2N7002K

60V/0.3A N-Channel Advanced Power MOSFET

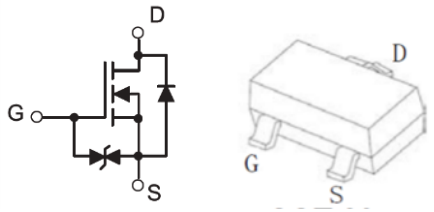
Features

- Lead free product is acquired
- Surface mount package
- High power and current handing capability
- ESD Rating：HBM 2000V

BVDSS	60	V
ID	0.3	A
RDSON@VGS=10V	1	Ω
RDSON@VGS=5V	1.3	Ω

Applications

- Direct logic-level interface: TTL/CMOS
- Drivers: relays, solenoids, lamps, hammers,display, memories, transistors, etc.
- Battery operated systems
- Solid-state relays



SOT-23

Order Information

Product	Package	Marking	Reel Size	Reel	Carton
2N7002K	SOT-23	72K	7inch	3000PCS	180000PCS

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (TC=25°C Unless Otherwise Noted)				
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		60	V
V_{GS}	Gate-Source Voltage		±20	V
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_S	Diode Continuous Forward Current	TA =25°C	0.3	A
Mounted on Large Heat Sink				
I_{DM}	Pulse Drain Current Tested (Sillicon Limit) (Note1)	TA=25°C	0.8	A
I_D	Continuous Drain current	TA =25°C	0.3	A
P_D	Maximum Power Dissipation	TA =25°C	0.35	W
$R_{\theta JA}$	Thermal Resistance Junction−to−Ambient (Note2)		350	°C/W

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Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain- Source Breakdown Voltage	VGS=0V ID=250μA	60	--	--	V
I_{DSS}	Zero Gate Voltage Drain current	VDS=60V,VGS=0V	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	±4	±10	μA
$V_{GS(TH)}$	Gate Threshold Voltage	VDS=VGS,ID=250μA	1	1.5	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance (Note3)	VGS=5V, ID=0.2A	--	1.3	4	Ω
		VGS=10V, ID=0.5A	--	1	3	Ω
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated) (Note4						
C_{iss}	Input Capacitance	VDS=25V, VGS=0V, F=1MHz	--	21	--	pF
C_{oss}	Output Capacitance		--	11	--	pF
C_{rss}	Reverse Transfer Capacitance		--	4.2	--	pF
Q_g	Total Gate Charge	VDS=10V, ID=0.3A, VGS=4.5V	--	1.7	--	nC
Switching Characteristics (Note4)						
$t_{d(on)}$	Turn-on Delay Time	VDS=30V, ID=0.2A, RG=10Ω, VGS=10V	--	10	--	nS
t_r	Turn-on Rise Time		--	50	--	nS
$t_{d(off)}$	Turn-off Delay Time		--	17	--	nS
t_f	Turn-off Fall Time		--	10	--	nS
Source- Drain Diode Characteristics@ TJ = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	IS=0.2A,VGS=0V	--	--	1.3	V

Note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: pulse width ≤ 300 us, duty cycle ≤ 2%.
4. Guranteed by design, not subject to production testing.

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Typical Characteristics

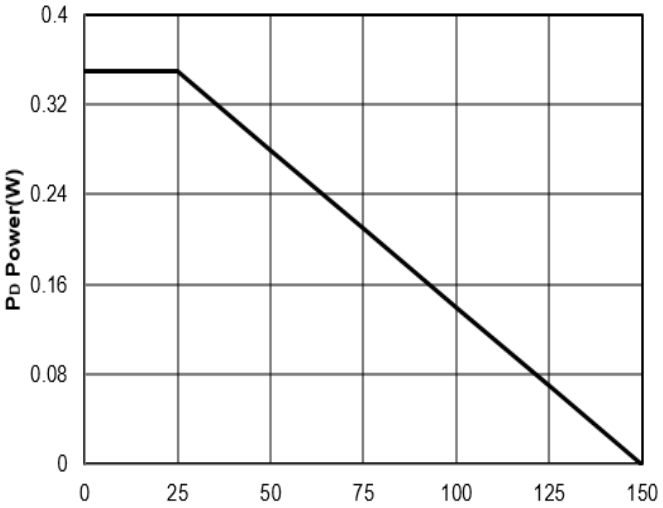

Figure1：T_J Junction Temperature（°C）

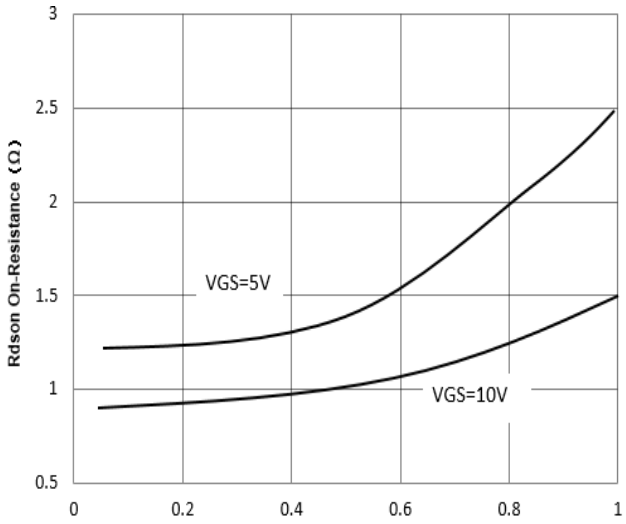

Figure2：I_D Drain Current（A）

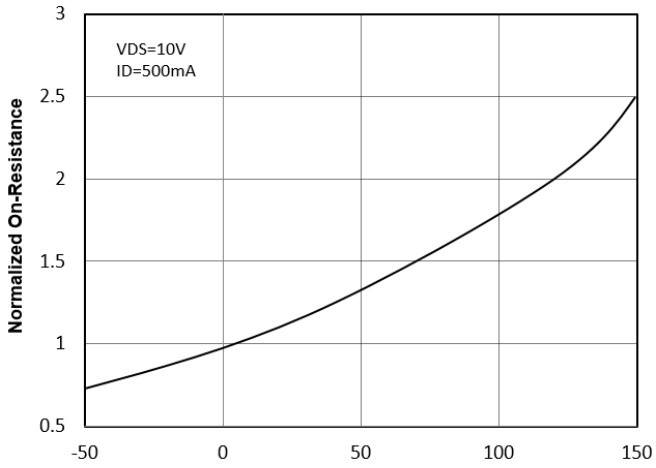

Figure3：T_J Junction Temperature（°C）

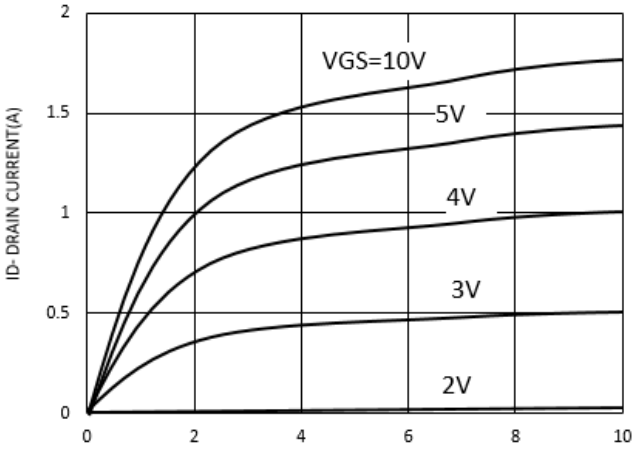

Figure4：V_{DS} Drain-Source Voltage（V）

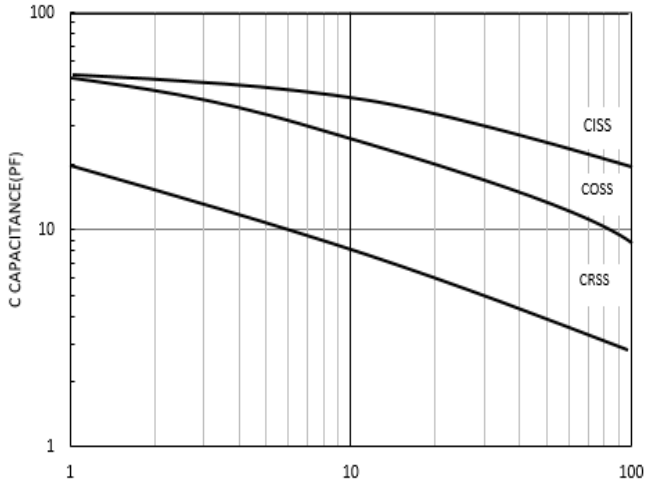

Figure5：V_{DS} Drain-Source Voltage（V）

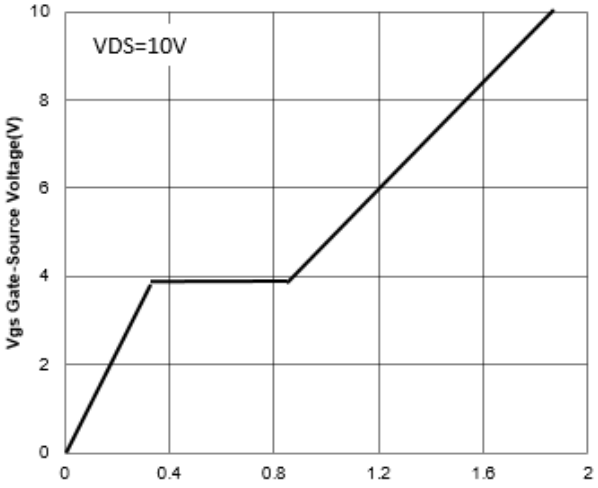

Figure6：Qg Gate Charge（nC）

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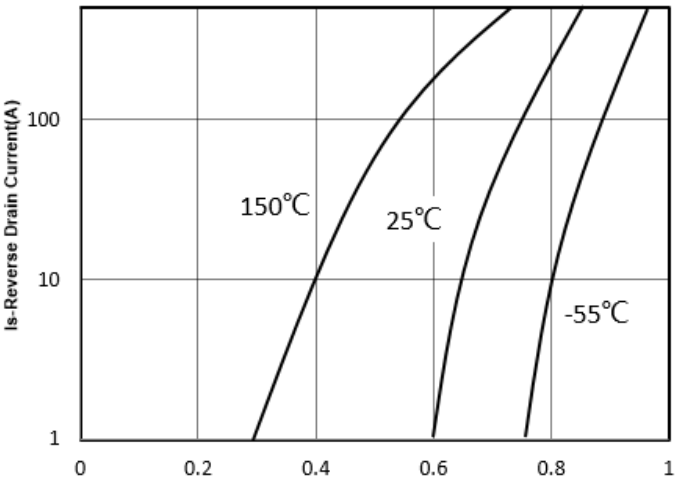

Figure7：Vsd Source-Drain Voltage（V）

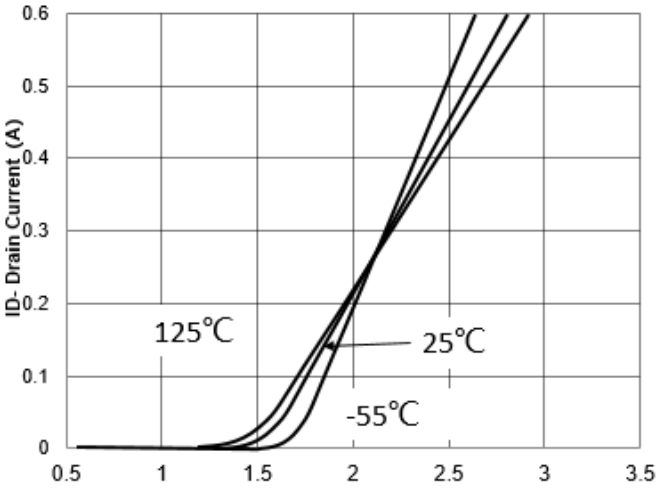

Figure8：Vgs Gate-Source Voltage（V）

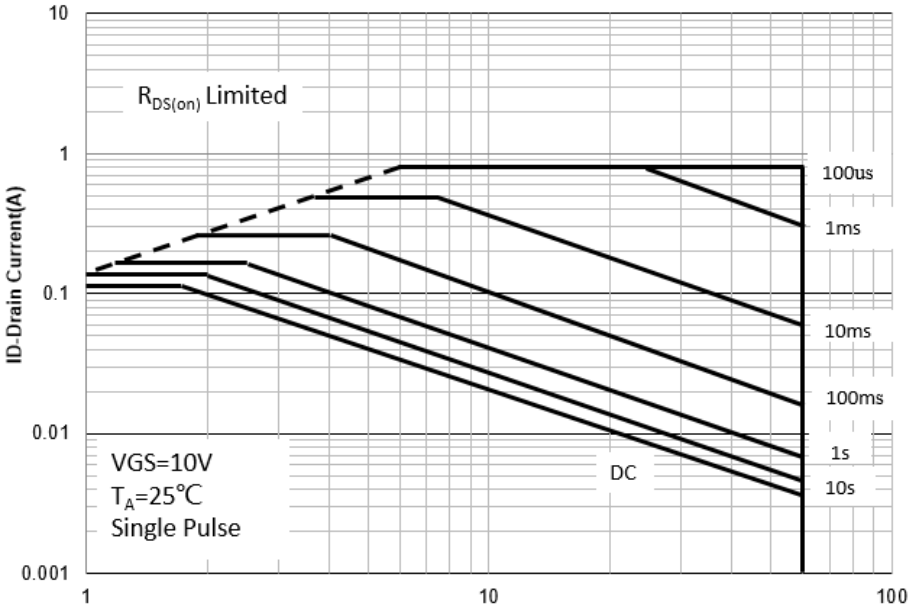

Figure9：Vsd Drain -Source Voltage（V）

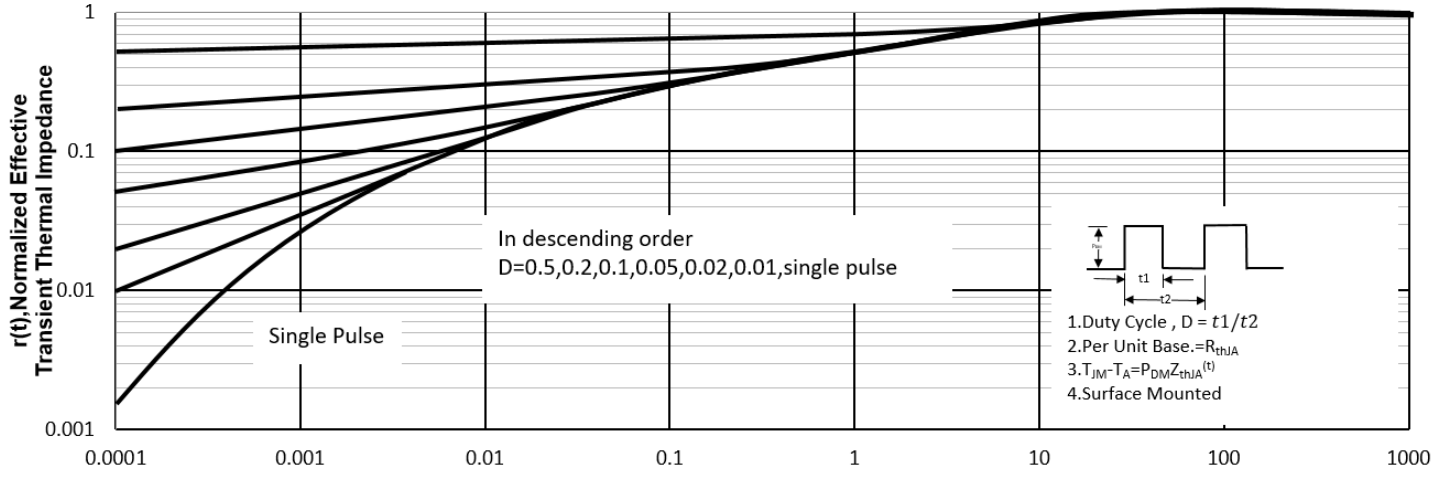

Figure10：Square Wave Pulse Duration（sec）

Test Circuit and Waveform:

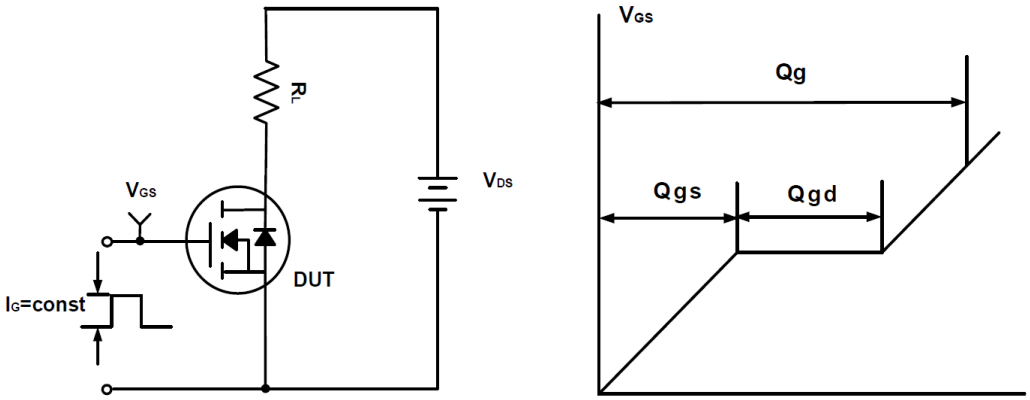

Figure A Gate Charge Test Circuit &Waveforms

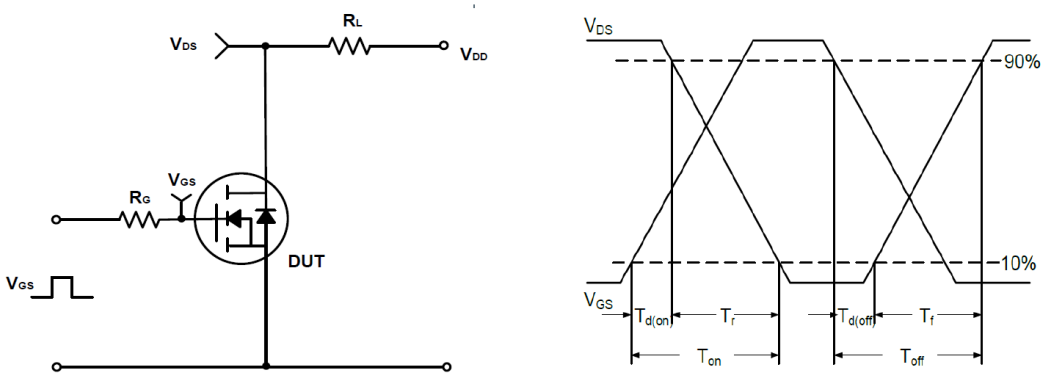

Figure B Switching Test Circuit & Waveforms

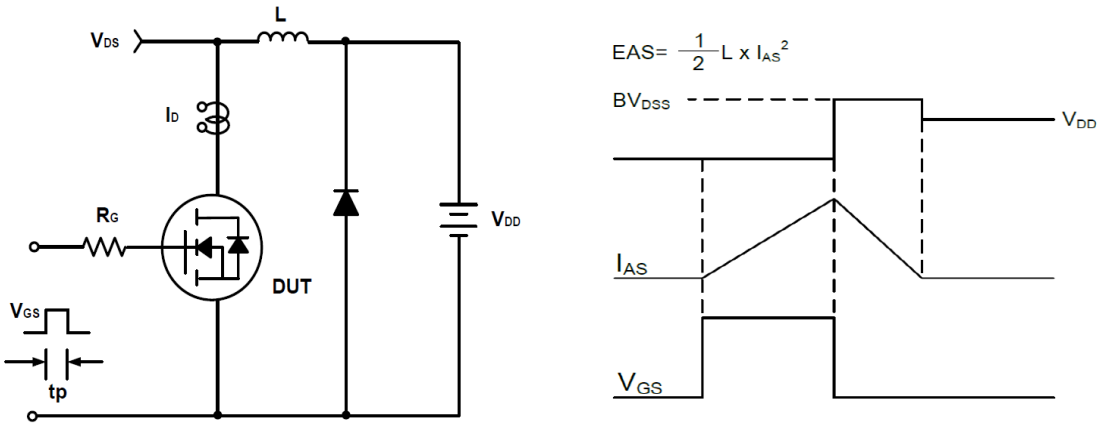

Figure C Unclamped Inductive Switching Circuit & Waveforms

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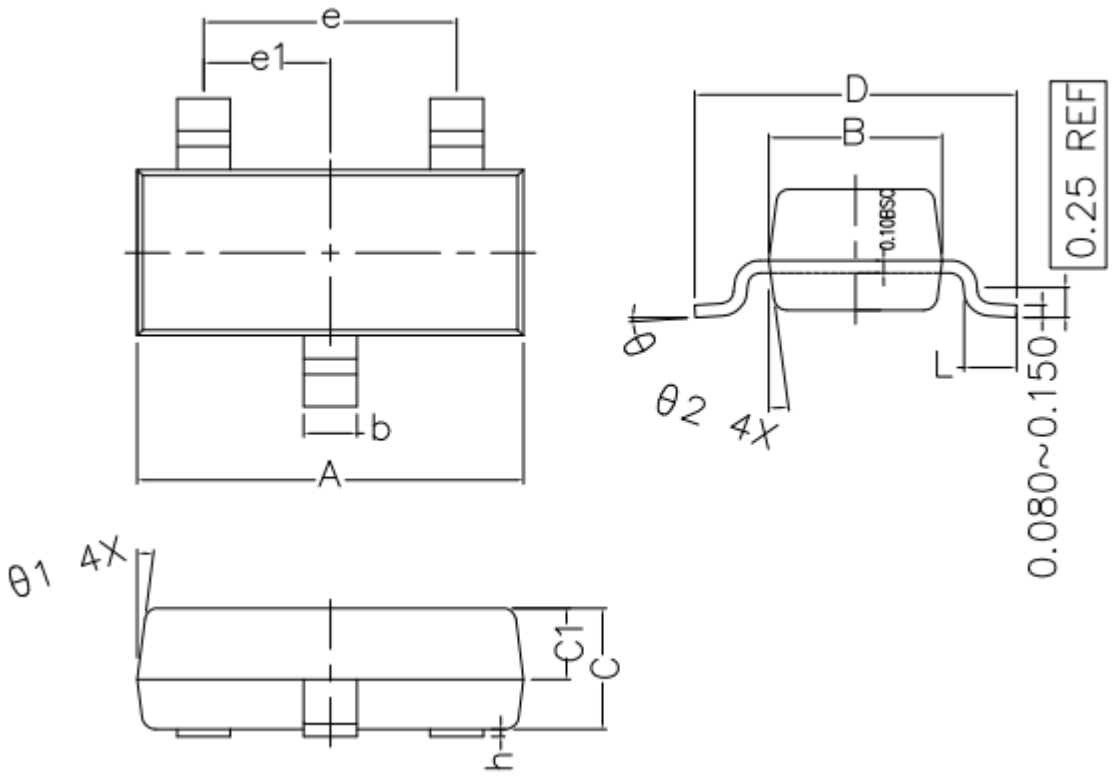
SOT-23 Package Outline Dimensions (Units: mm)



COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A	2.800	2.900	3.000
B	1.200	1.300	1.400
C	0.900	1.000	1.100
C1	0.500	0.550	0.600
D	2.250	2.400	2.550
L	0.300	0.400	0.500
h	0.010	0.050	0.100
b	0.300	0.400	0.500
e	1.90 TYPE		
e1	0.95 TYPE		
θ_1	7° TYPE		
θ_2	7° TYPE		
θ	0° ~ 7°		