5V Peak EMI reduction IC. PCS3P8504A accepts an input clock either from a

fundamental Crystal or from an external reference (AC or DC coupled to XIN / CLKIN) and locks on to it delivering a 1x modulated clock output. PCS3P8504A has a SSON pin for enabling and disabling Spread Spectrum function.

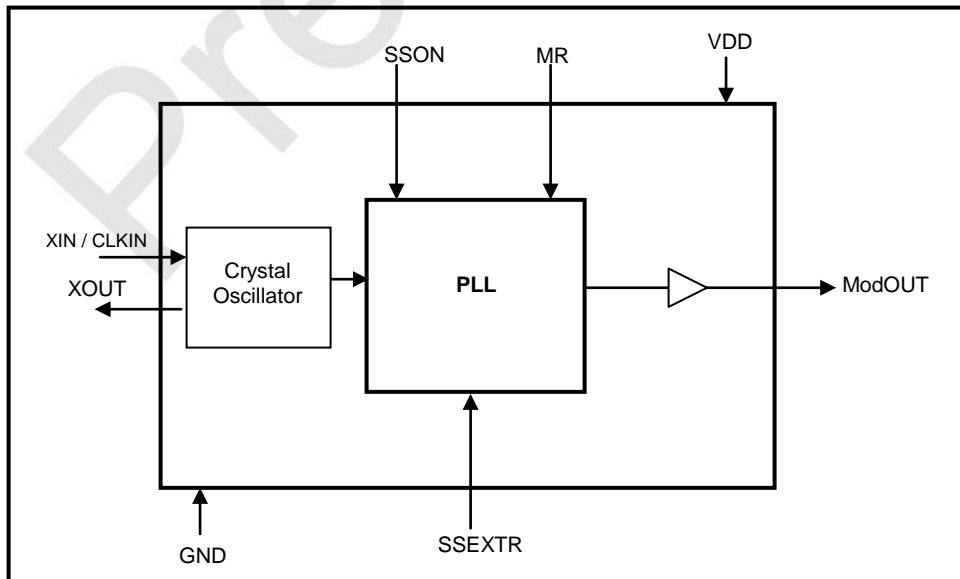
PCS3P8504A has an SSEXTR pin to select different deviations depending upon the value of an external resistor connected between SSEXTR and GND. Modulation Rate (MR) control selects one of the two different Modulation Rates.

PCS3P8504A operates from a 3.3V/2.5V supply, and is available in an 8 pin TSSOP and TDFN (2mmX2mm) packages, over Commercial and Industrial temperature range.

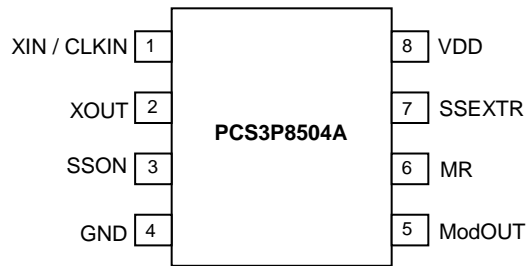
Application

PCS3P8504A is targeted for consumer electronics application like DPF, MFP.

Block Diagram



Pin Configuration



Pin Description

Pin #	Pin Name	Pin Type	Description
1	XIN / CLKIN	I	Crystal connection or External reference clock input.
2	XOUT	O	Crystal connection. If using an external reference, this pin should be left open.
3	SSON	I	Spread Spectrum ON/OFF. Spread Spectrum function enabled when HIGH, disabled when LOW. Has an internal pull-up resistor inside.
4	GND	P	Ground.
5	ModOUT	O	Modulated clock output.
6	MR	I	Modulation Rate Select. When LOW selects Low Modulation Rate. Selects High Modulation Rate when pulled HIGH. Has an internal pull-up resistor inside.
7	SSEXTR	I	Analog Deviation Selection through external resistor to GND.
8	VDD	P	2.5V/3.3V supply Voltage.

Frequency Selection table

VDD (V)	Frequency (MHz)
2.5	15-40
3.3	15-50

Operating Conditions

Parameter	Description	Min	Max	Unit	
VDD	Supply Voltage	2.3	3.6	V	
T _A	Operating Temperature	Commercial	0	+70	°C
		Industrial	-40	+85	
C _L	Load Capacitance		10	pF	
C _{IN}	Input Capacitance		7	pF	

Absolute Maximum Rating

Symbol	Parameter	Rating	Unit
VDD, V _{IN}	Voltage on any input pin with respect to Ground	-0.5 to +4.6	V
T _{STG}	Storage temperature	-65 to +125	°C
T _s	Max. Soldering Temperature (10 sec)	260	°C
T _J	Junction Temperature	150	°C
T _{DV}	Static Discharge Voltage (As per JEDEC STD22- A114-B)	2	KV

Note: These are stress ratings only and are not implied for functional use. Exposure to absolute maximum ratings for prolonged periods of time may affect device reliability.

DC Electrical Characteristics for 2.5V

Parameter	Description	Test Conditions	Min	Typ	Max	Unit
VDD	Supply Voltage		2.3	2.5	2.7	V
V _{IL}	Input LOW Voltage				0.7	V
V _{IH}	Input HIGH Voltage		1.7			V
I _{IL}	Input LOW Current	V _{IN} = 0V			25	μA
I _{IH}	Input HIGH Current	V _{IN} = V _{DD}			25	μA
V _{OL}	Output LOW Voltage	I _{OL} = 8mA			0.6	V
V _{OH}	Output HIGH Voltage	I _{OH} = -8mA	1.8			V
I _{CC}	Static Supply Current	XIN / CLKIN pulled low			50	μA
I _{DD}	Dynamic Supply Current	Unloaded Output			14	mA
Z _o	Output Impedance			35		Ω

Switching Characteristics for 2.5V

Parameter	Test Conditions	Min	Typ	Max	Unit
Input Frequency ¹ / ModeUT		15		40	MHz
Duty Cycle ^{2,3}	Measured at V _{DD} / 2	45	50	55	%
Output Rise Time ^{2,3}	Measured between 20% to 80%			2.2	nS
Output Fall Time ^{2,3}	Measured between 80% to 20%			2	nS
Cycle-to-Cycle Jitter ³	Unloaded output with SSEXTR OPEN @ 27MHz		±175		pS
PLL Lock Time ³	Stable power supply, valid clock presented on XIN / CLKIN			3	mS

- Notes:
1. Functionality with Crystal is guaranteed by design and characterization. Not 100% tested in production.
 2. All parameters are specified with 10pF loaded outputs.
 3. Parameter is guaranteed by design and characterization. Not 100% tested in production.

DC Electrical Characteristics for 3.3V

Parameter	Description	Test Conditions	Min	Typ	Max	Unit
VDD	Supply Voltage		3.0	3.3	3.6	V
V _{IL}	Input LOW Voltage				0.8	V
V _{IH}	Input HIGH Voltage		2.0			V
I _{IL}	Input LOW Current	V _{IN} = 0V			25	μA
I _{IH}	Input HIGH Current	V _{IN} = V _{DD}			25	μA
V _{OL}	Output LOW Voltage	I _{OL} = 8mA			0.4	V
V _{OH}	Output HIGH Voltage	I _{OH} = -8mA	2.4			V
I _{CC}	Static Supply Current	XIN / CLKIN pulled low			50	μA
I _{DD}	Dynamic Supply Current	Unloaded Output			20	mA
Z _o	Output Impedance			30		Ω

Switching Characteristics for 3.3V

Parameter	Test Conditions	Min	Typ	Max	Unit
Input Frequency ¹ / ModOUT		15		50	MHz
Duty Cycle ^{2,3}	Measured at V _{DD} / 2	45	50	55	%
Output Rise Time ^{2,3}	Measured between 20% to 80%			1.8	nS
Output Fall Time ^{2,3}	Measured between 80% to 20%			1.6	nS
Cycle-to-Cycle Jitter ³	Unloaded output with SSEXTR OPEN @ 27MHz		±150		pS
PLL Lock Time ³	Stable power supply, valid clock presented on XIN / CLKIN			3	mS

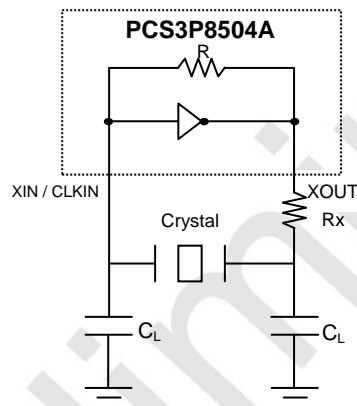
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Typical Crystal Specifications

Fundamental AT cut parallel resonant crystal	
Nominal frequency	27MHz
Frequency tolerance	±50 ppm or better at 25°C
Operating temperature range	-25°C to +85°C
Storage temperature	-40°C to +85°C
Load capacitance(C _P)	18pF
Shunt capacitance	7pF maximum
ESR	25 Ω

Note: C_L is the Load Capacitance and Rx is used to prevent oscillations at overtone frequency of the Fundamental frequency.

Typical Crystal Interface Circuit



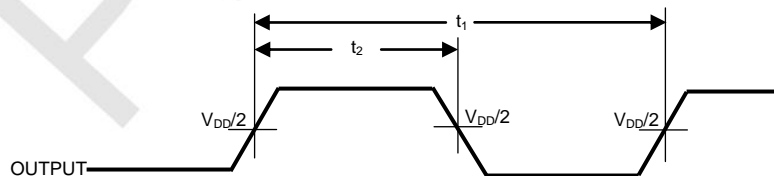
$$C_L = 2 * (C_P - C_S)$$

Where C_P = Load capacitance of crystal from crystal vendor datasheet.

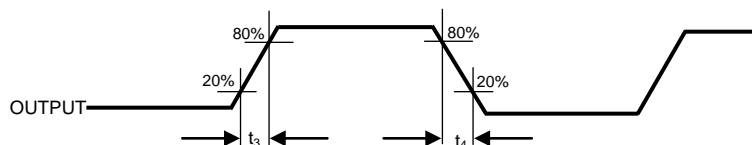
C_S = Stray capacitance due to C_{IN}, PCB, Trace, etc.

Switching Waveforms

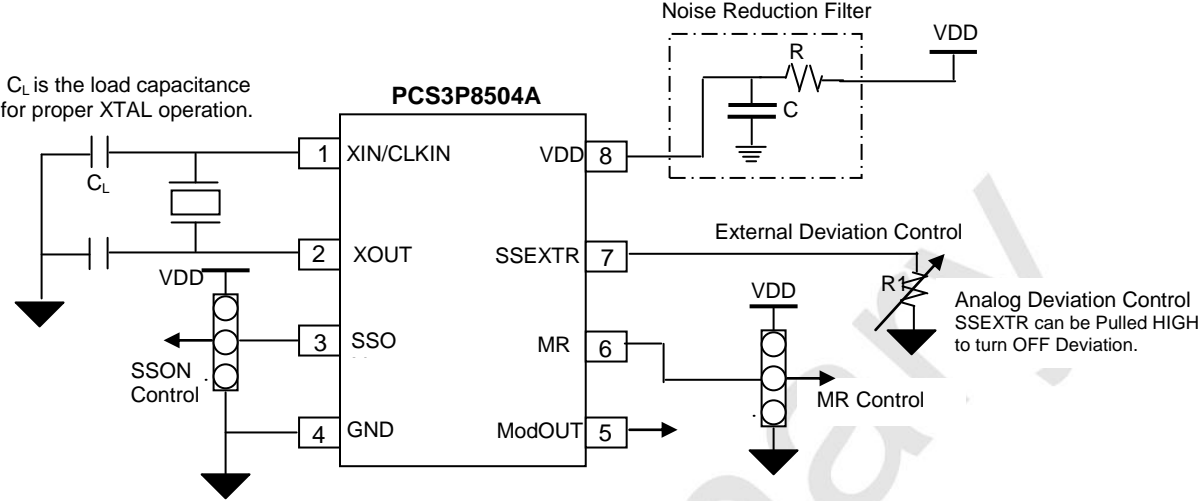
Duty Cycle Timing



Output Rise/Fall Time

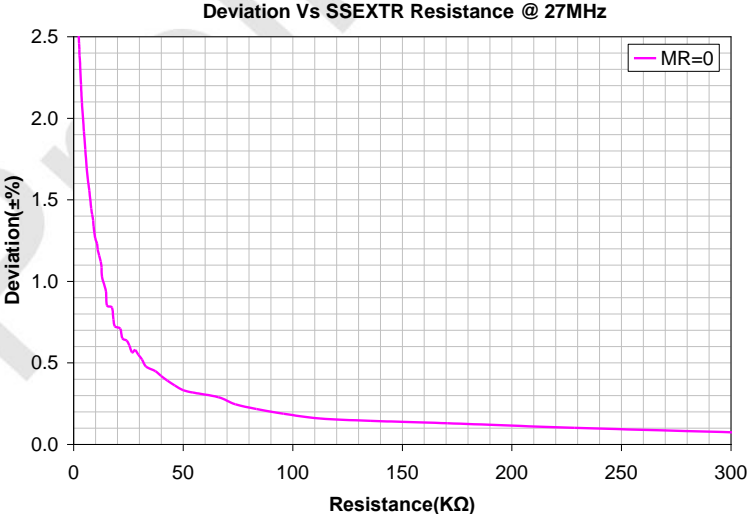


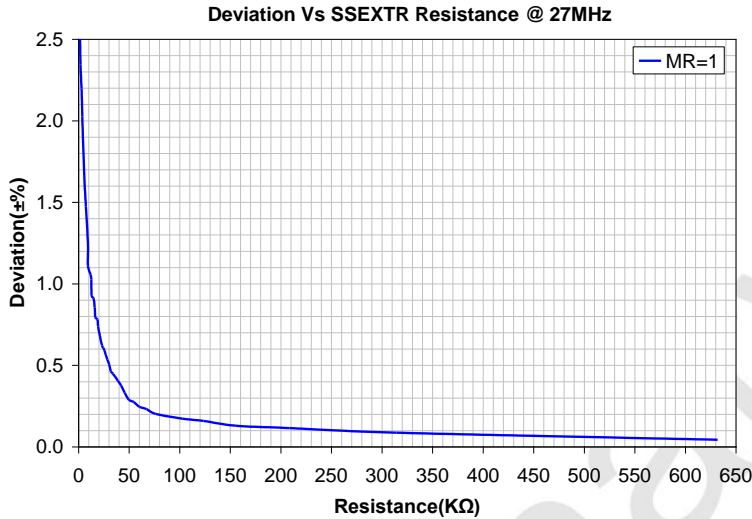
Application Schematic



Note: For AC Coupled Interface refer to Application Brief: CT100801.

Deviation Vs SSEXTTR resistance Charts at 27MHz



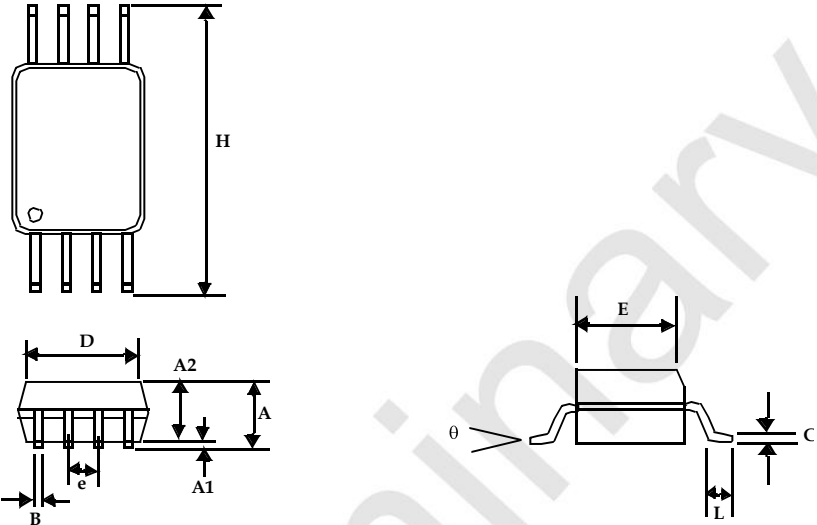


Note: Device to Device variation of Deviation is ±10%.

Preliminary

Package Information

8-lead TSSOP Package (4.40-MM Body)

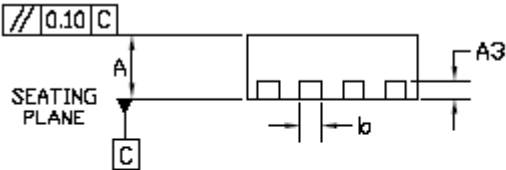
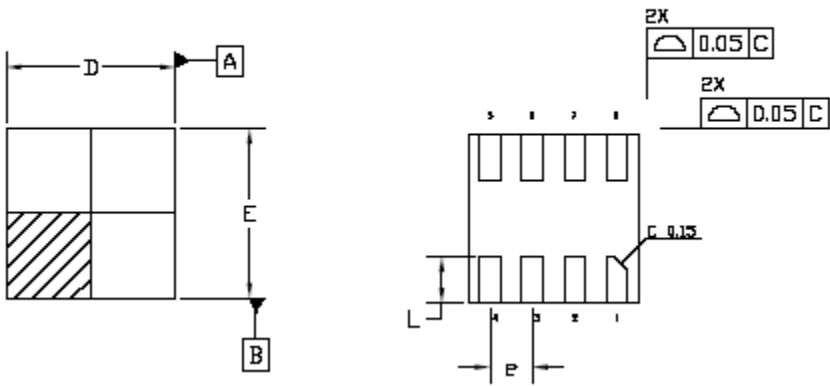


Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A		0.043		1.10
A1	0.002	0.006	0.05	0.15
A2	0.033	0.037	0.85	0.95
B	0.008	0.012	0.19	0.30
c	0.004	0.008	0.09	0.20
D	0.114	0.122	2.90	3.10
E	0.169	0.177	4.30	4.50
e	0.026 BSC		0.65 BSC	
H	0.252 BSC		6.40 BSC	
L	0.020	0.028	0.50	0.70
theta	0°	8°	0°	8°

TDFN (2mmx2mm) 8L package Outline drawing

TOP VIEW

BOTTOM VIEW



⌀ 0.10 (M) C B A

SIDE VIEW

Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.027	0.0315	0.70	0.80
A3	0.008 BSC		0.203 BSC	
b	0.008	0.012	0.20	0.30
D	0.079 BSC		2.00 BSC	
E	0.078 BSC		2.00 BSC	
e	0.020 BSC		0.50 BSC	
L	0.020	0.024	0.50	0.60

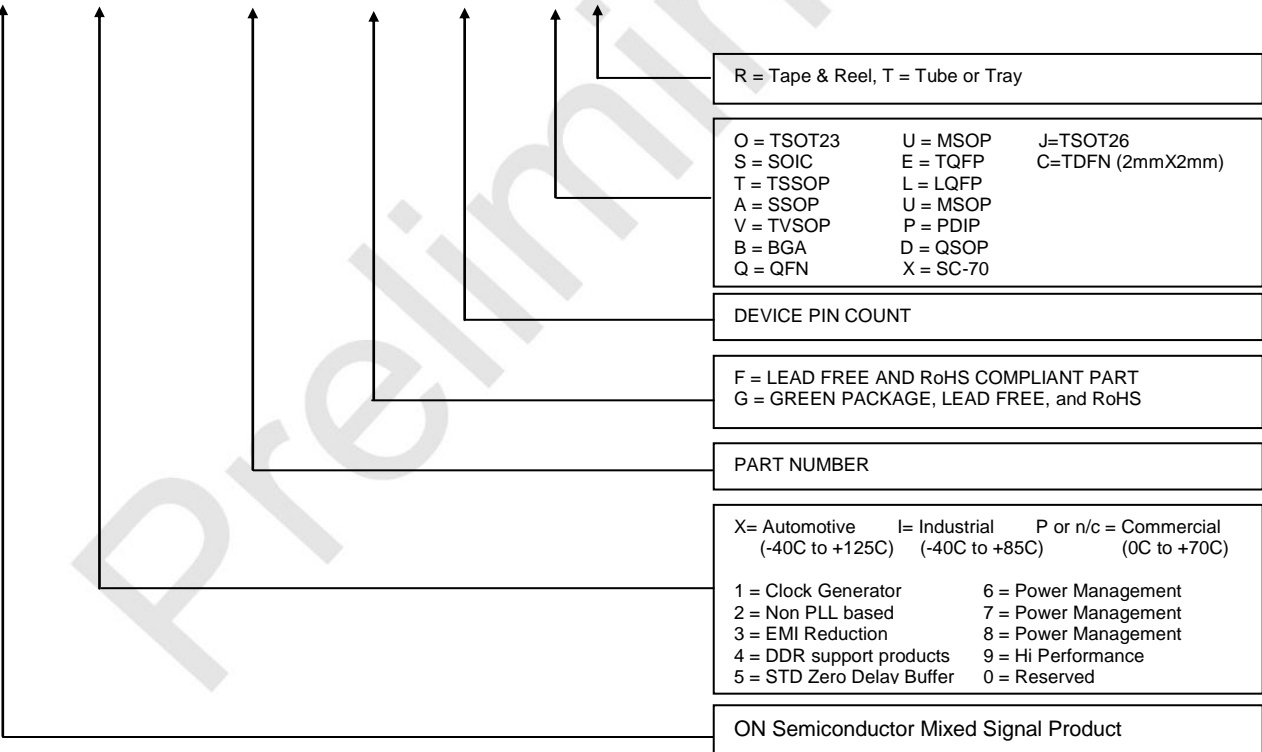
Ordering Code

Part Number	Marking	Package	Temperature
PCS3P8504AG -08-TR	3P8504AG	8-pin TSSOP, TAPE AND REEL, Green	Commercial
PCS3P8504AG -08-TT	3P8504AG	8-pin TSSOP, TUBE, Green	Commercial
PCS3P8504AG -08CR	BW1 LLYW	8- pin 2-mm TDFN COL - TAPE & REEL, Green	Commercial
PCS3I8504AG -08-TR	3I8504AG	8-pin TSSOP, TAPE AND REEL, Green	Industrial
PCS3I8504AG -08-TT	3I8504AG	8-pin TSSOP, TUBE, Green	Industrial
PCS3I8504AG -08-CR	BW2 LLYW	8- pin 2-mm TDFN COL - TAPE & REEL, Green	Industrial

LL = 2 Character LOT #
 YW=Year and Work Week Code

Device Ordering Information

P C S 3 P 8 5 0 4 A G - 0 8 - T T



R = Tape & Reel, T = Tube or Tray

O = TSOT23	U = MSOP	J=TSOT26
S = SOIC	E = TQFP	C=TDFN (2mmX2mm)
T = TSSOP	L = LQFP	
A = SSOP	U = MSOP	
V = TVSOP	P = PDIP	
B = BGA	D = QSOP	
Q = QFN	X = SC-70	

DEVICE PIN COUNT


F = LEAD FREE AND RoHS COMPLIANT PART
 G = GREEN PACKAGE, LEAD FREE, and RoHS

PART NUMBER

X= Automotive (-40C to +125C)	I= Industrial (-40C to +85C)	P or n/c = Commercial (0C to +70C)
1 = Clock Generator	6 = Power Management	
2 = Non PLL based	7 = Power Management	
3 = EMI Reduction	8 = Power Management	
4 = DDR support products	9 = Hi Performance	
5 = STD Zero Delav Buffer	0 = Reserved	

ON Semiconductor Mixed Signal Product

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