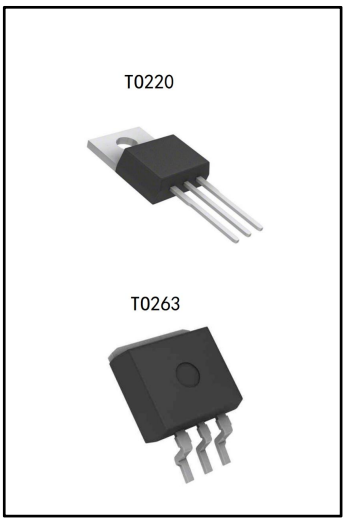
Max.Input 35V Max.Current 1.5A Voltage regulator

LM78XX

General Description

LM78XX is three-terminal positive regulators. One of these regulators can deliver up to 1.5A of output current. The internal limiting and thermal-shutdown features of the regulator make them essentially immune to overload. When used as a replacement for a zener diode-resistor Combination, an effective improvement in output impedance can be obtained, together with lower quiescent current.



Features

- Maximum Output current of 1.5A
- Maximum input voltage ： 35V
- Thermal overload protection
- Short circuit protection
- Built-in limited flow circuit
- Package：TO220 and TO263
- Output voltage accuracy: tolerance ±5%

Order specification

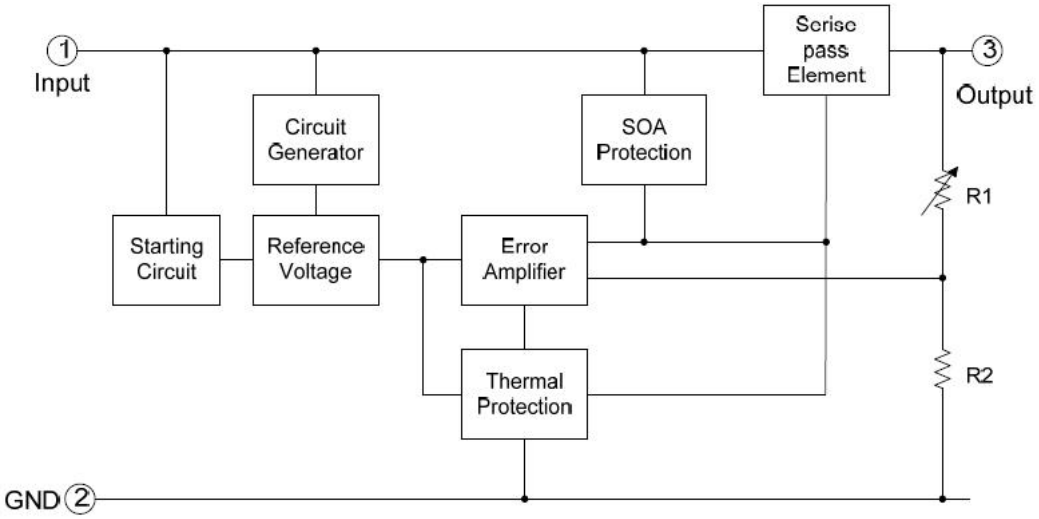
Part No	Package	Manner of Packing	Devices per bag/reel
LM78XXCT	TO220	Tube	50PCS/tube
LM78XXCD	TO263	Reel	800PCS/reel

Note: XX indicates output voltage. For example, 05 means product outputs 5.0V.

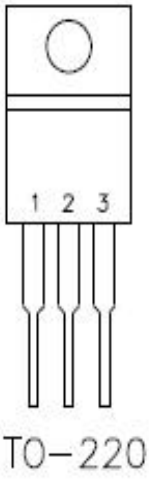
Selection Table

Part No.	Output Voltage	Package	Marking
LM7805	5.0V	TO220 TO263	L7805CV
LM7806	6.0V		L7806CV
LM7808	8.0V		L7808CV
LM7809	9.0V		L7809CV
LM7812	12V		L7812CV

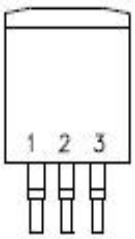
Block Diagram



Pin Assignment



TO-220



TO-263

PIN NO.	PIN NAME	FUNCTION
1	VIN	Input
2	GND	Ground
3	VOUT	Output

Functional Description

The LM78XX is three-terminal positive regulators. One of these regulators can deliver up to 1.5A of output current.

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Input Supply Voltage	V_{IN}	35	V
Max. Output Current	I_{OUT}	1500	mA
Power dissipation	P_D	Internally limited	
Maximum Junction Temperature	Tj	-25~125	℃
Storage Temperature	Tstr	-65~125	℃
Soldering Temperature and Time	Tsol	260(Recommended 10s)	℃

Note: The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

Electrical Characteristics

1、7805 (refer to the test circuits，TJ=-55 to 150℃，V_I=10V，I_O=500mA，C_I=0.33μF，C_O=0.1μF, unless otherwise specified.)

Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	TJ=+25℃		4.8	5	5.2	V
		IO=5mA to 1A, PD≤15W, VI=8V to 20V		4.75	5	5.25	V
Line Regulation (Note 1)	ΔV_O	TJ=+25℃	VI=7V to 25V	-	-	100	mV
			VI=8V to 12V	-	-	50	mV
Load Regulation (Note 1)	ΔV_O	TJ=+25℃,IO=5mA to 1.2A		-	-	100	mV
		TJ=+25℃,IO=250mA to 750mA		-	-	50	mV
Quiescent Current	I_Q	TJ=+25℃		-	2	6	mA
Quiescent Current Change	ΔI_Q	IO=5mA to 1A		-	-	0.5	mA
		VI=8V to 25V		-	-	1.5	mA
Quiescent Current Change	$\Delta V_O/\Delta T$	IO=5mA		-	0.6	-	mV/℃
Short Circuit Current	I_{SC}	TJ=+25℃,VI=35V		-	0.75	1.5	A

2、7806 (refer to the test circuits，TJ=-55 to 150℃，V_I = 11 V，I_O=500mA，C_I=0.33μF，C_O=0.1μF, unless otherwise specified.)

Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	TJ=+25℃		5.75	6	6.25	V
		IO=5mA to 1A, PD≤15W, VI=9V to 21V		5.65	6	6.35	V
Line Regulation (Note 1)	ΔV_O	TJ=+25℃	VI=8V to 25V	-	-	100	mV
			VI=9V to 13V	-	-	50	mV
Load Regulation (Note 1)	ΔV_O	TJ=+25℃,IO=5mA to 1.2A		-	-	100	mV
		TJ=+25℃,IO=250mA to 750mA		-	-	50	mV
Quiescent Current	I_Q	TJ=+25℃		-	2	6	mA
Quiescent Current Change	ΔI_Q	IO=5mA to 1A		-	-	0.5	mA
		VI=9V to 25V		-	-	0.8	mA
Quiescent Current Change	$\Delta V_O/\Delta T$	IO=5mA		-	0.7	-	mV/℃
Short Circuit Current	I_{SC}	TJ=+25℃,VI=35V		-	0.75	1.5	A

3、7808 (refer to the test circuits，TJ=-55 to 150℃，V_I = 14 V，I_O=500mA，C_I=0.33μF，C_O=0.1μF, unless otherwise specified.)

Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	TJ=+25℃		7.7	8	8.3	V
		IO=5mA to 1A, PD≤15W, VI=11.5V to 23V		7.6	8	8.4	V
Line Regulation (Note 1)	ΔV_O	TJ=+25℃	VI=10.5V to 25V	-	-	100	mV
			VI=11V to 17V	-	-	50	mV
Load Regulation (Note 1)	ΔV_O	TJ=+25℃,IO=5mA to 1.2A		-	-	100	mV
		TJ=+25℃,IO=250mA to 750mA		-	-	50	mV
Quiescent Current	I_Q	TJ=+25℃		-	2	6	mA
Quiescent Current Change	ΔI_Q	IO=5mA to 1A		-	-	0.5	mA
		VI=11.5V to 25V		-	-	1	mA
Quiescent Current Change	$\Delta V_O/\Delta T$	IO=5mA		-	1	-	mV/℃
Short Circuit Current	I_{SC}	TJ=+25℃,VI=35V		-	0.75	1.5	A

4、7809 (refer to the test circuits，TJ=-55 to 150℃，V_I = 15 V，I_O=500mA，C_I=0.33μF，C_O=0.1μF, unless otherwise specified.)

Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	TJ=+25℃		8.64	9	9.36	V
		IO=5mA to 1A, PD≤15W, VI=11.5V to 26V		8.55	9	9.45	V
Line Regulation (Note 1)	ΔV_O	TJ=+25℃	VI=11.5V to 26V	-	-	100	mV
			VI=12V to 18V	-	-	50	mV
Load Regulation (Note 1)	ΔV_O	TJ=+25℃,IO=5mA to 1.2A		-	-	100	mV
		TJ=+25℃,IO=250mA to 750mA		-	-	50	mV
Quiescent Current	I_Q	TJ=+25℃		-	2	6	mA
Quiescent Current Change	ΔI_Q	IO=5mA to 1A		-	-	0.5	mA
		VI=11.5V to 26V		-	-	1	mA
Quiescent Current Change	$\Delta V_O/\Delta T$	IO=5mA		-	1	-	mV/℃
Short Circuit Current	I_{SC}	TJ=+25℃,VI=35V		-	0.75	1.5	A

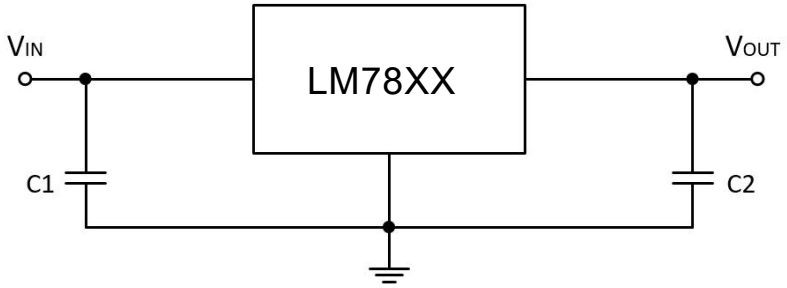
5、7812 (refer to the test circuits，TJ=-55 to 150℃，V_I = 19V，I_O=500mA，C_I=0.33μF，C_O=0.1μF, unless otherwise specified.)

Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	TJ=+25℃		11.5	12	12.5	V
		IO=5mA to 1A, PD≤15W, VI=15.5V to 27V		11.4	12	12.6	V
Line Regulation (Note 1)	ΔV_O	TJ=+25℃	VI=14.5V to 30V	-	-	100	mV
			VI=16V to 22V	-	-	50	mV
Load Regulation (Note 1)	ΔV_O	TJ=+25℃,IO=5mA to 1.2A		-	-	100	mV
		TJ=+25℃,IO=250mA to 750mA		-	-	50	mV
Quiescent Current	I_Q	TJ=+25℃		-	2	6	mA
Quiescent Current Change	ΔI_Q	IO=5mA to 1A		-	-	0.5	mA
		VI=15V to 30V		-	-	1	mA
Quiescent Current Change	$\Delta V_O/\Delta T$	IO=5mA		-	1.5	-	mV/℃
Short Circuit Current	I_{SC}	TJ=+25℃,VI=35V		-	0.75	1.5	A

LNR: Line Regulation. The change in output voltage for a change in the input voltage. The measurement is made under conditions of low dissipation or by using pulse techniques such that the average chip temperature is not significantly affected.

LDR: Load Regulation.The change in output voltage for a change in load current at constant chip temperature.

Application Circuits



C1=C2=1uF

Typical Performance Characteristics

Figure 1：Dropout voltage vs Junction temperature

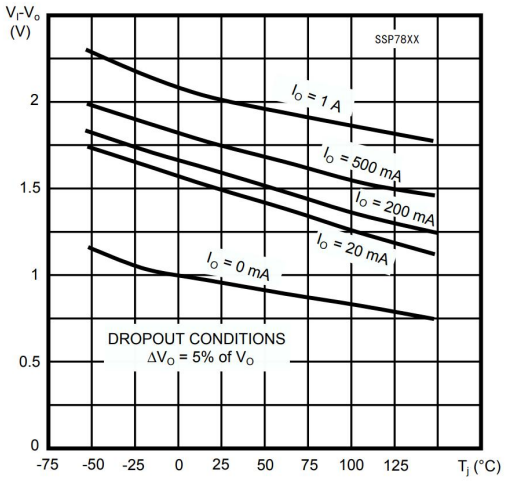


Figure 2：Peak output current vs Input/output differential voltage

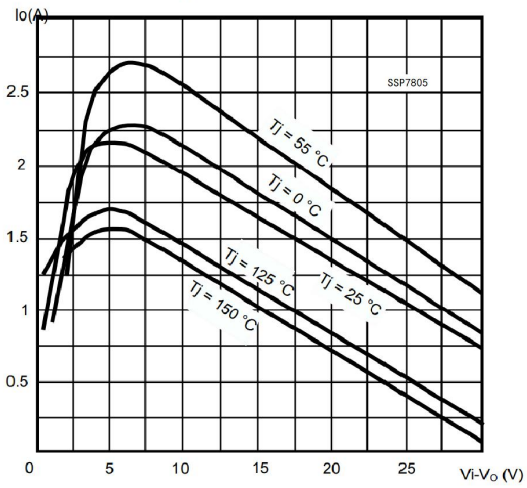


Figure 3：Supply voltage rejection vs Frequency temperature

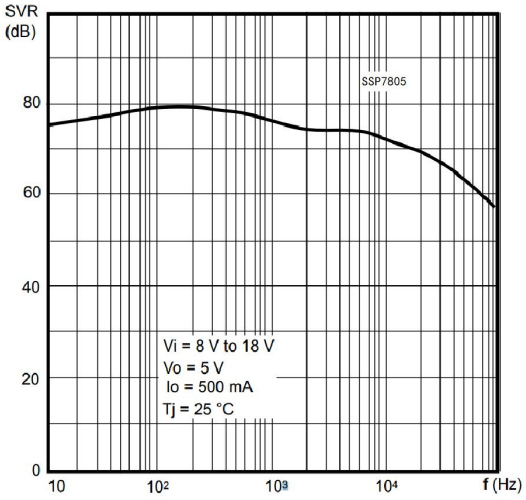


Figure 4：Quiescent current vs Junction

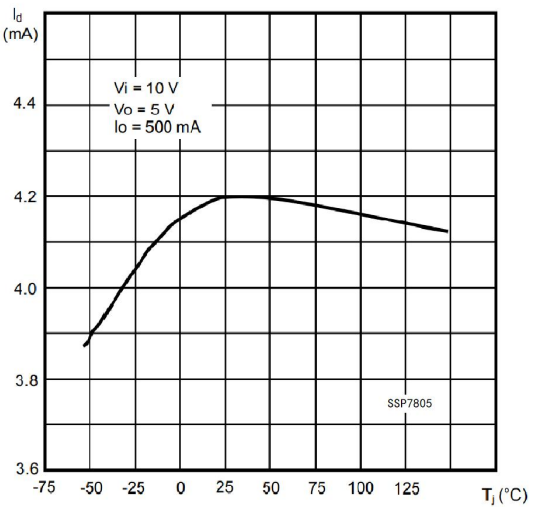


Figure 5：Output voltage vs Junction temperature

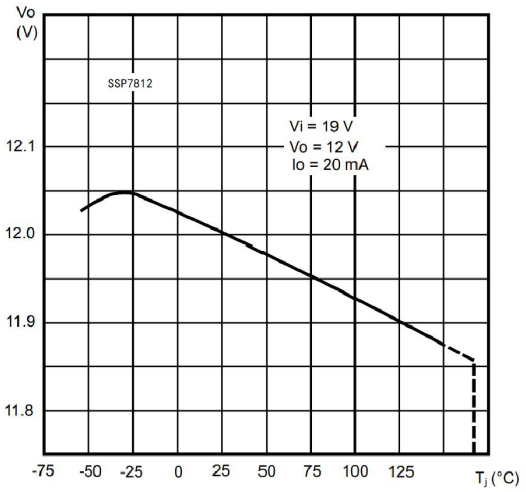


Figure 6：Load transient response

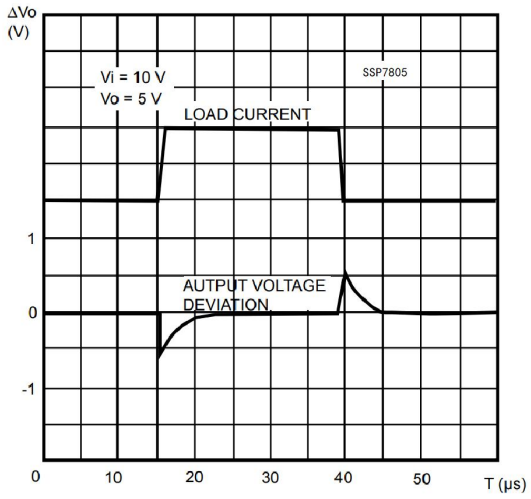


Figure 7：Output impedance vs Frequency

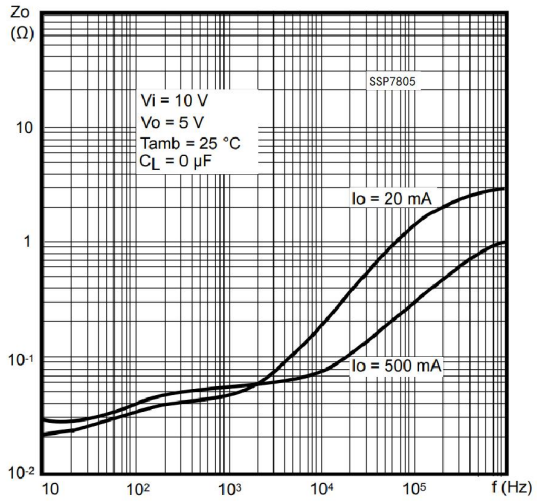


Figure 8：Line transient response

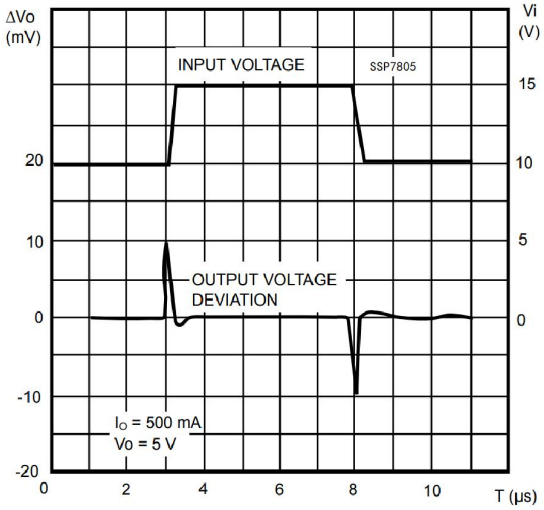
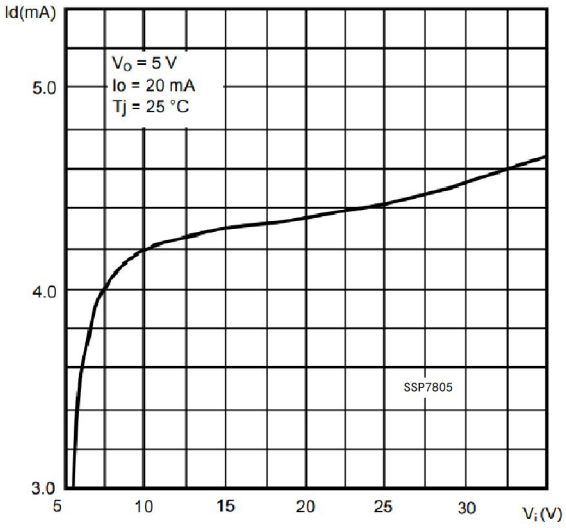
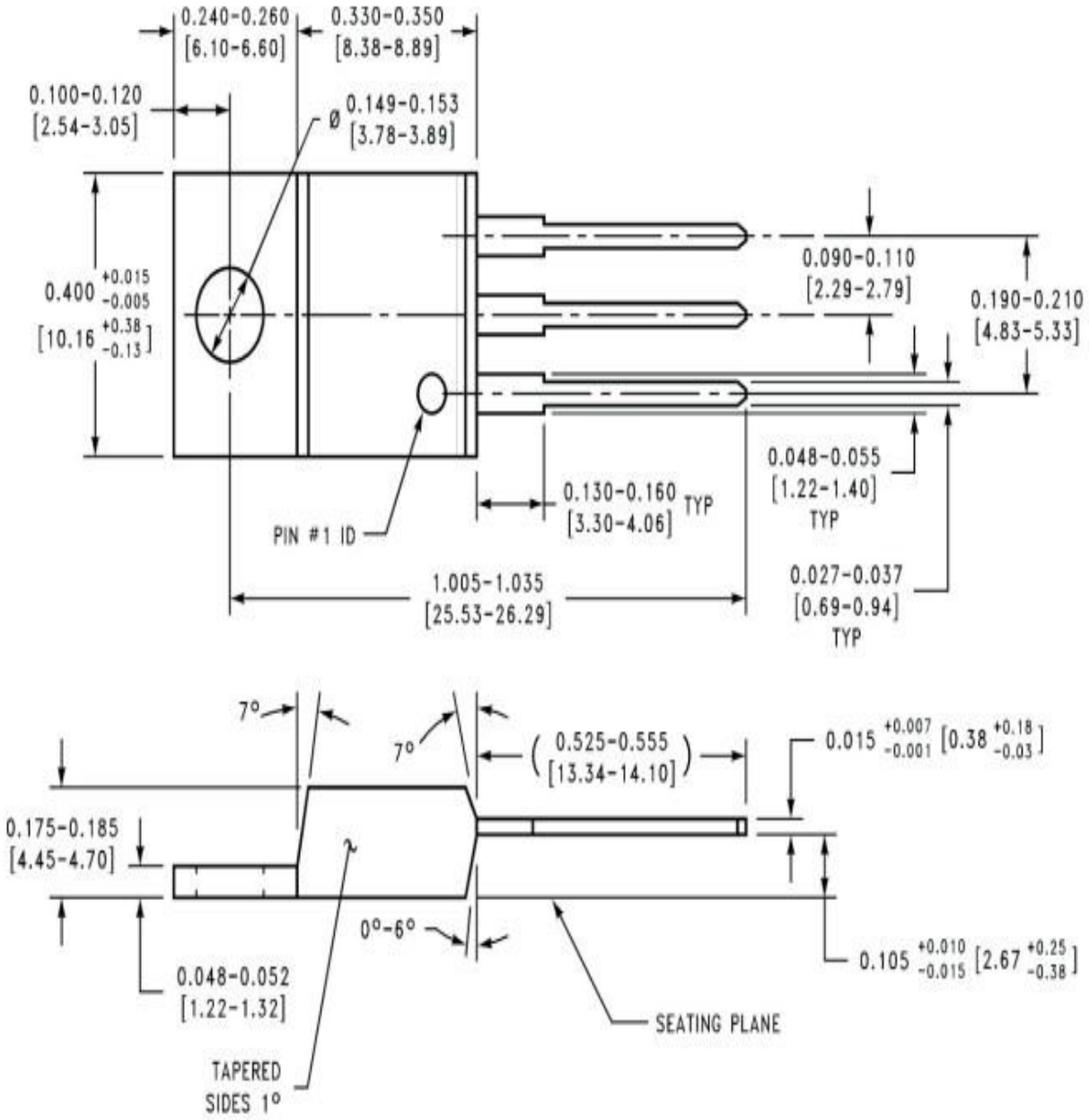


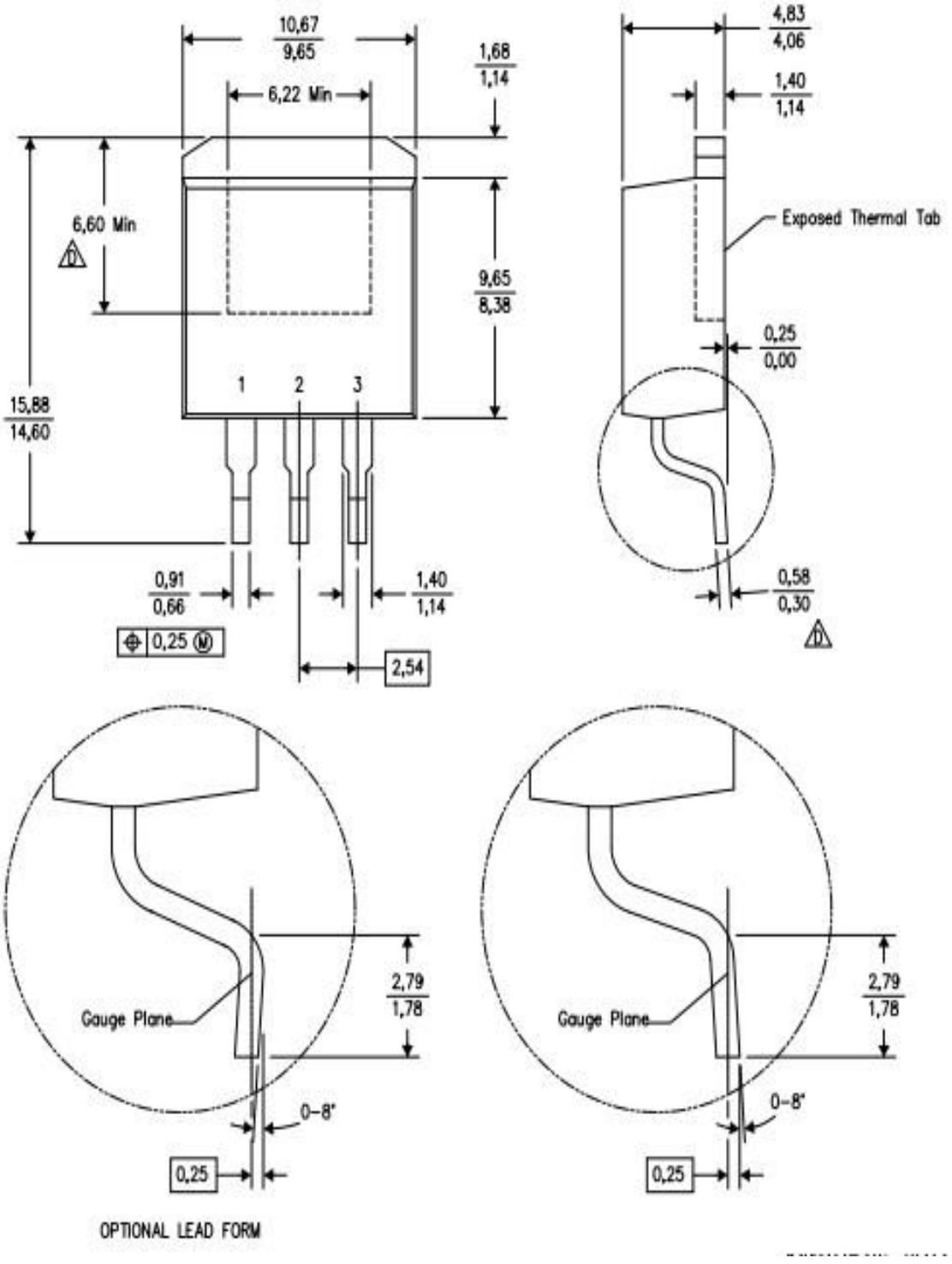
Figure9：Quiescent current vs Input voltage



Package Information（TO220）



Package Information（TO263）



Special Instructions

The company reserves the right of final interpretation of this specification.

Version Change Description

Version：V1.2	Author：Yangyang	Time：2021.3.10

Modify the record：

1. Re-typesetting the manual and checking some data

Statement

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