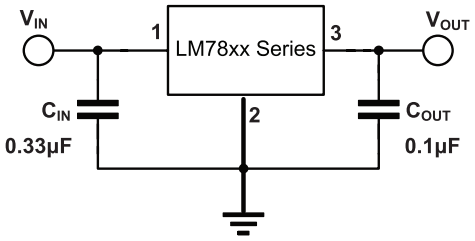
Linear Voltage Regulator
3 Terminal

RoHS Compliant



Fixed Output Voltage Regulator

Features

- Internal Current Limit
- Output Transistor SOA Protection
- Short Circuit Protection
- Thermal Shutdown Protection

Specification

- Output Current : up to 1.5A at T_J = 25°C
- Available in Fixed : 5.0V, 6.0V, 8.0V, 9.0V, 12V and 15V
- Output Voltage Tolerance : ±3% at T_J = 25°C, ±5% over the Operating T_J
- Line Regulation : 4mV to 12mV (Typ.) at T_J = 25°C
- Load Regulation : 9mV to 14mV (Typ.) at T_J = 25°C
- Dropout Voltage : 2V@1A (V_{OUT} = 5.0V)
- Power Supply Rejection Ratio : >55dB@120Hz (V_{OUT} = 5.0V)
- Operating Junction Temperature : -40°C to 125°C

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Maximum Input Voltage		VI	35	V
Maximum Power Dissipation		PD	1.53	W
Thermal Resistance, Junction-to-Case		$R_{\theta JC}$	5.5	°C/W
Thermal Resistance, Junction-to-Ambient		$R_{\theta JA}$	64.3	
Electrostatic Discharge	Human body model	$V_{ESD-HBM}$	2000	V
	Machine model	V_{ESD-MM}	200	
Operating Junction Temperature		T_{opr}	-40 to 125	°C
Maximum Junction Temperature		T_J	-55 to 150	
Storage Temperature Range		T_{stg}	-65 to 150	

Note : Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

Electrical Characteristics LM7805 (V_{IN} = 10V, I_{OUT} = 500mA, C_{IN} = 0.33µF, C_{OUT} = 0.1µF, T_J = 25°C, unless otherwise specified)

Parameter Name	Symbol	Test Conditions	Min	Typ	Max	Unit
Output voltage	V_{OUT}	T_J = 25°C	4.85	5	5.15	V
		I_{OUT}= 5mA to 1A, V_{IN} = 7 to 20V, T_J = 0 to 125°C	4.75		5.25	
Line regulation	ΔV_{OUT}	V_{IN} = 7 to 25V	--	4	100	mV
		V_{IN} = 8 to 12V		1.6	50	
Load regulation	ΔV_{OUT}	Iout = 5mA to 1.5A		9	100	
		Iout = 250 to 750mA		4	50	
Quiescent current	I_Q	T_J = 25°C		5	8	mA
Quiescent current change	ΔI_Q	Iout = 5mA to 1A		0.03	0.5	
		V_{IN} = 7 to 25V		0.3	1.3	
Output voltage drift	$\Delta V_{OUT}/\Delta T$	I_{OUT} = 5mA		-1.1	--	mV/°C
Output noise voltage	V_N	f = 10 to 100k Hz		42		µV
Ripple rejection	R_R	f = 120Hz, V_{IN} = 8 to 18V		73		dB
Dropout voltage	V_D	I_{OUT} = 1A		2		V
Output resistance	R_{OUT}	f = 1kHz		10		mΩ
Short circuit current	I_{SC}			230		mA
Peak current	I_{PK}			2.2		A

LM7809 (V_{IN} = 16V, I_{OUT} = 500mA, C_{IN} = 0.33µF, C_{OUT} = 0.1µF, T_J = 25°C, unless otherwise specified)

Parameter Name	Symbol	Test Conditions	Min	Typ	Max	Unit
Output voltage	V_{OUT}	T_J = 25°C	8.73	9	9.27	V
		I_{OUT}= 5mA to 1A, V_{IN} = 11.5 to 24V, T_J = 0 to 125°C	8.55		9.45	
Line regulation	ΔV_{OUT}	V_{IN} = 11.5 to 27V	--	7	180	mV
		V_{IN} = 13 to 19V		2	90	
Load regulation	ΔV_{OUT}	Iout = 5mA to 1.5A		12	180	
		Iout = 250 to 750mA		4	90	
Quiescent current	I_Q	T_J = 25°C		4	8	mA
Quiescent current change	ΔI_Q	Iout = 5mA to 1A			0.5	
		V_{IN} = 11.5 to 27V			1	
Output voltage drift	$\Delta V_{OUT}/\Delta T$	I_{OUT} = 5mA		-1	--	mV/°C
Output noise voltage	V_N	f = 10 to 100k Hz		60		µV
Ripple rejection	R_R	f = 120Hz, V_{IN} = 12 to 22V	595	70		dB
Dropout voltage(8)	V_D	I_{OUT} = 1A	--	2	--	V
Output resistance	R_{OUT}	f = 1kHz		18		mΩ
Short circuit current	I_{SC}			400		mA
Peak current	I_{PK}			2.2		A

LM7812 (V_{IN} = 19V, I_{OUT} = 500mA, C_{IN} = 0.33µF, C_{OUT} = 0.1µF, T_J = 25°C, unless otherwise specified)

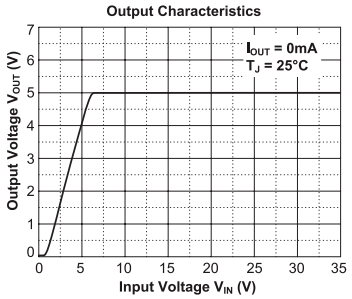
Parameter Name	Symbol	Test Conditions	Min	Typ	Max	Unit
Output voltage	V_{OUT}	T_J = 25°C	11.64	12	12.36	V
		I_{OUT}= 5mA to 1A, V_{IN} = 14.5 to 27V, T_J = 0 to 125°C	11.4		12.6	
Line regulation	ΔV_{OUT}	V_{IN} = 14.5 to 30V	--	12	240	mV
		V_{IN} = 16 to 22V		4	120	
Load regulation	ΔV_{OUT}	Iout = 5mA to 1.5A		10	240	
		Iout = 250 to 750mA		3	120	
Quiescent current	I_Q	T_J = 25°C		4	8	mA
Quiescent current change	ΔI_Q	Iout = 5mA to 1A			0.5	
		V_{IN} = 14.5 to 30V			1	
Output voltage drift	$\Delta V_{OUT}/\Delta T$	I_{OUT} = 5mA		-1	--	mV/°C
Output noise voltage	V_N	f = 10 to 100kHz		75		µV
Ripple rejection	R_R	f = 120Hz, V_{IN} = 15 to 25V	55	71		dB
Dropout voltage(8)	V_D	I_{OUT} = 1A	--	2		V
Output resistance	R_{OUT}	f = 1kHz		18		mΩ
Short circuit current	I_{SC}			350		mA
Peak current	I_{PK}			2.2		A

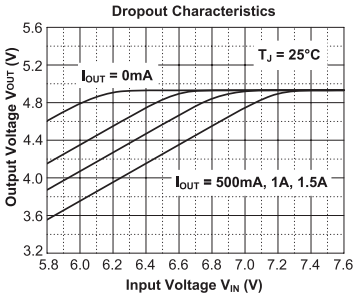
LM7815 (V_{IN} = 19V, I_{OUT} = 500mA, C_{IN} = 0.33µF, C_{OUT} = 0.1µF, T_J = 25°C, unless otherwise specified)

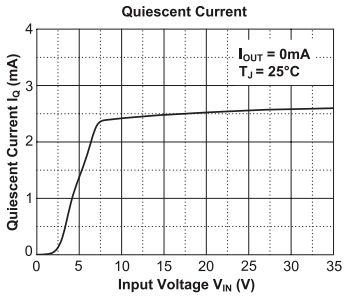
Parameter Name	Symbol	Test Conditions	Min	Typ	Max	Unit
Output voltage	V_{OUT}	T_J = 25°C	14.55	15	15.45	V
		I_{OUT}= 5mA to 1A, V_{IN} = 18.5 to 30V, T_J = 0 to 125°C	14.25		15.75	
Line regulation	ΔV_{OUT}	V_{IN} = 17.5 to 30V	--	15	300	mV
		V_{IN} = 20 to 26V		5	150	
Load regulation	ΔV_{OUT}	Iout = 5mA to 1.5A		10	240	
		Iout = 250 to 750mA		3	120	
Quiescent current	I_Q	T_J = 25°C		4	8	mA
Quiescent current change	ΔI_Q	Iout = 5mA to 1A			0.5	
		V_{IN} = 17.5 to 30V			1	
Output voltage drift	$\Delta V_{OUT}/\Delta T$	I_{OUT} = 5mA		-1	--	mV/°C
Output noise voltage	V_N	f = 10 to 100kHz		90		µV
Ripple rejection	R_R	f = 120Hz, V_{IN} = 15 to 25V	55	--		dB
Dropout voltage(8)	V_D	I_{OUT} = 1A	--	2		V
Output resistance	R_{OUT}	f = 1kHz		19		mΩ
Short circuit current	I_{SC}			350		mA
Peak current	I_{PK}			2.2		A

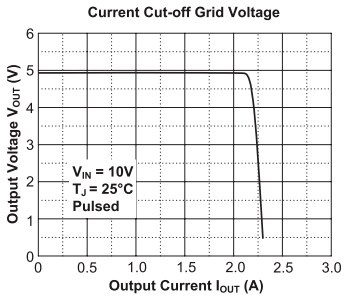
Typical Characteristics

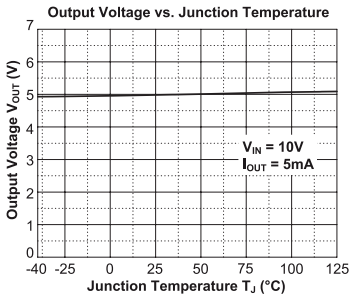
LM7805 (V_{OUT}= 5V,C_{IN} = 0.33µF, C_{OUT} = 0.1µF, T_J = 25°C,unless otherwise specified)

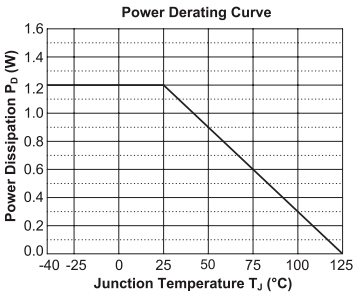




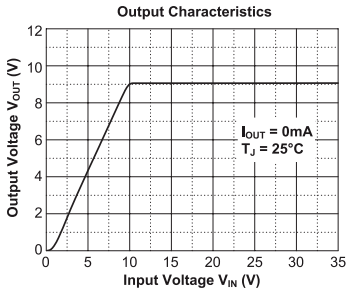


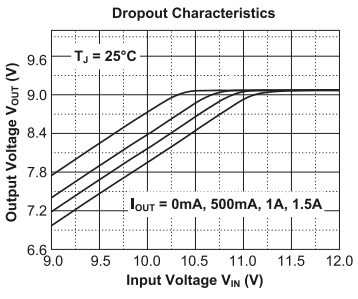


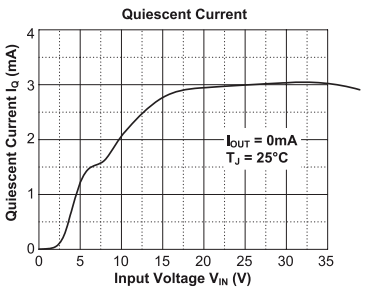


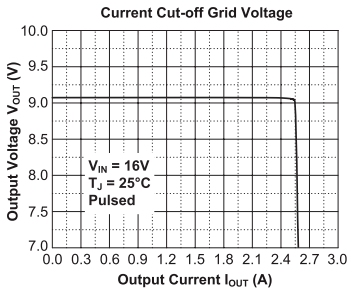


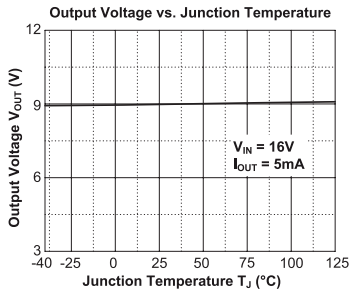
LM7809 (V_{OUT}= 9V, C_{IN} = 0.33µF, C_{OUT} = 0.1µF, T_J = 25°C,unless otherwise specified)

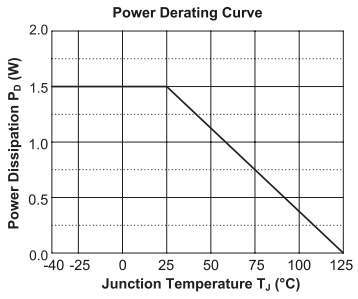




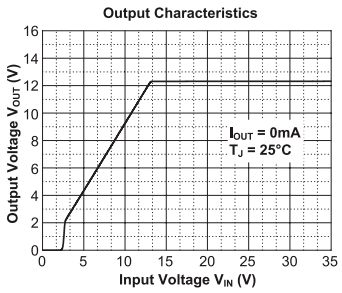


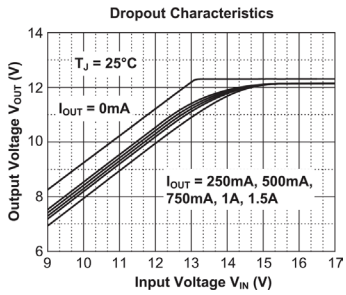


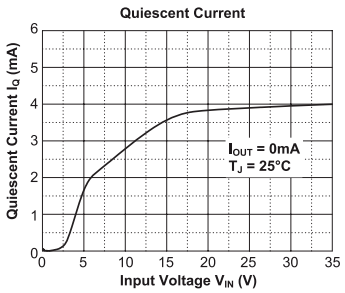


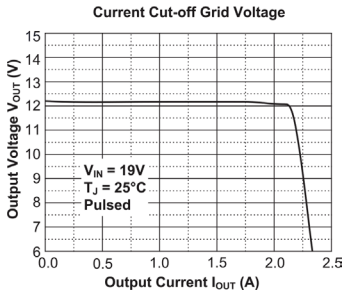


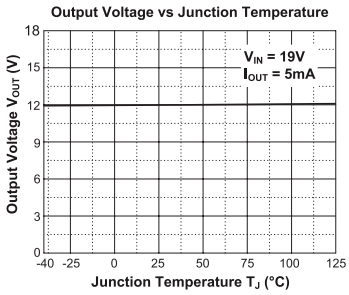
LM7812 (V_{OUT}= 12V,C_{IN} = 0.33μF, C_{OUT} = 0.1μF, T_J = 25°C,unless otherwise specified)

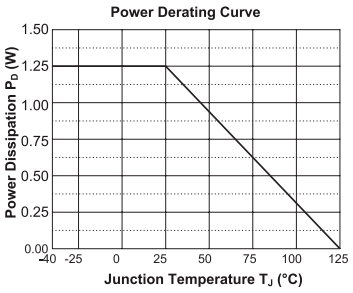




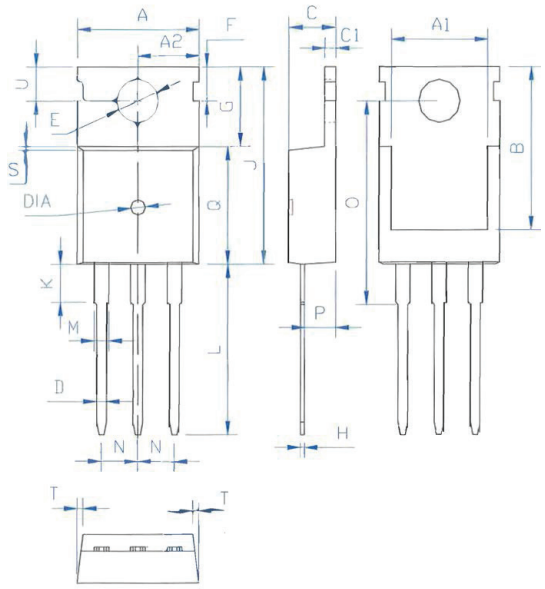








Package Outline Dimensions



DIM.	mm.
A	10 ±0.2
A1	8.2 ±0.3
A2	5 ±0.2
B	13. 3 ±0. 2
C	4.5 ±0.13
C1	1.30-0. 05/+0.1
D	0.8 ±0.10
E	3.6 ±0.1
F	3.6 ±0.1
G	3 ±0. 15
H	6.6 ±0.2
J	15.8 ±0.2

DIM.	mm.
K	3 ±0.2
L	13 ±0.2
M	1.27 ±0.1
N	Tyical 2.54
O	15.9 ±0.2
P	2.4 ±0.2
Q	9.2 ±0.2
S	0.25 ±0.1
T	0. 25 ±0.1
U	2.8 ±0.15
DIA	Φ1.5 ±0.1 Depth:0.05~0.45

Part Number Table

Description	Part Number
Linear Voltage Regulator, Fixed, 5V, 1.5A, TO-220	LM7805
Linear Voltage Regulator, Fixed, 9V, 1.5A, TO-220	LM7809
Linear Voltage Regulator, Fixed, 12V, 1.5A, TO-220	LM7812
Linear Voltage Regulator, Fixed, 15V, 1.5A, TO-220	LM7815