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June 2014

KA78RH33R Low Dropout Voltage Regulator

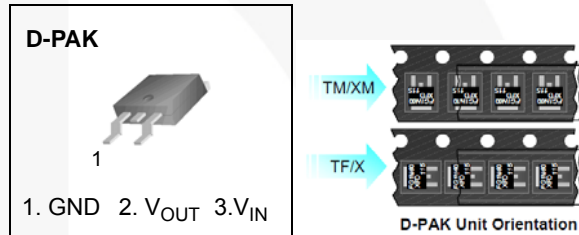
KA78RH33R — Low Dropout Voltage Regulator

Features

- Fixed Output Voltage of +3.3 V
- Space-Saving SMD Types of DPAK
- 1 V (Typical) Dropout at $I_O = 800$ mA
- Output Current: 800 mA
- Thermal Shutdown Protection
- Over-Current Protection
- Output Trimmed to $\pm 1\%$ Tolerance
- No Minimum Load Requirement

Description

The KA78RH33 is a +3.3V, fixed, low dropout voltage regulator specifically designed for use in low-voltage operation. The maximum load current is 0.8 A and the dropout voltage is guaranteed to be 1 V (typical). The dropout voltage varies with load current. The regulator consists of composite PNP-NPN pass transistors.



Ordering Information

Part Number	Operating Temperature Range	Top Mark	Package	Packing Method
KA78RH33RTF	-25°C to +125°C	KA78RH33	TO-252 3L (DPAK)	Tape and Reel
KA78RH33RTM	-25°C to +125°C	KA78RH33	TO-252 3L (DPAK)	Tape and Reel

* Refer to above unit orientation figure for TM / TF suffix packing.

Block Diagram

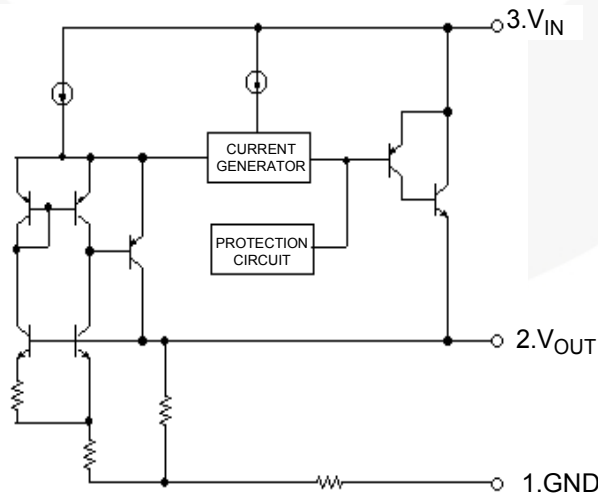


Figure 1. Block Diagram

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Value	Unit
V_{IN}	Power Supply Input Voltage	15	V
I_O	Output Load Current	800	mA
T_J	Junction Temperature	150	$^\circ\text{C}$
T_{OPR}	Operating Junction Temperature	-25 to 125	$^\circ\text{C}$
T_{STG}	Storage Temperature	-55 to 150	$^\circ\text{C}$

Temperature Characteristics

Symbol	Parameter	Value	Unit
$\Delta V_O / \Delta T$	Temperature Coefficient of Output Voltage	± 0.02	%/ $^\circ\text{C}$

Thermal Characteristics

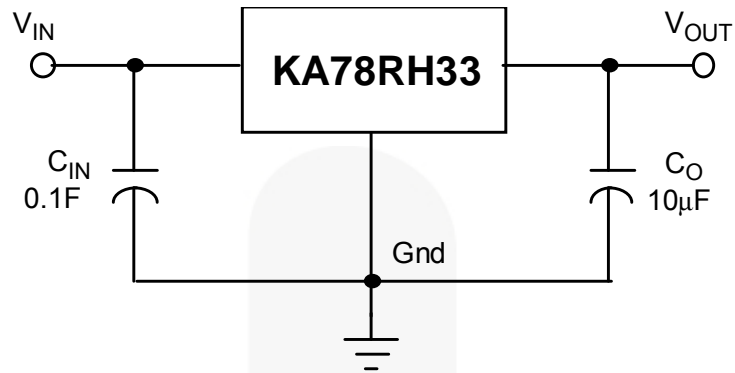
Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	110	$^\circ\text{C}/\text{W}$

Electrical Characteristics

Refer to the test circuit, values are at $V_{IN} = 5\text{ V}$, $C_O = 10\ \mu\text{F}$, and $T_A = 25^\circ\text{C}$, unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{OUT}	Output Voltage	$I_O = 10\text{ mA}$, $T_J = 25^\circ\text{C}$	3.27	3.30	3.33	V
V_{OUT}	Output Voltage	$V_{IN} = 4.8\text{ V to } 12\text{ V}$, $I_O = 10\text{ mA to } 800\text{ mA}$, $T_J = -25^\circ\text{C to } 125^\circ\text{C}$	3.23	3.30	3.37	V
R_{line}	Line Regulation	$V_{IN} = 4.8\text{ V to } 12\text{ V}$, $I_O = 10\text{ mA}$		1	10	mV
R_{load}	Load Regulation	$I_O = 10\text{ mA to } 800\text{ mA}$		1	20	mV
RR	Ripple Rejection	$f = 120\text{ Hz}$, $I_O = 500\text{ mA}$, $V_{IN} = 6.3 \pm 1\text{ V}_{rms}$	55			dB
V_{drop}	Dropout Voltage	$I_O = 100\text{ mA}$		1.00	1.20	V
		$I_O = 500\text{ mA}$		1.05	1.25	
		$I_O = 800\text{ mA}$		1.10	1.40	
I_q	Quiescent Current	$V_{IN} \leq 12\text{ V}$		5	10	mA
$\Delta V_O / \Delta T$	Temperature Coefficient of Output Voltage	$T_J = -25^\circ\text{C to } 125^\circ\text{C}$, $I_O = 10\text{ mA}$		0.2		mV/ $^\circ\text{C}$
I_{pk}	Peak Output Current	$V_{IN} = 6.3\text{ V}$	800			mA
V_n	Output Noise Voltage	$f = 10\text{ Hz to } 10\text{ kHz}$		100		μV_{rms}

Typical Application**Figure 2. Typical Application⁽¹⁾****Note:**

1. An input capacitor, C_{IN} is not necessary for stability, but improves the overall performance.



Physical Dimensions

TO-252 3L (DPAK)

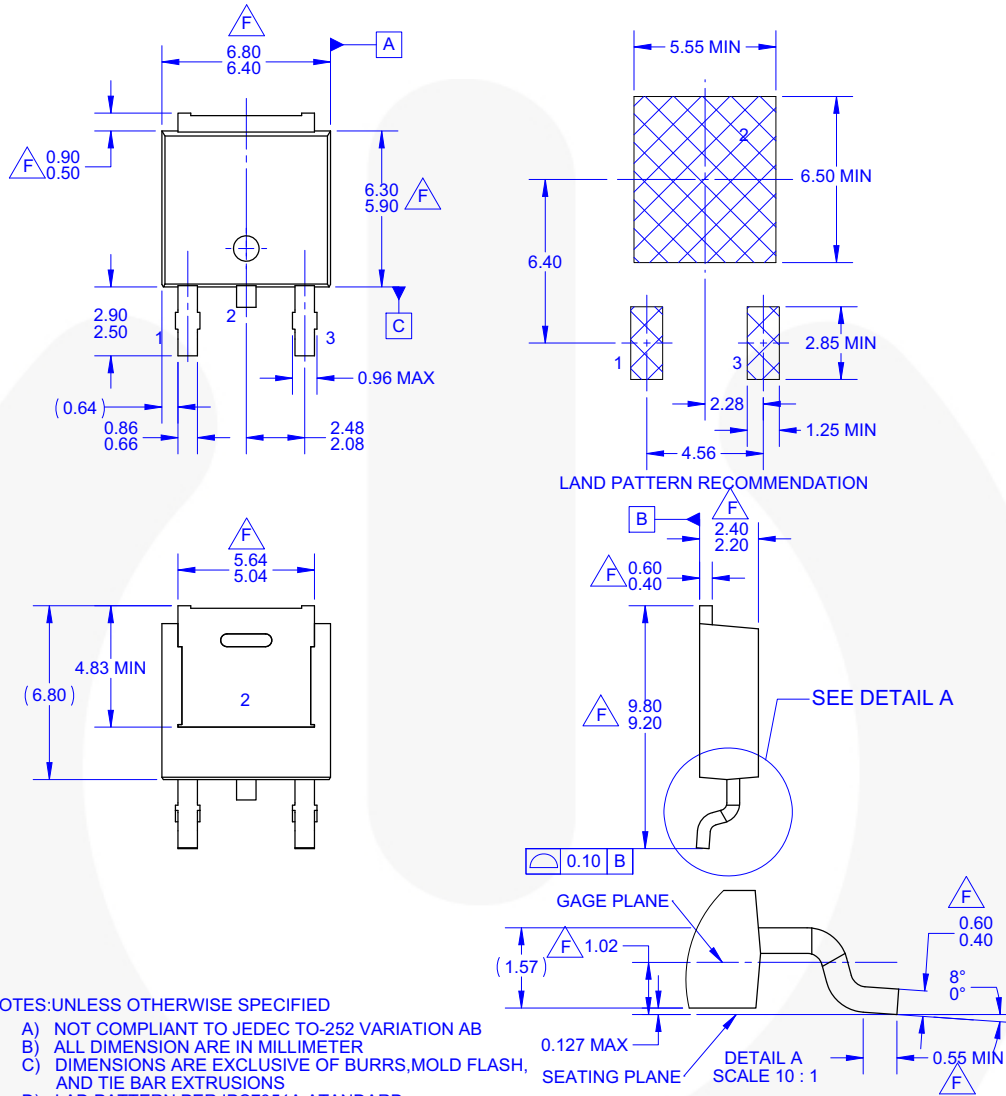


Figure 3. 3-Lead, TO-252, JEDEC TO-252 VAR. AB, SURFACE MOUNT (DPAK)

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