

1A Ultra Low Dropout Regulator

Description

The FP6153 is a high performance positive voltage regulator designed for use in applications requiring very low input voltage and very low dropout voltage at up to 1A.

The FP6153 provides current limiting and thermal shutdown function which protects the excessive heating due to high current and high junction temperature.

The FP6153 is available in the SOT-23-5 and TDFN-6 packages.

Features

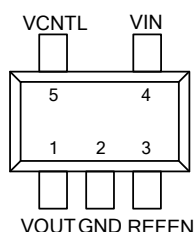
- 300mV Dropout at 1A Current.
- Power MOSFET Integrated
- Low Output Voltage Offset
- Current Limiting Protection
- Thermal Shutdown Protection
- Adjusted Output by External Resistors
- Shutdown for Standby or Suspend Mode
- RoHS Compliant

Applications

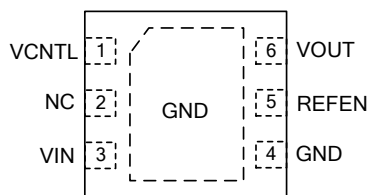
- Motherboard Application
- Notebook PC Application
- Set Top Box

Pin Assignments

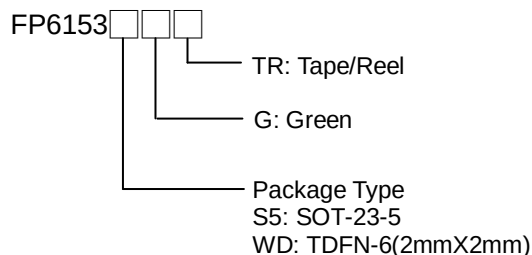
S5 Package (SOT-23-5)



WD Package (TDFN- 6) (2x2mm)



Ordering Information



SOT-23-5 Marking

Part Number	Product Code
FP6153S5GTR	U8=

TDFN-6(2x2mm) Marking

Part Number	Product Code
FP6153WDGTR	U9G

Figure 1. Pin Assignment of FP6153 (Top View)

Typical Application Circuit

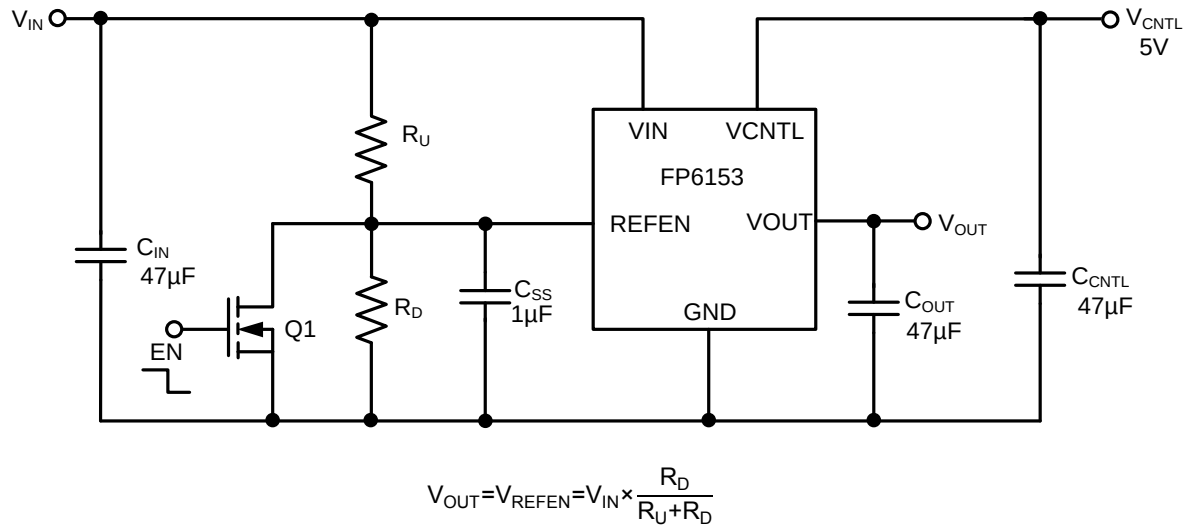


Figure 2. Typical Application Circuit of FP6153

Functional Pin Description

Pin Name	Pin Function
VIN	Power input pin. VIN is the input power supply used to create the external reference voltage for regulating VOUT. VIN sources current to VOUT by upper NMOS.
GND	Common ground pin.
VCNTL	Power input pin. The VCNTL power supplies the internal control circuitry and gate drive voltage.
REFEN	Chip enable, and input reference voltage pin.
VOUT	Regulator output pin. VOUT voltage tracks the REFEN voltage.

Block Diagram

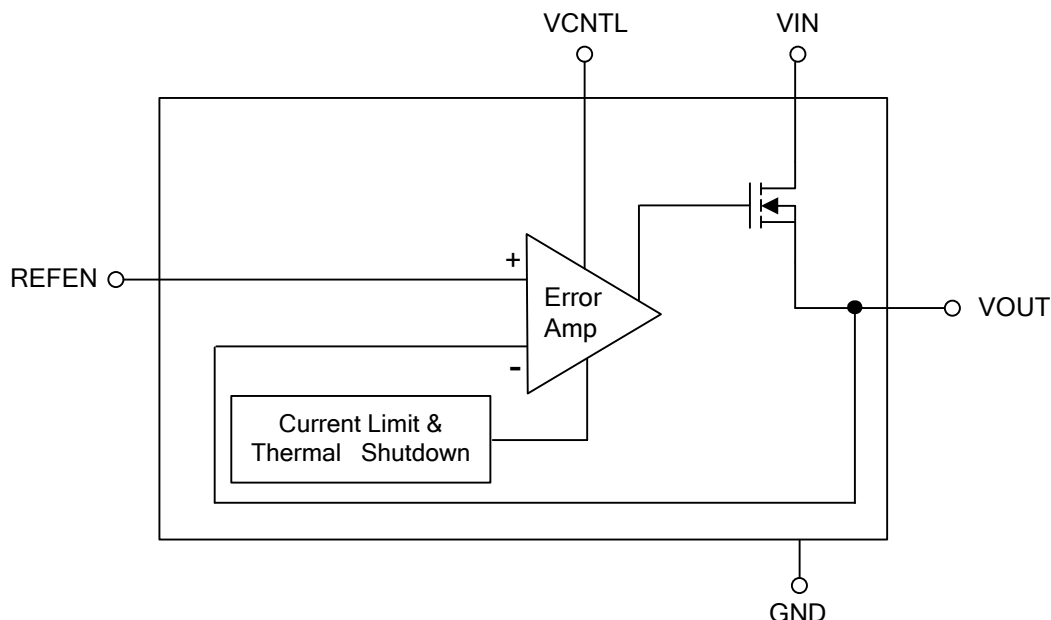


Figure 3. Block Diagram of FP6153

Absolute Maximum Ratings

- V_{IN} to GND ----- 6V
- V_{CNTL} to GND ----- 6V
- Power Dissipation @25°C, (P_D) ----- 1.25W
 - SOT-23-5 ----- +0.4W
 - TDFN-6 (2mX2m) ----- +1.25W
- Package Thermal Resistance, (θ_{JA})
 - SOT-23-5 ----- +250°C/W
 - TDFN-6(2mX2m) ----- +80°C/W
- Junction Temperature ----- 150°C
- Storage Temperature Range ----- -65°C to +150°C
- Lead Temperature (Soldering, 10sec.) ----- 260°C

Note1 : Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device.

Recommended Operating Conditions

- Input Voltage (V_{IN}) ----- 1.4V to 5.5 V
- Input Voltage (V_{CNTL}) ----- 3.3V to 5.5V
- Operating Temperature Range (T_{OPR}) ----- -40°C to +85°C

Electrical Characteristics

($V_{CNTL}=3.3V$, $V_{IN}=1.5V/1.8V/2.5V$, $V_{REFEN}=0.5 \cdot V_{IN}$, $C_{OUT}=10\mu F$, $T_A=25^\circ C$, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
INPUT						
Operation Voltage Range	V _{CNTL}			3.3	5.5	V
V _{CNTL} Quiescent Current	I _{CNTL}	No Load		1.5	3.0	mA
Shutdown Current	I _{SD}	V _{REFEN} <0.2V		5	30	μA
OUTPUT VOLTAGE						
Output Offset Voltage	V _{OS}	No Load , (V _{REFEN} -V _{OUT})	-20	0	20	mV
Load Regulation (Note2)	Δ V _{LOAD}	I _{OUT} = 0 to 1A			20	mV
Dropout Voltage (Note3)	V _D	V _{CNTL} =5V, I _{OUT} = 1A (for TDFN package)		300		mV
		V _{CNTL} =5V, I _{OUT} = 0.3A		100		
PROTECTION						
Current Limit	I _{LIM}		2.0	2.5		A
Thermal Shutdown Temperature (Note4)	T _{SD}			170		°C
	Δ T _{SD}	Hysteresis		35		°C
SHUTDOWN CONTROL						
Enable High Level	V _{REF-H}		0.6			V
Shutdown Low Level	V _{REF-L}				0.2	V

Note 2 : Load regulation and dropout voltage are measured at a constant junction temperature by using a 20ms low duty cycle current pulse.

Note 3 : The dropout voltage is defined as $V_{IN}-V_{OUT}$, which is measured when V_{OUT} drops 2% of its normal value with the specified output current.

Note 4 : The specification is guaranteed by design, not production tested.

Typical Performance Curves

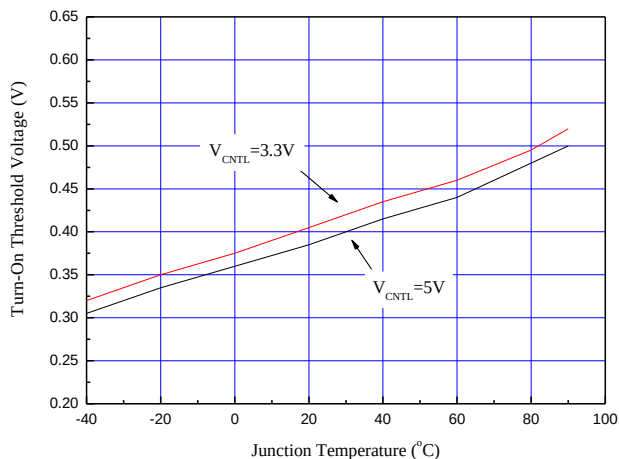


Figure 4. Turn-On Threshold Voltage vs. Junction Temperature

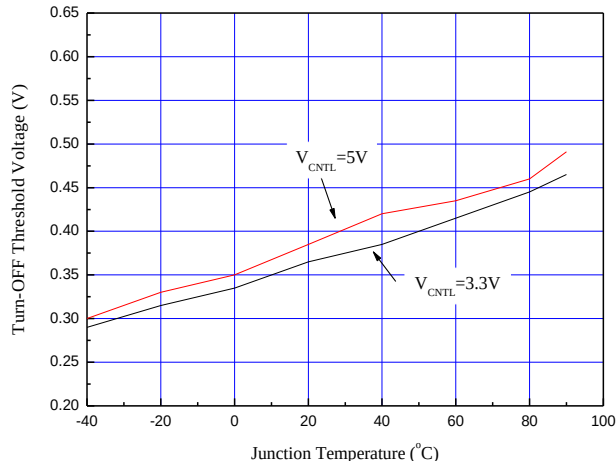


Figure 5. Turn-Off Threshold Voltage vs. Junction Temperature

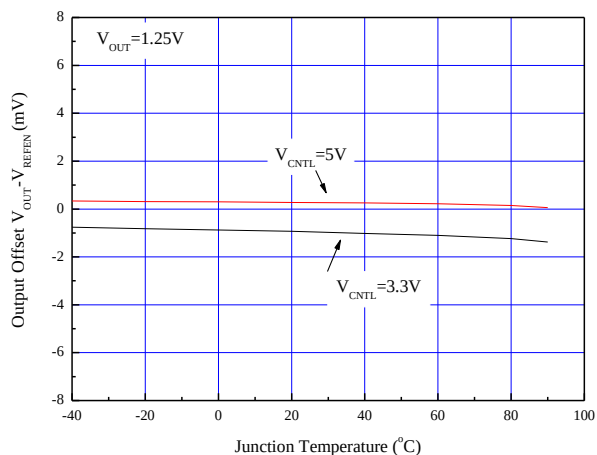


Figure 6. Output offset ($V_{OUT} - V_{REFEN}$) vs. Junction Temperature

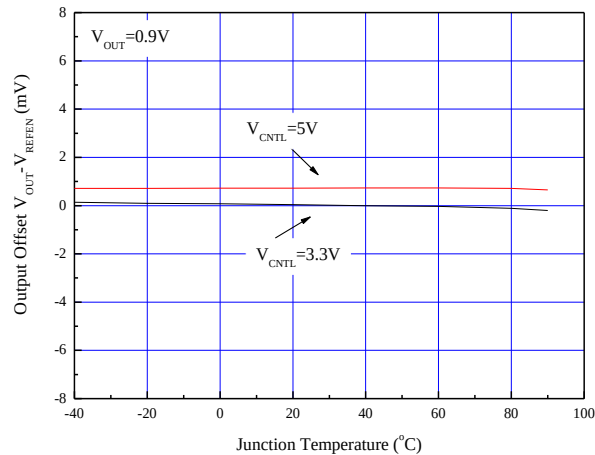


Figure 7. Output offset ($V_{OUT} - V_{REFEN}$) vs. Junction Temperature

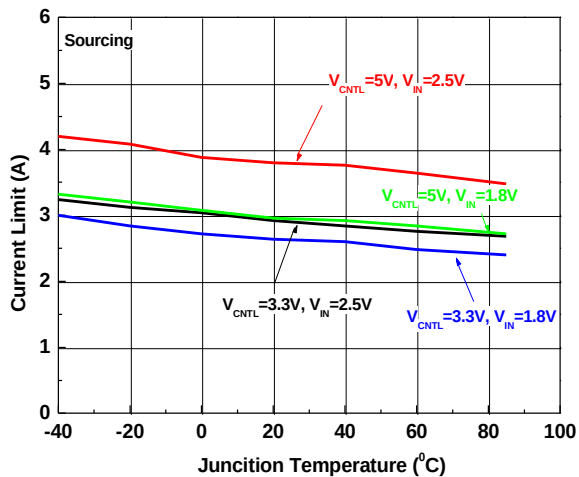


Figure 8. Current Limit vs. Junction Temperature

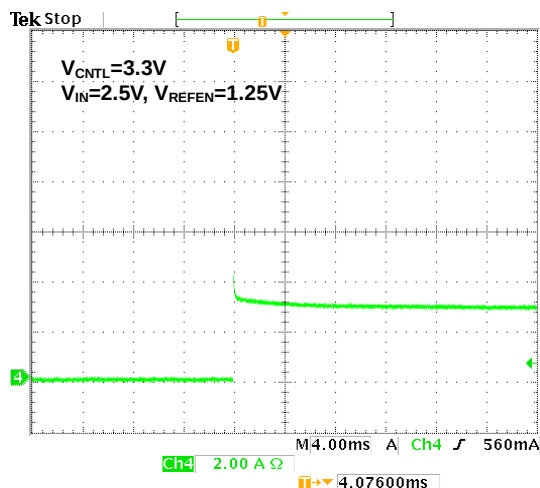
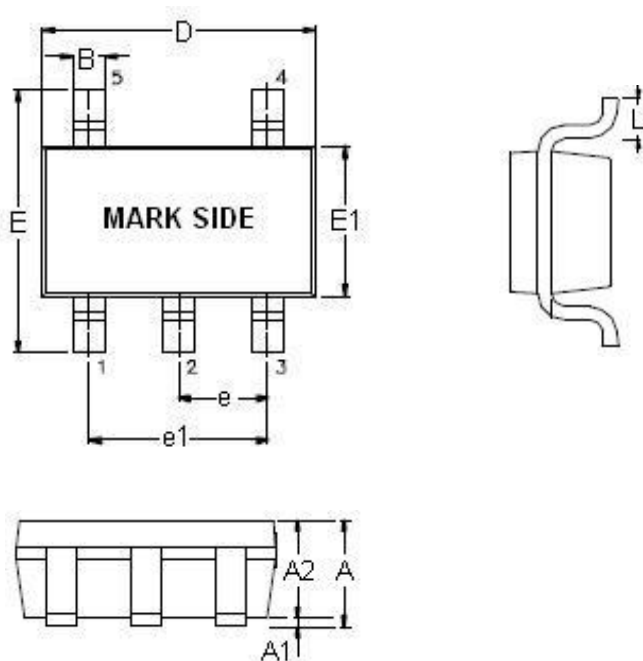


Figure9. Output Short-Circuit Protection

Outline Information

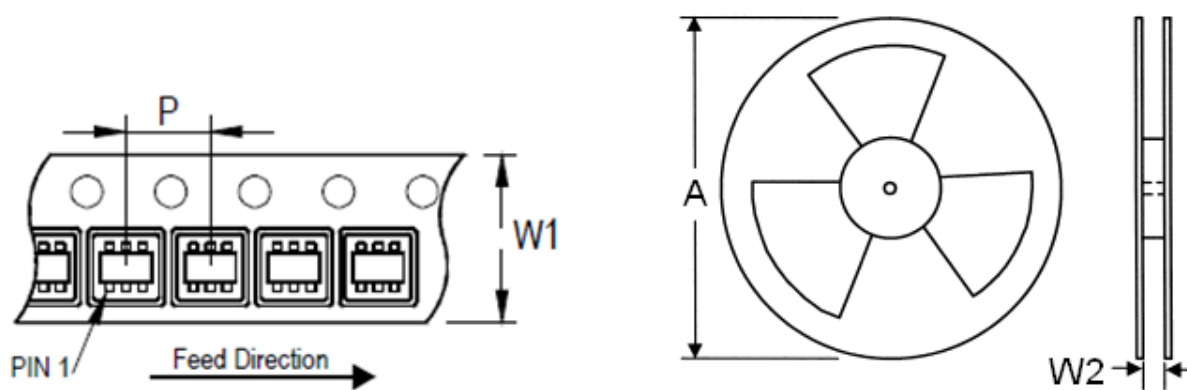
SOT-23-5 Package (Unit: mm)



SYMBOLS UNIT	DIMENSION IN MILLIMETER	
	MIN	MAX
A	0.90	1.45
A1	0.00	0.15
A2	0.90	1.30
B	0.30	0.50
D	2.80	3.00
E	2.60	3.00
E1	1.50	1.70
e	0.90	1.00
e1	1.80	2.00
L	0.30	0.60

Note : Followed From JEDEC MO-178-C.

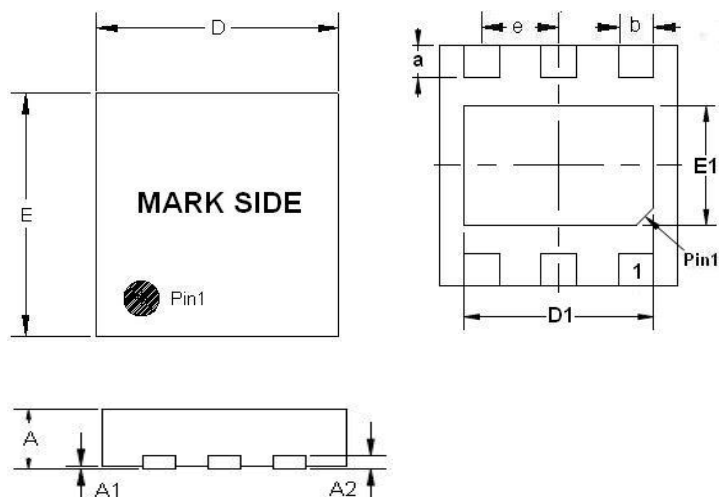
Carrier Dimensions



Tape Size (W1) mm	Pocket Pitch (P) mm	Reel Size (A)		Reel Width (W2) mm	Empty Cavity Length mm	Units per Reel
		in	mm			
8	4	7	180	8.4	300~1000	3,000

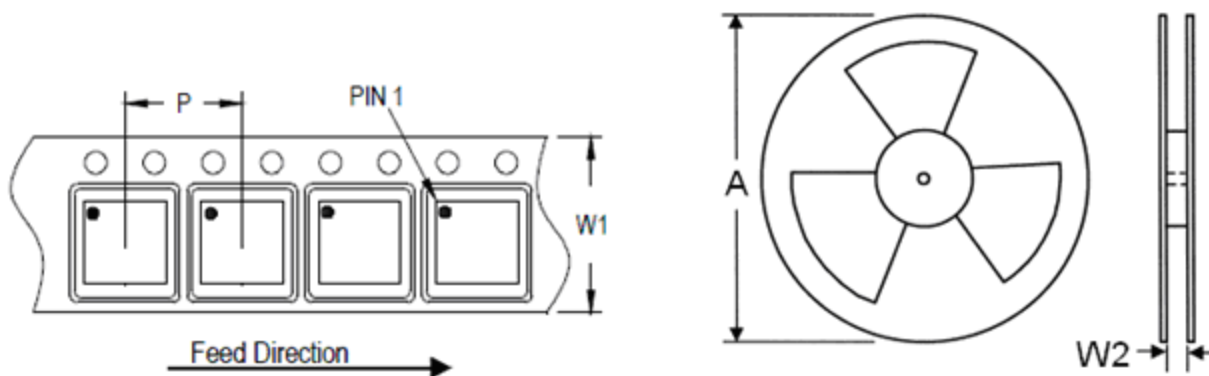
Outline Information (Continued)

TDFN-6 2mm×2mm Package (Unit: mm)



SYMBOLS UNIT	DIMENSION IN MILLIMETER	
	MIN	MAX
A	0.70	0.80
A1	0.00	0.05
A2	0.19	0.22
D	1.95	2.05
E	1.95	2.05
a	0.20	0.40
b	0.25	0.35
e	0.60	0.70
D1	1.15	1.65
E1	0.55	1.05

Carrier Dimensions



Tape Size (W1) mm	Pocket Pitch (P) mm	Reel Size (A)		Reel Width (W2) mm	Empty Cavity Length mm	Units per Reel
		in	mm			
8	4	7	180	8.4	400~1000	3,000

Life Support Policy

Fitipower's products are not authorized for use as critical components in life support devices or other medical systems.