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XL217 SOP8 / XT217 TO92

Datasheet - production data

Features

- Outuput voltage range: 1.2 to 37 V
- Outuput current in excess of 100 mA
- Output current up to 100 mA
- Line regulation typ. 0.01%
- Load regulation typ. 0.1%
- Thermal overload protection
- Short-circuit protection
- Output transition safe area compensation
- Floating operation for high voltage applications

Description

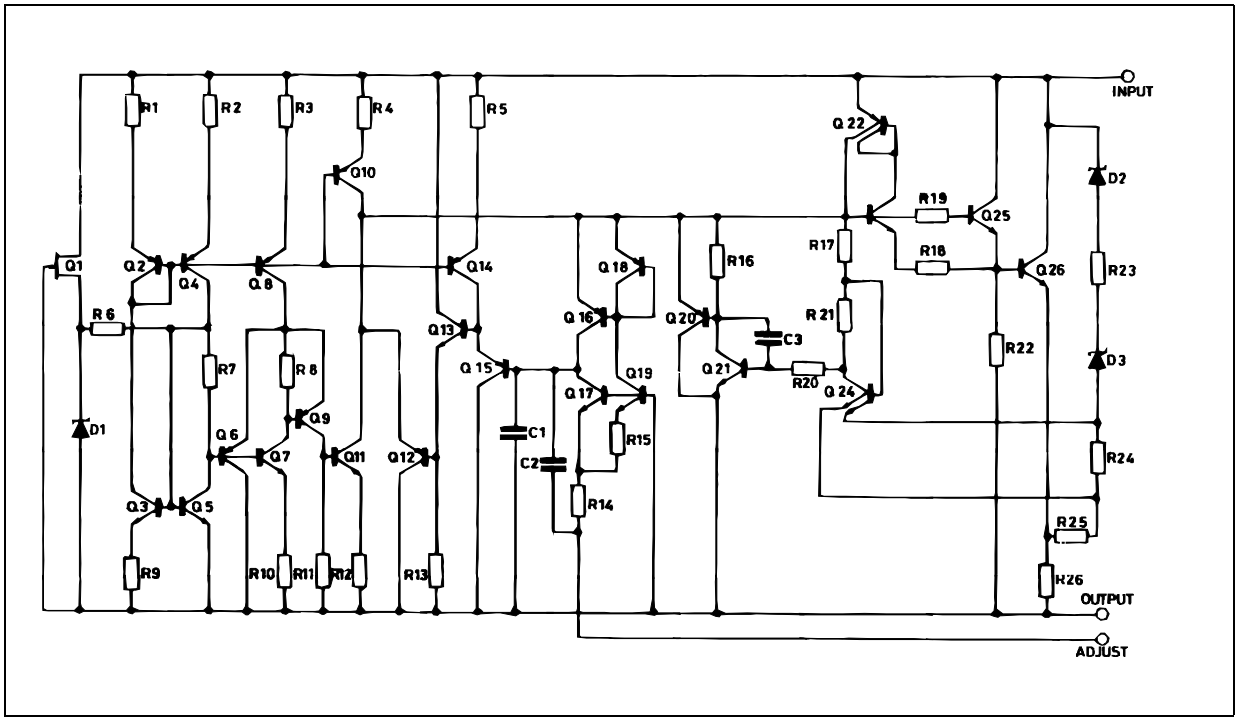
The XL217 are monolithic integrated circuits in SO-8 and TO-92 packages intended for use as positive adjustable voltage regulators. They are designed to supply up to 100 mA of load current with an output voltage adjustable over a 1.2 to 37 V range.The nominal output voltage is selected by means of only a resistive divider, making the device exceptionally easy to use and eliminating the stocking of many fixed regulators.

Table 1. Device summary

Order codes	
SO-8 (tape and reel)	**TO-92 (Bag)**
XL217	
XL217	XT217

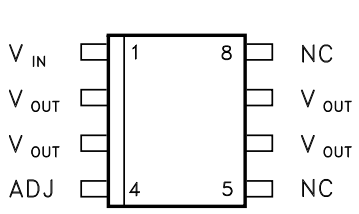
1 Diagram

Figure 1. Schematic diagram

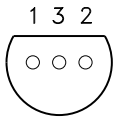


2 Pin configuration

Figure 2. Pin connections (top view for SO-8, bottom view for TO-92)



SO-8



PIN 1 = ADJUST
PIN 2 = IN
PIN 3 = OUT

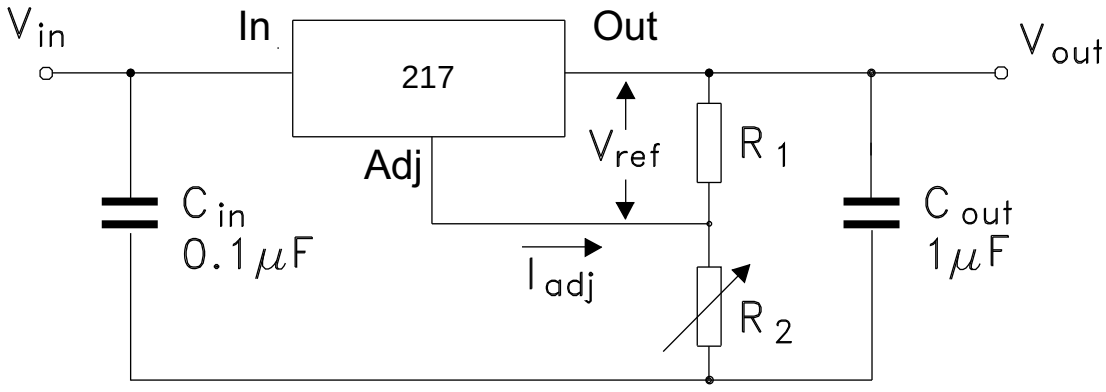
TO-92

3 Maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_I-V_O	Input-output differential voltage		40	V
P_D	Power dissipation		Internally limited	mW
T_{OP}	Operating junction temperature range	for XL217	-40 to 125	°C
		for XT217	0 to 125	
T_{STG}	Storage temperature range		-55 to 150	°C

Figure 3. Test circuit



4 Electrical characteristics

(Refer to the test circuits, T_J = - 40 to 125°C, V_I - V_O = 5 V, I_O = 40 mA, unless otherwise specified)

Table 3. Electrical characteristics of XL217

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
DV_O	Line regulation	V_I - V_O = 3 to 40 V, I_L 20 mA	T_J = 25°C		0.01	0.02	%/V
					0.02	0.05	
DV_O	Load regulation	$V_O \leq$ 5 V, I_O = 5 to 100 mA	T_J = 25°C		5	15	mV
					20	50	
		$V_O \geq$ 5 V, I_O = 5 to 100 mA	T_J = 25°C		0.1	0.3	%
					0.3	1	
I_{ADJ}	Adjustment pin current				50	100	µA
DI_{ADJ}	Adjustment pin current	V_I - V_O = 3 to 40 V, I_O = 5 to 100 mA P_d < 625 mW			0.2	5	µA
V_{REF}	Reference voltage	V_I - V_O = 3 to 40 V, I_O = 10 to 500 mA P_d < 625 mW		1.2	1.25	1.3	V
DV_O/V_O	Output voltage temperature stability				0.7		%
$I_{O(min)}$	Minimum load current	V_I - V_O = 40 V			3.5	5	mA
$I_{O(max)}$	Maximum output current	V_I - V_O = 3 to 13 V		100	200		mA
		V_I - V_O = 40 V			50		
eN	Output noise voltage	B = 10 Hz to 10 KHz, T_J = 25°C			0.003		%
SVR	Supply voltage rejection (1)	T_J = 25°C f = 120 Hz	C_{ADJ} = 0		65		dB
			C_{ADJ} = 10 µF	66	80		

1. C_{ADJ} is connected between adjust pin and ground.

(Refer to the test circuits, T_J = 0 to 125°C, V_I - V_O = 5 V, I_O = 40 mA, unless otherwise specified)

Table 4. Electrical characteristics of XL217

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
DV_O	Line regulation	V_I - V_O = 3 to 40 V, I_L < 20 mA	T_J = 25°C		0.01	0.04	%/V
					0.02	0.07	
DV_O	Load regulation	$V_O \leq$ 5 V, I_O = 5 to 100 mA	T_J = 25°C		5	25	mV
					20	70	
		$V_O \geq$ 5 V, I_O = 5 to 100 mA	T_J = 25°C		0.1	0.5	%
					0.3	1.5	
I_{ADJ}	Adjustment pin current				50	100	µA
DI_{ADJ}	Adjustment pin current	V_I - V_O = 3 to 40 V, I_O = 5 to 100 mA P_d < 625 mW			0.2	5	µA
V_{REF}	Reference voltage	V_I - V_O = 3 to 40 V, I_O = 5 to 100 mA P_d < 625 mW		1.2	1.25	1.3	V
DV_O/V_O	Output voltage temperature stability				0.7		%
$I_{O(min)}$	Minimum load current	V_I - V_O = 40 V			3.5	5	mA
$I_{O(max)}$	Maximum output current	V_I - V_O = 3 to 13 V		100	200		mA
		V_I - V_O = 40 V			50		
eN	Output noise voltage	B = 10 Hz to 10 KHz, T_J = 25°C			0.003		%
SVR	Supply voltage rejection (1)	T_J = 25°C f = 120 Hz	C_{ADJ} = 0		65		dB
			C_{ADJ} = 10 µF	66	80		

1. C_{ADJ} is connected between adjust pin and ground.

5 Typical performance

Figure 4. Current limit

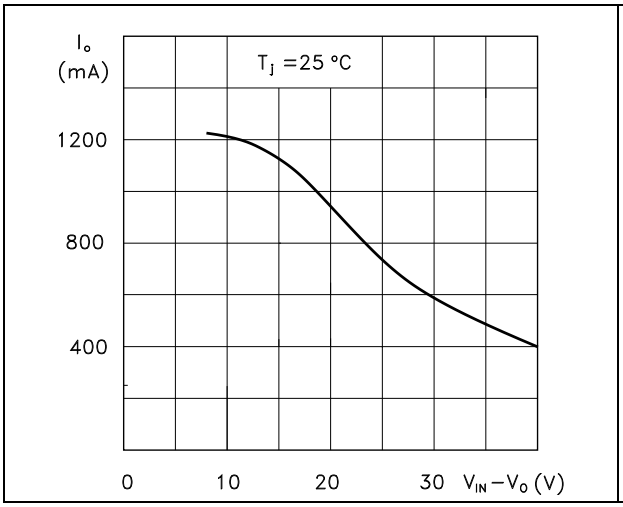
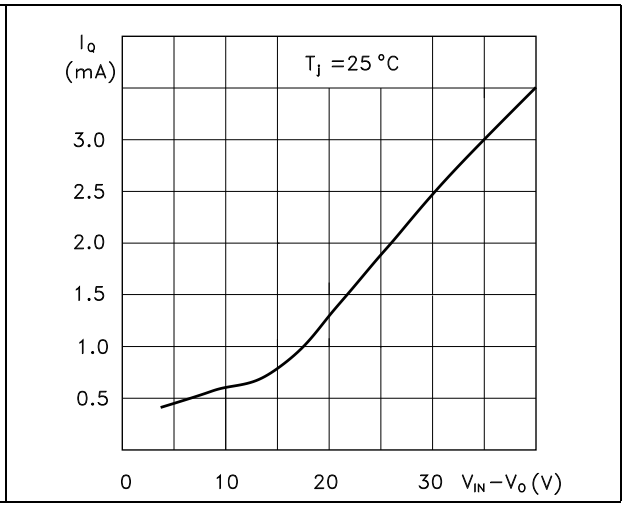


Figure 5. Minimum operating current



6 Application information

The XL217 provides an internal reference voltage of 1.25 V between the output and adjustments terminals. This is used to set a constant current flow across an external resistor divider (see *Figure 6.*), giving an output voltage V_O of:

$V_O = V_{REF} (1 + R_2/R_1) + I_{ADJ} R_2$

The device was designed to minimize the term I_{ADJ} (100 µA max) and to maintain it very constant with line and load changes. Usually, the error term $I_{ADJ} \times R_2$ can be neglected. To obtain the previous requirement, all the regulator quiescent current is returned to the output terminal, imposing a minimum load current condition. If the load is insufficient, the output voltage will rise.

Since the XL217 is a floating regulator and "sees" only the input-to-output differential voltage, supplies of very high voltage with respect to ground can be regulated as regulator as the maximum input-to-output differential is not exceeded. Furthermore, programmable regulators are easily obtainable and, by connecting a fixed resistor between the adjustment and output, the device can be used as a precision current regulator. In order to optimize the load regulation, the current set resistor R_1 (see *Figure 6.*) should be tied as close as possible to the regulator, while the ground terminal of R_2 should be near the ground of the load to provide remote ground sensing.

7 Application circuits

Figure 6. Basic adjustable regulator

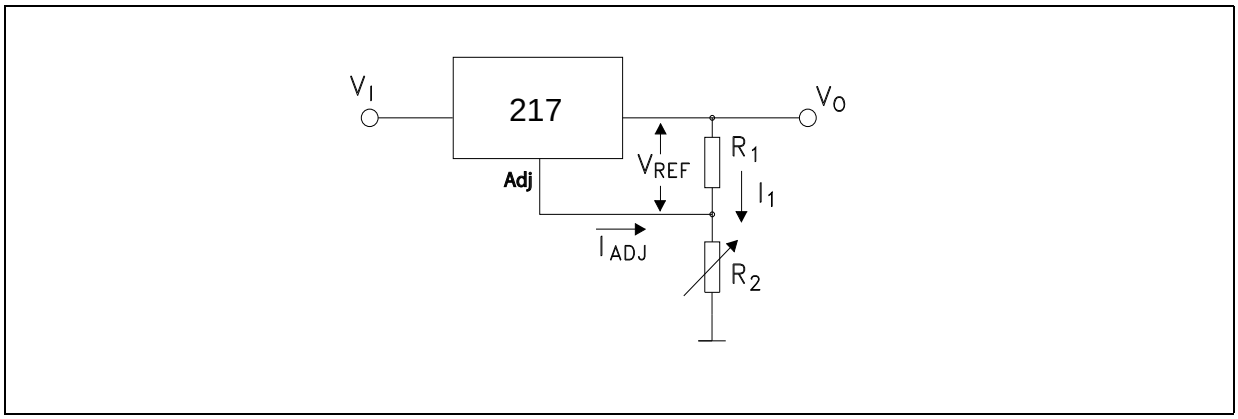


Figure 7. Voltage regulator with protection diodes

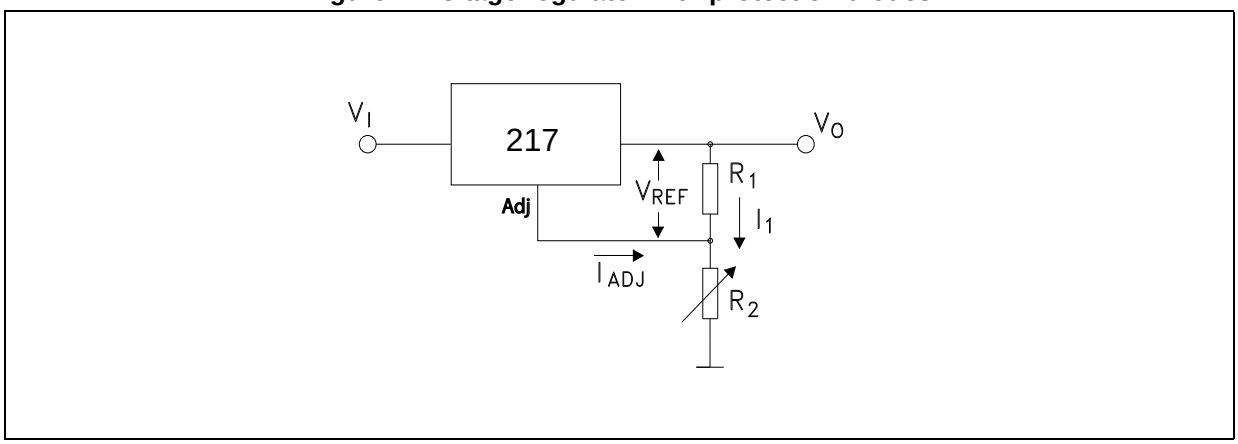


Figure 8. Slow turn-on 15 V regulator

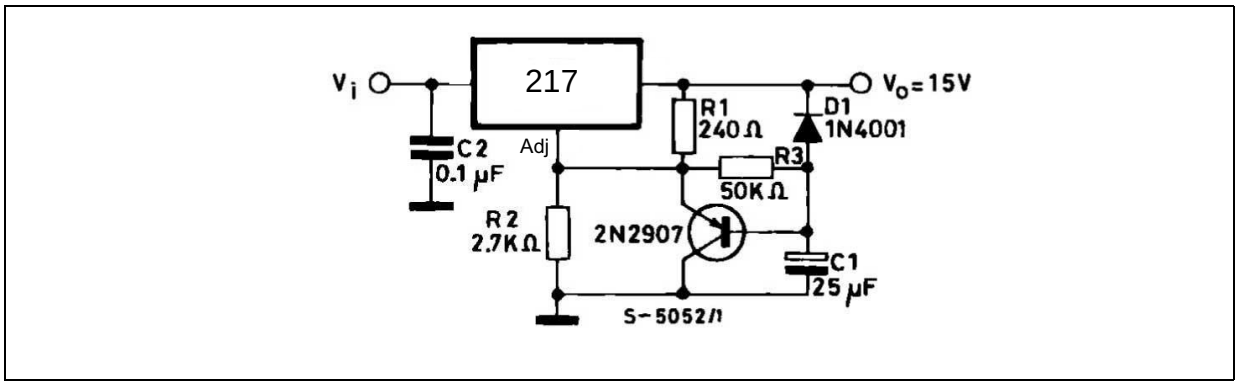
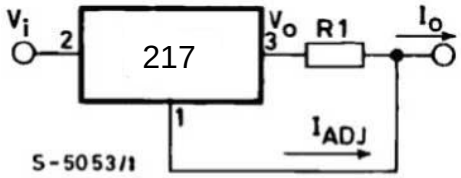


Figure 9. Current regulator



$I_O=V_{REF}/R_1 + I_{ADJ} = 1.25V/R_1$

Figure 10. 5 V Electronic shut-down regulator

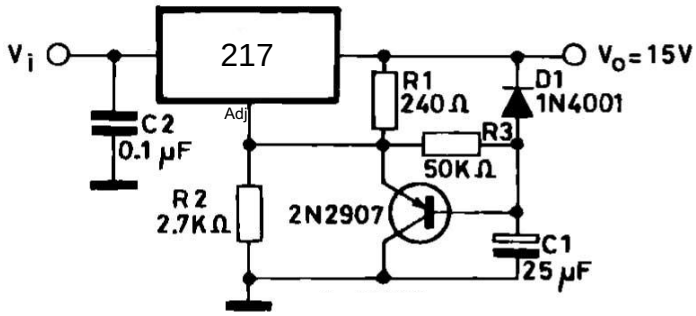
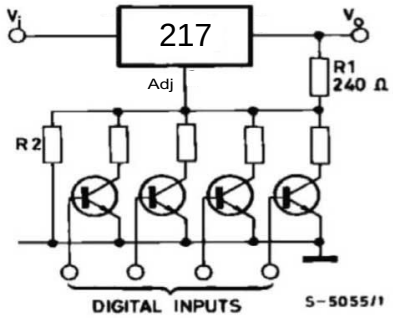
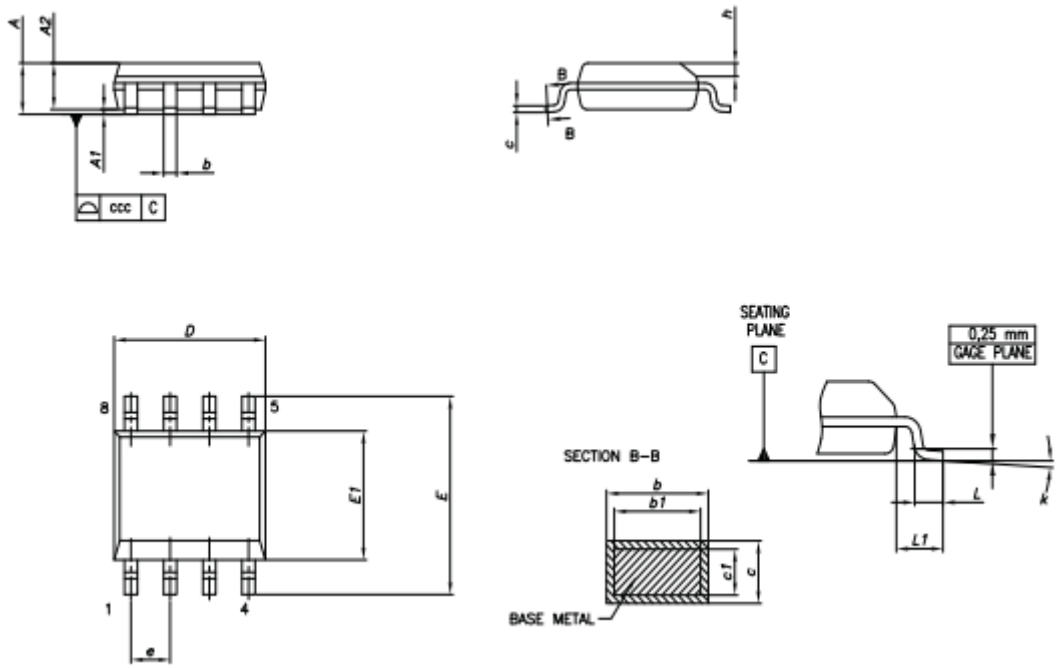


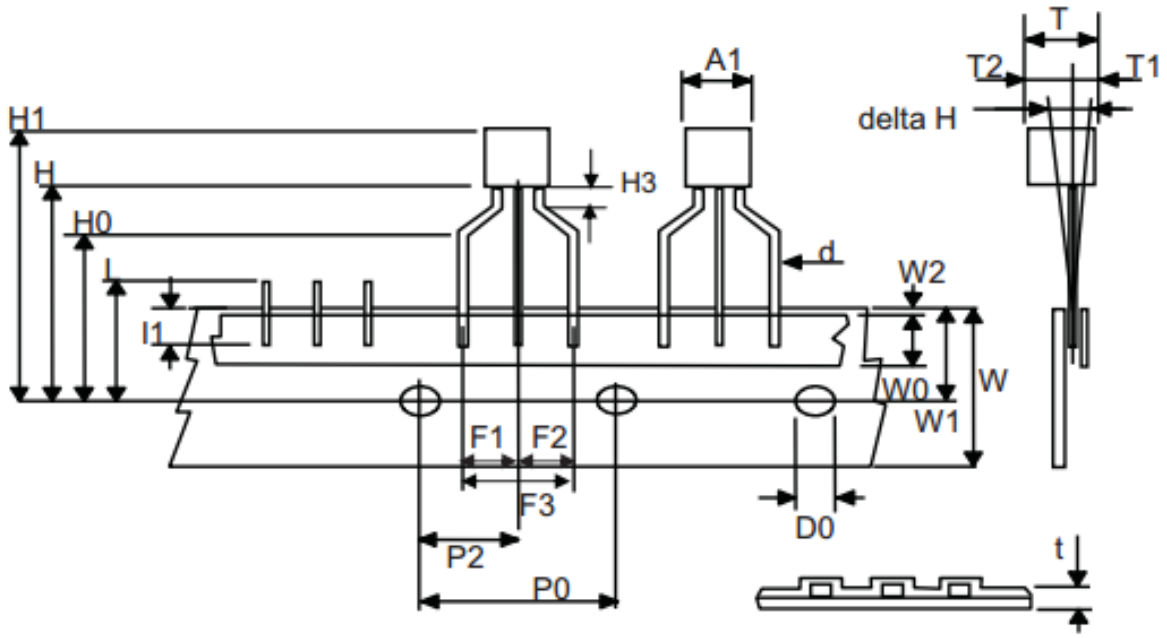
Figure 11. Digitally selected outputs



(R_2 = sets maximum V_O)



Dim.	mm		
	Min.	Typ.	Max.
A			1.75
A1	0.10		0.25
A2	1.25		
b	0.31		0.51
b1	0.28		0.48
c	0.10		0.25
c1	0.10		0.23
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e		1.27	
h	0.25		0.50
L	0.40		1.27
L1		1.04	
L2		0.25	
k	0°		8°
ccc			0.10



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