CHANGE NOTIFICATION

Linear Technology Corporation
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June 05, 2015

Dear Sir/Madam: PCN# 060515

Subject: Notification of Change to LTC2410 LTC2411/LTC2411-1, LTC2412, LTC2413, LTC2414/LTC2418, LTC2415/LTC2415-1 Datasheet

Please be advised that Linear Technology Corporation has made a change to the datasheet specifications of subject devices in order to improve device manufacturability.

The Maximum External Oscillator Frequency (f_{EOSC}) in the Timing Characteristics is being reduced from 2000 kHz to 500 kHz. There are many applications that are using the parts at 2000 kHz and the performance is perfectly adequate. But at 2000 kHz, performance is significantly reduced from the limits guaranteed in the specification table, as shown in the graphs at the end of the datasheet.

This change is intended to apply to future customer designs. No changes are being made to the circuit or the test methodology, so customers that are using these devices with FO frequencies between 500 kHz and 2000 kHz and are satisfied with performance will continue to receive the same product.

Should you have any further questions or concerns please contact your local Linear Technology Sales person or you may contact me at 408-432-1900 ext. 2077, or by e-mail at JASON.HU@LINEAR.COM. If I do not hear from you by August 05, 2015, we will consider this change to be approved by your company.

Sincerely,

Jason Hu
Quality Assurance Engineer

TIMING CHARACTERISTICS

The ● denotes specifications which apply over the full operating temperature range, otherwise specifications are at T_A = 25°C. (Note 3)

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
f_{EOSC}	External Oscillator Frequency Range		●	2.56		500 ~~2000~~	kHz
t_{HEO}	External Oscillator High Period		●	0.25		390	µs
t_{LEO}	External Oscillator Low Period		●	0.25		390	µs
t_{CONV}	Conversion Time	F_O = 0V	●	130.86	133.53	136.20	ms
		F_O = V_{CC}	●	157.03	160.23	163.44	ms
		External Oscillator (Note 11)	●		20510/f_{EOSC} (in kHz)		ms
f_{ISCK}	Internal SCK Frequency	Internal Oscillator (Note 10)			19.2		kHz
		External Oscillator (Notes 10, 11)			f_{EOSC}/8		kHz
D_{ISCK}	Internal SCK Duty Cycle	(Note 10)	●	45		55	%
f_{ESCK}	External SCK Frequency Range	(Note 9)	●			2000	kHz
t_{LESCK}	External SCK Low Period	(Note 9)	●	250			ns
t_{HESCK}	External SCK High Period	(Note 9)	●	250			ns
t_{DOUT_ISCK}	Internal SCK 32-Bit Data Output Time	Internal Oscillator (Notes 10, 12)	●	1.64	1.67	1.70	ms
		External Oscillator (Notes 10, 11)	●		256/f_{EOSC} (in kHz)		ms
t_{DOUT_ESCK}	External SCK 32-Bit Data Output Time	(Note 9)	●		32/f_{ESCK} (in kHz)		ms
t_1	$\overline{CS}$ ↓ to SDO Low Z		●	0		200	ns
t2	$\overline{CS}$ ↑ to SDO High Z		●	0		200	ns
t3	$\overline{CS}$ ↓ to SCK ↓	(Note 10)	●	0		200	ns
t4	$\overline{CS}$ ↓ to SCK ↑	(Note 9)	●	50			ns
t_{KQMAX}	SCK ↓ to SDO Valid		●			220	ns
t_{KQMIN}	SDO Hold After SCK ↓	(Note 5)	●	15			ns
t_5	SCK Set-Up Before $\overline{CS}$ ↓		●	50			ns
t_6	SCK Hold After $\overline{CS}$ ↓		●			50	ns

Note 1: Absolute Maximum Ratings are those values beyond which the life of the device may be impaired.

Note 2: All voltage values are with respect to GND.

Note 3: V_{CC} = 2.7 to 5.5V unless otherwise specified.
$V_{REF} = REF^+ - REF^-$, $V_{REFCM} = (REF^+ + REF^-)/2$;
$V_{IN} = IN^+ - IN^-$, $V_{INCM} = (IN^+ + IN^-)/2$.

Note 4: F_O pin tied to GND or to V_{CC} or to external conversion clock source with f_{EOSC} = 153600Hz unless otherwise specified.

Note 5: Guaranteed by design, not subject to test.

Note 6: Integral nonlinearity is defined as the deviation of a code from a straight line passing through the actual endpoints of the transfer curve. The deviation is measured from the center of the quantization band.

Note 7: F_O = 0V (internal oscillator) or f_{EOSC} = 153600Hz ±2% (external oscillator).

Note 8: F_O = V_{CC} (internal oscillator) or f_{EOSC} = 128000Hz ±2% (external oscillator).

Note 9: The converter is in external SCK mode of operation such that the SCK pin is used as digital input. The frequency of the clock signal driving SCK during the data output is f_{ESCK} and is expressed in kHz.

Note 10: The converter is in internal SCK mode of operation such that the SCK pin is used as digital output. In this mode of operation the SCK pin has a total equivalent load capacitance C_{LOAD} = 20pF.

Note 11: The external oscillator is connected to the F_O pin. The external oscillator frequency, f_{EOSC}, is expressed in kHz.

Note 12: The converter uses the internal oscillator.
F_O = 0V or F_O = V_{CC}.

Note 13: The output noise includes the contribution of the internal calibration operations.

Note 14: Guaranteed by design and test correlation.

TIMING CHARACTERISTICS

The ● denotes specifications which apply over the full operating temperature range, otherwise specifications are at T_A = 25°C. (Note 3)

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
f_{EOSC}	External Oscillator Frequency Range		●	2.56		500 ~~2000~~	kHz
t_{HEO}	External Oscillator High Period		●	0.25		390	µs
t_{LEO}	External Oscillator Low Period		●	0.25		390	µs
t_{CONV}	Conversion Time	F_O = 0V (LTC2411)	●	130.86	133.53	136.20	ms
		F_O = V_{CC} (LTC2411)	●	157.03	160.23	163.44	ms
		F_O = 0V (LTC2411-1)	●	143.78	146.71	149.64	ms
		External Oscillator (Note 11)	●		20510/f_{EOSC} (in kHz)		ms
f_{ISCK}	Internal SCK Frequency	Internal Oscillator (LTC2411) (Note 10)			19.2		kHz
		Internal Oscillator (LTC2411-1) (Note 10)			17.5		kHz
		External Oscillator (Notes 10, 11)			f_{EOSC}/8		kHz
D_{ISCK}	Internal SCK Duty Cycle	(Note 10)	●	45		55	%
f_{ESCK}	External SCK Frequency Range	(Note 9)	●			2000	kHz
t_{LESCK}	External SCK Low Period	(Note 9)	●	250			ns
t_{HESCK}	External SCK High Period	(Note 9)	●	250			ns
t_{DOUT_ISCK}	Internal SCK 32-Bit Data Output Time	Internal Oscillator (LTC2411) (Notes 10, 12)	●	1.64	1.67	1.70	ms
		Internal Oscillator (LTC2411-1) (Notes 10, 12)	●	1.80	1.83	1.86	ms
		External Oscillator (Notes 10, 11)	●		256/f_{EOSC} (in kHz)		ms
t_{DOUT_ESCK}	External SCK 32-Bit Data Output Time	(Note 9)	●		32/f_{ESCK} (in kHz)		ms
t_1	$\overline{CS}$ ↓ to SDO Low Z		●	0		200	ns
t2	$\overline{CS}$ ↑ to SDO High Z		●	0		200	ns
t3	$\overline{CS}$ ↓ to SCK ↓	(Note 10)	●	0		200	ns
t4	$\overline{CS}$ ↓ to SCK ↑	(Note 9)	●	50			ns
t_{KOMAX}	SCK ↓ to SDO Valid		●			220	ns
t_{KOMIN}	SDO Hold After SCK ↓	(Note 5)	●	15			ns
t_5	SCK Set-Up Before $\overline{CS}$ ↓		●	50			ns
t_6	SCK Hold After $\overline{CS}$ ↓		●			50	ns

Note 1: Absolute Maximum Ratings are those values beyond which the life of the device may be impaired.

Note 2: All voltage values are with respect to GND.

Note 3: V_{CC} = 2.7 to 5.5V unless otherwise specified.
$V_{REF} = REF^+ - REF^-$, $V_{REFCM} = (REF^+ + REF^-)/2$;
$V_{IN} = IN^+ - IN^-$, $V_{INCM} = (IN^+ + IN^-)/2$.

Note 4: F_O pin tied to GND or to V_{CC} or to external conversion clock source with f_{EOSC} = 153600Hz unless otherwise specified.

Note 5: Guaranteed by design, not subject to test.

Note 6: Integral nonlinearity is defined as the deviation of a code from a straight line passing through the actual endpoints of the transfer curve. The deviation is measured from the center of the quantization band.

Note 7: F_O = 0V (internal oscillator) or f_{EOSC} = 153600Hz ±2% (external oscillator).

Note 8: F_O = V_{CC} (internal oscillator) or f_{EOSC} = 128000Hz ±2% (external oscillator).

Note 9: The converter is in external SCK mode of operation such that the SCK pin is used as digital input. The frequency of the clock signal driving SCK during the data output is f_{ESCK} and is expressed in kHz.

Note 10: The converter is in internal SCK mode of operation such that the SCK pin is used as digital output. In this mode of operation the SCK pin has a total equivalent load capacitance C_{LOAD} = 20pF.

Note 11: The external oscillator is connected to the F_O pin. The external oscillator frequency, f_{EOSC}, is expressed in kHz.

Note 12: The converter uses the internal oscillator.
F_O = 0V or F_O = V_{CC}.

Note 13: The output noise includes the contribution of the internal calibration operations.

Note 14: Guaranteed by design and test correlation.

Note 15: F_O = 0V (internal oscillator) or f_{EOSC} = 139800Hz ±2% (external oscillator).

TIMING CHARACTERISTICS

The ● denotes specifications which apply over the full operating temperature range, otherwise specifications are at T_A = 25°C. (Note 3)

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
f_{EOSC}	External Oscillator Frequency Range		●	2.56		500 ~~2000~~	kHz
t_{HEO}	External Oscillator High Period		●	0.25		390	µs
t_{LEO}	External Oscillator Low Period		●	0.25		390	µs
t_{CONV}	Conversion Time	F_O = 0V F_O = V_{CC} External Oscillator (Note 11)	● ● ●	130.86 157.03	133.53 160.23 20510/f_{EOSC} (in kHz)	136.20 163.44	ms ms ms
f_{ISCK}	Internal SCK Frequency	Internal Oscillator (Note 10) External Oscillator (Notes 10, 11)			19.2 f_{EOSC}/8		kHz kHz
D_{ISCK}	Internal SCK Duty Cycle	(Note 10)	●	45		55	%
f_{ESCK}	External SCK Frequency Range	(Note 9)	●			2000	kHz
t_{LESCK}	External SCK Low Period	(Note 9)	●	250			ns
t_{HESCK}	External SCK High Period	(Note 9)	●	250			ns
t_{DOUT_ISCK}	Internal SCK 32-Bit Data Output Time	Internal Oscillator (Notes 10, 12) External Oscillator (Notes 10, 11)	● ●	1.64	1.67 256/f_{EOSC} (in kHz)	1.70	ms ms
t_{DOUT_ESCK}	External SCK 32-Bit Data Output Time	(Note 9)	●		32/f_{ESCK} (in kHz)		ms
t_1	$\overline{CS}$ ↓ to SDO Low Z		●	0		200	ns
t2	$\overline{CS}$ ↑ to SDO High Z		●	0		200	ns
t3	$\overline{CS}$ ↓ to SCK ↓	(Note 10)	●	0		200	ns
t4	$\overline{CS}$ ↓ to SCK ↑	(Note 9)	●	50			ns
t_{KQMAX}	SCK ↓ to SDO Valid		●			220	ns
t_{KQMIN}	SDO Hold After SCK ↓	(Note 5)	●	15			ns
t_5	SCK Set-Up Before $\overline{CS}$ ↓		●	50			ns
t_6	SCK Hold After $\overline{CS}$ ↓		●			50	ns

Note 1: Absolute Maximum Ratings are those values beyond which the life of the device may be impaired.

Note 2: All voltage values are with respect to GND.

Note 3: V_{CC} = 2.7V to 5.5V unless otherwise specified.
$V_{REF} = REF^+ - REF^-$, $V_{REFCM} = (REF^+ + REF^-)/2$; $V_{IN} = IN^+ - IN^-$, $V_{INCM} = (IN^+ + IN^-)/2$, IN^+ and IN^- are defined as the selected positive ($CH0^+$ or $CH1^+$) and negative ($CH0^-$ or $CH1^-$) input respectively.

Note 4: F_O pin tied to GND or to V_{CC} or to external conversion clock source with f_{EOSC} = 153600Hz unless otherwise specified.

Note 5: Guaranteed by design, not subject to test.

Note 6: Integral nonlinearity is defined as the deviation of a code from a straight line passing through the actual endpoints of the transfer curve. The deviation is measured from the center of the quantization band.

Note 7: F_O = 0V (internal oscillator) or f_{EOSC} = 153600Hz ±2% (external oscillator).

Note 8: F_O = V_{CC} (internal oscillator) or f_{EOSC} = 128000Hz ±2% (external oscillator).

Note 9: The converter is in external SCK mode of operation such that the SCK pin is used as digital input. The frequency of the clock signal driving SCK during the data output is f_{ESCK} and is expressed in kHz.

Note 10: The converter is in internal SCK mode of operation such that the SCK pin is used as digital output. In this mode of operation the SCK pin has a total equivalent load capacitance C_{LOAD} = 20pF.

Note 11: The external oscillator is connected to the F_O pin. The external oscillator frequency, f_{EOSC}, is expressed in kHz.

Note 12: The converter uses the internal oscillator.
F_O = 0V or F_O = V_{CC}.

Note 13: The output noise includes the contribution of the internal calibration operations.

Note 14: Guaranteed by design and test correlation.

TIMING CHARACTERISTICS

The ● denotes specifications which apply over the full operating temperature range, otherwise specifications are at T_A = 25°C. (Note 3)

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
f_{EOSC}	External Oscillator Frequency Range		●	2.56		500 ~~2000~~	kHz
t_{HEO}	External Oscillator High Period		●	0.25		390	µs
t_{LEO}	External Oscillator Low Period		●	0.25		390	µs
t_{CONV}	Conversion Time	F_O = 0V External Oscillator (Note 10)	● ●		146.71 20510/f_{EOSC} (in kHz)		ms ms
f_{ISCK}	Internal SCK Frequency	Internal Oscillator (Note 9) External Oscillator (Notes 9, 10)			17.5 f_{EOSC}/8		kHz kHz
D_{ISCK}	Internal SCK Duty Cycle	(Note 9)	●	45		55	%
f_{ESCK}	External SCK Frequency Range	(Note 8)	●			2000	kHz
t_{LESCK}	External SCK Low Period	(Note 8)	●	250			ns
t_{HESCK}	External SCK High Period	(Note 8)	●	250			ns
t_{DOUT_ISCK}	Internal SCK 32-Bit Data Output Time	Internal Oscillator (Notes 9, 11) External Oscillator (Notes 9, 10)	● ●	1.80	1.83 256/f_{EOSC} (in kHz)	1.86	ms ms
t_{DOUT_ESCK}	External SCK 32-Bit Data Output Time	(Note 8)	●		32/f_{ESCK} (in kHz)		ms
t_1	$\overline{CS}$ ↓ to SDO Low Z		●	0		200	ns
t2	$\overline{CS}$ ↑ to SDO Hi-Z		●	0		200	ns
t3	$\overline{CS}$ ↓ to SCK ↓	(Note 9)	●	0		200	ns
t4	$\overline{CS}$ ↓ to SCK ↑	(Note 8)	●	50			ns
t_{KQMAX}	SCK ↓ to SDO Valid		●			220	ns
t_{KQMIN}	SDO Hold After SCK ↓	(Note 5)	●	15			ns
t_5	SCK Set-Up Before $\overline{CS}$ ↓		●	50			ns
t_6	SCK Hold After $\overline{CS}$ ↓		●			50	ns

Note 1: Absolute Maximum Ratings are those values beyond which the life of the device may be impaired.

Note 2: All voltage values are with respect to GND.

Note 3: V_{CC} = 2.7V to 5.5V unless otherwise specified.
$V_{REF} = REF^+ - REF^-$, $V_{REFCM} = (REF^+ + REF^-)/2$;
$V_{IN} = IN^+ - IN^-$, $V_{INCM} = (IN^+ + IN^-)/2$.

Note 4: F_O pin tied to GND or to external conversion clock source with f_{EOSC} = 139800Hz unless otherwise specified.

Note 5: Guaranteed by design, not subject to test.

Note 6: Integral nonlinearity is defined as the deviation of a code from a straight line passing through the actual endpoints of the transfer curve. The deviation is measured from the center of the quantization band.

Note 7: F_O = 0V (internal oscillator) or f_{EOSC} = 139800Hz ±2% (external oscillator).

Note 8: The converter is in external SCK mode of operation such that the SCK pin is used as digital input. The frequency of the clock signal driving SCK during the data output is f_{ESCK} and is expressed in kHz.

Note 9: The converter is in internal SCK mode of operation such that the SCK pin is used as digital output.

Note 10: The external oscillator is connected to the F_O pin. The external oscillator frequency, f_{EOSC}, is expressed in kHz.

Note 11: The converter uses the internal oscillator. F_O = 0V.

Note 12: The output noise includes the contribution of the internal calibration operations.

Note 13: Guaranteed by design and test correlation.

DIGITAL INPUTS AND DIGITAL OUTPUTS

The ● denotes specifications which apply over the full operating temperature range, otherwise specifications are at T_A = 25°C. (Note 3)

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
V_{OL}	Low Level Output Voltage SDO	I_O = 1.6mA	●			0.4	V
V_{OH}	High Level Output Voltage SCK	I_O = –800µA (Note 10)	●	V_{CC} – 0.5			V
V_{OL}	Low Level Output Voltage SCK	I_O = 1.6mA (Note 10)	●			0.4	V
I_{OZ}	Hi-Z Output Leakage SDO		●	–10		10	µA

POWER REQUIREMENTS

The ● denotes specifications which apply over the full operating temperature range, otherwise specifications are at T_A = 25°C. (Note 3)

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
V_{CC}	Supply Voltage		●	2.7		5.5	V
I_{CC}	Supply Current						
	Conversion Mode	$\overline{CS}$ = 0V (Note 12)	●		200	300	µA
	Sleep Mode	$\overline{CS}$ = V_{CC} (Note 12)	●		4	10	µA
	Sleep Mode	$\overline{CS}$ = V_{CC}, 2.7V ≤ V_{CC} ≤ 3.3V (Note 12)			2		µA

TIMING CHARACTERISTICS

The ● denotes specifications which apply over the full operating temperature range, otherwise specifications are at T_A = 25°C. (Note 3)

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
f_{EOSC}	External Oscillator Frequency Range		●	2.56		500 ~~2000~~	kHz
t_{HEO}	External Oscillator High Period		●	0.25		390	µs
t_{LEO}	External Oscillator Low Period		●	0.25		390	µs
t_{CONV}	Conversion Time	F_O = 0V	●	130.86	133.53	136.20	ms
		F_O = V_{CC}	●	157.03	160.23	163.44	ms
		External Oscillator (Note 11)	●		20510/f_{EOSC} (in kHz)		ms
f_{ISCK}	Internal SCK Frequency	Internal Oscillator (Note 10)			19.2		kHz
		External Oscillator (Notes 10, 11)			f_{EOSC}/8		kHz
D_{ISCK}	Internal SCK Duty Cycle	(Note 10)	●	45		55	%
f_{ESCK}	External SCK Frequency Range	(Note 9)	●			2000	kHz
t_{LESCK}	External SCK Low Period	(Note 9)	●	250			ns
t_{HESCK}	External SCK High Period	(Note 9)	●	250			ns
t_{DOUT_ISCK}	Internal SCK 32-Bit Data Output Time	Internal Oscillator (Notes 10, 12)	●	1.64	1.67	1.70	ms
		External Oscillator (Notes 10, 11)	●		256/f_{EOSC} (in kHz)		ms
t_{DOUT_ESCK}	External SCK 32-Bit Data Output Time	(Note 9)	●		32/f_{ESCK} (in kHz)		ms

TIMING CHARACTERISTICS

The ● denotes specifications which apply over the full operating temperature range, otherwise specifications are at T_A = 25°C. (Note 3)

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
f_{EOSC}	External Oscillator Frequency Range		●	2.56		500 ~~2000~~	kHz
t_{HEO}	External Oscillator High Period		●	0.25		390	µs
t_{LEO}	External Oscillator Low Period		●	0.25		390	µs
t_{CONV}	Conversion Time (LTC2415)	F_O = 0V	●	65.43	66.77	68.1	ms
		F_O = V_{CC}	●	78.52	80.12	81.72	ms
		External Oscillator (Note 11)	●		10278/f_{EOSC} (in kHz)		ms
	Conversion Time (LTC2415-1)	F_O = 0V	●	71.3	72.8	74.3	ms
		External Oscillator (Note 11)	●		10278/f_{EOSC} (in kHz)		ms
f_{ISCK}	Internal SCK Frequency	Internal Oscillator (Note 10), LTC2415			19.2		kHz
		Internal Oscillator (Note 10), LTC2415-1			17.5		kHz
		External Oscillator (Notes 10, 11)			f_{EOSC}/8		kHz
D_{ISCK}	Internal SCK Duty Cycle	(Note 10)	●	45		55	%
f_{ESCK}	External SCK Frequency Range	(Note 9)	●			2000	kHz
t_{LESCK}	External SCK Low Period	(Note 9)	●	250			ns
t_{HESCK}	External SCK High Period	(Note 9)	●	250			ns
t_{DOUT_ISCK}	Internal SCK 32-Bit Data Output Time	Internal Oscillator (Notes 10, 12), LTC2415	●	1.64	1.67	1.70	ms
		Internal Oscillator (Notes 10, 12), LTC2415-1	●	1.80	1.83	1.86	ms
		External Oscillator (Notes 10, 11)	●		256/f_{EOSC} (in kHz)		ms
t_{DOUT_ESCK}	External SCK 32-Bit Data Output Time	(Note 9)	●		32/f_{ESCK} (in kHz)		ms
t_1	$\overline{CS}$ ↓ to SDO Low Z		●	0		200	ns
t2	$\overline{CS}$ ↑ to SDO High Z		●	0		200	ns
t3	$\overline{CS}$ ↓ to SCK ↓	(Note 10)	●	0		200	ns
t4	$\overline{CS}$ ↓ to SCK ↑	(Note 9)	●	50			ns
t_{KQMAX}	SCK ↓ to SDO Valid		●			220	ns
t_{KQMIN}	SDO Hold After SCK ↓	(Note 5)	●	15			ns
t_5	SCK Set-Up Before $\overline{CS}$ ↓		●	50			ns
t_6	SCK Hold After $\overline{CS}$ ↓		●			50	ns

Note 1: Absolute Maximum Ratings are those values beyond which the life of the device may be impaired.

Note 2: All voltage values are with respect to GND.

Note 3: V_{CC} = 2.7 to 5.5V unless otherwise specified.
$V_{REF} = REF^+ - REF^-$, $V_{REFCM} = (REF^+ + REF^-)/2$;
$V_{IN} = IN^+ - IN^-$, $V_{INCM} = (IN^+ + IN^-)/2$.

Note 4: F_O pin tied to GND or to V_{CC} or to external conversion clock source with f_{EOSC} = 153600Hz unless otherwise specified.

Note 5: Guaranteed by design, not subject to test.

Note 6: Integral nonlinearity is defined as the deviation of a code from a straight line passing through the actual endpoints of the transfer curve. The deviation is measured from the center of the quantization band.

Note 7: F_O = 0V (internal oscillator) or f_{EOSC} = 153600Hz ±2% (external oscillator).

Note 8: F_O = V_{CC} (internal oscillator) or f_{EOSC} = 128000Hz ±2% (external oscillator).

Note 9: The converter is in external SCK mode of operation such that the SCK pin is used as digital input. The frequency of the clock signal driving SCK during the data output is f_{ESCK} and is expressed in kHz.

Note 10: The converter is in internal SCK mode of operation such that the SCK pin is used as digital output. In this mode of operation the SCK pin has a total equivalent load capacitance C_{LOAD} = 20pF.

Note 11: The external oscillator is connected to the F_O pin. The external oscillator frequency, f_{EOSC}, is expressed in kHz.

Note 12: The converter uses the internal oscillator.
F_O = 0V or F_O = V_{CC}.

Note 13: The output noise includes the contribution of the internal calibration operations.

Note 14: Refer to Offset Accuracy and Drift in the Applications Information section.