

## 5A LOW DROPOUT POSITIVE REGULATOR

### Features

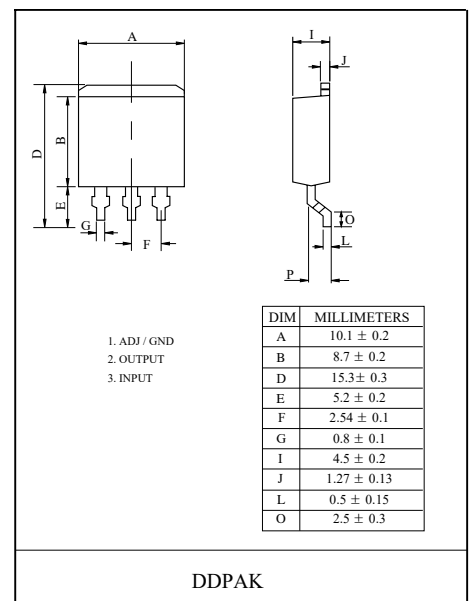
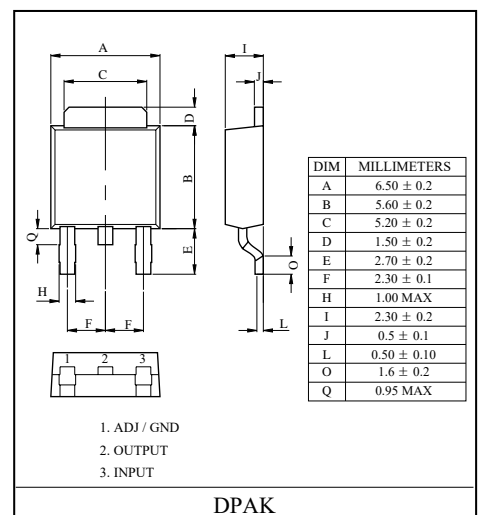
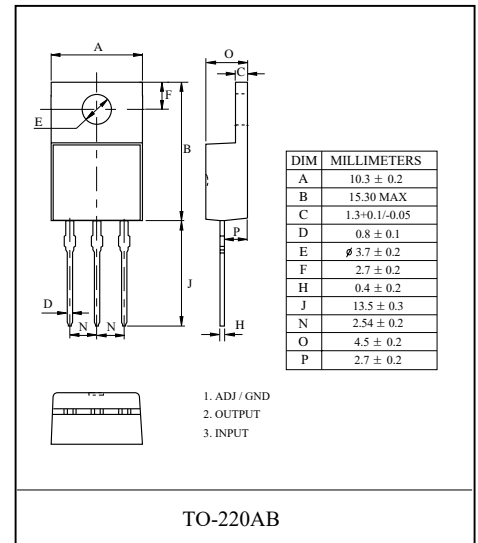
- Output Current : 5A
- Maximum Input Voltage : 15V
- Adjustable Output Voltage or Fixed
- 1.5V, 1.8V, 2.5V, 2.85V, 3.3V, 3.6V, 5.0V
- Current Limiting and Thermal Protection
- Standard 3-Pin Power Packages

### Application

- Post Regulator for Switching DC/DC Converter
- High Efficiency Linear Regulators
- Battery Charger

### Absolute Maximum Ratings

CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Input Voltage	VI	15	V
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C
Operating Junction Temperature Range (Note 3)	Top	-10 to +125	°C
Thermal Resistance	TO-220AB	50	°C/W
	DDPAK	62.5	
	DPAK	100	





# FR1084P/D/DD-XX

## ELECTRICAL CHARACTERISTICS

Typicals and limits appearing in normal type apply for  $T_j = +25^\circ\text{C}$ .

Limits appearing in **Boldface** type apply over the entire junction temperature range for operation.

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN. (Note 5)	TYP. (Note 4)	MAX. (Note 5)	UNIT	
Line Regulation (Note 7)	$\Delta V_{OUT}$	FR1084-Adj	$I_{OUT} = 10\text{mA}, 2.75\text{V} \leq V_{IN} \leq 10\text{V}$	- -	- -	0.3 <b>0.4</b>	%
		FR1084-1.5	$I_{OUT} = 10\text{mA}, 3.0\text{V} \leq V_{IN} \leq 10\text{V}$	- -	- -	6 <b>10</b>	mV
		FR1084-1.8	$I_{OUT} = 10\text{mA}, 3.3\text{V} \leq V_{IN} \leq 10\text{V}$	- -	- -	6 <b>10</b>	
		FR1084-2.5	$I_{OUT} = 10\text{mA}, 4.0\text{V} \leq V_{IN} \leq 10\text{V}$	- -	- -	6 <b>10</b>	
		FR1084-2.85	$I_{OUT} = 10\text{mA}, 4.35\text{V} \leq V_{IN} \leq 10\text{V}$	- -	- -	6 <b>10</b>	
		FR1084-3.3	$I_{OUT} = 10\text{mA}, 4.8\text{V} \leq V_{IN} \leq 10\text{V}$	- -	- -	6 <b>10</b>	
		FR1084-3.6	$I_{OUT} = 10\text{mA}, 5.1\text{V} \leq V_{IN} \leq 10\text{V}$	- -	- -	6 <b>10</b>	
		FR1084-5.0	$I_{OUT} = 10\text{mA}, 6.5\text{V} \leq V_{IN} \leq 10\text{V}$	- -	- -	6 <b>10</b>	
Load Regulation (Note 7)	$\Delta V_{OUT}$	FR1084-Adj	$V_{IN} = 4.25\text{V}, 0 \leq I_{OUT} \leq I_{FULL\ LOAD}$	- -	- -	0.3 <b>0.4</b>	%
		FR1084-1.5 FR1084-1.8 FR1084-2.5 FR1084-2.85	$V_{IN} = 5.0\text{V}, 0 \leq I_{OUT} \leq I_{FULL\ LOAD}$	- -	- -	12 <b>20</b>	mV
		FR1084-3.3	$V_{IN} = 5.0\text{V}, 0 \leq I_{OUT} \leq I_{FULL\ LOAD}$	- -	- -	15 <b>20</b>	
		FR1084-3.6	$V_{IN} = 5.3\text{V}, 0 \leq I_{OUT} \leq I_{FULL\ LOAD}$	- -	- -	15 <b>25</b>	
		FR1084-5.0	$V_{IN} = 8.0\text{V}, 0 \leq I_{OUT} \leq I_{FULL\ LOAD}$	- -	- -	20 <b>35</b>	
Dropout Voltage (Note 8)	$\Delta V$		$\Delta V_{REF} = 1\%, I_{OUT} = 5\text{A}$	- -	- -	1.5	V
Minimum Load Current	$I_{O(MIN)}$		$V_{IN} = 10\text{V}$	- -	- -	10	mA
Current Limit	$I_{LIMIT}$		$V_{IN} = 6.25\text{V}$	5.5	- -	-	A
Adjust Pin Current	$I_{ADJ}$		$V_{IN} = 2.75 \sim 10\text{V}, I_{OUT} = 10\text{mA}$	- -	- -	120	$\mu\text{A}$
Adjust Pin Current Change	$\Delta I_{ADJ}$		$I_{OUT} = 10\text{mA} \sim 5\text{A}, V_{IN} = 2.75 \div 10\text{V}$ ,	- -	- -	5	$\mu\text{A}$
Ripple Rejection	RR		$f_{RIPPLE} = 120\text{Hz}, C_{OUT} = 25\mu\text{F}$ Tantalum, $I_{OUT} = 5\text{A}; V_{IN} = 4.25\text{V}$	60	- -	-	dB
Temperature Stability	S			-	<b>0.5</b>	-	%

**NOTES 1** : Rating indicate conditions for which the device is intended to functional, but specific performance is not Guaranteed.

For guaranteed specification and the test conditions, see the Electrical Characteristics.

**NOTES 2** : Power dissipations is kept in a safe range by current limiting circuitry. Refer to Overload Recovery in Application Notes.

**NOTES 3** : The maximum power dissipation is a function of  $T_{j(MAX)}$ ,  $\theta_{ja}$  and  $T_A$ . The maximum allowable power dissipation at ambient Temperature is  $P_D = (T_{j(MAX)} - T_A) \theta_{ja}$ .

**NOTES 4** : Typical Values represent the most likely parametric norm.

**NOTES 5** : All limits are guaranteed by testing or statistical analysis.

**NOTES 6** :  $I_{FULL\ LOAD}$  is define in the current limit curves. The  $I_{FULL\ LOAD}$  curve defines the current limit as function.

**NOTES 7** : Load and Line regulation are measured at constant junction temperature, and are guaranteed up to the maximum power dissipation of 30W. Power dissipation is determined by the input/output differential and the output current. Guaranteed maximum power dissipation will not be available over the full input/output range.

**NOTES 8** : Dropout voltage is specified over the full output current range of the device.

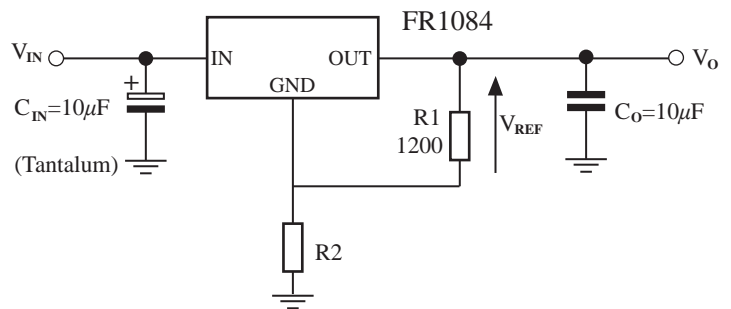
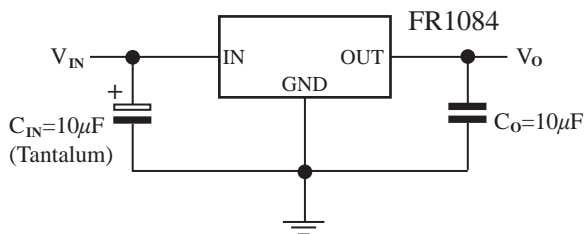
## ELECTRICAL CHARACTERISTICS

Typicals and limits appearing in normal type apply for  $T_j = +25^\circ\text{C}$ .

Limits appearing in **Boldface** type apply over the entire junction temperature range for operation.

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN. (Note 5)	TYP. (Note 4)	MAX. (Note 5)	UNIT
Output Voltage	$V_{\text{OUT}}$	FR1084-Adj $I_{\text{OUT}} = 10\text{mA}, V_{\text{IN}} = 4.25\text{V}$ $0 \leq I_{\text{OUT}} \leq I_{\text{FULL LOAD}}, 2.75\text{V} \leq V_{\text{IN}} \leq 10\text{V}$	1.237	1.250	1.263	V
			1.232	1.250	1.268	
			<b>1.225</b>	<b>1.250</b>	<b>1.275</b>	
		FR1084-1.5 $I_{\text{OUT}} = 10\text{mA}, V_{\text{IN}} = 4.5\text{V}$ $0 \leq I_{\text{OUT}} \leq I_{\text{FULL LOAD}}, 3.0\text{V} \leq V_{\text{IN}} \leq 10\text{V}$	1.485	1.500	1.515	
			1.478	1.500	1.522	
			<b>1.470</b>	<b>1.500</b>	<b>1.530</b>	
		FR1084-1.8 $I_{\text{OUT}} = 10\text{mA}, V_{\text{IN}} = 4.8\text{V}$ $0 \leq I_{\text{OUT}} \leq I_{\text{FULL LOAD}}, 3.3\text{V} \leq V_{\text{IN}} \leq 10\text{V}$	1.782	1.800	1.818	
			1.773	1.800	1.827	
<b>1.764</b>	<b>1.800</b>		<b>1.836</b>			
FR1084-2.5 $I_{\text{OUT}} = 10\text{mA}, V_{\text{IN}} = 5.5\text{V}$ $0 \leq I_{\text{OUT}} \leq I_{\text{FULL LOAD}}, 4.0\text{V} \leq V_{\text{IN}} \leq 10\text{V}$	2.475	2.500	2.525			
	2.463	2.500	2.537			
	<b>2.450</b>	<b>2.500</b>	2.550			
FR1084-2.85 $I_{\text{OUT}} = 10\text{mA}, V_{\text{IN}} = 5.85\text{V}$ $0 \leq I_{\text{OUT}} \leq I_{\text{FULL LOAD}}, 4.35\text{V} \leq V_{\text{IN}} \leq 10\text{V}$	2.820	2.850	2.880			
	2.805	2.850	2.895			
	<b>2.790</b>	<b>2.850</b>	<b>2.910</b>			
FR1084-3.3 $I_{\text{OUT}} = 10\text{mA}, V_{\text{IN}} = 6.3\text{V}$ $0 \leq I_{\text{OUT}} \leq I_{\text{FULL LOAD}}, 4.8\text{V} \leq V_{\text{IN}} \leq 10\text{V}$	3.270	3.300	3.330			
	3.250	3.300	3.350			
	<b>3.235</b>	<b>3.300</b>	<b>3.365</b>			
FR1084-3.6 $I_{\text{OUT}} = 10\text{mA}, V_{\text{IN}} = 6.6\text{V}$ $0 \leq I_{\text{OUT}} \leq I_{\text{FULL LOAD}}, 5.1\text{V} \leq V_{\text{IN}} \leq 10\text{V}$	3.564	3.600	3.636			
	3.546	3.600	3.654			
	<b>3.528</b>	<b>3.600</b>	<b>3.672</b>			
FR1084-5.0 $I_{\text{OUT}} = 10\text{mA}, V_{\text{IN}} = 8.0\text{V}$ $0 \leq I_{\text{OUT}} \leq I_{\text{FULL LOAD}}, 6.5\text{V} \leq V_{\text{IN}} \leq 10\text{V}$	4.950	5.000	5.050			
	4.925	5.000	5.075			
	<b>4.900</b>	<b>5.000</b>	<b>5.100</b>			

## Application Circuit

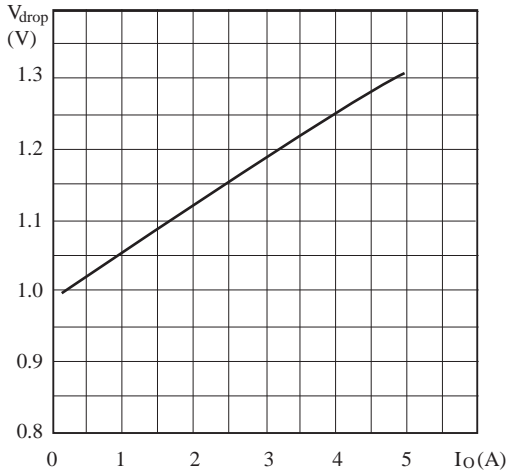


$$V_{\text{O}} = V_{\text{REF}} \left( 1 + \frac{R_2}{R_1} \right)$$

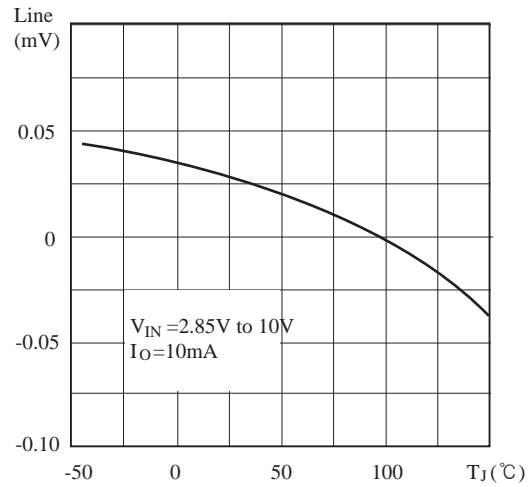
## TYPICAL CHARACTERISTICS

(unless otherwise specified  $T_j = 25^\circ\text{C}$ ,  $C_1 = 10\mu\text{F}$  (tant.),  $C_o = 10\mu\text{F}$  (tant.))

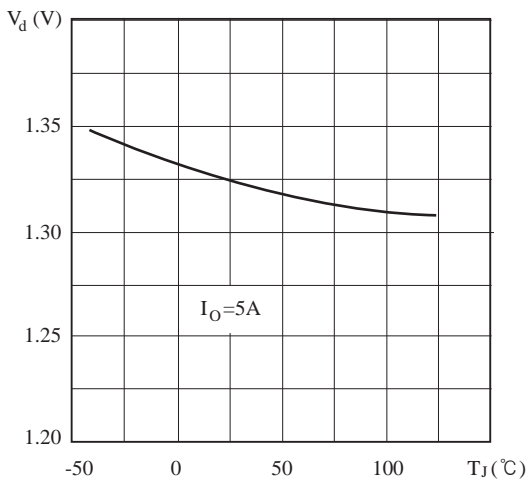
Dropout Voltage vs Output Current



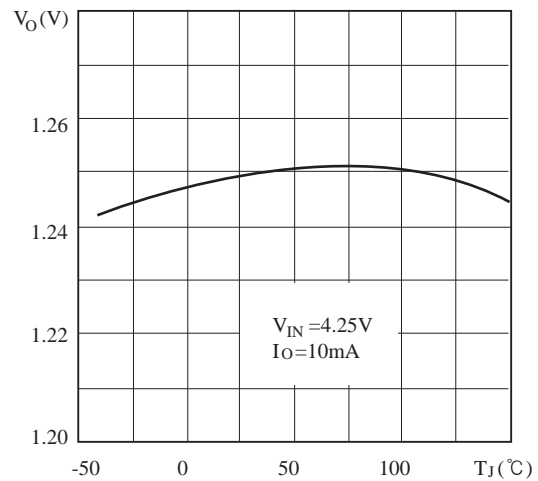
Line Regulation vs Temperature



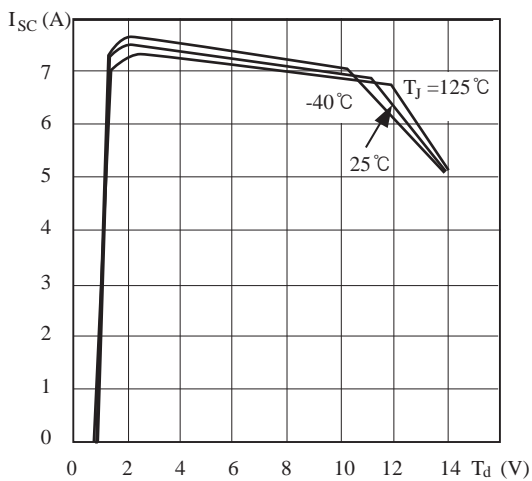
Dropout Voltage vs Temperature



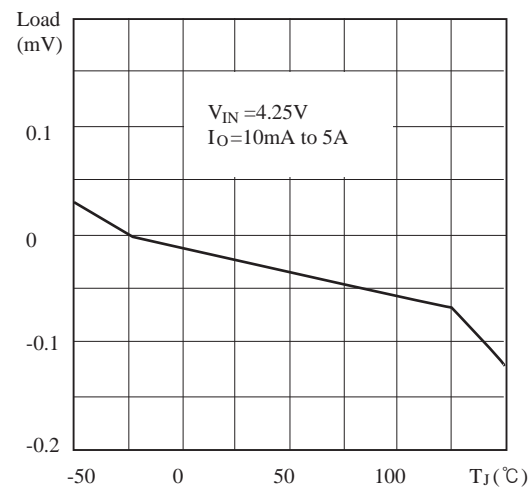
Output Voltage vs Temperature



Short Circuit Current vs Dropout Voltage



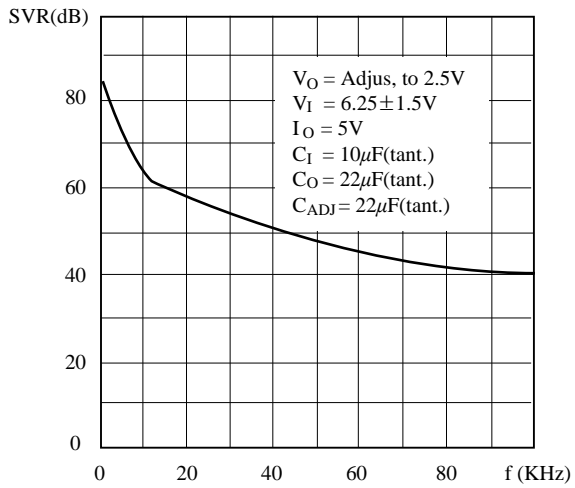
Load Regulation vs Temperature





## TYPICAL CHARACTERISTICS

### Supply Voltage Rejection vs Frequency



### Adjust Pin Current vs Output Current

