

## Touchstone Semiconductor Short-Form Product Guide

[Touchstone Semiconductor Inc.](#) develops high-performance analog integrated circuit (IC) solutions that solve critical design issues for electronics companies. Touchstone Semi products achieve or exceed state-of-the-art analog performance while reducing standby power consumption. Our proprietary analog IC products offer a unique combination of features and performance that cannot be found elsewhere in the analog IC market. Our second-source products are fit-/form-/function and specification-identical to competitive offerings, providing an ideal alternative for hard-to-secure sole-sourced products.

### NEW Products Introduced since Jan 2013

[TS3310](#): A True 150-nA, 0.9-3.6VIN, Selectable 1.8-5VOUT, Dual-Output Instant-ON™ Boost Converter in a 10-pin TDFN22EP

[TS3300](#): A 0.6-4.5VIN, 1.8-5.25VOUT, 3.5-µA, Low Input Voltage, High-Efficiency Boost Converter + LDO in a 16-pin TQFN33EP

[TS1003](#): The Industry's Only 0.8V-5.5V, 0.6µA Operational Amplifier in a SC70-5 or SOT23-5

[TS1005](#): The Industry's Only 0.8V-5.5V, 1.3µA, 20kHz Operational Amplifier in a SC70-5 or SOT23-5

[TS3003](#): A 1.55V to 5V, 1.9µA, 9kHz – 300kHz Timer with External RSET in a 10-pin TDFN33EP

[TS3004](#): A 1.55V to 5V, 1.9µA, 3.3µs – 233s Extended-Range Timer with External RSET in a 10-pin TDFN33EP

[TS3005](#): A 1.55V to 5V, 1.35µA, 1.7ms – 33hr Extended-Range Timer with External RSET in a 10-pin TDFN33EP

[TS3006](#): A 1.55V to 5V, 1.9µA, 9kHz – 300kHz Simple Timer with External RSET in a 8-pin TDFN33EP

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Power Management Products



Part Number	V <sub>IN</sub> Range (V)	No Load I <sub>SY</sub> (μA)	Boost V <sub>OUT</sub> Range (V)	Boost Efficiency (%)	Output Current (mA)	External Components	Power Good Indicator	Package	Description
<a href="#">TS3310ITD1022</a>	0.9 – 3.6	0.15	1.8 – 5 Pin-Selectable	92	50	One Inductor + 3 Capacitors	Yes	10-pin TDFN22EP	A True 150-nA, 0.9-3.6VIN, 1.8-5VOUT, Always-ON & Instant-ON™ Boost Converter

Part Number	V <sub>IN</sub> Range (V)	No Load I <sub>SY</sub> (μA)	Boost V <sub>OUT</sub> Range (V)	Boost Efficiency (%)	Peak L Current (mA)	LDO V <sub>OUT</sub> Range (V)	LDO V <sub>OUT</sub> Accuracy (%)	LDO Dropout Voltage (V)	Package	Description
<a href="#">TS3300ITQ1633</a>	0.6 – 4.5	3.5	1.8 – 5.25	84	500	1.8 – 5	2.5	0.04	16-pin TQFN33EP	A 0.6-4.5VIN, 1.8-5.25VOUT, 3.5-μA, High-Eff. Boost + LDO



Easy-to-Use Silicon Oscillators/Timer Products

Part Number	V <sub>DD</sub> (min)	V <sub>DD</sub> (max)	I <sub>DD</sub> (max)	F <sub>OUT</sub> (or t <sub>FOUT</sub> ) Range (Hz,s)	t <sub>FOUT</sub> Drift (%/°C)	Package	Description
<a href="#">TS3001</a>	0.9V	1.8V	1μA	5k – 100k	0.021	TDFN22EP-8	A 1V/1μA Silicon Oscillator/Timer, with External RSET
<a href="#">TS3002</a>	0.9V	1.8V	1μA	5k – 290k	0.044	TDFN22EP-8	A 1V/1μA Silicon Oscillator/Timer, with External RSET/CSET
<a href="#">TS3003</a>	1.55V	5.25V	2.4μA	9k – 300k	0.02	TDFN33EP-10	A 1.55V to 5V, 1.9μA, 9kHz – 300kHz Timer with External RSET
<a href="#">TS3004</a>	1.55V	5.25V	2.4μA	3.3μs – 233s	0.02	TDFN33EP-10	A 1.55V to 5V, 1.9μA, 3.3μs – 233s Timer with External RSET
<a href="#">TS3005</a>	1.55V	5.25V	1.9μA	1.7ms – 33hr	0.02	TDFN33EP-10	A 1.55V to 5V, 1.35μA, 1.7ms – 33hr Timer with External RSET
<a href="#">TS3006</a>	1.55V	5.25V	2.4μA	9k – 300k	0.02	TDFN33EP-8	A 1.55V to 5V, 1.9μA, 9kHz – 300kHz Timer with External RSET

**Current-Sense Amplifier Products**

Part Number	Bi-Directional?	Gain Option	V <sub>CM</sub> (min)	V <sub>CM</sub> (max)	I <sub>CC</sub> (max)	V <sub>OS</sub> (max)	Gain Error	Package	Description
<a href="#">TSM9938T</a>	No	25V/V	1.6V	28V	1 μA	500μV	0.5%	SOT23-5	MAX9938T Alternate Source
<a href="#">TSM9938F</a>	No	50V/V	1.6V	28V	1 μA	500μV	0.5%	SOT23-5	MAX9938F Alternate Source
<a href="#">TSM9938H</a>	No	100V/V	1.6V	28V	1 μA	500μV	0.5%	SOT23-5	MAX9938H Alternate Source
<a href="#">TSM9938W</a>	No	200V/V	1.6V	28V	1 μA	500μV	0.5%	SOT23-5	MAX9938W Alternate Source
<a href="#">TSM9634T</a>	No	25V/V	1.6V	28V	1 μA	250μV	0.5%	SOT23-5	MAX9634T Alternate Source
<a href="#">TSM9634F</a>	No	50V/V	1.6V	28V	1 μA	250μV	0.5%	SOT23-5	MAX9634F Alternate Source
<a href="#">TSM9634H</a>	No	100V/V	1.6V	28V	1 μA	250μV	0.5%	SOT23-5	MAX9634H Alternate Source
<a href="#">TSM9634W</a>	No	200V/V	1.6V	28V	1 μA	250μV	0.5%	SOT23-5	MAX9634W Alternate Source
<a href="#">TS1100-25</a>	No	25V/V	2V	25V	1 μA	100μV	0.5%	SOT23-5	Ultra-low V <sub>OS</sub> Proprietary Current-Sense Amplifier
<a href="#">TS1100-50</a>	No	50V/V	2V	25V	1 μA	100μV	0.5%	SOT23-5	Ultra-low V <sub>OS</sub> Proprietary Current-Sense Amplifier
<a href="#">TS1100-100</a>	No	100V/V	2V	25V	1 μA	100μV	0.5%	SOT23-5	Ultra-low V <sub>OS</sub> Proprietary Current-Sense Amplifier
<a href="#">TS1100-200</a>	No	200V/V	2V	25V	1 μA	100μV	0.5%	SOT23-5	Ultra-low V <sub>OS</sub> Proprietary Current-Sense Amplifier
<a href="#">TS1102-25</a>	No	25V/V	2V	25V	1 μA	200μV	0.5%	SOT23-5	Low V <sub>OS</sub> Proprietary Current-Sense Amplifier
<a href="#">TS1102-50</a>	No	50V/V	2V	25V	1 μA	200μV	0.5%	SOT23-5	Low V <sub>OS</sub> Proprietary Current-Sense Amplifier
<a href="#">TS1102-100</a>	No	100V/V	2V	25V	1 μA	200μV	0.5%	SOT23-5	Low V <sub>OS</sub> Proprietary Current-Sense Amplifier
<a href="#">TS1102-200</a>	No	200V/V	2V	25V	1 μA	200μV	0.5%	SOT23-5	Low V <sub>OS</sub> Proprietary Current-Sense Amplifier
<a href="#">TS1101-25</a>	Yes	25V/V	2V	25V	1 μA	100μV	0.6%	SOT23-6	Ultra-low V <sub>OS</sub> Proprietary Bidirectional Current-Sense Amplifier
<a href="#">TS1101-50</a>	Yes	50V/V	2V	25V	1 μA	100μV	0.6%	SOT23-6	Ultra-low V <sub>OS</sub> Proprietary Bidirectional Current-Sense Amplifier
<a href="#">TS1101-100</a>	Yes	100V/V	2V	25V	1 μA	100μV	0.6%	SOT23-6	Ultra-low V <sub>OS</sub> Proprietary Bidirectional Current-Sense Amplifier
<a href="#">TS1101-200</a>	Yes	200V/V	2V	25V	1 μA	100μV	0.6%	SOT23-6	Ultra-low V <sub>OS</sub> Proprietary Bidirectional Current-Sense Amplifier
<a href="#">TS1103-25</a>	Yes	25V/V	2V	25V	1 μA	200μV	0.6%	SOT23-6	Low V <sub>OS</sub> Proprietary Bidirectional Current-Sense Amplifier
<a href="#">TS1103-50</a>	Yes	50V/V	2V	25V	1 μA	200μV	0.6%	SOT23-6	Low V <sub>OS</sub> Proprietary Bidirectional Current-Sense Amplifier
<a href="#">TS1103-100</a>	Yes	100V/V	2V	25V	1 μA	200μV	0.6%	SOT23-6	Low V <sub>OS</sub> Proprietary Bidirectional Current-Sense Amplifier
<a href="#">TS1103-200</a>	Yes	200V/V	2V	25V	1 μA	200μV	0.6%	SOT23-6	Low V <sub>OS</sub> Proprietary Bidirectional Current-Sense Amplifier

Operational Amplifier Products



Part Number	V <sub>DD</sub> (min)	V <sub>DD</sub> (max)	I <sub>DD</sub> per Amp (max)	V <sub>OS</sub> (max)	GBW (kHz)	A <sub>VO</sub> L (dB)	Slew Rate (V/ms)	Rail-to-Rail In/Out	Package	Description
<a href="#">TS1001</a>	0.65V	2.5V	1µA	3mV	4	90	1.5	Yes/Yes	SC70-5	The Only 0.8V/0.6µA Operational Amplifier
<a href="#">TS1002</a>	0.65V	2.5V	1µA	3mV	4	90	1.5	Yes/Yes	MSOP-8	Dual TS1001
<a href="#">TS1004</a>	0.65V	2.5V	1µA	3mV	4	90	1.5	Yes/Yes	TSSOP-14	Quad TS1001
<a href="#">TS1003</a>	0.8V	5.5V	1µA	3mV	4	90	1.5	Yes/Yes	SC70-5 SOT23-5	The Only 0.8V-5.5V, 0.6µA Operational Amplifier
<a href="#">TS1005</a>	0.8V	5.5V	2µA	3mV	20	90	7.5	Yes/Yes	SC70-5 SOT23-5	The Only 0.8V-5.5V, 1.3µA, 20kHz Operational Amplifier

Integrated Operational Amplifier + Comparator + Voltage Reference Products

Part Number	V <sub>DD</sub> (V) (min-max)	I <sub>DD</sub> (max)	Op Amp V <sub>OS</sub> (mV)	Internal Reference	Comparator t <sub>PD+</sub> /t <sub>PD-</sub> (typ)	Comparator Output Stage	Comparator Latch	Package	Description
<a href="#">TS12011ITD1022</a>	0.8-2.5	1.5µA	5	0.6V	20/20 µs	Push-Pull	Active LOW	10-pin TDFN22EP	Nanopower Reference, Op Amp, and Comparator IC
<a href="#">TS12012ITD1022</a>						Open-drain			

**Analog-to-Digital Products**

Part Number	V <sub>DD</sub> (min)	V <sub>DD</sub> (max)	I <sub>DD</sub>	INL (LSB)	DNL (LSB)	Throughput (kHz)	Analog Input	Package	Description
<a href="#">TS7001</a>	2.7V	3.6V	0.85mA	±1	±1	187.5	2xSE - Unipolar	MSOP8	Most power efficient, Single-supply, 12-bit, 187.5ksps, 2-ch, Serial-Output ADC with Integrated 2.5V VREF
<a href="#">TS7003</a>	2.7V	3.6V	0.95mA	±1	±1	300	SE - Unipolar	TDFN33EP-8	Lowest-power, Single-supply, 12-bit, 300ksps Serial-Output ADC with Integrated 2.5V VREF
<a href="#">TSM1285</a>	2.7V	3.6V	2.5mA	±1	±1	300	SE - Unipolar	SOIC8	MAX1285 Alternate Source
<a href="#">TSA7887A</a>	2.7V	5.25V	0.85mA	±2	±1	125	2xSE - Unipolar	SOIC8, MSOP8	AD7887A Alternate Source
<a href="#">TSA7887B</a>	2.7V	5.25V	0.85mA	±1	±1	125	2xSE - Unipolar	SOIC8	AD7887B Alternate Source

**Precision Voltage Reference Products**

Part Number	V <sub>OUT</sub> (V)	Initial Accuracy (%)	V <sub>OUT</sub> Drift (ppm/°C)	V <sub>IN</sub> (V, min)	V <sub>IN</sub> (V, max)	I <sub>CC</sub> (μA)	I <sub>OUT</sub> (μA)	0.1Hz to 10Hz Noise (μV <sub>PP</sub> )	Package	Description
<a href="#">TS6001A-2.5</a>	2.5	0.08	7	2.7	12.6	35	500	50	SOT23-3	High-accuracy, Very Low Drift Proprietary Voltage Reference
<a href="#">TS6001B-2.5</a>		0.16	10							
<a href="#">TSM6025A</a>	2.5	0.2	15	2.7	12.6	35	500	50	SOT23-3	MAX6025 Alternate Source
<a href="#">TSM6025B</a>		0.4	25							

**Nanopower Voltage Detector Products**

Part Number	V <sub>DD</sub> (V) (min- max)	I <sub>DD</sub> (μA)	Comparator tpd+/tpd-	Internal V <sub>HYS</sub> (mV)	Detect Threshold (V)	REF OUT (V)	Comp Latch	Comp Outputs	Package	Description
<a href="#">TS12001ITD1022</a>	0.65 – 2.5	1	35	±10	0.8V Fixed /Adjustable	0.6	Active LOW	Push-pull & Open-drain	10-pin TDFN22EP	A 0.65V/1uA Detector w/Dual Comparator Outputs + Latch



Analog Comparator + Voltage Reference Products

Part Number	V <sub>CC</sub> (min)	V <sub>CC</sub> (max)	I <sub>CC</sub> (max)	Internal Reference	Output Stage	V <sub>OS</sub> (max)	t <sub>PD+</sub> /t <sub>PD-</sub> (typ)	Package	Description
<b>Single Comparators</b>									
<a href="#">TS9001-1</a>	1.6V	5.5V	1 μA	+1.252V, ±1%, 10ppm/°C	Push-Pull	5 mV	25/12 μs	SC70-5	1.6V Nanopower Comparator + VREF
<a href="#">TS9001-2</a>	1.6V	5.5V	1 μA	+1.252V, ±1%, 10ppm/°C	Open-Drain	5 mV	21/12 μs	SC70-5	1.6V Nanopower Comparator + VREF
<a href="#">TSM9117</a>	1.6V	5.5V	1 μA	+1.252V ±1.75%	Push-Pull	5 mV	15/16 μs	SC70-5 SOIC8	MAX9117 Alternate Source
<a href="#">TSM9118</a>	1.6V	5.5V	1 μA	+1.252V ±1.75%	Open-Drain	5 mV	16/16 μs	SC70-5	MAX9118 Alternate Source
<a href="#">TSM9119</a>	1.6V	5.5V	1 μA	No	Push-Pull	5 mV	15/16 μs	SC70-5	MAX9119 Alternate Source
<a href="#">TSM9120</a>	1.6V	5.5V	1 μA	No	Open-Drain	5 mV	16/16 μs	SC70-5 SOIC8	MAX9120 Alternate Source
<a href="#">TSM917</a>	1.8V	5.5V	1.3 μA	+1.245V, ±1.5%	Push-Pull	5 mV	30/17 μs	SOT23-5 SOIC8	MAX917 Alternate Source
<a href="#">TSM921</a>	2.5V	11V	3.2 μA	1.182V, ±1%	Push-Pull	10 mV	4/4 μs	SOIC-8 MSOP-8	MAX921 Alternate Source
<a href="#">TSM971</a>	2.5V	11V	3.2 μA	1.182V, ±1%	Open-Drain	10 mV	---/4 μs	SOIC-8 MSOP-8	MAX971 Alternate Source
<a href="#">TSM931</a>	2.5V	11V	3.2 μA	1.182V, ±2%	Push-Pull	10 mV	4/4 μs	SOIC-8 MSOP-8	MAX931 Alternate Source

Analog Comparator + Voltage Reference Products

Part Number	V <sub>CC</sub> (min)	V <sub>CC</sub> (max)	I <sub>CC</sub> (max)	Internal Reference	Output Stage	V <sub>OS</sub> (max)	t <sub>PD+</sub> /t <sub>PD-</sub> (typ)	Package	Description
<b>Dual Comparators</b>									
<a href="#">TS9002</a>	2.5V	11V	4 μA	1.182V, ±0.75%	Push-Pull	3.5 mV	7/7 μs	MSOP-8	Improved MAX923 Dual Comparator/Ref
<a href="#">TSM922</a>	2.5V	11V	3.2 μA	No	Push-Pull	10 mV	4/4 μs	SOIC-8 MSOP-8	MAX922 Alternate Source
<a href="#">TSM972</a>	2.5V	11V	3.2 μA	No	Open-Drain	10 mV	---/4 μs	SOIC-8 MSOP-8	MAX972 Alternate Source
<a href="#">TSM923</a>	2.5V	11V	4.5 μA	1.182V, ±1%	Push-Pull	10 mV	4/4 μs	SOIC-8 MSOP-8	MAX923 Alternate Source
<a href="#">TSM973</a>	2.5V	11V	4.5 μA	1.182V, ±1%	Open-Drain	10 mV	---/4 μs	SOIC-8 MSOP-8	MAX973 Alternate Source

## Analog Comparator + Voltage Reference Products (continued)

Part Number	V <sub>CC</sub> (min)	V <sub>CC</sub> (max)	I <sub>CC</sub> (max)	Internal Reference	Output Stage	V <sub>OS</sub> (max)	t <sub>PD+</sub> /t <sub>PD-</sub> (typ)	Package	Description
<b>Dual Comparators</b>									
<a href="#">TSM932</a>	2.5V	11V	4.5 μA	1.182V, ±2%	Push-Pull	10 mV	4/4 μs	SOIC-8 MSOP-8	MAX932 Alternate Source
<a href="#">TSM933</a>	2.5V	11V	4.5 μA	1.182V, ±2%	Push-Pull	10 mV	4/4 μs	SOIC-8 MSOP-8	MAX933 Alternate Source
<a href="#">TSM982</a>	2.5V	11V	6 μA	1.182V, ±2%	Open-Drain	10 mV	---/4 μs	SOIC-8 MSOP-8	MAX982 Alternate Source
<b>Quad Comparators</b>									
<a href="#">TS9004</a>	2.5V	11V	5.1 μA	1.182V, ±1%	Push-Pull	4.5 mV	7/7 μs	SOICN-16	Improved MAX934 Qual Comparator/Ref
<a href="#">TSM924</a>	2.5V	11V	6.5 μA	1.182V, ±1%	Push-Pull	10 mV	4/4 μs	SOICN-16	MAX924 Alternate Source
<a href="#">TSM934</a>	2.5V	11V	6.5 μA	1.182V, ±2%	Push-Pull	10 mV	4/4 μs	SOICN-16	MAX934 Alternate Source
<a href="#">TSM984</a>	2.5V	11V	6.5 μA	1.182V, ±2%	Open-Drain	10 mV	---/4 μs	SOICN-16	MAX984 Alternate Source

Maxim or ADI Part Number	Touchstone Part Number	Function	Pin Compatible to Maxim/ADI?	Spec and Functionally Identical to Maxim/ADI?
AD7887A	TSA7887A	12-bit SAR ADC	YES!	YES!
AD7887B	TSA7887B	12-bit SAR ADC	YES!	YES!
MAX1285B	TSM1285B	12-bit SAR ADC	YES!	YES!
MAX6025A	TSM6025A	2.5-V Reference	YES!	YES!
MAX6025B	TSM6025B	2.5-V Reference	YES!	YES!
MAX9938T	TSM9938T	CSA, G=25	YES!	YES!
MAX9938F	TSM9938F	CSA, G=50	YES!	YES!
MAX9938H	TSM9938H	CSA, G=100	YES!	YES!
MAX9938W	TSM9938W	CSA, G=200	YES!	YES!
MAX9634T	TSM9634T	CSA, G=25	YES!	YES!
MAX9634F	TSM9634F	CSA, G=50	YES!	YES!
MAX9634H	TSM9634H	CSA, G=100	YES!	YES!
MAX9634W	TSM9634W	CSA, G=200	YES!	YES!
MAX9117	TSM9117	Comparator + Ref	YES!	YES!
MAX9118	TSM9118	Comparator + Ref	YES!	YES!
MAX9119	TSM9119	Comparator Only	YES!	YES!
MAX9120	TSM9120	Comparator Only	YES!	YES!
MAX917	TSM917	Comparator + Ref	YES!	YES!
MAX921	TSM921	Comparator + Ref	YES!	YES!
MAX922	TSM922	Comparator Only	YES!	YES!
MAX923	TSM923	Comparator + Ref	YES!	YES!
MAX924	TSM924	Comparator + Ref	YES!	YES!
MAX931	TSM931	Comparator + Ref	YES!	YES!
MAX932	TSM932	Comparator + Ref	YES!	YES!
MAX933	TSM933	Comparator + Ref	YES!	YES!
MAX934	TSM934	Comparator + Ref	YES!	YES!
MAX971	TSM971	Comparator + Ref	YES!	YES!
MAX972	TSM972	Comparator Only	YES!	YES!
MAX973	TSM973	Comparator + Ref	YES!	YES!
MAX982	TSM982	Comparator + Ref	YES!	YES!
MAX984	TSM984	Comparator + Ref	YES!	YES!

**And many more to come!**