P-Channel 40V(D-S) MOSFET

Product summary		
V_{DS}	-40	V
$R_{DS(ON)}$(at V_{GS}=-10V) Typ.	40	mΩ
$R_{DS(ON)}$(at V_{GS}=-4.5V) Typ.	57	mΩ
I_D(T_A=25℃)	-5	A

Features

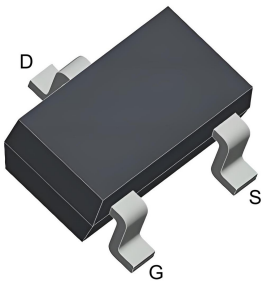
- Advanced Trench Technology
- Low Gate Charge
- Low $R_{DS(ON)}$

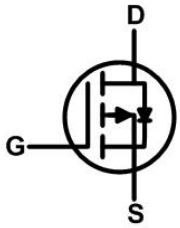
Applications

- Power management
- Load Switch

Pin Configuration

SOT23-3





Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECDB05P04A	SOT23-3	7″	3000pcs

Absolute Maximum Ratings (at T_A=25℃ Unless Otherwise Noted)

Symbol	Parameter		Rating	Units
V_{DS}	Drain-Source Voltage		-40	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current	T_A=25℃	-5	A
		T_A=100℃	-3.2	A
I_{DM}	Pulse Drain Current Tested [A]		-22	A
P_D	Power Dissipation [B]		1.4	W
T_J,T_{STG}	Junciton and Storage Temperature Range		-55 to +150	℃

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JA}$	Thermal Resistance-Junction to ambient [B]	89	℃/W

Electrical Characteristics (at T_J =25℃ Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=-250uA	-40	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-40V,V_{GS}=0V	--	--	-1	uA
I_{GSS}	Gate-Body Leakage Current	V_{DS}=0V,V_{GS}=±20V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=-250uA	-1.0	-1.6	-2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance [C]	V_{GS}=-10V,I_D=-5A	--	40	52	mΩ
		V_{GS}=-4.5V,I_D=-4A	--	57	79	mΩ
V_{SD}	Drain to Source Diode Forward Voltage	I_{SD}=-5A,V_{GS}=0V	--	--	-1.2	V
Dynamic Parameters [D]						
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=-20V f=1MHZ	--	869	--	pF
C_{oss}	Output Capacitance		--	94	--	pF
C_{rss}	Reverse Transfer Capacitance		--	69	--	pF
Q_g	Total Gate Charge	V_{DS}=-20V,I_D=-4A V_{GS}=-10V	--	17.3	--	nC
Q_{gs}	Gate-Source Charge		--	3.2	--	nC
Q_{gd}	Gate-Drain Charge		--	4.3	--	nC
$t_{D(on)}$	Turn-on Delay Time	V_{DS}=-20V, I_D=-4A,V_{GS}=-10V, R_{GEN}=3Ω	--	10.3	--	ns
t_r	Turn-on Rise Time		--	4.3	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	39	--	ns
t_f	Turn-off Fall Time		--	46.5	--	ns
t_{rr}	Reverse Recovery Time	V_{GS}=0V,I_S=-5A di/dt=100A/us	--	17	--	ns
Q_{rr}	Reverse Recovery Charge		--	11.5	--	uC

A. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

B. The data tested by surface mounted on a 1 inch x 1 inch FR-4 board with 2OZ copper.

C. Pulse Test: Pulse Width≤300us,Duty cycle ≤2%.

D. Guaranteed by design, not subject to production testing.

Typical Characteristics

Figure1: Output Characteristics

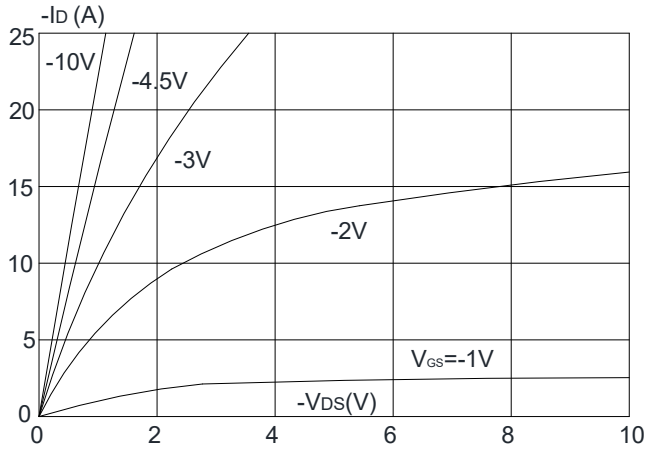


Figure 2: Typical Transfer Characteristics

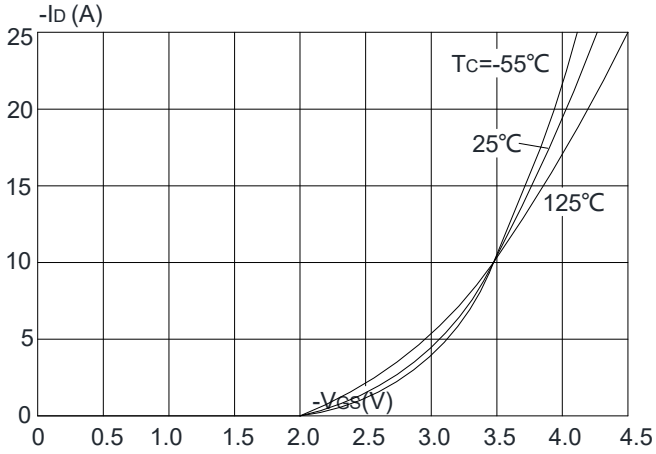


Figure 3: On-resistance vs. Drain Current

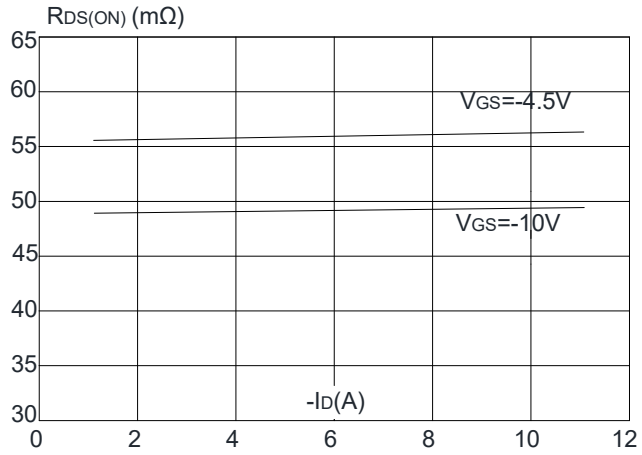


Figure 4: Body Diode Characteristics

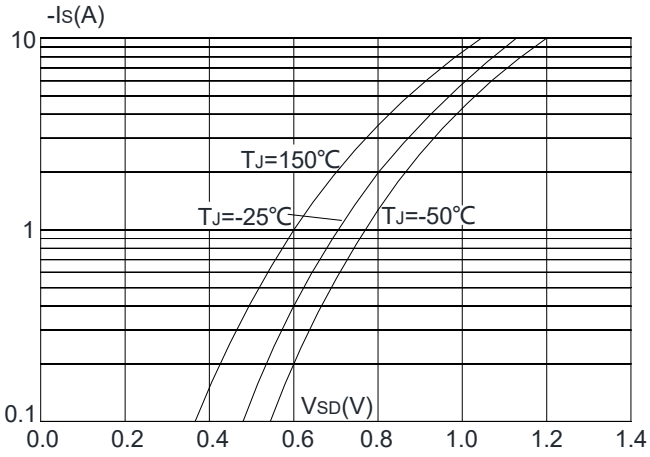


Figure 5: Gate Charge Characteristics

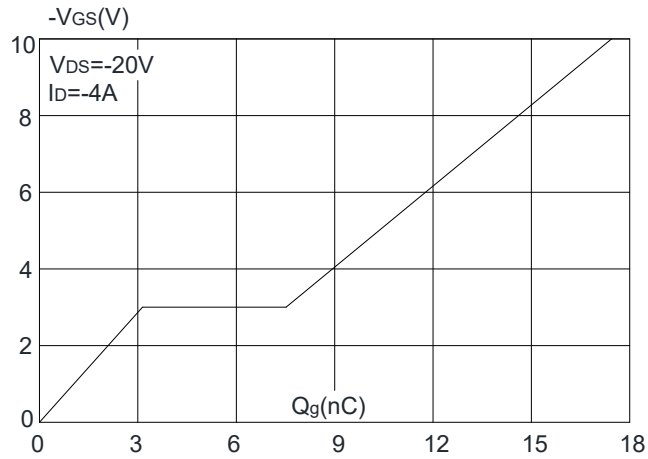
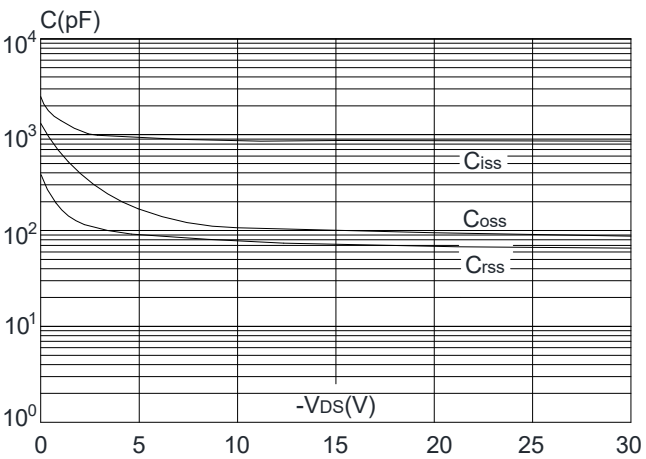


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

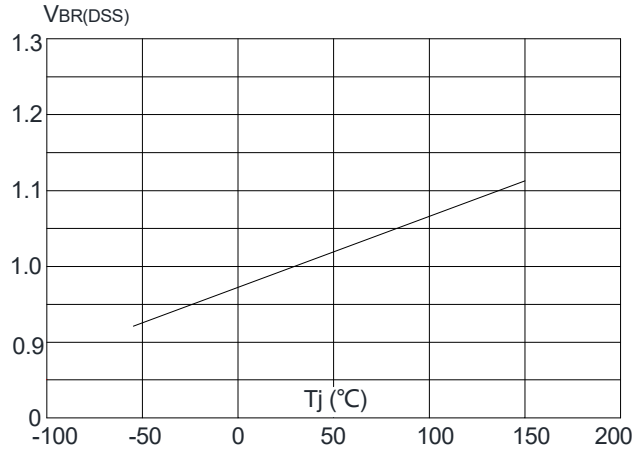


Figure 8: Normalized on Resistance vs. Junction Temperature

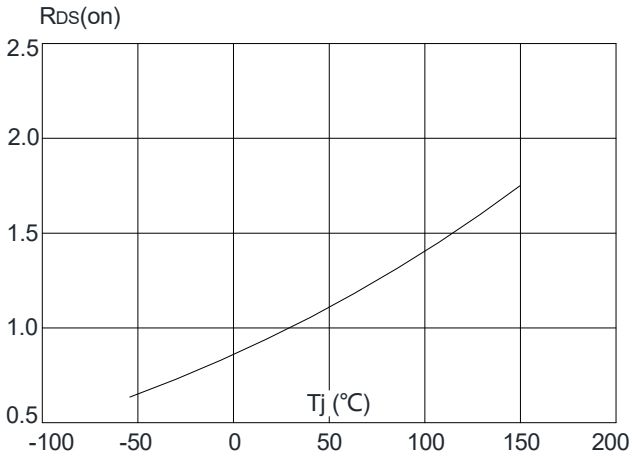


Figure 9: Maximum Safe Operating Area

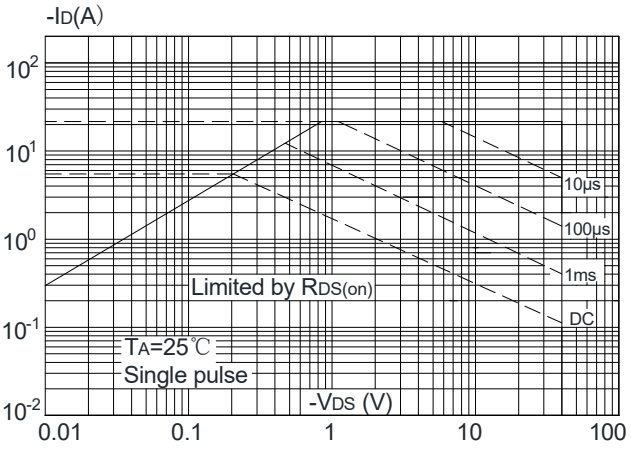


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

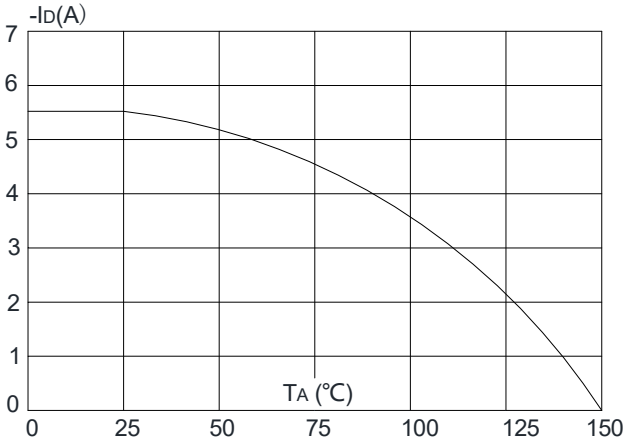
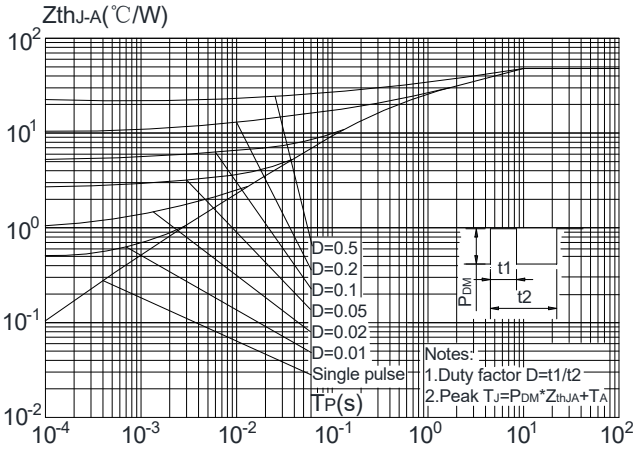
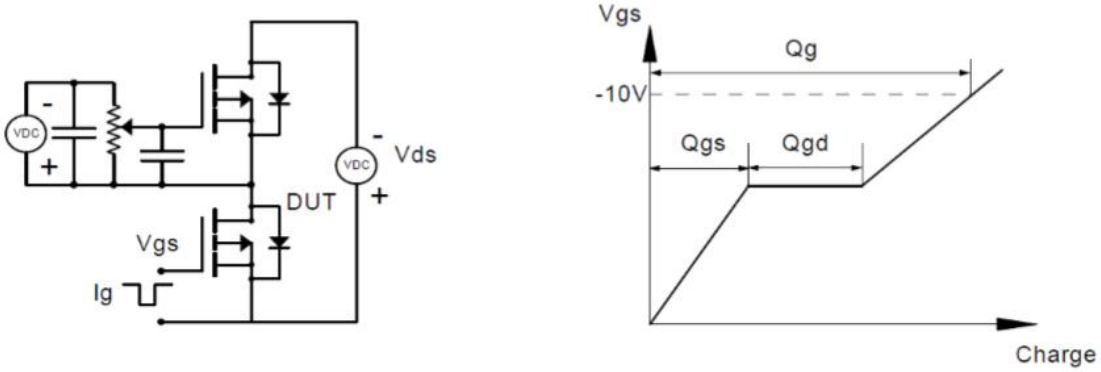


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

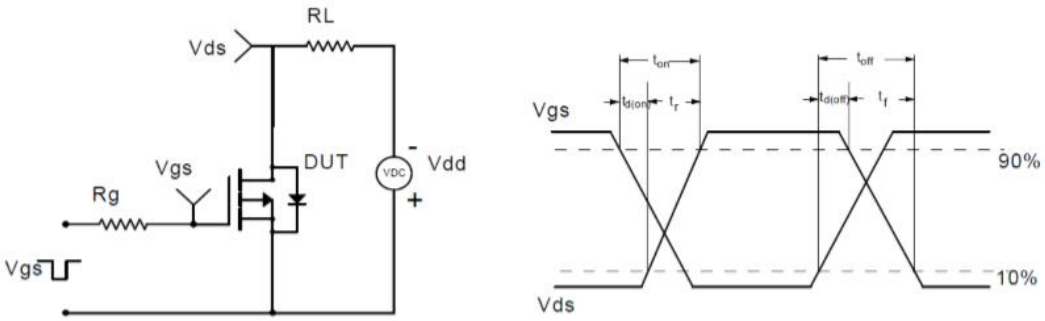


Test Circuit

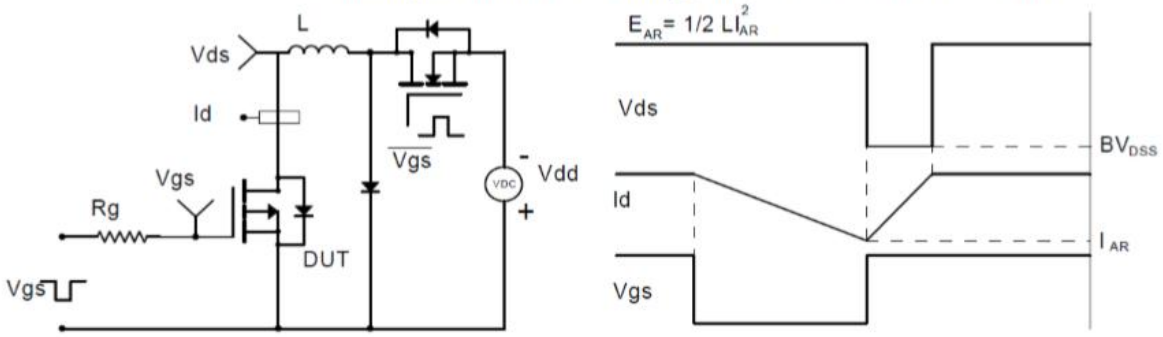
Gate Charge Test Circuit & Waveform



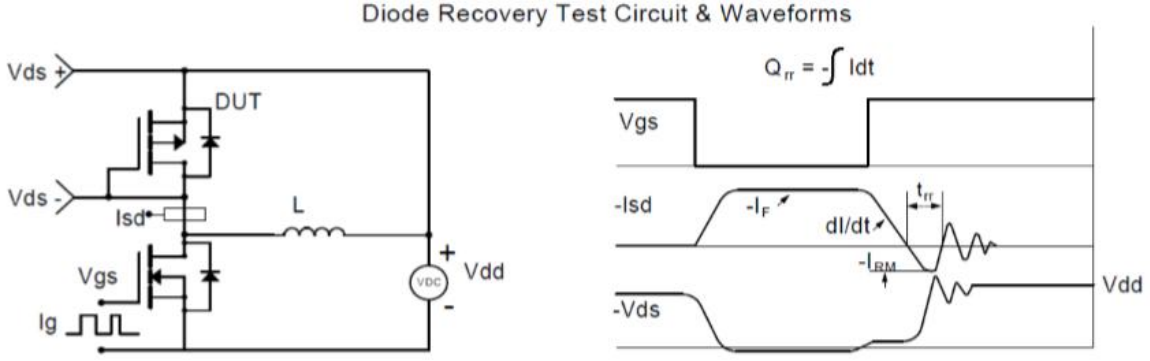
Resistive Switching Test Circuit & Waveforms



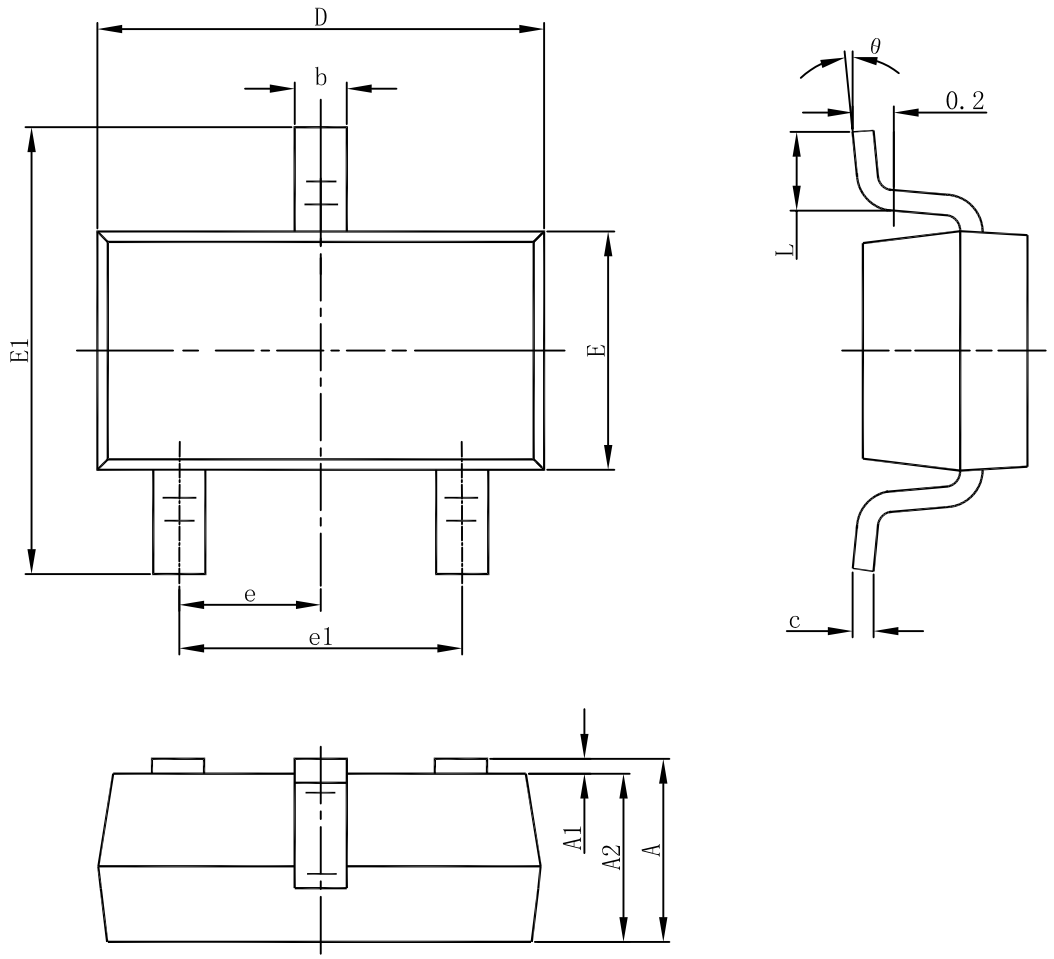
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



SOT23-3 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°