Features

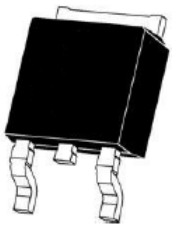
- Very Low On-resistance $R_{DS(ON)}$
- Low Crss
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

Product Summary

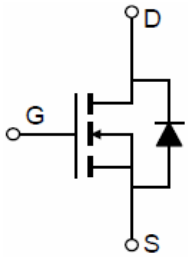
V_{DS}	30	V
$R_{DS(on),Typ}$@ V_{GS}=10 V	2.6	mΩ
I_D	120	A

Application

- PWM Application
- Load Switch
- Power Management



TO-252-2L top view



Schematic diagram

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Parameter	30N120KQ	Units
V_{DSS}	Drain-Source Voltage	30	V
I_D	Drain Current - Continuous (T_C = 25°C)	120	A
	- Continuous (T_C = 100°C)	78	A
I_{DM}	Drain Current - Pulsed (Note 1)	480	A
V_{GSS}	Gate-Source Voltage	±20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	156	mJ
P_D	Power Dissipation (T_C = 25°C)	89	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.4	°C/W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	°C
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	°C

Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =30 V, V_{GS} = 0 V	--	--	1	uA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 20V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -20 V, V_{DS} = 0 V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 uA	1.0	1.5	2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} =10 V, I_D = 20A	--	2.6	3.1	mΩ
		V_{GS} =4.5 V, I_D = 15A	--	3.5	4.5	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 15 V, V_{GS} = 0 V, f = 1.0 MHz	--	3573	-	pF
C_{oss}	Output Capacitance		--	390	-	pF
C_{rss}	Reverse Transfer Capacitance		--	353	-	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{GS}=10V, V_{DS}=15V, R_L = 3Ω ,I_D=30A (Note 3)	--	14	--	ns
t_r	Turn-On Rise Time		--	18	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	40	--	ns
t_f	Turn-Off Fall Time		--	12	--	ns
Q_g	Total Gate Charge	V_{DS} =15V, I_D =30A, V_{GS} = 10V (Note 3)	--	72	--	nC
Q_{gs}	Gate-Source Charge		--	46	--	nC
Q_{gd}	Gate-Drain Charge		--	13	--	nC
Drain Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	120	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	480	A
V_{SD}	Drain to Source Diode Forward Voltage,V_{GS} = 0V, I_{SD} =30A,T_J = 25℃		--	0.7	1.2	V
T_{rr}	Reverse recovery time,I_F =30A dI/dt=100A/μs			48		ns
Q_{rr}	Reverse recovery charge,I_F =30A dIF/dt=100A//μs			80		nC

Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: T_J =25℃, V_{DD} =15V, V_G =10V, R_G =25Ω, L=0.5mH, I_{AS}=25A
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

N- Channel Typical Characteristics

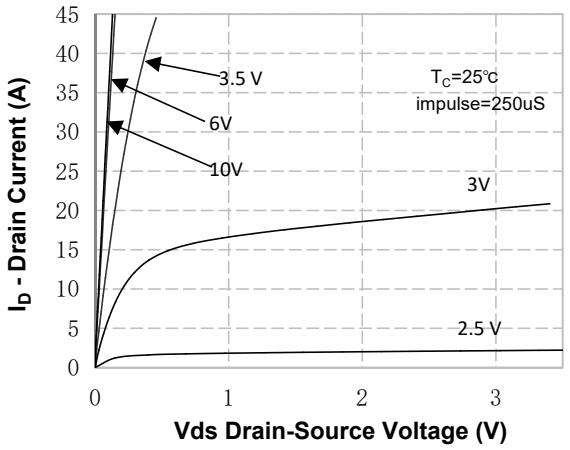


Figure 1. On-Region Characteristics

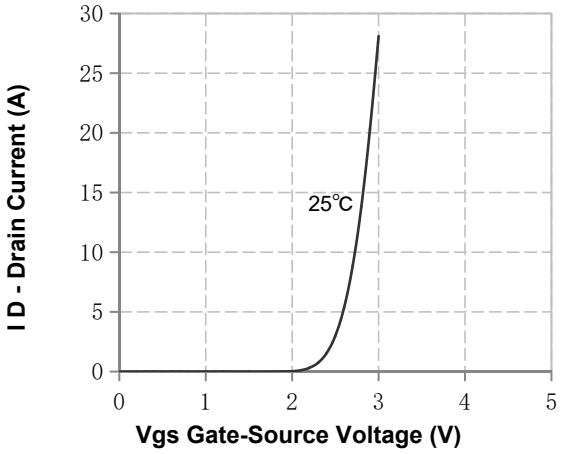


Figure 2. Transfer Characteristics

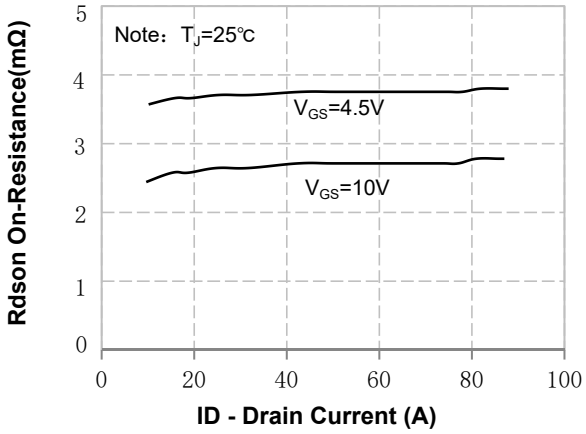


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

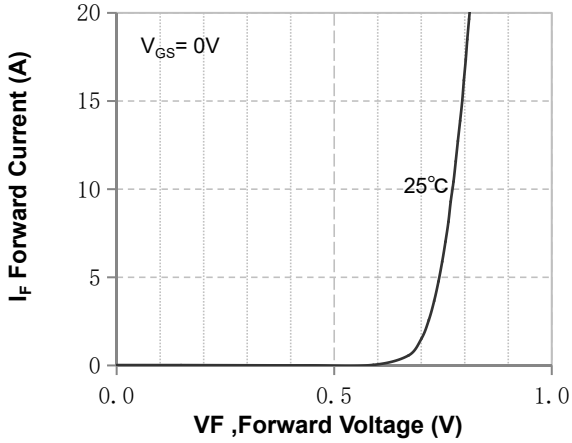


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

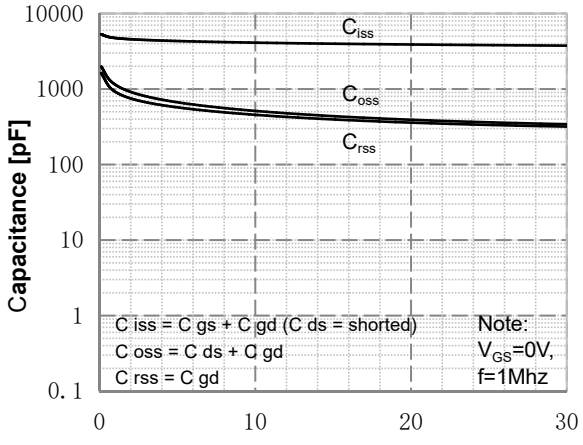


Figure 5. Capacitance Characteristics

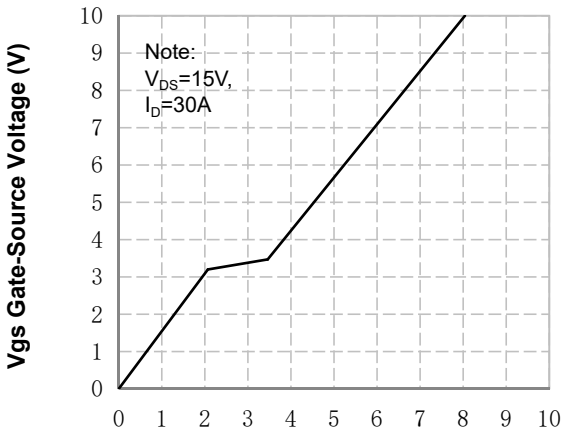


Figure 6. Gate Charge Characteristics

N- Channel Typical Characteristics (Continued)

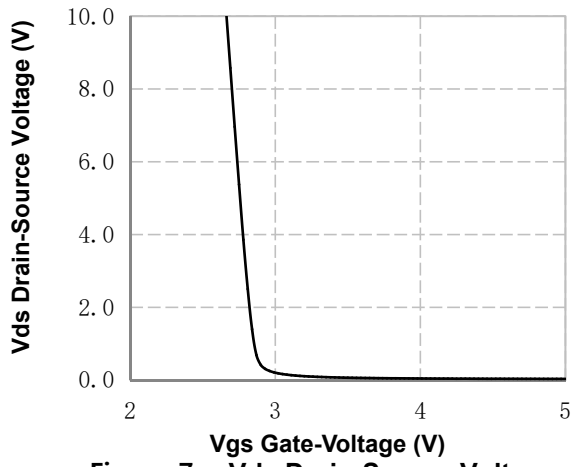


Figure 7. Vds Drain-Source Voltage vs Gate Voltage

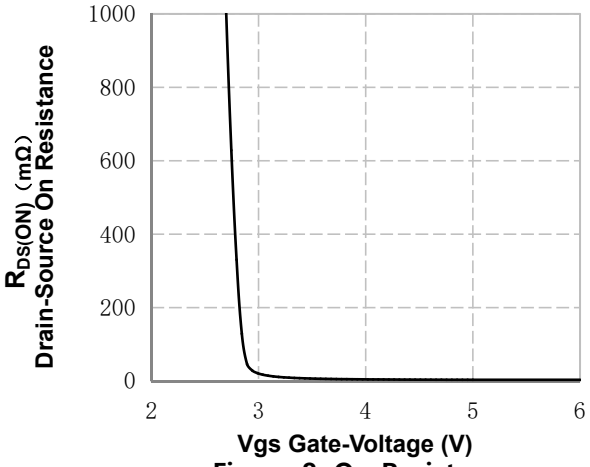


Figure 8. On-Resistance vs Gate Voltage

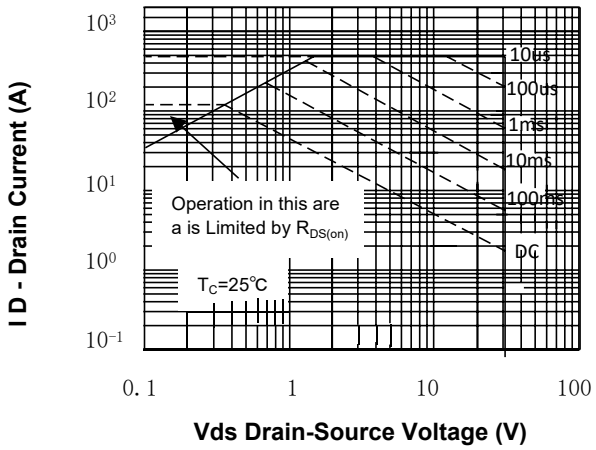


Figure 9. Maximum Safe Operating Area

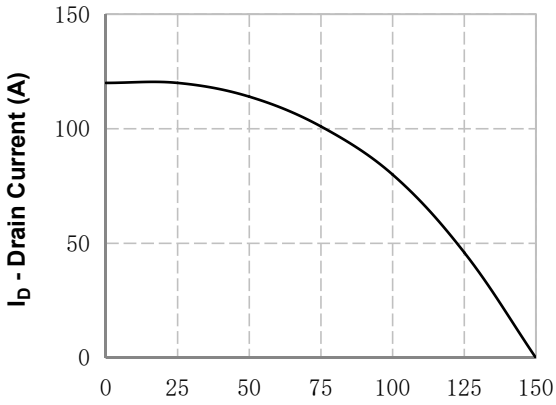


Figure 10. Maximum Continuous Drain Current vs Temperature

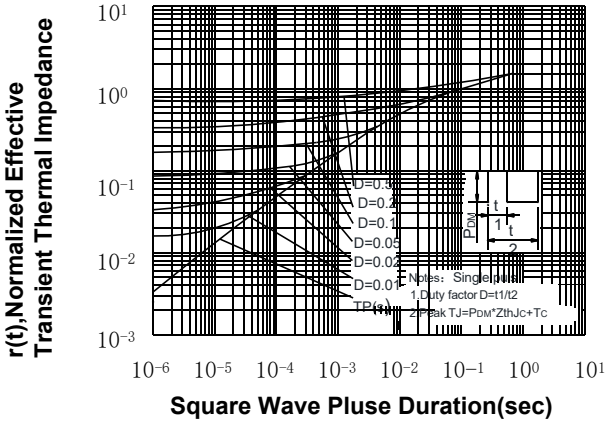
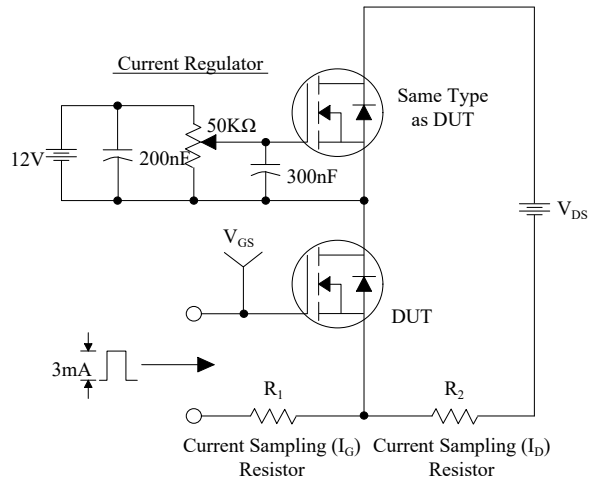
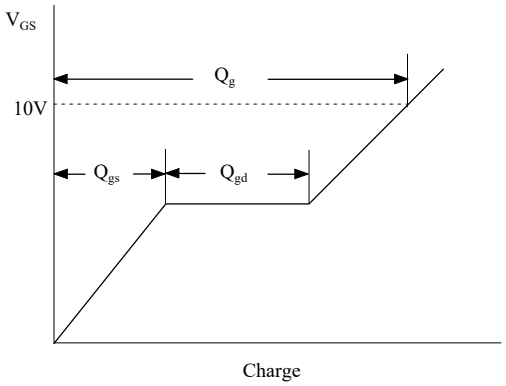


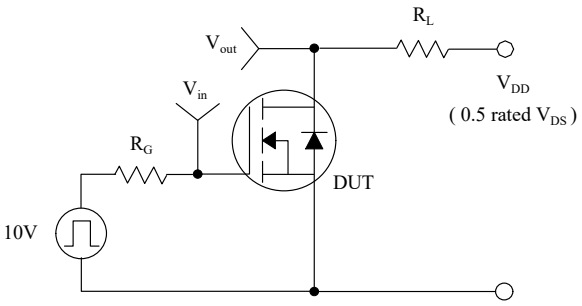
Figure 11. Transient Thermal Response Curve

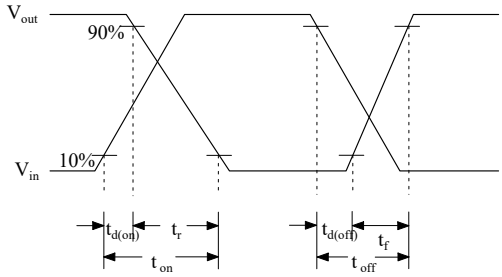
Gate Charge Test Circuit & Waveform



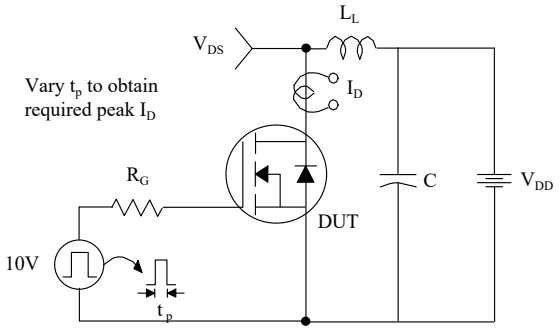


Resistive Switching Test Circuit & Waveforms

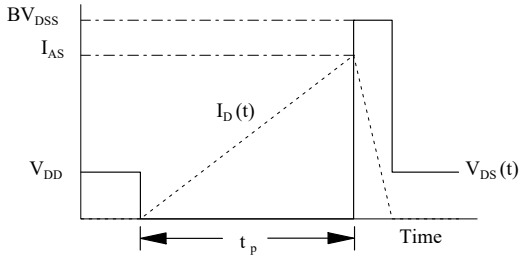




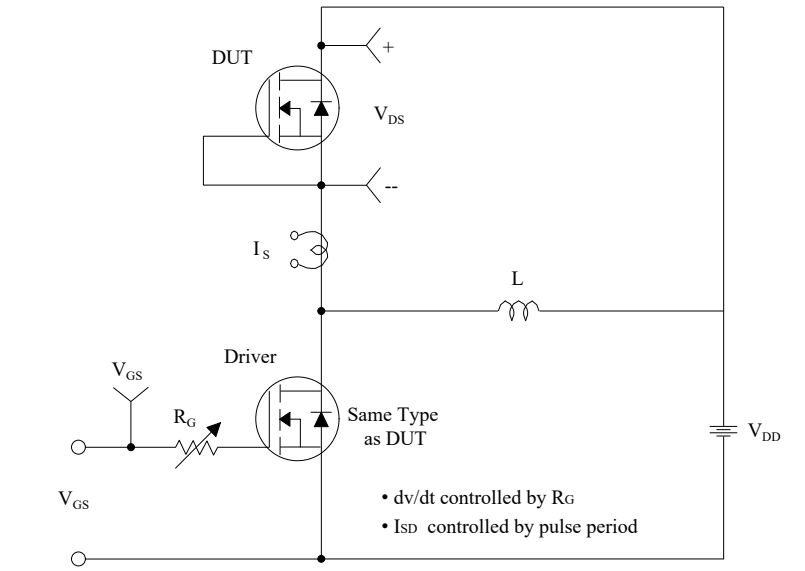
Unclamped Inductive Switching Test Circuit & Waveforms

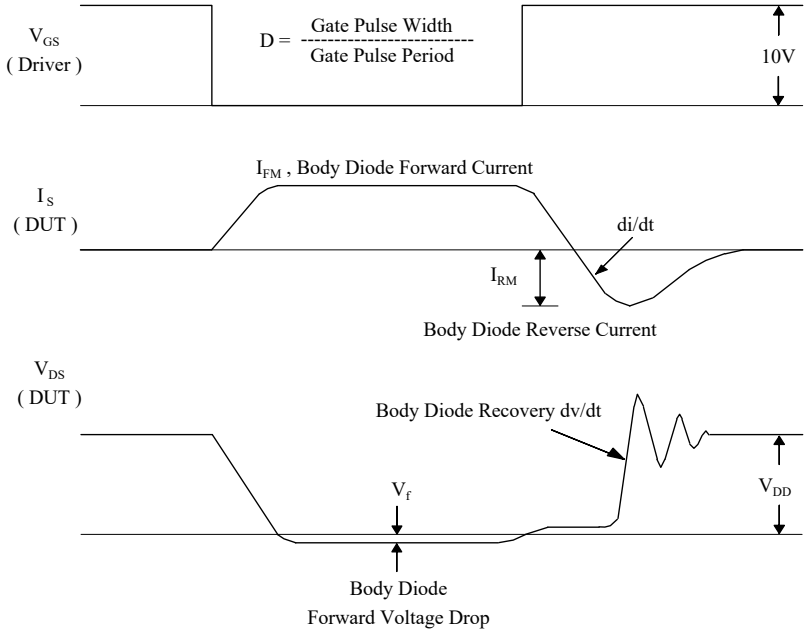


$$E_{AS} = \frac{1}{2} L_L I_{AS}^2$$



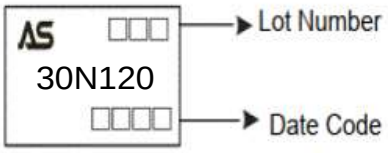
Peak Diode Recovery dv/dt Test Circuit & Waveforms



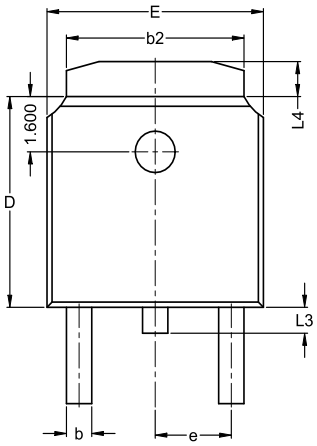


Ordering and Marking Information

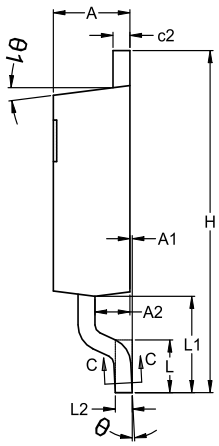
Ordering Device No.	Marking	Package	Packing	Quantity
ASDM30N120KQ-R	30N120	TO-252	Tape&Reel	2500/Reel

PACKAGE	MARKING
TO-252	

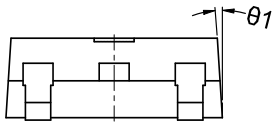
TO-252 PACKAGE IN FORMATION



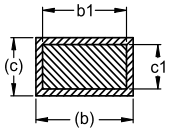
TOP VIEW



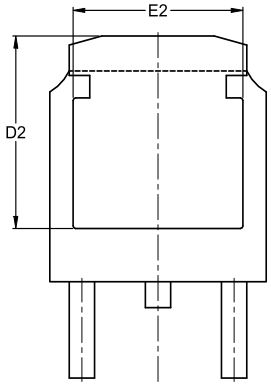
SIDE VIEW(Right)



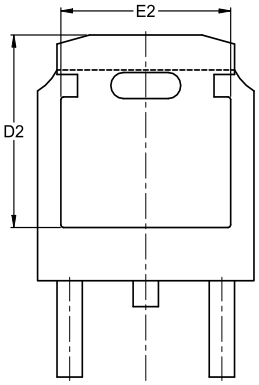
SIDE VIEW(Front)



SECTION:C-C



OPTION 1
BOTTOM VIEW



OPTION 2
BOTTOM VIEW

DIM / SYMBOL	MIN.	NOM.	MAX.
A	2.200	2.300	2.400
A1	0.000	0.070	0.130
A2	0.950	1.050	1.150
b	0.700	0.800	0.900
b1	0.660	0.760	0.860
b2	5.134	5.334	5.534
c	0.448	0.548	0.648
c1	0.458	0.508	0.558
c2	0.448	0.548	0.648
D	6.000	6.100	6.200
D2	5.372	5.572	5.772
E	6.400	6.500	6.600
E2	4.900	5.100	5.300
e	2.286 BSC.		
H	9.700	9.900	10.100
L	1.380	1.525	1.725
L1	2.588	2.788	2.988
L2	0.508 BSC.		
L3	0.600	0.750	0.950
L4	0.812	1.012	1.212
θ	1°	3°	5°
θ1	6°	7°	8°

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