



LA5643 — Monolithic Linear IC Multi-Power Supply System Regulator

Overview

The LA5643 is a multi-power supply IC that provides one 3.3V regulator circuits as well as two 5V regulator circuits. The LA5643 is optimal for MD players and other applications.

Functions

- 3.5V regulator circuit incorporated ($I_O=150\text{mA}$)
- Two 5V regulator circuits incorporated ($I_O=1\text{A}, 100\text{mA}$)
- With power-down detector circuit
- Reset circuit operating on the VBAK voltage
- Small current dissipation of reset circuit ($3.5\mu\text{A}$ typ during backup)
- Conversion of a 3.5V regulator into a 3.3V regulator through short-circuiting of ADJ pin with SYS3.5 pin

Specifications

Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage 1	V_{CC1} max		14	V
Input voltage 2	V_{CC2} max		14	V
AC input voltage	VAC max		14	V
Reset circuit input voltage	VBAK max		5	V
Allowable power dissipation	P_d max	Independent IC	2	W
Operating Temperature	T_{opr}		-20 to +80	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

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Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage 1	V _{CC1}		7.75 to 12	V
Input voltage 2	V _{CC2}		3.97 to 12	V
Reset circuit input voltage	V _{BAK}		1.4 to 4	V
PH5 output current	I _{PH5}		0 to 1	A
ANA5 output current	I _{ANA5}		0 to 100	mA
SYS3.5 output current	I _{SYS3.5}		0 to 150	mA
S.RESET sink current	I _{SINK_S}		0 to 0.2	mA
P.DOWN sink current	I _{SINK_P}		0 to 1	mA

Electrical Characteristics at Ta = 25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[All circuits (V _{CC1} =10V, V _{CC2} =5V, V _{BAK} =3.1V)]						
V _{CC1} current dissipation 1	I _{CC1}	I _{PH5} =0mA, I _{ANA5} =0mA		3.5	5	mA
V _{CC2} current dissipation 2	I _{CC2}	I _{SYS3.5} =0mA, AC terminal=5V		3.5	5	mA
V _{BAK} current dissipation 1	I _{IIN1_VBAK}	V _{BAK} =3.1V (S.RESET terminal at "Hi" input)		3.5	5	μA
V _{BAK} current dissipation 2	I _{IIN2_VBAK}	V _{BAK} =1.8V (S.RESET terminal at "Low" input)		0.24		mA
[PH5 regulator block (V _{CC1} =10V, I _{PH5} =1A)]						
Output voltage	V _{O_PH5}		4.75	5	5.25	V
Dropout voltage	V _{DROP_PH5}			2	2.5	V
Line regulation	ΔV _{OLN_PH5}	V _{CC1} =7.75V to 12V			200	mV
Load regulation	ΔV _{OLD_PH5}	I _{PH5} =5mA to 1A			200	mV
Peak output current	I _{OP_PH5}		1	1.4		A
Output short-circuit current	I _{osc_PH5}			0.4	1	A
[ANA5 regulator block (V _{CC1} =10V, I _{ANA5} =100mA)]						
Output voltage	V _{O_ANA5}		4.75	5	5.25	V
Dropout voltage	V _{DROP_ANA5}			2	2.5	V
Line regulation	ΔV _{OLN_ANA5}	V _{CC1} =7.75V to 12V			200	mV
Load regulation	ΔV _{OLD_ANA5}	I _{ANA5} =5 to 100mA			200	mV
Peak output current	I _{OP_ANA5}		100	140		mA
Output short-circuit current	I _{osc_ANA5}			40	100	mA
Output noise voltage	V _{NO_ANA}	10Hz ≤ f ≤ 100kHz		120		μV
[SYS3.5 regulator block (V _{CC2} =5V, I _{SYS3.5} =150mA)]						
Output voltage 1	V _{O_SYS3.5}		3.43	3.5	3.57	V
Output voltage 2	V _{O_SYS3.5/3.3}	SYS3.5 pin and ADJ pin short-circuited	3.23	3.3	3.37	V
Dropout voltage	V _{DROP_SYS3.5}			0.25	0.4	V
Line regulation	ΔV _{OLN_SYS3.5}	V _{CC2} =3.97V to 12V			200	mV
Load regulation	ΔV _{OLD_SYS3.5}	I _{SYS3.5} =5 to 150mA			200	mV
Peak output current	I _{OP_SYS3.5}		150	210		mA
Output short-circuit current	I _{osc_SYS3.5}			75	150	mA
[P.DOWN detection circuit (V _{CC2} =5V)]						
P.DOWN threshold voltage 1	V _{th1_P.DOWN}		2.7	2.78	2.86	V
P.DOWN threshold voltage 2	V _{th2_P.DOWN}	SYS3.5 pin and ADJ pin short-circuited				
P.DOWN hysteresis width	V _{hys_P.DOWN}		90	100	110	mV
P.DOWN residual voltage	V _{sat_P.DOWN}	cd1 terminal=Short P.DOWN terminal=1mA			200	mV
P.DOWN delay time	T _{d1}	cd1=1μF	75	100	125	ms

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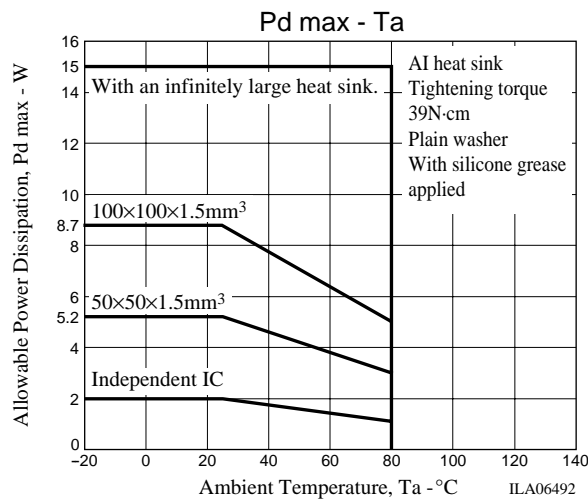
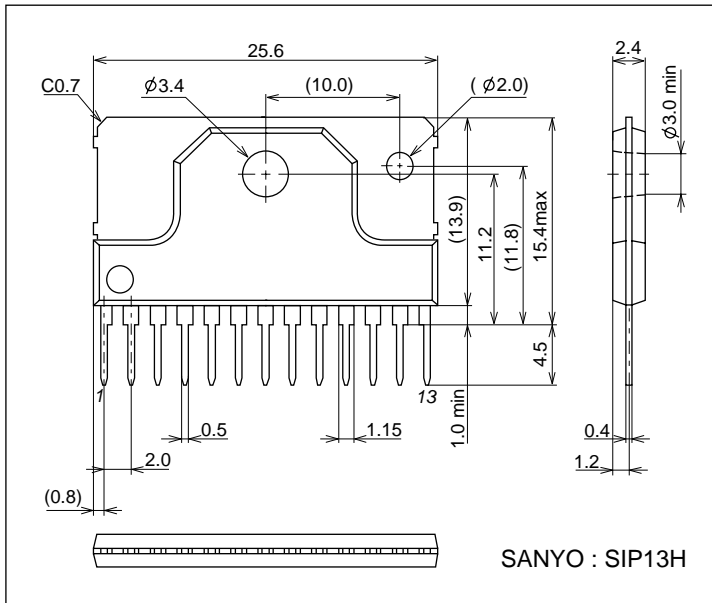
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[AC detection circuit ($V_{CC2}=5V$)]						
AC threshold voltage	Vth_AC		0.87	0.9	0.93	V
AC hysteresis width	Vhys_AC		0.5	0.6	0.7	V
AC pin drain current	IB_AC	VAC=0.8V		1.6		μA
[S.RESET circuit ($V_{BAK}=3.3V$)]						
S.RESET threshold voltage 1	Vth1_S.RESET		2.7	2.78	2.86	V
S.RESET threshold voltage 2	Vth2_S.RESET		1.9	2.0	2.1	V
Reset output undefined voltage	VUNS_S.RESET				1.4	V
S.RESET residual voltage	Vsat_S.RESET	cd2 terminal=Short S.RESET terminal=0.2mA			200	mV
S.RESET delay time	Td2	cd2=1 μF	75	100	125	ms

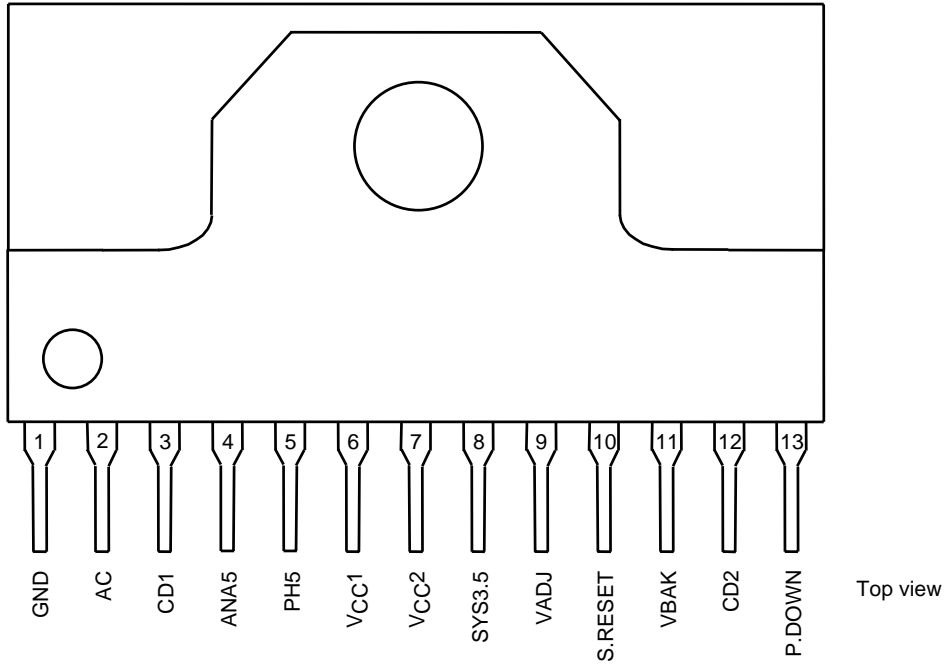
Package Dimensions

unit : mm

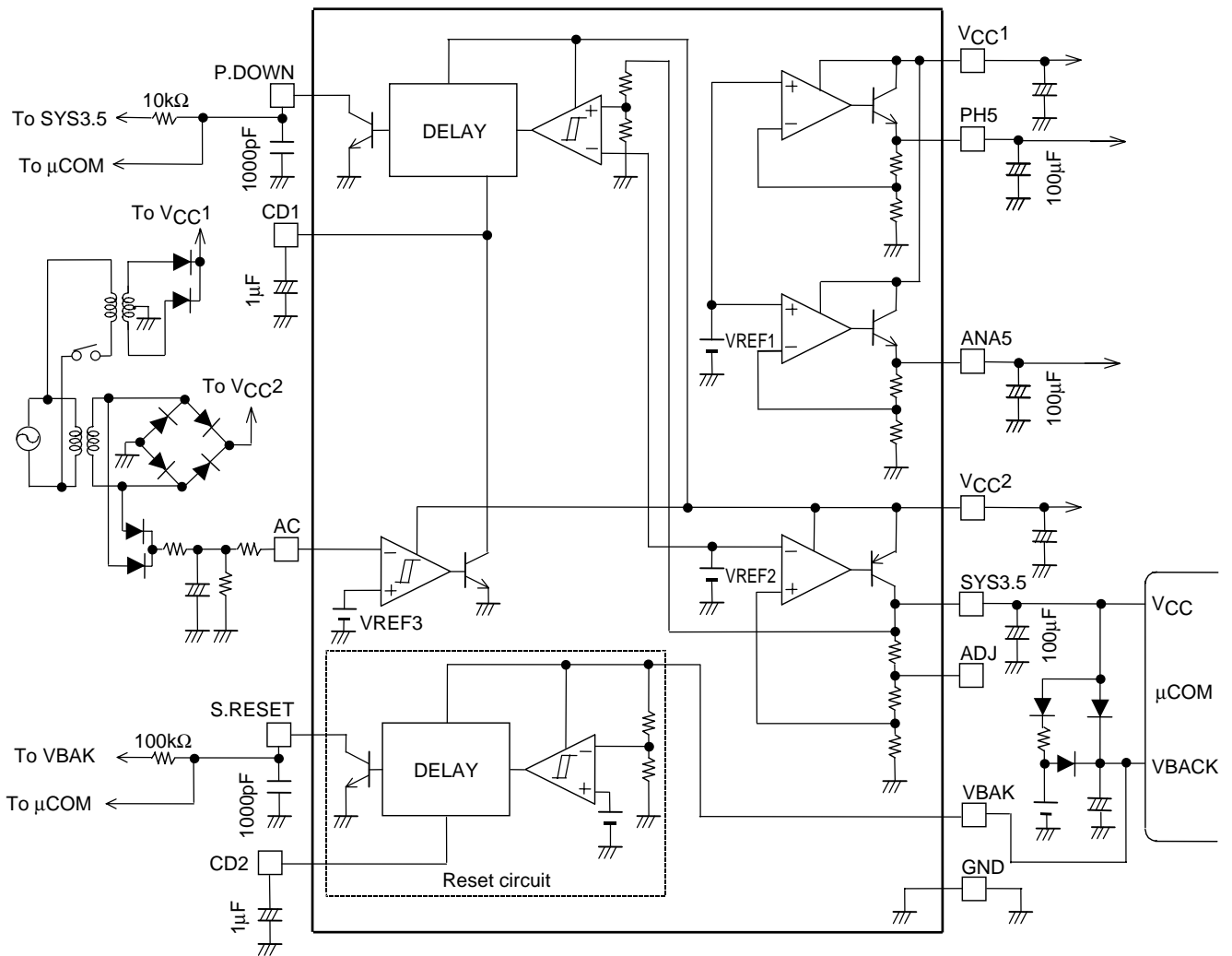
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Pin Assignment

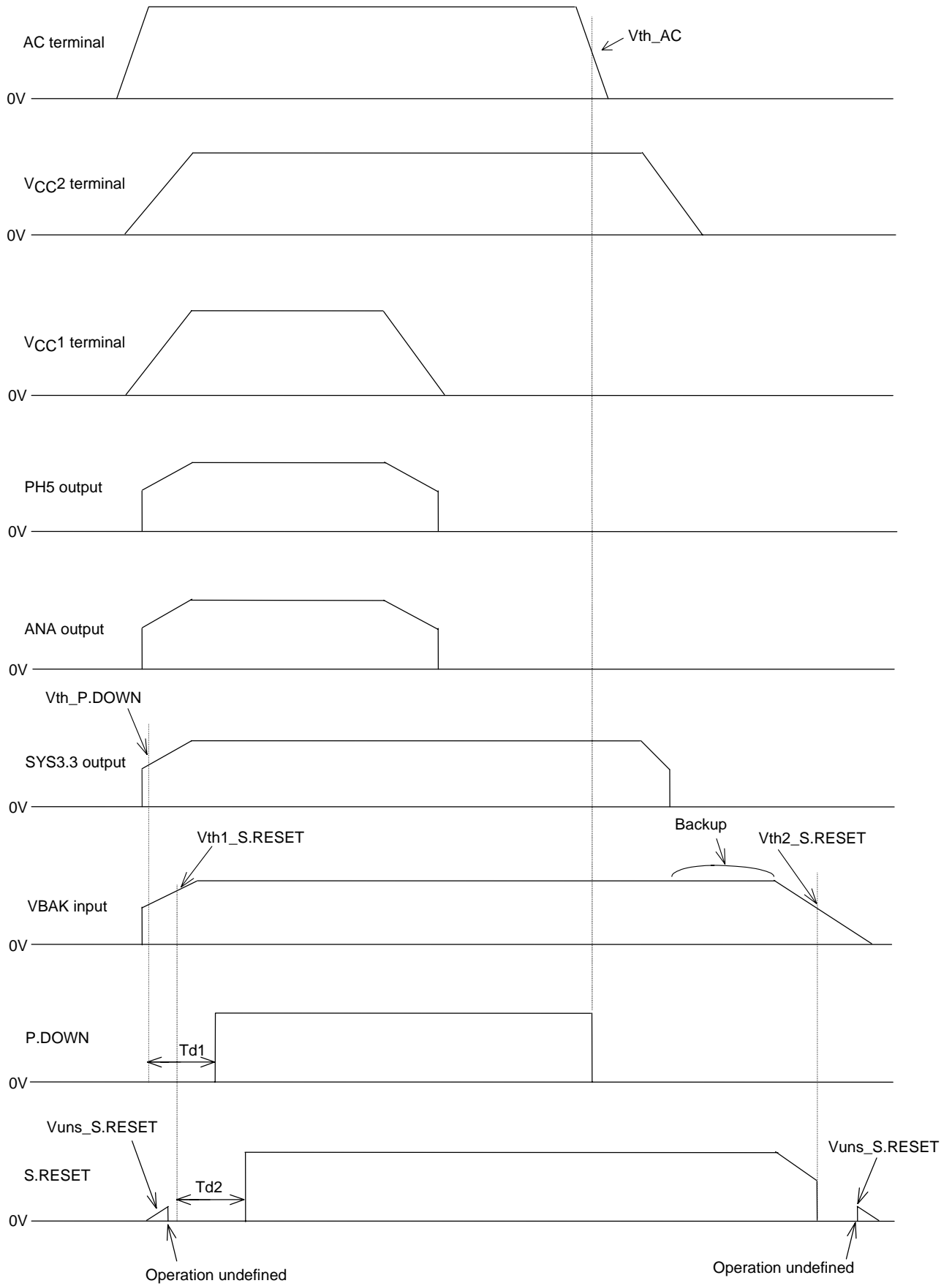


Block Diagram



Note) Use capacitors that develop less capacity fluctuation due to temperature.

Timing Chart



Note: S.RESET output is in the operation-undefined condition.

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