



- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

### Product Summary

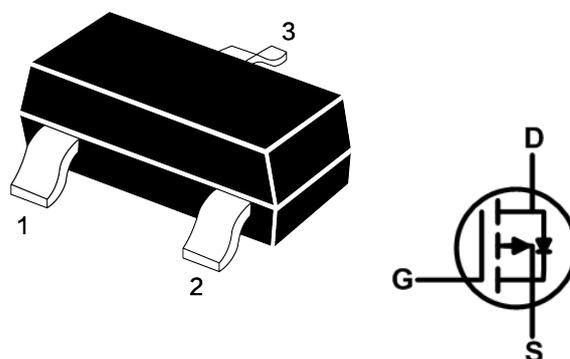
BVDSS	RDSON	ID
-60V	160 mΩ	-2 A

### Description

The JH2309 is the high cell density trenched P-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications.

The JH2309 meet the RoHS and Green Product requirement with full function reliability approved.

### SOT-23 Pin Configurations



### Absolute Maximum Rating

Parameter	Symbol	Value	Unit
Drain-Source voltage	$V_{DS}$	-60	V
Gate-Source voltage	$V_{GS}$	±20	
Continuous Drain Current	$I_D$	-2.0	A
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	-5.2	A
Power Dissipation	$P_D$	1	W
Junction Temperature	$T_J$	150	°C
Storage Temperature	$T_{STG}$	-55~ 150	°C
Thermal Resistance from Junction to Ambient <sup>2</sup>	$R_{θJA}$	125	°C/W

## Electrical Characteristics (T =25°C unless otherwise noted)

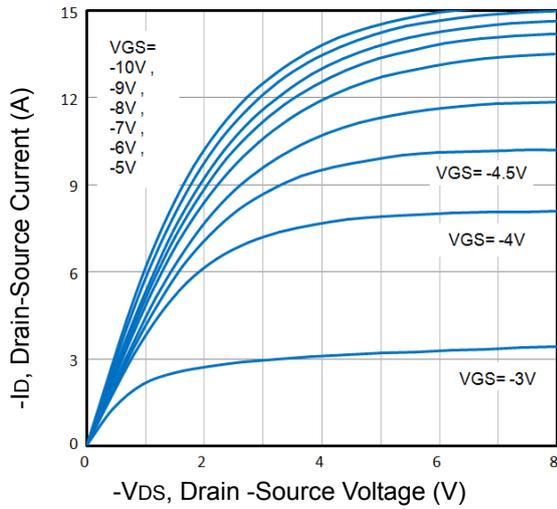
Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V I <sub>D</sub> =-250μA	-60	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current(T <sub>A</sub> =25°C)	V <sub>DS</sub> =-60V, V <sub>GS</sub> =0V	--	--	-1	μA
	Zero Gate Voltage Drain Current(T <sub>A</sub> =125°C)	V <sub>DS</sub> =-60V, V <sub>GS</sub> =0V	--	--	-100	uA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	--	--	±100	nA
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1.0	-1.5	-2.5	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance②	V <sub>GS</sub> =-10V, I <sub>D</sub> =-2A	--	160	200	mΩ
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance②	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1A	--	200	300	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, f=1MHz	--	310	--	pF
C <sub>oss</sub>	Output Capacitance		--	22	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	15	--	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-30V I <sub>D</sub> =-2A, V <sub>GS</sub> =-10V	--	5.4	--	nC
Q <sub>gs</sub>	Gate Source Charge		--	1.1	--	nC
Q <sub>gd</sub>	Gate Drain Charge		--	1.6	--	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn on Delay Time	V <sub>DD</sub> =-30V, I <sub>D</sub> =-2A, R <sub>G</sub> =3.3Ω, V <sub>GS</sub> =-10V	--	41	--	ns
t <sub>r</sub>	Turn on Rise Time		--	22	--	ns
t <sub>d(off)</sub>	Turn Off Delay Time		-	25	--	ns
t <sub>f</sub>	Turn Off Fall Time		--	32	--	ns
<b>Source Drain Diode Characteristics</b>						
I <sub>SD</sub>	Source drain current(Body Diode)	T <sub>A</sub> =25°C	--	--	-2.0	A
V <sub>SD</sub>	Forward on voltage②	T <sub>J</sub> =25°C, I <sub>SD</sub> =-2A, V <sub>GS</sub> =0V	--	-0.84	-1.2	V

Notes:

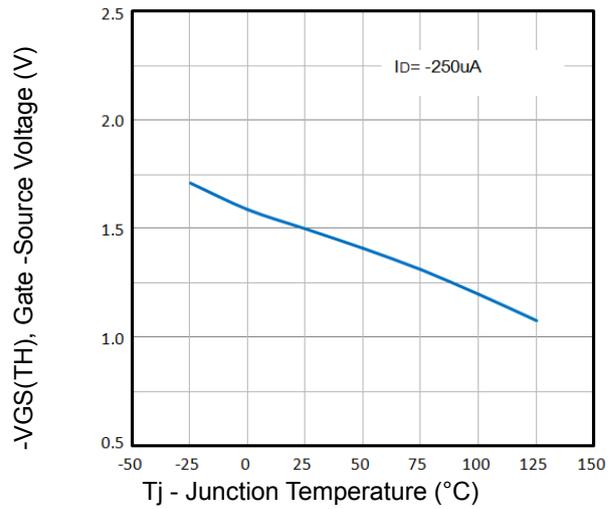
① Pulse width limited by maximum allowable junction temperature

②Pulse test ; Pulse width≤300μs, duty cycle≤2%.

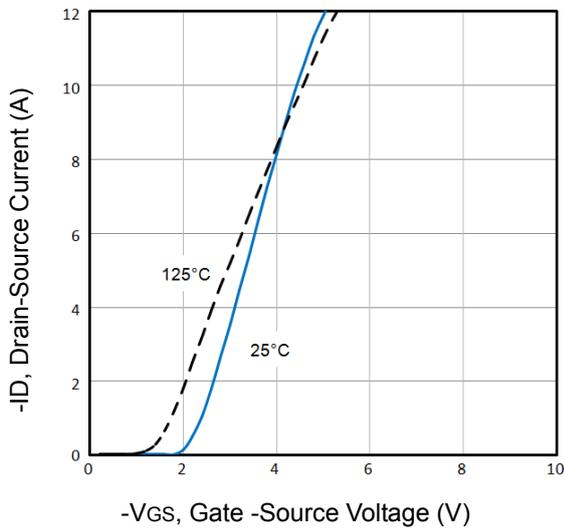
### Typical Characteristics



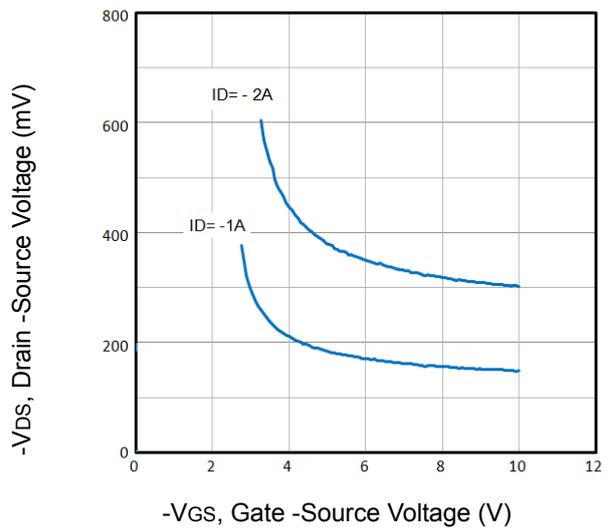
**Fig1.** Typical Output Characteristics



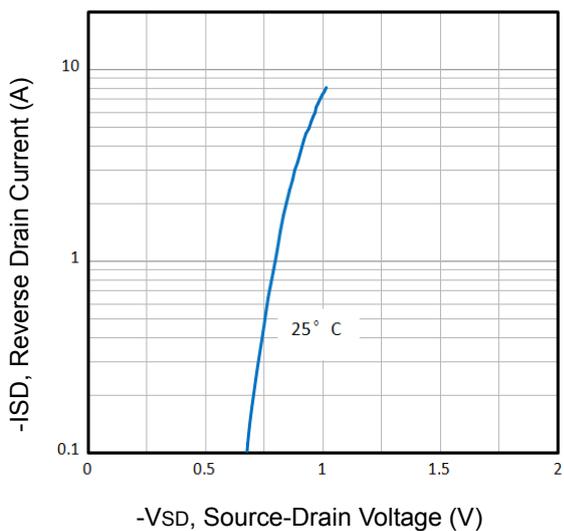
**Fig2.** Normalized Threshold Voltage Vs. Temperature



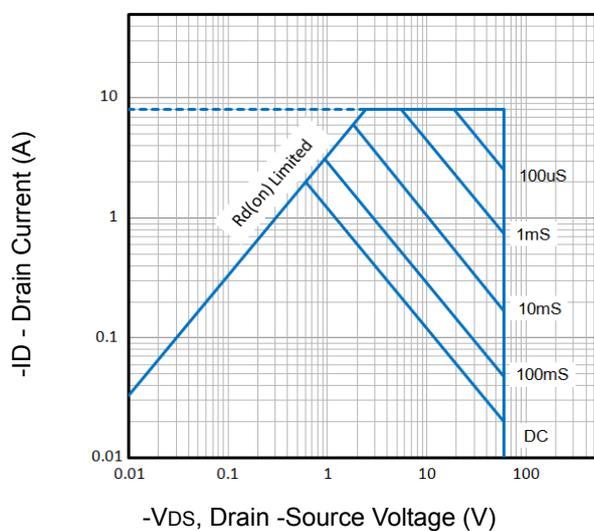
**Fig3.** Typical Transfer Characteristics



**Fig4.** Drain-Source Voltage vs Gate-Source Voltage

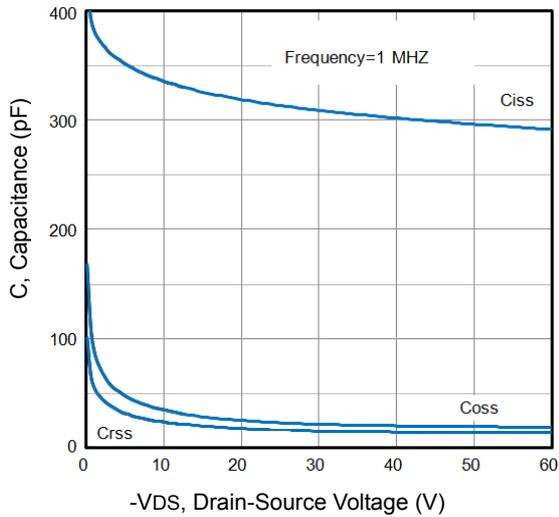


**Fig5.** Typical Source-Drain Diode Forward Voltage

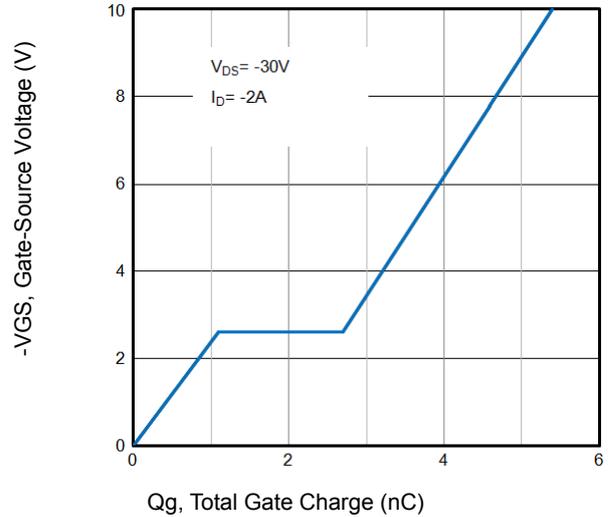


**Fig6.** Maximum Safe Operating Area

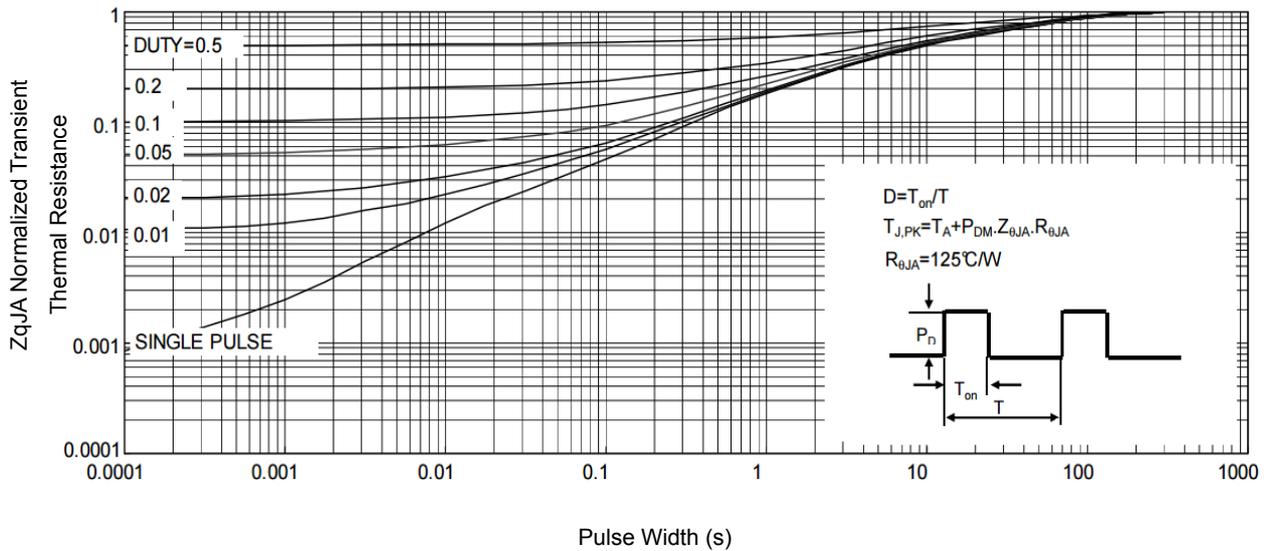
## Typical Characteristics



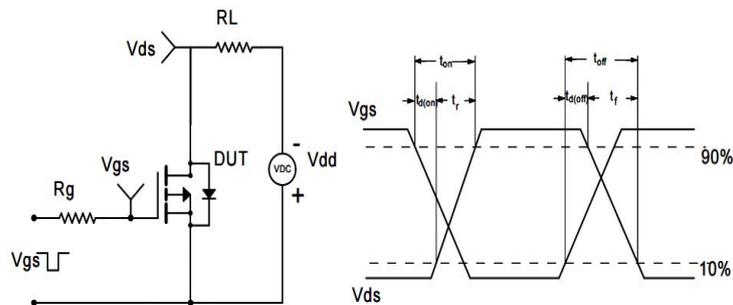
**Fig7.** Typical Capacitance Vs. Drain-Source Voltage



**Fig8.** Typical Gate Charge Vs. Gate-Source Voltage



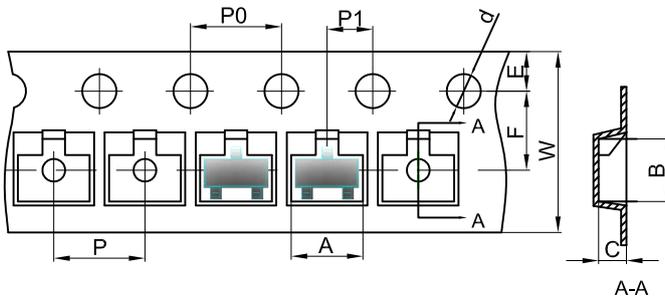
**Fig9.** Normalized Maximum Transient Thermal Impedance



**Fig10.** Switching Time Test Circuit and waveforms

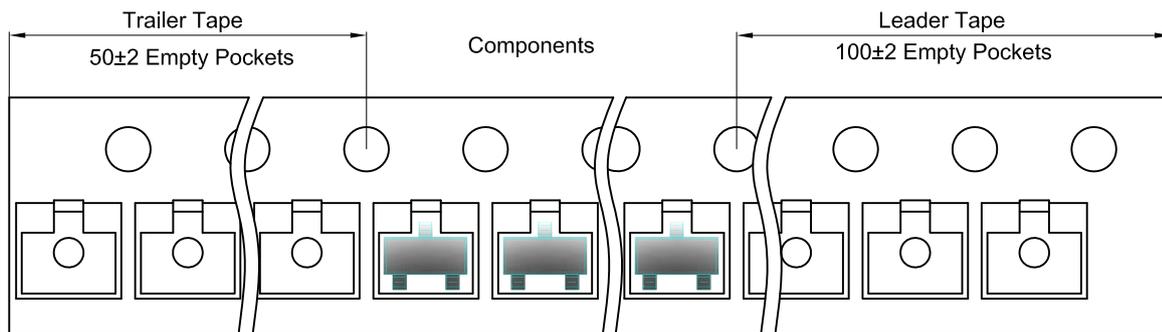
## SOT-23 Tape and Reel

### SOT-23 Embossed Carrier Tape

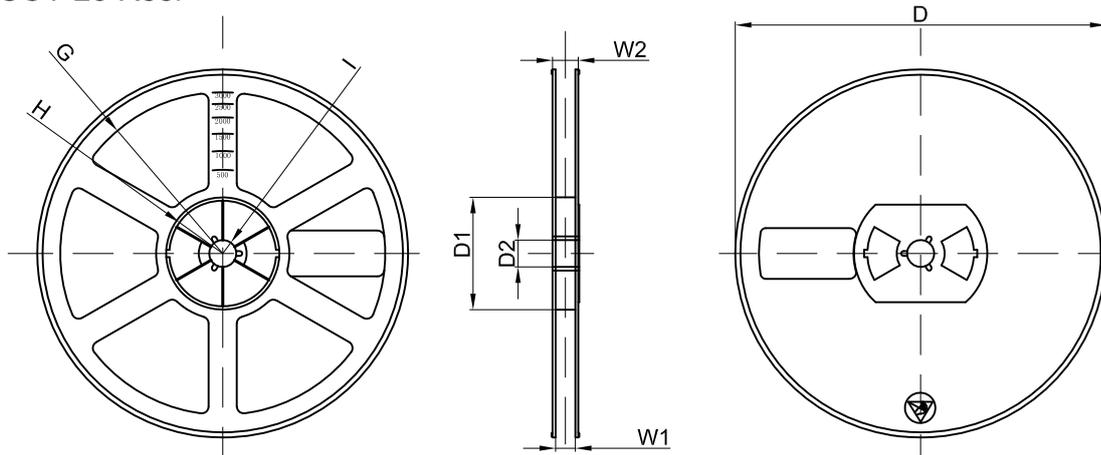


Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

### SOT-23 Tape Leader and Trailer

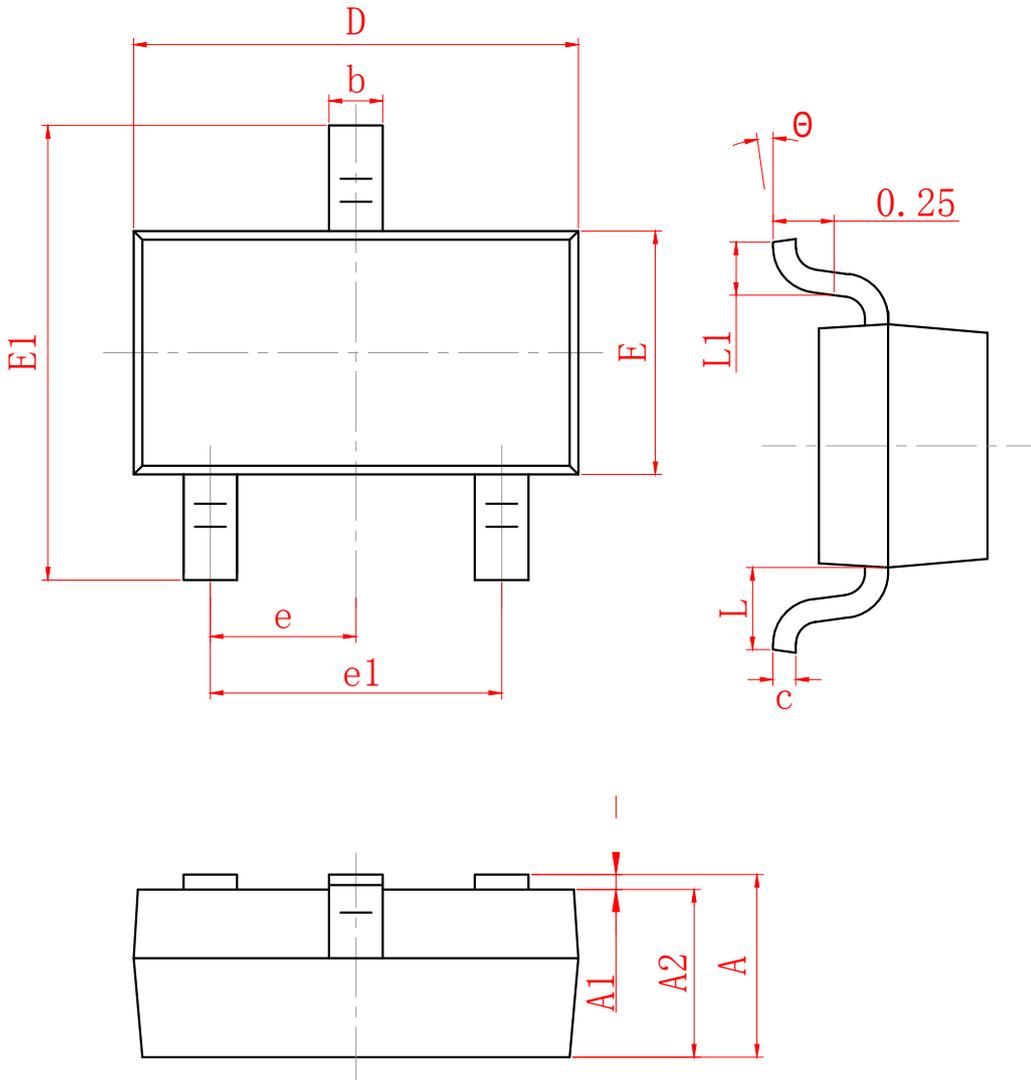


### SOT-23 Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
7" Dia	Ø178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
3000 pcs	7 inch	45,000 pcs	203×203×195	180,000 pcs	438×438×220	



SYMBOL	MILLIMETER	
	MIN	MAX
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950 TYP	
e1	1.800	2.000
L	0.550 REF	
L1	0.300	0.500
$\theta$	0°	8°

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