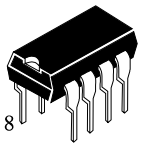
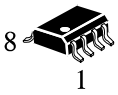
FTSM101A VOLTAGE AND CURRENT CONTROLLER

- 1.24V SERIES VOLTAGE RERFERENCE WITH 10mA OUTPUT CURRENT AND 1% PRECISION
- TWO OPERATIONAL AMPLIFIERS WITH ORED OUTPUT AND 1MHZ GAIN BANDWIDTH PRODUCT
- BUILT-IN CURRENT GENERATOR WITH ENABLE/DISABLE FUNCTION
- 4.5 TO 32V SUPPLY VOLTAGE RANGE
- SO8 AND DIP8 PACKAGES



N
DIP8
Plastic Package



D
SO-8
Plastic Micropackage

ORDERING NUMBER:

FTSM101AN	Plastic Package
FTSM101AD	Plastic Micropackage

DESCRIPTION

The FTSM101A integrated circuit incorporates a high stability series band gap voltage reference, two ORed operational amplifiers and a current source.
This IC compares the DC voltage and the current level a the output of a switching power supply to an internal reference. It provides a feedback through an optocoupler to the PWM controller IC in the primary side.
The controlled current generator can be used to modify the level of current limitation by offsetting the information coming from the current sensing resistor.

APPLICATIONS

This circuit is designed to be used in battery chargers with a constant voltage and a limited output current.
It can be used in every types of application requiring a precision voltage regulation and current limitation.

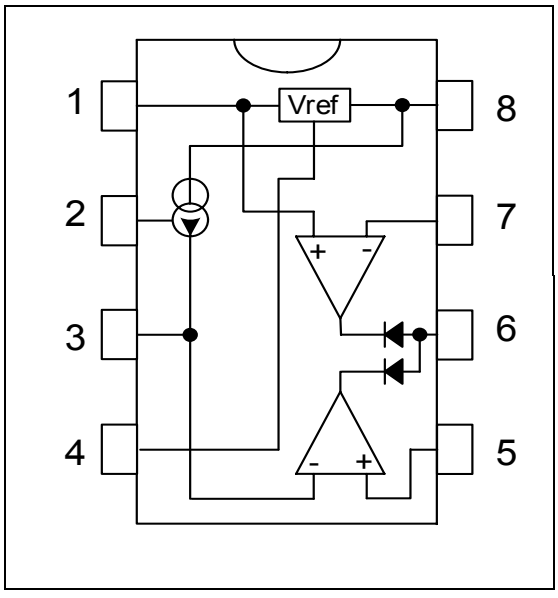
Other applications include voltage supervisors, over voltage protection

ORDER CODE

Part Number	Temperature Range	Package N	Package D
KGM101AI	-40ºC, +105ºC	•	•

N = Dual in Line Package (DIP)
D = Small Outline Package (SO) – also available in Tape & Reel (DT)

PIN CONNECTIONS (top view)



Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
Vcc	DC Supply Voltage [1]	36	V
I_{out}	Output Current [2]	20	mA
P_d	Power Dissipation	200	mW
V_{in}	Input Voltage [3]	-0.3, Vcc – 1.5	V
I_{out}	Input Current	±1	mA
T_{stg}	Storage Temperature	-40 to +125	ºC
Tj	Maximum Junction Temperature	150	ºC

1. All voltages values, except differential voltage are with respect to network ground terminal.
2. The voltage reference is not protected against permanent short circuit
3. The magnitude of input voltages must never exceed -0.3V or Vcc – 1.5V.

Operating Conditions

Symbol	Parameter	Value	Unit
Vcc	Supply Voltage	4.5 to 32	V
T_{oper}	Operating Free Air Temperature Range	T_{max} to T_{min}	

Electrical Characteristics

T_{amb} = 25ºC, Vcc = 15V (unless otherwise specified)

Operational Amplifier

Symbol	Parameter	Min	Typ	Max	Unit
I_{cc}	Total Supply Current V_{cc} = 1.5V			 2	mA
V_i	Input Voltage Range	0		Vcc-1.5V	V
V_{io}	Input Offset Voltage 25ºC $T_{min} \le T_{amb} \le T_{max}$	 -5 -7	 1	 5 7	mV
I_{ib}	Input Bias Current @ V_{in} = 1.2V on pin and V_{in} = 0V on pin 5 25ºC $T_{min} \le T_{amb} \le T_{max}$	 -700 -1000	 -300	 0 0	nA
I_{sink}	Output Sink Current, Vol = 2.5V 25ºC $T_{min} \le T_{amb} \le T_{max}$	 8	 15		mA
A_{vo}	Large Signal Voltage Gain R_L = 2kΩ $T_{min} \le T_{amb} \le T_{max}$	 15			V/m V
SVR	Supply Voltage Rejection Ratio $T_{min} \le T_{amb} \le T_{max}$	 65	 90		dB
CMR	Common Mode Rejection Ratio $T_{min} \le T_{amb} \le T_{max}$		 80		dB
GBP	Gain Bandwith Product V_{cc} = 15V, F = 100kHz V_{in} = 10mV, R_L = 2kΩ, C_L =100pF		 1		MHz
I_o	Output Leakage Current 25ºC $T_{min} \le T_{amb} \le T_{max}$			 2 7	µA

Electrical Characteristics

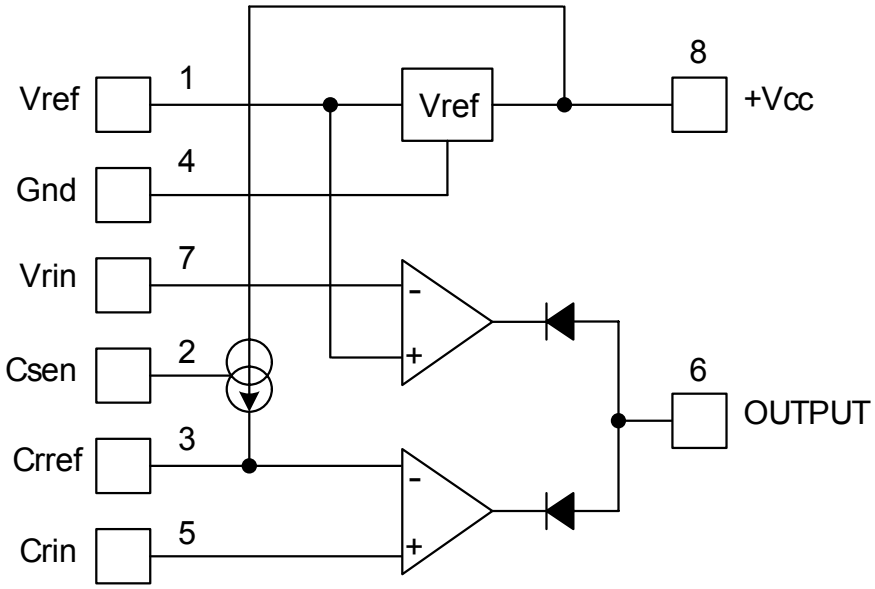
T_{amb} = 25 ºC, V_{cc} = 15V (unless otherwise specified)

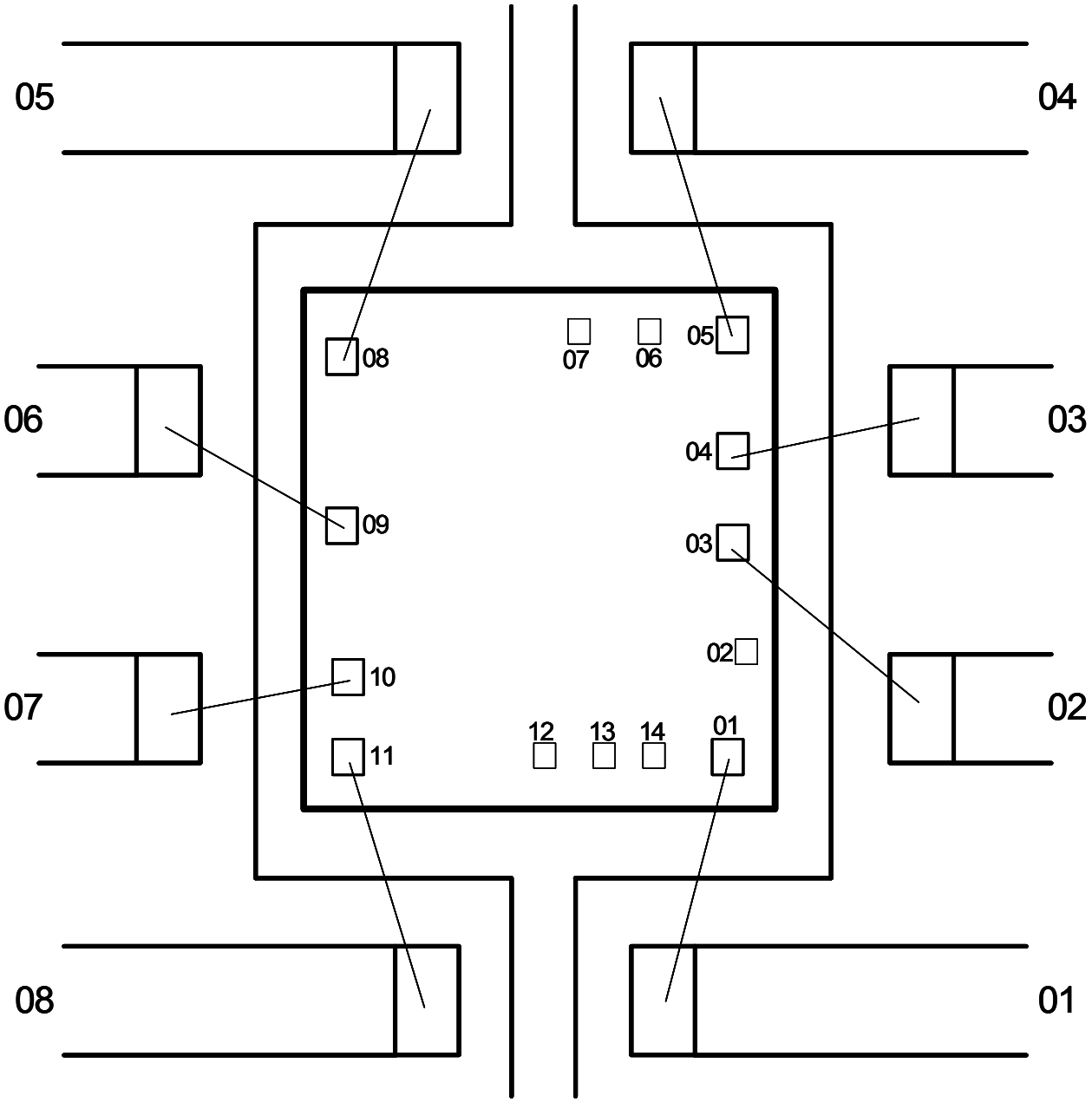
Voltage Reference KGM101A

Symbol	Parameter	KGM101AC			KGM101AI			Unit
		Min	Typ	Max	Min	Typ	Max	
V_{ref}	Reference Voltage I_{out} = 1mA, T_{amb} =25ºC	1.227	1.24	1.252	1.227	1.24	1.252	V
Kvt	Temperature Stability $T_{min} \le T_{amb} \le T_{max}$		30	100		35	120	ppm/ºC
R_{eglo}	Load Regulation $1 < I_{out} < 10mA$		5	15		5	15	mV
R_{egli}	Line Regulation $5 < V_{in} < 32V$		3.5	10		3.5	10	mV

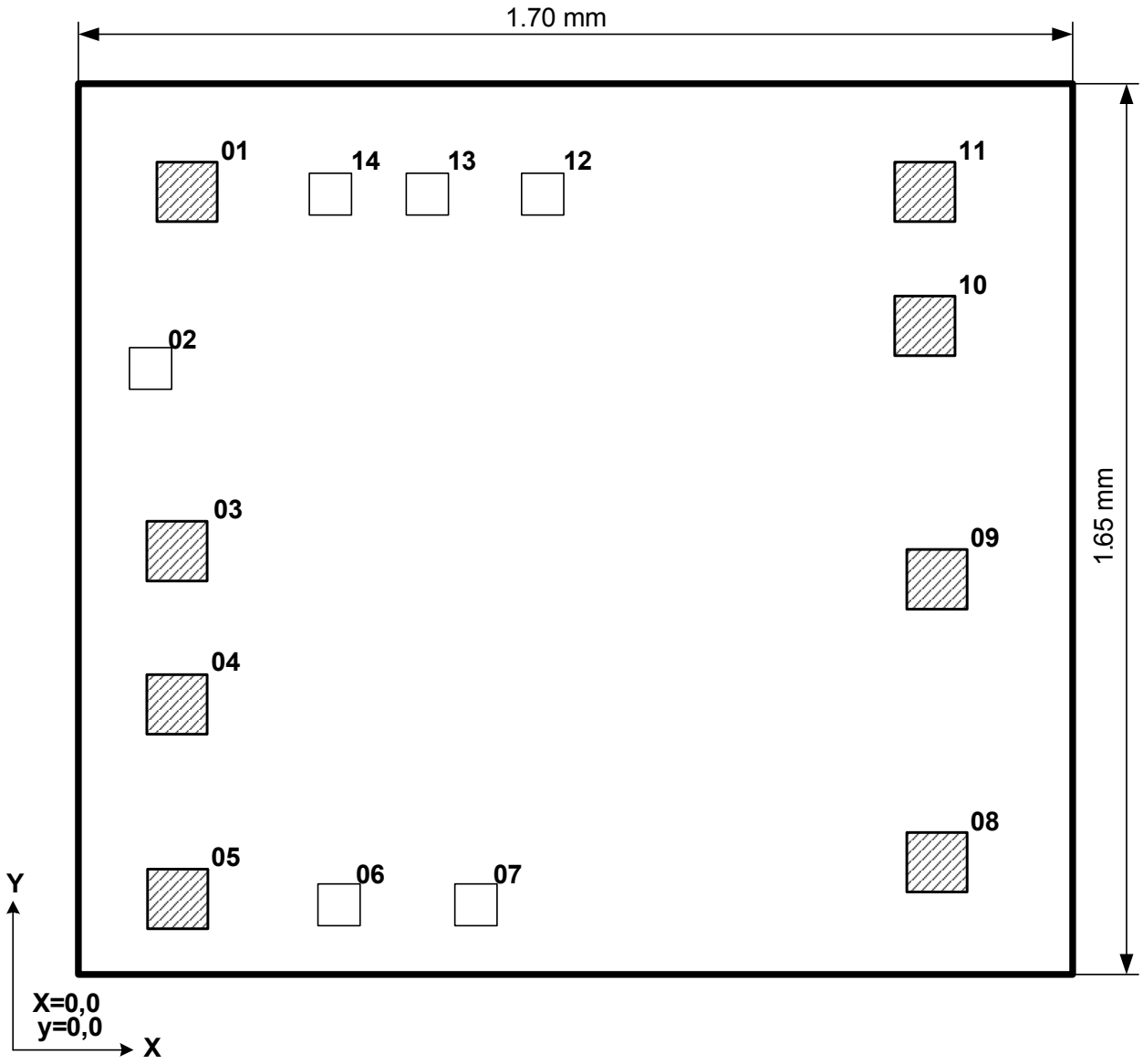
Current Generator KGM101A

Symbol	Parameter	KGM101C/AC			KGM101I/AI			Unit
		Min	Typ	Max	Min	Typ	Max	
I_o	Current Source		1.4			1.4		mA
K_{cgt}	Temperature Stability $T_{min} \le T_{amb} \le T_{max}$		500			600		ppm/ºC
C_{glir}	Line Regulation $4.5 < V_{cc} < 32V$		0.003	0.03		0.003	0.03	mA
V_{csen}	Voltage at the enable pin to have I_o = 1.4mA $T_{min} \le T_{amb} \le T_{max}$			0.6			0.6	V
V_{csdis}	Voltage at the enable pin to have I_o = 0mA $T_{min} \le T_{amb} \le T_{max}$	2			2			V
I_{csen}	Input Current on the C_{sen} pin $T_{min} \le T_{amb} \le T_{max}$			30			30	µA
I_{csleak}	Leakage Current V_{cs} = 2V $T_{min} \le T_{amb} \le T_{max}$		0.5	2		0.5	2	µA


Vref
1
Gnd
4
Vrin
7
Csen
2
Crref
3
Crin
5
Vref
8
+Vcc
6
OUTPUT
-
+
-
+



Bonding diagram of FTSTM101A



Pad size 01, 03 – 05, 08 -11 for bonding
Pad size 02, 06, 07, 12 - 14 not for bonding

Pads location of FTSM101A

Die size Xr=1.70 mm, Yr= 1.65 mm
Coordinates of pads

No of pad	Coordinates left bottom, mkm		pad size, mkm
	X	Y	
01	136	1417	100x100
02	132	1003	70x70
03	136	744	100x100
04	136	481	100x100
05	136	117	100x100
06	302	144	70x70
07	564	144	70x70
08	1487	171	100x100
09	1467	826	100x100
10	1467	1222	100x100
11	1467	1398	100x100
12	633	1441	70x70
13	478	1441	70x70
14	326	1441	70x70

Description

Name	No of pad	Pin	Type	Function
V_{ref}	01	01	Output	Voltage Reference Output 1.24V, 10mA max. Do not short circuit
V_{rin}	10	07	Input	Voltage Regulation Loop input
C_{rin}	08	05	Input	Current Limitation Loop Input, connected to the sense resistor
C_{rref}	04	03	Input	Current Limitation Reference Input
C_{sen}	03	02	Input	Current source enable input. This current source can be used to offset the Voltage measurement on the sense resistor and therefore to modify the charge current. The current source enabled when the input voltage on pin 2 is lower than 0.8V
OUTPUT	09	06	Output	Output pin common to the voltage regulation and current limitation loops. This output can drive the primary side (LED) of an optocoupler
V_{cc}	11	08	Input	Power Supply Input (4.5 to 32V DC)
GND	05	04	Input	Ground