

# KA78R33

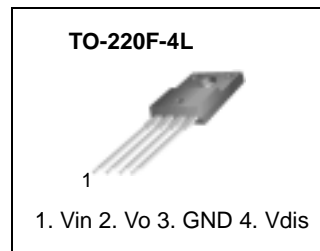
## Low Dropout Voltage Regulator

### Features

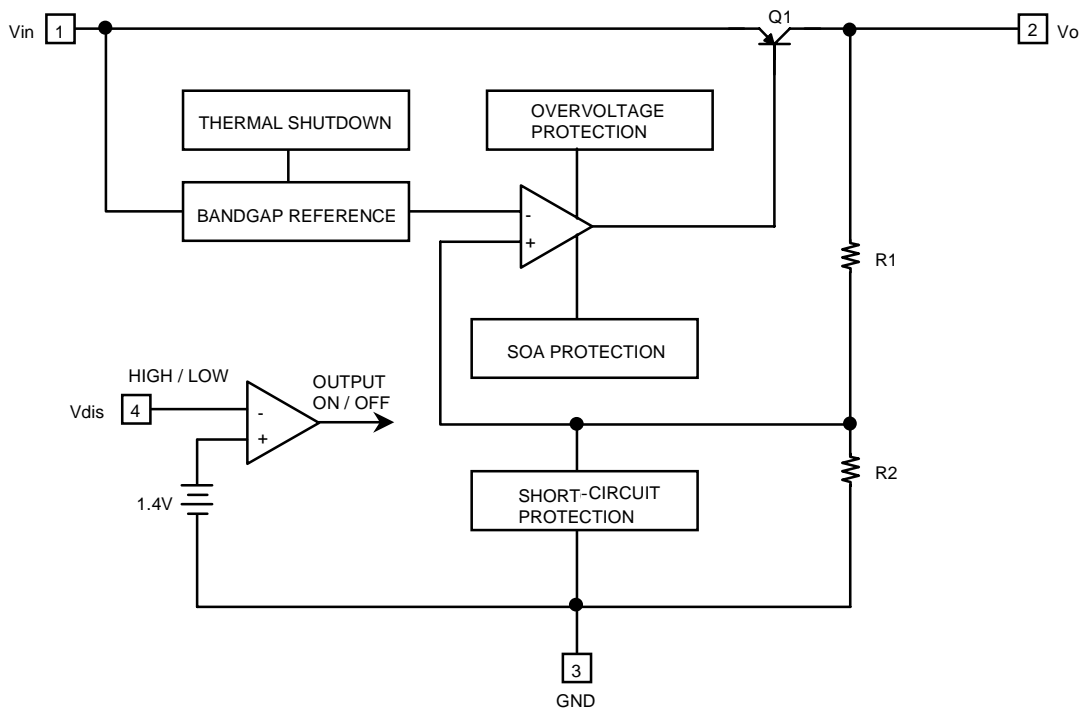
- 1A / 3.3V Output low dropout voltage regulator
- TO220 Full-Mold package (4PIN)
- Overcurrent protection, Thermal shutdown
- Overvoltage protection, Short-Circuit protection
- With output disable function

### Description

The KA78R33 is a low-dropout voltage regulator suitable for various electronic equipments. It provides constant voltage power source with TO-220 4 lead full mold package. Dropout voltage of KA78R33 is below 0.5V in full rated current(1A). This regulator has various function such as peak current protection, thermal shut down, overvoltage protection and output disable function.



### Internal Block Diagram



## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit	Remark
Input Voltage	V <sub>in</sub>	35	V	-
Disable Voltage	V <sub>dis</sub>	35	V	-
Output Current	I <sub>o</sub>	1.0	A	-
Power Dissipation 1	P <sub>d1</sub>	1.5	W	No Heatsink
Power Dissipation 2	P <sub>d2</sub>	15	W	With Heatsink
Junction Temperature	T <sub>j</sub>	+150	°C	-
Operating Temperature	T <sub>opr</sub>	-20 ~ +80	°C	-
Thermal Resistance, Junction-to-Case (Note2)	R <sub>θjc</sub>	4.31	°C/W	-
Thermal Resistance, Junction-to-Air (Note2)	R <sub>θja</sub>	48.83	°C/W	-
Thermal Shutdown Temperature	T <sub>tsd</sub>	150	°C	-

## Electrical Characteristics

(V<sub>in</sub>=5V, I<sub>o</sub>=0.5A, T<sub>a</sub>=25 °C , unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V <sub>o</sub>	-	3.22	3.3	3.38	V
Load Regulation	R <sub>load</sub>	5mA < I <sub>o</sub> < 1A	-	0.1	2.0	%
Line Regulation	R <sub>line</sub>	4V < V <sub>in</sub> < 10V	-	0.5	2.5	%
Ripple Rejection Ratio	RR	note1	45	55	-	dB
Dropout Voltage	V <sub>drop</sub>	I <sub>o</sub> = 1A	-	-	0.5	V
Disable Voltage High	V <sub>disH</sub>	Output Active	2.0	-	-	V
Disable Voltage Low	V <sub>disL</sub>	Output Disabled	-	-	0.8	V
Disable Bias Current High	I <sub>disH</sub>	V <sub>dis</sub> = 2.7V	-	-	20	μA
Disable Bias Current Low	I <sub>disL</sub>	V <sub>dis</sub> = 0.4V	-	-	-0.4	mA
Quiescent Current	I <sub>q</sub>	I <sub>o</sub> = 0A	-	-	10	mA

### Note:

1. These parameters, although guaranteed, are not 100% tested in production.
2. Junction to case thermal resistance test environments.
  - Pneumatic heat sink fixture.
  - Clamping pressure 60psi through 12mm diameter cylinder.
  - Thermal grease applied between PKG and heat sink fixture

## Typical Performance Characteristics

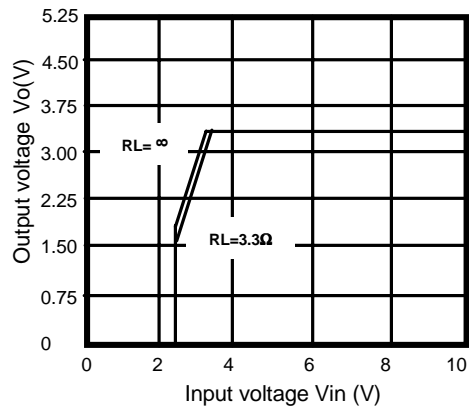


Figure 1. Output Voltage vs. Input Voltage

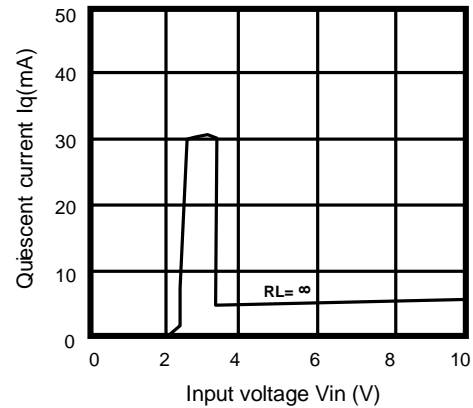


Figure 2. Quiescent Current vs. Input Voltage

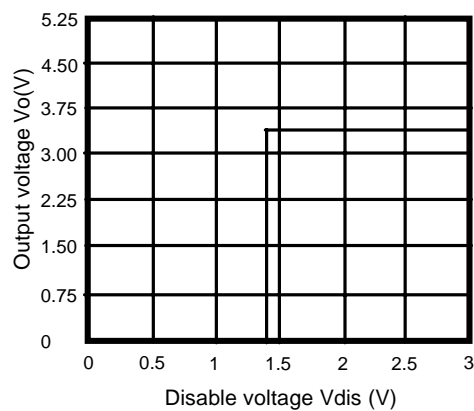


Figure 3. Output Voltage vs. Disable Voltage

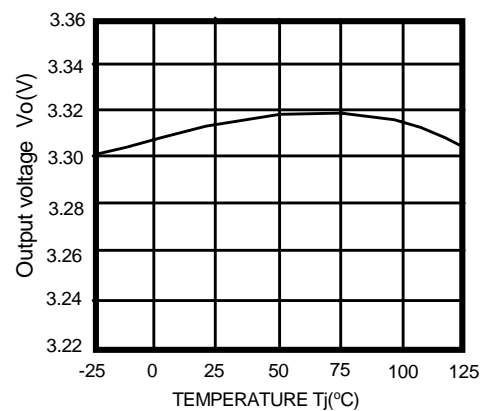


Figure 4. Output Voltage vs. Temperature( $T_j$ )

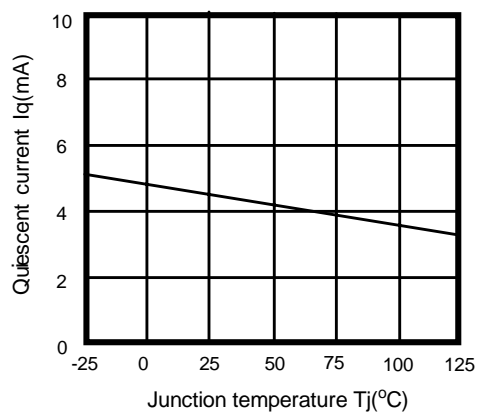


Figure 5. Quiescent Current vs. Temperature( $T_j$ )

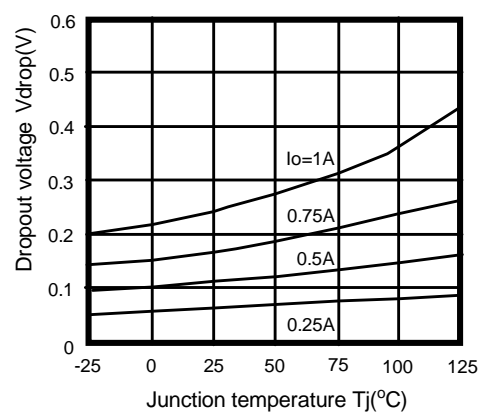


Figure 6. Dropout Voltage vs. Junction Temperature

### Typical Performance Characteristics (continued)

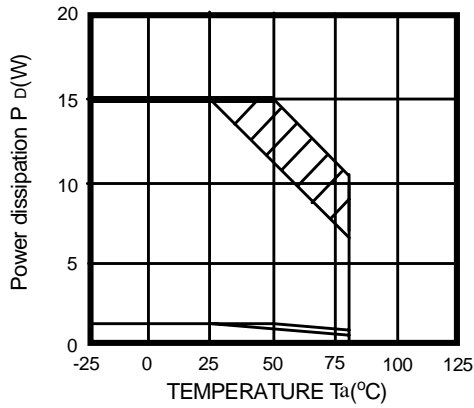


Figure 7. Power Dissipation vs. Temperature( $T_a$ )

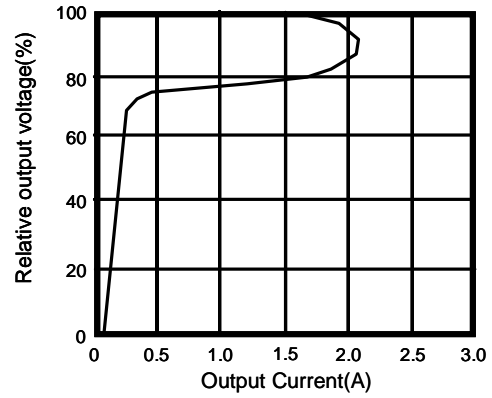
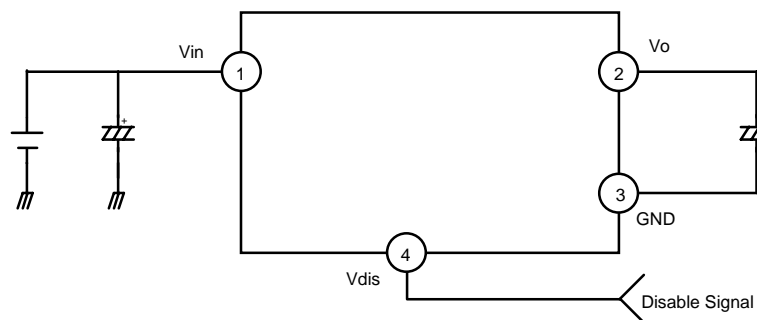


Figure 8. Overcurrent Protection Characteristics (Typical Value)

## Typical Application



**Figure 1. Application Circuit**

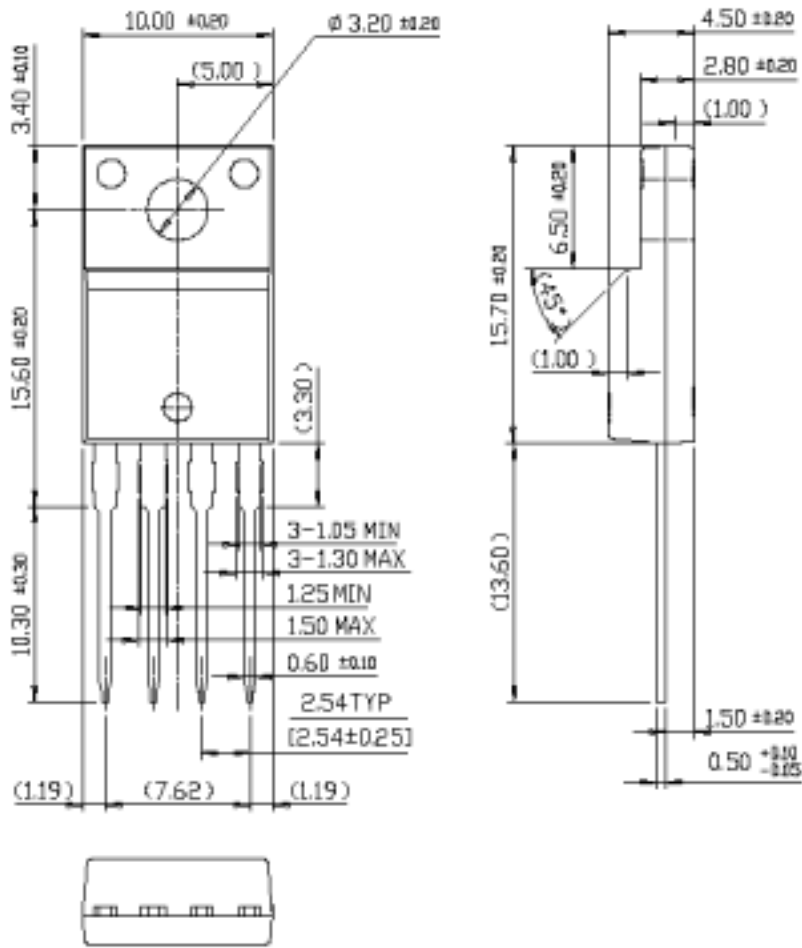
- $C_i$  is required if regulator is located an appreciable distance from power supply filter.
- $C_o$  improves stability and transient response. ( $C_o > 47\mu\text{F}$ )

# Mechanical Dimensions

Package

Dimensions in millimeters

## TO-220F-4L



**Ordering Information**

<b>Product Number</b>	<b>Package</b>	<b>Operating Temperature</b>
KA78R33	TO-220F-4L	-20°C to + 80°C

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