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October 2014

KA78RM33R
Low Dropout Voltage Regulator

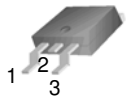
Features

- 0.5 A / 3.3 V Output Low-Dropout Voltage Regulator
- Low-Dropout Voltage (Max: 0.6 V)
- Over-Current Protection, Thermal Shutdown
- SOA Protection, Short-Circuit Protection

Description

The KA78RM33R is a low-dropout voltage regulator suitable for various electronic equipment. It provides constant voltage power source with surface-mount type package (DPAK). The dropout voltage is below 0.6 V in full-rated current 0.5 A. This regulator has over-current protection, thermal shut-down and the SOA (Safe operating Area) protection.

DPAK

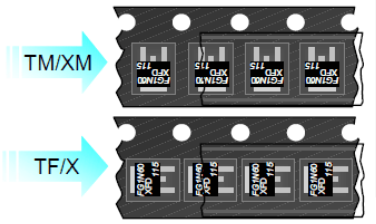


1. V_{IN} 2. GND 3. V_{OUT}

Ordering Information

Part Number	Operating Temperature Range	Top Mark	Package	Packing Method
KA78RM33RTF	-40 to +125°C	KA78RM33	DPAK	Tape and Reel
KA78RM33RTM		KA78RM33	DPAK	Tape and Reel

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



Block Diagram

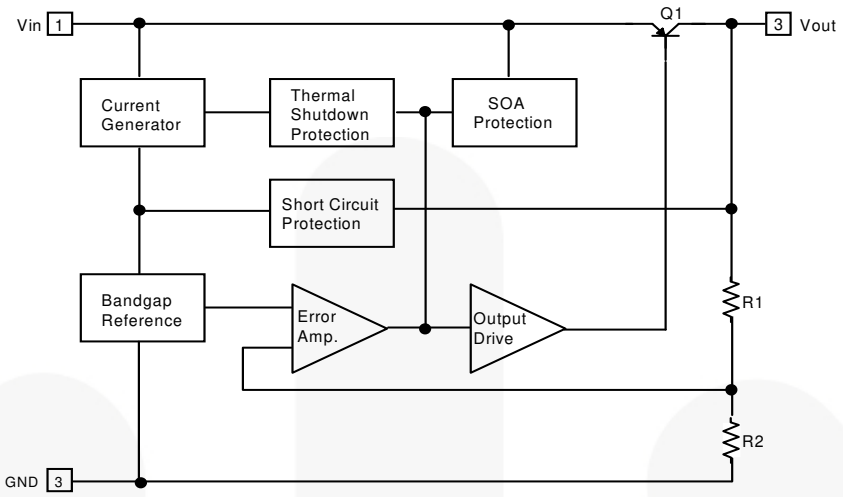


Figure 1. Block Diagram

Typical Application

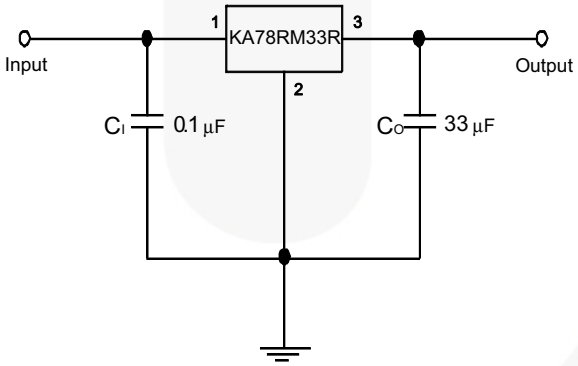


Figure 2. DC Parameters

Notes:

1. C_I is required if the regulator is located an appreciable distance from power supply filter.
2. C_O improves stability and transient response. Refer to the figure 12 for ESR values of capacitors.

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°C unless otherwise noted.

Symbol	Parameter	Value	Remark	Unit
V_{IN}	Input Voltage	20		V
I_O	Output Current	0.5		A
$R_{\theta JA}$	Thermal Resistance Junction-Air	110	No Heatsink	°C/W
P_D	Power Dissipation	Internally limited		
T_J	Junction Temperature	150		°C
T_{OPR}	Operating Temperature	-40 to +125		°C

Electrical Characteristics

Values are at T_A = 25°C, V_{IN} = 5 V, I_O = 0.25 A unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{OUT}	Output Voltage	I_O =10 mA	3.22	3.30	3.38	V
R_{LOAD}	Load Regulation	5 mA < I_O < 0.5 A		2.0	20	mV
R_{LINE}	Line Regulation	4.3 V < V_{IN} < 16 V		2.0	20	mV
R_R	Ripple Rejection Ratio	f = 120 Hz, V_{IN}=5 V ± 0.5 V_{RMS}	55			dB
V_{DROP}	Dropout Voltage	I_O = 0.5 A			0.6	V
I_Q	Quiescent Current	I_O = 0 A		5.0	10	mA
I_{PK}	Peak Current	V_{IN} = 5 V	0.5	1.0		A
V_N	Output Noise Voltage	10 Hz < f < 100 kHz		50		μV_{RMS}
$\Delta V_{OUT}/\Delta T$	Temperature Coefficient of Output Voltage	-40°C < T_J < 125°C, I_O = 100 mA		-0.2		mV /°C

Typical Performance Characteristics

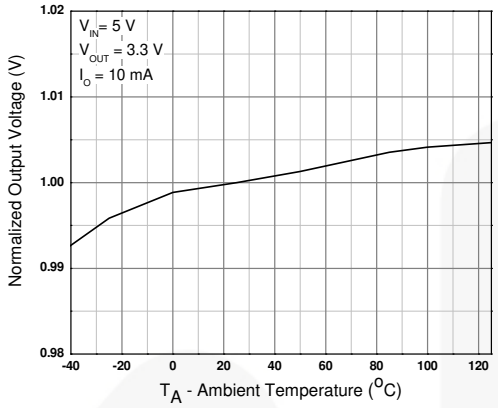


Figure 3. Normalized Output Voltage

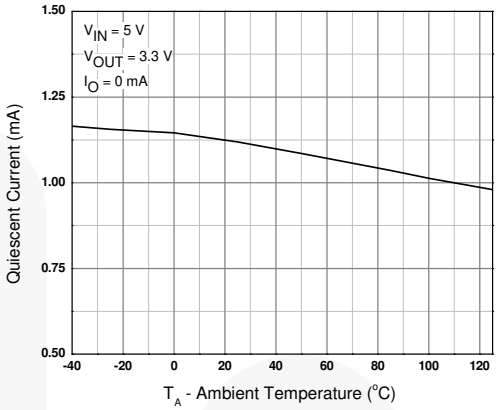


Figure 4. Quiescent vs. Temperature

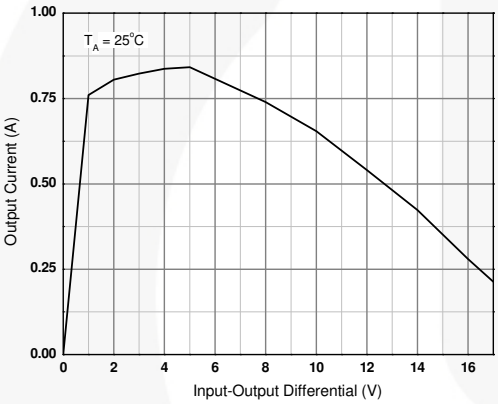


Figure 5. Peak Output Current

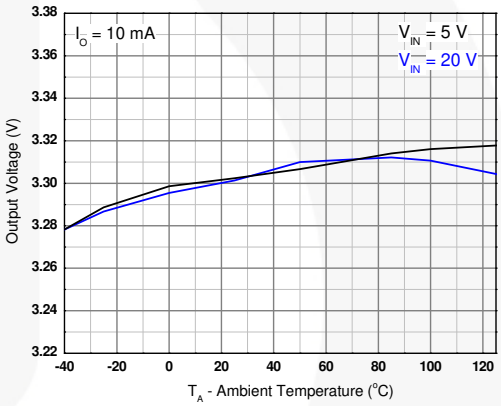


Figure 6. Output Voltage vs. Temperature

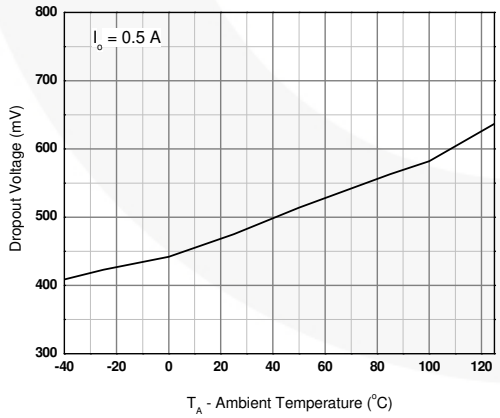


Figure 7. Dropout Voltage vs. Temperature

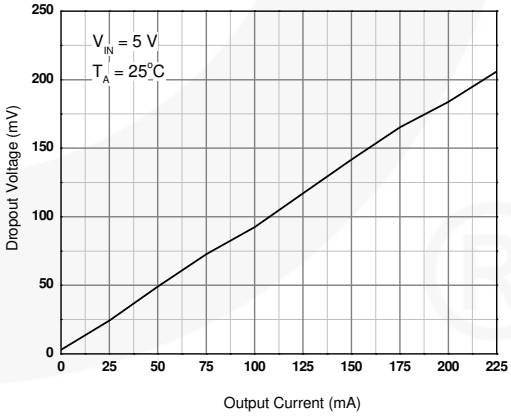


Figure 8. Dropout Voltage vs. Output Current

Typical Performance Characteristics (Continued)

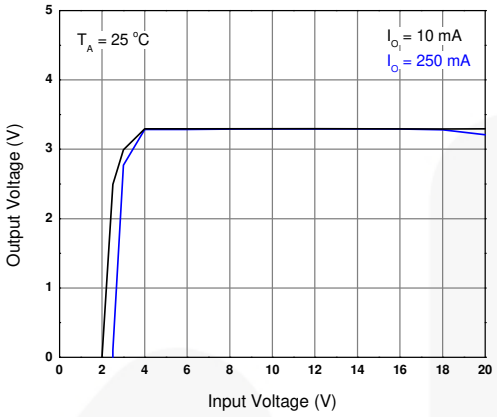


Figure 9. Output Voltage vs. Input Voltage

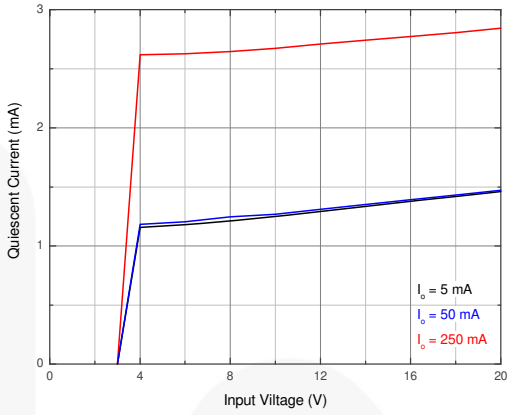


Figure 10. Quiescent Current vs. Input Voltage

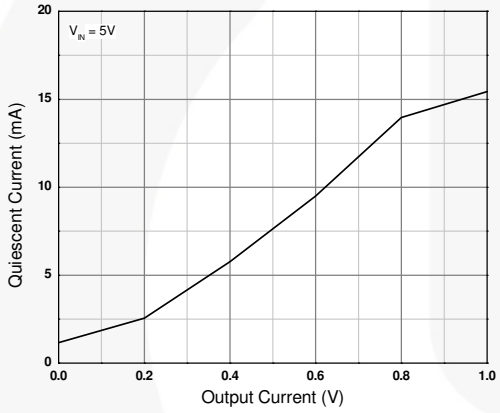


Figure 11. Quiescent Current vs. Output Current

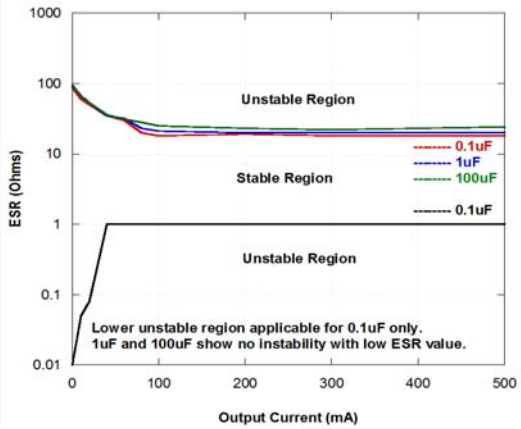


Figure 12. Output Stability vs. Output Capacitor Change

Physical Dimensions

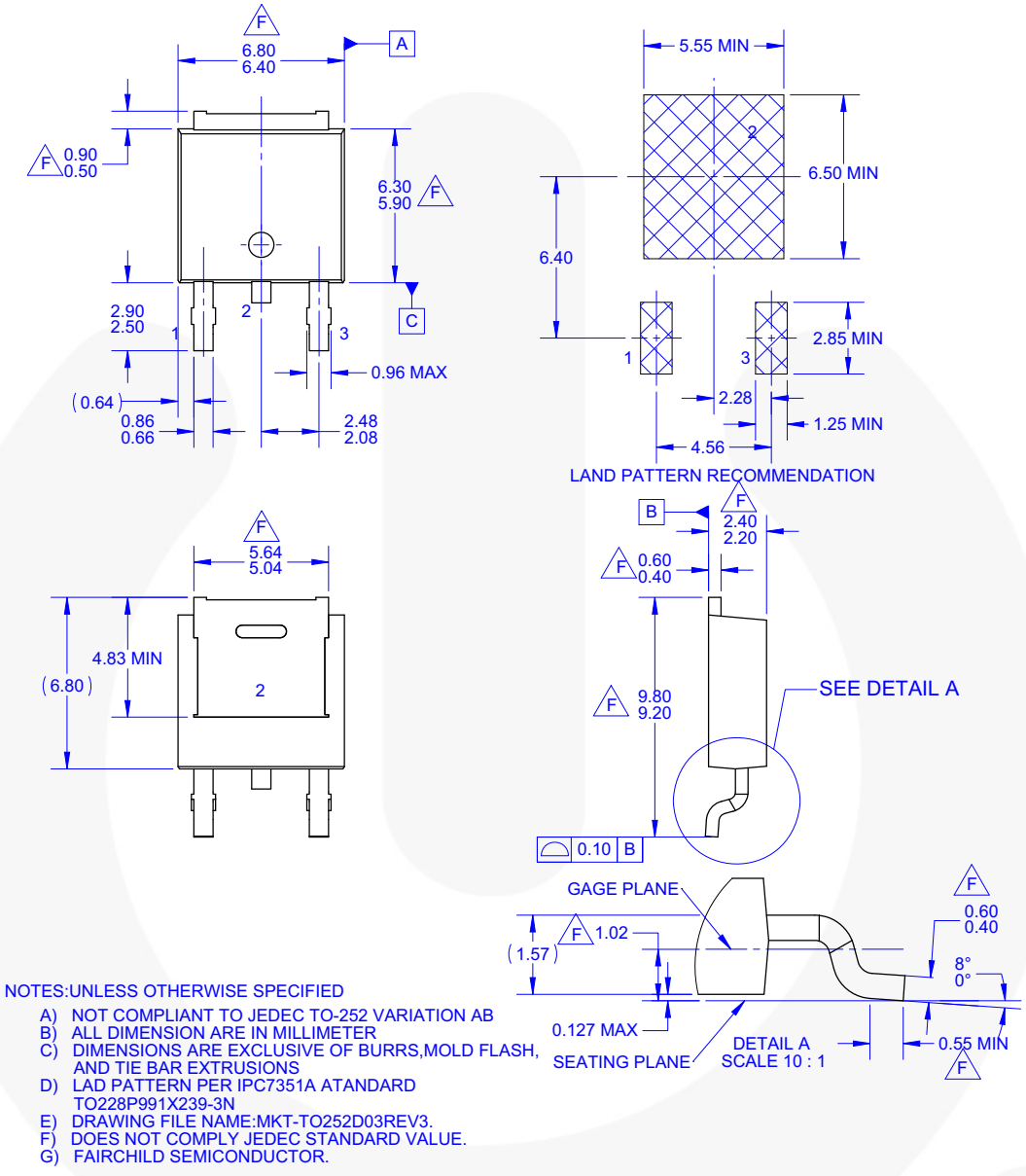


Figure 13. 3-Lead, TO-252, JEDEC TO-252 VAR. AB, SURFACE MOUNT (DPAK)

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