

KA7632/KA7633

Fixed Multi-output Regulator

Features

- Output Currents up to 0.5A (output1 & 2)
- Output Current up to 1A with External Transistor (output3)
- Fixed Precision Output 1 voltage $3.3V \pm 2\%$
- Fixed Precision Output 2 voltage $8V \pm 2\%$ (KA7632)
- Fixed Precision Output 2 voltage $9V \pm 2\%$ (KA7633)
- Control Signal Generator for Output 3 voltage ($5.1V \pm 2\%$)
- Reset Facility for Output Voltage1
- Output 2,3 with Disable by TTL Input
- Current Limit Protection at Each Output
- Thermal Shut Down

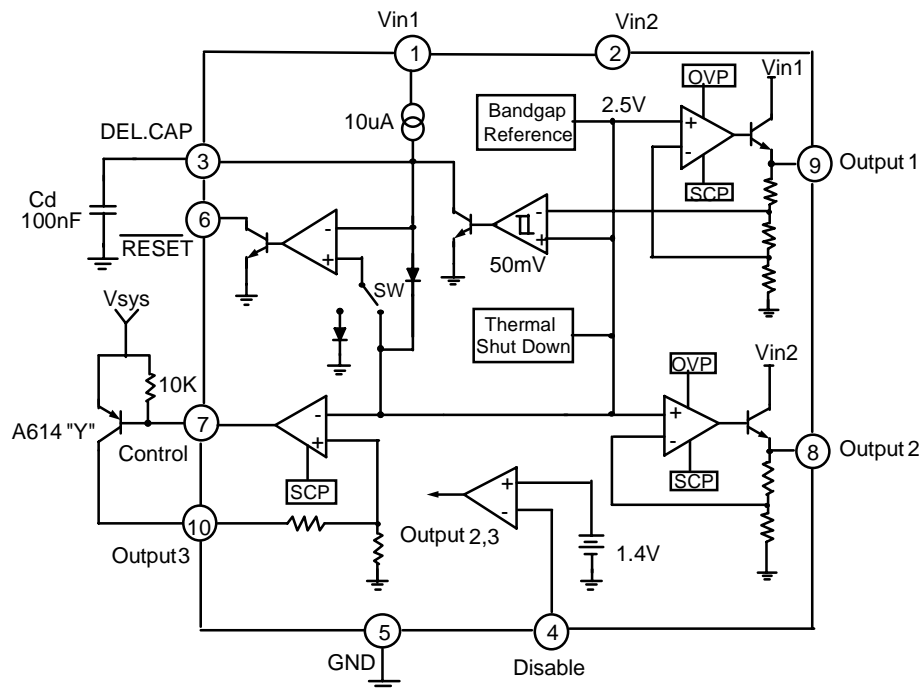
Description

The KA7632/KA7633 is a multi-output positive voltage regulator designed to provide fixed precision output voltages of 3.3V, 8V (KA7632) / 9V (KA7633) at current up to 0.5A and 5.1V at current up to 1A with external PNP transistor. An internal reset circuit generates a reset pulse when the output 1 decrease below the regulated value. Output2 & 3 can be disabled by TTL input. Protection features include over voltage protection, short circuit protection and thermal shutdown.

10-SIP H/S



Internal Block Diagram



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit	Remark
DC Input Voltage	V _{in}	20	V	-
Disable Input Voltage	V _c	20	V	-
Output Current	I _o	0.5	A	-
Power Dissipation	P _d	1.5	W	No Heatsink
Junction Temperature	T _j	+150	°C	-
Operating Temperature	T _{opr}	0~+125	°C	-

Electrical Characteristics(KA7632)

(Refer to test circuit V_{in1}=6V , V_{in2}=10.5V , T_j = +25 °C, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage 1	V _{o1}	I _{o1} =10mA 6V<V _{in1} <14V 5mA<I _{o1} <500mA	3.22 3.14	3.3 3.3	3.38 3.46	V
Output Voltage 2	V _{o2}	I _{o2} =10mA 10.5V<V _{in2} <18V 5mA<I _{o2} <500mA	7.84 7.7	8 8	8.16 8.3	V
Dropout Output Voltage 1,2	V _{d1,2}	I _{o1,2} =500mA	-	-	2.5	V
Line Regulation 1,2	ΔV _o 1,2	6V <V _{in1} <14V 10.5V <V _{in2} <18V I _{o1,2} = 200mA	-	-	40 80	mV
Load Regulation 1,2	ΔV _o 1,2	5mA < I _{o1} < 500mA 5mA < I _{o2} < 500mA	-	-	70 160	mV
Output Voltage 3	V _{o3}	V _{sys} =7V, I _{o3} =100mA	4.97	5.1	5.23	V
Line Regulation 3	ΔV _{o3}	13V< V _{in2} <18V, I _{o3} =100mA	-	-	50	mV
Load Regulation 3	ΔV _{o3}	5mA < I _{o3} < 1A	-	-	110	mV
Reset Pulse Delay	Trd	C _d =100nF, Note1	-	25	-	ms
Saturation Voltage in Reset Condition	V _{rL}	I ₆ =5mA	-	-	0.4	V
Leakage Current at Pin 6	I _{rH}	V ₆ =10V	-	-	10	μA
Output Voltage Thermal Drift	ST _t	0 °C <T _j < +125 °C , Note 2	-	100	-	ppm/°C
Short Circuit Output Current	I _{sc1,2}	V _{in1} =6V , V _{in2} =10.5V	-	-	1.6	A
Disable Voltage High	V _{disH}	Output 2 Active	2	-	-	V
Disable Voltage Low	V _{disL}	Output 2 Disabled	-	-	0.8	V
Disable Bias Current	I _{dis}	0V < V _{dis} < 7V	-100	-	2	μA
Junction Temperature for TSD	T _{tsd}	Note 2	-	145	-	°C
Quiescent Current	I _q	I _{o1} =10mA, Output2 Disabled	-	-	2	mA
Reset Threshold Voltage	V _r	K=V _{o1}	K-0.4	K-0.25	K-0.1	V
Reset Threshold Hysteresis	V _{rth}	Note 1	20	50	100	mV

Notes:

- To check the reset circuit ,the reset output is low to discharge the delay capacitor(=C_d). if it's less than V_{o1}-0.25V. And the reset output is high when the delay capacitor voltage linearly increased by the internal current source(10μA) if it's more than V_{o1}- 0.2V. The equations of delay time is same as below. Trd = (C_d × 2.5) / 10μA
- These parameters, although guaranteed, are not 100% tested in production.

Electrical Characteristics(KA7633)

(Refer to test circuit $V_{in1}=6V$, $V_{in2}=11.5V$, $T_j = +25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage 1	V_{o1}	$I_{o1}=10\text{mA}$ $6V < V_{in1} < 14V$ $5\text{mA} < I_{o1} < 500\text{mA}$	3.22 3.14	3.3 3.3	3.38 3.46	V
Output Voltage 2	V_{o2}	$I_{o2}=10\text{mA}$ $11.5V < V_{in2} < 18V$ $5\text{mA} < I_{o2} < 500\text{mA}$	8.82 8.65	9 9	9.18 9.35	V
Dropout Output Voltage 1,2	$V_{d1,2}$	$I_{o1,2}=500\text{mA}$	-	-	2.5	V
Line Regulation 1,2	$\Delta V_{o1,2}$	$6V < V_{in1} < 14V$ $11.5V < V_{in2} < 18V$ $I_{o1,2} = 200\text{mA}$	-	-	40 80	mV
Load Regulation 1,2	$\Delta V_{o1,2}$	$5\text{mA} < I_{o1} < 500\text{mA}$ $5\text{mA} < I_{o2} < 500\text{mA}$	-	-	70 160	mV
Output Voltage 3	V_{o3}	$V_{sys}=7V$, $I_{o3}=100\text{mA}$	4.97	5.1	5.23	V
Line Regulation 3	ΔV_{o3}	$13V < V_{in2} < 18V$, $I_{o3} = 100\text{mA}$	-	-	50	mV
Load Regulation 3	ΔV_{o3}	$5\text{mA} < I_{o3} < 1\text{A}$	-	-	110	mV
Reset Pulse Delay	T_{rd}	$C_d=100\text{nF}$, Note1	-	25	-	ms
Saturation Voltage in Reset Condition	V_{rL}	$I_6=5\text{mA}$	-	-	0.4	V
Leakage Current at Pin 6	I_{rH}	$V_6=10V$	-	-	10	μA
Output Voltage Thermal Drift	ST_t	$0\text{ }^{\circ}\text{C} < T_j < +125\text{ }^{\circ}\text{C}$, Note 2	-	100	-	ppm/ $^{\circ}\text{C}$
Short Circuit Output Current	$I_{sc1,2}$	$V_{in1}=6V$, $V_{in2} = 11.5V$	-	-	1.6	A
Disable Voltage High	V_{disH}	Output 2 Active	2	-	-	V
Disable Voltage Low	V_{disL}	Output 2 Disabled	-	-	0.8	V
Disable Bias Current	I_{dis}	$0V < V_{dis} < 7V$	-100	-	2	μA
Junction Temperature for TSD	T_{tsd}	Note 2	-	145	-	$^{\circ}\text{C}$
Quiescent Current	I_q	$I_{o1}=10\text{mA}$, Output2 Disabled	-	-	2	mA
Reset Threshold Voltage	V_r	$K=V_{o1}$	K-0.4	K-0.25	K-0.1	V
Reset Threshold Hysteresis	V_{rth}	Note 1	20	50	100	mA

Notes:

- To check the reset circuit, the reset output is low to discharge the delay capacitor(=Cd). if it's less than $V_{o1}-0.25V$. And the reset output is high when the delay capacitor voltage linearly increased by the internal current source($10\mu\text{A}$) if it's more than $V_{o1}-0.2V$. The equations of delay time is same as below. $T_{rd} = (C_d \times 2.5) / 10\mu\text{A}$
- These parameters, although guaranteed, are not 100% tested in production.

Typical Performance Characteristics

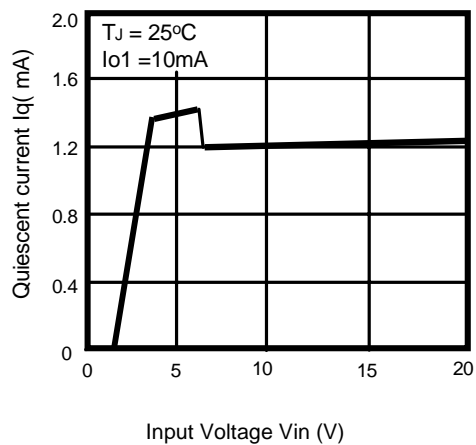


Figure 1. Quiescent Current vs. Input Voltage

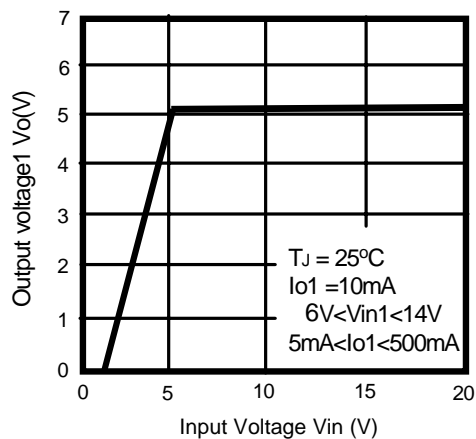


Figure 2. Output Voltage1 vs. Input Voltage

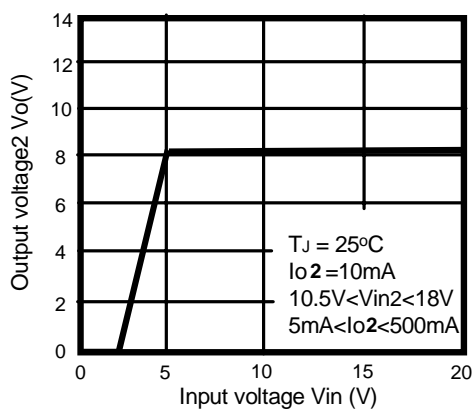


Figure 3. Output Voltage2 vs. Input Voltage

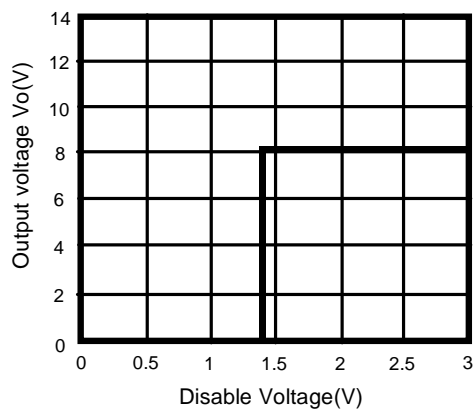


Figure 4. Output Voltage vs. Disable Voltage High(Low)

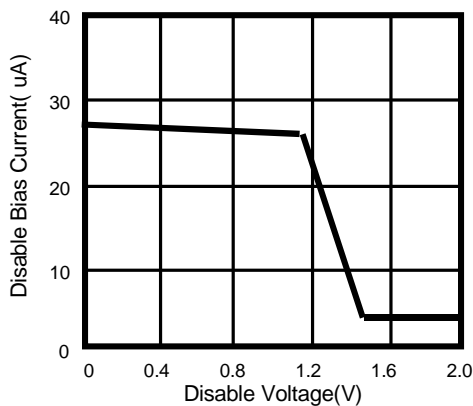
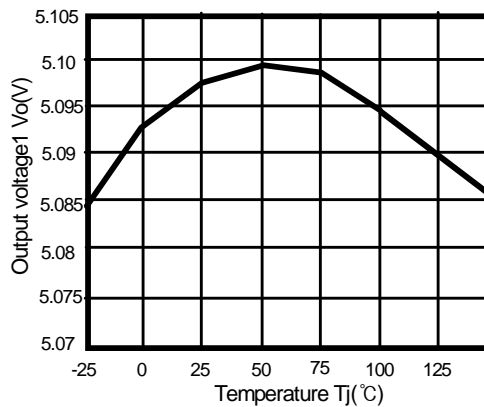


Figure 5. Disable Bias Current vs. Disable Voltage

Figure 6. Output Voltage1 vs. Temperature(T_J)

Typical Performance Characteristics (continued)

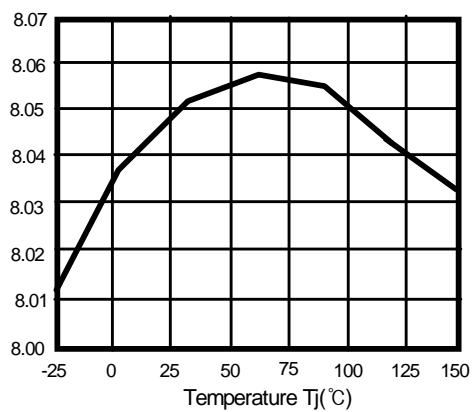


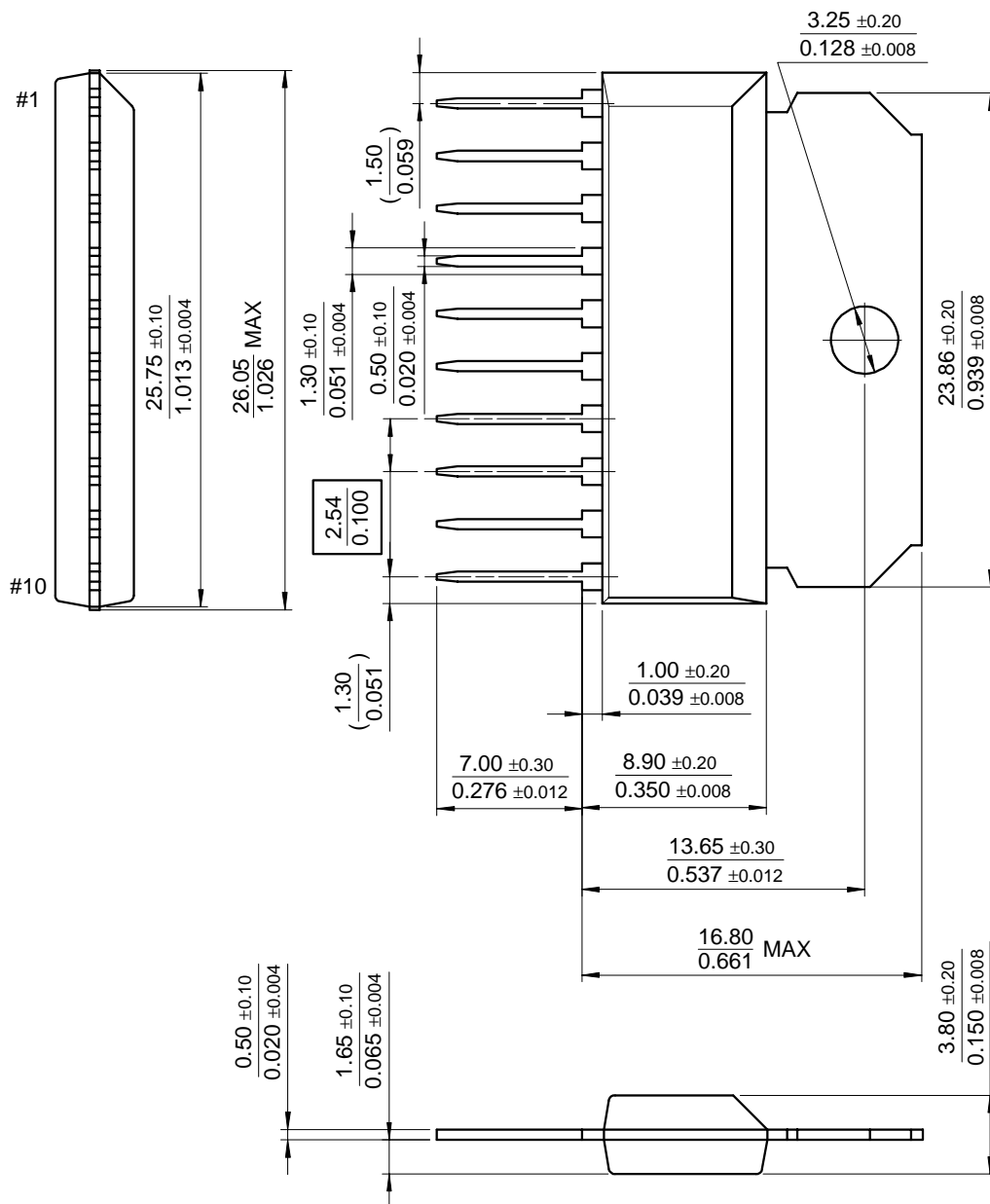
Figure 7. Output Voltage2 vs. Temperature(T_j)

Mechanical Dimensions

Package

Dimensions in millimeters

10-SIP H/S



Ordering Information

Product Number	Package	Operating Temperature
KA7632	10-SIP H/S	0°C to +125°C
KA7633		

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