TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

TS1540

1A Low Dropout Voltage Regulator with Low Quiescent Current

TO-252 (DPAK)

Pin Definition:
1. Output
2. Ground
3. Input

General Description

TS1540 of high current LDOs has been developed for portable application where low quiescent current is an important requirement. The device features excellent line and load transient response which does not exceed 10% of nominal output value for full operating temperature range even during power ON cycle and short circuit removal. Internally trimmed, temperature compensated bandgap reference guarantees 2.5% accuracy for full range of input voltage, output current and temperature. Included on the chip are accurate current limit and thermal shutdown protection. Device stability is achieved with only two external low ESR ceramic capacitors.

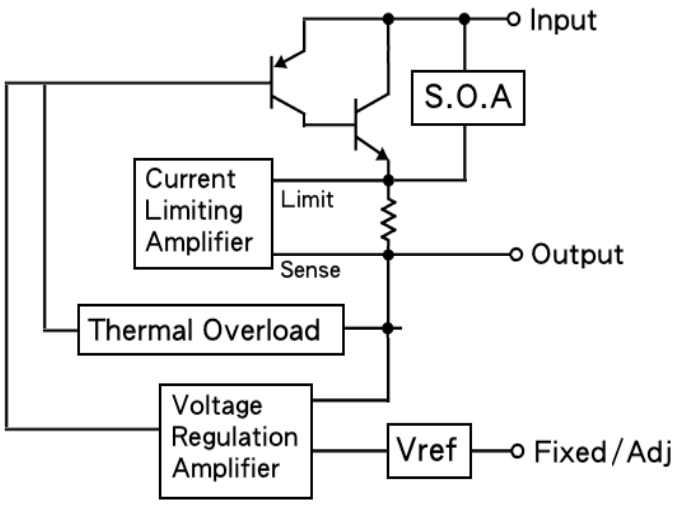
Features

- Very Low Ground Current (I_{GND} = 1mA)
- Excellent Line Regulation
- Excellent Load Regulation
- Very Low transient Overshoot
- Stable with low ESR output Capacitor (ESR = 0mΩ)
- Thermal Shutdown
- Current Limit

Application

- Disk Drive Circuits
- Desktop Computers
- Laptop, Notebook Computers

Block Diagram

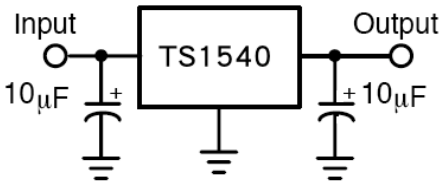


Ordering Information

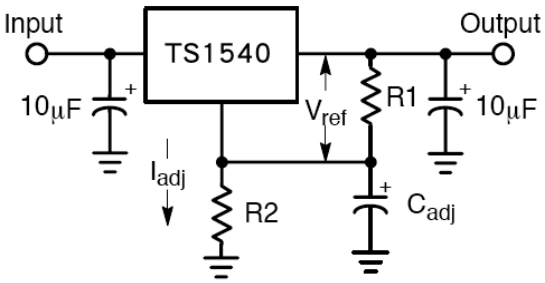
Part No.	Package	Packing
TS1540CP**xx** RO	TO-252	2.5Kpcs / 13" Reel

Note: Where **xx** denotes voltage option, available are
50= 5.0V
33= 3.3V
25= 2.5V
18= 1.8V
15= 1.5V
Leave blank for adjustable version.

Typical Application Circuit



Fixed Output Voltage Version



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

Adjustable Output Voltage Version

Note:
1. Use Low ESR Capacitors.
2. C_{IN} should be placed as closed to V_{IN} as possible

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Absolute Maximum Rating (Note 1)

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

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

Parameter	Conditions	Min	Typ	Max	Unit
Reference Voltage	V_{IN} = 2.75, Io= 1A	1.225	1.25	1.275	V
Output Voltage (Note 4)	V_{IN} = 3V ~ 12V, Io= 1A	1.470	1.5	1.530	V
	V_{IN} = 3.3V ~ 12V, Io= 1A	1.764	1.8	1.836	V
	V_{IN} = 4V ~ 12V, Io= 1A	2.450	2.5	2.550	V
	V_{IN} = 4.8V ~ 12V, Io= 1A	3.235	3.3	3.366	V
	V_{IN} = 6.5V ~ 12V, Io= 1A	4.900	5.0	5.100	V
Line Regulation	Vo+1.5V ≤ V_{IN} ≤ 12V, Io= 10mA	--	2	15	mV
Load Regulation (Note 1,2)	V_{IN} = V_{OUT} +1.5V Io= 10mA ~ 1.0A	--	30	40	mV
Dropout Voltage	Io= 1A, ΔV_{OUT} = 1% V_{OUT}	--	1.0	1.2	V
Quiescent Current	V_{IN} = 5V	--	2.5	5	mA
Adjustable Pin Current		--	90	--	uA
Output Current Limit	V_{IN} - V_{OUT} = 3V	--	1.8	--	A
Temperature Stability	Io=10mA,	--	0.5	--	%
Ripple Rejection	F= 120Hz, Io= 1A, C_{OUT} = 10uF, 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 10W. 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.

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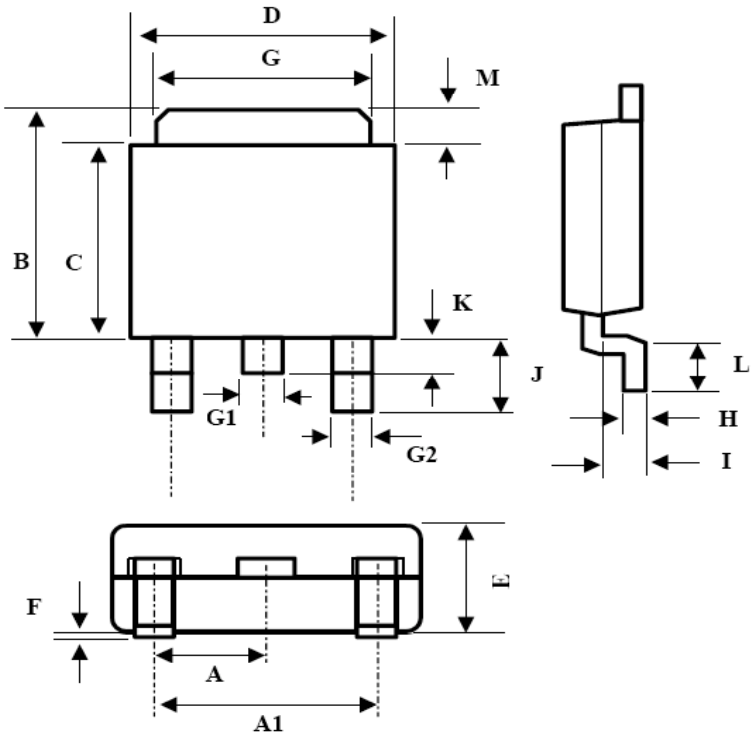
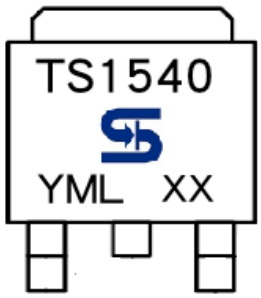
TO-252 Mechanical Drawing



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



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
(**15**=1.5V, **18**=1.8V, **25**=2.5V, **33**=3.3V, **50**=5V)
= Package code for Adjustable type
(CP = TO-252)

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