78M00 SERIES
500mA 3-TERMINAL POSITIVE LINEAR REGULATOR

General Description

The 78M00 series are monolithic integrated circuits designed as fixed-voltage regulators for a wide variety of applications including local, on-card regulation.

This series of regulators are complete with internal current limiting, thermal shutdown protection, and safe-area compensation which make them virtually immune from output overload. If adequate heat sinking are provided, these regulators can deliver output currents up to 0.5A.

The 78M00 series are av ailable in two standard plastic packages: TO-220-3 and TO-252-2 (1).

Features

- Output Current up to 0.5A
- Fixed Output Voltages of 5V, 6V, 8V, 9V and 12V
- Output Voltage Tolerances of ±5% over the Full Temperature Range
- Internal Short Circuit Current-limiting
- Internal Thermal Overload Protection

Applications

- Consumer Electronics
- Microprocessor Power Supply
- Mother Board I/O Power Supply

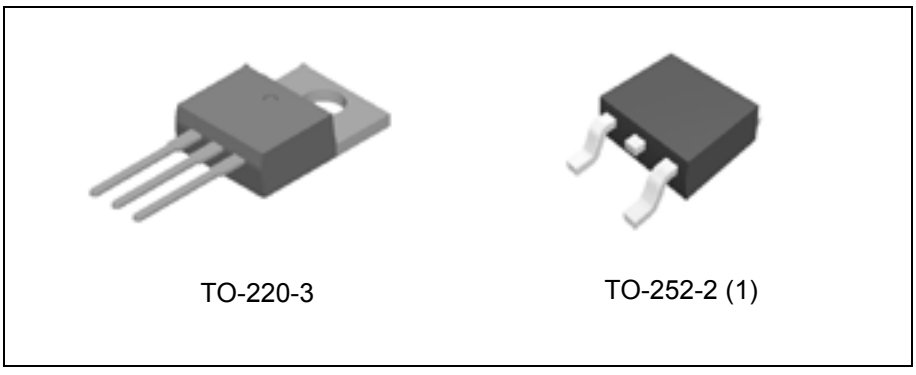


Figure 1. Package Types of 78M00

Pin Configuration

T Package
(TO-220-3)

D Package
(TO-252-2 (1))

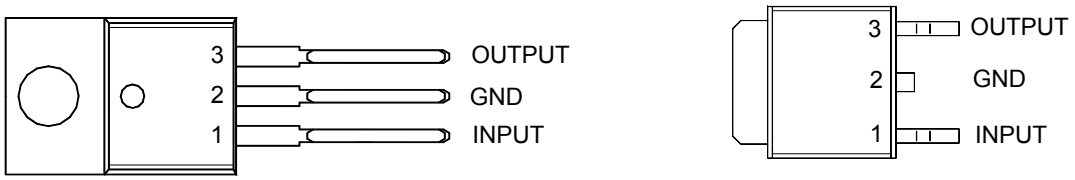


Figure 2. Pin Configuration of 78M00 (Top View)

Pin Description

Pin Number	Pin Name	Function
1	INPUT	Voltage Input
2	GND	Ground
3	OUTPUT	Voltage Output

Functional Block Diagram

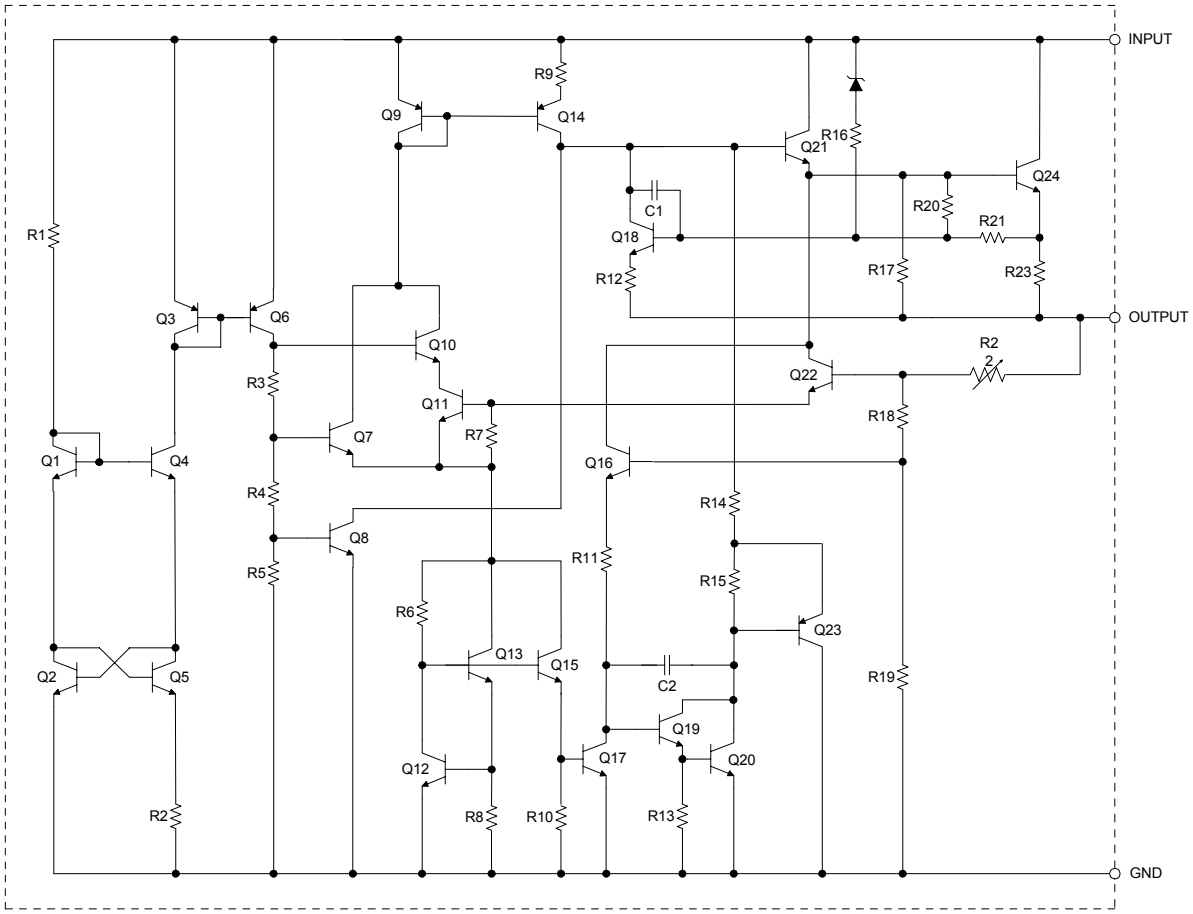


Figure 3. Functional Block Diagram of 78M00

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value		Unit
Input Voltage	V_{IN}	35		V
Operating Junction Temperature	T_J	150		°C
Lead Temperature (Soldering, 10sec.)	T_{LEAD}	260		°C
Power Dissipation	P_D	Internally Limited		W
Storage Temperature Range	T_{STG}	-65 to 150		°C
Thermal Resistance	θ_{JA}	TO-220-3	60	°C/W
		TO-252-2 (1)	100	
ESD (Human Body Model)	ESD	2500		V
ESD (Machine Model)	ESD	250		V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Input Voltage	V_{IN}		35	V
Operating Junction Temperature Range	T_J	-40	125	℃

Electrical Characteristics

78M05 (V_{IN}=10V, I_{OUT}=350mA, T =-40°C to 125 °C, P_D ≤ 5W, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	T_J=25°C	4.8	5	5.2	V
		V_{IN}=7V to 20V, I_{OUT}=5mA to 350mA	4.75	5	5.25	V
Line Regulation	V_{RLINE}	T_J=25°C, V_{IN}=7V to 25V, I_{OUT}=200mA		3	100	mV
Load Regulation	V_{RLOAD}	T_J=25°C, I_{OUT}=5mA to 500mA		20	100	mV
Quiescent Current	I_Q	T_J=25°C		3.2	6	mA
Quiescent Current Change	ΔI_Q	V_{IN}=8V to 25V, I_{OUT}=200mA			0.8	mA
		I_{OUT}=5mA to 350mA			0.5	
Ripple Rejection	$\Delta V_{IN}/\Delta V_{OUT}$	V_{IN}=8V to 18V, f=120Hz, I_{OUT}=200mA	62	73		dB
Dropout Voltage	V_{IN}-V_{OUT}	ΔV_{OUT} =1%, T_J=25°C		2		V
Output Noise Voltage	N_O	T_A=25°C, f=10Hz to 100KHz		40		μV
Short Circuit Current	I_{SC}	T_J=25°C, V_{IN} =35V		50		mA
Peak Output Current	I_{PK}	T_J=25°C		700		mA
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA		0.2		mV/°C

78M06 (V_{IN}=11V, I_{OUT}=350mA, T =-40°C to 125 °C, P_D ≤ 5W, unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	T_J=25°C	5.75	6	6.25	V
		V_{IN}=8V to 21V, I_{OUT}=5mA to 350mA	5.7	6	6.3	V
Line Regulation	V_{RLINE}	T_J=25°C, V_{IN}=8V to 25V, I_{OUT}=200mA		5	100	mV
Load Regulation	V_{RLOAD}	T_J=25°C, I_{OUT}=5mA to 500mA		20	120	mV
Quiescent Current	I_Q	T_J=25°C		3.2	6	mA
Quiescent Current Change	ΔI_Q	V_{IN}=9V to 25V, I_{OUT}=200mA			0.8	mA
		I_{OUT}=5mA to 350mA			0.5	
Ripple Rejection	$\Delta V_{IN}/\Delta V_{OUT}$	V_{IN}=9V to 19V, f=120Hz, I_{OUT}=200mA	59	65		dB
Dropout Voltage	V_{IN}-V_{OUT}	ΔV_{OUT} =1%, T_J=25°C		2		V
Output Noise Voltage	N_O	T_A=25°C, f=10Hz to 100KHz		45		μV
Short Circuit Current	I_{SC}	T_J=25°C, V_{IN} =35V		50		mA
Peak Output Current	I_{PK}	T_J=25°C		700		mA
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA		0.2		mV/°C

Electrical Characteristics (Continued)

78M08 (V_{IN}=14V, I_{OUT}=350mA, T =-40°C to 125 °C, P_D ≤ 5W, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	T_J=25°C	7.7	8	8.3	V
		V_{IN}=10.5V to 23V, I_{OUT}=5mA to 350mA	7.6	8	8.4	V
Line Regulation	V_{RLINE}	T_J=25°C, V_{IN}=10.5V to 25V, I_{OUT}=200mA		6	100	mV
Load Regulation	V_{RLOAD}	T_J=25°C, I_{OUT}=5mA to 500mA		25	160	mV
Quiescent Current	I_Q	T_J=25°C		3.2	6	mA
Quiescent Current Change	ΔI_Q	V_{IN}=10.5V to 25V, I_{OUT}=200mA			0.8	mA
		I_{OUT}=5mA to 350mA			0.5	
Ripple Rejection	$\Delta V_{IN}/\Delta V_{OUT}$	V_{IN}=11.5V to 21.5V, f=120Hz, I_{OUT}=200mA	56	62		dB
Dropout Voltage	V_{IN}-V_{OUT}	ΔV_{OUT} =1%, T_J=25°C		2		V
Output Noise Voltage	N_O	T_A=25°C, f=10Hz to 100KHz		52		μV
Short Circuit Current	I_{SC}	T_J=25°C, V_{IN}=35V		50		mA
Peak Output Current	I_{PK}	T_J=25°C		700		mA
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA		0.2		mV/°C

78M09 (V_{IN}=15V, I_{OUT}=350mA, T =-40°C to 125 °C, P_D ≤ 5W, unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	T_J=25°C	8.65	9	9.35	V
		V_{IN}=11.5V to 24V, I_{OUT}=5mA to 350mA	8.55	9	9.45	V
Line Regulation	V_{RLINE}	T_J=25°C, V_{IN}=11.5V to 25V, I_{OUT}=200mA		6	100	mV
Load Regulation	V_{RLOAD}	T_J=25°C, I_{OUT}=5mA to 500mA		25	180	mV
Quiescent Current	I_Q	T_J=25°C		3.2	6	mA
Quiescent Current Change	ΔI_Q	V_{IN}=11.5V to 25V, I_{OUT}=200mA			0.8	mA
		I_{OUT}=5mA to 350mA			0.5	
Ripple Rejection	$\Delta V_{IN}/\Delta V_{OUT}$	V_{IN}=12.5V to 22.5V, f=120Hz, I_{OUT}=200mA	56	61		dB
Dropout Voltage	V_{IN}-V_{OUT}	ΔV_{OUT} =1%, T_J=25°C		2		V
Output Noise Voltage	N_O	T_A=25°C, f=10Hz to 100KHz		52		μV
Short Circuit Current	I_{SC}	T_J=25°C, V_{IN}=35V		50		mA
Peak Output Current	I_{PK}	T_J=25°C		700		mA
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA		0.2		mV/°C

Electrical Characteristics (Continued)

78M12 (V_{IN}=17V, I_{OUT}=350mA, T_J=-40°C to 125 °C, $P_D \leqslant$ 5W, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	T_J=25°C	11.5	12	12.5	V
		V_{IN}=14.5V to 27V, I_{OUT}=5mA to 350mA	11.4	12	12.6	V
Line Regulation	V_{RLINE}	T_J=25°C, V_{IN}=14.5V to 30V, I_{OUT}=200mA		8	100	mV
Load Regulation	V_{RLOAD}	T_J=25°C, I_{OUT}=5mA to 500mA		25	240	mV
Quiescent Current	I_Q	T_J=25°C		3.2	6	mA
Quiescent Current Change	ΔI_Q	V_{IN}=14.5V to 30V, I_{OUT}=200mA			0.8	mA
		I_{OUT}=5mA to 350mA			0.5	
Ripple Rejection	$\Delta V_{IN}/\Delta V_{OUT}$	V_{IN}=15V to 25V, f=120Hz, I_{OUT}=200mA	55	60		dB
Dropout Voltage	V_{IN}-V_{OUT}	ΔV_{OUT} =1%, T_J=25°C		2		V
Output Noise Voltage	N_O	T_A=25°C, f=10Hz to 100KHz		75		μV
Short Circuit Current	I_{SC}	T_J=25°C, V_{IN}=35V		50		mA
Peak Output Current	I_{PK}	T_J=25°C		700		mA
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA		0.3		mV/°C

Typical Performance Characteristics

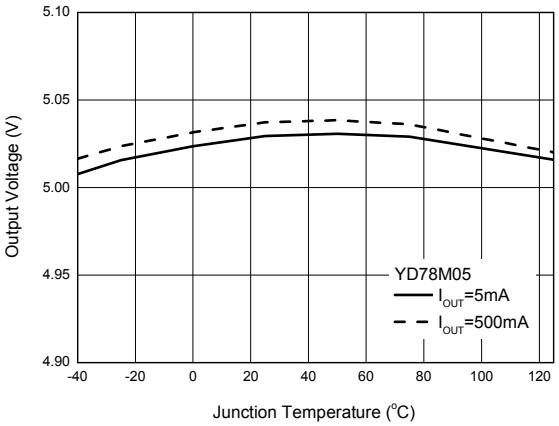


Figure 4. Output Voltage vs. Junction Temperature

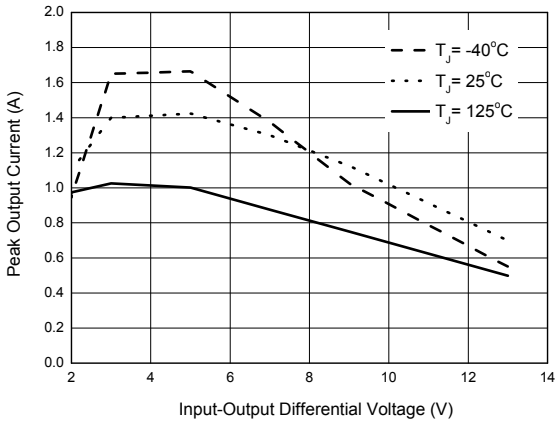


Figure 5. Peak Output Current vs. Input-Output Differential Voltage

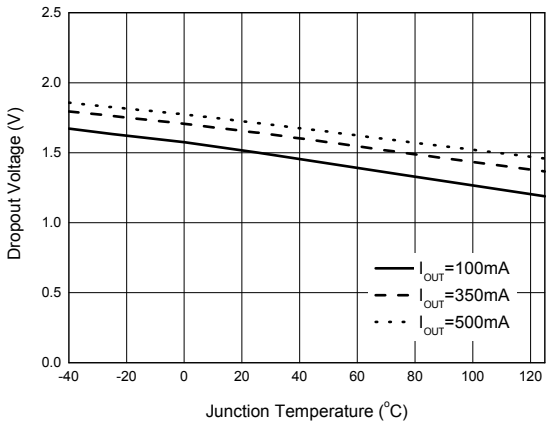


Figure 6. Dropout Voltage vs. Junction Temperature

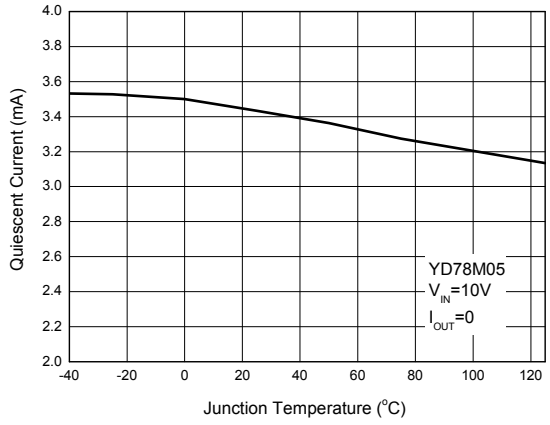


Figure 7. Quiescent Current vs. Junction Temperature

Typical Performance Characteristics (Continued)

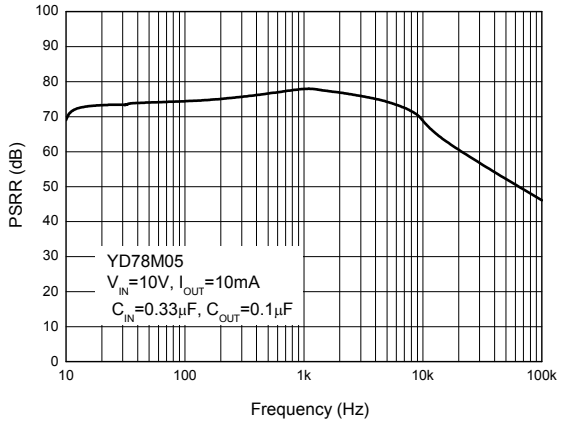


Figure 8. PSRR vs. Frequency

Typical Application

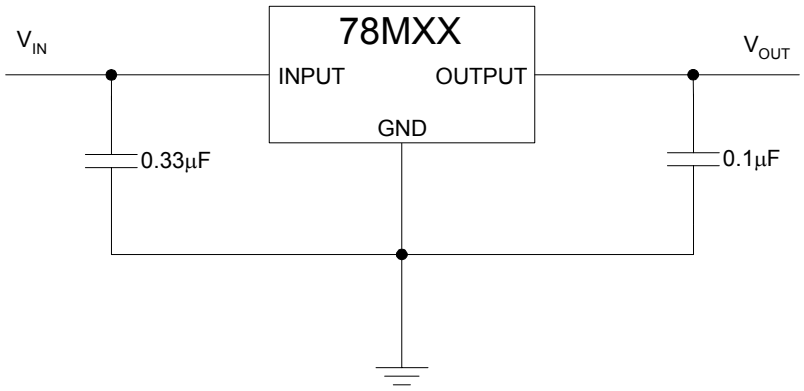
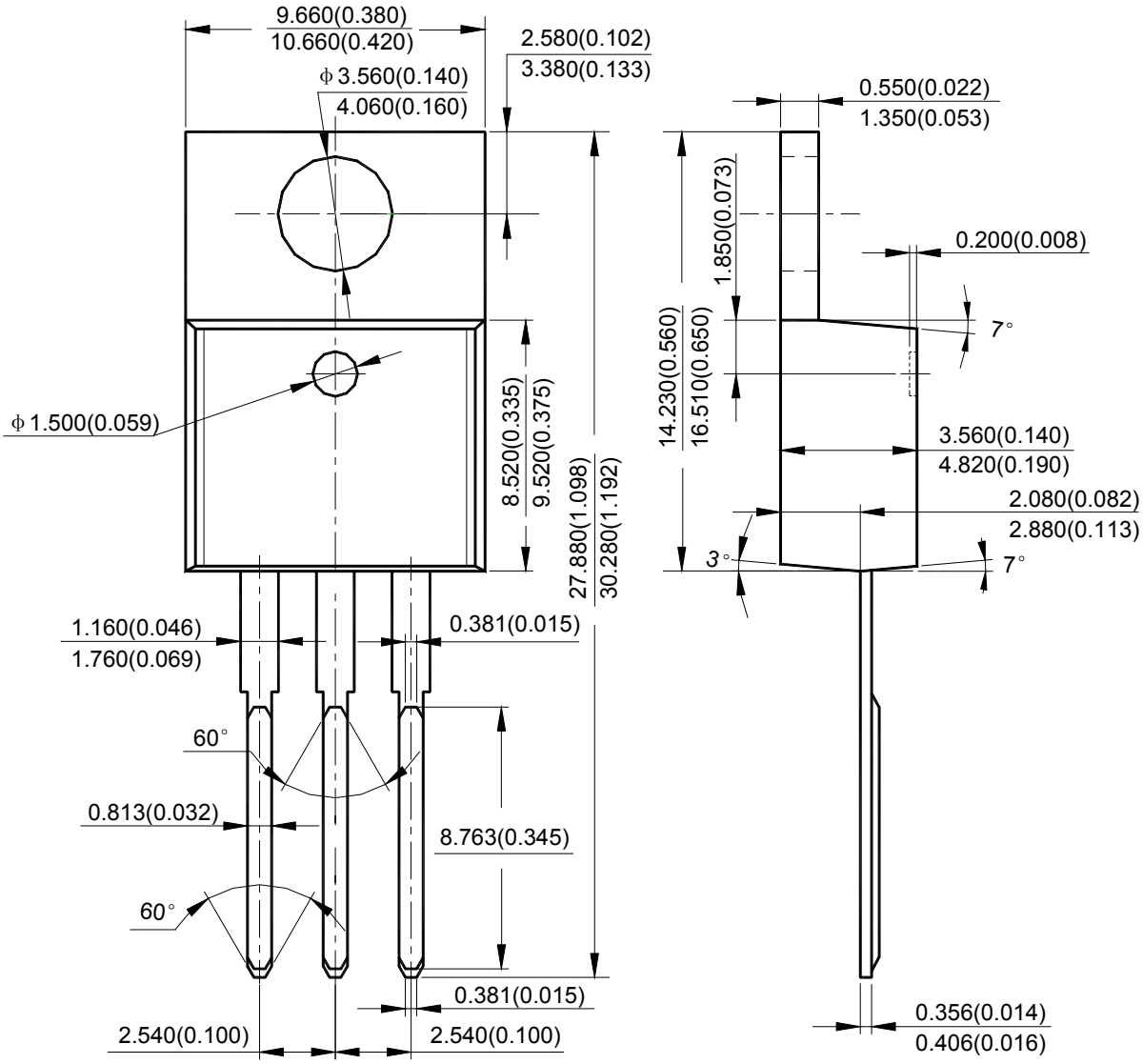


Figure 9. Typical Application of 78M00

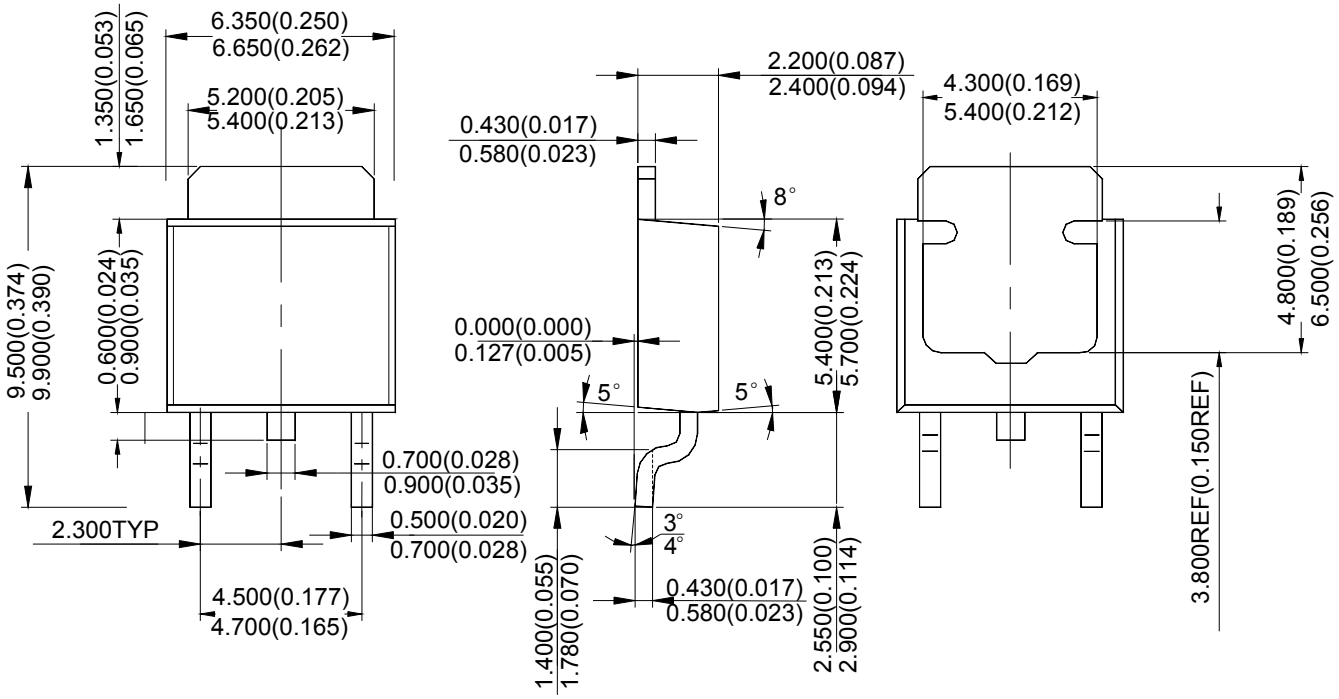
Mechanical Dimensions

TO-220-3 **Unit: mm(inch)**



Mechanical Dimensions (Continued)

TO-252-2(1) **Unit: mm(inch)**



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