High Output Current LDO Regulator , High PSRR , Low Dropout, ME6207 Series

General Description

The ME6217 Series is a positive voltage regulator with a low dropout voltage,high output voltage accuracy,and low crrent consumption developed based on CMOS technology.

A built-in low on-resistance transistor provides a low dropout voltage and large output current, a built-in overcurrent protector prevents the load current from exceeding the current capacitance of the output transistor. An ON/OFF circuit ensures a long battery life. Compared with the voltage regulators using the conventional CMOS process, a larger variety of capacitors are available, including small ceramic capacitors.

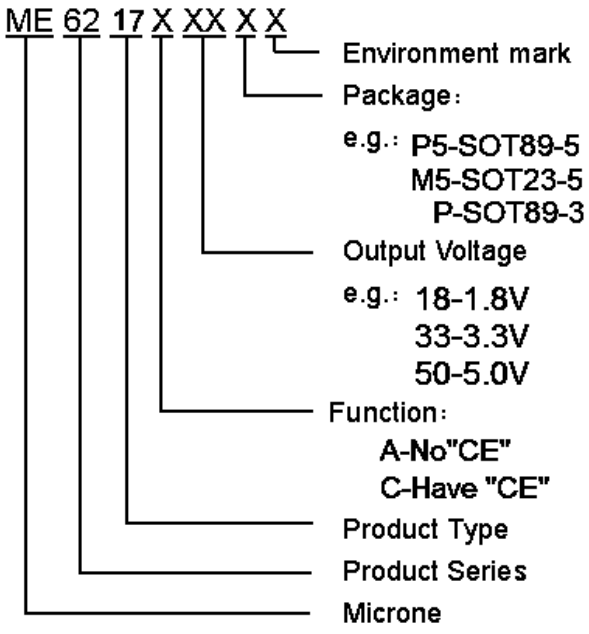
Features

- Maximum Output Current: 800 mA
  （V_{IN}≥V_{OUT}(T)+1.0V）
- Dropout Voltage:
  100mV@ I_{OUT} =300mA, V_{OUT} =5.0V
- Operating Voltage Range: 2V～6.5V
- Output Voltage：1.5V~5.6V ，selectable in 0.1V steps
- Highly Accuracy: ±1％
- Low Current Consumption:
  During Operation: 100uA（TYP.）
  During Shutdown:0.1uA（TYP.）
- High Ripple Rejection: 65dB@1KHz (ME6217C50)
- Line Regulation: 0.05％（TYP.）
- Thermal Shutdown Protection：160℃
- Small Packages: SOT-89-5,SOT23-5，SOT89-3

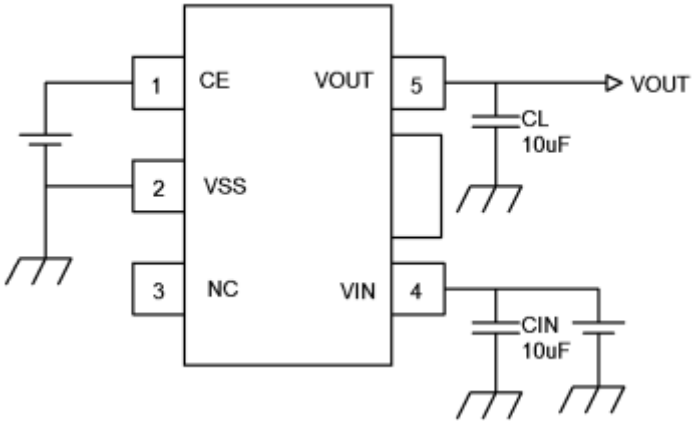
Typical Application

- Power supply for DVD and CD-ROM drives
- Power supply for personal communication device
- Power supply for battery-powered devices
- Power supply for note PCs

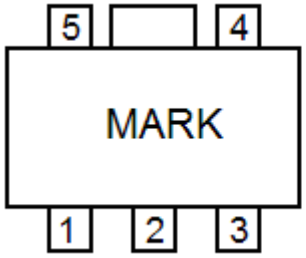
Selection Guide



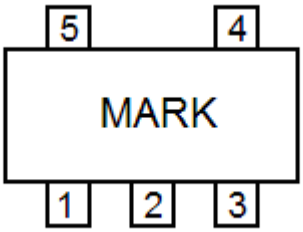
Typical Application Circuit



Pin Configuration



SOT-89-5



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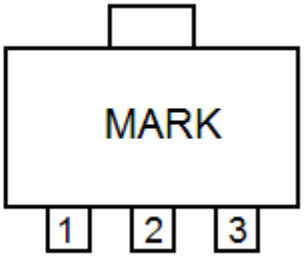


SOT89-3

Pin Assignment

ME6217AXX

Pin Number	Pin Name	Functions
SOT89-3		
1	V_{SS}	Ground
2	V_{IN}	Input Voltage
3	V_{OUT}	Output Voltage

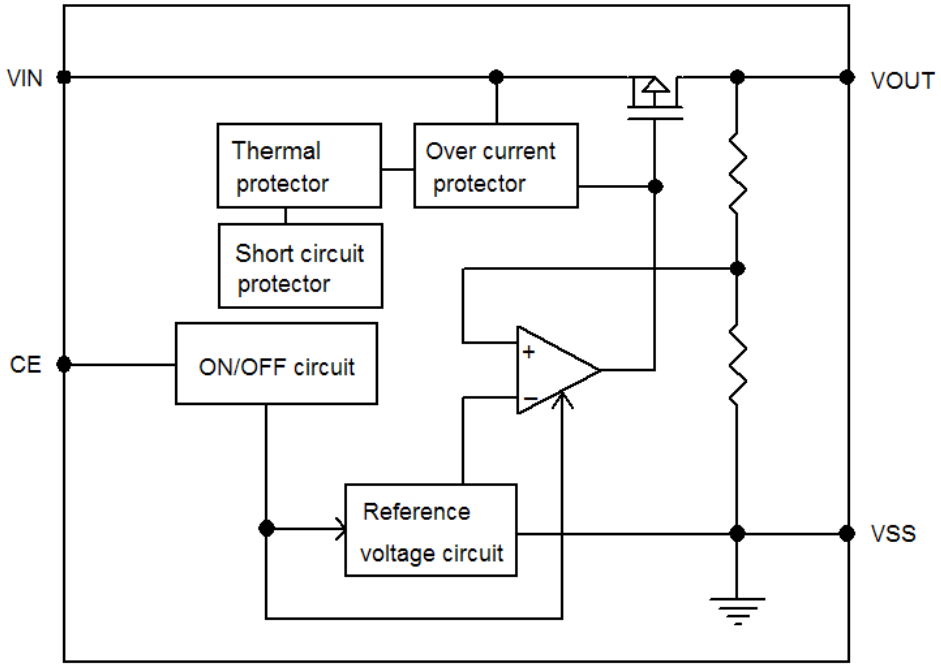
ME6217CXX

Pin Number		Pin Name	Functions
SOT89-5	SOT23-5		
1	3	CE	ON / OFF Control
2	2	V_{SS}	Ground
3	4	NC	No Connect
4	1	V_{IN}	Input Voltage
5	5	V_{OUT}	Output Voltage

Absolute Maximum Ratings

Parameter		Symbol	Ratings	Units
Input Voltage		V_{IN}	7.0	V
Output Current		I_{OUT}	800	mA
Output Voltage		V_{OUT}	Vss-0.3～V_{IN} +0.3	V
CE Pin Voltage		V_{CE}	Vss-0.3～V_{IN} +0.3	V
Power Dissipation	SOT-89-5	P_D	1000	mW
Operating Temperature Range		T_{OPR}	－40～＋85	℃
Storage Temperature Range		T_{STG}	－40～＋125	℃

Block Diagram



Electrical Characteristics

(V_{IN}= V_{OUT} (T) +1.0V， V_{CE} = V_{IN}， C_{IN}=C_L=10uF， Ta=25°C ,unless otherwise noted)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Units
Output Voltage	V_{OUT}(E) (Note 2)	I_{OUT}=100mA		X 0.99	V_{OUT} (T) (Note 1)	X 1.01	V
Input voltage	V_{IN}	-		2.0	-	6.5	V
Maximum Output Current	I_{OUTMAX} (Note 4)	V_{IN}≥ V_{OUT} (T) +1.0V		-	800	-	mA
Load Regulation	ΔV_{OUT}	1mA≤I_{OUT}≤300mA		-	10	50	mV
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \bullet V_{OUT}}$	I_{OUT} =100mA V_{OUT} (T) +0.5V ≤V_{IN}≤6.5V		-	0.1	0.3	%/V
Dropout Voltage	V_{DIF} (Note 3)	I_{OUT} =300mA	1.8V≤V_{OUT} (T)≤2.0V	-	200	260	mV
			3.0V≤V_{OUT} (T)≤5.5V	-	100	180	
Current consumption during operation	I_{SS1}	CE pin = ON, no load		-	100	130	μA
Current consumption during shutdown	I_{SS2}	CE pin = OFF, no load		-	0.1	1.0	μA
CE “High” Voltage	V_{CEH}	Start up,R_L=1.0KΩ		1.5	-	-	V
CE “Low” Voltage	V_{CEL}	Shut down, R_L=1.0KΩ		-	-	0.3	V
CE “High” Current	I_{CEH}	V_{IN}=6.5V,V_{CE}=6.5V		-0.1	-	0.1	μA
CE “Low” Current	I_{CEL}	V_{IN}=6.5V,V_{CE}=0V		-0.1	-	0.1	μA
Ripple Rejection Rate	|RR|	V_{IN}=6V , △Vrip=0.5Vrms, I_{OUT}=100mA, f=1kHz	1.8V≤V_{OUT} (T)≤2.0V	-	70	-	dB
			3.0V≤V_{OUT} (T)≤5.5V	-	65	-	
Short-circuit current	I_{short}	CE pin = ON, VOUT = 0 V		-	350	-	mA
Thermal Shutdown Protection	T_{sd}	I_{OUT}=1mA,V_{IN}= V_{OUT}+1V			160		℃

Note ：

1. V_{OUT} (T) ： Specified Output Voltage

2.V_{OUT} (E) ： Effective Output Voltage (Ie. The output voltage when “V_{OUT} (T)+1.0V”is provided at the Vin pin while maintaining a certain Iout value.)

3.V_{DIF}： V_{IN1} –V_{OUT} (E)’

V_{IN1} ： The input voltage when V_{OUT}(E)’ appears as input voltage is gradually decreased.

V_{OUT} (E)’=A voltage equal to 98% of the output voltage whenever an amply stabilized Iout {V_{OUT} (T)+1.0V} is input.

4. I_{OUTMAX}： Due to restrictions on the package power dissipation, this value may not be satisfied. Attention should be paid to the power dissipation of the package when the output current is large.This specification is guaranteed by design.

Operation

1. Basic operation

Figure 1 shows the block diagram of the ME6217 Series.

The error amplifier compares the reference voltage (Vref) with Vfb, which is the output voltage resistance-divided by feedback resistors Rs and Rf. It supplies the output transistor with the gate voltage necessary to ensure a certain output voltage free of any fluctuations of input voltage and temperature.

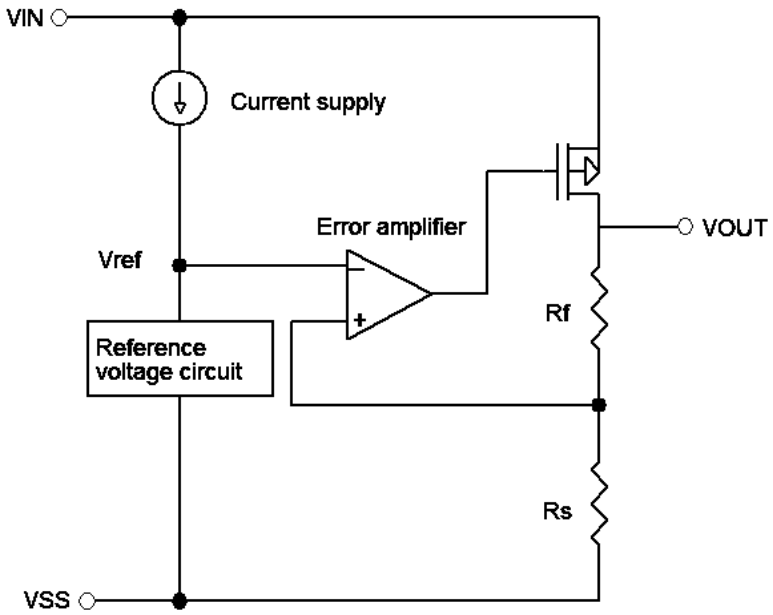


Figure 1

2. Output transistor

The ME6217 Series uses a low on-resistance P-channel MOS FET as the output transistor.Be sure that VOUT does not exceed VIN + 0.3 V to prevent the voltage regulator from being damaged due to inverse current flowing from VOUT pin through a parasitic diode to VIN pin.

3. Shutdown pin (CE pin)

This pin starts and stops the regulator.

When the CE pin is set to the shutdown level, the operation of all internal circuits stops, and the built-in P-channel MOS FET output transistor between the VIN pin and VOUT pin is turned off to substantially reduce the current consumption. The VOUT pin becomes the VSS level due to the internally divided resistance of several hundreds kΩ between the VOUT pin and VSS pin. Since the CE pin is neither pulled down nor pulled up internally, do not use it in the floating state. In addition, note that the current consumption increases if a voltage of 0.3 V to VIN − 0.3 V is applied to the CE pin.

Table 1

CE Pin	Internal Circuits	VOUT Pin Voltage	Current Consumption
“H” Power on	Operating	Set value	I_{SS1}
“L” Power off	Stopped	Vss level	I_{SS2}

Precautions

1. Wiring patterns for the VIN, VOUT and GND pins should be designed so that the impedance is low.When mounting an output capacitor between the VOUT and VSS pins (CL) and a capacitor for stabilizing the input between VIN and VSS pins (CIN), the distance from the capacitors to these pins should be as short as possible.
2.Note that the output voltage may increase when a series regulator is used at low load current (1.0 mA or less).
3.Generally a series regulator may cause oscillation, depending on the selection of external parts. The following conditions are recommended for this IC. However, be sure to perform sufficient evaluation under the actual usage conditions for selection, including evaluation of temperature characteristics.

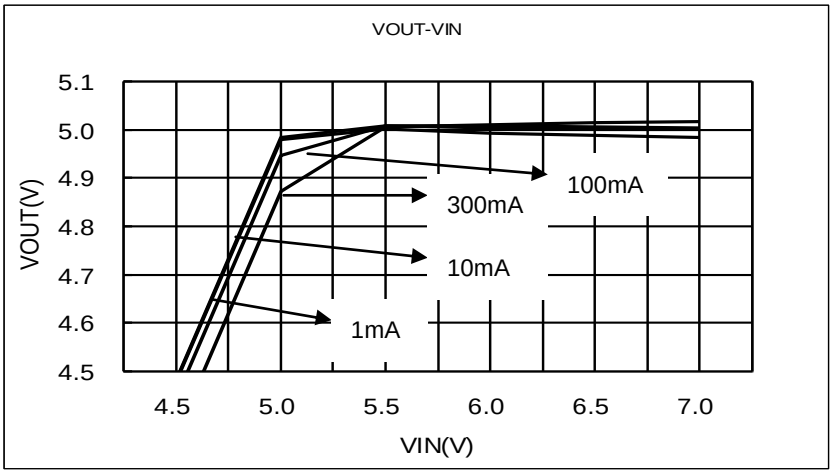
Input capacitor (CIN): 4.7 µF or more
Output capacitor (CL): 4.7 µF or more
Equivalent series resistance (ESR): 0.5 Ω or less

4. The voltage regulator may oscillate when the impedance of the power supply is high and the input capacitor is small or an input capacitor is not connected.
5.The application conditions for the input voltage, output voltage, and load current should not exceed the package power dissipation.
6. Do not apply an electrostatic discharge to this IC that exceeds the performance ratings of the built-in electrostatic protection circuit.
7. SII claims no responsibility for any disputes arising out of or in connection with any infringement by products including this IC of patents owned by a third party.

Type Characteristics

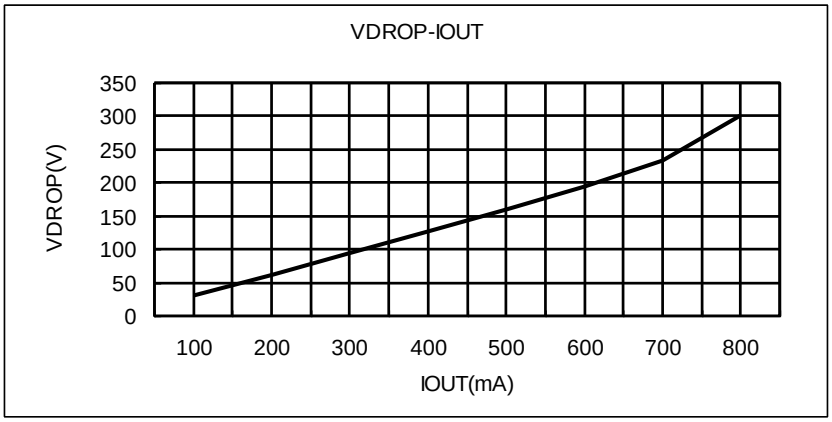
（1） Input VoltageVS.Output Voltage（Ta = 25 °C）

ME6217C50P5G



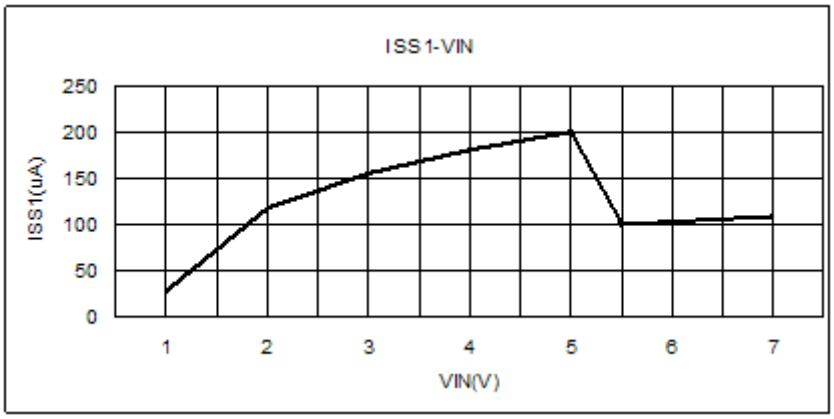
（2） Output Current VS.Droput Voltage（V_{IN}= V_{OUT} (T) +1.0V,Ta = 25 °C）

ME6217C50P5G



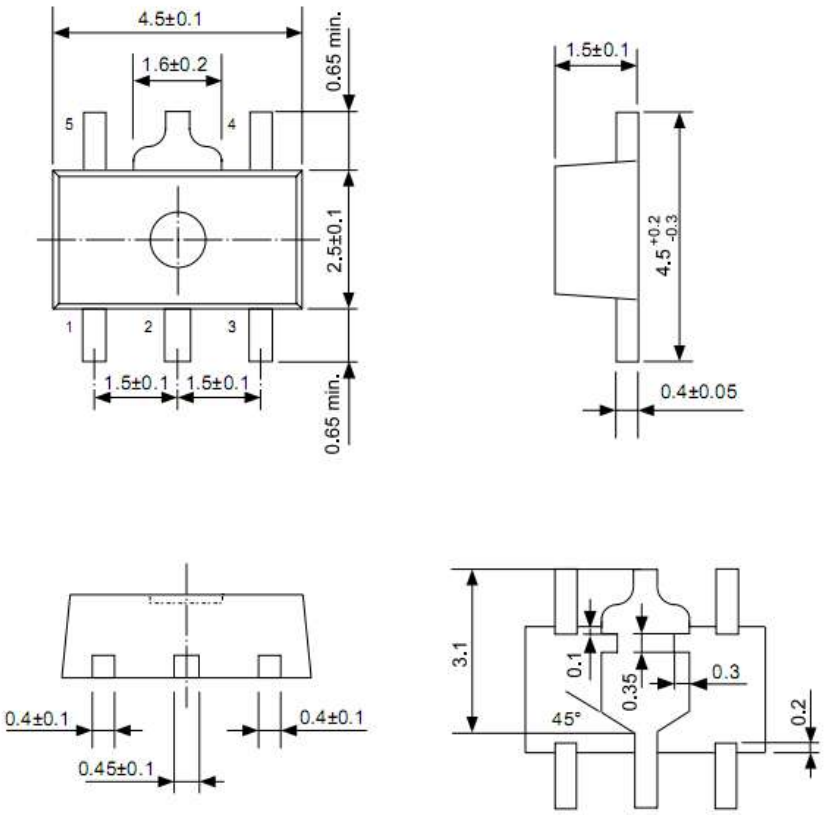
（3）Input Voltage VS. Current Consumption（Ta = 25 °C）

ME6217C50P5G

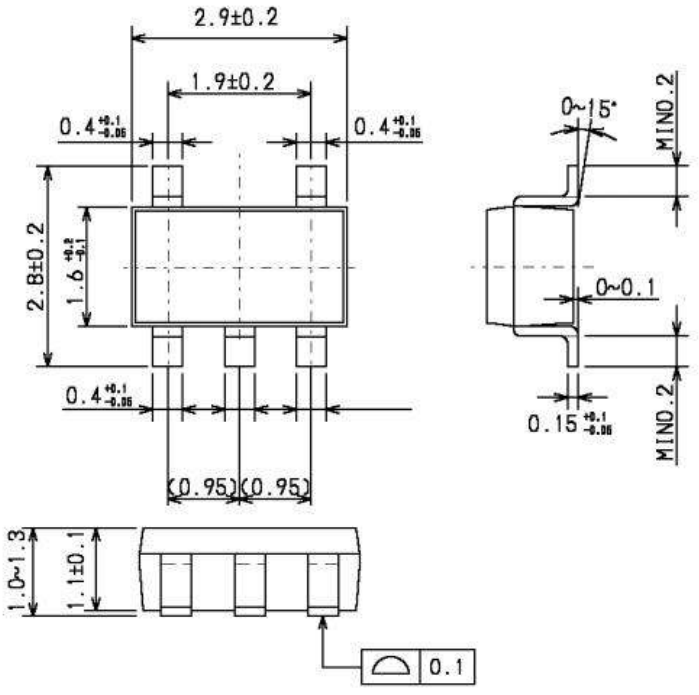


Package Information:

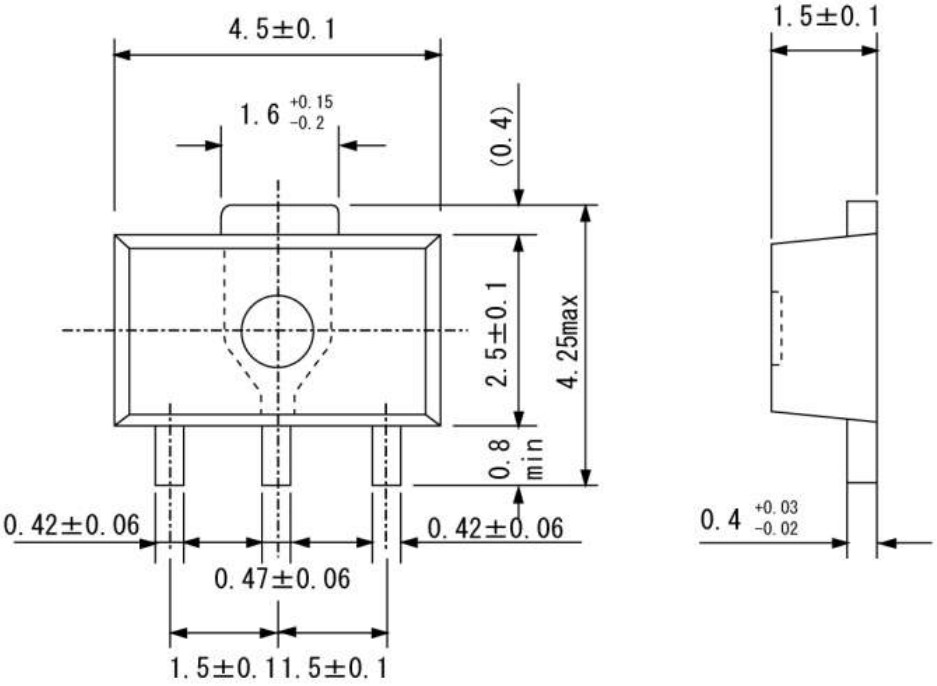
SOT89-5



SOT23-5



SOT89-3


4.5±0.1
1.6 +0.15 -0.2
(0.4)
2.5±0.1
4.25max
0.8 min
0.42±0.06
0.42±0.06
0.47±0.06
1.5±0.1
1.5±0.1
0.4 +0.03 -0.02

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