ACE7228RT

2A, 28V, 500KHz, ECOT PSM Sync Step-Down Regulator

Description

The ACE7228RT is a high frequency, synchronous, rectified, step-down, switch-mode converter with internal power MOSFETs. It offers a very compact solution to provide a 2A continuous output current over a wide input supply range, with excellent load and line regulation. ECOT PSM control operation provides very fast transient response and easy loop design as well as very tight output regulation. The ACE7228RT requires a minimal number of readily available, external components and is available in a space saving SOT-23-6 package.

Features

- 2A Continuous Output Current
- Wide 4.5V to 28V Operating Input Range
- 500KHz Switching Frequency
- Output Adjustable
- -40°C to 85°C Temperature Range
- ECOT PSM Mode Control with Fast Transient Response
- 100mΩ/50mΩ Low RDS(ON) Internal Power MOSFETs
- Internal Soft-Start
- Built-in Over Current Limit
- Built-in Over Voltage Protection
- Thermal Shutdown
- PFM Mode for High Efficiency in Light Load
- No Schottky Diode Required
- Integrated internal compensation
- Short Protection with Hiccup-Mode

Application

- Network Terminal Equipment
- Distributed Power Systems
- Security Monitoring Camera
- Automotive Systems
- Industrial Power Systems

Absolute Maximum Ratings Note(1)(2)

Item	Min	Max	Unit
V_{IN} Voltage	-0.3	30	V
EN Voltage	-0.3	30	V
SW Voltage	-0.3	V_{IN}+1V	V
SW Voltage (10ns transient)	-5	V_{IN}+2V	V
BS voltage (to SW)	-0.3	6	V
FB Voltage	-0.3	6	V
Power Dissipation Note(3)	Internally Limited		
Operating Junction Temperature, T_J	-40	150	°C
Storage Temperature, T_{stg}	-55	150	°C
Lead Temperature (Soldering, 10sec.)		260	°C

Note:

(1). Exceeding these ratings may damage the device.

(2). The device is not guaranteed to function outside of its operating conditions.

(3). The maximum allowable power dissipation is a function of the maximum junction temperature, $T_{J(MAX)}$, the junction-to-ambient thermal resistance, $R_{\theta JA}$, and the ambient temperature, T_A. The maximum allowable power dissipation at any ambient temperature is calculated using: $P_{D(MAX)} = (T_{J(MAX)}-T_A) / R_{\theta JA}$. Exceeding the maximum allowable power dissipation causes excessive die temperature, and the regulator goes into thermal shutdown. Internal thermal shutdown circuitry protects the device from permanent damage. Thermal shutdown engages at T_J=160°C (typical) and disengages at T_J=130°C (typical).

Recommended Operating

Item	Min	Max	Unit
Operating Junction Temperature Note(1)	-40	125	°C
Operating Temperature Range	-40	85	°C
Input Voltage V_{IN}	4.5	28	V
Output Current	0	2	A

Note:

(1). All limits specified at room temperature (T_A=25°C) unless otherwise specified. All room temperature limits are 100% production tested. All limits at temperature extremes are ensured through correlation using standard Statistical Quality Control (SQC) methods. All limits are used to calculate Average Outgoing Quality Level (AOQL).

ESD Ratings

Item	Description	Value	Unit
$V_{(ESD-HBM)}$	Human Body Model (HBM) ANSI/ ESDA/JEDEC JS-001-2014 Classification, Class: 2	±2000	V
$V_{(ESD-CDM)}$	Charged Device Mode (CDM) ANSI/ESDA/JEDEC JS-002-2014 Classification, Class: C0b	±200	V
$I_{LATCH-UP}$	JEDEC STANDARD NO.78E APRIL 2016 Temperature Classification, Class: I	±150	mA

Thermal Information

Item	Description	Value	Unit
$R_{\theta JA}$	Junction-to-Ambient Thermal Resistance Note(1)(2)	105	°C/W
$R_{\theta JC(TOP)}$	Junction-to-Case (TOP) Thermal Resistance	55	°C/W
$R_{\theta JB}$	Junction-to-Board Thermal Resistance	17.5	°C/W
ψ_{JT}	Junction-to-Top Characterization Parameter	3.5	°C/W
ψ_{JB}	Junction-to-Board Characterization Parameter	17.5	°C/W

Note:

(1). The package thermal impedance is calculated in accordance to JESD 51-7.

(2). Thermal Resistances were simulated on a 4-layer, JEDEC board.

Ordering Information

ACE7228RT X XX + H

- Halogen - free
- Pb - free
- GM : SOT-23-6
- VFB: A: 0.6V
  B: 0.8V
  C: 0.765V

Notes

ACE does not assume any responsibility for use as critical components in life support devices or systems without the express written approval of the president and general counsel of ACE Technology Co., LTD. As sued herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and shoes failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.