

3A BUS TERMINATION REGULATOR

Description

The FP6137F linear regulator is designed to provide the transient peaks up to 3A sourcing or sinking capability for DDR SDRAM bus termination application. The output voltage can track half of input power by two external voltage divider resistors.

The FP6137F provides current limiting in both sourcing/sinking mode and thermal shutdown function which protects the excessive heating due to high current and high junction temperature.

The FP6137F is available in SOP-8 (Exposed Pad) package.

Features

- Peak 3A Source or Sink Current
- Power MOSFET Integrated
- Low Output Voltage Offset
- Built-in Soft-start
- Current Limiting Protection
- Thermal Shutdown Protection
- Adjustable Output by External Resistors
- Shutdown for Standby or Suspend Mode
- RoHS Compliant

Applications

- DDR-I, DDR-II, DDR-III ,and DDR-IIIL Bus Termination Voltage
- SSTL-2 and SSTL-3 Termination
- Active Termination Buses

Pin Assignments

SP Package (SOP-8 Exposed Pad)

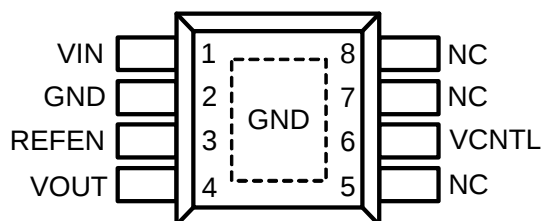
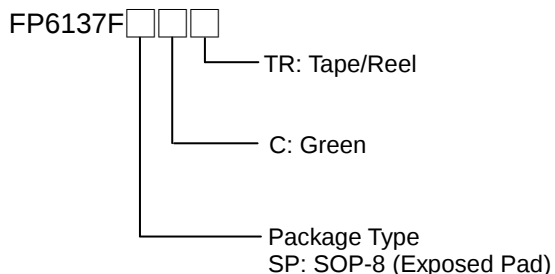


Figure 1. Pin Assignment of FP6137F (Top View)

Ordering Information



Typical Application Circuit

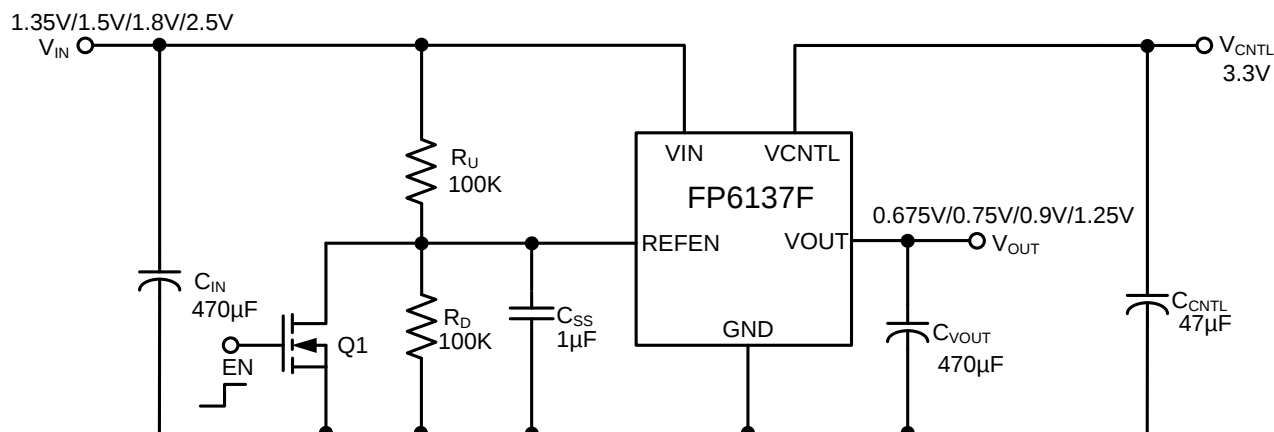
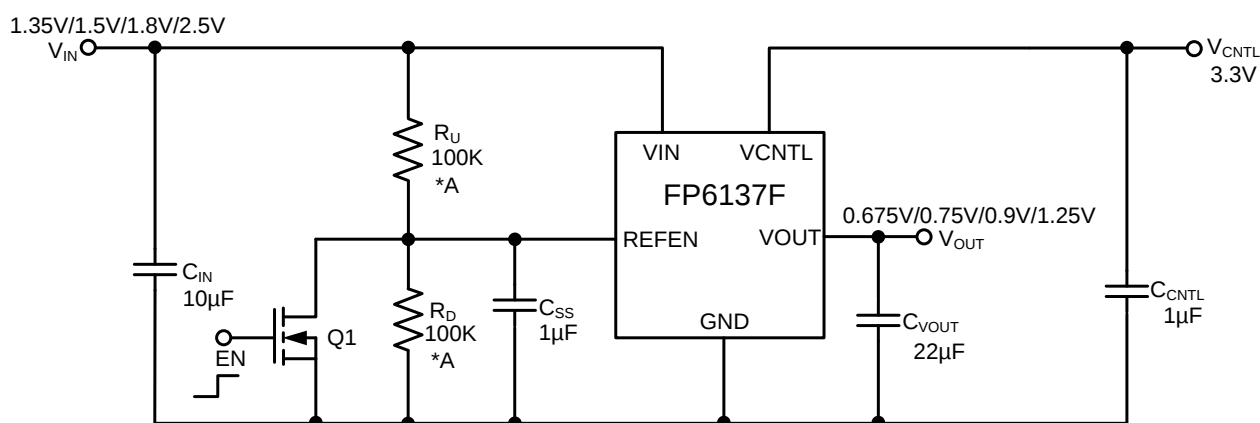


Figure 2. Typical Application Circuit of FP6137F with EC Capacitors



Note A: The recommend value of resistor is 10k~100k

Figure 3. Typical Application Circuit of FP6137F with MLCC Capacitors

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. The VOUT sinks current to GND by lower NMOS.
VCNTL	Power input pin. The VCNTL power supplies the internal control circuitry and gate drive voltage.
REFEN	Chip enable, and input reference voltage pin. The reference voltage is half of the VIN power by two external voltage divide resistors.
VOUT	Regulator output pin. VOUT voltage tracks the REFEN voltage and is capable of sourcing or sinking current up to peak 3A.

Block Diagram

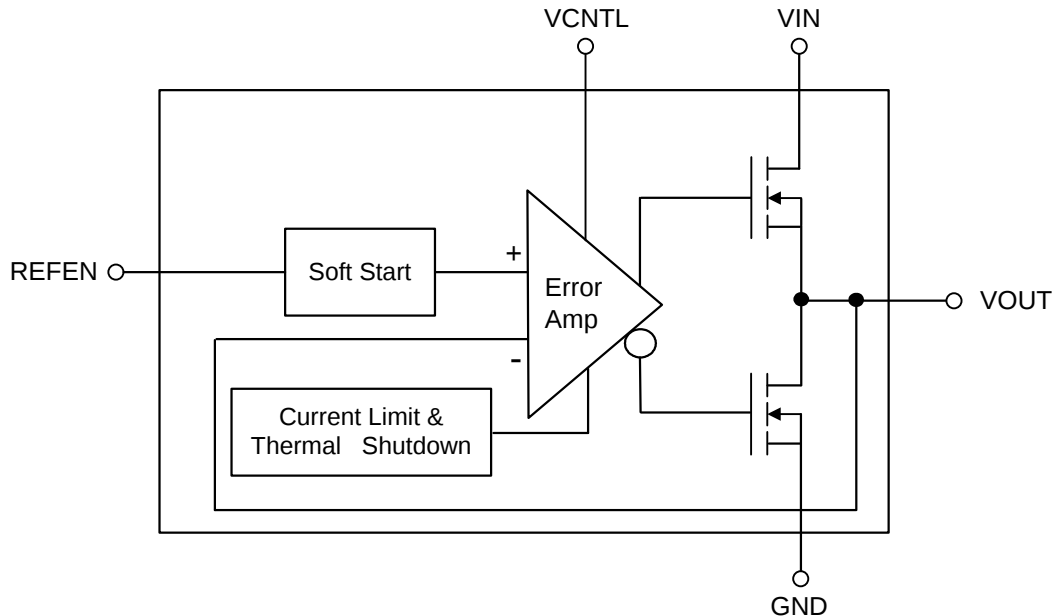


Figure 4. Block Diagram of FP6137F

Absolute Maximum Ratings

- VIN to GND ----- 6V
- VCNTL to GND ----- 6V
- Power Dissipation @25°C (P_D) SOP-8 (Exposed Pad) ----- 1.25W
- Package Thermal Resistance (θ_{JA}) SOP-8 (Exposed Pad) ----- 80°C/W
- Junction Temperature ----- 150°C
- Storage Temperature Range ----- -65°C to +150°C
- Lead Temperature (Soldering, 10sec.) ----- 260°C

Note 1 : Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device.

Recommended Operating Conditions

- Input Voltage (V_{IN}) ----- (1.35V, 1.5V, 1.8V, 2.5V) ±5%
- Input Voltage (V_{CNTL}) ----- (3.3V to 5.5V) ±5%
- Operating Temperature Range (T_{OPR}) ----- -40°C to +85°C

Electrical Characteristics

($V_{\text{CNTL}}=3.3\text{V}$, $V_{\text{IN}}=1.35\text{V}/1.5\text{V}/1.8\text{V}/2.5\text{V}$, $V_{\text{REFEN}}=0.5 \cdot V_{\text{IN}}$, $C_{\text{OUT}}=10\mu\text{F}$, $T_A=25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
INPUT						
Operation Voltage Range (DDRI /DDII/ DDR-III/ DDR-IIIL)	V_{CNTL}			3.3	5.5	V
V_{CNTL} Quiescent Current	I_{CNTL}	No Load		1.5	3.0	mA
Shutdown Current	I_{SD}	$V_{\text{REFEN}} < 0.2\text{V}$		5	30	μA
OUTPUT VOLTAGE						
Output Offset Voltage	V_{OS}	No Load , ($V_{\text{REFEN}} - V_{\text{OUT}}$)	-20	0	20	mV
Load Regulation (Note2) (DDRI/DDII/DDR-III/ DDR-IIIL)	$ \Delta V_{\text{LOAD}} $	$I_{\text{OUT}} = 0 \text{ to } 2\text{A}$			20	mV
		$I_{\text{OUT}} = 0 \text{ to } -2\text{A}$			20	
Line Regulation		$V_{\text{CC}}=3.3\text{V to } 5.5\text{V}$, No Load		1	20	mV
PROTECTION						
Soft-Start Time	T_{SS}			400		μs
Current Limit	I_{LIM}		3.0	4.0		A
Thermal Shutdown Temperature (Note3)	T_{SD}			170		$^\circ\text{C}$
	ΔT_{SD}	Hysteresis		35		$^\circ\text{C}$
SHUTDOWN CONTROL						
Enable High Level	$V_{\text{REF-H}}$		0.6			V
Shutdown Low Level	$V_{\text{REF-L}}$				0.2	V

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

Note 3 : Guarantee by design.

Typical Performance Curves

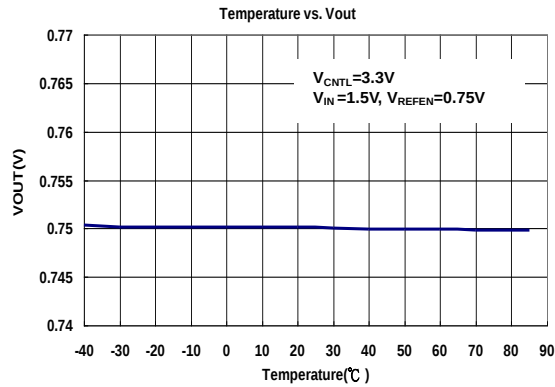


Figure 5. Temperature vs. Vout

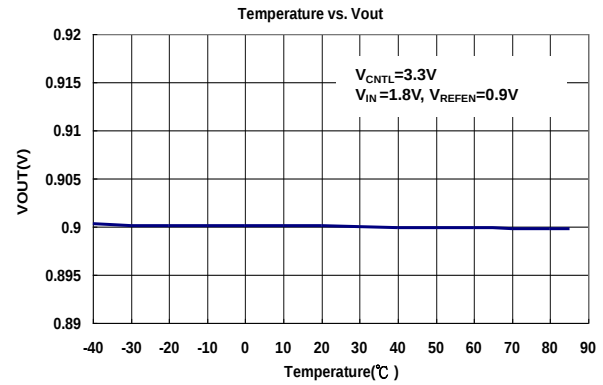


Figure 6. Temperature vs. Vout

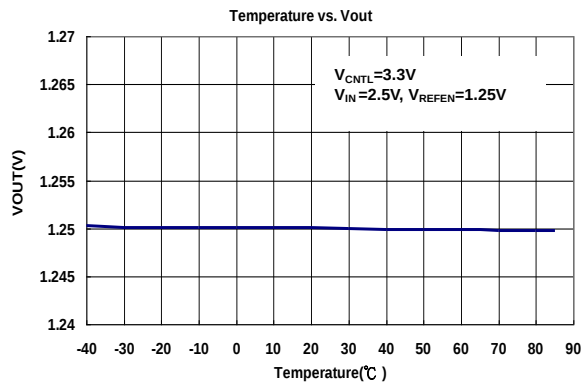


Figure 7. Temperature vs. Vout

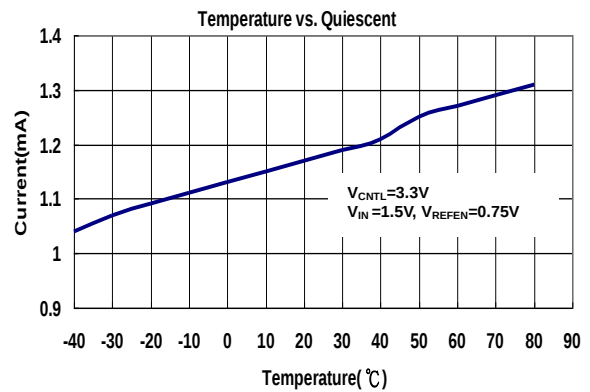


Figure 8. Temperature vs. Quiescent Current

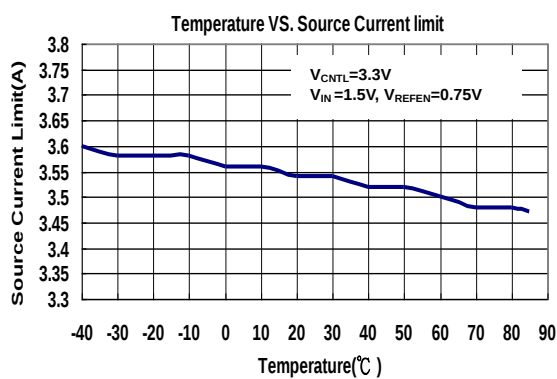


Figure 9. Temperature vs. Source Current Limit

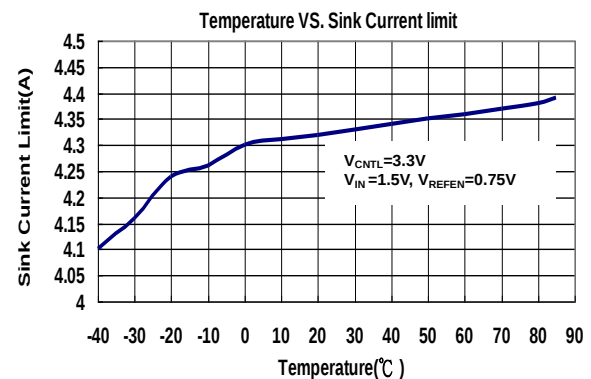


Figure 10. Temperature vs. Sink Current Limit

Typical Performance Curves (Continued)

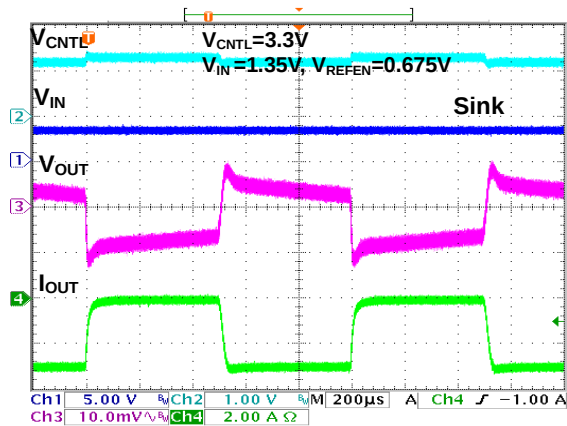


Figure11. Output Transient Response

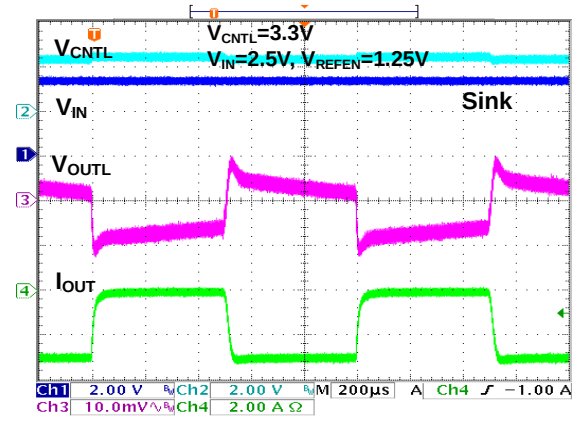


Figure12. Output Transient Response

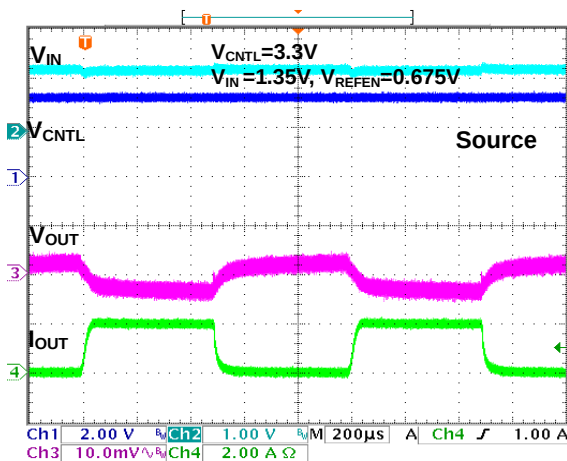


Figure13. Output Transient Response

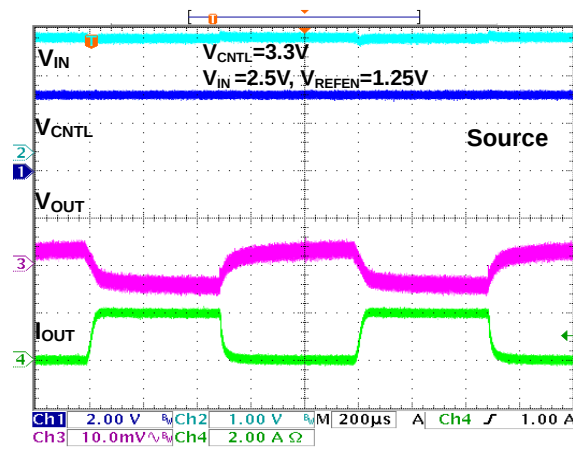


Figure14. Output Transient Response

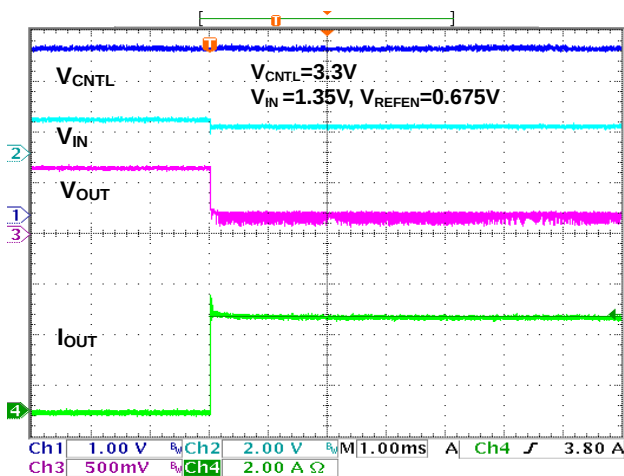


Figure15. Output Short-Circuit Protection

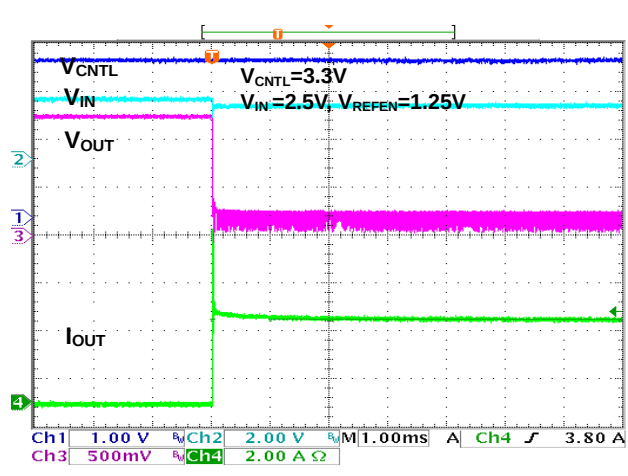
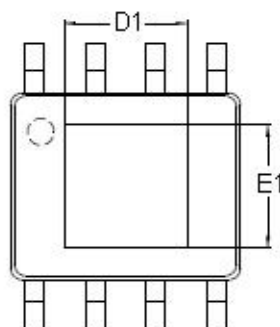
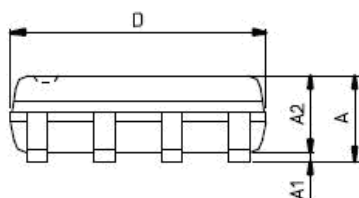
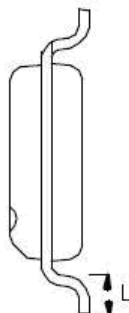
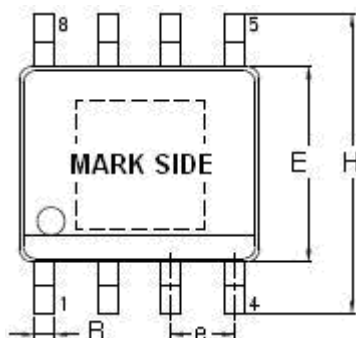


Figure16. Output Short-Circuit Protection

Outline Information

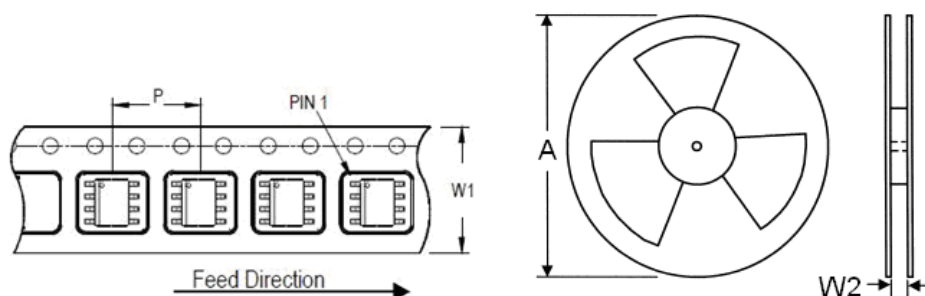
SOP-8 (Exposed Pad) Package (Unit: mm)



SYMBOLS UNIT	DIMENSION IN MILLIMETER	
	MIN	MAX
A	1.25	1.70
A1	0.00	0.15
A2	1.25	1.55
B	0.31	0.51
D	4.80	5.00
D1	3.04	3.50
E	3.80	4.00
E1	2.15	2.41
e	1.20	1.34
H	5.80	6.20
L	0.40	1.27

Note : Followed From JEDEC MO-012-E.

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			
12	8	13	330	12.4	400~1000	2,500

Life Support Policy

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