

AT5204/AT5204E

250mA ,Low Supply current Iq 1μA LDO



Immense Advance Tech.

FEATURES

- Output Current Over 250mA(TYP.)
- Low Dropout Voltage:
600mV at 200mA
300mV at 100mA
30mV at 10mA
- Low Power Consumption 1μA(TYP.)
- Maximum Operating voltage:35V
- Output Voltage Range:1.8V ,3.3V, 5.0V
- Highly Accurate:±2%
- Operational Temperature Range:-40°C~85°C
- Package Type: SOT-89

DESCRIPTION

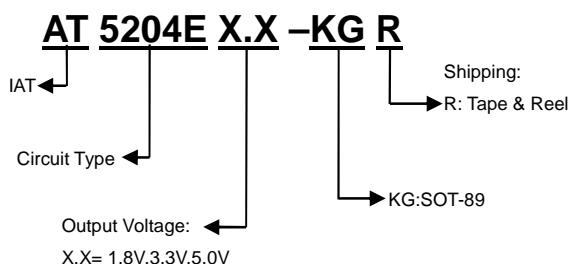
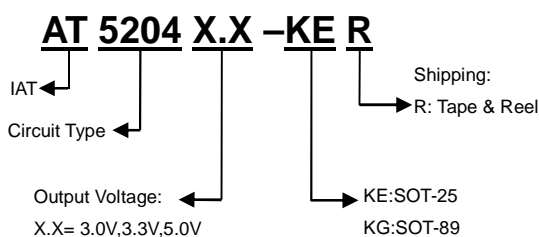
The AT5204/AT5204E is a set of three-terminal high current low voltage regulator implemented in CMOS technology. They can deliver 250mA output current and allow an input voltage as high as 35V. They are available with several fixed output voltages ranging from 1.8V ,3.3V, 5.0V. CMOS technology ensures low voltage drop and low quiescent current.

Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain variable voltages and currents.

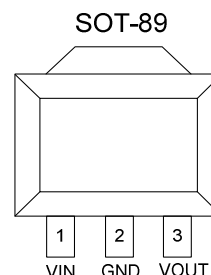
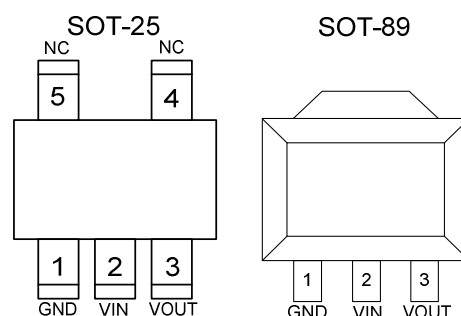
APPLICATION

- Battery-powered equipment
- Communication equipment
- Portable Application

ORDER INFORMATION



PIN CONFIGURATIONS (TOP VIEW)



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PIN DESCRIPTIONS

Pin Name	Pin Description
GND	Ground return for all internal circuit
VIN	Input Voltage
VOU	Output Voltage
NC	Not Connected

TYPICAL APPLICATION CIRCUITS

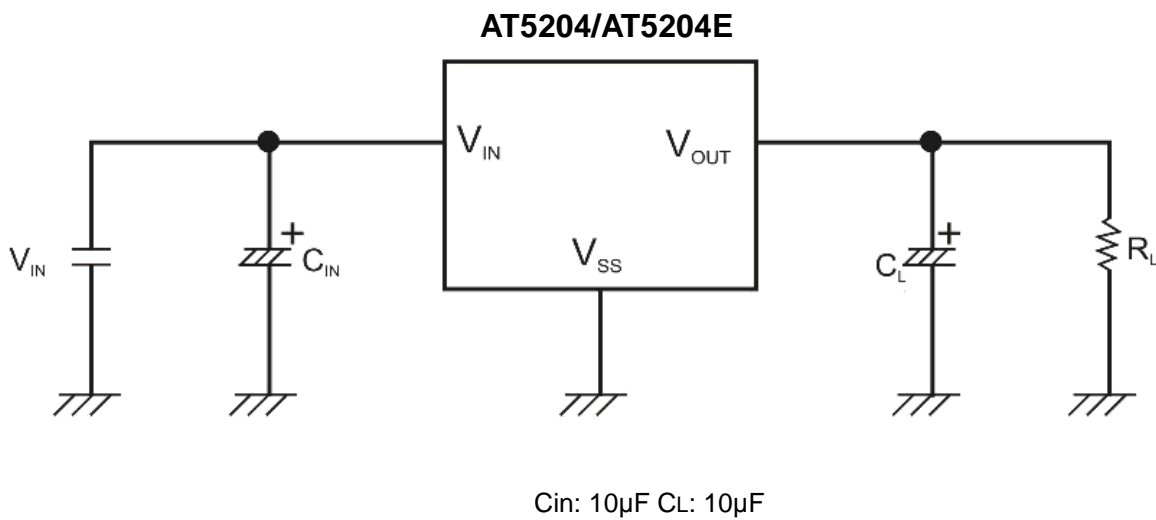


Figure 1

BLOCK DIAGRAM

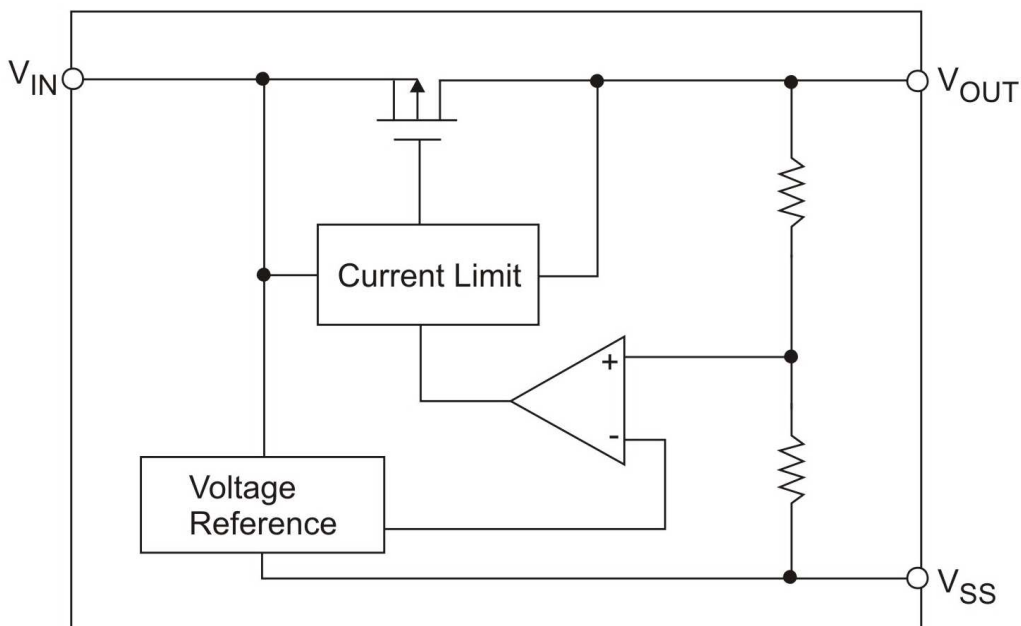


Figure 2

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ABSOLUTE MAXIMUM RATINGS (Note 1)

Parameter	Symbol	Range	Unit	
Supply Voltage	V_{CC}	-0.3~+40	V	
Storage Temperature Range	T_{STG}	-65 to +150	°C	
Junction Temperature Range	T_J	-40 to +150	°C	
Lead Temperature (Soldering 10 sec)	T_{LEAD}	260	°C	
Power Dissipation @ $T_A=25$ °C	SOT-25	P_D	450	mW
	SOT-89		640	
Thermal Resistance Junction to Ambient (Note 2)	SOT-25	θ_{JA}	220	°C/W
	SOT-89		156	
Thermal Resistance Junction to Case	SOT-25	θ_{JC}	106.6	°C/W
	SOT-89		100	
ESD Rating (Human body mode)(Note 3)	V_{ESD}	2	kV	

RECOMMENDED OPERATING CONDITIONS (Note 4)

Parameter	Symbol	Operation Conditions	Unit
Supply Voltage	V_{CC}	3~35	V
Operating Junction Temperature Range	T_J	-40 to +125	°C
Operating Ambient Temperature Range	T_{OPA}	-40 to +85	°C

Note 1: Stresses listed as the above "Absolute Maximum Ratings" may cause permanent damage to the device. These are for stress ratings. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may remain possibility to affect device reliability.

Note 2: Thermal Resistance is specified with the component mounted on a low effective thermal conductivity test board in free air at $T_A=25$ °C .

Note 3: Devices are ESD sensitive. Handling precaution recommended.

Note 4: The device is not guaranteed to function outside its operating conditions.

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ELECTRICAL CHARACTERISTICS

T_A= 25°C, unless otherwise specified.

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Input Voltage	V _{OUT}		3	—	35	V
Supply Current	I _{SS}	I _{LOAD} = 0mA	—	1.0	—	μA
Output Voltage	V _{OUT}	I _{LOAD} = 10mA	-2%		+2%	V _{OUT}
Output Current	I _{OUT}		200	250	—	mA
Output Voltage	V _{DROP}	I _{LOAD} =10mA ΔV _{OUT} = -V _{OUT} x 2%	—	30	50	mV
		I _{LOAD} =100mA ΔV _{OUT} = -V _{OUT} x 2%	—	300	400	
		I _{LOAD} =200mA ΔV _{OUT} = -V _{OUT} x 2%	—	600	750	
Line Regulation	ΔV _{OUT_LINE}	I _{LOAD} =1mA, V _{IN} =(V _{OUT} + 1V) to 30V	—	—	0.2	%/V
Load Regulation	ΔV _{OUT_LOAD}	1mA ≤ I _{OUT} ≤ 100mA	—	20	50	mV
Current Limit	I _{LIM}	V _{IN} =(V _{OUT} +1V) to 30V R _{LOAD} = V _{OUT} / 1A	—	0.45	—	A
Over Temperature Protection	T _{OTP}		—	125	—	°C
Temperature Coefficient	ΔV _{OUT} /ΔT	I _{LOAD} =10mA -40 °C ≤ T _{AMB} ≤ 100°C	—	±100	—	ppm/°C

Note5 : Power Calculation

Power Dissipation of Built-in Power Transistor (MOSFET) = (V_{IN}-V_{OUT}) * I_{OUT}

Overall Power Dissipation P_D (TOTAL) = P_D (MOSFET) + V_{IN} * I_{SS}

The Quiescent Current, I_{GND}, is 1.0μA with Negligible V_{IN} * I_{GND} Power Dissipation, so the Worst-Case Power Dissipation is :

P_D (max) = [VIN (max) -V_{OUT} (min)] * I_{OUT}

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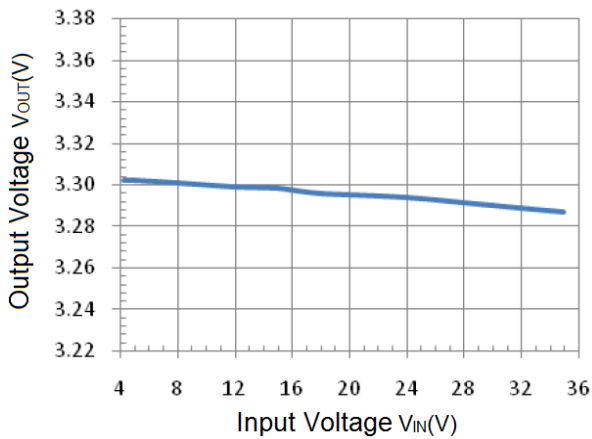
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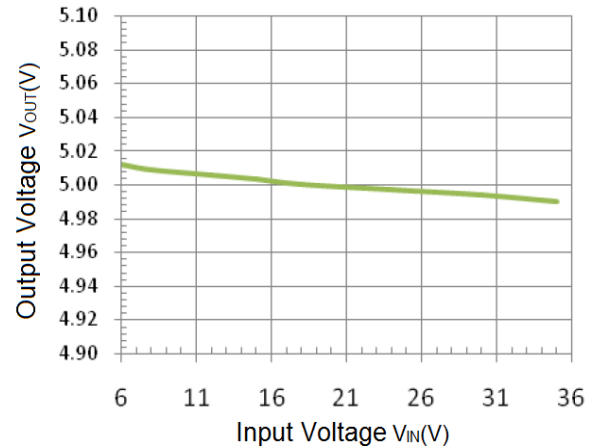
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TYPICAL PERFORMANCE CHARACTERISTICS

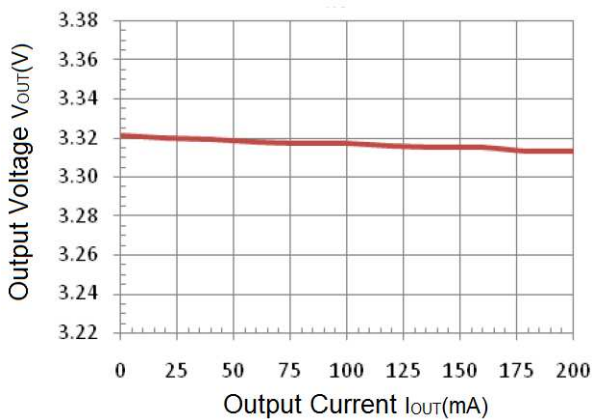
V_{OUT} VS. $V_{IN}, I_{OUT}=1mA$



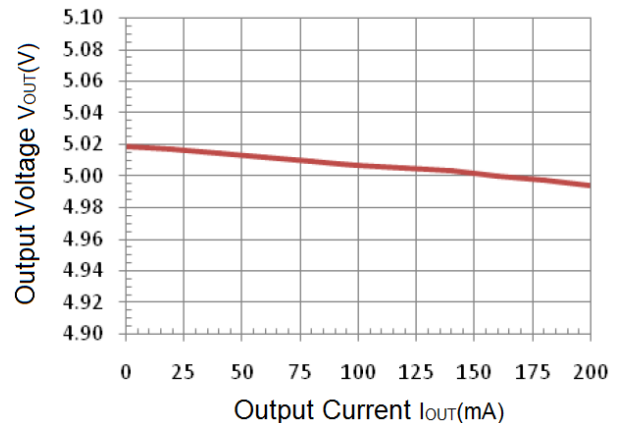
V_{OUT} VS. $V_{IN}, I_{OUT}=1mA$



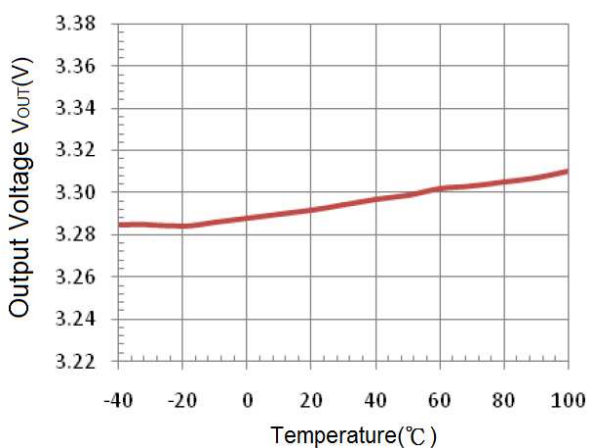
V_{OUT} VS. $I_{OUT}, V_{IN}=4.3V$



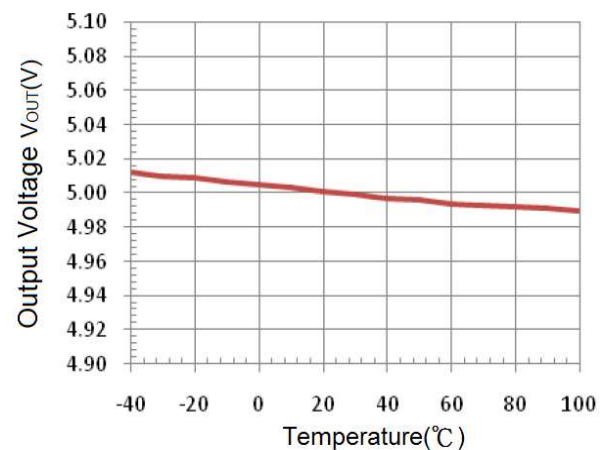
V_{OUT} VS. $I_{OUT}, V_{IN}=6.0V$



V_{OUT} VS. Temperature, $I_{OUT}=10mA$



V_{OUT} VS. Temperature, $I_{OUT}=10mA$



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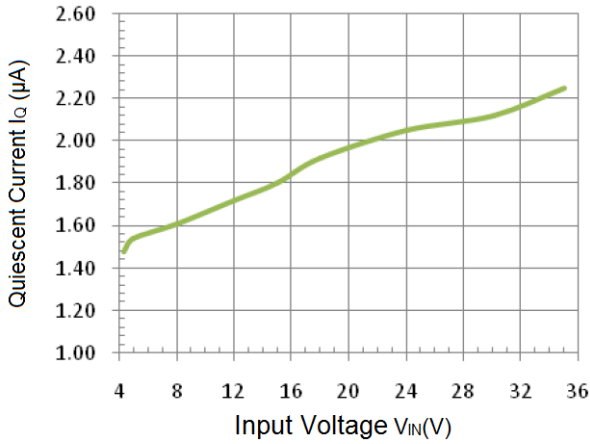
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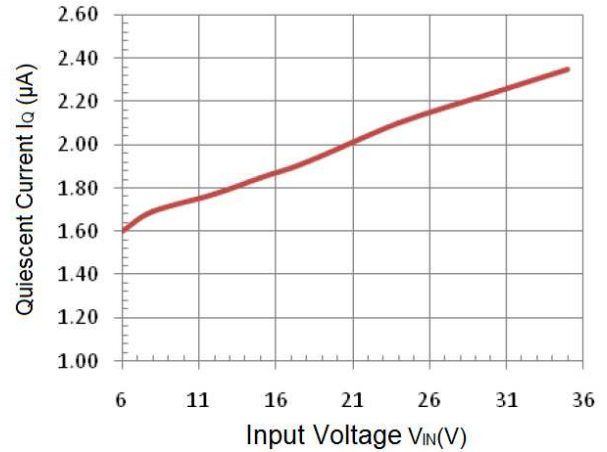
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TYPICAL PERFORMANCE CHARACTERISTICS(Continue)

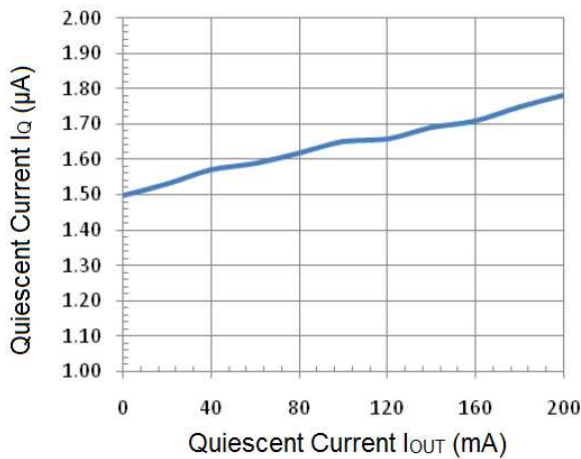
Quiescent Current VS. Voltage
NO LOAD



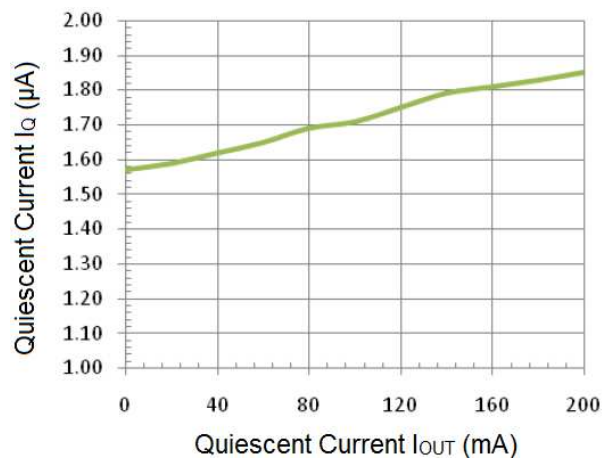
Quiescent Current VS. Voltage,NO LOAD
NO LOAD



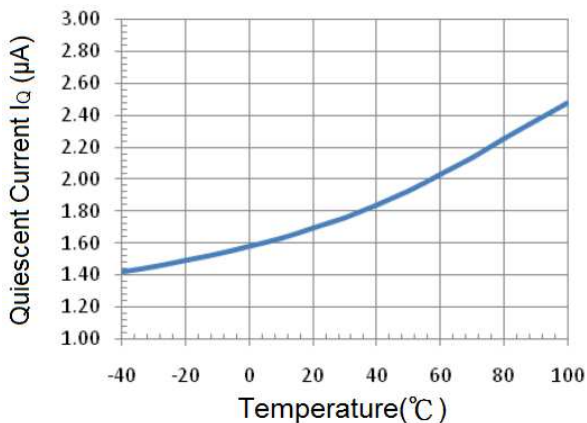
Quiescent Current VS. I_{OUT} , $V_{IN}=4.3V$



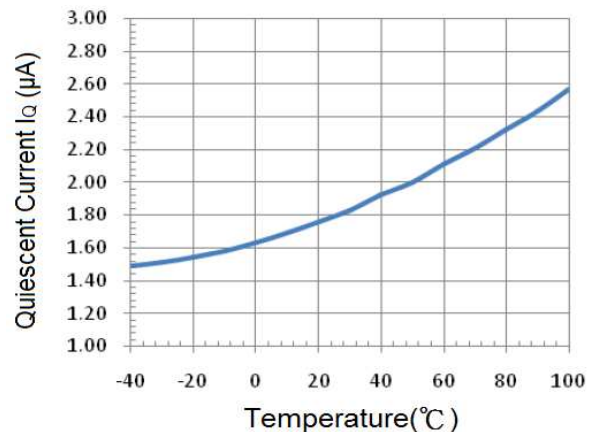
Quiescent Current VS. I_{OUT} , $V_{IN}=6.0V$



Quiescent Current VS. Temperature
NO LOAD



Quiescent Current VS. Temperature
NO LOAD



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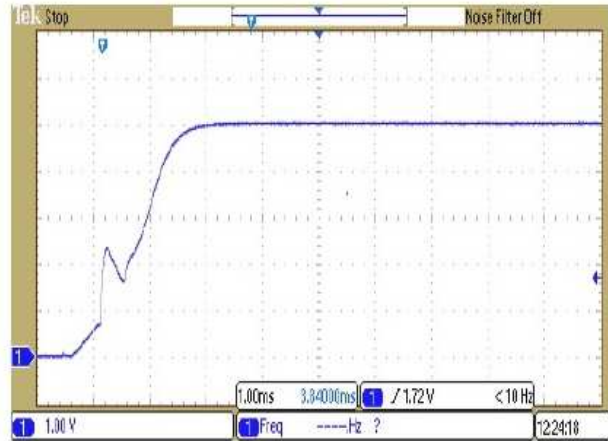
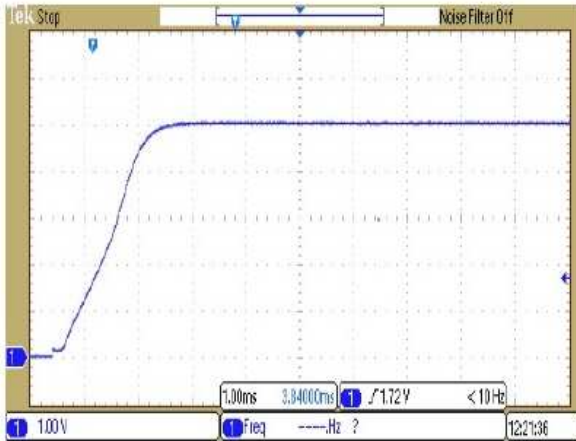
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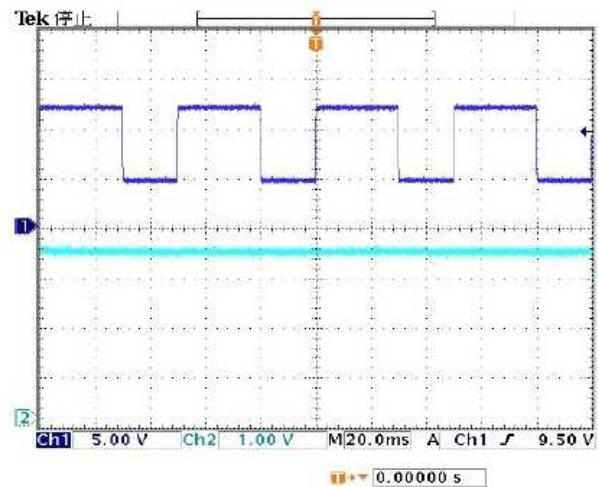
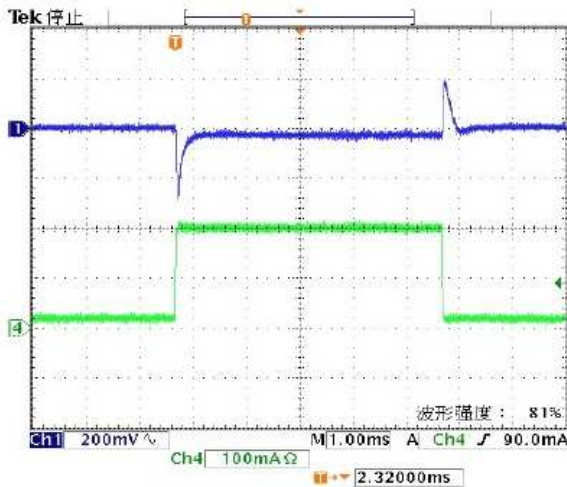
TYPICAL PERFORMANCE CHARACTERISTICS(Continue)

System No Load Start :No Load C_{OUT}=10μF, With Load 30mA Start

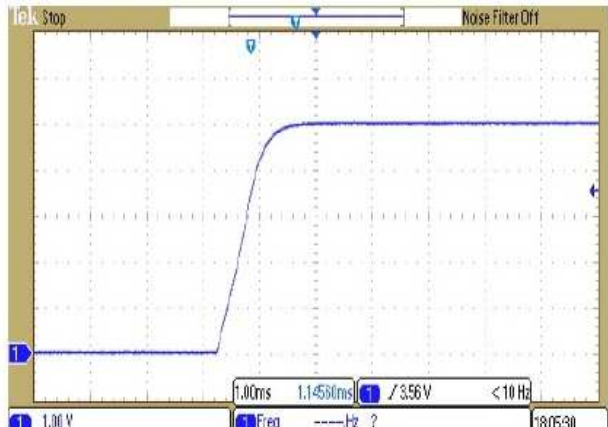
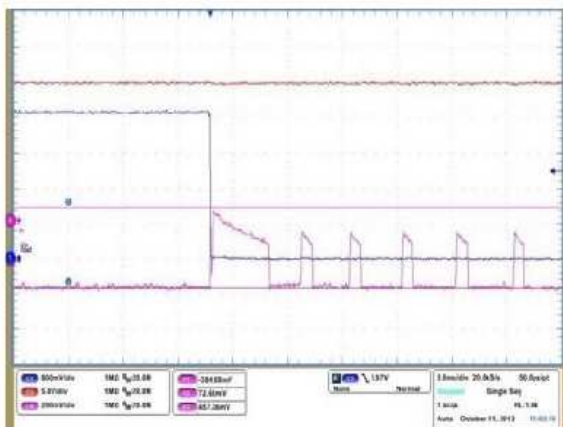


Transient Response of Load Modulation & Transient Response of Power Modulation :

V_{IN}=12.0V, C_{OUT}=10μF, I_{OUT}=10mA to 200mA, V_{IN}=5.0V to 12.0V, C_{OUT}=10μF, I_{OUT}=10mA



OCP & Release : V_{IN}=25.0V, OCP V_{IN}=25.0V, OCP & Release



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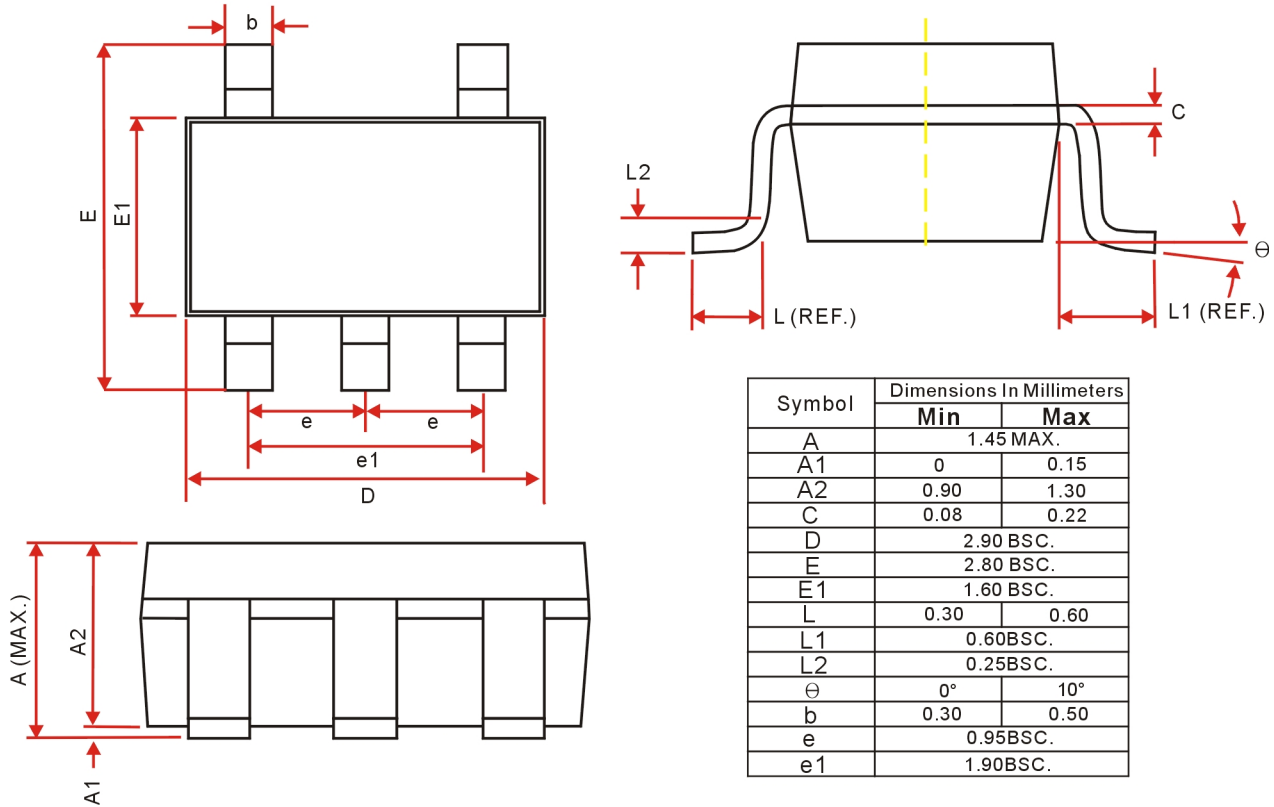
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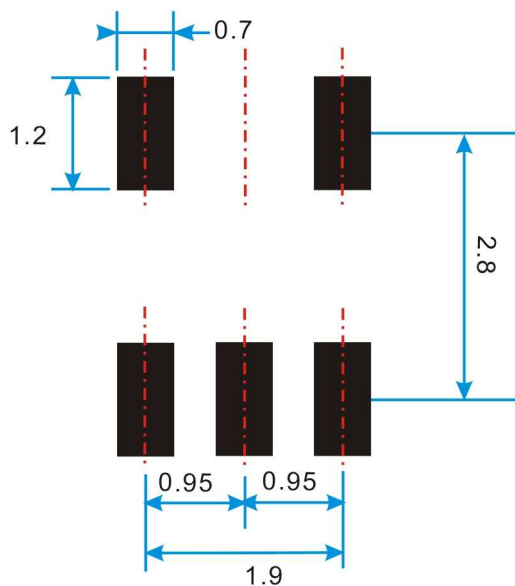
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PACKAGE OUTLINE DIMENSIONS

SOT-25 PACKAGE OUTLINE DIMENSIONS



SOT-25 PACKAGE FOOTPRINT (mm)



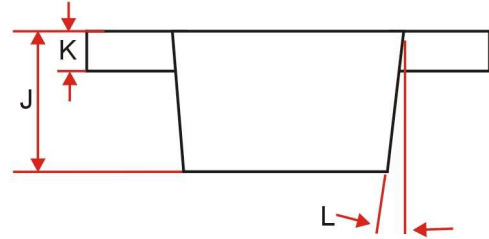
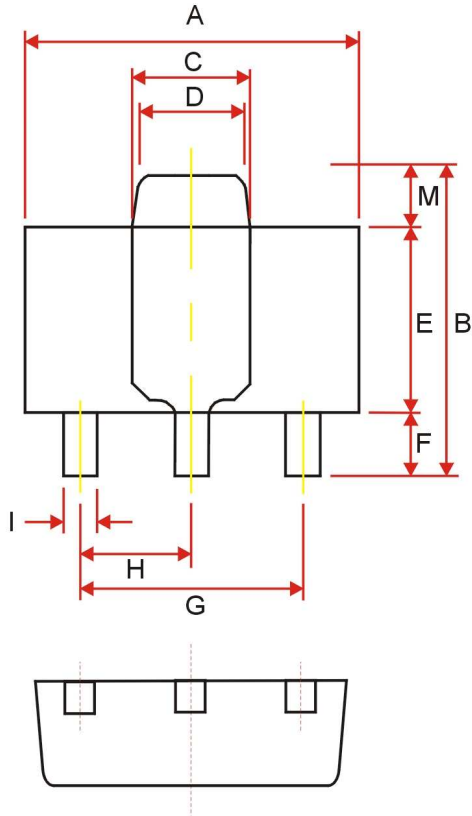
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PACKAGE OUTLINE DIMENSIONS SOT-89 PACKAGE OUTLINE DIMENSIONS



REF.	Dimensions In Millimeters	
	Min.	Max.
A	4.40	4.60
B	3.94	4.25
C	1.50	1.70
D	1.30	1.50
E	2.29	2.60
F	0.89	1.20
G	3.00 REF.	
H	1.50 REF.	
I	0.40	0.56
J	1.40	1.60
K	0.35	0.44
L	5° TYP.	
M	0.70 REF.	

Note :

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