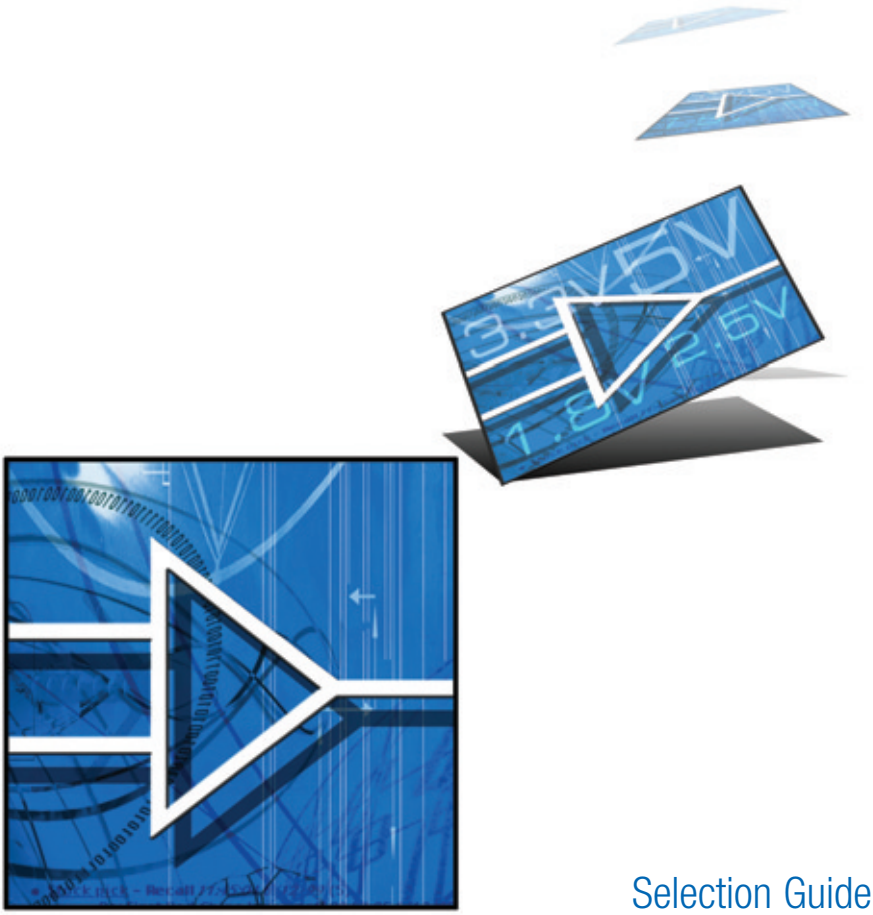
Standard Linear Portfolio

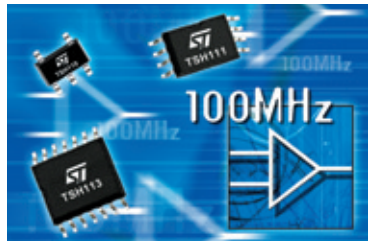
From innovative devices to application specific products



Selection Guide

STMicroelectronics

More Intelligent Solutions



RAIL TO RAIL OP-AMPS

INPUT & OUTPUT

1.8V Supply Low Power

TS1851 single, Icc = 120µA, SOT23-5
TS1852 dual, Icc = 120µA
TS1854 quad, Icc = 120µA
TS1871 single, Icc = 400µA, SOT23-5
TS1872 dual, Icc = 400µA
TS1874 quad, Icc = 400µA

Low Noise High Output Current

TS921 single, Iout = 80mA
TS922 dual, Iout = 80mA
TS924 quad, Iout = 80mA
TS925 quad + standby + phantom ground, Iout = 80mA
TS951 single, Iout = 22mA, SOT23-5
TS952 dual, Iout = 22mA
TS954 quad, Iout = 22mA
TS982* dual, Iout = 150mA

Precision

TS922A dual, 0.9mV max
TS924A quad, 0.9mV max
TS925A quad + standby + phantom ground, 0.9mV max

CMOS Low Power

TS902 dual, Icc = 200µA, standby
TS912 dual, Icc = 200µA
TS914 quad, Icc = 200µA

OUTPUT

Micropower

TS931 single, Icc = 20µA, SOT23-5
TS932 dual, Icc = 20µA
TS934 quad, Icc = 20µA
TS941 single, Icc = 1.2µA, SOT23-5
TS942 dual, Icc = 1.2µA
TS944 quad, Icc = 1.2µA

Low Noise

TS461 single, 4nV/$\sqrt{Hz}$, SOT23-5
TS462 dual, 4nV/$\sqrt{Hz}$
TS464 quad, 4nV/$\sqrt{Hz}$
TS971 single, 4nV/$\sqrt{Hz}$, SOT23-5
TS972 dual, 4nV/$\sqrt{Hz}$
TS974 quad, 4nV/$\sqrt{Hz}$

Mixed Part

TSM221 2 Rail to Rail Op-Amps + 2 Comparators

PRECISION OP-AMPS

OP07 single, 0.15mV max
TEB1033 dual, 1.0mV max
TS512 dual, 0.5mV max
TS514 quad, 0.5mV max
TS522 dual, 0.85mV max
TS524 quad, 0.95mV max

HIGH SPEED OP-AMPS

VOLTAGE FEEDBACK

TSH70 single, 70MHz, SOT23-5
TSH71 single, 70MHz, 1 standby
TSH72 dual, 70MHz
TSH73 triple, 70MHz, 3 standby
TSH74 quad, 70MHz
TSH75 quad, 70MHz, 2 standby
TSH150 single, 150MHz
TSH151 single, 150MHz
TSH31 single, 280MHz
TSH321 single, 300MHz
TSH93 triple, 150MHz
TSH94 quad, 150MHz, standby
TSH95 quad, 150MHz, standby
TSH10 single, 140MHz
TSH11 single, 120MHz

CURRENT FEEDBACK

TSH110 single, low noise, 100MHz, SOT23-5
TSH111 single, low noise, 100MHz, standby
TSH112 dual, low noise, 100MHz
TSH113 triple, low noise, 100MHz, standby
TSH114 quad, low noise, 100MHz

ADSL

Line Drivers

TS612 high output current, large bandwidth, very low distortion, SO20 batwing
TS613 high output current, large bandwidth, very low distortion, SO8 exposed-pad
TS615 low consumption, very large bandwidth, TSSOP14 exposed-pad for ADSL & VDSL
TS616* low noise, wide band, high output current
TS634 for Centaurus & Unicorn chipset
TS635 for Centaurus chipset

Line Receivers

TS636 for Centaurus & Unicorn chipset
TS652 dual variable gain low noise amplifier

LOW NOISE OP-AMPS

LM833 dual, 4.5nV/$\sqrt{Hz}$
LS204 dual, 8nV/$\sqrt{Hz}$
LS404 quad, 8nV/$\sqrt{Hz}$
MC33078 dual, 4.5nV/$\sqrt{Hz}$
MC33079 quad, 4.5nV/$\sqrt{Hz}$
MC4558 dual, 12nV/$\sqrt{Hz}$
TDA2320A stereo amplifier

Icc (Consumption current) is per amplifier
*** Next Releases**
**** Under development**

GENERAL PURPOSE OP-AMPS

BIPOLAR

LM201/301A	single,	Icc = 1.8mA
LM224/324(A)	quad,	Icc = 170µA
LM246/346	quad,	Icc = 170µA
LM248/348	quad,	Icc = 0.5mA
LM258/358(A)	dual,	Icc = 350µA
LM2902	quad,	Icc = 170µA
LM2904	dual,	Icc = 170µA
MC1458	dual,	Icc = 1.15mA
MC3403	quad,	Icc = 0.7mA
TS321	single,	Icc = 300µA, SOT23-5
TSH22	dual,	Icc = 2.15mA
TSH24	quad,	Icc = 2.15mA
UA741	single,	Icc = 1.7mA
UA748	single,	Icc = 1.8mA

Low Power

MC33171	single,	Icc = 200µA
MC33172	dual,	Icc = 200µA
MC33174	quad,	Icc = 200µA

JFET

LF247/347	quad,	Icc = 1.4mA
LF251/351	single,	Icc = 1.4mA
LF253/353	dual,	Icc = 1.4mA
TL071	single,	Icc = 1.4mA
TL072	dual,	Icc = 1.4mA
TL074	quad,	Icc = 1.4mA
TL081	single,	Icc = 1.4mA
TL082	dual,	Icc = 1.4mA
TL084	quad,	Icc = 1.4mA

Low Power

TL061	single,	Icc = 200µA
TL062	dual,	Icc = 200µA
TL064	quad,	Icc = 200µA

CMOS

TS272	dual,	Icc = 1mA
TS274	quad,	Icc = 1mA

Low Power

TS271	single, programmable,	Icc = 10µA,150µA, 800µA
TS27L2	dual,	Icc = 10 µA
TS27L4	quad,	Icc = 10 µA
TS27M2	dual,	Icc = 150 µA
TS27M4	quad,	Icc = 150 µA

POWER AUDIO AMPLIFIERS

TS419* 300mW mono amplifier, active-high standby
TS420* 300mW mono amplifier, active-low standby
TS482 100mW stereo headphone amplifier
TS4851* Loudspeaker & headset driver with volume control, FlipChip
TS4855* Dedicated driver with volume control, FlipChip
TS486* 100mW stereo headphone amplifier, active-low standby
TS487* 100mW stereo headphone amplifier, active-high standby
TS4871 1W, BTL, active-high standby
TS4872 1W, BTL, active-high standby, FlipChip
TS4890 1W, BTL, active-low standby
TS4900 300mW, BTL, active-high standby
TS4902 300mW, BTL, active-low standby
TS4972 1.2W, BTL, active-high standby, FlipChip
TS4973** 1.2W, BTL, active-low standby with 2 audio inputs, FlipChip
TS4990** 1W, BTL, active-low standby, FlipChip

POWER MANAGEMENT

BATTERY CHARGER & ADAPTER ICs

TSM100 1 Op-Amp + 1 Comparator
TSM101 2 ORed Op-Amps + 1% VRef + 1.4mA Current source
TSM102 2 Op-Amps + 2 Comparators + 0.4% VRef adj
TSM103 1 Op-Amp + 1 Comparator + 0.4% VRef
TSM104 4 Op-Amps + 0.4% VRef
TSM105 Linear mode current & voltage controller, SOT23-5
TSM108 Switching mode current & voltage controller, automotive
TSM109* Dual Comparator & VRef
TSM1051 Linear mode current & voltage controller, SOT23-6

HOUSEKEEPING ICs

TSM111 SMPS secondary supervisor
TSM112 SMPS secondary supervisor
TSM121 SMPS secondary supervisor + PWM H-Bridge controller
TSM1121* Over voltage protection for 3.3V, 5V & 12V

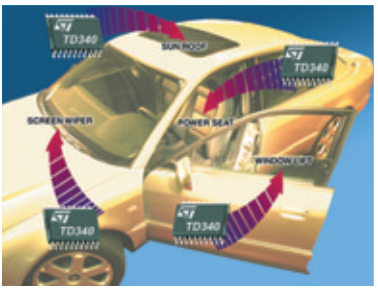
POWER MOSFET DRIVERS

Triple MOSFET Drivers
TD310 0.6A/ch, UVLO, Op-Amps + Comparator + Standby

Full Bridge Driver - DC Motor Control
TD340 µC interface, regulator, watchdog, reset

ELECTRONIC CIRCUIT BREAKER

TD230 60mV, 3µs, soft start, remote control



COMPARATORS

MICROPOWER (<10µA/op)

Open Drain

TS339	quad, CMOS
TS393	dual, CMOS
TS3V339	quad, CMOS
TS3V393	dual, CMOS

Push Pull

TS3702	dual, CMOS
TS3704	quad, CMOS
TS3V3702	dual, CMOS
TS3V3704	quad, CMOS

Rail to Rail

TS7211	single, BiCMOS, push pull, SOT23-5
TS861	single, BiCMOS, push pull, SOT23-5
TS862	dual, BiCMOS, push pull
TS864	dual, BiCMOS, push pull

GENERAL PURPOSE

Open Emitter and Collector

LM311	single, bipolar

High Speed (tre = 80ns)

LM319	dual, bipolar

Open Collector Low Power (<200µA/op)

LM2901	quad, bipolar
LM2903	dual, bipolar
LM339	quad, bipolar
LM393	dual, bipolar
TS391	single, bipolar, SOT23-5

Open drain Low Power (<200µA/op)

TS372	dual, CMOS
TS374	quad, CMOS

VOLTAGE REFERENCES

MICROPOWER

TS4040-2.5	2.5V fixed, shunt, 2%, 1%, SOT23-3
TS4041-1.2	1.225V fixed, shunt, 2%, 1%, 0.5%, SOT23-3
TS431	1.24 to 6V adj, shunt, 1%, 2%
TS432*	1.24 to 10VAdj, shunt, 1%, 0.5%, SOT23-3
TS821	1.225V fixed, shunt, 2%, 1%, 0.5%, SOT23-3
TS822	2.5V fixed, shunt, 2%, 1%, SOT23-3
TS824-1.2	1.225V fixed, shunt, 1%, SOT23-3
TS824-2.5	2.5V fixed, shunt, 1%, 0.5%, SOT23-3

GENERAL PURPOSE

LM336	2.5V fixed, shunt, 2%, 1%
MC1403	2.5V fixed, series, 1%
TL1431	2.5 to 36V adj, shunt, 0.4%, 0.25%
TL431	2.5 to 36V adj, shunt, 2%, 1%
TS2431	2.5 to 24V adj, shunt, 2%, 1%, 0.5%, SOT23-3

THERMAL SENSORS

LM334	1µA to 10mA adj
LM335	10mV/°K, 1°K initial accuracy

TIMERS

LOW POWER (max freq: 2.7MHz)

TS555	single
TS556	dual
TS3V555	single
TS3V556	dual

GENERAL PURPOSE

NE555	single
NE556	dual

RF & COMMUNICATION

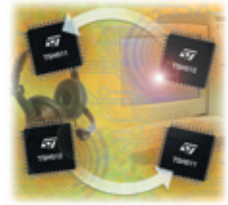
TSH690	Wide band amplifier (13.5dBm, 28dB @ 900MHz)
TSH511	Hifi stereo infrared transmitter
TSH512	Hifi stereo infrared receiver

RESET CIRCUITS MICROPOWER

TS831-3/4/5	reset active low, Vthr. = 4.5V, 4.33V, 2.7V
TS834-5	reset active low, Vthr. = 4.33V
TS836-4	reset active high, Vthr. = 4.5V

DATA CONVERSION

TSA0801	8bits, 40Msps, 40mW, 2.5V, TQFP48
TSA1001	10bits, 25Msps, 35mW, 2.5V, TQFP48
TSA1002	10bits, 50Msps, 50mW, 2.5V, TQFP48
TSA1201	12bits, 50Msps, 150mW, 2.5V, TQFP48
TSA1203	dual-12bits, 40Msps, 150mW, 2.5V, TQFP48
TSA1204	dual-12bits, 20Msps, 120mW, 2.5V, TQFP48



RF & COMMUNICATION

Part Numbers	Comments	Temp. range °C	Package	Icc mA	Vcc Range V	Freq Range MHz	Gain @450MHz dB	Gain @900MHz dB	P1dB @3V dBm	Matching Ohm
TSH690	Bipolar wide band amplifier, driver stage	I	SO8	46	1.5 to 5	40MHz to 1GHz	28	20	+13.5	50 IN/OUT

TRANSMITTERS, RECEIVERS, TRANSCEIVERS

Part Numbers	Comments	Temp. range °C	Package	Icc mA	Vcc Range V	Freq Range MHz	Input Data	Output Data	Misc.
TSH511	Dual FM receiver with audio amplifiers	C	TQFP44	15 (stereo) 9.5 (mono)	2.3 to 5.5	0.4 to 11	5µV sensitivity @ 12dB Sinad	2x20mW audio power into 16 ohms	Built-in SQUELCH
TSH512	Dual FM transmitter	C	TQFP44	16 (stereo) 10 (mono)	2.3 to 5.5	0.4 to 11	ALC on each audio input	1.3Vpp @ 2.8MHz	VOX (Voice Operated Transmission)

MICROPOWER RESET GENERATORS

Part Numbers	Temp. range	Packages °C	Technology µA	Icc max	Vcc Voltage V	Threshold V	Output	Reset	Timer ms	Comments
TS831-3	I	SO8/TO92/TSSOP8	CMOS	12	12	2.7	Open drain	Low	none	Output active low
TS831-4	I	SO8/TO92/TSSOP8	CMOS	12	12	4.5	Open drain	Low	none	Output active low
TS831-5	I	SO8/TO92/TSSOP8	CMOS	12	12	4.33	Open drain	Low	none	Output active low
TS834-5	I	SO8/TSSOP8	CMOS	15	12	4.33	Open drain	Low and High	250	Output active low & high - enable function on timer
TS836-4	I	SO8/TO92/TSSOP8	CMOS	12	12	4.5	Open drain	High	none	Output active high

DATA CONVERSION

Part Numbers	Package	Resolution b	FS Msps	Consumption mW	Power Supply V	Effective Bandwidth MHz	ENOB at FS b note 1	SFDR at FS dBc note 2	THD at FS dBc note 1	SINAD at FS dB note 1
TSA0801	TQFP48	8	40	40	2.5	60	7.97	-68	-72.5	48.7
TSA1001	TQFP48	10	25	35	2.5	60	9.7	-80.5	-79.5	59
TSA1002	TQFP48	10	50	50	2.5	60	9.76	-79.2	-77.8	59.4
TSA1201	TQFP48	12	50	150	2.5	90	10.5	-77.2	-74.3	64.4
TSA1203	TQFP48	2 X 12	40	230	2.5	70	10.3	-68.3	-66.6	62.8
TSA1204	TQFP48	2 X 12	20	120	2.5	70	11.2	-81.5	-80	68

Note 1: Fin=5MHz for TSA0801/1001/1002 - Fin=15MHz for TSA1201/1203
Note 2: Fin=5MHz for TSA0801/1001/1002 - Fin=15MHz for TSA1201 - Fin=10MHz for TSA1203/1204

LOW NOISE OP-AMPS

Part Numbers	Comments	Nbr of Operators	Temp. range °C note 1	Icc typ. per amp mA	Vcc min. V	Vcc max. V	Vio max mV note 2	GBP MHz	Slew Rate (SR) note 2	ISC (Short Circuit Current)	Input Capability	Output Capability	Bias Current level (Iib max.) note 3
LM833	Very low noise & low distortion (0.002%)	2	I	2	5	30	5	15	7	20	STD	STD	4=High (Bipolar, High Speed)
LS204/404	Low noise & low distortion (0.01%)	2/4	C	0.35	6	36	2.5/3.5	3	1.5	23	STD	STD	3=Medium (Bipolar)
MC33078/9	Very low noise & low distortion (0.002%)	2/4	I	2	5	30	2/2.5	15	7	29	STD	STD	3=Medium (Bipolar)
MC4558	Very low noise & low distortion (0.008%)	2	I	1.15	4	44	5	5.5	2.2	20	STD	STD	3=Medium (Bipolar)
TDA2320A	Stereo preamplifier - single supply	2	I	2	3	30	5	2.5	1.6		STD	STD	3=Medium (Bipolar)

GENERAL PURPOSE OP-AMPS

Part Numbers	Comments	Nbr of Operators	Temp. range °C note 1	Icc typ. per amp mA	Vcc max. V	Vio max mV note 2	GBP MHz	Slew Rate (SR) note 2	ISC (Short Circuit Current)	Input Capability	Output Capability	Bias Current level (Iib max.) note 3
LF247/347	JFET inputs, low input bias & offset current, (15nV/√Hz & 0.01%)	4	C,I	1.4	36	10	4	16	40	Single S+	STD	2=Low (JFET)
LF251/351	JFET inputs, low input bias & offset current, (15nV/√Hz & 0.01%)	1	C,I	1.4	36	10	4	16	40	Single S+	STD	2=Low (JFET)
LF253/353	JFET inputs, low input bias & offset current, (15nV/√Hz & 0.01%)	2	C,I	1.4	36	10	4	16	40	Single S+	STD	2=Low (JFET)
LM2902/4	Low power, Bipolar Op-amp	4/2	I	0.17	32	7	4	16	40	Single S-	Single S-	3=Medium (Bipolar)
LM201A/301A	Input & Output overload protection, low input offset current	1	C,I	1.8	44	2/7.5	1.1/1	0.6/0.5	30	STD	STD	3=Medium (Bipolar)
LM224/324	Low power, low input bias current	4	C,I	0.17	30	5	1/1.3	0.5/0.4	40	Single S-	Single S-	3=Medium (Bipolar)
LM224A/324A	Low power, low input bias current	4	C,I	0.17	30	3	1.3	0.4	40	Single S-	Single S-	3=Medium (Bipolar)
LM246/346	Programmable amplifier	4	C,I	0.25	44	5	1.3/1	0.4/0.5	20	STD	STD	3=Medium (Bipolar)
LM248/348	Four UA741	4	C,I	0.5	44	5	1/1.3	0.5	25	STD	STD	3=Medium (Bipolar)
LM258/358	Low input bias current	2	C,I	0.35	32	5	1.3/1.1	0.5/0.6	40	Single S-	Single S-	3=Medium (Bipolar)
LM258A/358A	Low input bias current	2	C,I	0.35	32	7	1.3/1.1	0.5/0.6	40	Single S-	Single S-	3=Medium (Bipolar)
MC1458	Wide input common mode voltage range	2	C,I	2.3	44	5	3	1.5	20	STD	STD	3=Medium (Bipolar)
MC33171/2/4	Low consumption versus speed	1/2/4	I	0.20	44	4.5	1/2.1	0.8/2	6	Single S-	STD	3=Medium (Bipolar)
MC3403	Quad enhanced UA741 version with lower consumption	4	C,I	0.7	36	5	2.1	2	30	Single S-	STD	3=Medium (Bipolar)
TL061/2/4	JFET inputs, low input bias current	1/2/4	C,I	0.2	36	6	1/2.5	0.5/1.6/3.5		Single S+	STD	2=Low (JFET)
TL071/2/4	JFET inputs, low input bias current	1/2/4	C,I	1.4	36	6	1/4	3.5/16	40	Single S+	STD	2=Low (JFET)
TL081/2/4	JFET inputs, low input bias current	1/2/4	C,I	1.4	36	6	4	16	40	Single S+	STD	2=Low (JFET)
TS271	Micropower, programmable Op-Amp	1	C,I	prog.	16	10	4	16	60	Single S-	Single S-	1=Very Low (CMOS)
TS272/4	Micropower, wide range of input offset voltage	2/4	C,I	1	16	10	4/prog.	16/prog.	60	Single S-	Single S-	1=Very Low (CMOS)
TS27L2/4	Micropower, wide range of input offset voltage	2/4	C,I	0.01	16	10	3.5	5.5	60	Single S-	Single S-	1=Very Low (CMOS)
TS27M2/4	Micropower, wide range of input offset voltage	2/4	C,I	0.15	16	10	0.1	0.04	60	Single S-	Single S-	1=Very Low (CMOS)
TS321	Single LM324, LM358 enhanced version with lower supply voltage	1	I	0.3	30	4	1	0.6	40	Single S-	Single S-	3=Medium (Bipolar)
TSH22/4	Very low distortion (0.003% at f=1kHz)	2/4	I	2.15	30	2.5	1/0.8	0.6/0.4	37	Single S-	STD	4=High (Bipolar, High Speed)
UA741	Wide applications range	1	C,I	1.7	44	5	25	15	25	STD	STD	3=Medium (Bipolar)
UA748	Wide applications range	1	C,I	1.8	44	2	25	15	30	STD	STD	3=Medium (Bipolar)

Note 1: T° Range
Commercial: 0/70°C, -20/70°C, -40/85°C
Industrial -40/85°C, -40/105°C, -40/125°C

Note 2
Multiple grades are indicated with "/"

Note 3: Bias Current Level
1=Very Low (CMOS)
2=Low (JFET)
3=Medium (Bipolar)
4=High (Bipolar, High Speed)

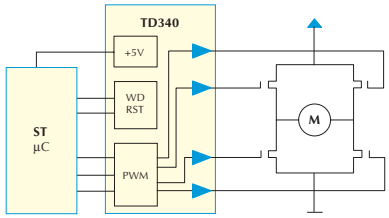
POWER AUDIO AMPLIFIERS

Part Numbers	Comments	Temp. range °C	Package	Pout	Shutdown level nA	Shutdown current (typ.) mA	Icc at 5V	PSRR @ 5V dB note 1	Mono/ Stereo	Output Type	Supply Voltage V
TS4871	Audio power amplifier with active high standby mode	I	SO8/miniSO8	1 W @ Vcc= 5V / RL=8 ohms, THD+N=1%	High	10	6	75	Mono	BTL	2.5 to 5.5
TS4872	Audio power amplifier with active high standby mode	I	Flip Chip (4.6 mm^2) 8 bumps - 170µm	1 W @ Vcc= 5V / RL=8 ohms, THD+N=1%	High	10	6	75	Mono	BTL	2.2 to 5.5
TS4972	Audio power amplifier with active high standby mode	I	Flip Chip (3.61 mm^2) 8 bumps - 300µm	1.2 W @ Vcc= 5V / RL=8 ohms, THD+N=1%	High	10	6	75	Mono	BTL	2.5 to 5.5
TS4890	Audio power amplifier with active low standby mode	I	SO8/miniSO8	1 W @ Vcc= 5V / RL=8 ohms, THD+N=1%	Low	10	6	77	Mono	BTL	2.2 to 5.5
TS4900	Audio power amplifier with active high standby mode	I	SO8/miniSO8	0.7 W @ Vcc= 5V / RL=8 ohms, THD+N=1%	High	10	6	75	Mono	BTL	2.5 to 5.5
TS4902	Audio power amplifier with active low standby mode	I	SO8/miniSO8	0.7 W @ Vcc= 5V / RL=8 ohms, THD+N=1%	Low	10	6	77	Mono	BTL	2.2 to 5.5
TS482	Stereo 100mW headphone driver	I	SO8/miniSO8	100 mW @ Vcc= 5V / RL=16 ohms, THD+N=0.1%	N/A	N/A	5.5	85	Stereo	Single Ended	2 to 5.5

Note 1
200mV rms ripple, f=217Hz, gain=2

POWER MOSFET DRIVERS

Part Numbers	Comments	Icc (typ) mA	Vcc Range V	Stand by µA	UVLO V	Iout sink/source mA
TD310	Triple Mosfet/IGBT driver + Current sense comparator + Op-Amp	1.5	4/16	30	12.5V adj.	600 peak mA
TD340	H-Bridge Power Mosfet Driver + 5V regulator + Reset & Watchdog circuit	4.5	6.5/18.5	180	6.2	100/50



TD340 Thanks to its 5V regulator and watchdog/reset circuits, the TD340 enables you to build a complete DC motor control system with only a few parts.

ELECTRONIC CIRCUIT BREAKER

Part Numbers	Comments	Icc (typ) mA	Vcc Range V	Remote Ctrl	Vsense mV	Step up (Vcc) V	Response Time µs	Soft Start (Gate Change) µA	Timing Thres. V
TD230	Dual MOSFET driver - Remote control - Live insertion	2.3	-4.5/-18 to +2.7/+18	TTL compatible	63	+13.4	8	15	1.2

COMPARATORS

MICROPOWER

Part Numbers	Comments	Temp. range °C	Package	Nbr of Operators	Technology	Icc/op (typ.) µA	Vcc max V	Vio max (25°C) mV	Response Time µs
TS339	Open drain - micropower	I	DIP14/SO14/TSSOP14	4	CMOS	9	16	5	1.5
TS393	Open drain - micropower	I	DIP8/SO8/TSSOP8	2	CMOS	10	16	5	1.5
TS3V339	Open drain - specified at 3V	I	DIP14/SO14	4	CMOS	9	16	5	1.5
TS3V393	Open drain - specified at 3V	I	DIP8/SO8	2	CMOS	9	16	5	1.5
TS3702	Push pull - micropower	I	DIP8/SO8/TSSOP8	2	CMOS	9	16	5	1.5
TS3704	Push pull - micropower	I	DIP14/SO14/TSSOP14	4	CMOS	9	16	5	1.2
TS3V3702	Push pull - specified at 3V	I	DIP8/SO8/TSSOP8	2	CMOS	7	16	5	1.5
TS3V3704	Push pull - specified at 3V	I	DIP14/SO14	4	CMOS	7	16	5	1.2
TS7211	Rail to Rail push pull - micropower	I	SOT23-5	1	BiCMOS	6	10	7	0.5
TS861	Rail to Rail push pull - micropower	I	DIP8/SO8/SOT23-5	1	BiCMOS	6	10	7	0.5
TS862	Rail to Rail push pull - micropower	I	DIP8/SO8/TSSOP8	2	BiCMOS	6	10	7	0.5
TS864	Rail to Rail push pull - micropower	I	DIP14/SO14/TSSOP14	4	BiCMOS	6	10	7	0.5

GENERAL PURPOSE

Part Numbers	Comments	Temp. range °C	Package	Nbr of Operators	Technology	Icc/op (typ.) µA	Vcc max V	Vio max (25°C) mV	Response Time µs
LM311	Open emitter and collector	C	DIP8/SO8	1	BIPOLAR	5000	36	7.5	0.2
LM319	High speed	C	DIP14/SO14	2	BIPOLAR	8000	36	8	0.08
LM2901	Open collector - low power	I	DIP14/SO14/TSSOP14	4	BIPOLAR	275	36	7	1.3
LM2903	Open collector - low power	I	DIP8/SO8/TSSOP8	2	BIPOLAR	200	36	7	1.3
LM339	Open collector - low power	C	DIP14/SO14/TSSOP14	4	BIPOLAR	275	36	2/5	1.3
LM393	Open collector - low power	C	DIP8/SO8/TSSOP8	2	BIPOLAR	200	36	5	1.3
TS391	Open collector - low power	I	SOT23-5	1	BIPOLAR	200	36	5	1.3
TS372	Open drain - low power	I	DIP8/SO8	2	CMOS	150	16	10	0.6
TS374	Open drain - low power	I	DIP14/SO14	4	CMOS	150	16	10	0.6

RAIL TO RAIL OP-AMPS

Part Numbers	Comments	Nbr of Operators	Temp. range °C note 1	Icc typ. per amp mA	Vcc min. V	Vcc max. V	Vio max mV note 2	GBP MHz	Slew Rate (SR) note 2	ISC (Short Circuit Current)	Input Capability	Output Capability	Bias Current level (Iib max.) note 3
TS1851/2/4	1.8V min. voltage supply, micropower	1/2/4	I	0.12	1.8	6	3	0.48	0.2	40	RR	RR	3=Medium (Bipolar)
TS1871/2/4	1.8V min. voltage supply, micropower	1/2/4	I	0.40	1.8	6	3	1.6	0.54	65	RR	RR	3=Medium (Bipolar)
TS461/2/4	TS321, LM324, LM358 replacement in low voltage applications	1/2/4	C	2	2.7	12	5	10	4	1.5	STD	RR	3=Medium (Bipolar)
TS902	Low power with standby mode, CMOS inputs	2	I	0.2	2.7	16	5	0.8	0.5	40	RR	RR	1=Very Low (CMOS)
TS912/4	Low power with CMOS inputs	2/4	I	0.2	2.7	16	5	0.8	0.4/0.5	40	RR	RR	1=Very Low (CMOS)
TS921/2/4/5	Excellent audio performance, low distortion (0.005%), TS925 with standby mode	1/2/4	I	1	2.7	12	3/0.9	4	1.3	80	RR	RR	3=Medium (Bipolar)
TS931/2/4	Micropower amplifier with CMOS inputs	1/2/4	I	0.02	2.7	10	5	0.1	0.05	1.5	Single S-	RR	1=Very Low (CMOS)
TS941/2/4	Ultra-micropower amplifier with CMOS inputs	1/2/4	I	0.0012	2.7	10	5	0.01	0.004	1.5	Single S-	RR	1=Very Low (CMOS)
TS951/2/4	Real Input & Output Rail to Rail, low distortion (0.01%)	1/2/4	I	0.9	2.7	12	6	3	1	22	RR	RR	3=Medium (Bipolar)
TS971/2/4	High performance, suitable for battery powered applications	1/2/4	I	2	2.7	12	5	12	4	1.5	STD	RR	3=Medium (Bipolar)
TS982*	Rail to Rail High Output Current Dual Op-Amp	2	I	5	2	6	3	4	0.7	120	RR	RR	3=Medium (Bipolar)
TSM221	Dual Rail to Rail Op Amps + Dual CMOS Comparator		I	0.5	2.7		10	1	0.7				

PRECISION OP-AMPs

Part Numbers	Comments	Nbr of Operators	Temp. range °C note 1	Icc typ. per amp mA	Vcc min. V	Vcc max. V	Vio max mV note 2	GBP MHz	Slew Rate (SR) note 2	ISC (Short Circuit Current)	Input Capability	Output Capability	Bias Current level (Iib max.) note 3
OP07C	Very low offset, Bipolar Op-amp	1	I	5		6	30	0.15	0.5	0.17		STD	STD 3=Medium (Bipolar)
TEB1033	Low noise & distortion (8nV/$\sqrt{Hz}$ & 0.008%)	2	C	0.5		6	30	1	2	1	23	STD	STD 3=Medium (Bipolar)
TS512/4	Low noise & distortion (8nV/$\sqrt{Hz}$ & 0.03%)	2/4	I	0.3		6	30	2.5	3	1.5	23/13	STD	STD 3=Medium (Bipolar)
TS522/4	Very low noise suitable for audio applications (4.5nV/$\sqrt{Hz}$)	2/4	I	2		5	30	0.85/0.95	15	7	29	STD	STD 3=Medium (Bipolar)

HIGH SPEED OP-AMPs

Part Numbers	Comments	Nbr of Operators	Temp. range °C note 1	Icc typ. per amp mA	Vcc min. V	Vcc max. V	Vio max mV note 2	GBP MHz	Slew Rate (SR) note 2	ISC (Short Circuit Current)	Input Capability	Output Capability	Bias Current level (Iib max.) note 3	Noise
TS612	ADSL line driver with standby mode	2	I	14	7	12	6	130	40	200	STD	STD	4=High (Bipolar, High Speed)	3
TS613	ADSL line driver	2	I	11	7	12	6	130	40	200	STD	STD	4=High (Bipolar, High Speed)	3
TS615	ADSL line driver with standby mode (short circuited output)	2	I	10,3	5	12	6	100	490	312	STD	Rail to Rail	4=High (Bipolar, High Speed)	2.5
TS634	ADSL line driver with standby mode	2	I	14	7	12	6	130	40	160	STD	STD	4=High (Bipolar, High Speed)	3.2
TS635	ADSL line driver	2	I	11	7	12	6	130	40	160	STD	STD	4=High (Bipolar, High Speed)	3.2
TS636	ADSL line receiver with standby mode, differential variable gain amplifier	Differential	I	28	5	12	6	100	90	28	STD	STD	4=High (Bipolar, High Speed)	4.7
TS652	ADSL line receiver with standby mode, differential variable gain amplifier	Differential	I	28	5	12	6	110	100	28	STD	STD	4=High (Bipolar, High Speed)	4.5
TSH10	Video amplifier	1	I	20	6	12	10	140	150	70	STD	STD	4=High (Bipolar, High Speed)	6
TSH11	Video amplifier with CMOS inputs	1	I	20	6	12	15	120	150	70	Single S-	STD	1=Very Low (CMOS)	20
TSH31	Video amplifier with CMOS inputs	1	I	20	6	12	15	280	300	70	Single S-	STD	1=Very Low (CMOS)	20
TSH70	Wide band video op-amp in SO23-5	1	C	7.2 @ 3V	3	12	10	70	100	+55/-33	Single S-	RR	4=High (Bipolar, High Speed)	8
TSH71	Wide band video op-amp with standby mode	1	C	7.2 @ 3V	3	12	10	70	100	+55/-33	Single S-	RR	4=High (Bipolar, High Speed)	8
TSH72/4	Dual wide band video op-amp	2/4	C	7.2 @ 3V	3	12	10	70	100	+55/-33	Single S-	RR	4=High (Bipolar, High Speed)	8
TSH73/5	Triple wide band video op-amp with standby mode	3/4	C	7.2 @ 3V	3	12	10	70	100	+55/-33	Single S-	RR	4=High (Bipolar, High Speed)	8
TSH93/4/5	Video amplifier	3/4	I	4.5	7	12	4/3	150	110	36	STD	STD	4=High (Bipolar, High Speed)	4.2
TSH110/1/2/3/4	Wide band, low noise video op-amp	1/2/3/4	I	3.2 @ 5V	5	12	3	100	490	-47/+46	Single S-		4=High (Bipolar, High Speed)	3
TSH150	Video amplifier	1	C,I	23	6	12	5	150	190	100	STD	STD	4=High (Bipolar, High Speed)	7
TSH151	Video amplifier with CMOS inputs	1	C,I	23	6	12	10	150	200	100	Single S-	STD	1=Very Low (CMOS)	20
TSH321	Video amplifier with CMOS inputs	1	I	23	6	12	10	300	400	100	Single S-	STD	1=Very Low (CMOS)	20

Note 1: T° Range
Commercial: 0/70°C
-20/70°C
-40/85°C
Industrial -40/85°C
-40/105°C
-40/125°C

Note 2
Multiple grades are indicated with "/"

Note 3: Bias Current Level
1=Very Low (CMOS)
2=Low (JFET)
3=Medium (Bipolar)
4=High (Bipolar, High Speed)

* Next Releases

VOLTAGE REFERENCES

MICROPOWER

Part Numbers	Temp Range °C	Package	Output Voltage (typ.) V	Precision	Tc max ppm/°C Note 1	Ik min mA Note 2	Ik max mA	Rka max Ohm Note 3
TS4040-2.5	I	T092/SOT23-3	2.5	2% 1%	150	0.065	15	0.6
TS4041-1.2	I	T092/SOT23-3	1.225	2% 1% 0.5%	150 & 120	0.065	12	0.5
TS431	I	T092/SOT23-5	1.24 to 6	2% 1%	100	0.06	30	0.4
TS821	I	T092/SOT23-3	1.225	2% 1% 0.5%	120	0.045	12	0.5
TS822	I	T092/SOT23-3	2.5	2% 1%	100	0.05	15	0.6
TS824-1.2	I	SOT23-3	1.225	1%	50	0.05	12	0.7
TS824-2.5	I	SOT23-3	2.5	1% 0.5%	50	0.06	15	0.6

GENERAL PURPOSE

Part Numbers	Temp Range °C	Package	Output Voltage (typ.) V	Precision	Tc max ppm/°C Note 1	Ik min mA Note 2	Ik max mA	Rka max Ohm Note 3
LM336	C	T092/S08	2.5	4% 2%	-	0.4	10	1
MC1403	C	S08	2.5	1	40			
TL1431	I	T092/S08	2.5 to 36	0.4% 0.25%	100	1	100	0.5
TL431	I	T092/S08	2.5 to 36	2% 1%	100	1	100	0.5
TS2431	I	SOT23-3	2.5 to 24	2% 1% 0.5%	100	1	100	0.75

THERMAL SENSORS

Part Numbers	Temp Range °C	Package	Precision %	Precision °C	Technology	Model	Comments
LM334	C	S08/T092	+/-6		BIPOLAR	Shunt	Adjustable current source
LM335	I	S08/T092	+/-3	+/-9	BIPOLAR	Shunt	Temperature Sensor

Note 1: Temperature coefficient
Note 2: Cathode current
Note 3: Static impedance

TIMERS

LOW POWER

Part Numbers	Comments	Temp. range °C	Package	Nbr of Operators	Technology	Icc tot µA	Vcc max V	Max Freq MHz	Output mA	Operation
TS3V555	Very long timing possible	I	DIP8/S08	1	CMOS	110	16	2.7	50	mono/astable
TS3V556	Very long timing possible	I	DIP14/S014	2	CMOS	220	16	2.7	50	mono/astable
TS555	Very long timing possible	I	DIP8/S08/TSS0P8	1	CMOS	110	16	2.7	50	mono/astable
TS556	Very long timing possible	I	DIP14/S014	2	CMOS	220	16	2.7	50	mono/astable

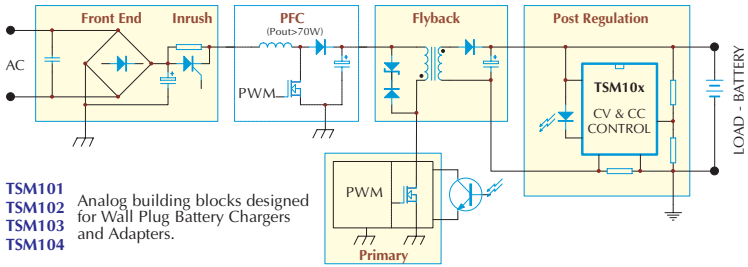
GENERAL PURPOSE

Part Numbers	Comments	Temp. range °C	Package	Nbr of Operators	Technology	Icc tot µA	Vcc max V	Max Freq MHz	Output mA	Operation
NE555	General purpose single bipolar timer	C	DIP8/S08	1	BIPOLAR	3000	18	>0.5	50	mono/astable
NE556	General purpose dual bipolar timer	C	DIP14/S014	2	BIPOLAR	6000	18	>0.5	50	mono/astable

POWER MANAGEMENT

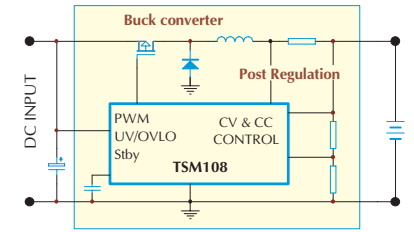
BATTERY CHARGER & ADAPTER ICs

Part Numbers	Comments	Icc (typ) µA	Vio max opamp mV	Vio max comp mV	Vref shunt V	Precision %	GBP (typ) MHz	SR typ (V/µs)	Response Time µs	Supply Range V
TSM100	1 Op-Amp + 1 Comparator	900	4				0.9	0.4	1.3	5 to 30
TSM101	Dual Op-Amp (Ored outputs) VRef + Igenerator	2	5		1.24	2 / 1 / 0.4	1			4.5 to 36
TSM102	Dual Op-Amp + Dual Comparator + VRef (Bipolar), Adjustable	800	4.5	5	2.5	0.4	2.1	2	1.3	4.5 to 36
TSM103	Dual Op-Amp + VRef (Bipolar), Fixed	700	3/5		2.5	0.4	0.9	0.4		4.5 to 36
TSM104	Quad Op-Amp + VRef (Bipolar), Adjustable	1400	3/5		2.5	0.4	0.9	0.3		4.5 to 36
TSM105	Constant Voltage & Current Controller for Battery Chargers & Adaptors	1050			1.21	1				2.8 to 12
TSM1051	Constant Voltage & Current Controller for Battery Chargers & Adaptors	1100			1.21	1				2.5 to 12



TSM101
TSM102
TSM103
TSM104
Analog building blocks designed for Wall Plug Battery Chargers and Adapters.

TSM108 Nomad Equipment Car Battery Chargers device dedicated to new generation of Traveller and Cigarette Lighter Battery Chargers and Adapters.

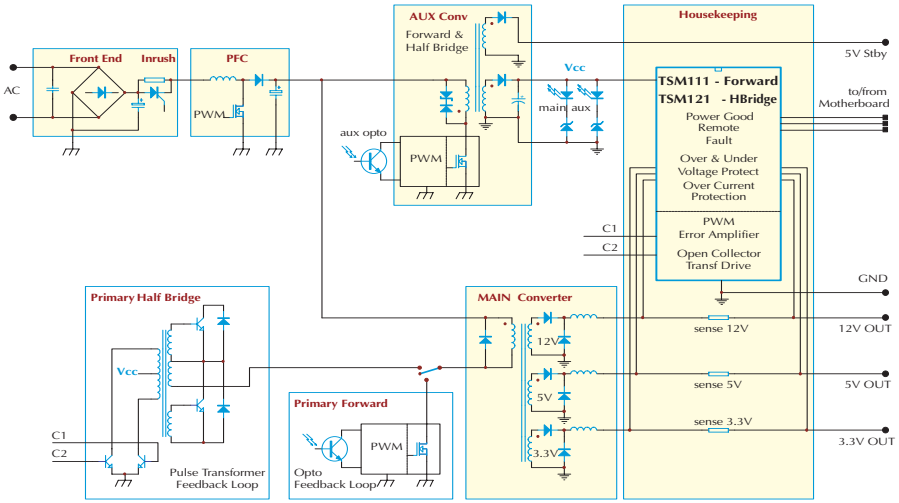


BATTERY CHARGER FOR AUTOMOTIVE APPLICATIONS

Part Numbers	Comments	Icc (typ) mA	Icc (stdby) µA	Vctrl (typ) V	PWM freq (adj) KHz	Gate drive sink/source mA	UVLO (adj)	OVLO (adj)
TSM108	2 Ored Op-Amps - PWM generator - PMOS driver	4	150	2.52	100	40/80	8	32

HOUSEKEEPING ICs

Part Numbers	Comments	Icc mA	Under/Over Voltage (3.3V) V	Under/Over Voltage (5V) V	Under/Over Voltage (12V) V	Vsense (3.3/5/12V) V	Other function	Power good	Remote Control	Supply Range V
TSM111	3.3, 5, 12V triple over voltage and over current protection	5	4	6.1	14.2	50/50/65	Vref = 2.5V	Open collector	TTL compatible	15 to 36
TSM112	3.3, 5, 12V triple over/under voltage controller	3	2.3/4	4/6.1	10/14.2		Extra pin to control - 12V	Open collector	TTL compatible	4.5 to 24
TSM121	3.3, 5, 12V triple over/under voltage controller and over current protection + PWM	7	2.3/4	4/6.1	10/14.2	50/50/65	PWM type TL494	Open collector	TTL compatible	14 to 24



Highly integrated solution for SMPS:
TSM111, the "Housekeeper" for Secure PC Power Supplies
TSM121, the Solution for High-Performance Power Supplies

Packages


TO92

Thin Shrink Small Outline Packages


TSSOP8

Small Outline Packages


SO8

Dual in Line Packages

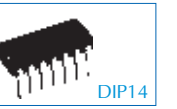

DIP8

Tiny Package


SOT23-3


TSSOP14


SO14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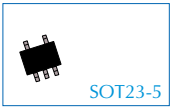
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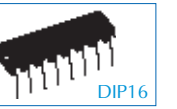
TSSOP16


SO16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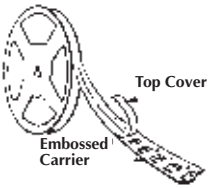
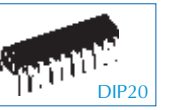
SOT23-6




SO20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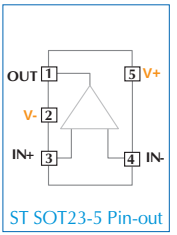
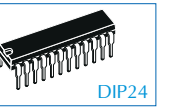
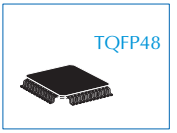


ST SOT23-5 Pin-out


DIP24

Thin Quad Flat Package


TQFP48

Example of Flip Chip

TAPE & REEL

PACKAGE	TAPE WIDTH (mm)	QTY/REEL (min. order qty)
TO92	18	2000
SO8	12	2500
SO14/16	16	2500
SO20	24	1000
TSSOP8	12	4000
TSSOP14/16	16	2500
SOT23-3/5/6	8	3000
TQFP48	16	2400
mini-SO8	12	4000
FlipChip	8	3000

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