# Over-Voltage Protection Load Switch

## DESCRIPTION

ETA6121 is an Over-Voltage-Protection (OVP) IC with an ultra-low 30 mΩ RDSON high current high voltage MOSEFT. It can sustain voltage as high as 32V DC, protecting downstream devices from high voltage surges.

When input voltage of ETA6121 exceed the OVP threshold, it responses quickly and shuts off the MOSFET. The OVP threshold is externally adjustable with resistors. There is also an internally set current limit up to 5.5A for the switch. When overload condition occurs, it goes into a hiccup mode to protect the IC from over-heating. It also has an over-temperature protection feature that turns off the MOSFET.

ETA6121 is available in CSP3X4 package.

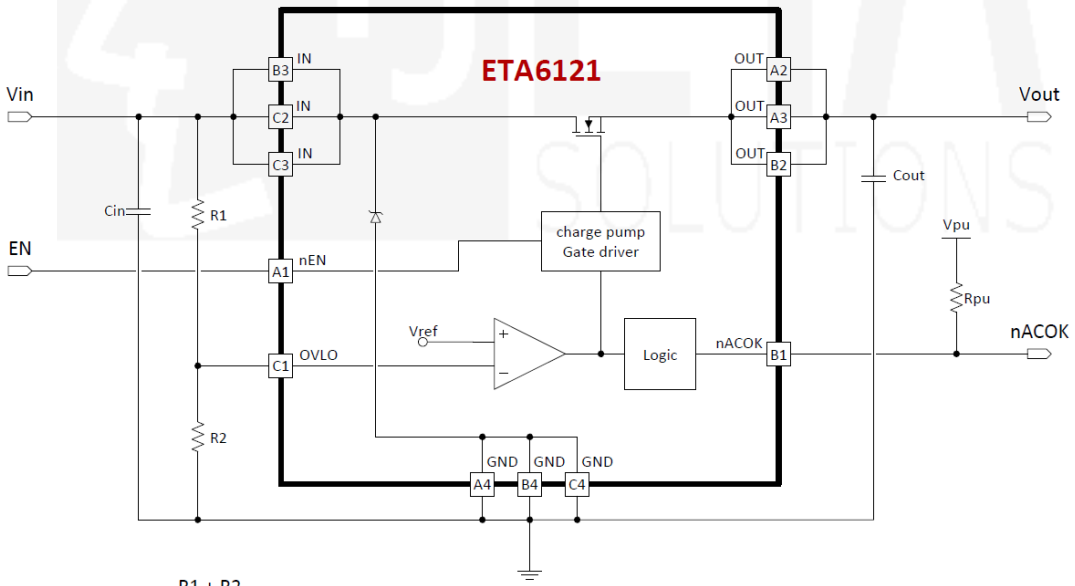
## FEATURES

- Over voltage protection up to 32V
- 30mohm switch resistance
- Externally adjustable OVP voltage
- Fast Transient response
- Internally set current limit

## APPLICATIONS

- Tablet, MID
- Smart Phone
- Car camera
- Power bank

## TYPICAL APPLICATION

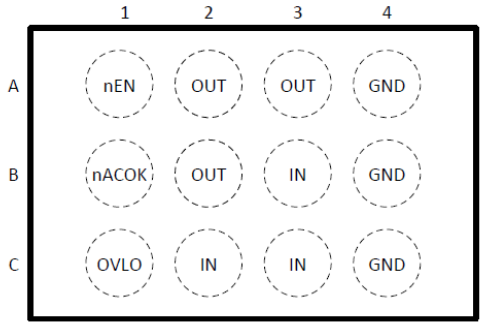



$$Vovp\ (V) = 1.2 \times \frac{R1 + R2}{R2}$$

## ORDERING INFORMATION

| PART No. | PACKAGE | TOP MARK | | Pcs/Reel |
|---|---|---|---|---|
| ETA6121CSM | CSP3x4 | 6121<br>YWWL | YWW: data code<br>L: lot no | 3000 |

## PIN CONFIGURATION




Top View

## ABSOLUTE MAXIMUM RATINGS

(Note: Exceeding these limits may damage the device. Exposure to absolute maximum rating conditions for long periods may affect device reliability.)

IN Pin .....–0.3V to 30V
OUT Pin .....-0.3V to IN+0.3V
Other Pins .....6V
IN Current(Continuous) ..... 5.5A
Operating Temperature Range .....–40°C to 85°C
Storage Temperature Range .....–55°C to 150°C
Thermal Resistance $\Theta_{JA}$
CSP3x4.....70.....°C /W
Lead Temperature (Soldering, 10ssec) .....260°C
ESD HBM (Human Body Mode) .....4KV
ESD MM (Machine Mode) .....200V
IEC 61000-4-2 System ESD
Air Gap.....15KV
Contact.....8KV

## PIN DESCRIPTION

| PIN # | NAME | DESCRIPTION |
|---|---|---|
| A1 | nEN | Enable pin. Active Low |
| A2,A3,B2 | OUT | Output power pin |
| B3,C2,C3 | IN | Input power pin |
| A4,B4,C4 | GND | Ground pin |
| B1 | nACOK | Power good pin. Open drain. It is high when input voltage is out of range, low when input voltage is within range |
| C1 | OVLO | Over-voltage level adjustment pin |

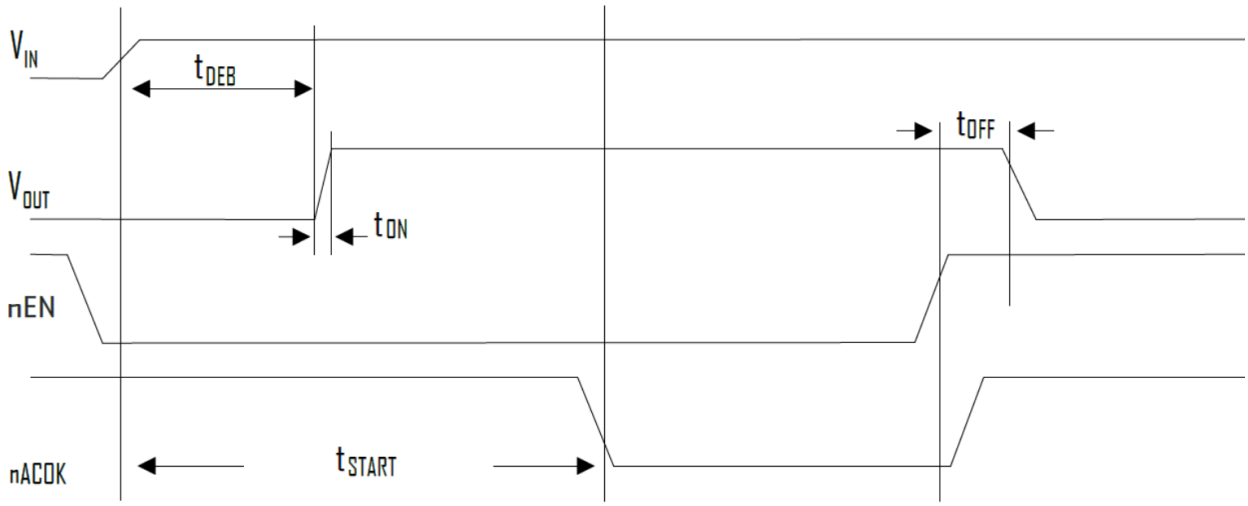
## DC ELECTRICAL CHACRACTERISTICS

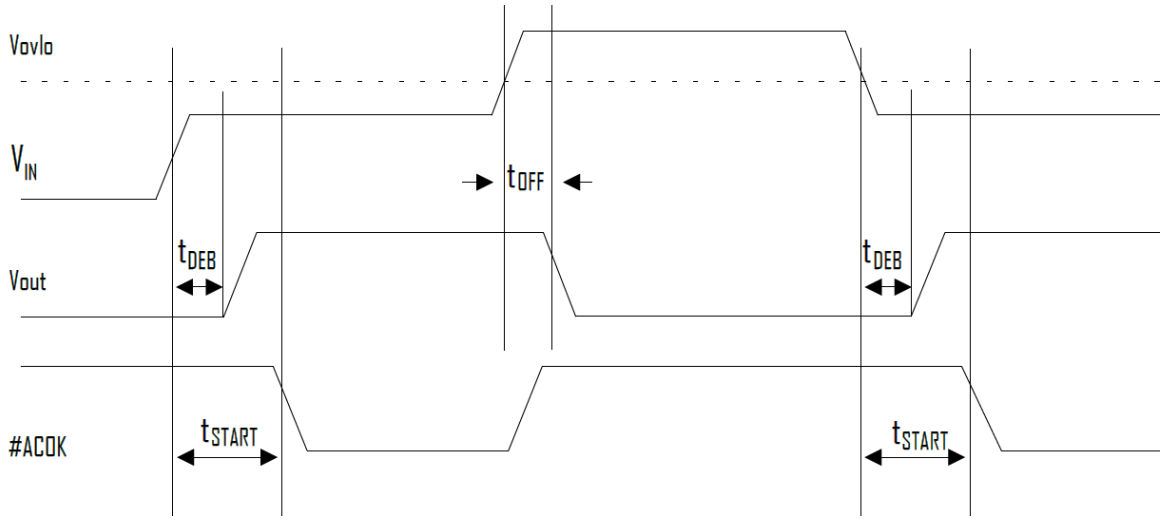
($V_{IN}$ = 5V, unless otherwise specified. Typical values are at TA = 25°C.)

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|
| Input Clamp Voltage | $I_{IN}$=10mA | | 33 | | V |
| Recommended Operation Range | Recommend Input Voltage | 3.5 | | 20 | V |
| Internal Over-Voltage Trip level | Vin Rising, OVLO=0V, Hys=400mV | 6.45 | 6.9 | 7.35 | V |
| OVLO Set Threshold | | 1.13 | 1.21 | 1.29 | V |
| OVLO Voltage Range | | 4 | | 20 | V |
| External OVLO Select Threshold | | | 0.30 | 0.25 | V |

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|
| Resistance from $V_{IN}$ to $V_{OUT}$ | Vin=5V, Iout=1A. | | 30 | 50 | mΩ |
| Input Quiescent Current | Vin=5V, nEN=0V, No load | | 250 | 350 | uA |
| OVLO Supply Current | $V_{OLVO}$=3V, $V_{IN}$=5,$V_{OUT}$=0V | | 100 | 150 | uA |
| OVLO input Leakage Current | Vovlo=1.2V | -500 | | 500 | nA |
| ILIM | Max Current limit | | 5.5 | | A |
| Thermal Shutdown | Rising, Hys=20°C | | 130 | | °C |
| **Logic Signals** | | | | | |
| nACOK Output Low Voltage | $I_{SINK}$=1mA | | | 0.4 | V |
| EN High Voltage | | 1.2 | | | V |
| EN Low Voltage | | | | 0.4 | V |
| nACOK Leakage Current | | -0.5 | | 0.5 | uA |
| EN leakage Current | Vin=5.0V, Vout=Float | -1.0 | | 1.0 | uA |
| **Timing Characteristics** | | | | | |
| Denounce Time | Time from 2..5V < VIN < VIN_OVLO to VOUT = 10% of VIN | | 20 | | ms |
| Soft-Start Time | Time from Vin=Vin_min to 0.2xnACOK, $V_{IO}$=1.8V with 10KΩ pull-up Resistor | | 40 | | ms |
| Switch Turn-On Time | $C_L$=100uF,$R_L$=100Ω | | 1.5 | | ms |
| Switch Turn-Off Time | $R_L$=100Ω, $C_L$=0uF, Time from $V_{IN}$>$V_{OLVO}$ to $V_{OUT}$=0.8x$V_{IN}$ | | 100 | | ns |

## TIMING DEFINITION






## EOS TEST RESULT

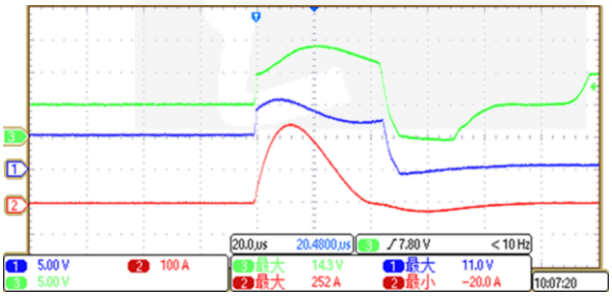
Description of oscilloscope curves:

*Channel 1, blue line: the output voltage of ETA6121*

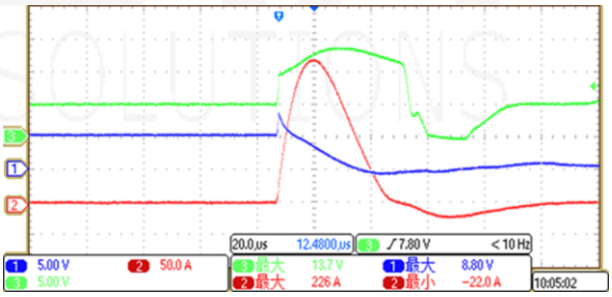
*Channel 2, red line: the EOS current*

*Channel 3, green line: the input voltage of ETA6121, clamped by TVS*

### 550V EOS with 7V TVS and ETA6121

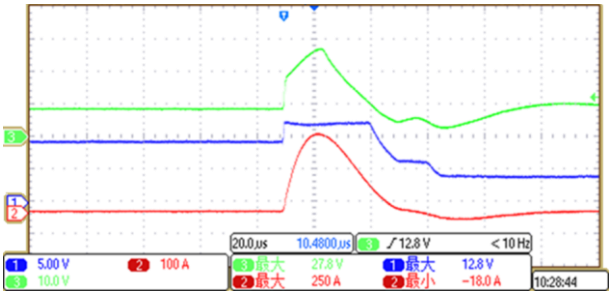


No load at ETA6121 output

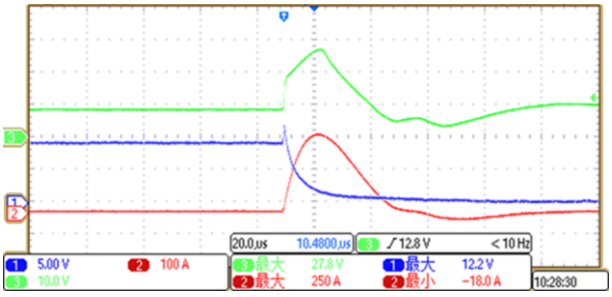


10ohm load at ETA6121 output

### 550V EOS with 12V TVS and ETA6121

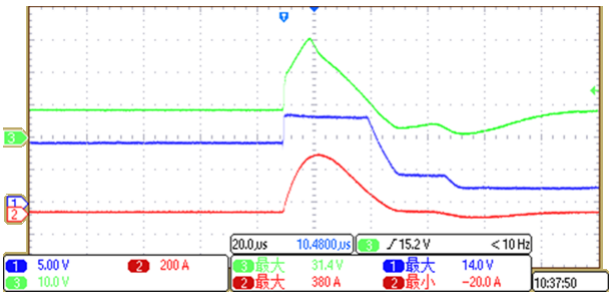


No load at ETA6121 output

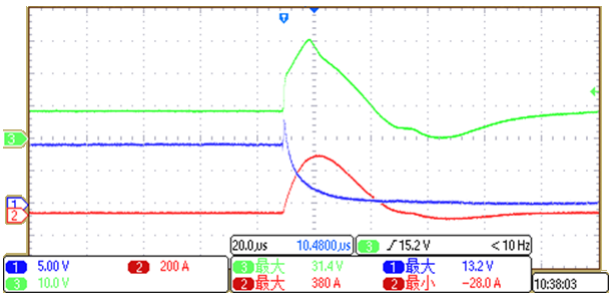


10ohm load at ETA6121 output

800V EOS with 12V TVS and ETA6121, for proving ETA6121's standing of 30V+ voltage



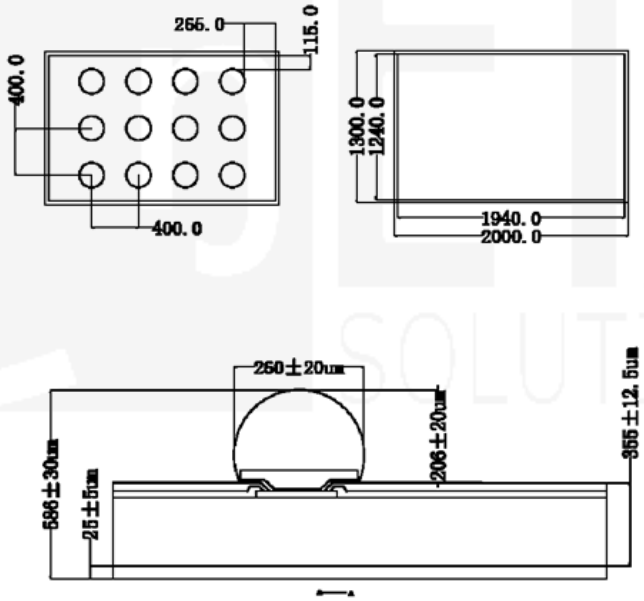

No load at ETA6121 output




10ohm load at ETA6121 output

## PACKAGE OUTLINE

Package: CSP 3x4




Unit: um