

GJ78XXA

3-TERMINAL POSITIVE VOLTAGE REGULATORS

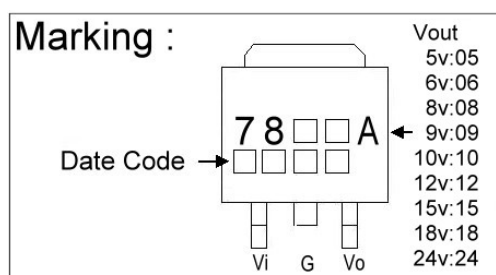
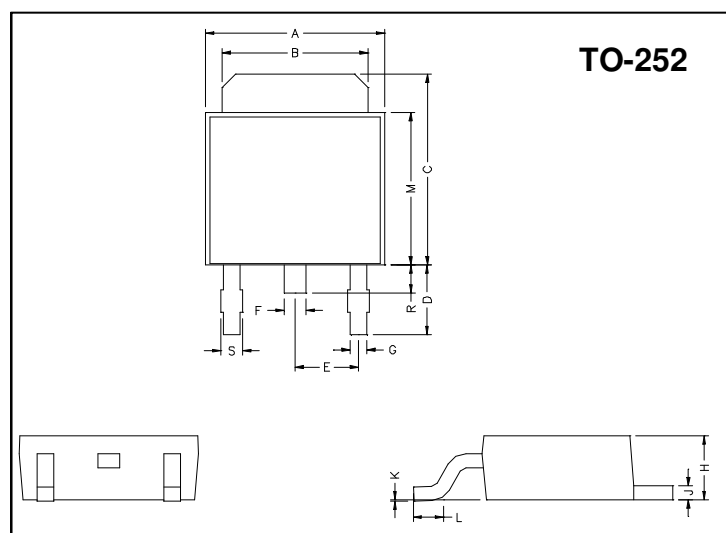
Description

The GJ78XXA series of fixed-voltage monolithic integrated-circuit voltage regulators 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 1.5 amperes 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 Thermal Overload Protection
- High Power Dissipation Capability
- Internal Short-Circuit Current Limiting
- No External Components
- Output Transistor Safe-Area Compensation

Package Dimensions



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	6.40	6.80	G	0.50	0.70
B	5.20	5.50	H	2.20	2.40
C	6.80	7.20	J	0.45	0.55
D	2.40	3.00	K	0	0.15
E	2.30 REF.		L	0.90	1.50
F	0.70	0.90	M	5.40	5.80
S	0.60	0.90	R	0.80	1.20

Absolute Maximum Ratings

Parameter		Ratings	Unit
Input voltage	GJ7805A ~ 18A	35V	V
	GJ7824A	40V	V
Output current		1.5	A
Operating junction temperature range		0 ~ 150	°C
Storage temperature range		-55 ~ 150	°C
Thermal resistance junction-air (RθJA)		125	°C/W
Thermal resistance junction-cases (RθJC)		12.5	°C/W

Electrical Characteristics**GJ7805A** (Refer to the test circuits, $T_j=0\sim 125^{\circ}\text{C}$, $I_o=500\text{mA}$, $V_{in}=10\text{V}$, $C_{in}=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$ unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	4.85	5.0	5.15	V	Vin=10V, Io=500mA, Tj=25°C 7.5V ≤ Vin ≤ 20V, 5mA ≤ Io ≤ 1A, PD ≤ 15W
	B-Rank (5%)	4.75	-	5.25		
ΔVO (Line Regulation)		-	3	100	mV	7V ≤ Vin ≤ 25V, Io=500mA, Tj=25°C
		-	1	50		8V ≤ Vin ≤ 12V, Io=500mA, Tj=25°C
ΔVO (Load Regulation)		-	15	100	mV	Vin=10V, 5mA ≤ Io ≤ 1.5A, Tj=25°C
		-	5	50		Vin=10V, 250mA ≤ Io ≤ 750mA, Tj=25°C
IQ		-	4.2	8.0	mA	Vin=10V, Io=500mA, Tj=25°C
Δ IQ		-	-	0.5	mA	Vin=10V, 5mA ≤ Io ≤ 1A
		-	-	1.3		7V ≤ Vin ≤ 25V, Io=500mA
Vn		-	40	-	μV	10Hz ≤ f ≤ 100KHz, Tj=25°C
RR		62	-	-	dB	8V ≤ Vin ≤ 18V, f=120Hz, Tj=25°C
VD		-	2.0	-	V	Io=1A, Tj=25°C
Isc		-	750	-	mA	Vin=10V, Tj=25°C
Ipk		-	2.2	-	A	Tj=25°C
ΔVo / ΔTj		-	-1.1	-	mV/°C	Io=5mA, 0°C ≤ Tj ≤ 125°C

GJ7806A (Refer to the test circuits, $T_j=0\sim 125^{\circ}\text{C}$, $I_o=500\text{mA}$, $V_{in}=11\text{V}$, $C_{in}=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$ unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	5.82	6.0	6.18	V	Vin=11V, Io=500mA, Tj=25°C 8V ≤ Vin ≤ 21V, 5mA ≤ Io ≤ 1A, PD ≤ 15W
	B-Rank (5%)	5.70	-	6.30		
ΔVO (Line Regulation)		-	5	120	mV	8V ≤ Vin ≤ 25V, Io=500mA, Tj=25°C
		-	1.5	60		9V ≤ Vin ≤ 13V, Io=500mA, Tj=25°C
ΔVO (Load Regulation)		-	14	120	mV	Vin=11V, 5mA ≤ Io ≤ 1.5A, Tj=25°C
		-	4	60		Vin=11V, 250mA ≤ Io ≤ 750mA, Tj=25°C
IQ		-	4.3	8.0	mA	Vin=11V, Io=500mA, Tj=25°C
Δ IQ		-	-	0.5	mA	Vin=11V, 5mA ≤ Io ≤ 1A
		-	-	1.3		8V ≤ Vin ≤ 25V, Io=500mA
Vn		-	45	-	μV	10Hz ≤ f ≤ 100KHz, Tj=25°C
RR		59	-	-	dB	9V ≤ Vin ≤ 19V, f=120Hz, Tj=25°C
VD		-	2.0	-	V	Io=1A, Tj=25°C
Isc		-	550	-	mA	Vin=11V, Tj=25°C
Ipk		-	2.2	-	A	Tj=25°C
ΔVo / ΔTj		-	-0.8	-	mV/°C	Io=5mA, 0°C ≤ Tj ≤ 125°C

GJ7808A (Refer to the test circuits, $T_j=0\sim 125^{\circ}\text{C}$, $I_o=500\text{mA}$, $V_{in}=14\text{V}$, $C_{in}=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$ unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	7.76	8.0	8.24	V	$V_{in}=14\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$ $10.5\text{V} \leq V_{in} \leq 23\text{V}$, $5\text{mA} \leq I_o \leq 1\text{A}$, $PD \leq 15\text{W}$
	B-Rank (5%)	7.60	-	8.40		
ΔVO (Line Regulation)		-	6	160	mV	$10.5\text{V} \leq V_{in} \leq 25\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
		-	2	80		$11\text{V} \leq V_{in} \leq 17\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
ΔVO (Load Regulation)		-	12	160	mV	$V_{in}=14\text{V}$, $5\text{mA} \leq I_o \leq 1.5\text{A}$, $T_j=25^{\circ}\text{C}$
		-	4	80		$V_{in}=14\text{V}$, $250\text{mA} \leq I_o \leq 750\text{mA}$, $T_j=25^{\circ}\text{C}$
IQ		-	4.3	8.0	mA	$V_{in}=14\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
ΔIQ		-	-	0.5	mA	$V_{in}=14\text{V}$, $5\text{mA} \leq I_o \leq 1\text{A}$
		-	-	1.0		$10.5\text{V} \leq V_{in} \leq 25\text{V}$, $I_o=500\text{mA}$
Vn		-	52	-	μV	$10\text{Hz} \leq f \leq 100\text{KHz}$, $T_j=25^{\circ}\text{C}$
RR		55	-	-	dB	$11.5\text{V} \leq V_{in} \leq 21.5\text{V}$, $f=120\text{Hz}$, $T_j=25^{\circ}\text{C}$
VD		-	2.0	-	V	$I_o=1\text{A}$, $T_j=25^{\circ}\text{C}$
Isc		-	450	-	mA	$V_{in}=14\text{V}$, $T_j=25^{\circ}\text{C}$
Ipk		-	2.2	-	A	$T_j=25^{\circ}\text{C}$
$\Delta VO / \Delta T_j$		-	-0.8	-	$\text{mV}/^{\circ}\text{C}$	$I_o=5\text{mA}$, $0^{\circ}\text{C} \leq T_j \leq 125^{\circ}\text{C}$

GJ7809A (Refer to the test circuits, $T_j=0\sim 125^{\circ}\text{C}$, $I_o=500\text{mA}$, $V_{in}=16\text{V}$, $C_{in}=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$ unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	8.73	9.0	9.27	V	$V_{in}=16\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$ $11.5\text{V} \leq V_{in} \leq 24\text{V}$, $5\text{mA} \leq I_o \leq 1\text{A}$, $PD \leq 15\text{W}$
	B-Rank (5%)	8.55	-	9.45		
ΔVO (Line Regulation)		-	7	180	mV	$11.5\text{V} \leq V_{in} \leq 27\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
		-	2	90		$13\text{V} \leq V_{in} \leq 19\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
ΔVO (Load Regulation)		-	12	180	mV	$V_{in}=16\text{V}$, $5\text{mA} \leq I_o \leq 1.5\text{A}$, $T_j=25^{\circ}\text{C}$
		-	4	90		$V_{in}=16\text{V}$, $250\text{mA} \leq I_o \leq 750\text{mA}$, $T_j=25^{\circ}\text{C}$
IQ		-	4.3	8.0	mA	$V_{in}=16\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
ΔIQ		-	-	0.5	mA	$V_{in}=16\text{V}$, $5\text{mA} \leq I_o \leq 1\text{A}$
		-	-	1.0		$11.5\text{V} \leq V_{in} \leq 27\text{V}$, $I_o=500\text{mA}$
Vn		-	60	-	μV	$10\text{Hz} \leq f \leq 100\text{KHz}$, $T_j=25^{\circ}\text{C}$
RR		55	-	-	dB	$12\text{V} \leq V_{in} \leq 22\text{V}$, $f=120\text{Hz}$, $T_j=25^{\circ}\text{C}$
VD		-	2.0	-	V	$I_o=1\text{A}$, $T_j=25^{\circ}\text{C}$
Isc		-	400	-	mA	$V_{in}=16\text{V}$, $T_j=25^{\circ}\text{C}$
Ipk		-	2.2	-	A	$T_j=25^{\circ}\text{C}$
$\Delta VO / \Delta T_j$		-	-1.0	-	$\text{mV}/^{\circ}\text{C}$	$I_o=5\text{mA}$, $0^{\circ}\text{C} \leq T_j \leq 125^{\circ}\text{C}$

GJ7810A (Refer to the test circuits, $T_j=0\sim 125^{\circ}\text{C}$, $I_o=500\text{mA}$, $V_{in}=17\text{V}$, $C_{in}=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$ unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	9.70	10.0	10.30	V	$V_{in}=17\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$ $12.5\text{V} \leq V_{in} \leq 25\text{V}$, $5\text{mA} \leq I_o \leq 1\text{A}$, $PD \leq 15\text{W}$
	B-Rank (5%)	9.50	-	10.50		
ΔVO (Line Regulation)		-	7	200	mV	$12.5\text{V} \leq V_{in} \leq 28\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
		-	2	100		$14\text{V} \leq V_{in} \leq 20\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
ΔVO (Load Regulation)		-	12	200	mV	$V_{in}=17\text{V}$, $5\text{mA} \leq I_o \leq 1.5\text{A}$, $T_j=25^{\circ}\text{C}$
		-	4	100		$V_{in}=17\text{V}$, $250\text{mA} \leq I_o \leq 750\text{mA}$, $T_j=25^{\circ}\text{C}$
IQ		-	4.3	8.0	mA	$V_{in}=17\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
ΔIQ		-	-	0.5	mA	$V_{in}=17\text{V}$, $5\text{mA} \leq I_o \leq 1\text{A}$
		-	-	1.0		$12.5\text{V} \leq V_{in} \leq 28\text{V}$, $I_o=500\text{mA}$
Vn		-	70	-	μV	$10\text{Hz} \leq f \leq 100\text{KHz}$, $T_j=25^{\circ}\text{C}$
RR		55	-	-	dB	$13\text{V} \leq V_{in} \leq 23\text{V}$, $f=120\text{Hz}$, $T_j=25^{\circ}\text{C}$
VD		-	2.0	-	V	$I_o=1\text{A}$, $T_j=25^{\circ}\text{C}$
Isc		-	400	-	mA	$V_{in}=17\text{V}$, $T_j=25^{\circ}\text{C}$
Ipk		-	2.2	-	A	$T_j=25^{\circ}\text{C}$
$\Delta Vo / \Delta Tj$		-	-1.0	-	$\text{mV}/^{\circ}\text{C}$	$I_o=5\text{mA}$, $0^{\circ}\text{C} \leq T_j \leq 125^{\circ}\text{C}$

GJ7812A (Refer to the test circuits, $T_j=0\sim 125^{\circ}\text{C}$, $I_o=500\text{mA}$, $V_{in}=19\text{V}$, $C_{in}=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$ unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	11.64	12.0	12.36	V	$V_{in}=19\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$ $14.5\text{V} \leq V_{in} \leq 27\text{V}$, $5\text{mA} \leq I_o \leq 1\text{A}$, $PD \leq 15\text{W}$
	B-Rank (5%)	11.40	-	12.60		
ΔVO (Line Regulation)		-	10	240	mV	$14.5\text{V} \leq V_{in} \leq 30\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
		-	3	120		$16\text{V} \leq V_{in} \leq 22\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
ΔVO (Load Regulation)		-	12	240	mV	$V_{in}=19\text{V}$, $5\text{mA} \leq I_o \leq 1.5\text{A}$, $T_j=25^{\circ}\text{C}$
		-	4	120		$V_{in}=19\text{V}$, $250\text{mA} \leq I_o \leq 750\text{mA}$, $T_j=25^{\circ}\text{C}$
IQ		-	4.3	8.0	mA	$V_{in}=19\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
ΔIQ		-	-	0.5	mA	$V_{in}=19\text{V}$, $5\text{mA} \leq I_o \leq 1\text{A}$
		-	-	1.0		$14.5\text{V} \leq V_{in} \leq 30\text{V}$, $I_o=500\text{mA}$
Vn		-	75	-	μV	$10\text{Hz} \leq f \leq 100\text{KHz}$, $T_j=25^{\circ}\text{C}$
RR		55	-	-	dB	$15\text{V} \leq V_{in} \leq 25\text{V}$, $f=120\text{Hz}$, $T_j=25^{\circ}\text{C}$
VD		-	2.0	-	V	$I_o=1\text{A}$, $T_j=25^{\circ}\text{C}$
Isc		-	350	-	mA	$V_{in}=19\text{V}$, $T_j=25^{\circ}\text{C}$
Ipk		-	2.2	-	A	$T_j=25^{\circ}\text{C}$
$\Delta Vo / \Delta Tj$		-	-1.0	-	$\text{mV}/^{\circ}\text{C}$	$I_o=5\text{mA}$, $0^{\circ}\text{C} \leq T_j \leq 125^{\circ}\text{C}$

GJ7815A (Refer to the test circuits, $T_j=0\sim 125^{\circ}\text{C}$, $I_o=500\text{mA}$, $V_{in}=23\text{V}$, $C_{in}=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$ unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	14.55	15.0	15.45	V	$V_{in}=23\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$ $17.5\text{V} \leq V_{in} \leq 30\text{V}$, $5\text{mA} \leq I_o \leq 1\text{A}$, $PD \leq 15\text{W}$
	B-Rank (5%)	14.25	-	15.75		
ΔVO (Line Regulation)		-	12	300	mV	$17.5\text{V} \leq V_{in} \leq 30\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
		-	3	150		$20\text{V} \leq V_{in} \leq 26\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
ΔVO (Load Regulation)		-	12	300	mV	$V_{in}=23\text{V}$, $5\text{mA} \leq I_o \leq 1.5\text{A}$, $T_j=25^{\circ}\text{C}$
		-	4	150		$V_{in}=23\text{V}$, $250\text{mA} \leq I_o \leq 750\text{mA}$, $T_j=25^{\circ}\text{C}$
IQ		-	4.3	8.0	mA	$V_{in}=23\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
ΔIQ		-	-	0.5	mA	$V_{in}=23\text{V}$, $5\text{mA} \leq I_o \leq 1\text{A}$
		-	-	1.0		$17.5\text{V} \leq V_{in} \leq 30\text{V}$, $I_o=500\text{mA}$
Vn		-	90	-	μV	$10\text{Hz} \leq f \leq 100\text{KHz}$, $T_j=25^{\circ}\text{C}$
RR		54	-	-	dB	$18.5\text{V} \leq V_{in} \leq 28.5\text{V}$, $f=120\text{Hz}$, $T_j=25^{\circ}\text{C}$
VD		-	2.0	-	V	$I_o=1\text{A}$, $T_j=25^{\circ}\text{C}$
Isc		-	230	-	mA	$V_{in}=19\text{V}$, $T_j=25^{\circ}\text{C}$
Ipk		-	2.1	-	A	$T_j=25^{\circ}\text{C}$
$\Delta VO / \Delta T_j$		-	-1.0	-	$\text{mV}/^{\circ}\text{C}$	$I_o=5\text{mA}$, $0^{\circ}\text{C} \leq T_j \leq 125^{\circ}\text{C}$

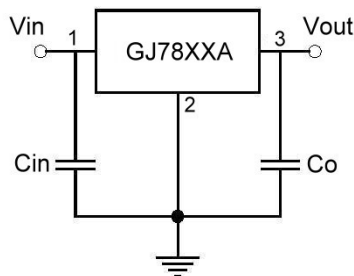
GJ7818A (Refer to the test circuits, $T_j=0\sim 125^{\circ}\text{C}$, $I_o=500\text{mA}$, $V_{in}=27\text{V}$, $C_{in}=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$ unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	17.46	18.0	18.54	V	$V_{in}=27\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$ $21\text{V} \leq V_{in} \leq 33\text{V}$, $5\text{mA} \leq I_o \leq 1\text{A}$, $PD \leq 15\text{W}$
	B-Rank (5%)	17.10	-	18.9		
ΔVO (Line Regulation)		-	15	360	mV	$21\text{V} \leq V_{in} \leq 33\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
		-	5	180		$24\text{V} \leq V_{in} \leq 30\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
ΔVO (Load Regulation)		-	12	360	mV	$V_{in}=27\text{V}$, $5\text{mA} \leq I_o \leq 1.5\text{A}$, $T_j=25^{\circ}\text{C}$
		-	4	180		$V_{in}=27\text{V}$, $250\text{mA} \leq I_o \leq 750\text{mA}$, $T_j=25^{\circ}\text{C}$
IQ		-	4.5	8.0	mA	$V_{in}=27\text{V}$, $I_o=500\text{mA}$, $T_j=25^{\circ}\text{C}$
ΔIQ		-	-	0.5	mA	$V_{in}=27\text{V}$, $5\text{mA} \leq I_o \leq 1\text{A}$
		-	-	1.0		$21\text{V} \leq V_{in} \leq 33\text{V}$, $I_o=500\text{mA}$
Vn		-	110	-	μV	$10\text{Hz} \leq f \leq 100\text{KHz}$, $T_j=25^{\circ}\text{C}$
RR		53	-	-	dB	$22\text{V} \leq V_{in} \leq 32\text{V}$, $f=120\text{Hz}$, $T_j=25^{\circ}\text{C}$
VD		-	2.0	-	V	$I_o=1\text{A}$, $T_j=25^{\circ}\text{C}$
Isc		-	200	-	mA	$V_{in}=27\text{V}$, $T_j=25^{\circ}\text{C}$
Ipk		-	2.1	-	A	$T_j=25^{\circ}\text{C}$
$\Delta VO / \Delta T_j$		-	-1.0	-	$\text{mV}/^{\circ}\text{C}$	$I_o=5\text{mA}$, $0^{\circ}\text{C} \leq T_j \leq 125^{\circ}\text{C}$

GJ7824A (Refer to the test circuits, $T_j=0\sim 125^{\circ}\text{C}$, $I_o=500\text{mA}$, $V_{in}=33\text{V}$, $C_{in}=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$ unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	23.28	24.0	24.72	V	Vin=33V, Io=500mA, Tj=25°C
	B-Rank (5%)	22.80	-	25.20		27V ≤ Vin ≤ 38V, 5mA ≤ Io ≤ 1A, PD ≤ 15W
ΔVO (Line Regulation)		-	18	480	mV	27V ≤ Vin ≤ 38V, Io=500mA, Tj=25°C
		-	6	240		30V ≤ Vin ≤ 36V, Io=500mA, Tj=25°C
ΔVO (Load Regulation)		-	12	480	mV	Vin=33V, 5mA ≤ Io ≤ 1.5A, Tj=25°C
		-	4	240		Vin=33V, 250mA ≤ Io ≤ 750mA, Tj=25°C
IQ		-	4.6	8.0	mA	Vin=33V, Io=500mA, Tj=25°C
Δ IQ		-	-	0.5	mA	Vin=33V, 5mA ≤ Io ≤ 1A
		-	-	1.0		27V ≤ Vin ≤ 38V, Io=500mA
Vn		-	170	-	μV	10Hz ≤ f ≤ 100KHz, Tj=25°C
RR		50	-	-	dB	28V ≤ Vin ≤ 38V, f=120Hz, Tj=25°C
VD		-	2.0	-	V	Io=1A, Tj=25°C
Isc		-	150	-	mA	Vin=33V, Tj=25°C
Ipk		-	2.1	-	A	Tj=25°C
ΔVo / ΔTj		-	-1.5	-	mV/°C	Io=5mA, 0°C ≤ Tj ≤ 125°C

Typical Application



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