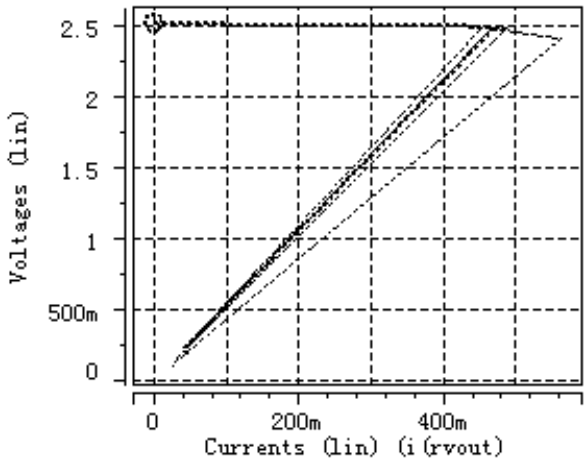
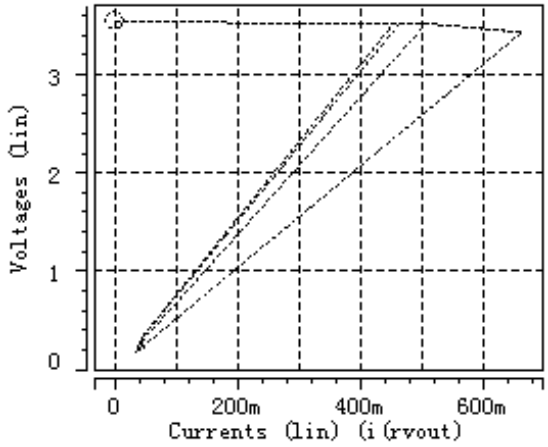
Typical Characteristics

1. Output Voltage vs. Output Current (Cin=1.0uF,Cout=1.0uF,Temp=25℃)

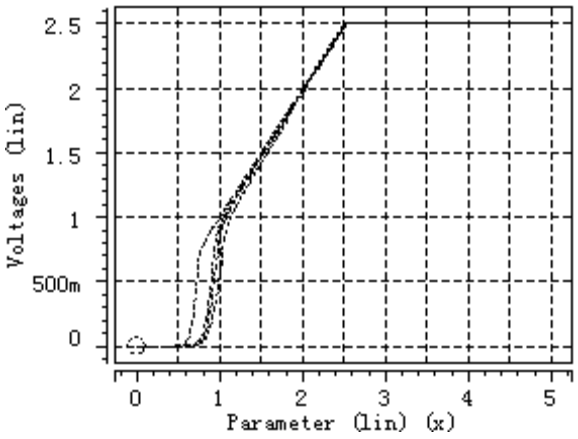


V_{OUT}=2.5V, V_{DD}=1.3V,1.5V,2.0V,3.0V,5.0V

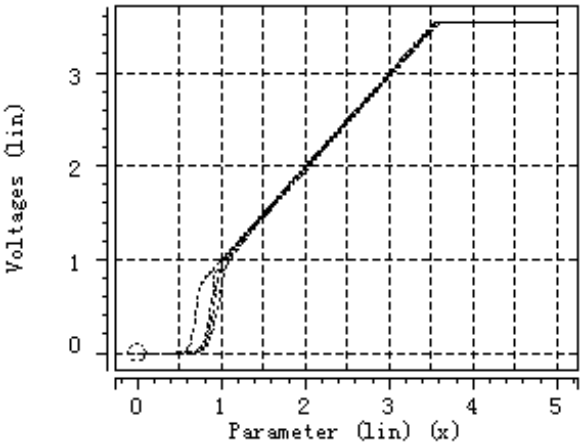


V_{OUT}=3.5V, V_{DD}=3.8V,4.0V,4.5V,5.0V

2. Output Voltage vs. Input Voltage (Cin=1.0uF,Cout=1.0uF,Temp=25℃)

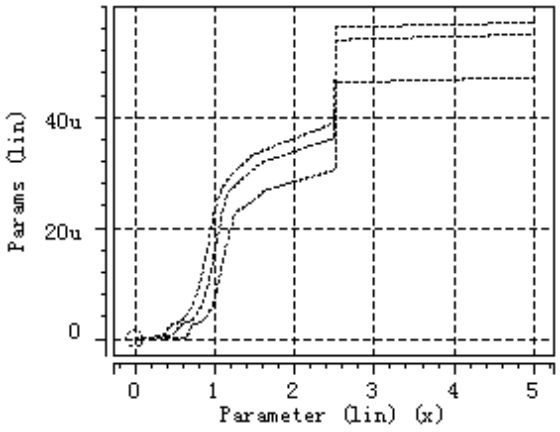


V_{OUT}=2.5V, I_{OUT}=1mA,30mA,50mA

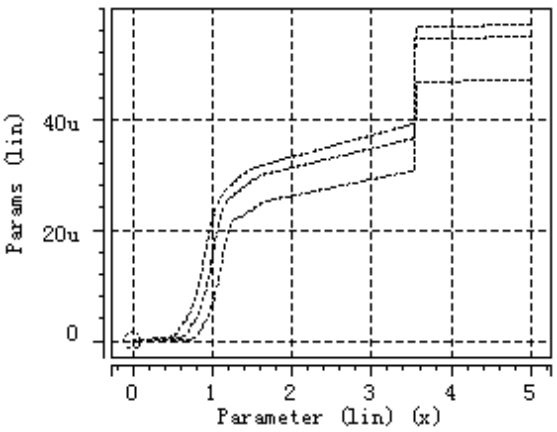


V_{OUT}=3.5V, I_{OUT}=1mA,30mA,50mA

3. Supply Current vs. Input Voltage (Cin=1.0uF,Cout=1.0uF,Temp=25℃)

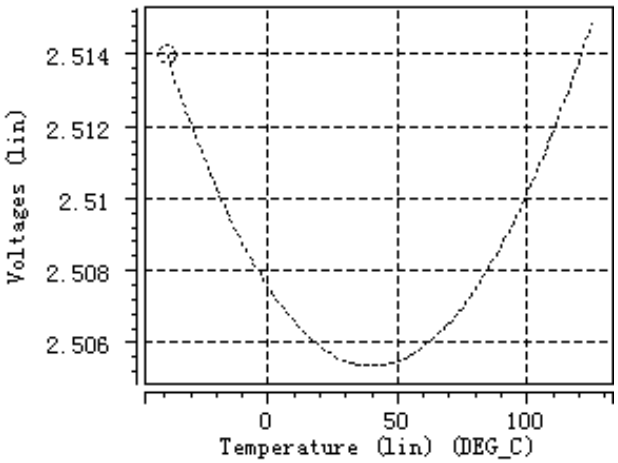


V_{OUT}=2.5V, no load

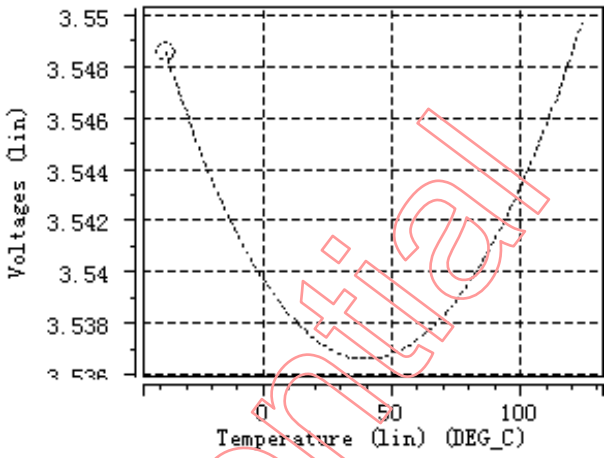


V_{OUT}=3.5V, no load

4. Output Voltage vs. Temperature (Cin=1.0uF,Cout=1.0uF,Iout=1mA)

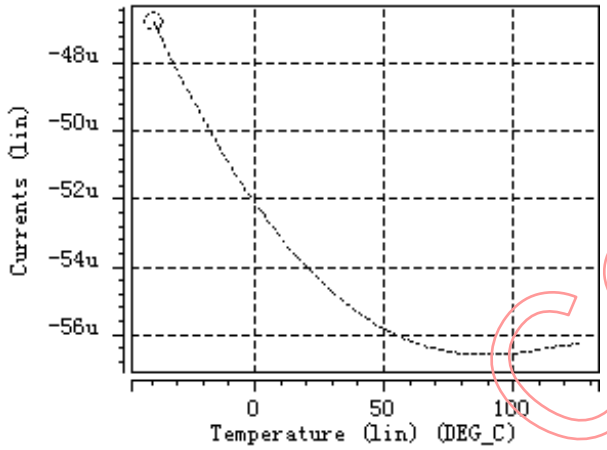


V_{OUT}=2.5V, V_{DD}=3.5V, no load

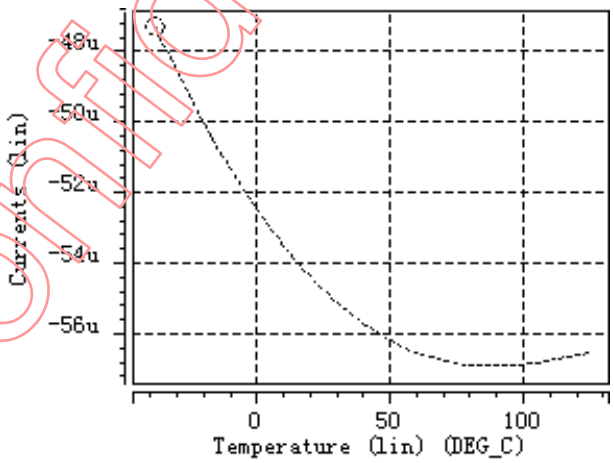


V_{OUT}=3.5V, V_{DD}=4.5V, no load

5. Supply Current vs. Temperature (Cin=1.0uF,Cout=1.0uF,Iout=0mA)

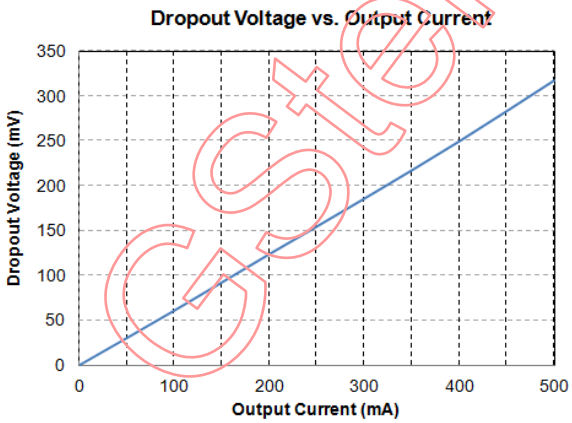


V_{OUT}=2.5V, V_{DD}=3.5V, no load



V_{OUT}=3.5V, V_{DD}=4.5V, no load

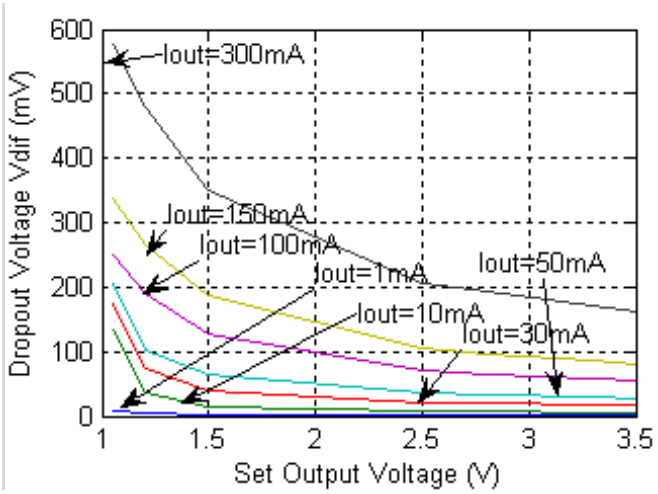
6. Dropout Voltage vs. Output Current (Cin=1.0uF,Cout=1.0uF)



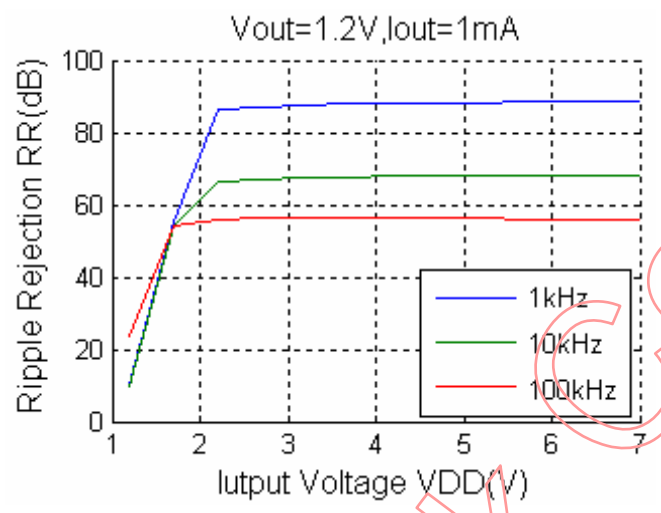
V_{OUT}=3.3V

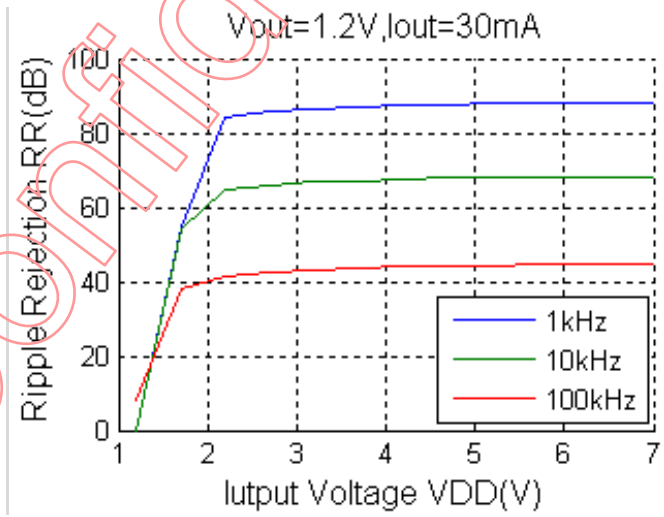
GStek Confidential

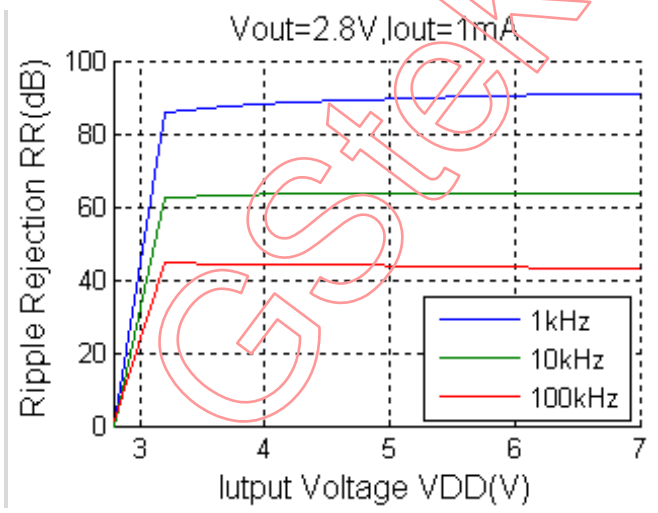
7. Dropout Voltage vs. Set Output Voltage (Cin=1.0uF,Cout=1.0uF,Temp=25℃)

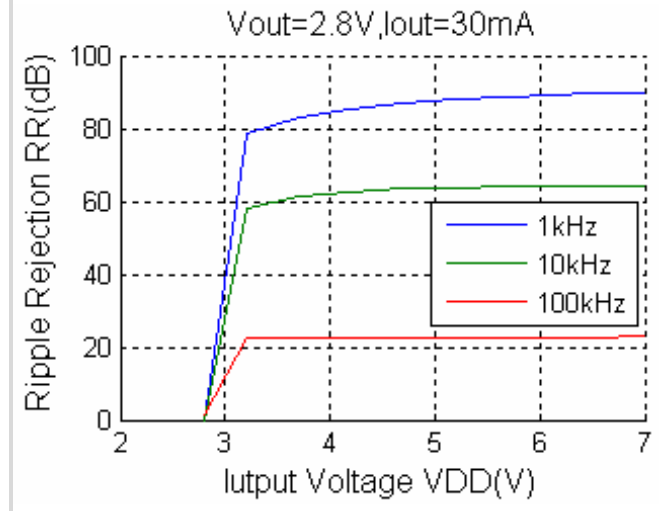


8. Ripple Rejection vs. Input Bias Voltage (Cin=none, Cout=1.0uF, Rippie=0.2Vp-p, Temp=25℃)



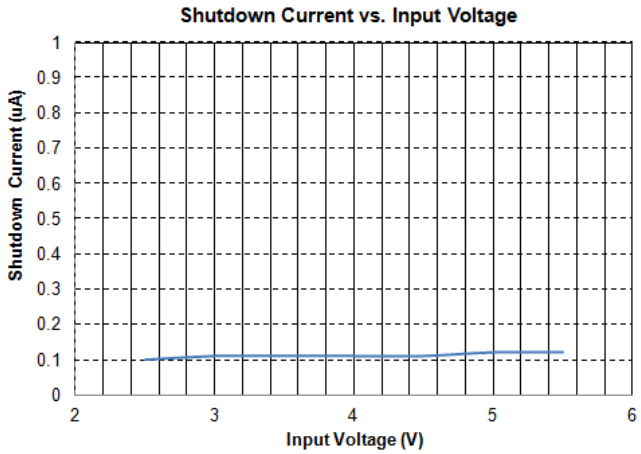




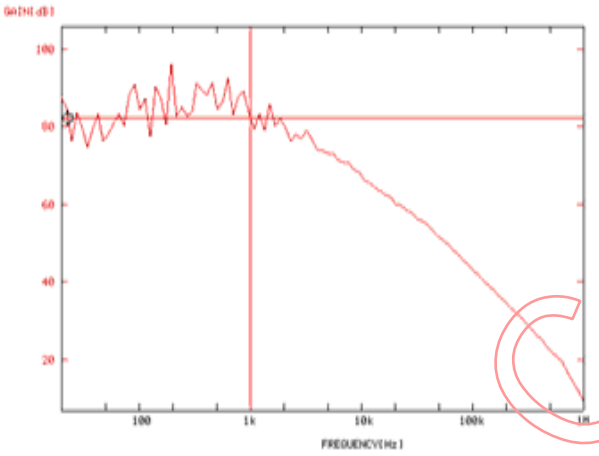


GStek Confidential

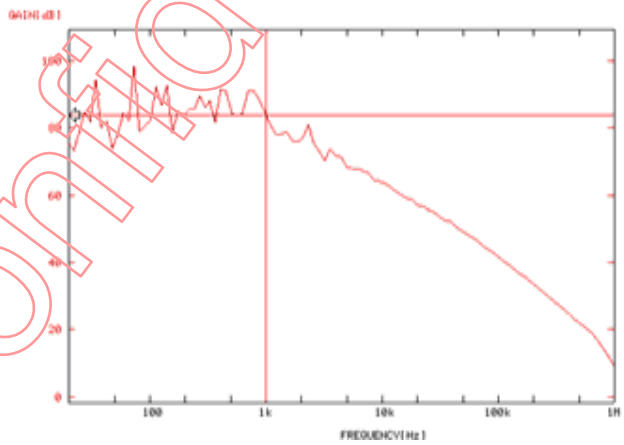
9. Shutdown Current vs. Input Voltage (Cin=1.0uF,Cout=1.0uF,Temp=25℃)



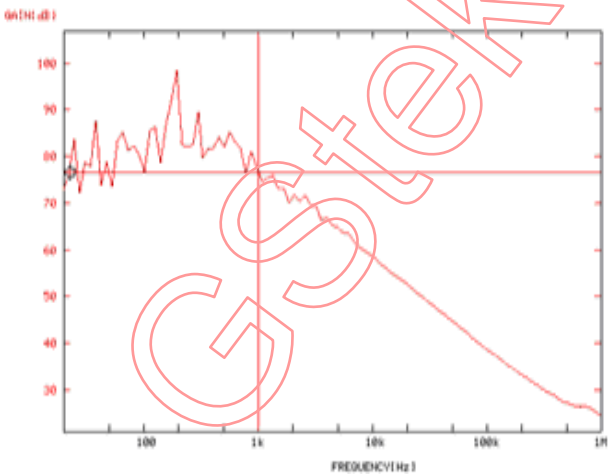
10. Ripple Rejection vs. Frequency (Cin=none, Cout=1.0uF, Ripple=0.2Vp-p)



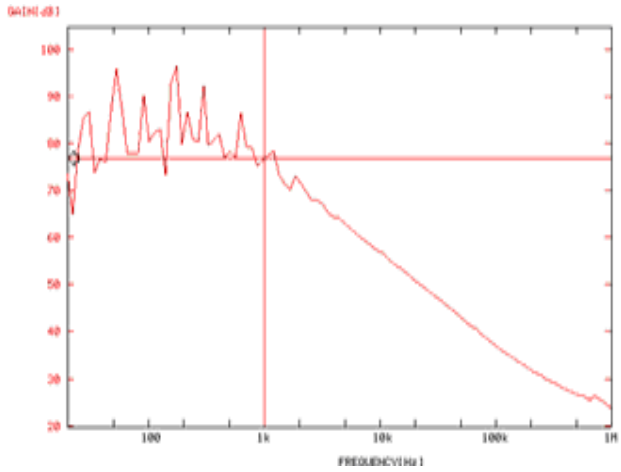
V_{OUT}=1.8V,V_{DD}=2.8V,I_{OUT}=30mA



V_{OUT}=1.8V,V_{DD}=4.8V,I_{OUT}=30mA



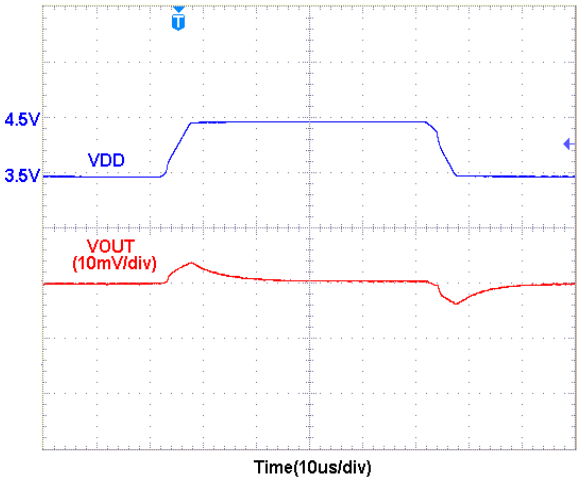
V_{OUT}=2.5V,V_{DD}=3.5V,I_{OUT}=30mA



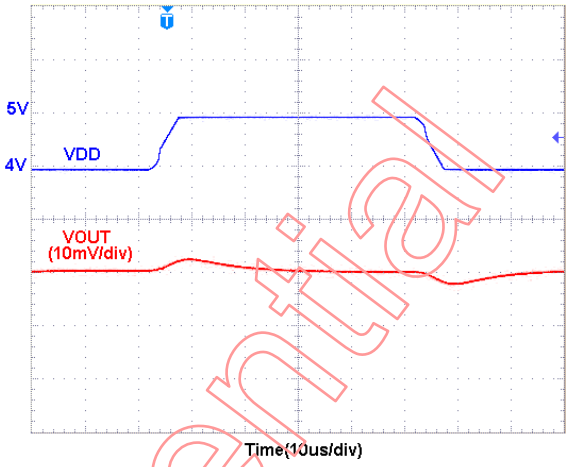
V_{OUT}=2.5V,V_{DD}=5.5V,I_{OUT}=30mA

GStek Confidential

11. Input Transient Response (Iout=30mA, tr=tf=5us, Temp=25℃)

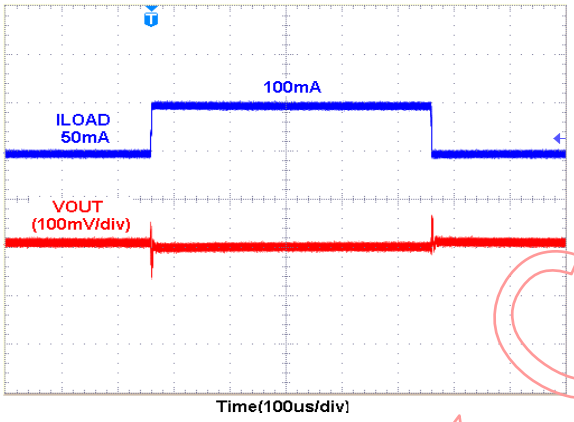


V_{OUT}=2.5V, V_{DD}=3.5V~4.5V~3.5V



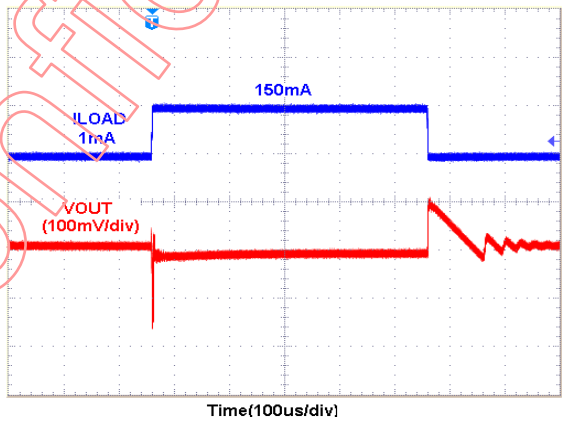
V_{OUT}=3.0V, V_{DD}=4.0V~5.0V~4.0V

12. Load Transient Response (Cout=1.0uF, Temp=25℃)



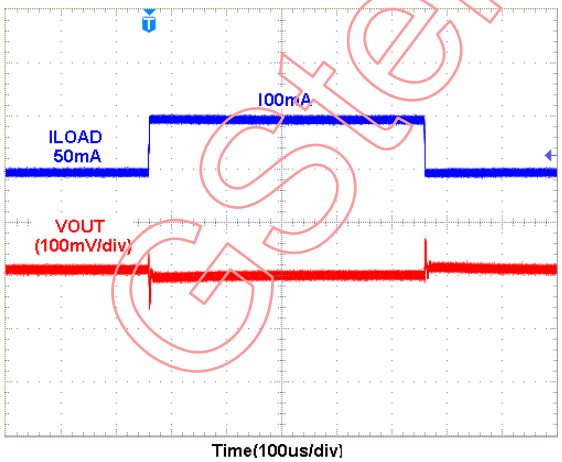
V_{OUT}=2.5V, I_{OUT}=50mA~100mA~50mA, V_{DD}=3.5V

tr=tf=0.5us



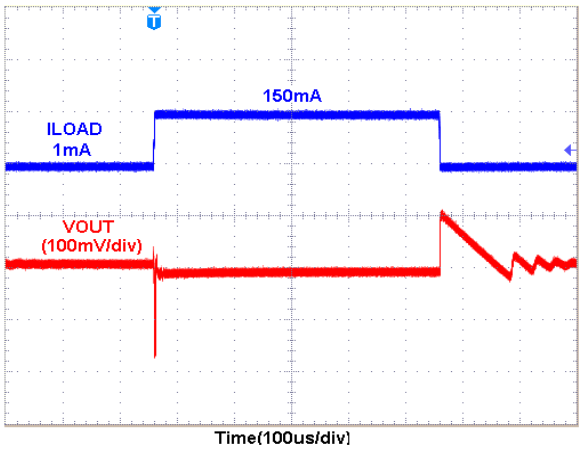
V_{OUT}=2.5V, I_{OUT}=1mA~150mA~1mA, V_{DD}=3.5V

tr=tf=0.5us



V_{OUT}=3.0V, I_{OUT}=50mA~100mA~50mA, V_{DD}=4.0V

tr=tf=0.5us

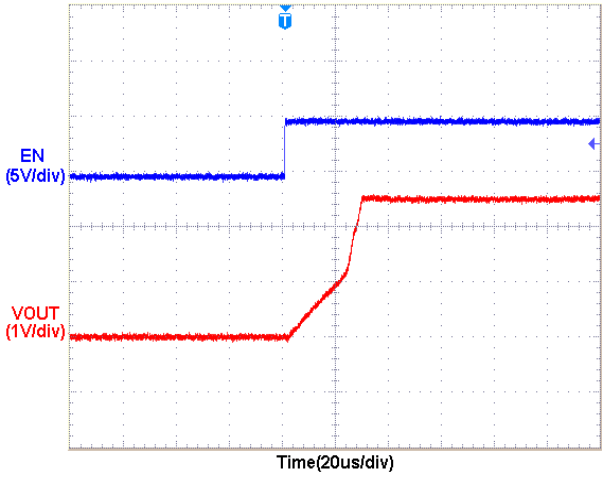


V_{OUT}=3.0V, I_{OUT}=1mA~150mA~1mA, V_{DD}=4.0V

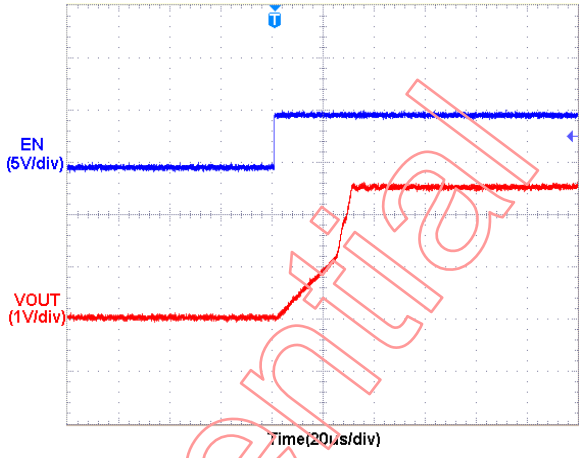
tr=tf=0.5us

GStek Confidential

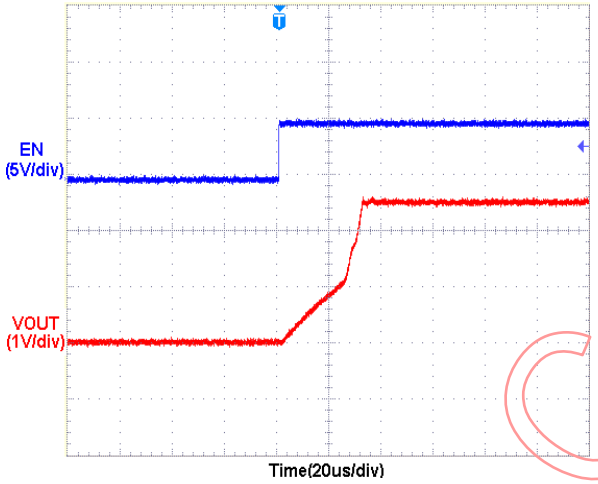
13. Turn On Speed with EN pin (Cin=1.0uF,Cout=1.0uF, Temp=25℃)



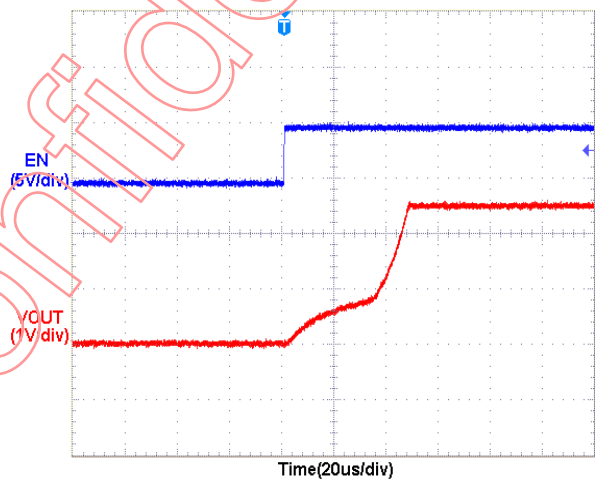
V_{OUT}=2.5V, I_{OUT}=0mA, V_{DD}=3.5V



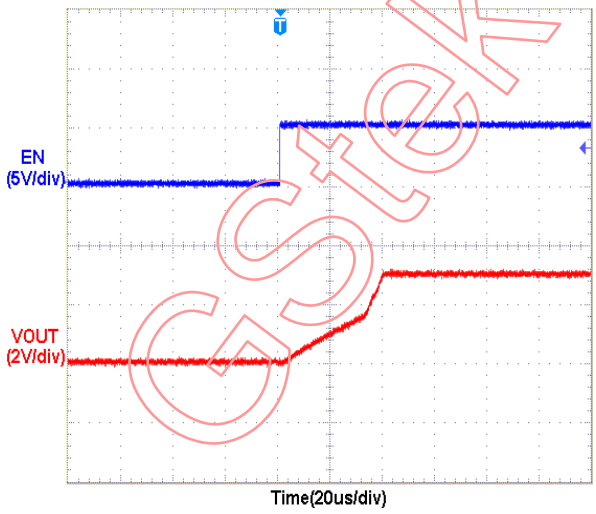
V_{OUT}=2.5V, I_{OUT}=10mA, V_{DD}=3.5V



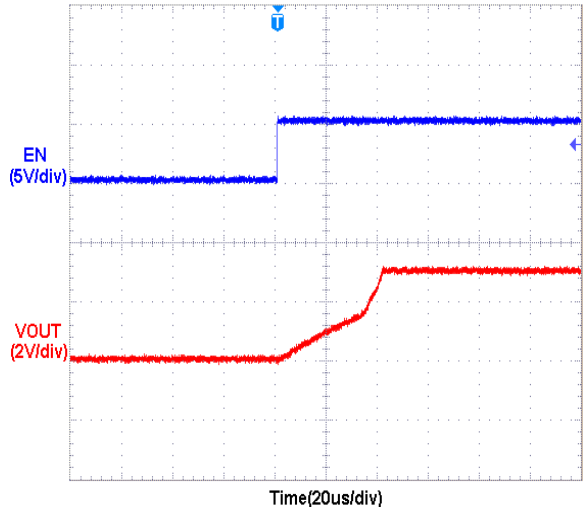
V_{OUT}=2.5V, I_{OUT}=30mA, V_{DD}=3.5V



V_{OUT}=2.5V, I_{OUT}=150mA, V_{DD}=3.5V

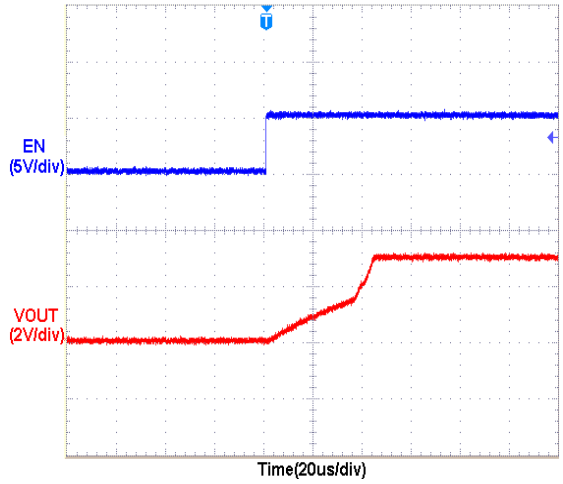


V_{OUT}=3.0V, I_{OUT}=0mA, V_{DD}=4.0V

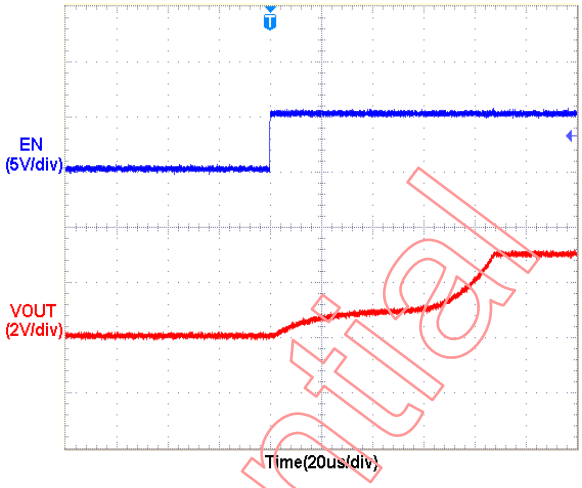


V_{OUT}=3.0V, I_{OUT}=10mA, V_{DD}=4.0V

GStek Confidential

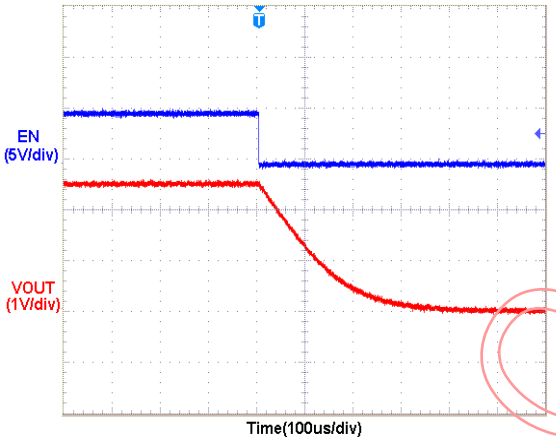


V_{OUT}=3.0V, I_{OUT}=30mA, V_{DD}=4.0V

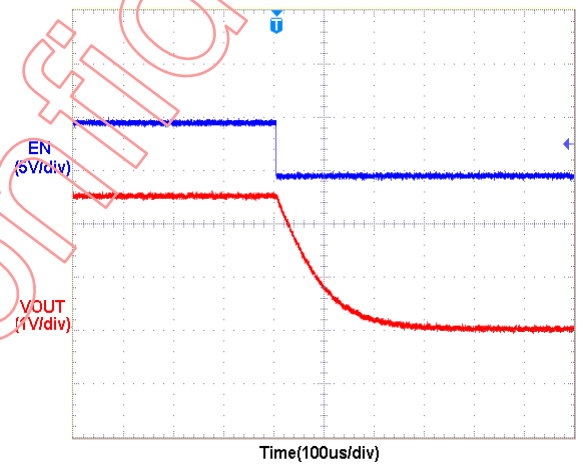


V_{OUT}=3.0V, I_{OUT}=150mA, V_{DD}=4.0V

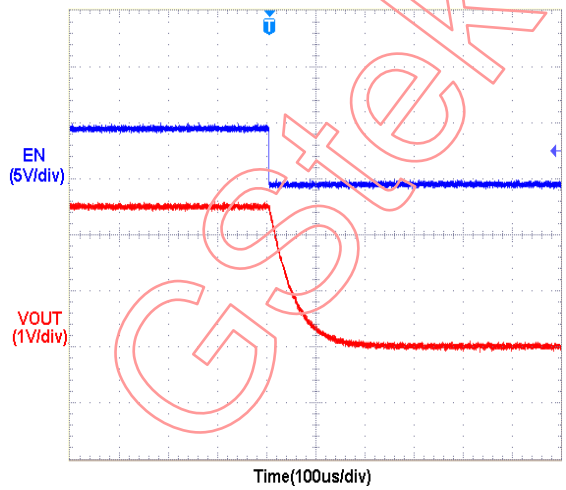
14. Turn Off Speed with EN pin (Auto Discharge) (Cin=1.0uF,Cout=1.0uF, Temp=25℃)



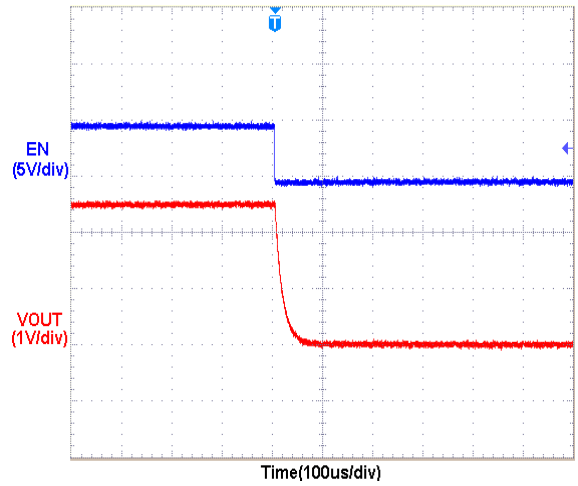
V_{OUT}=2.5V, I_{OUT}=0mA, V_{DD}=3.5V



V_{OUT}=2.5V, I_{OUT}=10mA, V_{DD}=3.5V

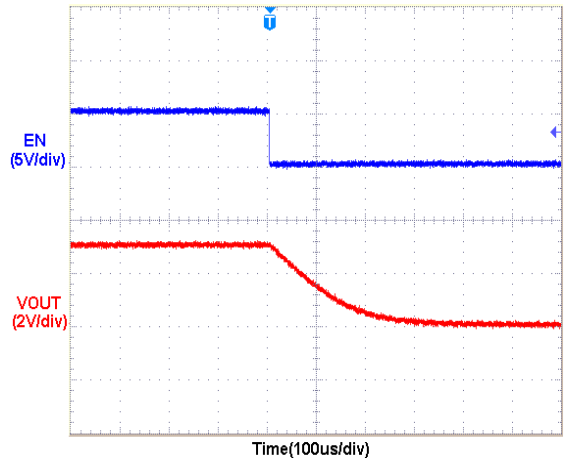


V_{OUT}=2.5V, I_{OUT}=30mA, V_{DD}=3.5V

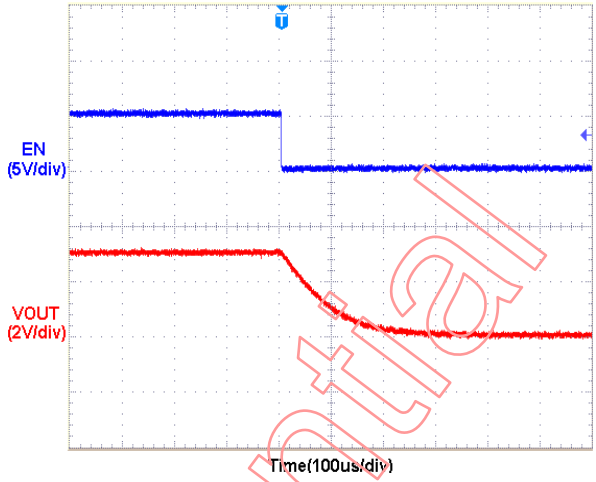


V_{OUT}=2.5V, I_{OUT}=150mA, V_{DD}=3.5V

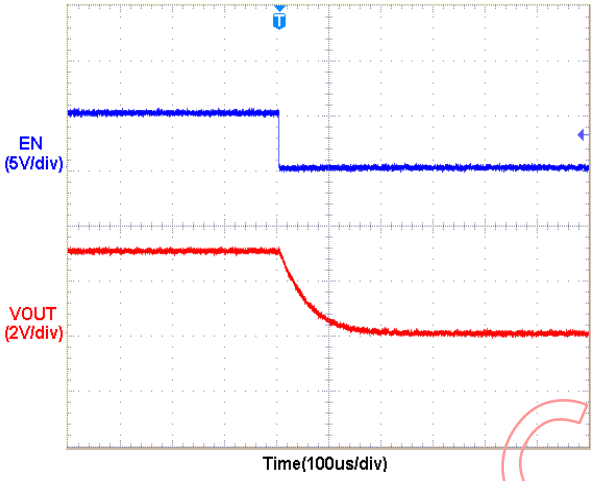
GStek Confidential



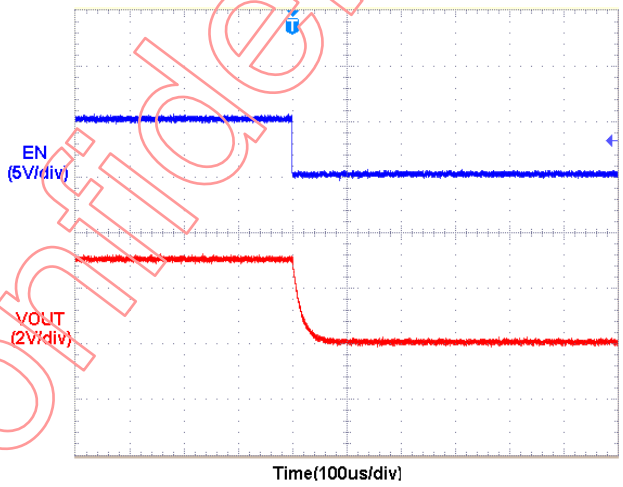
V_{OUT}=3.0V, I_{OUT}=0mA, V_{DD}=4.0V



V_{OUT}=3.0V, I_{OUT}=10mA, V_{DD}=4.0V



V_{OUT}=3.0V, I_{OUT}=30mA, V_{DD}=4.0V



V_{OUT}=3.0V, I_{OUT}=150mA, V_{DD}=4.0V

GStek Confidential

Application Information

Enable

The GS7156 has a dedicated enable pin(EN). When the EN pin is in the logic low (V_{EN}<0.3V), the regulator will be turned off, reducing the supply current to less than 1uA.

When the EN pin is in the logic high (V_{EN}>1.2V), the regulator will be turned on. Left open, the EN pin is pulled down by a internal resistor to shut down the regulator.

Current Limit and Short circuit current protection

The GS7156 use a current mirror to monitor the output current. A small portion of the PMOS output transistor's current is mirrored onto a resistor such that the voltage across this resistor is proportional to the output current; this voltage is compared against the feedback voltage. Once the output current cannot exceeds the limit. The current is set to 620mA typically.

When the output voltage is less than 0.2V, the short circuit current protection starts and maintains the loading current to 40mA. The output can be shorted to ground without damaging the device.

Output Capacitor

The GS7156 is specifically designed to employ ceramic output capacitors as low as 1uF (X7R). The ceramic capacitors offer significant cost and space savings, along with high frequency noise filtering. Place the capacitors physically as close as possible to the device with wide and direct PCB traces.

Ceramic capacitors have different temperature characteristics and bias characteristics which depend on their dimensions and manufacturers. If the setting voltage is 2.5V or more and the capacitor's dimensions for V_{OUT} equal to 1.0mm by 0.5mm or smaller than that, the capacitance value might be extremely low. As a result, the capacitance might be much less than expected value. In such cases, the operation might be unstable at low temperature (-25°C or less). In that case, use a larger capacity, or a large dimensions' capacitor. (For example 1.6mm by 0.8mm)

Input Capacitor

Good bypassing is recommended from input to ground to help improve AC performance. A 1uF (X7R) input capacitor or greater located as close as possible to the IC is recommended. Place the capacitors physically as close as possible to the device with wide and direct PCB traces.

Power Dissipation and Layout Considerations

Excessive power dissipation may cause thermal overload, and hence the increase of the IC junction temperature beyond a safe operating level. For continuous operation, it is highly recommended to keep the junction temperature below the maximum operation junction temperature 125°C for maximum reliability.

The relationship between θ_{JA} and $T_{J(MAX)}$ can be calculated as:

$P_{D(MAX)} = (T_{J(MAX)} - T_A) / \theta_{JA}$

Where $T_{J(MAX)}$ is the maximum operation junction temperature 125°C, T_A is the ambient temperature and the θ_{JA} is the junction to ambient thermal resistance.

The power dissipation definition in device is:

$P_D = (V_{IN} - V_{OUT}) \times I_{OUT} + V_{DD} \times I_Q$

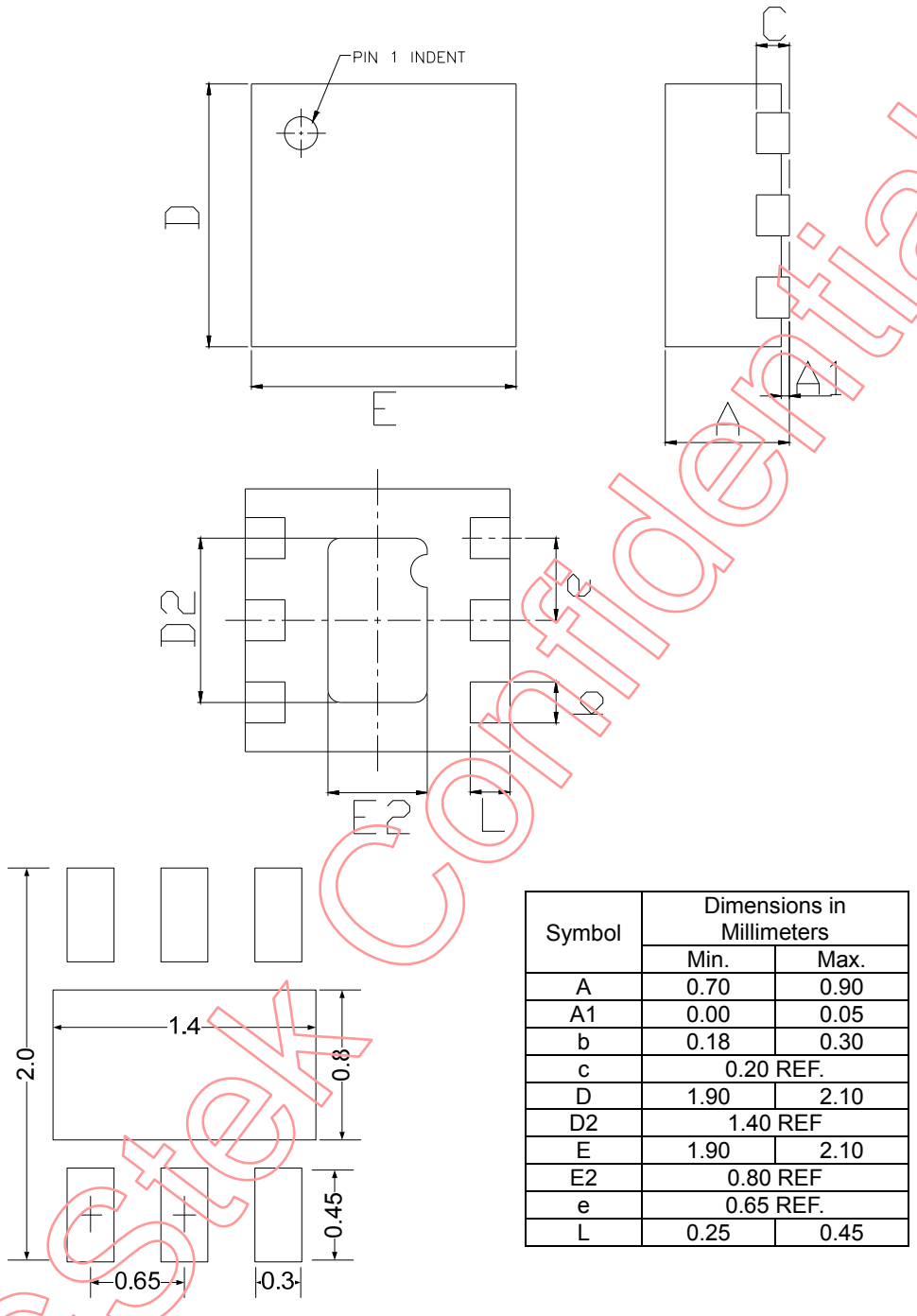
As the above equations indicate, it is desirable to work ICs whose θ_{JA} values are small such that $T_{J(MAX)}$ does not increase strongly with P_D. To

GStek Confidential

avoid thermally overloading the GS7156, refrain from exceeding the absolute maximum junction temperature rating of 150°C under continuous operating condition. Overstressing the regulator with high loading currents and elevated input-to-output differential voltages can increase the IC die temperature significantly.

GStek Confidential

Package Dimensions, TDFN6-2x2



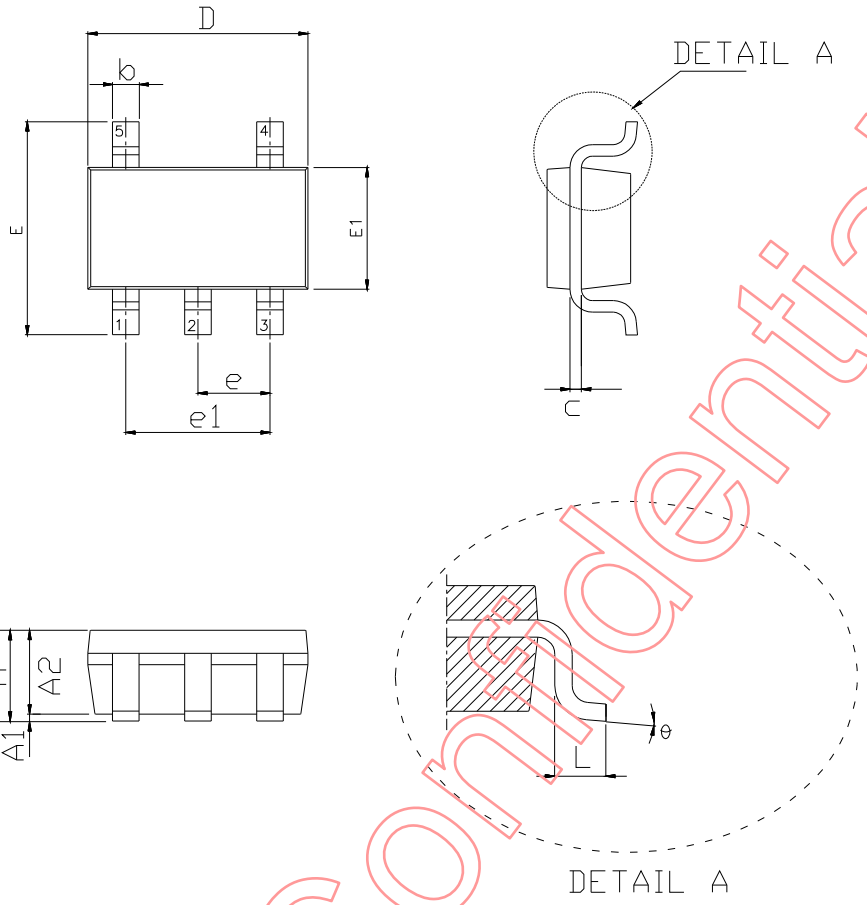
Symbol	Dimensions in Millimeters	
	Min.	Max.
A	0.70	0.90
A1	0.00	0.05
b	0.18	0.30
c	0.20 REF.	
D	1.90	2.10
D2	1.40 REF	
E	1.90	2.10
E2	0.80 REF	
e	0.65 REF.	
L	0.25	0.45

GStek Confidential

Note

1. Min.: Minimum dimension specified.
2. Max.: Maximum dimension specified.
3. REF.: Reference. Normal/Regular dimension specified for reference.

Package Dimensions, SOT-23-5



Unit: mm

Symbol	Dimensions in Millimeters	
	Min.	Max.
A	0.90	1.45
A1	0.00	0.15
A2	0.90	1.30
b	0.30	0.50
c	0.08	0.25
D	2.70	3.10
E	2.60	3.00
E1	1.20	1.80
e	0.95 REF.	
e1	1.90 REF.	
L	0.37 REF.	
θ	0^{o}	10^{o}

GStek Confidential

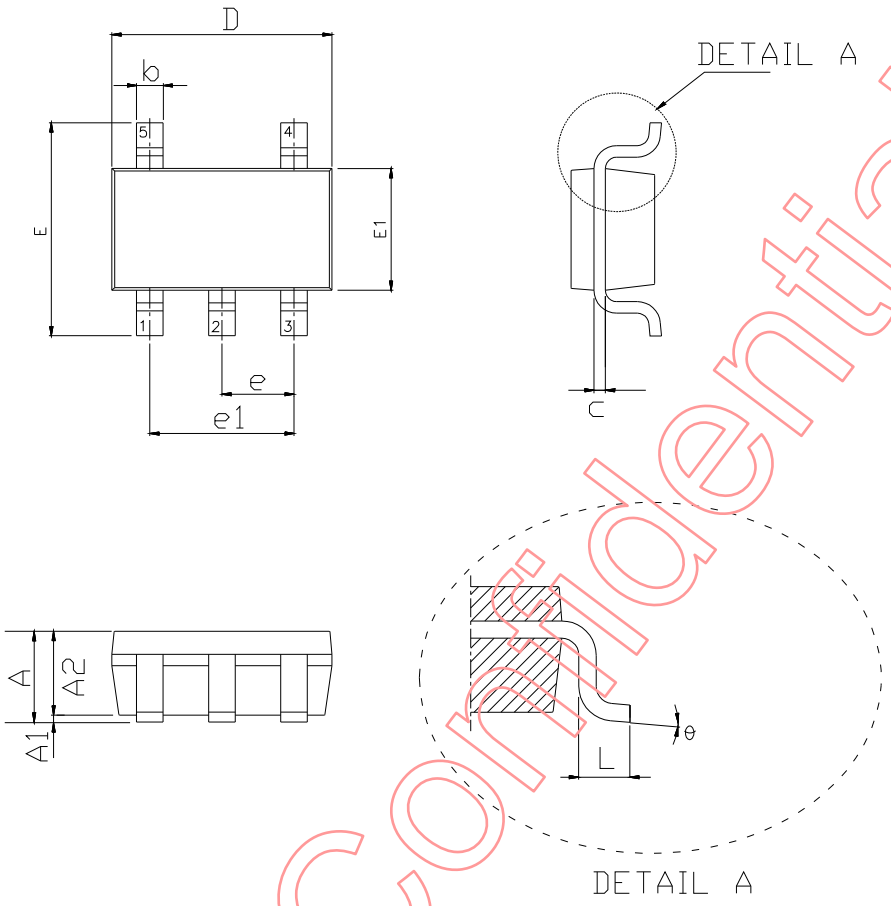
Note

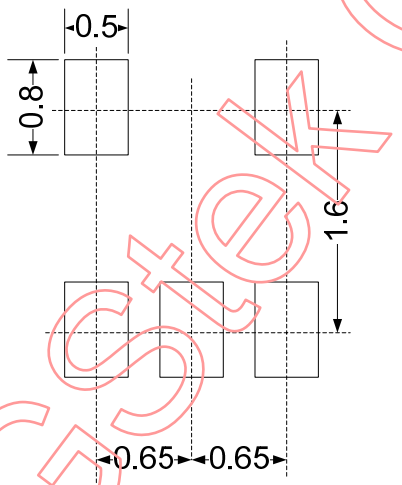
1.Min.: Minimum dimension specified.

2.Max.: Maximum dimension specified.

3.REF.: Reference. Normal/Regular dimension specified for reference.

Package Dimensions, SOT-353





Unit: mm

Symbol	Dimensions in Millimeters	
	Min.	Max.
A	0.80	1.10
A1	0.00	0.10
A2	0.70	1.00
b	0.15	0.35
c	0.08	0.22
D	1.80	2.20
E	1.80	2.45
E1	1.15	1.35
e	0.65 REF.	
e1	1.30 REF.	
L	0.36 REF.	
θ	0°	8°

GStek Confidential

Note

1.Min.: Minimum dimension specified.

2.Max.: Maximum dimension specified.

3.REF.: Reference. Normal/Regular dimension specified for reference.

GStek Confidential

DISCLAIMERS

Please read the notice stated in this preamble carefully before Admission e accessing any contents of the document attached. Admission of GStek's statement therein is presumed once the document is released to the receiver.

Notice:

Firstly, GREEN SOLUTION CO., LTD. (GStek) reserves the right to make corrections, modifications, enhancements, improvements, and other changes to its information herein without notice.. And the aforesaid information does not form any part or parts of any quotation or contract between GStek and the information receiver.

Further, no responsibility is assumed for the usage of the aforesaid information. GStek makes no representation that the interconnect of its circuits as described herein will not infringe on exiting or future patent rights and other intellectual property rights, nor do the descriptions contained herein express or imply that any licenses under any GStek patent right, copyright, mask work right, or other GStek intellectual property right relating to any combination, machine, or process in which GStek products or services are used.

Besides, the product in this document is not designed for use in life support appliances, devices, or systems where malfunction of this product can reasonably be expected to result in personal injury. GStek customers' using or selling this product for use in such applications shall do so at their own risk and agree to fully indemnify GStek for any damage resulting from such improper use or sale.

At last, the information furnished in this document is the property of GStek and shall be treated as highly confidentiality; any kind of distribution, disclosure, copying, transformation or use of whole or parts of this document without duly authorization from GStek by prior written consent is strictly prohibited. The receiver shall fully compensate GStek without any reservation for any losses thereof due to its violation of GStek's confidential request. The receiver is deemed to agree on GStek's confidential request therein suppose that said receiver receives this document without making any expressly opposition. In the condition that aforesaid opposition is made, the receiver shall return this document to GStek immediately without any delay.