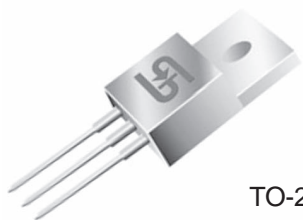




# TS1083

## 7.5 Amp Low Dropout Positive Voltage Regulator



TO-220

Low dropout voltage 1.3V max.

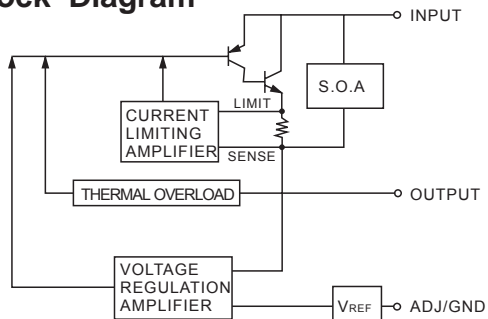
### General Description

The TS1083 Series of high performance positive voltage regulators are designed for use in applications requiring low dropout performance at full rated current. Additionally, the TS1083 Series provide excellent regulation over variations due to changes in line, load and temperature. Outstanding features include low dropout performance at rated current, fast transient response, internal current limiting and thermal shutdown protection of the output device. The TS1083 Series are three terminal regulators with fixed and adjustable voltage options available in popular packages.

### Features

- ✧ Low dropout voltage 1.3V max.
- ✧ Full current rating over line and temperature
- ✧ Fast transient response
- ✧ Total output regulation  $\pm 2\%$  over line, load and temperature
- ✧ Adjust pin current max  $120 \mu A$  over temperature
- ✧ Line regulation typical 0.015%.
- ✧ Load regulation typical 0.05%.
- ✧ Fixed/adjustable output voltage
- ✧ TO-220 package

### Block Diagram



### Ordering Information

DEVICE	OPERATING TEMPERATURE (Ambient)	PACKAGE
TS1083CZ	-20 to +85°C	TO-220
TS1083CZ-2.5		
TS1083CZ-3.3		

### Absolute Maximum Rating

PARAMETER	SYMBOL	MAXIMUM	UNITS
Input Voltage	$V_{IN}$	12	V
Power Dissipation	$P_D$	Internally Limited	W
Thermal Resistance Junction to Case	$\theta_{JC}$	2	°C / W
Thermal Resistance Junction to Ambient	$\theta_{JA}$	50	
Operating Junction Temperature Range	$T_J$	0 to +125	°C
Operating Ambient Temperature Range	$T_A$	-20 to +85	
Storage Temperature Range	$T_{STG}$	-25 to +150	
Lead Temperature (Soldering) 10 Sec	$T_{LEAD}$	260	

## Electrical Characteristics

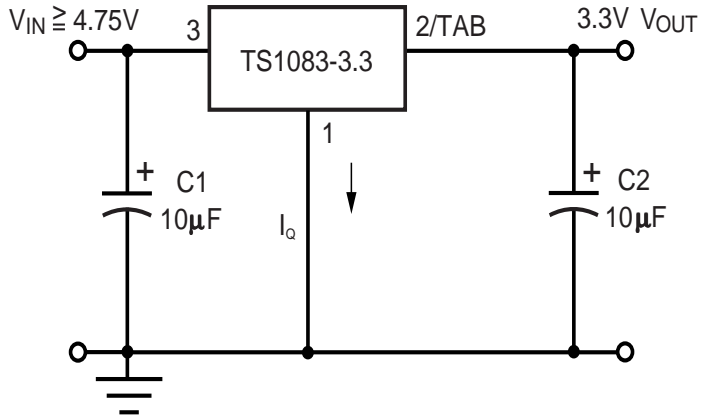
Unless otherwise specified,  
 Adjust  $V_{IN}=2.75V$  to 12V and Adjust  $I_O=10mA$  to 7.5A  
 Fixed  $V_{IN}=4.75V$  to 12V and Fixed  $I_O=10mA$  to 7.5A

PARAMETER	SYMBOL	TEST CONDITIONS			TEST LIMITS			UNITS
		$V_{IN} - V_{OUT}$	$I_O$	$T_J^{(4)}$	MIN	TYP	MAX	
Output Voltage <sup>(1)</sup> Fixed Voltage	$V_O$	5V	10mA	25	0.99   $V_O$	$V_O$	1.01   $V_O$	V
				Over Temp.	0.98   $V_O$		1.02   $V_O$	
Reference Voltage <sup>(1)</sup> Adj Voltage	$V_{REF}$	5V	10mA	25	1.238	1.250	1.262	
				Over Temp.	1.225		1.275	
Line Regulation <sup>(1)</sup> ( $V_{in}-V_{out}=3V$ )	$REG_{(LINE)}$		10mA	25		0.015	0.2	%
				Over Temp.		0.035		
Load Regulation <sup>(1)</sup> ( $V_{in}-V_{out}=3V$ )	$REG_{(LOAD)}$			25		0.05	0.3	
				Over Temp.		0.2	0.4	
Dropout Voltage $\Delta V_{REF}=1\%$	$V_D$			25		1		V
				Over Temp.		1.1	1.3	
Current Limit ( $V_{in}-V_{out}=5V$ )	$I_{CL}$				8.5	9.5		A
Quiescent Current Fixed Model	$I_Q$	5V		Over Temp.		12	14	mA
Temperature Coefficient	$T_C$					0.005		% / °C
Adjust Pin Current	$I_{ADJ}$			25		55		$\mu A$
				Over Temp.			120	
Adjust Pin Current Change	$\Delta I_{ADJ}$					0.2	5	
Temperature Stability	$T_S$	5V	500mA	Over Temp.		0.5		%
Minimum Load Current Adjust Model	$I_O$	5V				5	10	mA
RMS Output Noise <sup>(2)</sup>	$V_N$			25		0.003		% $V_O$
Ripple Rejection Ratio <sup>(3)</sup>	$R_A$	5V	7.5A	Over Temp.	60	72		dB

- (1) Low duty cycle pulse testing with Kelvin connections required.  
 (2) Bandwidth of 10Hz to 10KHz.  
 (3) 120Hz input ripple ( $C_{ADJ}$  for ADJ) = 25  $\mu F$ .  
 (4) Over Temp. - over specified operating junction temperature range.

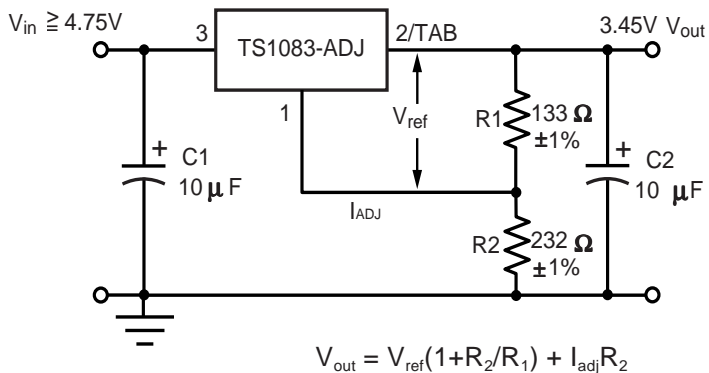


### Fixed Voltage Regulator(1)(2)



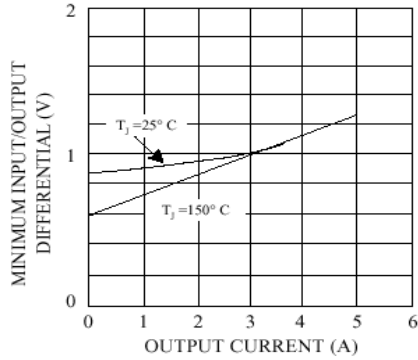
- (1) C1 NEEDED IF DEVICE IS FAR FROM FILTER CAPACITORS
- (2) C2 REQUIRED FOR STABILITY

### Adjustable Voltage Regulator(1)(2)

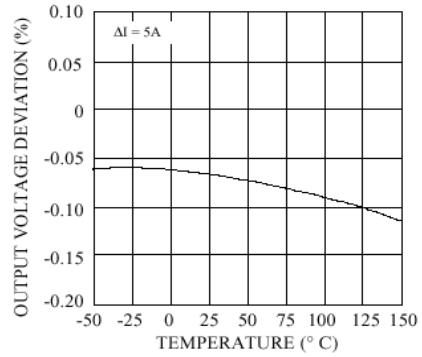


- (1) C1 NEEDED IF DEVICE IS FAR FROM FILTER CAPACITORS
- (2) C2 REQUIRED FOR STABILITY

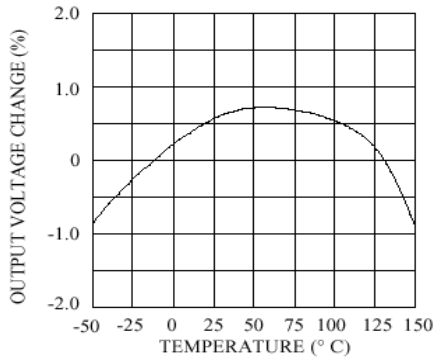
**Dropout Voltage**



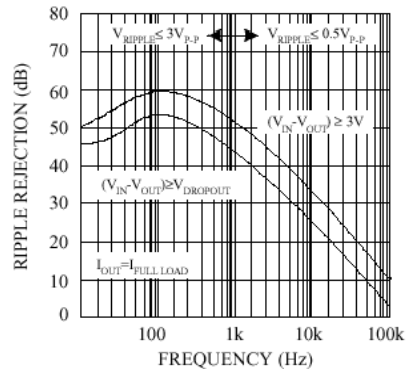
**Load Regulation**



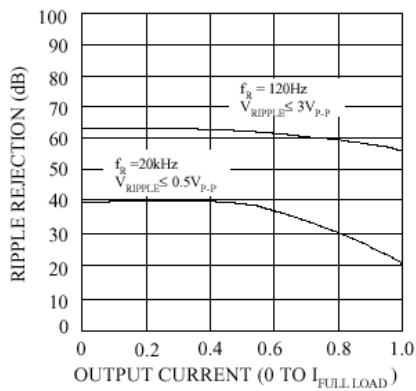
**Temperature Stability**



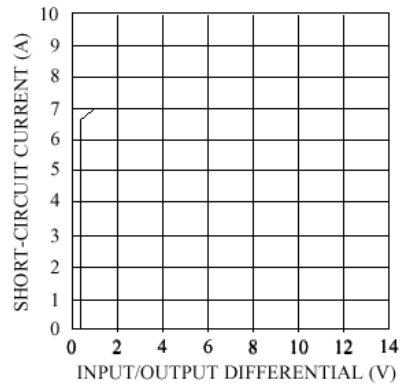
**Ripple Rejection**



**Ripple Rejection vs. Current**

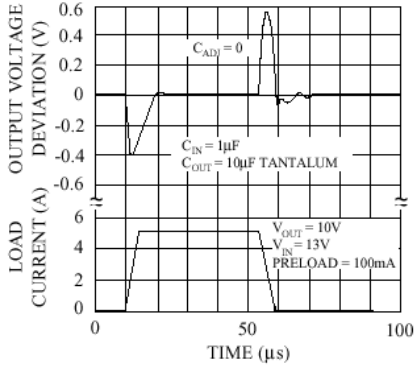


**Short-Circuit Current**

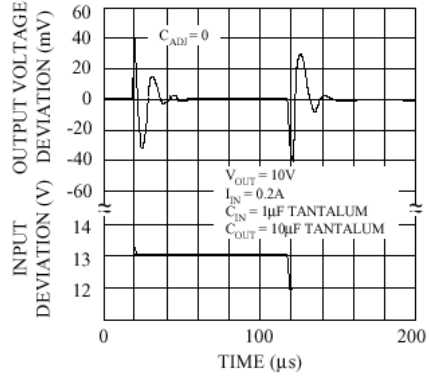




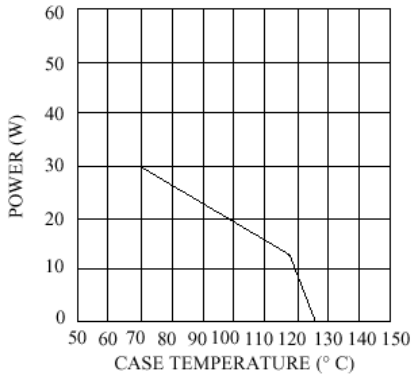
### Load Transient Response



### Line Transient Response

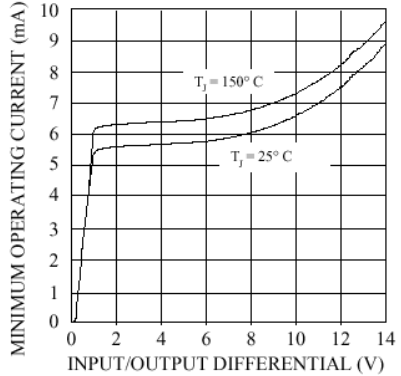


### Maximum Power Dissipation\*

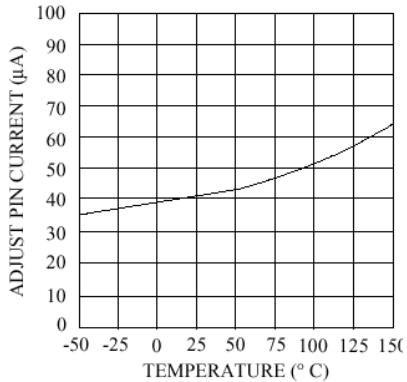


\*AS LIMITED BY MAXIMUM JUNCTION TEMPERATURE

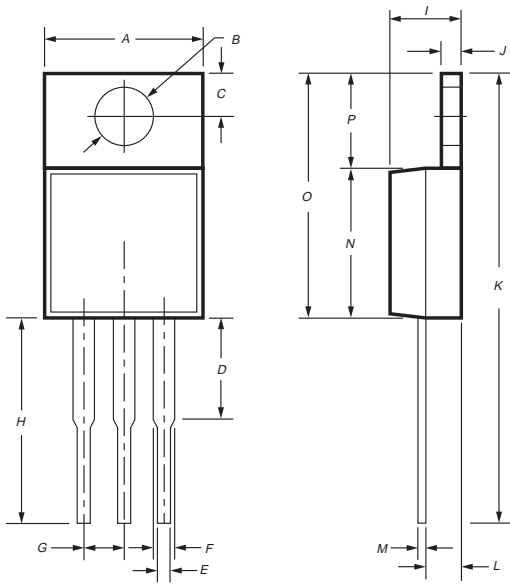
### Minimum Operating Current (Adjustable only)



### Adjust Pin Current (Adjustable only)



TO-220 Unit:mm



DIM	TO-220 DIMENSION			
	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	10.00	10.50	0.394	0.413
B	3.24	4.44	0.128	0.175
C	2.44	2.94	0.096	0.116
D	3.565	4.315	0.140	0.170
E	0.68	0.92	0.027	0.036
F	1.115	1.485	0.044	0.058
G	2.345	2.715	0.092	0.107
H	13.49	14.31	0.531	0.563
I	4.475	5.225	0.176	0.206
J	1.15	1.39	0.045	0.055
K	27.78	29.62	1.094	1.166
L	2.175	2.925	0.086	0.115
M	0.297	0.477	0.012	0.019
N	8.28	8.80	0.326	0.346
O	14.29	15.31	0.563	0.603
P	6.01	6.51	0.273	0.256