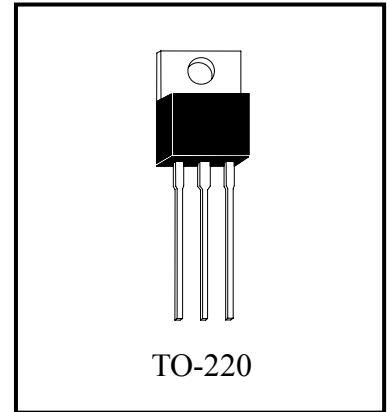


Three Terminal Positive Voltage Regulators

LM78XXE3


Description

The LM78XXE3 series of fixed voltage monolithic integrated circuit voltage regulators is designed for a wide range of applications. These applications include on-card regulation for elimination of noise and distribution problems associated with single point regulation. Each of these regulators can deliver up to 1.5A of output current. The internal current limiting and thermal shutdown features of these regulators make them essentially immune to overload.

Features:

- 5V, 6V, 8V, 9V, 10V, 12V, 15V, 18V, 24V output voltage available
- Internal Short-Circuit Current Limiting
- High Power Dissipation Capability
- Internal Thermal Overload Protection
- No External Components Required
- Output Transistor Safe Area Compensation
- RoHS compliant package

Absolute Maximum Ratings (Ta=25°C)

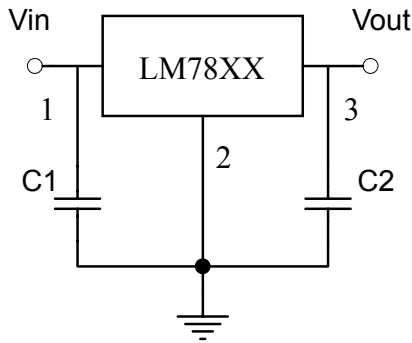
Parameter		Ratings	Unit
Input Voltage	LM7805~LM7818	35	V
	LM7824	40	
Output Current		1.5	A
Operating Junction Temperature Range		-40 ~ +125	°C
Storage Temperature Range		-55 ~ +150	°C
Thermal Resistance, Junction to Ambient (R _{θJA})		65	°C/W
Thermal Resistance, Junction to Case (R _{θJC})		5	°C/W



Ordering Information

Device	Output Voltage Tolerance	Package	Shipping	Marking
LM7805E3 A-rank	±3%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7805
LM7805E3 B-rank	±5%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7805
LM7806E3 A-rank	±3%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7806
LM7806E3 B-rank	±5%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7806
LM7808E3 A-rank	±3%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7808
LM7808E3 B-rank	±5%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7808
LM7809E3 A-rank	±3%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7809
LM7809E3 B-rank	±5%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7809
LM7810E3 A-rank	±3%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7810
LM7810E3 B-rank	±5%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7810
LM7812E3 A-rank	±3%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7812
LM7812E3 B-rank	±5%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7812
LM7815E3 A-rank	±3%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7815
LM7815E3 B-rank	±5%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7815
LM7818E3 A-rank	±3%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7818
LM7818E3 B-rank	±5%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7818
LM7824E3 A-rank	±3%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7824
LM7824E3 B-rank	±5%	TO-220 (RoHS compliant)	50 pcs / tube, 80 tubes/box	7824

Typical Application



Note:
 C1 and C2 are required if regulator is located far from power supply filter and load, or oscillation may induced on the loop.

Electrical Characteristics

LM7805 ($T_j=0\sim 125^{\circ}\text{C}$, $V_{in}=10\text{V}$, $I_o=500\text{mA}$, $C_{in}=0.33\mu\text{F}$, $C_{out}=0.1\mu\text{F}$, unless otherwise noted)

Symbol	Parameter	Min	Typ	Max	Conditions	Units
V_o	Output Voltage	4.85	5.0	5.15	$V_{in}=10\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$	V
		4.75	-	5.25	$7.5\text{V}\leq V_{in}\leq 20\text{V}$, $5\text{mA}\leq I_o\leq 1\text{A}$, $P_D\leq 15\text{W}$	
ΔV_o	Line Regulation	-	3	50	$7\text{V}\leq V_{in}\leq 25\text{V}$, $T_j=25^{\circ}\text{C}$	mV
		-	1	25	$8\text{V}\leq V_{in}\leq 12\text{V}$, $T_j=25^{\circ}\text{C}$	
ΔV_o	Load Regulation	-	-	100	$5\text{mA}\leq I_o\leq 1.5\text{A}$, $T_j=25^{\circ}\text{C}$	mV
		-	-	50	$250\text{mA}\leq I_o\leq 750\text{mA}$, $T_j=25^{\circ}\text{C}$	
I_Q	Quiescent Current	-	-	8	$V_{in}=10\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$	mA
ΔI_Q	Quiescent Current Change	-	-	0.5	$5\text{mA}\leq I_o\leq 1\text{A}$	mA
		-	-	1.3	$7\text{V}\leq V_{in}\leq 25\text{V}$	
V_n	Output Noise Voltage	-	40	-	$10\text{Hz}\leq f\leq 100\text{KHz}$, $T_j=25^{\circ}\text{C}$	μV
RR	Ripple Rejection	-	80	-	$8\text{V}\leq V_{in}\leq 18\text{V}$, $f=120\text{Hz}$, $T_j=25^{\circ}\text{C}$	dB
VD	Dropout Voltage	-	2	-	$I_o=1\text{A}$, $T_j=25^{\circ}\text{C}$	V
ISC	Output Short Circuit Current	-	250	-	$V_{in}=35\text{V}$, $T_j=25^{\circ}\text{C}$	mA
IPK	Peak Output Current	-	1.8	-	$T_j=25^{\circ}\text{C}$	A
$\Delta V_o/\Delta T_j$	Temperature Stability	-	-0.6	-	$I_o=5\text{mA}$, $0^{\circ}\text{C}\leq T_j\leq 125^{\circ}\text{C}$	$\text{mV}/^{\circ}\text{C}$



LM7806 ($T_j=0\sim 125^\circ\text{C}$, $V_{in}=11\text{V}$, $I_o=500\text{mA}$, $C_{in}=0.33\mu\text{F}$, $C_{out}=0.1\mu\text{F}$, unless otherwise noted)

Symbol	Parameter	Min	Typ	Max	Conditions	Units	
V_o	A-rank(3%)	Output Voltage	5.82	6.0	6.18	$V_{in}=11\text{V}$, $I_o=500\text{mA}$, $T_j=25^\circ\text{C}$ $8\text{V}\leq V_{in}\leq 21\text{V}$, $5\text{mA}\leq I_o\leq 1\text{A}$, $PD\leq 15\text{W}$	V
	B-rank(5%)		5.70	-	6.30		
ΔV_o	Line Regulation	-	3	60	$8\text{V}\leq V_{in}\leq 25\text{V}$, $T_j=25^\circ\text{C}$	mV	
		-	1	25	$9\text{V}\leq V_{in}\leq 13\text{V}$, $T_j=25^\circ\text{C}$		
ΔV_o	Load Regulation	-	-	100	$5\text{mA}\leq I_o\leq 1.5\text{A}$, $T_j=25^\circ\text{C}$	mV	
		-	-	50	$250\text{mA}\leq I_o\leq 750\text{mA}$, $T_j=25^\circ\text{C}$		
I_Q	Quiescent Current	-	-	8	$V_{in}=11\text{V}$, $I_o=500\text{mA}$, $T_j=25^\circ\text{C}$	mA	
ΔI_Q	Quiescent Current Change	-	-	0.5	$5\text{mA}\leq I_o\leq 1\text{A}$	mA	
		-	-	1.3	$8\text{V}\leq V_{in}\leq 25\text{V}$		
V_n	Output Noise Voltage	-	45	-	$10\text{Hz}\leq f\leq 100\text{KHz}$, $T_j=25^\circ\text{C}$	μV	
RR	Ripple Rejection	-	75	-	$9\text{V}\leq V_{in}\leq 19\text{V}$, $f=120\text{Hz}$, $T_j=25^\circ\text{C}$	dB	
VD	Dropout Voltage	-	2	-	$I_o=1\text{A}$, $T_j=25^\circ\text{C}$	V	
ISC	Output Short Circuit Current	-	250	-	$V_{in}=35\text{V}$, $T_j=25^\circ\text{C}$	mA	
IPK	Peak Output Current	-	1.8	-	$T_j=25^\circ\text{C}$	A	
$\Delta V_o/\Delta T_j$	Temperature Stability	-	-0.7	-	$I_o=5\text{mA}$, $0^\circ\text{C}\leq T_j\leq 125^\circ\text{C}$	$\text{mV}/^\circ\text{C}$	

LM7808 ($T_j=0\sim 125^\circ\text{C}$, $V_{in}=14\text{V}$, $I_o=500\text{mA}$, $C_{in}=0.33\mu\text{F}$, $C_{out}=0.1\mu\text{F}$, unless otherwise noted)

Symbol	Parameter	Min	Typ	Max	Conditions	Units	
V_o	A-rank(3%)	Output Voltage	7.76	8.0	8.24	$V_{in}=14\text{V}$, $I_o=500\text{mA}$, $T_j=25^\circ\text{C}$ $10.5\text{V}\leq V_{in}\leq 23\text{V}$, $5\text{mA}\leq I_o\leq 1\text{A}$, $PD\leq 15\text{W}$	V
	B-rank(5%)		7.60	-	8.40		
ΔV_o	Line Regulation	-	3	80	$10.5\text{V}\leq V_{in}\leq 25\text{V}$, $T_j=25^\circ\text{C}$	mV	
		-	1	40	$11\text{V}\leq V_{in}\leq 17\text{V}$, $T_j=25^\circ\text{C}$		
ΔV_o	Load Regulation	-	-	100	$5\text{mA}\leq I_o\leq 1.5\text{A}$, $T_j=25^\circ\text{C}$	mV	
		-	-	50	$250\text{mA}\leq I_o\leq 750\text{mA}$, $T_j=25^\circ\text{C}$		
I_Q	Quiescent Current	-	-	8	$V_{in}=14\text{V}$, $I_o=500\text{mA}$, $T_j=25^\circ\text{C}$	mA	
ΔI_Q	Quiescent Current Change	-	-	0.5	$5\text{mA}\leq I_o\leq 1\text{A}$	mA	
		-	-	1.3	$10.5\text{V}\leq V_{in}\leq 25\text{V}$		
V_n	Output Noise Voltage	-	58	-	$10\text{Hz}\leq f\leq 100\text{KHz}$, $T_j=25^\circ\text{C}$	μV	
RR	Ripple Rejection	-	72	-	$11.5\text{V}\leq V_{in}\leq 21.5\text{V}$, $f=120\text{Hz}$, $T_j=25^\circ\text{C}$	dB	
VD	Dropout Voltage	-	2	-	$I_o=1\text{A}$, $T_j=25^\circ\text{C}$	V	
ISC	Output Short Circuit Current	-	250	-	$V_{in}=35\text{V}$, $T_j=25^\circ\text{C}$	mA	
IPK	Peak Output Current	-	1.8	-	$T_j=25^\circ\text{C}$	A	
$\Delta V_o/\Delta T_j$	Temperature Stability	-	-0.9	-	$I_o=5\text{mA}$, $0^\circ\text{C}\leq T_j\leq 125^\circ\text{C}$	$\text{mV}/^\circ\text{C}$	



LM7809 ($T_j=0\sim 125^\circ\text{C}$, $V_{in}=15\text{V}$, $I_o=500\text{mA}$, $C_{in}=0.33\mu\text{F}$, $C_{out}=0.1\mu\text{F}$, unless otherwise noted)

Symbol	Parameter	Min	Typ	Max	Conditions	Units	
V_o	A-rank(3%)	Output Voltage	8.73	9.0	9.27	$V_{in}=15\text{V}$, $I_o=500\text{mA}$, $T_j=25^\circ\text{C}$ $11.5\text{V}\leq V_{in}\leq 24\text{V}$, $5\text{mA}\leq I_o\leq 1\text{A}$, $PD\leq 15\text{W}$	V
	B-rank(5%)		8.55	-	9.45		
ΔV_o	Line Regulation	-	5	90	$11.5\text{V}\leq V_{in}\leq 25\text{V}$, $T_j=25^\circ\text{C}$	mV	
		-	3	45	$13\text{V}\leq V_{in}\leq 19\text{V}$, $T_j=25^\circ\text{C}$		
ΔV_o	Load Regulation	-	-	100	$5\text{mA}\leq I_o\leq 1.5\text{A}$, $T_j=25^\circ\text{C}$	mV	
		-	-	50	$250\text{mA}\leq I_o\leq 750\text{mA}$, $T_j=25^\circ\text{C}$		
I_Q	Quiescent Current	-	-	8	$V_{in}=15\text{V}$, $I_o=500\text{mA}$, $T_j=25^\circ\text{C}$	mA	
ΔI_Q	Quiescent Current Change	-	-	0.5	$5\text{mA}\leq I_o\leq 1\text{A}$	mA	
		-	-	1.3	$11.5\text{V}\leq V_{in}\leq 26\text{V}$		
V_n	Output Noise Voltage	-	58	-	$10\text{Hz}\leq f\leq 100\text{KHz}$, $T_j=25^\circ\text{C}$	μV	
RR	Ripple Rejection	-	72	-	$12.5\text{V}\leq V_{in}\leq 22.5\text{V}$, $f=120\text{Hz}$, $T_j=25^\circ\text{C}$	dB	
VD	Dropout Voltage	-	2	-	$I_o=1\text{A}$, $T_j=25^\circ\text{C}$	V	
ISC	Output Short Circuit Current	-	250	-	$V_{in}=35\text{V}$, $T_j=25^\circ\text{C}$	mA	
IPK	Peak Output Current	-	1.8	-	$T_j=25^\circ\text{C}$	A	
$\Delta V_o/\Delta T_j$	Temperature Stability	-	-1.1	-	$I_o=5\text{mA}$, $0^\circ\text{C}\leq T_j\leq 125^\circ\text{C}$	$\text{mV}/^\circ\text{C}$	

LM7810 ($T_j=0\sim 125^\circ\text{C}$, $V_{in}=16\text{V}$, $I_o=500\text{mA}$, $C_{in}=0.33\mu\text{F}$, $C_{out}=0.1\mu\text{F}$, unless otherwise noted)

Symbol	Parameter	Min	Typ	Max	Conditions	Units	
V_o	A-rank(3%)	Output Voltage	9.70	10.0	10.30	$V_{in}=16\text{V}$, $I_o=500\text{mA}$, $T_j=25^\circ\text{C}$ $12.5\text{V}\leq V_{in}\leq 25\text{V}$, $5\text{mA}\leq I_o\leq 1\text{A}$, $PD\leq 15\text{W}$	V
	B-rank(5%)		9.50	-	10.50		
ΔV_o	Line Regulation	-	-	100	$13\text{V}\leq V_{in}\leq 25\text{V}$, $T_j=25^\circ\text{C}$	mV	
		-	-	50	$14\text{V}\leq V_{in}\leq 20\text{V}$, $T_j=25^\circ\text{C}$		
ΔV_o	Load Regulation	-	-	100	$5\text{mA}\leq I_o\leq 1.5\text{A}$, $T_j=25^\circ\text{C}$	mV	
		-	-	50	$250\text{mA}\leq I_o\leq 750\text{mA}$, $T_j=25^\circ\text{C}$		
I_Q	Quiescent Current	-	-	8	$V_{in}=16\text{V}$, $I_o=500\text{mA}$, $T_j=25^\circ\text{C}$	mA	
ΔI_Q	Quiescent Current Change	-	-	0.5	$5\text{mA}\leq I_o\leq 1\text{A}$	mA	
		-	-	1.0	$12.5\text{V}\leq V_{in}\leq 25\text{V}$		
V_n	Output Noise Voltage	-	58	-	$10\text{Hz}\leq f\leq 100\text{KHz}$, $T_j=25^\circ\text{C}$	μV	
RR	Ripple Rejection	-	72	-	$13\text{V}\leq V_{in}\leq 23\text{V}$, $f=120\text{Hz}$, $T_j=25^\circ\text{C}$	dB	
VD	Dropout Voltage	-	2	-	$I_o=1\text{A}$, $T_j=25^\circ\text{C}$	V	
ISC	Output Short Circuit Current	-	250	-	$V_{in}=35\text{V}$, $T_j=25^\circ\text{C}$	mA	
IPK	Peak Output Current	-	1.8	-	$T_j=25^\circ\text{C}$	A	
$\Delta V_o/\Delta T_j$	Temperature Stability	-	-1.1	-	$I_o=5\text{mA}$, $0^\circ\text{C}\leq T_j\leq 125^\circ\text{C}$	$\text{mV}/^\circ\text{C}$	



LM7812 ($T_j=0\sim 125^{\circ}\text{C}$, $V_{in}=19\text{V}$, $I_o=500\text{mA}$, $C_{in}=0.33\mu\text{F}$, $C_{out}=0.1\mu\text{F}$, unless otherwise noted)

Symbol	Parameter	Min	Typ	Max	Conditions	Units	
V_o	A-rank(3%)	Output Voltage	11.64	12.0	12.36	$V_{in}=19\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$ $14.5\text{V}\leq V_{in}\leq 27\text{V}$, $5\text{mA}\leq I_o\leq 1\text{A}$, $PD\leq 15\text{W}$	V
	B-rank(5%)		11.40	-	12.60		
ΔV_o	Line Regulation	-	10	120	$14.5\text{V}\leq V_{in}\leq 30\text{V}$, $T_j=25^{\circ}\text{C}$	mV	
		-	3	60	$16\text{V}\leq V_{in}\leq 22\text{V}$, $T_j=25^{\circ}\text{C}$		
ΔV_o	Load Regulation	-	-	100	$5\text{mA}\leq I_o\leq 1.5\text{A}$, $T_j=25^{\circ}\text{C}$	mV	
		-	-	60	$250\text{mA}\leq I_o\leq 750\text{mA}$, $T_j=25^{\circ}\text{C}$		
I_Q	Quiescent Current	-	-	8	$V_{in}=19\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$	mA	
ΔI_Q	Quiescent Current Change	-	-	0.5	$5\text{mA}\leq I_o\leq 1\text{A}$	mA	
		-	-	1.3	$14.5\text{V}\leq V_{in}\leq 30\text{V}$		
V_n	Output Noise Voltage	-	75	-	$10\text{Hz}\leq f\leq 100\text{KHz}$, $T_j=25^{\circ}\text{C}$	μV	
RR	Ripple Rejection	-	72	-	$15\text{V}\leq V_{in}\leq 25\text{V}$, $f=120\text{Hz}$, $T_j=25^{\circ}\text{C}$	dB	
VD	Dropout Voltage	-	2	-	$I_o=1\text{A}$, $T_j=25^{\circ}\text{C}$	V	
ISC	Output Short Circuit Current	-	250	-	$V_{in}=35\text{V}$, $T_j=25^{\circ}\text{C}$	mA	
IPK	Peak Output Current	-	1.8	-	$T_j=25^{\circ}\text{C}$	A	
$\Delta V_o/\Delta T_j$	Temperature Stability	-	-1.5	-	$I_o=5\text{mA}$, $0^{\circ}\text{C}\leq T_j\leq 125^{\circ}\text{C}$	$\text{mV}/^{\circ}\text{C}$	

LM7815 ($T_j=0\sim 125^{\circ}\text{C}$, $V_{in}=23\text{V}$, $I_o=500\text{mA}$, $C_{in}=0.33\mu\text{F}$, $C_{out}=0.1\mu\text{F}$, unless otherwise noted)

Symbol	Parameter	Min	Typ	Max	Conditions	Units	
V_o	A-rank(3%)	Output Voltage	14.55	15.0	15.45	$V_{in}=23\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$ $17.5\text{V}\leq V_{in}\leq 30\text{V}$, $5\text{mA}\leq I_o\leq 1\text{A}$, $PD\leq 15\text{W}$	V
	B-rank(5%)		14.25	-	15.75		
ΔV_o	Line Regulation	-	-	150	$17.5\text{V}\leq V_{in}\leq 30\text{V}$, $T_j=25^{\circ}\text{C}$	mV	
		-	-	75	$18.5\text{V}\leq V_{in}\leq 30\text{V}$, $T_j=25^{\circ}\text{C}$		
ΔV_o	Load Regulation	-	-	150	$5\text{mA}\leq I_o\leq 1.5\text{A}$, $T_j=25^{\circ}\text{C}$	mV	
		-	-	75	$250\text{mA}\leq I_o\leq 750\text{mA}$, $T_j=25^{\circ}\text{C}$		
I_Q	Quiescent Current	-	-	8	$V_{in}=23\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$	mA	
ΔI_Q	Quiescent Current Change	-	-	0.5	$5\text{mA}\leq I_o\leq 1\text{A}$	mA	
		-	-	1.3	$17.5\text{V}\leq V_{in}\leq 30\text{V}$		
V_n	Output Noise Voltage	-	90	-	$10\text{Hz}\leq f\leq 100\text{KHz}$, $T_j=25^{\circ}\text{C}$	μV	
RR	Ripple Rejection	-	70	-	$18.5\text{V}\leq V_{in}\leq 28.5\text{V}$, $f=120\text{Hz}$, $T_j=25^{\circ}\text{C}$	dB	
VD	Dropout Voltage	-	2	-	$I_o=1\text{A}$, $T_j=25^{\circ}\text{C}$	V	
ISC	Output Short Circuit Current	-	250	-	$V_{in}=35\text{V}$, $T_j=25^{\circ}\text{C}$	mA	
IPK	Peak Output Current	-	1.8	-	$T_j=25^{\circ}\text{C}$	A	
$\Delta V_o/\Delta T_j$	Temperature Stability	-	-1.8	-	$I_o=5\text{mA}$, $0^{\circ}\text{C}\leq T_j\leq 125^{\circ}\text{C}$	$\text{mV}/^{\circ}\text{C}$	



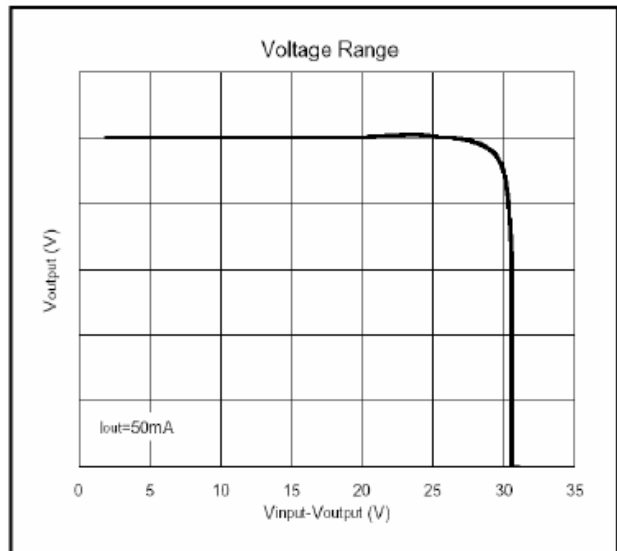
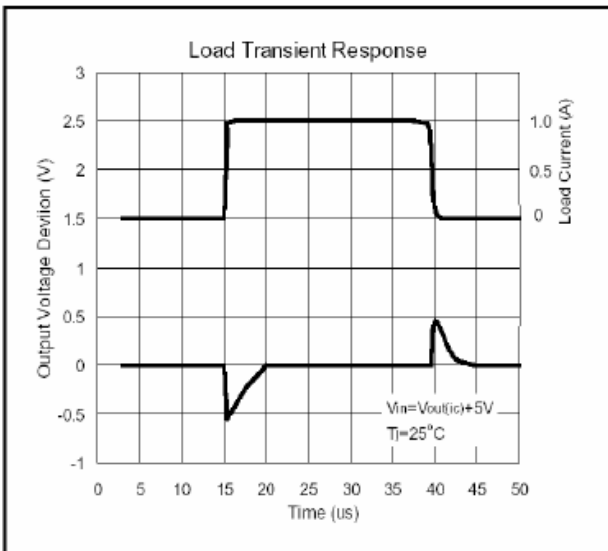
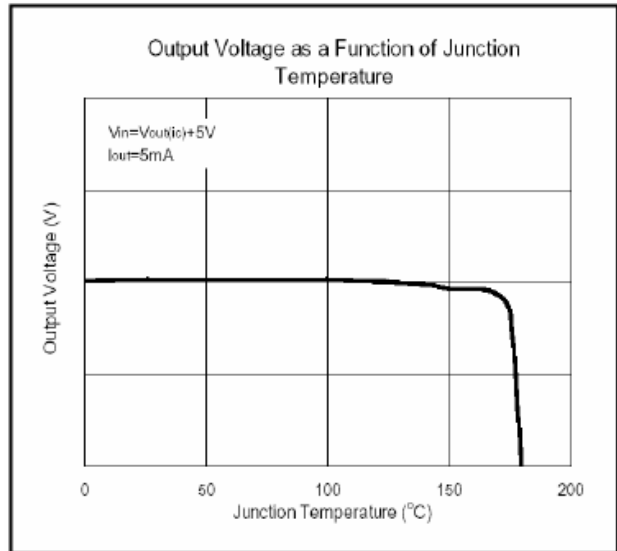
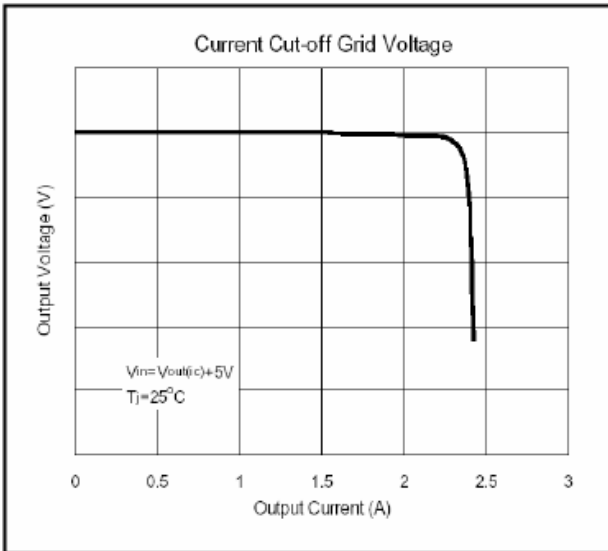
LM7818 ($T_j=0\sim 125^\circ\text{C}$, $V_{in}=27\text{V}$, $I_o=500\text{mA}$, $C_{in}=0.33\mu\text{F}$, $C_{out}=0.1\mu\text{F}$, unless otherwise noted)

Symbol	Parameter	Min	Typ	Max	Conditions	Units	
V_o	A-rank(3%)	Output Voltage	17.46	18.0	18.54	$V_{in}=27\text{V}$, $I_o=500\text{mA}$, $T_j=25^\circ\text{C}$ $21\text{V}\leq V_{in}\leq 33\text{V}$, $5\text{mA}\leq I_o\leq 1\text{A}$, $PD\leq 15\text{W}$	V
	B-rank(5%)		17.10	-	18.90		
ΔV_o	Line Regulation	-	-	180	$21\text{V}\leq V_{in}\leq 33\text{V}$, $T_j=25^\circ\text{C}$	mV	
		-	-	90	$24\text{V}\leq V_{in}\leq 30\text{V}$, $T_j=25^\circ\text{C}$		
ΔV_o	Load Regulation	-	-	180	$5\text{mA}\leq I_o\leq 1.5\text{A}$, $T_j=25^\circ\text{C}$	mV	
		-	-	90	$250\text{mA}\leq I_o\leq 750\text{mA}$, $T_j=25^\circ\text{C}$		
I_Q	Quiescent Current	-	-	8	$V_{in}=27\text{V}$, $I_o=500\text{mA}$, $T_j=25^\circ\text{C}$	mA	
ΔI_Q	Quiescent Current Change	-	-	0.5	$5\text{mA}\leq I_o\leq 1\text{A}$	mA	
		-	-	1.0	$21\text{V}\leq V_{in}\leq 33\text{V}$		
V_n	Output Noise Voltage	-	110	-	$10\text{Hz}\leq f\leq 100\text{KHz}$, $T_j=25^\circ\text{C}$	μV	
RR	Ripple Rejection	-	69	-	$22\text{V}\leq V_{in}\leq 32\text{V}$, $f=120\text{Hz}$, $T_j=25^\circ\text{C}$	dB	
VD	Dropout Voltage	-	2	-	$I_o=1\text{A}$, $T_j=25^\circ\text{C}$	V	
ISC	Output Short Circuit Current	-	250	-	$V_{in}=35\text{V}$, $T_j=25^\circ\text{C}$	mA	
IPK	Peak Output Current	-	1.8	-	$T_j=25^\circ\text{C}$	A	
$\Delta V_o/\Delta T_j$	Temperature Stability	-	-2.2	-	$I_o=5\text{mA}$, $0^\circ\text{C}\leq T_j\leq 125^\circ\text{C}$	$\text{mV}/^\circ\text{C}$	

LM7824 ($T_j=0\sim 125^\circ\text{C}$, $V_{in}=33\text{V}$, $I_o=500\text{mA}$, $C_{in}=0.33\mu\text{F}$, $C_{out}=0.1\mu\text{F}$, unless otherwise noted)

Symbol	Parameter	Min	Typ	Max	Conditions	Units	
V_o	A-rank(3%)	Output Voltage	23.28	24.0	24.72	$V_{in}=33\text{V}$, $I_o=500\text{mA}$, $T_j=25^\circ\text{C}$ $27\text{V}\leq V_{in}\leq 38\text{V}$, $5\text{mA}\leq I_o\leq 1\text{A}$, $PD\leq 15\text{W}$	V
	B-rank(5%)		22.80	-	25.20		
ΔV_o	Line Regulation	-	-	240	$27\text{V}\leq V_{in}\leq 38\text{V}$, $T_j=25^\circ\text{C}$	mV	
		-	-	120	$30\text{V}\leq V_{in}\leq 36\text{V}$, $T_j=25^\circ\text{C}$		
ΔV_o	Load Regulation	-	-	240	$5\text{mA}\leq I_o\leq 1.5\text{A}$, $T_j=25^\circ\text{C}$	mV	
		-	-	120	$250\text{mA}\leq I_o\leq 750\text{mA}$, $T_j=25^\circ\text{C}$		
I_Q	Quiescent Current	-	-	8	$V_{in}=33\text{V}$, $I_o=500\text{mA}$, $T_j=25^\circ\text{C}$	mA	
ΔI_Q	Quiescent Current Change	-	-	0.5	$5\text{mA}\leq I_o\leq 1\text{A}$	mA	
		-	-	1.0	$28\text{V}\leq V_{in}\leq 38\text{V}$		
V_n	Output Noise Voltage	-	170	-	$10\text{Hz}\leq f\leq 100\text{KHz}$, $T_j=25^\circ\text{C}$	μV	
RR	Ripple Rejection	-	66	-	$28\text{V}\leq V_{in}\leq 38\text{V}$, $f=120\text{Hz}$, $T_j=25^\circ\text{C}$	dB	
VD	Dropout Voltage	-	2	-	$I_o=1\text{A}$, $T_j=25^\circ\text{C}$	V	
ISC	Output Short Circuit Current	-	250	-	$V_{in}=35\text{V}$, $T_j=25^\circ\text{C}$	mA	
IPK	Peak Output Current	-	1.8	-	$T_j=25^\circ\text{C}$	A	
$\Delta V_o/\Delta T_j$	Temperature Stability	-	-2.8	-	$I_o=5\text{mA}$, $0^\circ\text{C}\leq T_j\leq 125^\circ\text{C}$	$\text{mV}/^\circ\text{C}$	

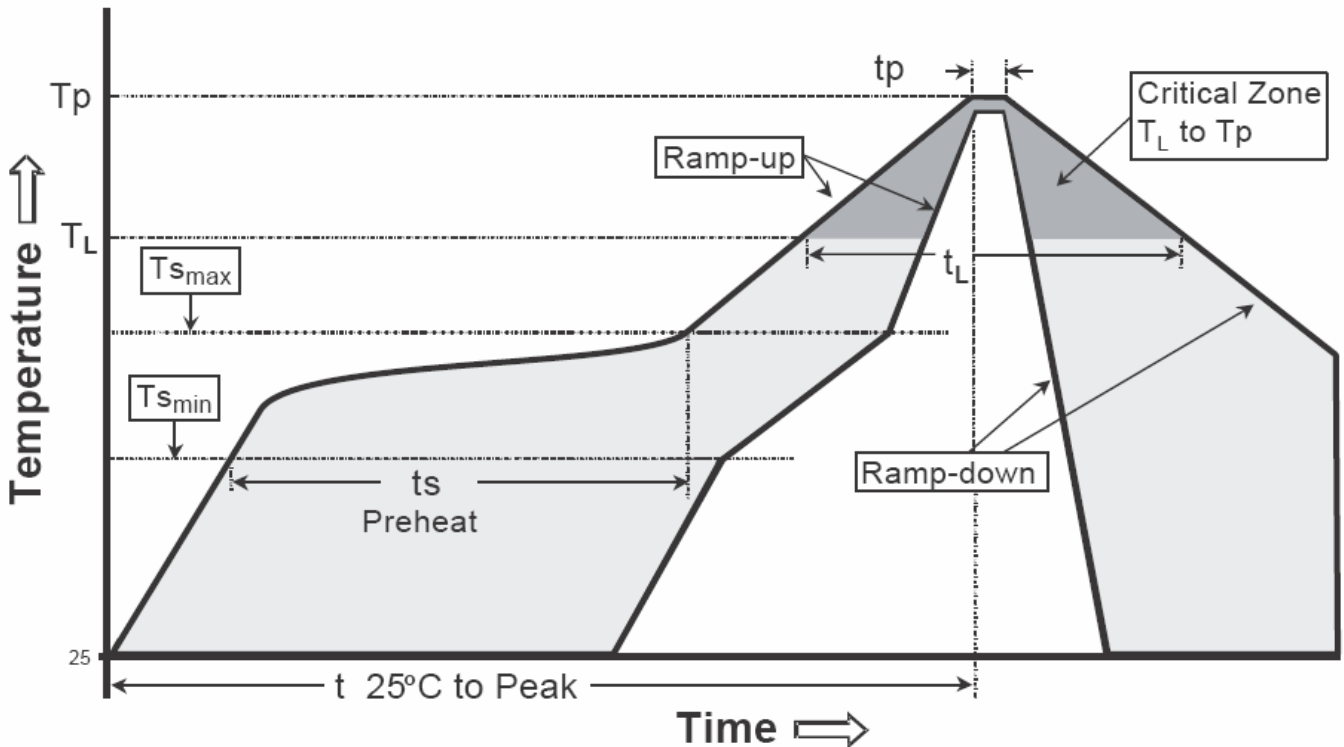
Characteristic Curves



Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

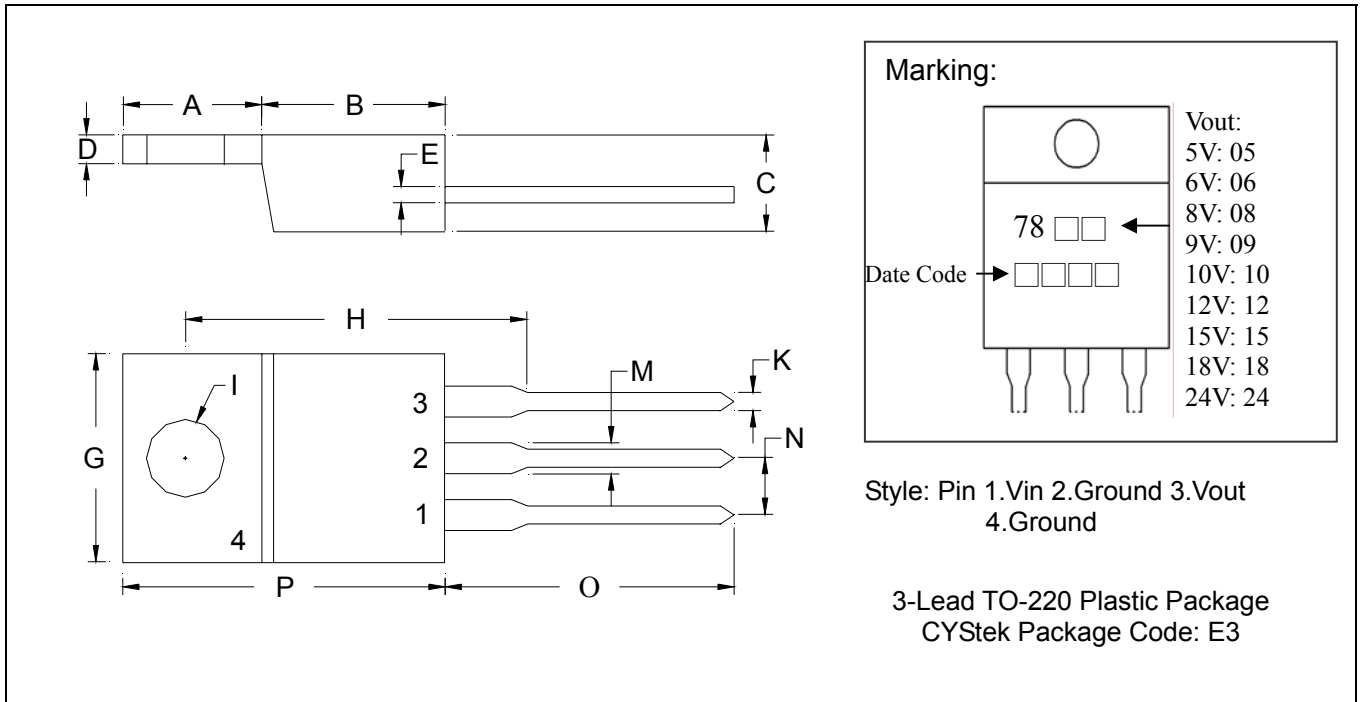
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(Ts min)	100°C	150°C
-Temperature Max(Ts max)	150°C	200°C
-Time(ts min to ts max)	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (Tl)	183°C	217°C
- Time (tl)	60-150 seconds	60-150 seconds
Peak Temperature(Tp)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

TO-220 Dimension



*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.2197	0.2949	5.58	7.49	I	-	*0.1508	-	*3.83
B	0.3299	0.3504	8.38	8.90	K	0.0295	0.0374	0.75	0.95
C	0.1732	0.185	4.40	4.70	M	0.0449	0.0551	1.14	1.40
D	0.0453	0.0547	1.15	1.39	N	-	*0.1000	-	*2.54
E	0.0138	0.0236	0.35	0.60	O	0.5000	0.5618	12.70	14.27
G	0.3803	0.4047	9.66	10.28	P	0.5701	0.6248	14.48	15.87
H	-	*0.6398	-	*16.25					

Notes: 1.Controlling dimension: millimeters.
 2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
 3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material:

- Lead: Pure tin plated
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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