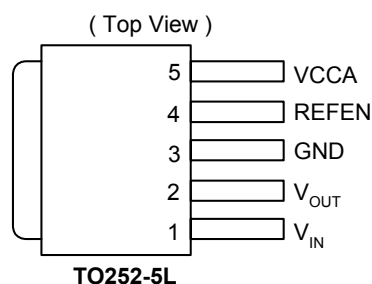# AP1127

3A Bus Terminator Regulator

■ Features

- Ideal for DDR-I and DDR-II
- Source and sink up to 3A, no heat sink required
- Integrated power MOSFETs
- Programmable output voltage by external resistors
- Output voltage could go down to 0.6V
- Iccq at VCCA less than 500uA
- Current limit protection and Short Circuit protection
- Thermal shutdown protection
- Shutdown for standby or suspend mode operation
- Minimum external components
- 5-Lead TO252 **Pb-free** Package

■ Applications

- Mother Board
- PCI/AGP Graphics
- Game/Play Station
- Set Top Box
- SCSI-III Bus Terminator
- IPC

■ General Description

The AP1127 is a low cost linear regulator designed to provide a desired output voltage or termination voltage for various applications by converting voltage supplies ranging from 1.6V to 6.0V. The desired output voltage could be programmable by two external voltage divider resistors.
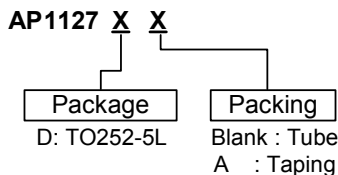
The AP1127 is capable of sourcing or sinking up to 3A of current while regulating an output V_{OUT} voltage to within 2% (DDR-I), 3%(DDR-II) or less.

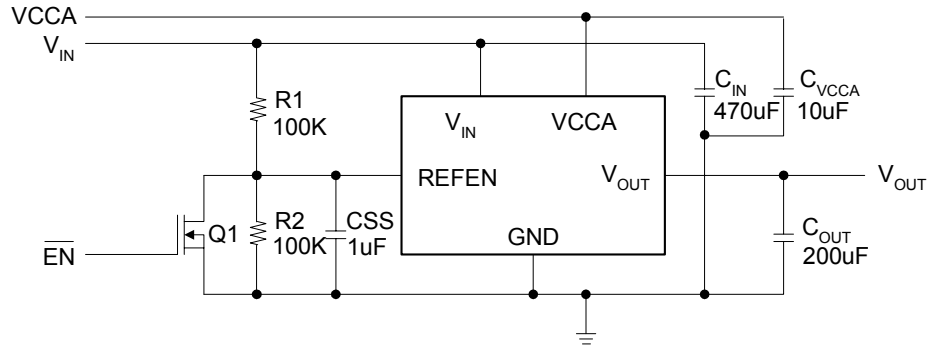The AP1127 provides low profile 5-lead TO-252 package to save system space.

■ Pin Assignment

(Top View)

```
  5 ──────┤ VCCA
  4 ──────┤ REFEN
  3 ──────┤ GND
  2 ──────┤ V_OUT
  1 ──────┤ V_IN
```

TO252-5L

■ Pin Descriptions

Pin Name	Pin No.	Descriptions
V_{IN}	1	Input Power
V_{OUT}	2	Output Voltage
GND	3	Ground
REFEN	4	Reference Voltage Input and Chip Enable
VCCA	5	Voltage Supply for Internal Circuits

■ Ordering Information

AP1127 <u>X</u> <u>X</u>

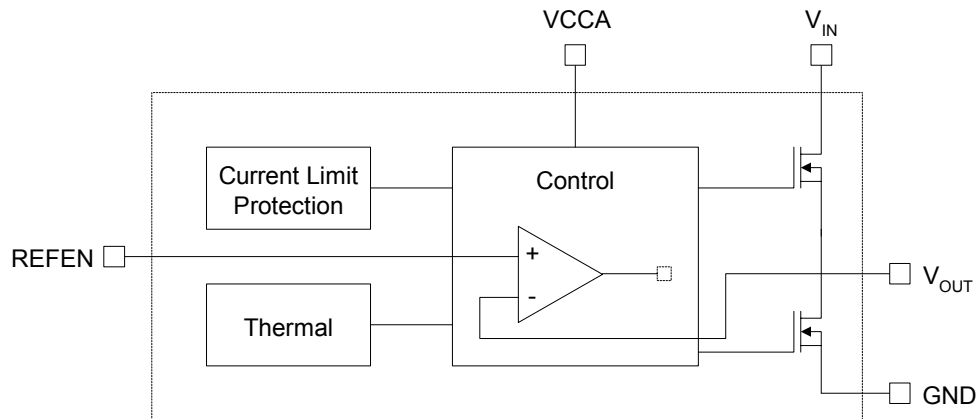| Package	Packing
D: TO252-5L	Blank : Tube
	A : Taping

◼ Typical Circuit

◼ Block Diagram

◼ Absolute Maximum Ratings (Note 1)

Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Symbol	Parameter	Rating	Unit
V_{IN}	Supply Voltage	7	V
VCCA	Voltage Supply for internal circuits	7	V
I_{OUT}	Output RMS Current, Source or Sink	3	A
T_{STG}	Storage Temperature	-65 to 125	^{o}C
T_{Lead}	Lead Temperature (Soldering, 5 sec)	260	^{o}C
θ_{JC}	Thermal Resistance	7.7	^{o}C/W

3A Bus Terminator Regulator

■ Electrical Characteristics

Unless otherwise stated, these specifications apply T_A=25°C; V_{IN}=+2.5V and VCCA=+3.3V, V_{REFEN}=1.25V) maximum ratings are stress ratings only and functional device operating is not implied. **(Note 1)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{OS}	Output Offset Voltage	I_{OUT}=0A (Note 2)	-20	-	20	mV
I_{OP}	Operating Current at VIN	No load, C_{OUT}=200uF	-	-	1	mA
$\mid \Delta V_{LOAD} \mid$	Load Regulation (DDR I/II)	I_L: 0A~3A	-	0.8/1.2	2/3	%
		I_L: 0A~3A	-	0.8/1.2	2/3	
I_{CCQ}	Quiescent Current at VCCA	At room temp.	-	190	230	µA
I_{SHDN}	Current in Shutdown Mode	REFEN < 0.2V, R_L=10Ω	-	90	110	µA
V_{IN}	Input Voltage Range **(Note 3)**	No load	1.35/1	2.5/1.8	6	V
VCCA	Input Voltage Range **(Note 3)**	R_L=10Ω	3.75	-	6	V
Short Circuit Protection						
I_{LIMIT}	Current Limit		-	5	-	A
$I_{SC, VIN}$	Short Current	Sinking	2	-	-	A
$I_{SC, GND}$	Short Current	Sourcing	3	-	-	A
Over Thermal Protection						
THSD	Thermal Shutdown Temperature	3.75V ≤ VCCA ≤ 6V	125	150	-	^{o}C
	Thermal Shutdown Hysteresis		25	30	35	^{o}C
REFEN Function						
	REFEN Threshold	V_{REFEN} < V_{IN} V_{REFEN} < VCCA-2.5V	0.4	0.5	0.6	V

Note 1: Limits are guaranteed by 100% testing, sampling, or correlation with worst case test conditions.
Note 2: V_{OS}=V_{REFEN}-V_{OUT}
Note 3: Keep VCCA ≥ VIN and VCCA ≥ V_{REFEN} + 2.5V on operation power on and power off sequences.
Note 4: Guaranteed by design, not 100% test.

■ Function Description

The AP1127 is a linear regulator that is capable of sinking and sourcing 3A of current without an external heat sink.

The AP1127 integrates power MOSFETs that are capable of source and sink 3A of current while maintaining excellent voltage regulation. The output voltage can be regulated within 3% or less by using the external feedback. Separate voltage supply inputs have been added to fit applications with various power supplies for the data bus and power buses.

Outputs
The output voltage pins (V_{OUT}) are tied to the data bus, address, or clock lines via an external inductor. Output voltage is determined by the V_{IN}.

Inputs
The input voltage pins (V_{IN}) determine the output voltages (V_{OUT}). At AP1127, the desired output voltage could be programmable by two external voltage divider resistors. V_{IN} is suggested to connect to VDDQ of memory module for better tracking with memory VDDQ.
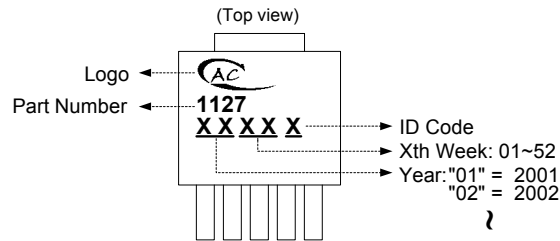
Other Supply Voltages
VCCA provide the voltage supply to the logic section and internal error amplifiers of AP1127.
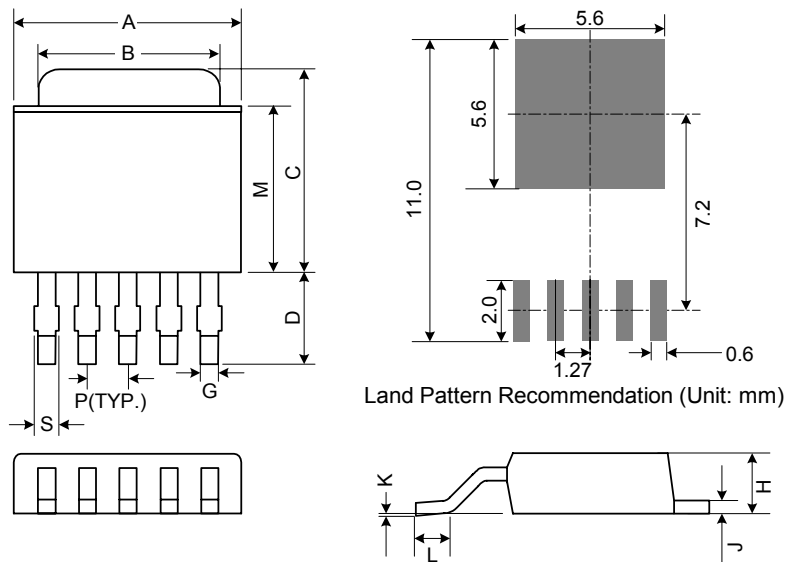
■ Marking Information

TO252-5L

■ Package Information

Land Pattern Recommendation (Unit: mm)

Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	**Nom.**	**Max.**	**Min.**	**Nom.**	**Max.**
A	6.35	6.60	6.85	0.250	0.260	0.270
B	5.20	5.35	5.50	0.205	0.211	0.217
C	6.80	7.00	7.30	0.268	0.276	0.287
D	2.20	2.50	2.80	0.087	0.098	0.110
P	1.27 REF.			0.050 REF.		
S	0.50	0.65	0.80	0.020	0.026	0.031
G	0.40	0.50	0.63	0.016	0.020	0.025
H	2.20	2.30	2.40	0.087	0.091	0.094
J	0.45	0.52	0.58	0.018	0.020	0.023
K	0.00	0.08	0.15	0.000	0.003	0.006
L	0.90	1.20	1.63	0.035	0.047	0.064
M	5.40	5.80	6.20	0.213	0.228	0.244