AME, Inc.

AME8753

Low Dropout 500mA / 500mA Dual CMOS LDO Regulator

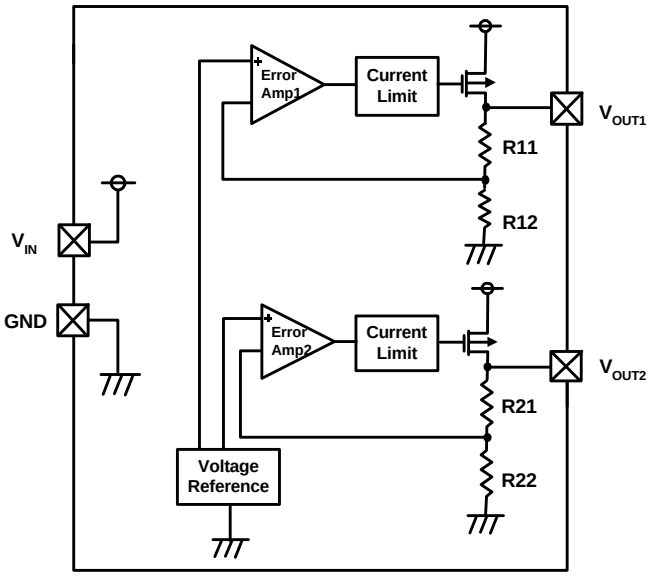
■ General Description

The AME8753 dual, low dropout, linear regulators operate from $V_{OUT}+V_{DROPOUT}$ to 5.5V input and deliver up to 500mA / 500mA output current each. Low dropout voltage and low quiescent current(70μA typ.)make them ideal for battery applications.

The AME8753 is available with a wide variety of voltage options as standard and can be trimmed to 2% accuracy.

For protection purpose, AME8753 has both thermal shutdown and current fold-back to prevent device failure under the "Worst" operating conditions.

■ Functional Block Diagram

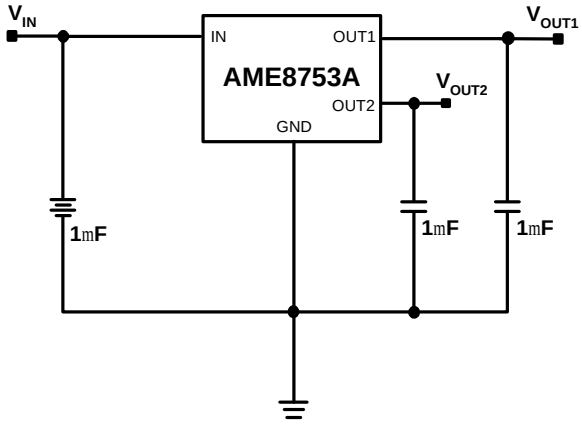


■ Features

- Very Low Dropout Voltage
- Guaranteed 500mA / 500mA Each Output
- Accurate to within 2% for both outputs
- Typical 70 μA Quiescent Current
- Over-Temperature Shutdown
- Current Limiting
- Short Circuit Current Fold-back
- All AME's Lead Free Products Meet RoHS Standards

■ Typical Applications

Fixed Version

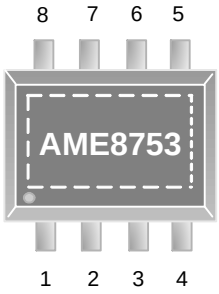


■ Applications

- Cellular Phones
- Palm / Notebook
- Battery Power Equipment
- Handheld Instruments

■ Pin Configuration

SOP-8/PP
Top View



AME 8753AEZA

1. IN
2. GND
3. GND
4. OUT1
5. OUT2
6. GND
7. GND
8. GND

* **Die Attach:**
Conductive Epoxy

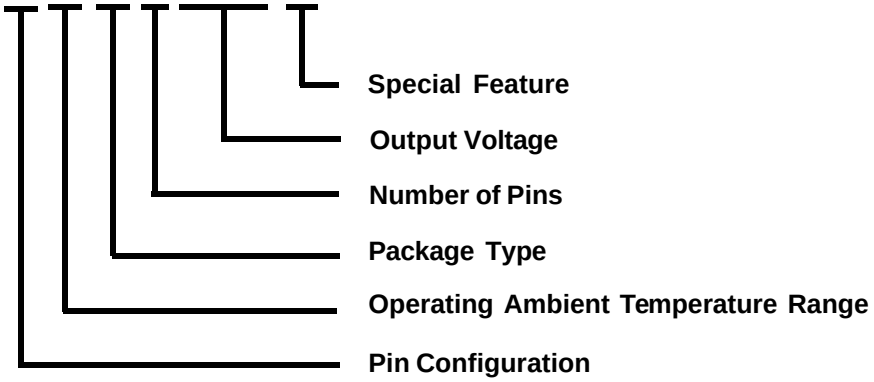
Note: The area enclosed by dashed line represents Exposed Pad and connection to GND.

■ Pin Description

Pin Number	Pin Name	Description
1	IN	Regulator Input. Supply voltage can range from Higher V_{OUT}+$V_{DROPOUT}$ to 5.5V. This input also supplies the on-chip reference. Bypass with 1μF capacitor to GND.
2	GND	Ground. This pin also functions as heatsink. Solder to a large pad or the circuit-board ground plane to maximize thermal dissipation.
3	GND	Ground. This pin also functions as heatsink. Solder to a large pad or the circuit-board ground plane to maximize thermal dissipation.
4	OUT1	Regulator 1 Output. Sources up to 500mA continuous current. Bypass with a 1μF (< 0.5Ω typ ESR) capacitor to GND.
5	OUT2	Regulator 2 Output. Sources up to 500mA continuous current. Bypass with a 1μF (< 0.5Ω typ ESR) capacitor to GND.
6	GND	Ground. This pin also functions as heatsink. Solder to a large pad or the circuit-board ground plane to maximize thermal dissipation.
7	GND	Ground. This pin also functions as heatsink. Solder to a large pad or the circuit-board ground plane to maximize thermal dissipation.
8	GND	Ground. This pin also functions as heatsink. Solder to a large pad or the circuit-board ground plane to maximize thermal dissipation.

■ Ordering Information

AME8753 x x x x xxxx x



Pin Configuration	Operating Ambient Temperature Range	Package Type	Number of Pins	Output Voltage (Both LDOs)	Special Feature
A (SOP-8/PP) 1. IN 2. GND 3. GND 4. OUT1 5. OUT2 6. GND 7. GND 8. GND	E: -40°C to 85°C	Z: SOP/PP	A: 8	2533: V_{OUT1}=2.5V V_{OUT2}=3.3V	Z: Lead free

■ Ordering Information

Part Number	Marking*	Output Voltage	Package	Operating Ambient Temperature Range
AME8753AEZA2533Z	AME8753 AEZA2533 yyww	V_{OUT1}=2.5V V_{OUT2}=3.3V	SOP-8/PP	- 40°C to 85°C

Note:yyww represents date code .
* a line on top of the first letter represents lead free plating such as $\overline{A}$ME8753.
Please consult AME sales office or authorized Rep./Distributor for voltage accuracy and package type availability.

■ Absolute Maximum Ratings

Parameter	Maximum	Unit
Input Voltage	-0.3 to 6	V
Output Voltage	-0.3 to V_{IN} + 0.3	V
Output Current	P_D / [$2V_{IN}$-(V_{OUT1}+V_{OUT2})]	mA
ESD Classification	C*	

Caution: Stress above the listed absolute maximum rating may cause permanent damage to the device

* HBM C:4000V+

■ Recommended Operating Conditions

Parameter	Symbol	Rating	Unit
Ambient Temperature Range	T_A	-40 to 85	°C
Junction Temperature Range	T_J	-40 to 125	°C
Storage Temperature Range	T_{STG}	-65 to 150	°C

■ Thermal Information

Parameter	Package	Die Attach	Symbol	Maximum	Unit
Thermal Resistance * (Junction to Case)	SOP-8/PP	Conductive Epoxy	θ_{JC}	19	°C / W
Thermal Resistance (Junction to Ambient)			θ_{JA}	84	
Internal Power Dissipation			P_D	1450	mW
Maximum Junction Temperature				150	°C
Solder Iron (10 Sec)**				350	°C

* Measure θ_{JC} on center of molding compound if IC has no tab.

** MIL-STD-202G 210F

■ Electrical Specifications

Unless specified: T_J=25°C, V_{IN}=Higher V_{OUT}+1V, I_{OUT1}=I_{OUT2}=1mA, C_{IN}=C_{OUT}=1μF.
Typical values are at T_J=25°C

Parameter	Symbol	Test Condition		Min	Typ	Max	Units
IN							
Input Supply Voltage	V_{IN}			Note1		5.5	V
Quiescent Current	I_Q				70	160	μA
OUT1, OUT2							
Output Voltage	V_{OUT}	I_{OUT}=1mA		-2%		2%	V
		0mA<I_{OUT}<=500mA, V_{OUT}+1V<V_{IN}<5.5V	T_J=-40°C to +125°C	-2.5%		2.5%	
Line Regulation	REG_{LINE}	V_{OUT}+1V<V_{IN}<5.5V, I_{OUT}=1mA	T_J=25°C	-0.2		0.2	%/V
			T_J=-40°C to +125°C	-0.25		0.25	
Load Regulation	REG_{LOAD}	1mA<I_{OUT}	T_J=-40°C to +125°C	-0.005	±0.0025	0.005	%/mA
Dropout Voltage	V_{DROP}	I_{OUT1}=I_{OUT2}=500mA (V_O=$V_{O(NOM)}$-2%), $V_{O(NOM)}$>=2.5V	T_J=-40°C to +125°C			800	mV
Current Limit	I_{LIM}			700		1400	mA
Short Circuit Current	I_{SC}				350	500	
Ripple Rejection	PSRR	f=100HZ, I_{OUT}=1mA			55		dB
		f=1kHZ, I_{OUT}=1mA			55		
		f=10kHZ, I_{OUT}=1mA			48		
Output Voltage Noise	e_n	f=1kHz to 100kHz, C_{OUT}=1μF			550		$μV_{RMS}$
Over Temperature Protection							
Over Temperature Shutdown	OTS				150		°C
Over Temperature Hysteresis	OTH				20		°C

Note1: $V_{IN(min)}$=HigherV_{OUT}+ $V_{Dropout}$

■ Detailed Description

The AME8753 is low-dropout, low quiescent-current linear regulator designed primarily for battery-powered applications. These parts are available with preset output voltage ranging from 2.5V to 3.3V, and the parts can supply loads up to 500mA.

Internal P-Channel Pass Transistor

The AME8753 features two 1Ω P-Channel MOSFET pass transistors. A P-Channel MOSEFT provides several advantages over similar designs using PNP pass transistors, including longer battery life. It requires no base drive, which reduces quiescent current significantly. The AME8753 only consume 70μA of quiescent current whether in dropout, light-load, or heavy-load applications.

Current Limit

The AME8753 contains two independent current limiters, one for each regulator, which monitor and control the pass transistor's gate voltage, limiting output current to 700mA minimum. The output can be shorted to ground for an indefinite time without damaging the part.

Thermal-Overload Protection

Thermal -overload protection limits total power dissipation in the AME8753. When the junction trmperature exceeds T_J=150°C, the themal sensor signals the shutdown logic, turning off the pass transistor and allowing the IC to cool.

■ Application Information

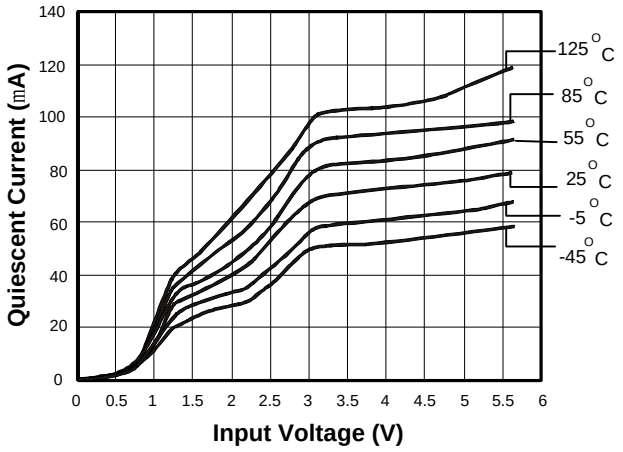
Capacitor Selection and Regulator Stability

Use a 1μF capacitor on the AME8753 input and a 1μF capacitor on the outputs. Larger input capacitor values and lower ESRs provide better supply noise rejection and line transient response.

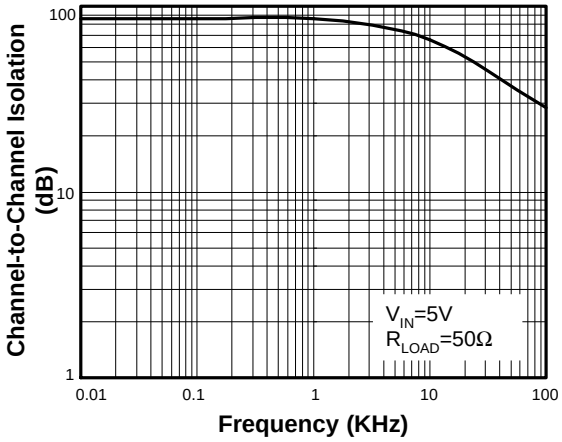
PSRR and Operation from Sources Other than Batteries

The AME8753 is designed to deliver low dopout voltages and low quiescent currents in battery powered systems. Power-supply rejection is 50dB at low frequencies.

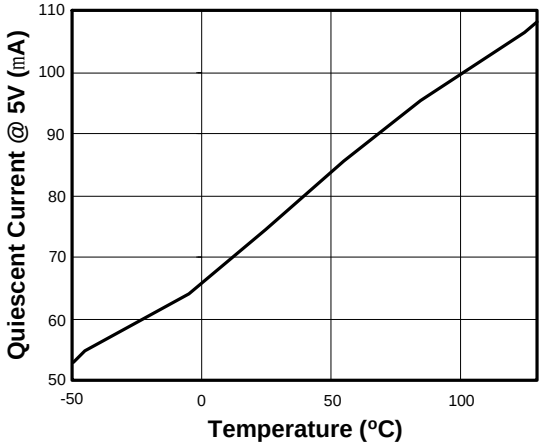
Quiescent Current vs Input Voltage



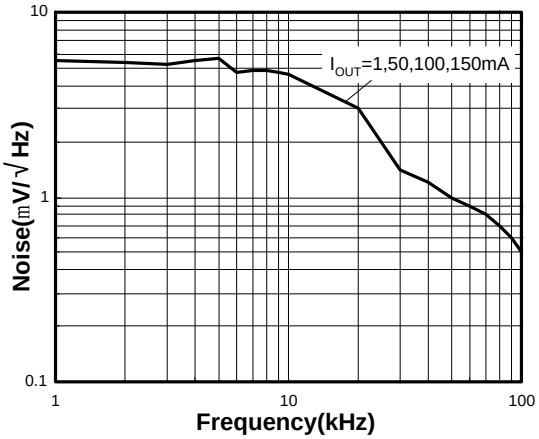
Channel-to-Channel Isolation (dB)



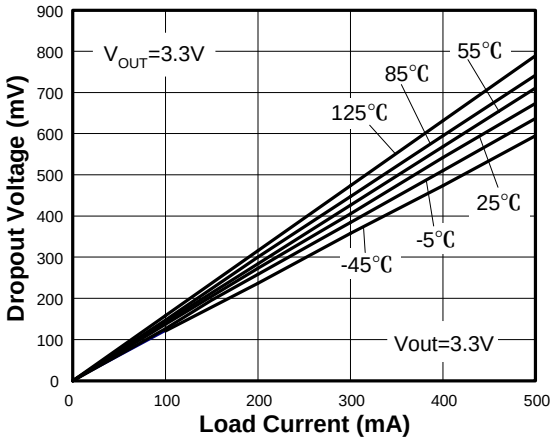
Quiescent Current vs Temperature



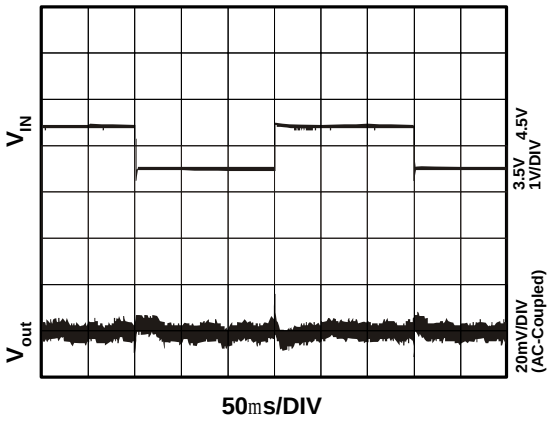
Output Noise Spectral Density



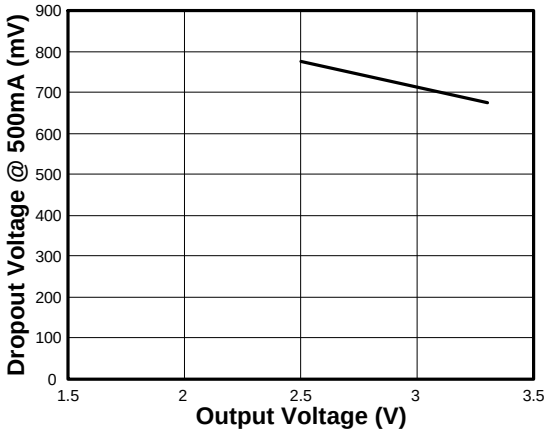
Dropout Voltage vs Load Current



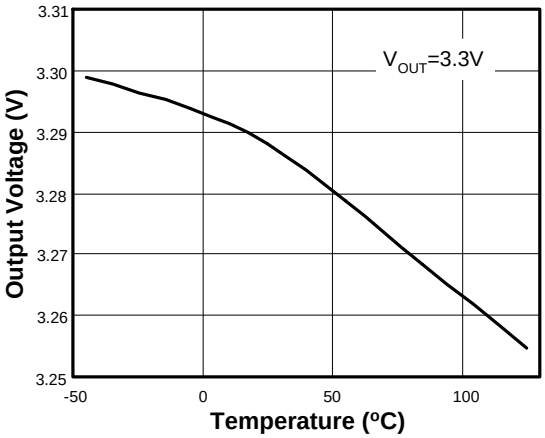
Line Transient



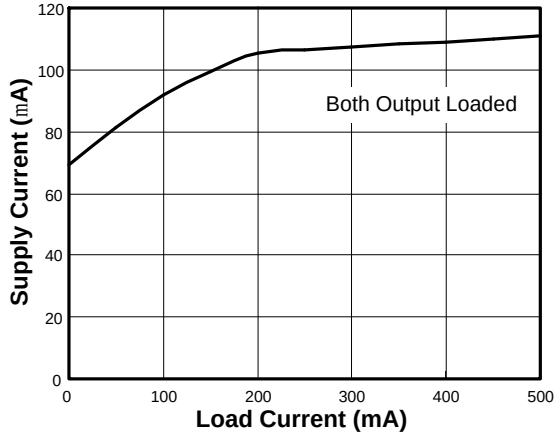
Dropout Voltage vs Output Voltage



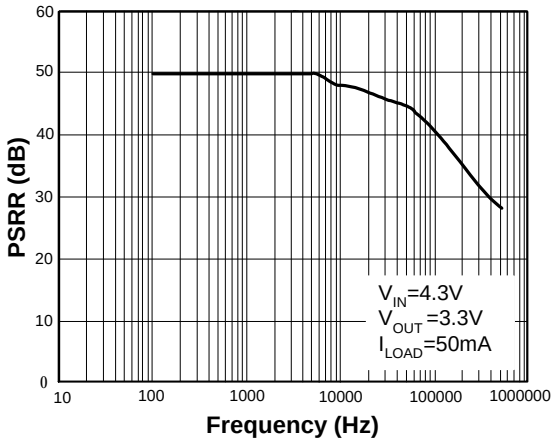
Output Voltage vs Temperature



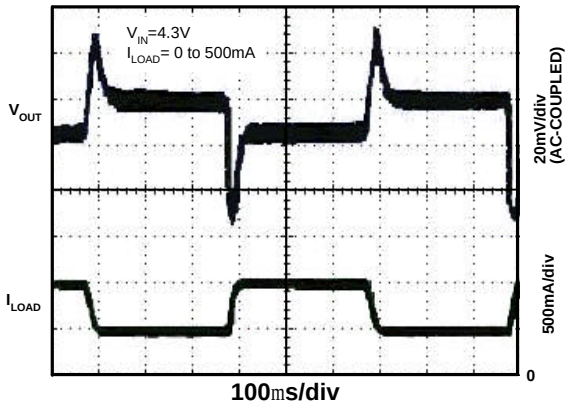
Supply Current vs Load Current



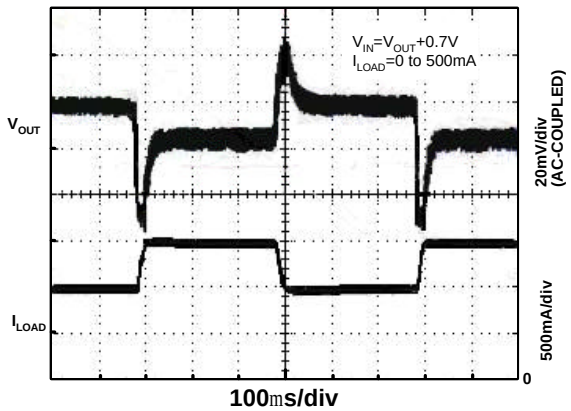
PSRR vs Frequency



Load Transient

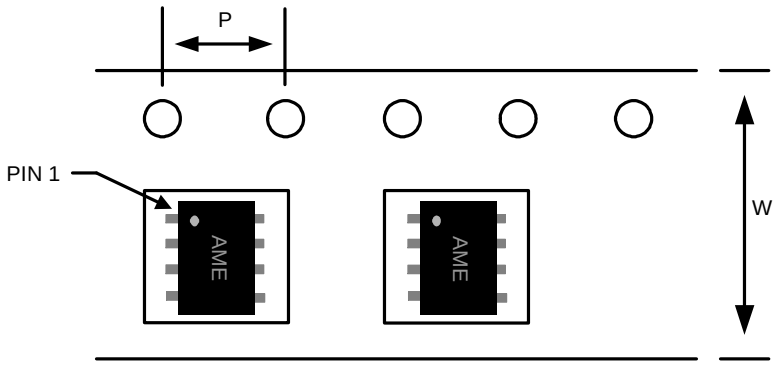


Load Transient Near Dropout



■ Tape and Reel Dimension

SOP-8/PP

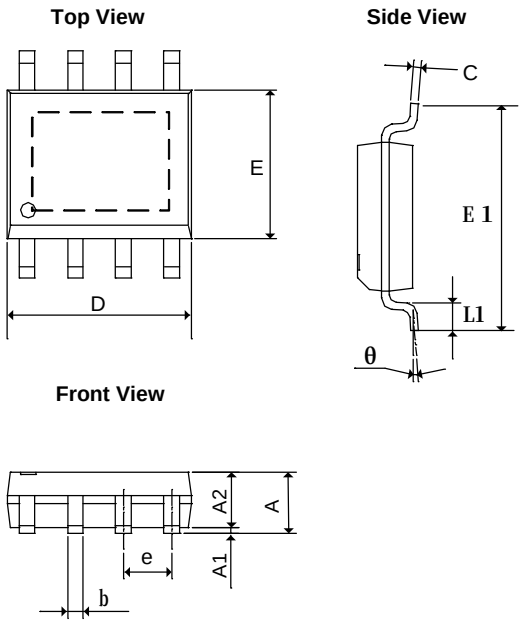


Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOP-8/PP	12.0±0.1 mm	4.0±0.1 mm	2500pcs	330±1 mm

■ Package Dimension

SOP-8/PP



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	-	1.700	-	0.067
A_1	0.050	0.150	0.002	0.006
A2	1.350	1.550	0.053	0.061
C	0.100	0.250	0.004	0.010
E	3.750	4.150	0.148	0.163
E1	5.700	6.300	0.224	0.248
L	0.300	0.700	0.012	0.028
b	0.310	0.510	0.012	0.020
D	4.720	5.120	0.186	0.202
e	1.270 BSC		0.05 BSC	
q	0^o	8^o	0^o	8^o

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