

## 3A Bus Terminator Regulator

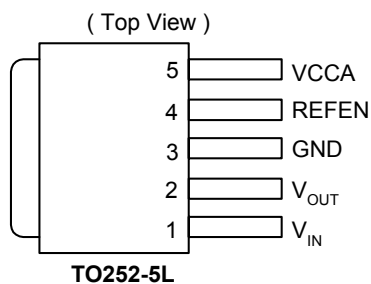
### ■ Features

- 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

### ■ Pin Assignment



### ■ 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.

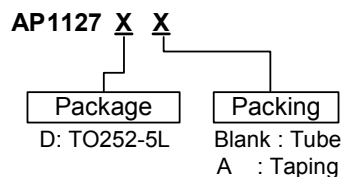
The AP1127 is capable of sourcing or sinking up to 3A of current while regulating an output  $V_{OUT}$  voltage to within 2% (DDR-I), 3%(DDR-II) or less.

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

### ■ Pin Descriptions

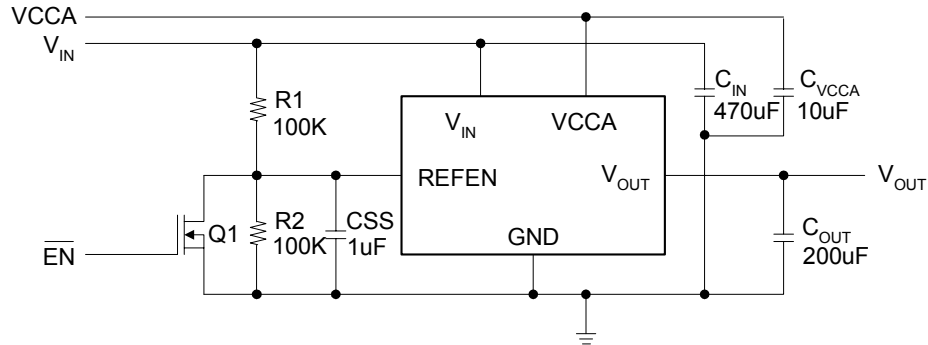
Pin Name	Pin No.	Descriptions
$V_{IN}$	1	Input Power
$V_{OUT}$	2	Output Voltage
GND	3	Ground
REFEN	4	Reference Voltage Input and Chip Enable
VCCA	5	Voltage Supply for Internal Circuits

### ■ Ordering Information

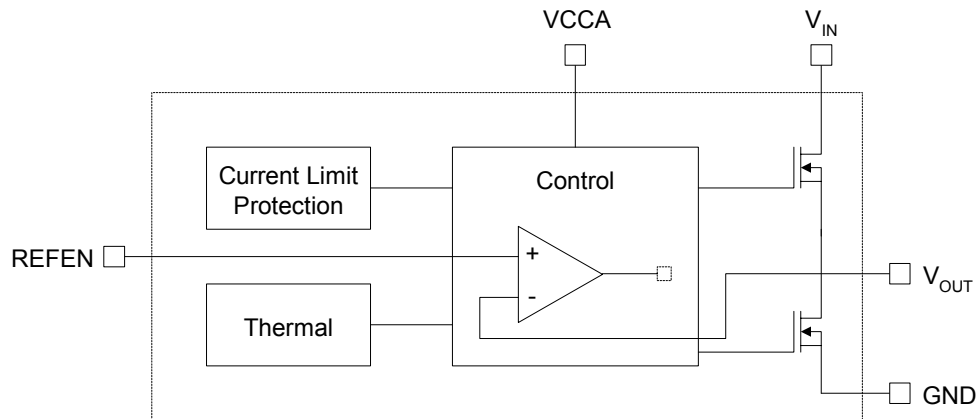


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### ■ Typical Circuit



### ■ 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	°C
$T_{Lead}$	Lead Temperature (Soldering, 5 sec)	260	°C
$\theta_{JC}$	Thermal Resistance	7.7	°C/W



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### ■ Electrical Characteristics

Unless otherwise stated, these specifications apply  $T_A=25^{\circ}\text{C}$ ;  $V_{IN}=+2.5\text{V}$  and  $V_{CCA}=+3.3\text{V}$ ,  $V_{REFEN}=1.25\text{V}$ ) 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	$I_{OUT}=0\text{A}$ (Note 2)	-20	-	20	mV
$I_{OP}$	Operating Current at $V_{IN}$	No load, $C_{OUT}=200\mu\text{F}$	-	-	1	mA
$ \Delta V_{LOAD} $	Load Regulation (DDR I/II)	$I_L: 0\text{A}\sim 3\text{A}$	-	0.8/1.2	2/3	%
		$I_L: 0\text{A}\sim 3\text{A}$	-	0.8/1.2	2/3	
$I_{CCQ}$	Quiescent Current at $V_{CCA}$	At room temp.	-	190	230	$\mu\text{A}$
$I_{SHDN}$	Current in Shutdown Mode	$V_{REFEN} < 0.2\text{V}$ , $R_L=10\Omega$	-	90	110	$\mu\text{A}$
$V_{IN}$	Input Voltage Range (Note 3)	No load	1.35/1	2.5/1.8	6	V
$V_{CCA}$	Input Voltage Range (Note 3)	$R_L=10\Omega$	3.75	-	6	V
<b>Short Circuit Protection</b>						
$I_{LIMIT}$	Current Limit		-	5	-	A
$I_{SC\_VIN}$	Short Current	Sinking	2	-	-	A
$I_{SC\_GND}$	Short Current	Sourcing	3	-	-	A
<b>Over Thermal Protection</b>						
THSD	Thermal Shutdown Temperature	$3.75\text{V} \leq V_{CCA} \leq 6\text{V}$	125	150	-	$^{\circ}\text{C}$
	Thermal Shutdown Hysteresis		25	30	35	$^{\circ}\text{C}$
<b>REFEN Function</b>						
	REFEN Threshold	$V_{REFEN} < V_{IN}$ $V_{REFEN} < V_{CCA}-2.5\text{V}$	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  $V_{CCA} \geq V_{IN}$  and  $V_{CCA} \geq V_{REFEN} + 2.5\text{V}$  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.

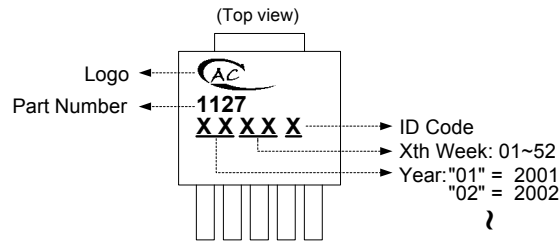
#### Other Supply Voltages

$V_{CCA}$  provide the voltage supply to the logic section and internal error amplifiers of AP1127.

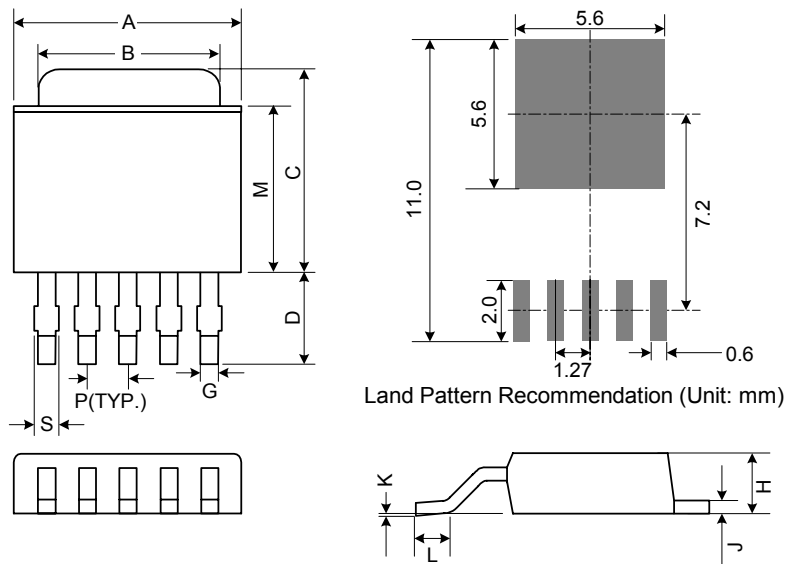
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### ■ Marking Information

TO252-5L



### ■ Package Information



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