



FEATURES

- Ideal for DDR-I and DDR-II Applications
- Capable of Sourcing and Sinking Current 1.5A
- Current Limiting Protection
- Thermal Protection
- Current-shoot-through Protection
- High Accuracy Output Voltage at Full Load
- Minimum External Components
- Adjustable V_{OUT} by External Resistors
- Shutdown for Standby or Suspend Mode Operation with High-impedance Output
- Halogen Free Product

DESCRIPTION

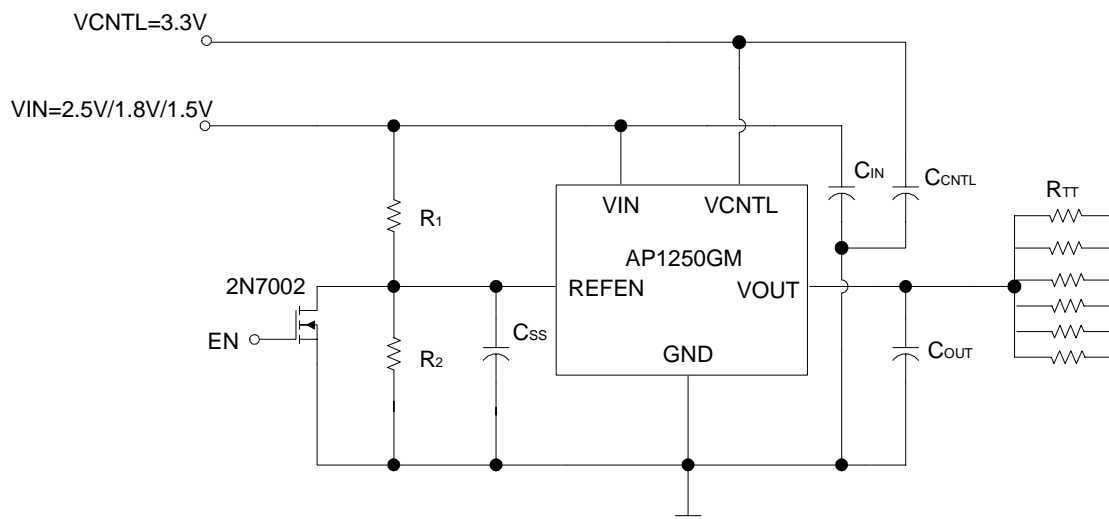
AP1250GM is a linear regulator designed as a cost-effective solution for active termination of DDR SDRAM. The converting voltage range is from 1.6V to 6V into a desired output voltage, which is adjusted by two external resistors. The current sourcing and sinking capability of the regulator is up to 1.5A while the output voltage within 2%/3%.

This device provides on-chip thermal shutdown and current limit functions for circuit tolerance of the output fault conditions. SO-8 packages are available for all commercial and industrial surface mount applications.

APPLICATION

- Mother Board DDR-SDRAM Termination
- Mother Board DDR-II Termination
- Game / Play Station
- Set Top Box
- PCI / AGP Graphics
- IPC
- SCSI-III Bus Termination

TYPICAL APPLICATION



$$V_{OUT} = V_{REF} = V_{IN} \times [R_2 / (R_1 + R_2)]$$

$$R_1 = R_2 = 100K\Omega, R_{TT} = 50\Omega / 33\Omega / 25\Omega$$

$$C_{OUT, min} = 10\mu F \text{ (Ceramic)} + 1000\mu F \text{ under the worst case testing condition}$$

$$C_{SS} = 1\mu F, C_{IN} = 470\mu F \text{ (Low ESR)}, C_{CNTL} = 47\mu F$$



ABSOLUTE MAXIMUM RATINGS

Input Voltage (V_{IN})	6V
HBM ESD Rating	3KV
Power Dissipation (P_D)	1.25W
Storage Temperature Range (T_{ST})	-65 to +150°C
Junction Temperature Range (T_J)	-40 to +125°C
Ambient Temperature Range (T_A)	-40 to +85°C
Lead Temperature (Soldering, 10sec.)	260°C
Thermal Resistance from Junction to Case (R_{thjc}) ^{Note1}	20°C/W
Thermal Resistance from Junction to Ambient (R_{thja})	80°C/W

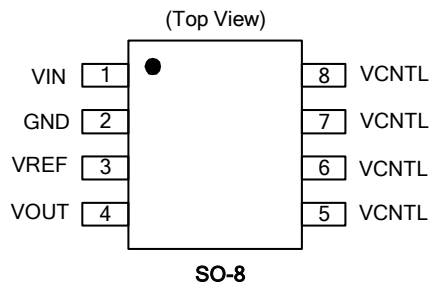
Note1. Surface mounted on 1 in² copper pad of FR4 board

ORDERING / PACKAGE INFORMATION

AP1250GX

Package Type

M : SO-8



ELECTRICAL SPECIFICATIONS

($V_{IN}=2.5V$, $V_{CNTL}=3.3V$, $V_{REFEN}=1.25V$, $C_{OUT}=10\mu F$ (Ceramic), $T_A=25^\circ C$, unless otherwise specified)

Parameter	SYM	TEST CONDITION	MIN	TYP	MAX	UNITS
Input						
Input Voltage Range(DDR I/II) ^{Note3}	V_{IN}	$V_{CNTL} \geq V_{IN}$	1.6	2.5/1.8	-	V
Gate Drive Voltage Range ^{Note3}	V_{CNTL}	$V_{CNTL} \geq V_{IN}$	-	3.3	6	V
Current in Shutdown	I_{SHDN}	$V_{REFEN} < 0.2V$, $R_{LOAD} = 180\Omega$	-	10	90	μA
Output (DDR-I / DDR-II)						
Output Offset Voltage ^{Note2}	V_{OS}	$I_{OUT} = 0A$	-20	-5	20	mV
Load Regulation ^{Note4}	ΔV_{Load}	$I_{OUT} = 10mA \sim 1.5A$	-	0.5	2	%
		$I_{OUT} = -10mA \sim -1.5A$	-	0.5	2	
Protection						
Current Limit	I_{LIM}		-	2	-	A
Quiescent Current	I_Q	$I_{OUT}=0A$	-	1	3	mA
Thermal Shutdown Temperature	T_{SD}	$3.3V \leq V_{CNTL} \leq 5V$	-	140	-	°C
REFEN Shutdown						
Shutdown Threshold	V_{IH}	Enable	0.8	-	-	V
	V_{IL}	Shutdown	-	-	0.2	

Note2. V_{OS} offset is the voltage measurement defined as V_{OUT} subtracted from V_{REFEN} .

Note3. Keep $V_{CNTL} \geq V_{IN}$ at power on/off sequences.

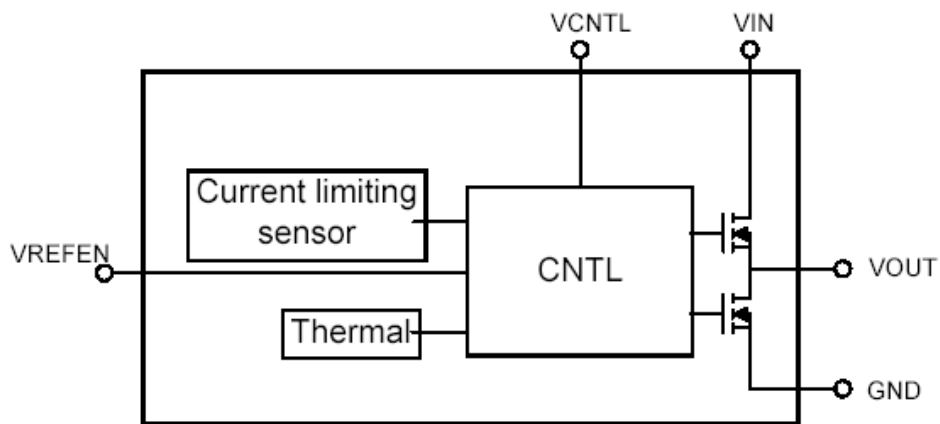
Note4. Regulation is measured at constant junction temperature by using a 5ms current pulse. Devices are tested for load regulation in the load range from 0A to 1.5A.



PIN DESCRIPTIONS

PIN SYMBOL	PIN DESCRIPTION
V_{IN}	Power Input Voltage.
GND	Ground Pin
V_{OUT}	Output Voltage
V_{CNTL}	Gate Drive Voltage
VREFEN	Reference Voltage Input and Chip Enable

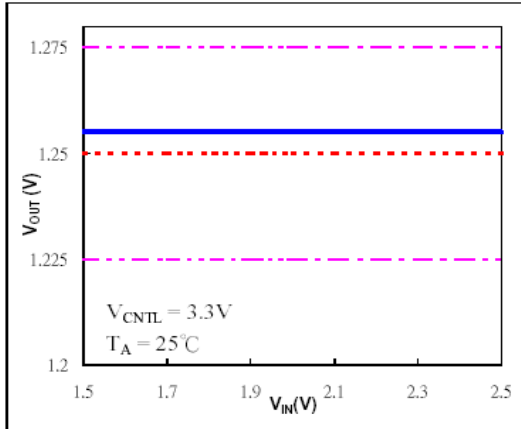
BLOCK DIAGRAM



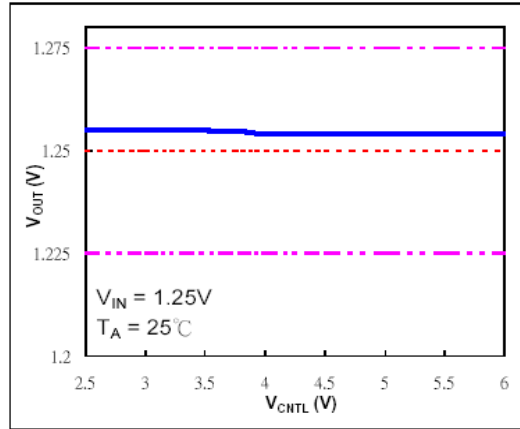


TYPICAL PERFORMANCE CHARACTERISTICS

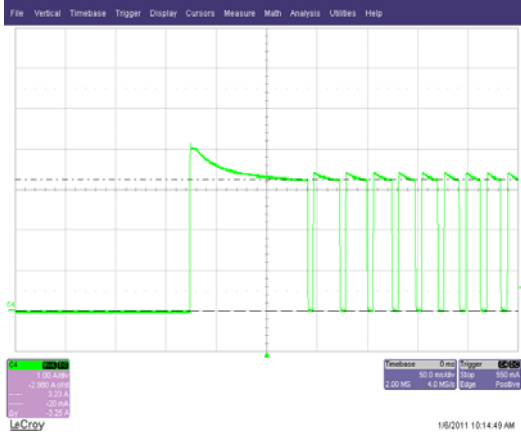
Line Regulation(V_{IN} vs. V_{OUT})



Line Regulation(V_{CNTL} vs. V_{OUT})

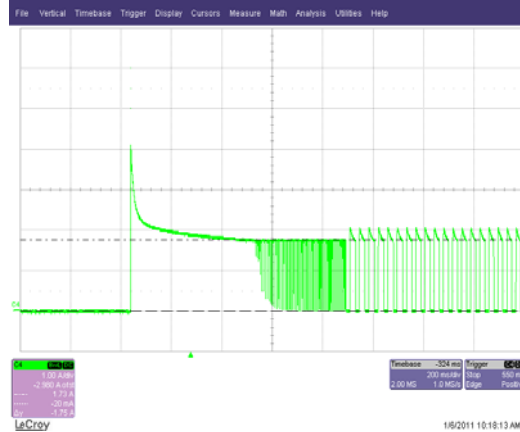


Output Short-Circuit Protection (Source)



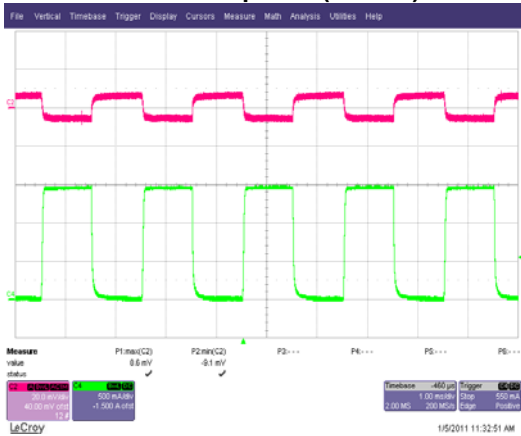
$V_{IN}=2.5V, V_{CNTL}=3.3V, V_{REFN}=1.25V$

Output Short-Circuit Protection (Sink)



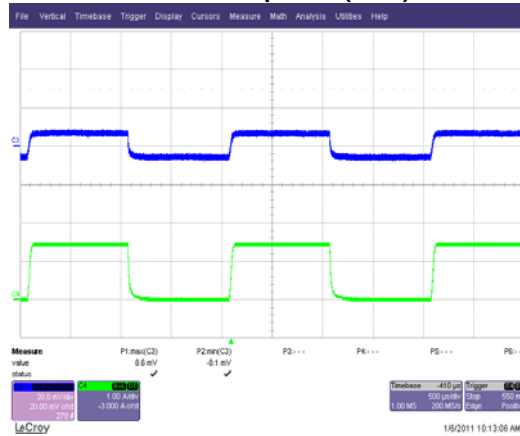
$V_{IN}=2.5V, V_{CNTL}=3.3V, V_{REFN}=1.25V$

Transient Response (Source)



$V_{IN}=2.5V, V_{CNTL}=3.3V, I_{OUT}=0.1\sim 1.5A$

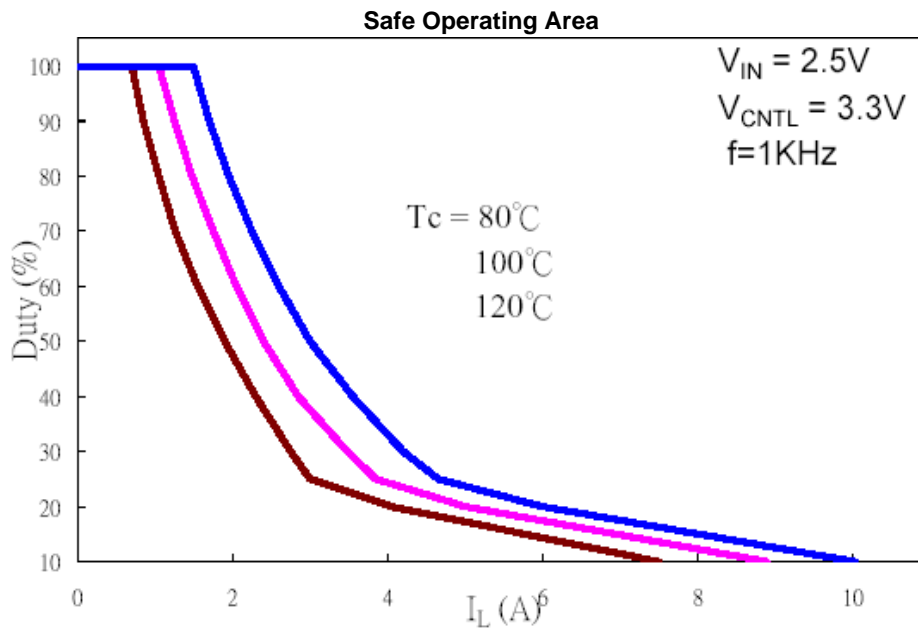
Transient Response (Sink)



$V_{IN}=2.5V, V_{CNTL}=3.3V, I_{OUT}=0.1\sim 1.5A$



TYPICAL PERFORMANCE CHARACTERISTICS





MARKING INFORMATION

SO-8

