TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

TS1084

5A Low Dropout Positive Voltage Regulator

TO-220



TO-263 (D^2PAK)



TO-252 (DPAK)



Pin Definition:
1. Fixed / Adj
2. Output
3. Input

Pin 2 connect to heat sink

General Description

TS1084 are high performance positive voltage regulators are designed for use in applications requiring low dropout performance at full rated current, Additionally, TS1084 provides 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. TS1084 are three terminal regulators with fixed and adjustable voltage options available in popular packages.

Features

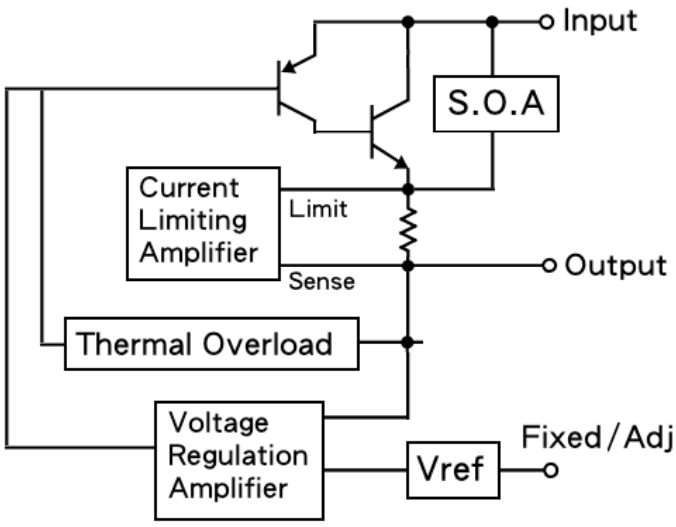
- Low Dropout Performance 1.5V max.
- Fill Current Rating Over Line and Temperature
- Fast Transient Response
- ±2% Total Output Regulation Over Line, Load and Temperature
- Adjust Pin Current max 90uA Over Temperature
- Line Regulation Typical 0.015%
- Load Regulation Typical 0.05%
- Fixed / Adjustable Output Voltage
- TO-220, TO-263 and TO-252 Package

Ordering Information

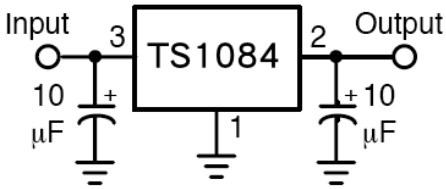
Part No.	Package	Packing
TS1084CZ**xx** C0	TO-220	50pcs / Tube
TS1084CM**xx** RN	TO-263	800pcs / 13” Reel
TS1084CP**xx** RO	TO-252	2.5Kpcs / 13” Reel

Note: Where **xx** denotes voltage option, available are 3.3V and 2.5V. Leave blank for adjustable version. Contact factory for additional voltage options.

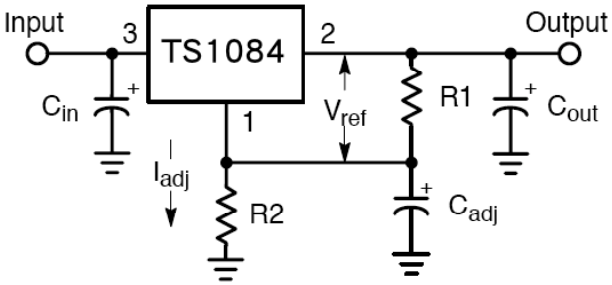
Block Diagram



Typical Application Circuit



Fixed Output Voltage Version



$V_{OUT} = V_{REF}(1+R2/R1) + I_{adj} R2$

Adjustable Output Voltage Version

Absolute Maximum Rating (Note 1)

Parameter		Symbol	Limit	Unit
Input Supply Voltage		V_{IN}	15	V
Operation Input Supply Voltage		V_{IN} (Opr. Typ.)	12	V
Power Dissipation (Note 2)		P_D	Internal limited	
Thermal Resistance Junction to Ambient	TO-220	Θ_{JA}	80	°C/W
	TO-263		85	
	TO-252		105	
Operating Junction Temperature Range		T_J	0 ~+125	°C
Storage Temperature Range		T_{STG}	-65 ~ +150	°C
Lead Soldering Temperature (260°C)	TO-220 / TO-263		10	S
	TO-252		5	

Electrical Specification (Ta = 25°C, unless otherwise specified.)

Parameter	Conditions	Min	Typ	Max	Unit
Reference Voltage	V_{IN} = 2.75, Io=5	1.225	1.25	1.275	V
Output Voltage (Note 4)	V_{IN} = 4V~7V, Io=5A	2.450	2.5	2.550	V
	V_{IN} = 4.8V~7V, Io=5A	3.235	3.3	3.366	V
Line Regulation	Vo+1.5V ≤ V_{IN} ≤ 7V, Io= 10mA	--	0.015	0.2	%
Load Regulation (Note 1,2)	V_{IN} = V_{OUT} +1.5V Io= 10mA ~ 5A	--	0.05	1.0	%
Dropout Voltage	Io=1A, Δ V_{OUT} = 1% V_{OUT}	--	1.3	1.5	V
Quiescent Current	V_{IN} = 5V	--	8	10	mA
Adjustable Pin Current		--	90	--	uA
Output Current Limit	V_{IN} - V_{OUT} = 3V	2.0	--	--	A
Temperature Stability	Io=10mA,	--	0.5	--	%
Ripple Rejection	F= 120Hz, Io= 1A, C_{OUT} = 25uF, V_{IN} = Vout+3V	--	60	70	dB

Note 1: See thermal regulation specification for changes in output voltage due to heating effects. Line and load regulation are measured at a constant junction temperature by low duty cycle pulse testing. Load regulation is measured at the output lead = 1/18" from the package.

Note 2: Line and load regulation are guaranteed up to the maximum power dissipation of 15W. Power dissipation is determined by the input / output voltage difference and the output current. Guaranteed maximum power dissipation will not be available over the full input / output voltage range.

Note 3: Quiescent current is defined as the minimum output current required to maintain the regulation.

Note 4: The Output Capacitor does not have a theoretical upper limit and increasing its value will increase stability C_{OUT}=100uF or more is typical for high current regulator design.

Electrical Characteristics Curve

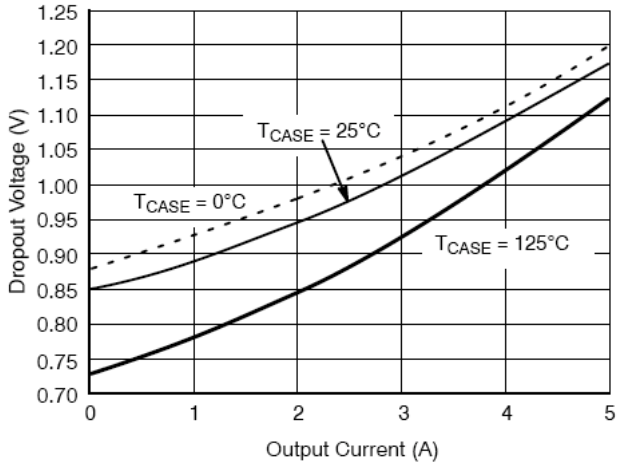


Figure 1. Vdrop vs. Output Current

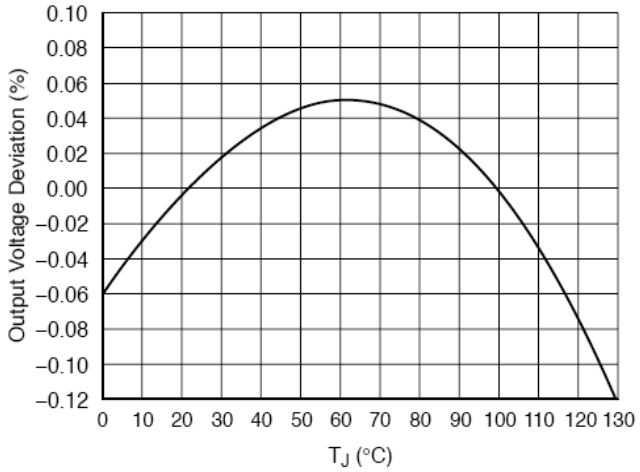


Figure 2. Reference Voltage vs. Temperature

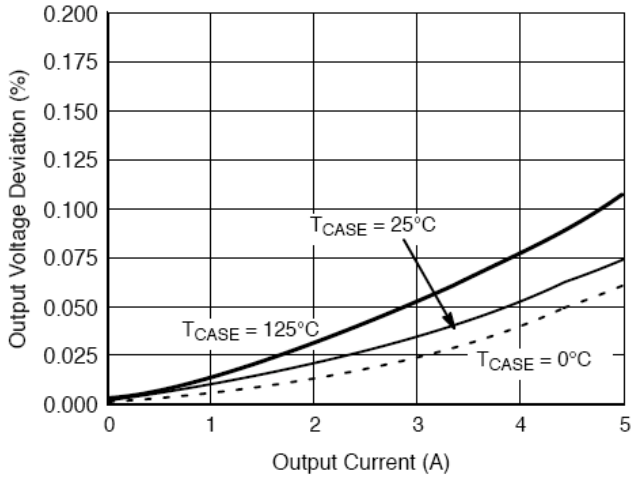


Figure 3. Load Regulation vs. Output Current

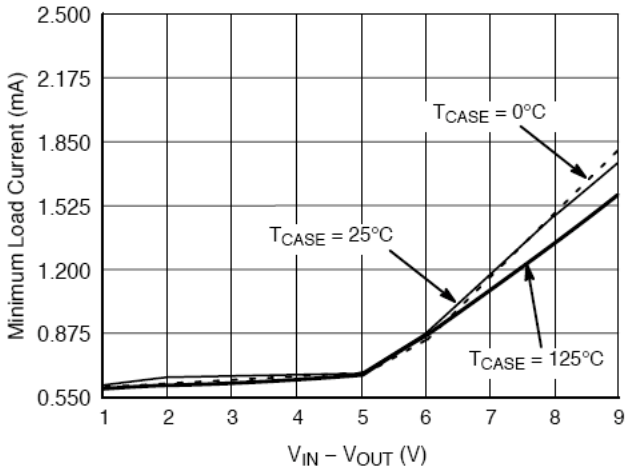


Figure 4. Minimum Load Current

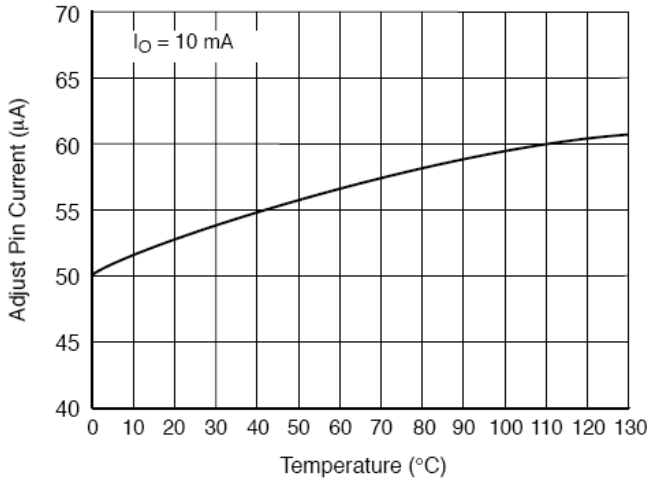


Figure 5. Iadj Pin vs. Temperature

Application Information

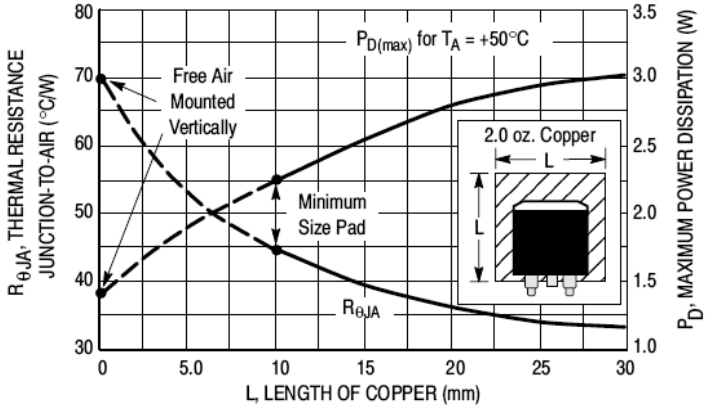


FIGURE 6 – D^2PAK Thermal Resistance and Maximum Power Dissipation vs. P.C.B Copper Length

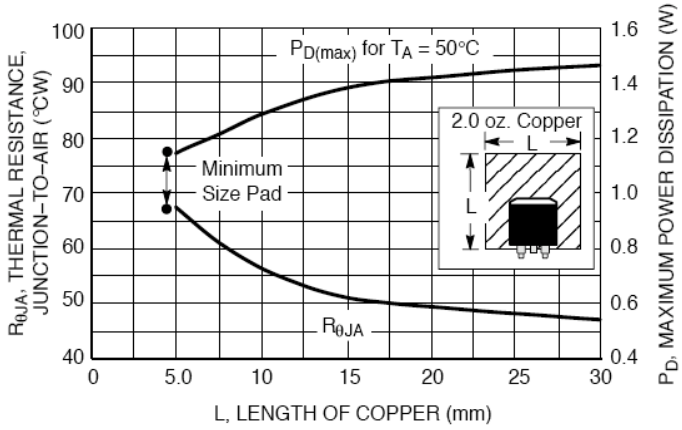
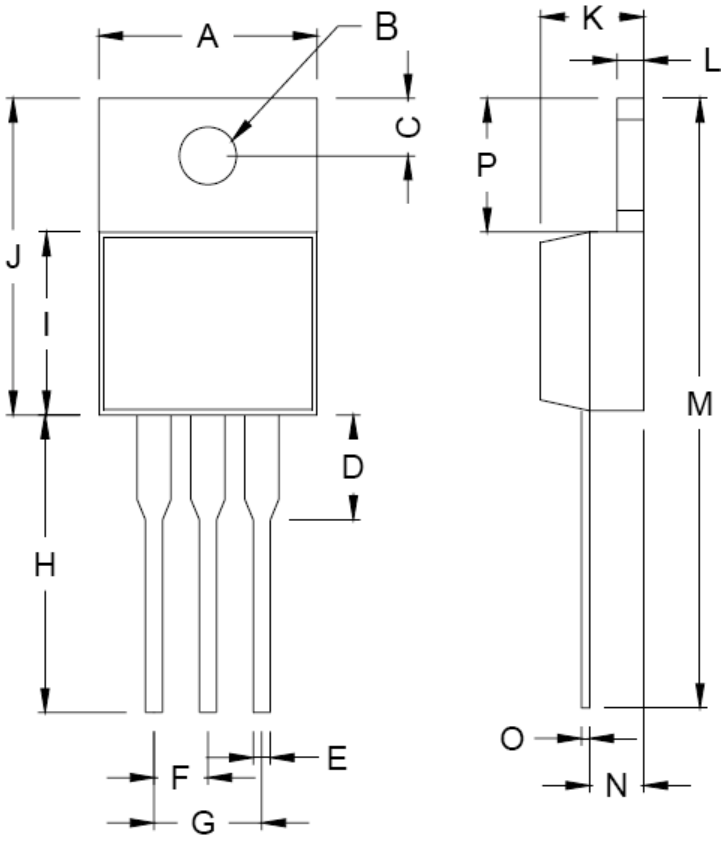


Figure 7 – DPAK Thermal Resistance and Maximum Power Dissipation vs. P.C.B Copper Length

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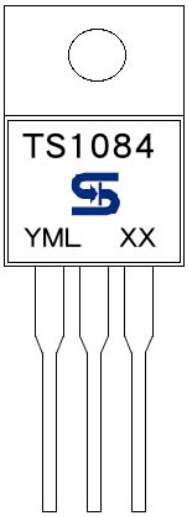
5A Low Dropout Positive Voltage Regulator

TO-220 Mechanical Drawing



TO-220 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	10.000	10.500	0.394	0.413
B	3.740	3.910	0.147	0.154
C	2.440	2.940	0.096	0.116
D	-	6.350	-	0.250
E	0.381	1.106	0.015	0.040
F	2.345	2.715	0.092	0.058
G	4.690	5.430	0.092	0.107
H	12.700	14.732	0.500	0.581
I	8.382	9.017	0.330	0.355
J	14.224	16.510	0.560	0.650
K	3.556	4.826	0.140	0.190
L	0.508	1.397	0.020	0.055
M	27.700	29.620	1.060	1.230
N	2.032	2.921	0.080	0.115
O	0.255	0.610	0.010	0.024
P	5.842	6.858	0.230	0.270

Marking Diagram



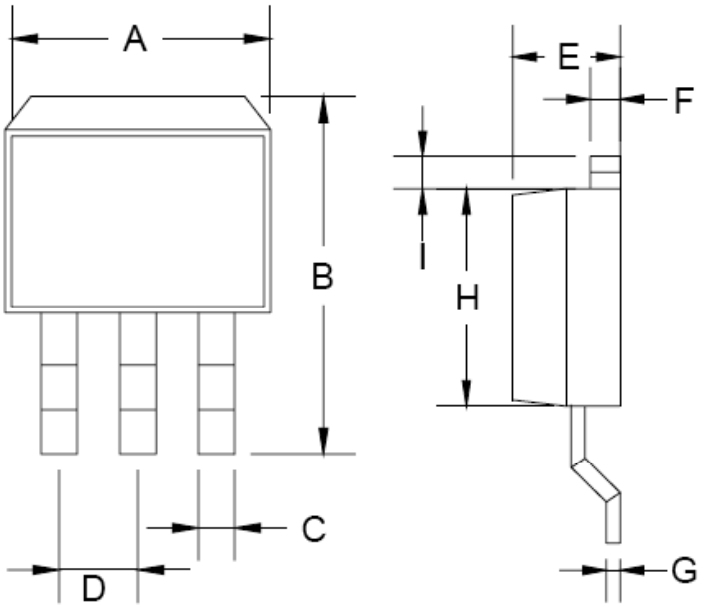
Y = Year Code

M = Month Code
(**A**=Jan, **B**=Feb, **C**=Mar, **D**=Apl, **E**=May, **F**=Jun, **G**=Jul, **H**=Aug, **I**=Sep, **J**=Oct, **K**=Nov, **L**=Dec)

L = Lot Code

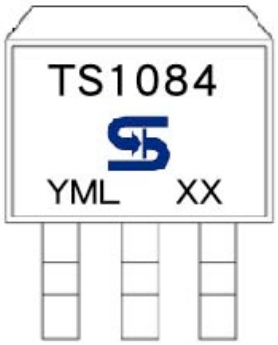
XX = Voltage Code
(2.5=2.5V, 3.3=3.3V)
= Package Code for Adjustable type
(CZ = TO-220)

TO-263 Mechanical Drawing



TO-263 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	10.000	10.500	0.394	0.413
B	14.605	15.875	0.575	0.625
C	0.508	0.991	0.020	0.039
D	2.420	2.660	0.095	0.105
E	4.064	4.830	0.160	0.190
F	1.118	1.400	0.045	0.055
G	0.450	0.730	0.018	0.029
H	8.280	8.800	0.325	0.346
I	1.140	1.400	0.044	0.055
J	1.480	1.520	0.058	0.060

Marking Diagram

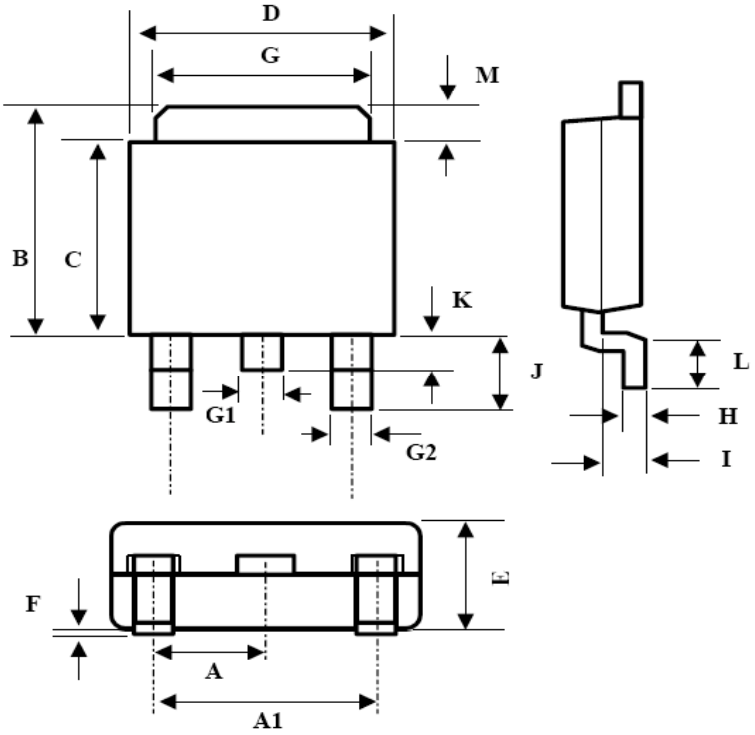


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L = Lot Code
XX = Voltage Code
(2.5=2.5V, 3.3=3.3V)
= Package Code for Adjustable type
(CM = TO-263)

TS1084

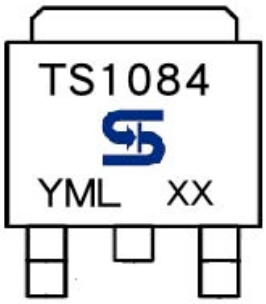
5A Low Dropout Positive Voltage Regulator

TO-252 Mechanical Drawing



TO-252 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.3BSC		0.09BSC	
A1	4.6BSC		0.18BSC	
B	6.80	7.20	0.268	0.283
C	5.40	5.60	0.213	0.220
D	6.40	6.65	0.252	0.262
E	2.20	2.40	0.087	0.094
F	0.00	0.20	0.000	0.008
G	5.20	5.40	0.205	0.213
G1	0.75	0.85	0.030	0.033
G2	0.55	0.65	0.022	0.026
H	0.35	0.65	0.014	0.026
I	0.90	1.50	0.035	0.059
J	2.20	2.80	0.087	0.110
K	0.50	1.10	0.020	0.043
L	0.90	1.50	0.035	0.059
M	1.30	1.70	0.051	0.67

Marking Diagram



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L = Lot Code
XX = Voltage Code
(2.5=2.5V, 3.3=3.3V)
= Package Code for Adjustable type
(CP = TO-252)

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