Standard 78 series, 3-terminal regulator

BA178○○T/FP series

The BA178○○T and BA178○○FP Series are 3-terminal, fixed positive output voltage regulators. These regulators are used to provide a stabilized output voltage from a fluctuating DC input voltage.
There are 11 fixed output voltages, as follows : 5V, 6V, 7V, 8V, 9V, 10V, 12V, 15V, 18V, 20V, and 24V. The maximum current capacity is 1A for each of the above voltages.

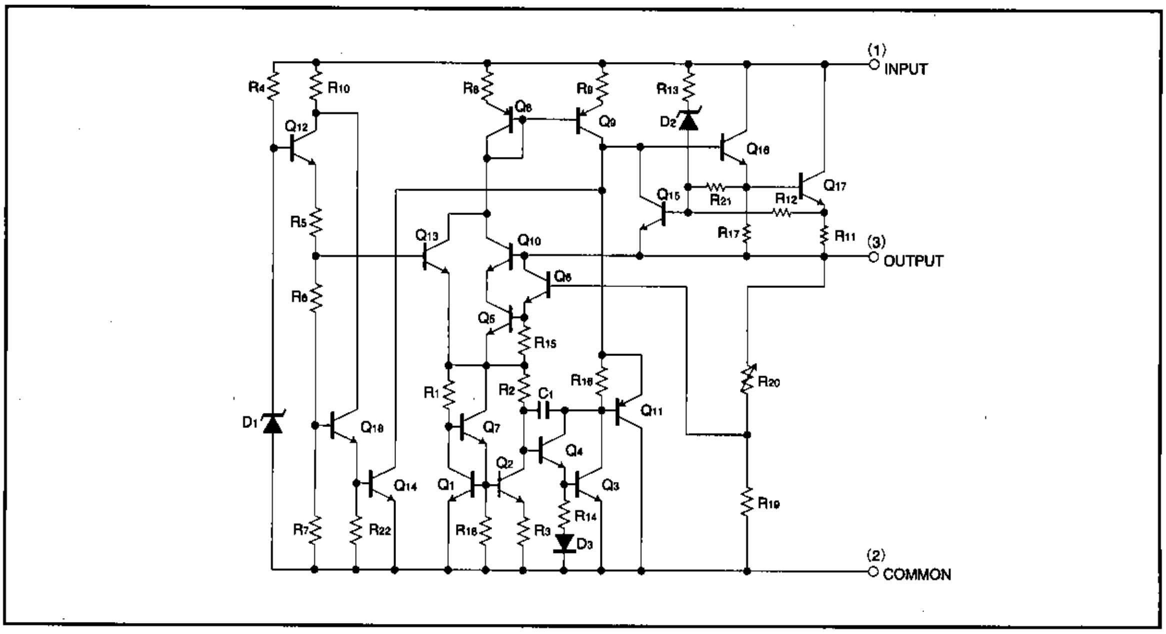
●Applications
Constant voltage power supply

●Features
1) Built-in overcurrent protection circuit and thermal shutdown circuit.
2) Excellent ripple regulation.
3) Available in TO220FP and TO252-3 packages, to meet wide range of applications.
4) Compatible with other manufacturers' regulators.
5) Richly diverse lineup (5V, 6V, 7V, 8V, 9V, 10V, 12V, 15V, 18V, 20V, 24V)

●Product codes

Output Voltage (V)	Product Name	Output Voltage (V)	Product Name
5	BA17805T / FP	12	BA17812T / FP
6	BA17806T / FP	15	BA17815T / FP
7	BA17807T / FP	18	BA17818T / FP
8	BA17808T / FP	20	BA17820T / FP
9	BA17809T / FP	24	BA17824T / FP
10	BA17810T / FP	—	—

●Internal circuit configuration diagram



《Common specifications for BA178○○T/FP series》

●Absolute maximum ratings (Ta=25℃)

Parameter		Symbol	Limits	Unit
Input voltage		V_{in}	35	V
Power dissipation	TO220FP	Pd	2.0*	W
	TO252−3		1.0*	
Operating temperature		Topr	−40～85	℃
Storage temperature		Tstg	−55～150	℃

* Reduce by 16 mW/°C (TO220FP) or 8 mW/°C (TO252-3) if Ta≧25°C (without heat sink).

●Recommended operating conditions (Ta=25℃)

BA17805T / FP

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	V_{in}	7.5	−	25	V
Output current	Io	−	−	1	A

BA17806T / FP

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	V_{in}	8.5	−	21	V
Output curren	Io	−	−	1	A

BA17807T / FP

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	V_{in}	9.5	−	22	V
Output current	Io	−	−	1	A

BA17808T / FP

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	V_{in}	10.5	−	23	V
Output current	Io	−	−	1	A

●Recommended operating conditions

BA17809T / FP

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	V_{in}	11.5	—	26	V
Output current	Io	—	—	1	A

BA17810T / FP

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	V_{in}	12.5	—	25	V
Output current	Io	—	—	1	A

BA17812T / FP

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	V_{in}	15	—	27	V
Output current	Io	—	—	1	A

BA17815T / FP

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	V_{in}	17.5	—	30	V
Output current	Io	—	—	1	A

BA17818T / FP

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	V_{in}	21	—	33	V
Output current	Io	—	—	1	A

BA17820T / FP

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	V_{in}	23	—	33	V
Output current	Io	—	—	1	A

BA17824T / FP

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	V_{in}	27	—	33	V
Output current	Io	—	—	1	A

〈BA17805T/FP individual specifications〉

●Electrical characteristics (unless otherwise noted, Ta=25℃, V_{in}=10V, Io=500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Output voltage 1	V_{O1}	4.8	5.0	5.2	V	Io=500mA	Fig.5
Output voltage 2	V_{O2}	4.75	—	5.25	V	V_{in}=7.5~20V, Io=5mA~1A	Fig.5
Line regulation 1	Reg.I_1	—	3	100	mV	V_{in}=7~25V, Io=500mA	Fig.5
Line regulation 2	Reg.I_2	—	1	50	mV	V_{in}=8~12V, Io=500mA	Fig.5
Ripple rejection	R.R.	62	78	—	dB	e_{in}=1V_{rms}, f=120Hz, Io=100mA	Fig.6
Load regulation 1	Reg.L_1	—	15	100	mV	Io=5mA~1A	Fig.5
Load regulation 2	Reg.L_2	—	5	50	mV	Io=250~750mA	Fig.5
Temperature coefficient of output voltage	T_{cvo}	—	−1.0	—	mV/℃	Io=5mA, T_j=0~125℃	Fig.5
Output noise voltage	V_n	—	40	—	μV	f=10Hz~100kHz	Fig.7
Dropout voltage	V_d	—	2.0	—	V	Io=1A	Fig.8
Bias current	I_b	—	4.5	8.0	mA	Io=0mA	Fig.9
Bias current change 1	I_{b1}	—	—	0.5	mA	Io=5mA~1A	Fig.9
Bias current change 2	I_{b2}	—	—	0.8	mA	V_{in}=8~25V	Fig.9
Peak output current	I_{O-P}	—	1.7	—	A	T_j=25℃	Fig.5
Short-circuit output current	I_{OS}	—	0.6	—	A	V_{in}=25V	Fig.10

〈BA17806T/FP individual specifications〉

●Electrical characteristics (unless otherwise noted, Ta=25℃, V_{in}=11V, Io=500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Output voltage 1	V_{O1}	5.75	6.0	6.25	V	Io=500mA	Fig.5
Output voltage 2	V_{O2}	5.7	—	6.3	V	V_{in}=8.5~21V, Io=5mA~1A	Fig.5
Line regulation 1	Reg.I1	—	4	120	mV	V_{in}=8~25V, Io=500mA	Fig.5
Line regulation 2	Reg.I2	—	2	60	mV	V_{in}=9~13V, Io =500mA	Fig.5
Ripple rejection	R.R.	59	73	—	dB	e_{in}=1V_{rms}, f=120Hz, Io=100mA	Fig.6
Load regulation 1	Reg.L1	—	16	120	mV	Io=5mA~1A	Fig.5
Load regulation 2	Reg.L2	—	6	60	mV	Io=250~750mA	Fig.5
Temperature coefficient of output voltage	Tcvo	—	−0.5	—	mV/℃	Io=5mA, T_j=0~125℃	Fig.5
Output noise voltage	V_n	—	60	—	μV	f=10Hz~100kHz	Fig.7
Dropout voltage	V_d	—	2.0	—	V	Io=1A	Fig.8
Bias current	I_b	—	4.5	8.0	mA	Io=0mA	Fig.9
Bias current change 1	I_{b1}	—	—	0.5	mA	Io=5mA~1A	Fig.9
Bias current change 2	I_{b2}	—	—	0.8	mA	V_{in}=8.5~25V	Fig.9
Peak output current	I_{O-P}	—	1.7	—	A	T_j=25℃	Fig.5
Short-circuit output current	Ios	—	0.6	—	A	V_{in}=25V	Fig.10

〈BA17807T/FP individual specifications〉

●Electrical characteristics (unless otherwise noted, Ta=25℃, V_{in}=13V, Io=500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Output voltage 1	V_{O1}	6.7	7.0	7.3	V	Io=500mA	Fig.5
Output voltage 2	V_{O2}	6.65	—	7.35	V	V_{in}=9.5~22V, Io=5mA~1A	Fig.5
Line regulation 1	Reg.I1	—	5	140	mV	V_{in}=9~25V, Io=500mA	Fig.5
Line regulation 2	Reg.I2	—	2	70	mV	V_{in}=10~15V, Io =500mA	Fig.5
Ripple rejection	R.R.	57	69	—	dB	e_{in}=1V_{rms}, f=120Hz, Io=100mA	Fig.6
Load regulation 1	Reg.L1	—	17	140	mV	Io=5mA~1A	Fig.5
Load regulation 2	Reg.L2	—	6	70	mV	Io=250~750mA	Fig.5
Temperature coefficient of output voltage	Tcvo	—	−0.5	—	mV/℃	Io=5mA, T_j=0~125℃	Fig.5
Output noise voltage	V_n	—	70	—	μV	f=10Hz~100kHz	Fig.7
Dropout voltage	V_d	—	2.0	—	V	Io=1A	Fig.8
Bias current	I_b	—	4.5	8.5	mA	Io=0mA	Fig.9
Bias current change 1	I_{b1}	—	—	0.5	mA	Io=5mA~1A	Fig.9
Bias current change 2	I_{b2}	—	—	0.8	mA	V_{in}=9.5~25V	Fig.9
Peak output current	I_{O-P}	—	1.7	—	A	T_j=25℃	Fig.5
Short-circuit output current	Ios	—	0.6	—	A	V_{in}=25V	Fig.10

〈BA17808T/FP individual specifications〉

●Electrical characteristics (unless otherwise noted, Ta=25℃, V_{in}=14V, Io=500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Output voltage 1	V_{O1}	7.7	8.0	8.3	V	Io=500mA	Fig.5
Output voltage 2	V_{O2}	7.6	—	8.4	V	V_{in}=10.5~23V, Io=5mA~1A	Fig.5
Line regulation 1	Reg.I1	—	6	160	mV	V_{in}=10.5~25V, Io=500mA	Fig.5
Line regulation 2	Reg.I2	—	3	80	mV	V_{in}=11~17V, Io=500mA	Fig.5
Ripple rejection	R.R.	56	65	—	dB	e_{in}=1V_{rms}, f=120Hz, Io=100mA	Fig.6
Load regulation 1	Reg.L1	—	19	160	mV	Io=5mA~1A	Fig.5
Load regulation 2	Reg.L2	—	7	80	mV	Io=250~750mA	Fig.5
Temperature coefficient of output voltage	Tcvo	—	−0.5	—	mV/℃	Io=5mA, T_j=0~125℃	Fig.5
Output noise voltage	V_n	—	80	—	μV	f=10Hz~100kHz	Fig.7
Dropout voltage	V_d	—	2.0	—	V	Io=1A	Fig.8
Bias current	I_b	—	4.5	8.0	mA	Io=0mA	Fig.9
Bias current change 1	I_{b1}	—	—	0.5	mA	Io=5mA~1A	Fig.9
Bias current change 2	I_{b2}	—	—	0.8	mA	V_{in}=10.5~25V	Fig.9
Peak output current	Io-P	—	1.7	—	A	T_j=25℃	Fig.5
Short-circuit output current	Ios	—	0.6	—	A	V_{in}=25V	Fig.10

〈BA17809T/FP individual specifications〉

●Electrical characteristics (unless otherwise noted, Ta=25℃, V_{in}=16V, Io=500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Output voltage 1	V_{O1}	8.6	9.0	9.4	V	Io=500mA	Fig.5
Output voltage 2	V_{O2}	8.55	—	9.45	V	V_{in}=11.5~26V, Io=5mA~1A	Fig.5
Line regulation 1	Reg.I1	—	6	180	mV	V_{in}=11.5~26V, Io=500mA	Fig.5
Line regulation 2	Reg.I2	—	4	90	mV	V_{in}=13~19V, Io=500mA	Fig.5
Ripple rejection	R.R.	56	64	—	dB	e_{in}=1V_{rms}, f=120Hz, Io=100mA	Fig.6
Load regulation 1	Reg.L1	—	20	180	mV	Io=5mA~1A	Fig.5
Load regulation 2	Reg.L2	—	8	90	mV	Io=250~750mA	Fig.5
Temperature coefficient of output voltage	Tcvo	—	−0.5	—	mV/℃	Io=5mA, T_j=0~125℃	Fig.5
Output noise voltage	V_n	—	90	—	μV	f=10Hz~100kHz	Fig.7
Dropout voltage	V_d	—	2.0	—	V	Io=1A	Fig.8
Bias current	I_b	—	4.5	8.0	mA	Io=0mA	Fig.9
Bias current change 1	I_{b1}	—	—	0.5	mA	Io=5mA~1A	Fig.9
Bias current change 2	I_{b2}	—	—	0.8	mA	V_{in}=11.5~26V	Fig.9
Peak output current	Io-P	—	1.7	—	A	T_j=25℃	Fig.5
Short-circuit output current	Ios	—	0.3	—	A	V_{in}=30V	Fig.10

〈BA17810T / FP individual specifications〉

●Electrical characteristics (unless otherwise noted, Ta=25℃, V_{in}=16V, Io=500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Output voltage 1	V_{O1}	9.6	10.0	10.4	V	Io=500mA	Fig.5
Output voltage 2	V_{O2}	9.5	—	10.5	V	V_{in}=12.5~25V, Io=5mA~1A	Fig.5
Line regulation 1	Reg.I1	—	7	200	mV	V_{in}=12.5~27V, Io=500mA	Fig.5
Line regulation 2	Reg.I2	—	4	100	mV	V_{in}=14~20V, Io=500mA	Fig.5
Ripple rejection	R.R.	55	64	—	dB	e_{in}=1V_{rms}, f=120Hz, Io=100mA	Fig.6
Load regulation 1	Reg.L1	—	21	200	mV	Io=5mA~1A	Fig.5
Load regulation 2	Reg.L2	—	8	90	mV	Io=250~750mA	Fig.5
Temperature coefficient of output voltage	Tcvo	—	−0.5	—	mV/℃	Io=5mA, T_j=0~125℃	Fig.5
Output noise voltage	V_n	—	100	—	μV	f=10Hz~100kHz	Fig.7
Dropout voltage	V_d	—	2.0	—	V	Io=1A	Fig.8
Bias current	I_b	—	4.5	8.0	mA	Io=0mA	Fig.9
Bias current change 1	I_{b1}	—	—	0.5	mA	Io=5mA~1A	Fig.9
Bias current change 2	I_{b2}	—	—	0.8	mA	V_{in}=12.5~27V	Fig.9
Peak output current	Io-P	—	1.7	—	A	T_j=25℃	Fig.5
Short-circuit output current	Ios	—	0.3	—	A	V_{in}=30V	Fig.10

〈BA17812T / FP individual specifications〉

●Electrical characteristics (unless otherwise noted, Ta=25℃, V_{in}=19V, Io=500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Output voltage 1	V_{O1}	11.5	12.0	12.5	V	Io=500mA	Fig.5
Output voltage 2	V_{O2}	11.4	—	12.6	V	V_{in}=14.5~27V, Io=5mA~1A	Fig.5
Line regulation 1	Reg.I1	—	8	240	mV	V_{in}=14.5~30V, Io=500mA	Fig.5
Line regulation 2	Reg.I2	—	5	120	mV	V_{in}=16~22V, Io=500mA	Fig.5
Ripple rejection	R.R.	55	63	—	dB	e_{in}=1V_{rms}, f=120Hz, Io=100mA	Fig.6
Load regulation 1	Reg.L1	—	23	240	mV	Io=5mA~1A	Fig.5
Load regulation 2	Reg.L2	—	10	120	mV	Io=250~750mA	Fig.5
Temperature coefficient of output voltage	Tcvo	—	−0.5	—	mV/℃	Io=5mA, T_j=0~125℃	Fig.5
Output noise voltage	V_n	—	110	—	μV	f=10Hz~100kHz	Fig.7
Dropout voltage	V_d	—	2.0	—	V	Io=1A	Fig.8
Bias current	I_b	—	4.5	8.0	mA	Io=0mA	Fig.9
Bias current change 1	I_{b1}	—	—	0.5	mA	Io=5mA~1A	Fig.9
Bias current change 2	I_{b2}	—	—	0.8	mA	V_{in}=14.5~30V	Fig.9
Peak output current	Io-P	—	1.7	—	A	T_j=25℃	Fig.5
Short-circuit output current	Ios	—	0.3	—	A	V_{in}=30V	Fig.10

〈BA17815T/FP individual specifications〉

●Electrical characteristics (unless otherwise noted, Ta=25℃, V_{in}=23V, Io=500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Output voltage 1	V_{O1}	14.4	15.0	15.6	V	Io=500mA	Fig.5
Output voltage 2	V_{O2}	14.25	—	15.75	V	V_{in}=17.5~30V, Io=5mA~1A	Fig.5
Line regulation 1	Reg.I_1	—	9	300	mV	V_{in}=17.5~30V, Io=500mA	Fig.5
Line regulation 2	Reg.I_2	—	5	150	mV	V_{in}=20~26V, Io=500mA	Fig.5
Ripple rejection	R.R.	54	62	—	dB	e_{in}=1V_{rms}, f=120Hz, Io=100mA	Fig.6
Load regulation 1	Reg.L_1	—	27	300	mV	Io=1mA~1A	Fig.5
Load regulation 2	Reg.L_2	—	10	150	mV	Io=250~750mA	Fig.5
Temperature coefficient of output voltage	Tcvo	—	−0.6	—	mV/℃	Io=5mA, T_j=0~125℃	Fig.5
Output noise voltage	V_n	—	125	—	μV	f=10Hz~100kHz	Fig.7
Dropout voltage	V_d	—	2.0	—	V	Io=1A	Fig.8
Bias current	I_b	—	4.5	8.0	mA	Io=0mA	Fig.9
Bias current change 1	I_{b1}	—	—	0.5	mA	Io=5mA~1A	Fig.9
Bias current change 2	I_{b2}	—	—	0.8	mA	V_{in}=17.5~30V	Fig.9
Peak output current	I_{O-P}	—	1.7	—	A	T_j=25℃	Fig.5
Short-circuit output current	Ios	—	0.3	—	A	V_{in}=30V	Fig.10

〈BA17818T/FP individual specifications〉

●Electrical characteristics (unless otherwise noted, Ta=25℃, V_{in}=27V, Io=500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Output voltage 1	V_{O1}	17.3	18.0	18.7	V	Io=500mA	Fig.5
Output voltage 2	V_{O2}	17.1	—	18.9	V	V_{in}=21~33V, Io=5mA~1A	Fig.5
Line regulation 1	Reg.I_1	—	10	360	mV	V_{in}=21~33V, Io=500mA	Fig.5
Line regulation 2	Reg.I_2	—	5	180	mV	V_{in}=24~33V, Io=500mA	Fig.5
Ripple rejection	R.R.	55	61	—	dB	e_{in}=1V_{rms}, f=120Hz, Io=100mA	Fig.6
Load regulation 1	Reg.L_1	—	30	360	mV	Io=5mA~1A	Fig.5
Load regulation 2	Reg.L_2	—	12	180	mV	Io=250~750mA	Fig.5
Temperature coefficient of output voltage	Tcvo	—	−0.6	—	mV/℃	Io=5mA, T_j=0~125℃	Fig.5
Output noise voltage	V_n	—	140	—	μV	f=10Hz~100kHz	Fig.7
Dropout voltage	V_d	—	2.0	—	V	Io=1A	Fig.8
Bias current	I_b	—	4.5	8.0	mA	Io=0mA	Fig.9
Bias current change 1	I_{b1}	—	—	0.5	mA	Io=5mA~1A	Fig.9
Bias current change 2	I_{b2}	—	—	0.8	mA	V_{in}=21~33V	Fig.9
Peak output current	I_{O-P}	—	1.7	—	A	T_j=25℃	Fig.5
Short-circuit output current	Ios	—	0.3	—	A	V_{in}=30V	Fig.10

〈BA17820T/FP individual specifications〉

●Electrical characteristics (unless otherwise noted, Ta=25℃, V_{in}=29V, Io=500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Output voltage 1	V_{O1}	19.2	20.0	20.8	V	Io=500mA	Fig.5
Output voltage 2	V_{O2}	19.0	—	21.0	V	V_{in}=23~33V, Io=5mA~1A	Fig.5
Line regulation 1	Reg.I_1	—	12	400	mV	V_{in}=23~33V, Io=500mA	Fig.5
Line regulation 2	Reg.I_2	—	7	200	mV	V_{in}=26~32V, Io=500mA	Fig.5
Ripple rejection	R.R.	53	60	—	dB	e_{in}=1V_{rms}, f=120Hz, Io=100mA	Fig.6
Load regulation 1	Reg.L_1	—	32	400	mV	Io=5mA~1A	Fig.5
Load regulation 2	Reg.L_2	—	14	200	mV	Io=250~750mA	Fig.5
Temperature coefficient of output voltage	Tcvo	—	−0.7	—	mV/℃	Io=5mA, T_j=0~125℃	Fig.5
Output noise voltage	V_n	—	150	—	μV	f=10Hz~100kHz	Fig.7
Dropout voltage	V_d	—	2.0	—	V	Io=1A	Fig.8
Bias current	I_b	—	4.5	8.0	mA	Io=0mA	Fig.9
Bias current change 1	I_{b1}	—	—	0.5	mA	Io=5mA~1A	Fig.9
Bias current change 2	I_{b2}	—	—	0.8	mA	V_{in}=23~33V	Fig.9
Peak output current	I_{O-P}	—	1.7	—	A	T_j=25℃	Fig.5
Short-circuit output current	I_{OS}	—	0.3	—	A	V_{in}=30V	Fig.10

〈BA17824T/FP individual specifications〉

●Electrical characteristics (unless otherwise noted, Ta=25℃, V_{in}=33V, Io=500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Output voltage 1	V_{O1}	23.0	24.0	25.0	V	Io=500mA	Fig.5
Output voltage 2	V_{O2}	22.8	—	25.2	V	V_{in}=27~33V, Io=5mA~1A	Fig.5
Line regulation 1	Reg.I_1	—	15	480	mV	V_{in}=27~33V, Io=500mA	Fig.5
Line regulation 2	Reg.I_2	—	10	240	mV	V_{in}=30~33V, Io=500mA	Fig.5
Ripple rejection	R.R.	50	58	—	dB	e_{in}=1V_{rms}, f=120Hz, Io=100mA	Fig.6
Load regulation 1	Reg.L_1	—	37	480	mV	Io=5mA~1A	Fig.5
Load regulation 2	Reg.L_2	—	15	240	mV	Io=250~750mA	Fig.5
Temperature coefficient of output voltage	Tcvo	—	−0.7	—	mV/℃	Io=5mA, T_j=0~125℃	Fig.5
Output noise voltage	V_n	—	180	—	μV	f=10Hz~100kHz	Fig.7
Dropout voltage	V_d	—	2.0	—	V	Io=1A	Fig.8
Bias current	I_b	—	4.8	8.0	mA	Io=0mA	Fig.9
Bias current change 1	I_{b1}	—	—	0.5	mA	Io=5mA~1A	Fig.9
Bias current change 2	I_{b2}	—	—	0.8	mA	V_{in}=27~33V	Fig.9
Peak output current	I_{O-P}	—	1.7	—	A	T_j=25℃	Fig.5
Short-circuit output current	I_{OS}	—	0.3	—	A	V_{in}=30V	Fig.10

● Electrical characteristic curves

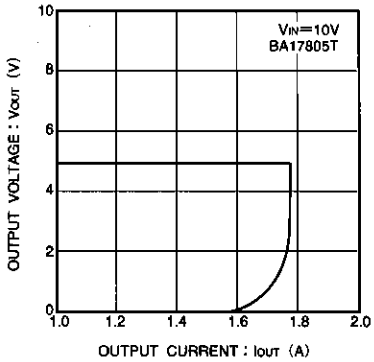


Fig. 1 Current limit characteristic

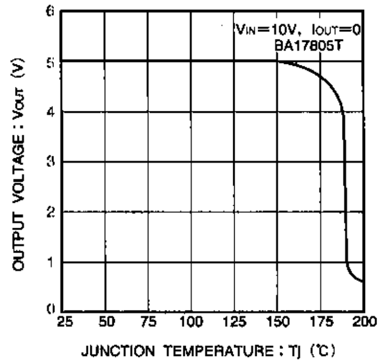


Fig. 2 The rmal cutoff circuit characteristic

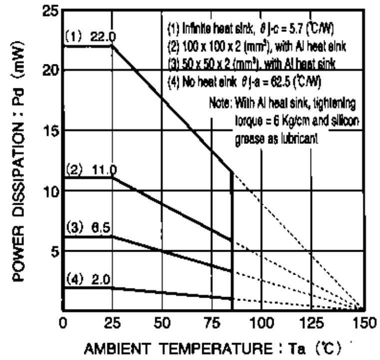


Fig.3 Ta - power consumption characteristic (TO220)

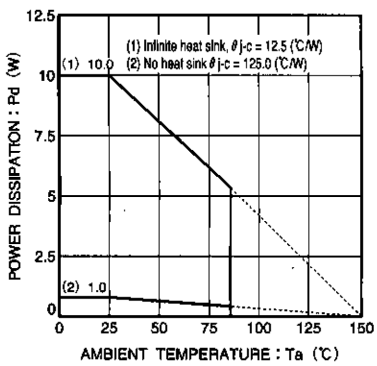


Fig.4 Ta - power consumption characteristic (TO252-3)

● Measurement circuits

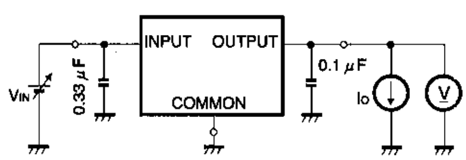
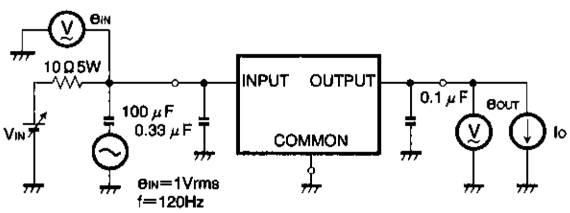


Fig. 5 Measurement circuit for output voltage, line regulation, load regulation, temperature coefficient of output voltage



Ripple rejection ratio R.R. = 20 log $\left(\frac{|e_{IN}|}{|e_{OUT}|} \right)$

Fig. 6 Measurement circuit for ripple rejection

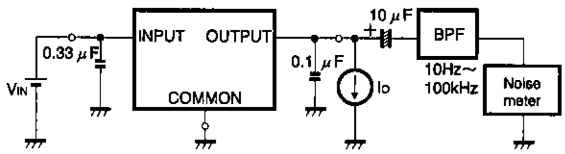


Fig. 7 Measurement circuit for output noise voltage

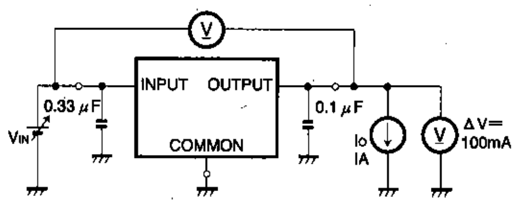


Fig. 8 Measurement circuit for dropout voltage

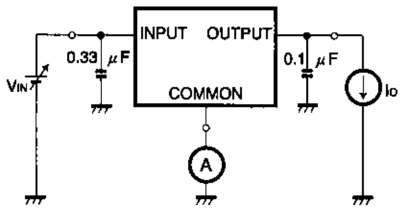


Fig. 9 Measurement circuit for bias current and bias current change

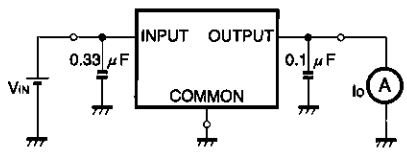


Fig. 10 Measurement circuit for short-circuit output current

●Operation notes

1. Although the circuit examples included in this handbook are highly recommendable for general use, you should be thoroughly familiar with circuit characteristics as they relate to your own use conditions. If you intend to change the number of external circuits, leave an ample margin, taking into account discrepancies in both static and dynamic characteristics of external parts and Rohm ICs. In addition, please be advised that Rohm cannot provide complete assurance regarding patent rights.

2. Operating power supply voltage
When operating within the normal voltage range and within the ambient operating temperature range, most circuit functions are guaranteed. The rated values can not be guaranteed for the electrical characteristics, but there are no sudden changes of the characteristics within these ranges.

3. Power dissipation Pd
Heat attenuation characteristics are noted on a separate page and can be used as a guide in judging power dissipation.
If these ICs are used in such a way that the allowable power dissipation level is exceeded, an increase in the chip temperature could cause a reduction in the current capability or could otherwise adversely affect the performance of the IC. Make sure a sufficient margin is allowed so that the allowable power dissipation value is not exceeded.

4. Preventing oscillation in output and using bypass capacitors
Always use a capacitor between the output pins and the GND to prevent fluctuation in the output and to prevent oscillation between the output pins and the GN of the application's input (V_{IN} 0.1 μF should be used.)
Changes in the temperature and other factors can cause the capacitance of the capacitor to change, and this can cause oscillation. To prevent this, we recommend using a tantalum capacitor which has minimal changes in nominal capacitance.
Also, we recommend adding a bypass capacitor of about 0.33 μF between the input pin and the GND, as close to the pin as possible.

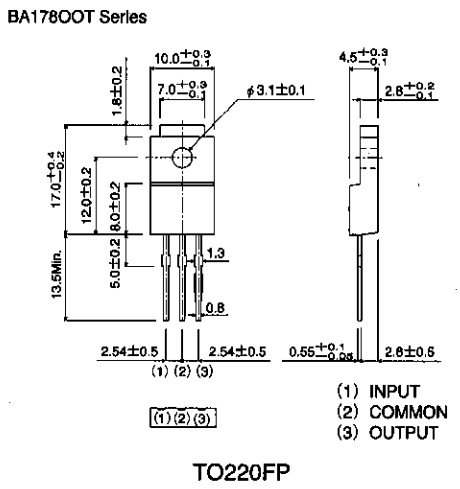
5. Thermal overload circuit
A built-in thermal overload circuit prevents damage from overheating. When the thermal circuit is activated, the various outputs are in the OFF state. When the temperature drops back to a constant level, the circuit is restored.

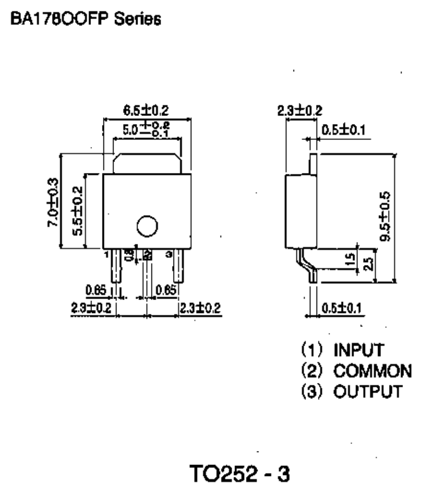
6. Internal circuits could be damaged if there are modes in which the electric potential of the application's input (V_{IN}) and GND are the opposite of the electric potential of the various outputs. Use of a diode or other such bypass path is recommended.

7. Although the manufacture of this product includes rigorous quality assurance procedures, it may be damaged if absolute maximum ratings for voltage or operating temperature are exceeded. When damage has occurred, special modes (such as short circuit mode or open circuit mode) cannot be specified. If it is possible that such special modes may be needed, please consider using a fuse or some other mechanical safety measure.

8. When used within a strong magnetic field, be aware that there is a slight possibility of malfunction.

●External dimensions (Units: mm)





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