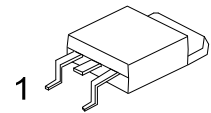


**78TXX****LINEAR INTEGRATED CIRCUIT****3-TERMINALS 0.5A POSITIVE
VOLTAGE REGULATOR****■ DESCRIPTION**

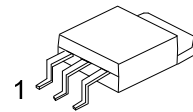
The UTC 78TXX family is monolithic fixed voltage regulator integrated circuit. They are suitable for applications that required supply current up to 0.5 A.

■ FEATURE

- * Output current up to 0.5 A
- * Fixed output voltage of 5V, 6V, 7V, 8V, 9V, 12V, 15V, 18V and 20V available
- * Thermal overload shutdown protection
- * Short circuit current limiting
- * Output transistor SOA protection



TO-263



TO-263-3

■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
78TXXL-TQ2-R	78TXXG-TQ2-R	TO-263	I	G	O	Tape Reel
78TXXL-TQ2-T	78TXXG-TQ2-T	TO-263	I	G	O	Tube
78TXXL-TQ3-R	78TXXG-TQ3-R	TO-263-3	I	G	O	Tape Reel
78TXXL-TQ3-T	78TXXG-TQ3-T	TO-263-3	I	G	O	Tube

Note: 1. xx: output voltage, refer to Marking Information
2. Pin Code: I: Input G: GND O: Output

78TXXG-TQ2-R (1)Packing Type (2)Package Type (3)Green Package (4)Output Voltage Code	(1) R: Tape Reel, T: Tube (2) TQ2: TO-263, TQ3: TO-263-3 (3) G: Halogen Free and Lead Free, L: Lead Free (4) xx: refer to Marking Information
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PACKAGE	VOLTAGE CODE	MARKING
TO-263 TO-263-3	05 : 5V 06 : 6V 07 : 7V 08 : 8V 09 : 9V 12 : 12V 15 : 15V 18 : 18V 20 : 20V	UTC 78TXX Voltage Code ← Lot Code ← → G: Halogen Free → L: Lead Free → Date Code 1 2 3



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■ **ABSOLUTE MAXIMUM RATINGS** (Operating temperature range applies unless otherwise specified.)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	35	V
Output Current	I_{OUT}	0.5	A
Power Dissipation	P_D	Internally Limited	W
Junction Temperature	T_J	0 ~ +125	°C
Storage Temperature	T_{STG}	-65 ~ +150	°C

Notes:1. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

The device could be damaged beyond Absolute maximum ratings.

2. The maximum steady state usable output current are dependent on input voltage, heat sinking, lead length of the package and copper pattern of PCB. The data are showed as electrical characteristics table represents pulse test conditions with junction temperatures specified at the initiation of test.

■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^{\circ}\text{C}$, $C_I=0.33\mu\text{F}$, $C_O=0.1\mu\text{F}$, $P_D\leq 7\text{W}$, unless otherwise specified)

For 78T05 ($V_{IN}=10\text{V}$, $I_{OUT}=0.5\text{A}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$I_{OUT}=5\text{mA}\sim 0.5\text{A}$	4.8	5	5.2	V
		$V_{IN}=7.5\sim 20\text{V}$, $I_{OUT}=5\text{mA}\sim 0.5\text{A}$	4.75		5.25	V
Load Regulation	ΔV_{OUT}	$I_{OUT}=5\text{mA}\sim 0.5\text{A}$			100	mV
		$I_{OUT}=5\text{mA}\sim 200\text{mA}$			50	mV
Line Regulation	ΔV_{OUT}	$V_{IN}=7\text{V}\sim 25\text{V}$			100	mV
		$V_{IN}=7.5\sim 20\text{V}$, $I_{OUT}=0.5\text{A}$			50	mV
Quiescent Current	I_Q	$I_{OUT}=0.5\text{A}$			8	mA
Quiescent Current Change	ΔI_Q	$V_{UT}=7.5\sim 20\text{V}$			1	mA
		$I_{OUT}=5\text{mA}\sim 0.5\text{A}$			0.5	mA
Output Noise Voltage	e_N	$10\text{Hz}\leq f\leq 100\text{kHz}$		40		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5\text{mA}$		-0.6		$\text{mV}/^{\circ}\text{C}$
Ripple Rejection	RR	$V_{IN}=8\sim 18\text{V}$, $f=120\text{Hz}$	62	80		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	$V_{IN}=35\text{V}$		250		mA
Dropout Voltage	V_D			2		V

For 78T06 ($V_{IN}=11\text{V}$, $I_{OUT}=0.5\text{A}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$I_{OUT}=5\text{mA}\sim 0.5\text{A}$	5.76	6	6.24	V
		$V_{IN}=8.5\sim 21\text{V}$, $I_{OUT}=5\text{mA}\sim 0.5\text{A}$	5.7		6.3	V
Load Regulation	ΔV_{OUT}	$I_{OUT}=5\text{mA}\sim 0.5\text{A}$			60	mV
		$I_{OUT}=5\text{mA}\sim 200\text{mA}$			30	mV
Line Regulation	ΔV_{OUT}	$V_{IN}=8\sim 25\text{V}$			60	mV
		$V_{IN}=8.5\sim 21\text{V}$, $I_{OUT}=0.5\text{A}$			60	mV
Quiescent Current	I_Q	$I_{OUT}=0.5\text{A}$			8	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=8.5\sim 21\text{V}$			1	mA
		$I_{OUT}=5\text{mA}\sim 0.5\text{A}$			0.5	mA
Output Noise Voltage	e_N	$10\text{Hz}\leq f\leq 100\text{kHz}$		45		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5\text{mA}$		-0.7		$\text{mV}/^{\circ}\text{C}$
Ripple Rejection	RR	$V_{IN}=9\sim 19\text{V}$, $f=120\text{Hz}$	59	75		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	$V_{IN}=35\text{V}$		250		mA
Dropout Voltage	V_D			2		V

■ ELECTRICAL CHARACTERISTICS(Cont.)

For 78T07 ($V_{IN}=13V$, $I_{OUT}=0.5A$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$I_{OUT}=5mA\sim0.5A$	6.72	7.0	7.28	V
		$V_{IN}=9.5\sim22V$, $I_{OUT}=5mA\sim0.5A$	6.65		7.35	V
Load Regulation	ΔV_{OUT}	$I_{OUT}=5mA\sim0.5A$			70	mV
		$I_{OUT}=5mA\sim200mA$			35	mV
Line Regulation	ΔV_{OUT}	$V_{IN}=9.5\sim25V$			70	mV
		$V_{IN}=9.5\sim22V$, $I_{OUT}=0.5A$			70	mV
Quiescent Current	I_Q	$I_{OUT}=0.5A$			8	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=9.5\sim22V$			1.0	mA
		$I_{OUT}=5mA\sim0.5A$			0.5	mA
Output Noise Voltage	e_N	$10Hz \leq f \leq 100kHz$		50		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-0.8		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=10\sim20V$, $f=120Hz$	59	75		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$		250		mA
Dropout Voltage	V_D			2.0		V

For 78T08 ($V_{IN}=14V$, $I_{OUT}=0.5A$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$I_{OUT}=5mA\sim0.5A$	7.68	8	8.32	V
		$V_{IN}=10.5\sim23V$, $I_{OUT}=5mA\sim0.5A$	7.6		8.4	V
Load Regulation	ΔV_{OUT}	$I_{OUT}=5mA\sim0.5A$			80	mV
		$I_{OUT}=5mA\sim200mA$			40	mV
Line Regulation	ΔV_{OUT}	$V_{IN}=10.5\sim25V$			80	mV
		$V_{IN}=10.5\sim23V$, $I_{OUT}=0.5A$			80	mV
Quiescent Current	I_Q	$I_{OUT}=0.5A$			8	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=10.5\sim23V$			1	mA
		$I_{OUT}=5mA\sim0.5A$			0.5	mA
Output Noise Voltage	e_N	$10Hz \leq f \leq 100kHz$		58		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-0.9		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=11.5\sim21.5V$, $f=120Hz$	56	72		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$		250		mA
Dropout Voltage	V_D			2		V

For 78T09 ($V_{IN}=15V$, $I_{OUT}=0.5A$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$I_{OUT}=5mA\sim0.5A$	8.64	9	9.36	V
		$V_{IN}=11.5\sim24V$, $I_{OUT}=5mA\sim0.5A$	8.55		9.45	V
Load Regulation	ΔV_{OUT}	$I_{OUT}=5mA\sim0.5A$			90	mV
		$I_{OUT}=5mA\sim200mA$			45	mV
Line Regulation	ΔV_{OUT}	$V_{IN}=11.5\sim25V$			90	mV
		$V_{IN}=11.5\sim24V$, $I_{OUT}=0.5A$			90	mV
Quiescent Current	I_Q	$I_{OUT}=0.5A$			8	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=11.5\sim24V$			1	mA
		$I_{OUT}=5mA\sim0.5A$			0.5	mA
Output Noise Voltage	e_N	$10Hz \leq f \leq 100kHz$		58		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-1.1		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=12.5\sim22.5V$, $f=120Hz$	56	72		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$		250		mA
Dropout Voltage	V_D			2		V

■ ELECTRICAL CHARACTERISTICS(Cont.)

For 78T12 ($V_{IN}=19V$, $I_{OUT}=0.5A$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$I_{OUT}=5mA\sim0.5A$	11.52	12	12.48	V
		$V_{IN}=14.5\sim27V$, $I_{OUT}=5mA\sim0.5A$	11.4		12.6	V
Load Regulation	ΔV_{OUT}	$I_{OUT}=5mA\sim0.5A$			120	mV
		$I_{OUT}=5mA\sim200mA$			60	mV
Line Regulation	ΔV_{OUT}	$V_{IN}=14.5\sim30V$			120	mV
		$V_{IN}=14.6\sim27V$, $I_{OUT}=0.5A$			120	mV
Quiescent Current	I_Q	$I_{OUT}=0.5A$			8	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=14.5\sim30V$			1	mA
		$I_{OUT}=5mA\sim0.5A$			0.5	mA
Output Noise Voltage	e_N	$10Hz \leq f \leq 100kHz$		75		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-1.5		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=15\sim25V$, $f=120Hz$	55	72		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$		250		mA
Dropout Voltage	V_D			2		V

For 78T15 ($V_{IN}=23V$, $I_{OUT}=0.5A$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$I_{OUT}=5mA\sim0.5A$	14.4	15	15.6	V
		$V_{IN}=17.5\sim30V$, $I_{OUT}=5mA\sim0.5A$	14.25		15.75	V
Load Regulation	ΔV_{OUT}	$I_{OUT}=5mA\sim0.5A$			150	mV
		$I_{OUT}=5mA\sim200mA$			75	mV
Line Regulation	ΔV_{OUT}	$V_{IN}=18.5\sim30V$			150	mV
		$V_{IN}=17.5\sim30V$, $I_{OUT}=0.5A$			150	mV
Quiescent Current	I_Q	$I_{OUT}=0.5A$			8	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=17.5\sim30V$			1	mA
		$I_{OUT}=5mA\sim0.5A$			0.5	mA
Output Noise Voltage	e_N	$10Hz \leq f \leq 100kHz$		90		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-1.8		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=18.5\sim28.5V$, $f=120Hz$	54	70		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$		250		mA
Dropout Voltage	V_D			2		V

For 78T18 ($V_{IN}=27V$, $I_{OUT}=0.5A$)

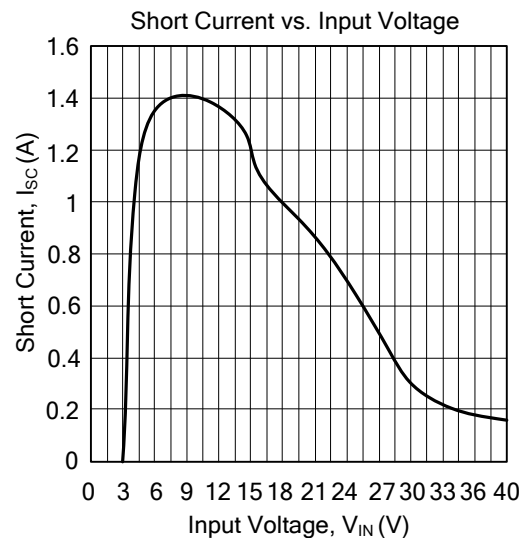
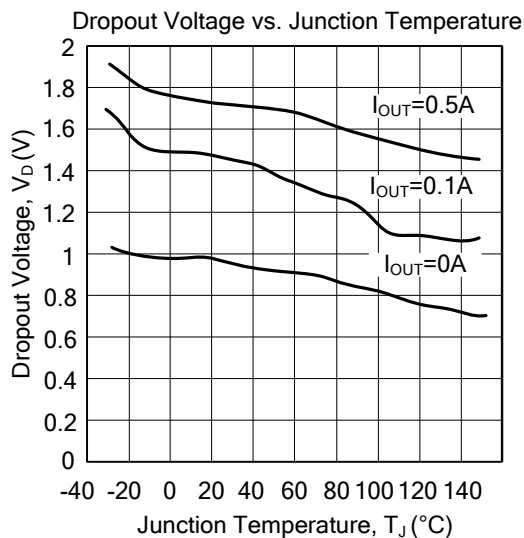
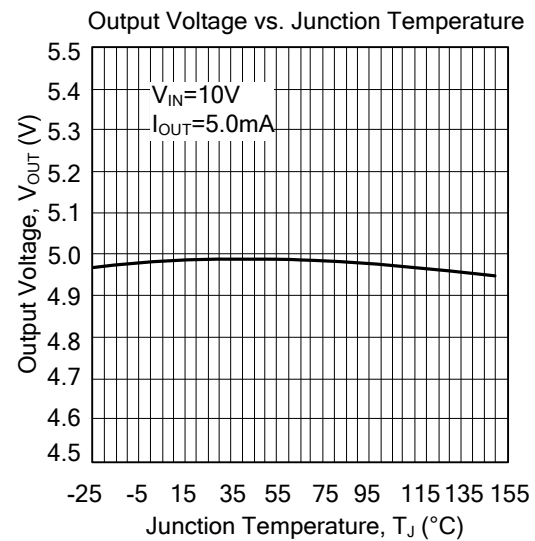
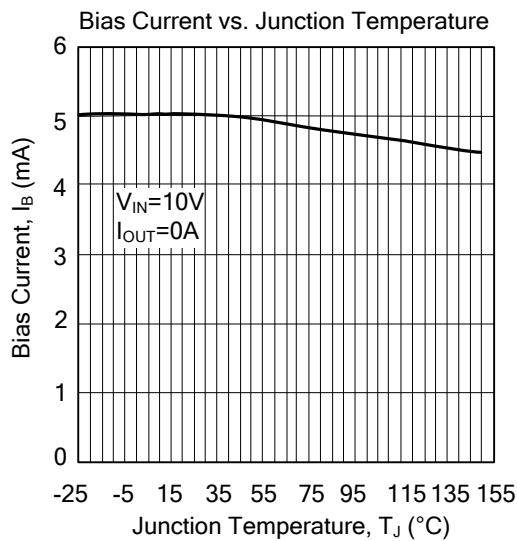
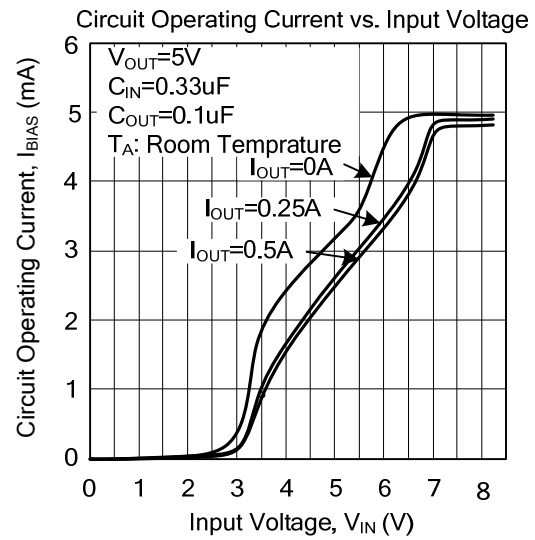
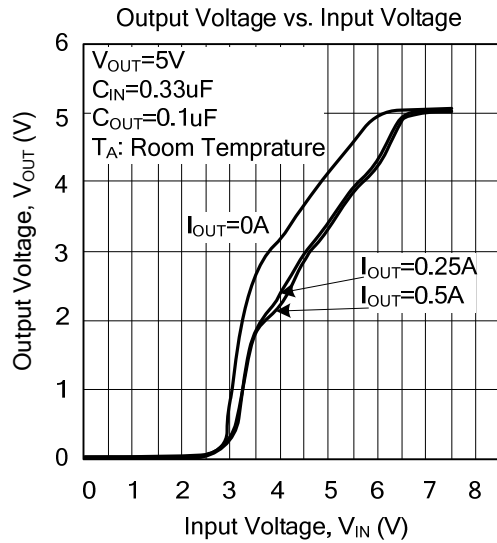
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$I_{OUT}=5mA\sim0.5A$	17.28	18	18.72	V
		$V_{IN}=21\sim33V$, $I_{OUT}=5mA\sim0.5A$	17.1		18.9	V
Load Regulation	ΔV_{OUT}	$I_{OUT}=5mA\sim0.5A$			180	mV
		$I_{OUT}=5mA\sim200mA$			90	mV
Line Regulation	ΔV_{OUT}	$V_{IN}=21\sim33V$			180	mV
		$V_{IN}=21\sim33V$, $I_{OUT}=0.5A$			180	mV
Quiescent Current	I_Q	$I_{OUT}=0.5A$			8	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=21.5\sim33V$			1	mA
		$I_{OUT}=5mA\sim0.5A$			0.5	mA
Output Noise Voltage	e_N	$10Hz \leq f \leq 100kHz$		110		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-2.2		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=22\sim32V$, $f=120Hz$	53	69		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$		250		mA
Dropout Voltage	V_D			2		V

■ ELECTRICAL CHARACTERISTICS(Cont.)

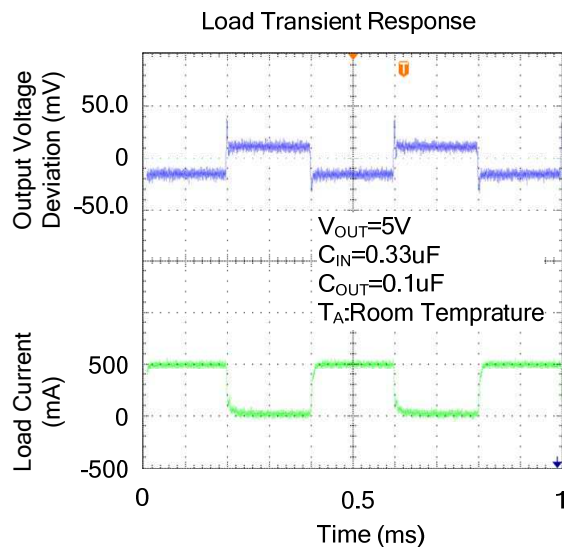
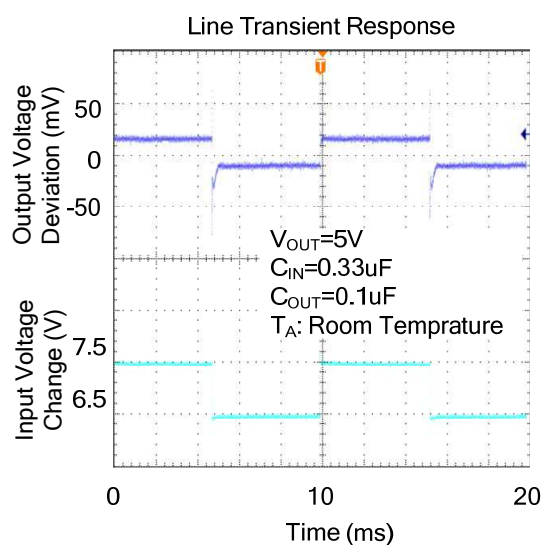
For 78T20 ($V_{IN}=29V$, $I_{OUT}=0.5A$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$I_{OUT}=5mA\sim0.5A$	19.20	20	20.80	V
		$V_{IN}=23\sim35V$, $I_{OUT}=5mA\sim0.5A$	19.00		21.00	V
Load Regulation	ΔV_{OUT}	$I_{OUT}=5mA\sim0.5A$			200	mV
		$I_{OUT}=5mA\sim200mA$			100	mV
Line Regulation	ΔV_{OUT}	$V_{IN}=23\sim35V$			200	mV
		$V_{IN}=23\sim35V$, $I_{OUT}=0.5A$			200	mV
Quiescent Current	I_Q	$I_{OUT}=0.5A$			8	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=23.5\sim35V$			1	mA
		$I_{OUT}=5mA\sim0.5A$			0.5	mA
Output Noise Voltage	e_N	$10Hz \leq f \leq 100kHz$		130		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-2.6		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=24\sim34V$, $f=120Hz$	52	68		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$		250		mA
Dropout Voltage	V_D			2.0		V

■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



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