

## P-Channel Enhancement Mode Power MOSFET

### Description

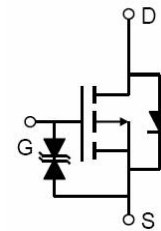
The G20P10KE uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge. It can be used in a wide variety of applications.

### General Features

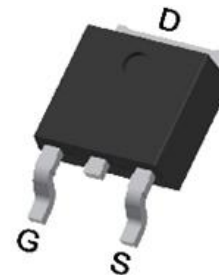
- $V_{DS}$  -100V
- $I_D$  (at  $V_{GS} = -10V$ ) -20A
- $R_{DS(ON)}$  (at  $V_{GS} = -10V$ ) < 116mΩ
- 100% Avalanche Tested
- RoHS Compliant
- ESD (HBM)>7.0KV

### Application

- Power switch
- DC/DC converters



Schematic diagram



TO-252

### Ordering Information

Device	Package	Marking	Packaging
G20P10KE	TO-252	G20P10KE	2500pcs/Reel

### Absolute Maximum Ratings $T_C = 25^\circ C$ , unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-100	V
Continuous Drain Current	$I_D$	-20	A
Pulsed Drain Current (note1)	$I_{DM}$	-80	A
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Power Dissipation	$P_D$	69	W
Single pulse avalanche energy (note2)	$E_{AS}$	56	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 To 150	$^\circ C$

### Thermal Resistance

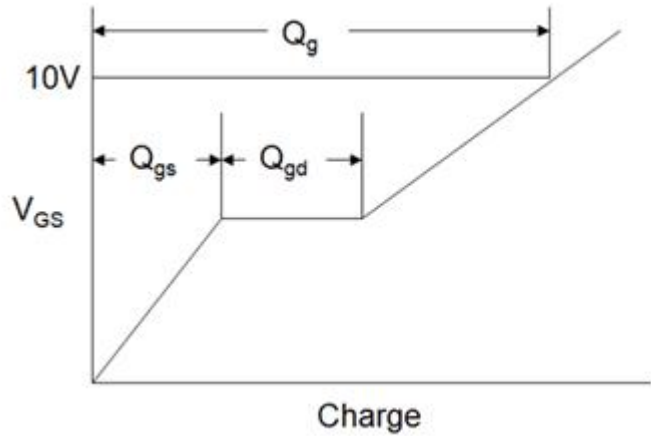
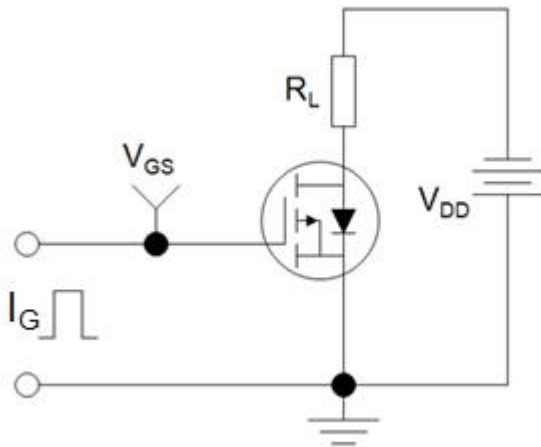
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	25	$^\circ C/W$
Maximum Junction-to-Case	$R_{thJC}$	1.8	$^\circ C/W$

Specifications $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>Static Parameters</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-100	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -100V, V_{GS} = 0V$	--	--	-1	$\mu A$
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20V$	--	--	$\pm 10$	$\mu A$
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1	-1.5	-3	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -16A$	--	94	116	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS} = -5V, I_D = -16A$	--	35	--	S
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = -50V,$ $f = 1.0MHz$	--	3354	--	pF
Output Capacitance	$C_{oss}$		--	89	--	
Reverse Transfer Capacitance	$C_{rss}$		--	87	--	
Total Gate Charge	$Q_g$	$V_{DD} = -50V,$ $I_D = -16A,$ $V_{GS} = -10V$	--	70	--	nC
Gate-Source Charge	$Q_{gs}$		--	12.5	--	
Gate-Drain Charge	$Q_{gd}$		--	15.5	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = -50V,$ $I_D = -16A,$ $R_G = 9\Omega$	--	16	--	ns
Turn-on Rise Time	$t_r$		--	73	--	
Turn-off Delay Time	$t_{d(off)}$		--	34	--	
Turn-off Fall Time	$t_f$		--	57	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	-20	A
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = -16A, V_{GS} = 0V$	--	--	-1.2	V
Reverse Recovery Charge	$Q_{rr}$	$I_F = -16A, V_{GS} = 0V$ $di/dt = -500A/\mu s$	--	66	--	nC
Reverse Recovery Time	$T_{rr}$		--	88	--	ns

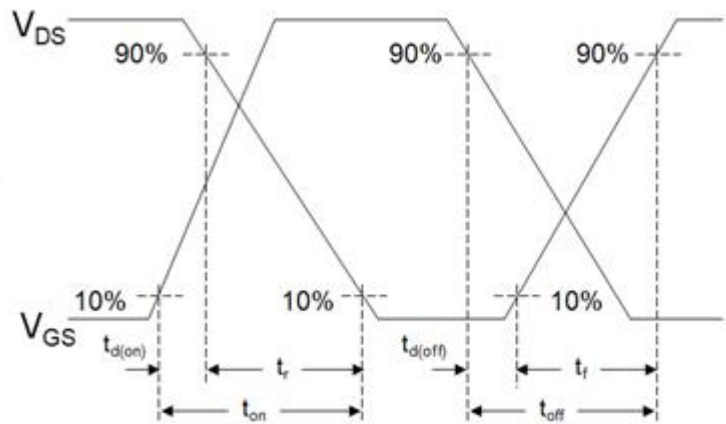
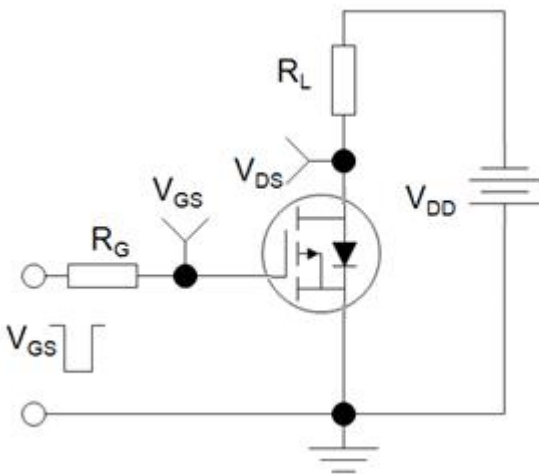
### Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition :  $T_J = 25^\circ\text{C}, V_{DD} = -50V, V_{GS} = -10V, L = 0.5mH, R_G = 25\Omega$
3. Identical low side and high side switch with identical  $R_G$

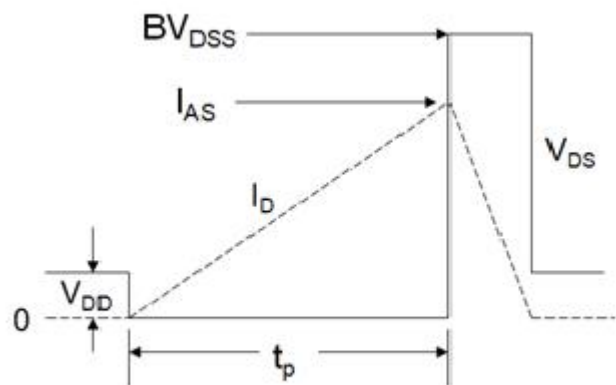
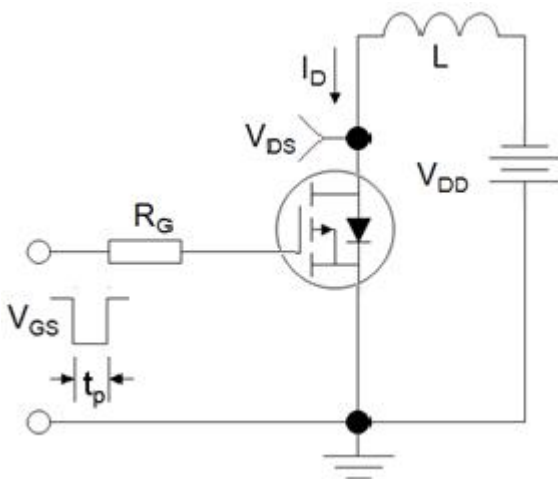
### Gate Charge Test Circuit



### Switch Time Test Circuit



### EAS Test Circuit



Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 1. Output Characteristics

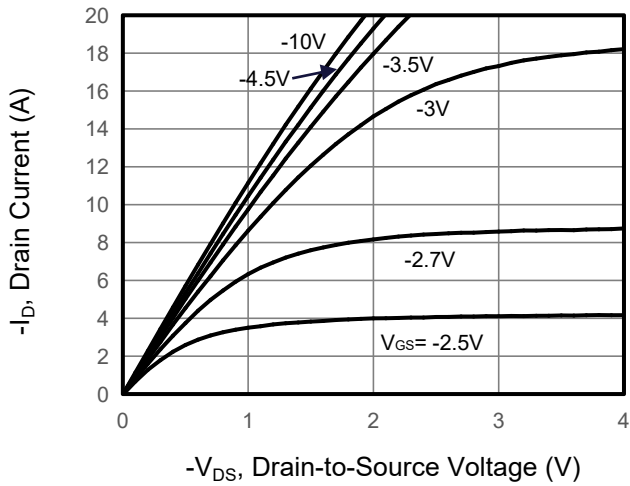


Figure 2. Transfer Characteristics

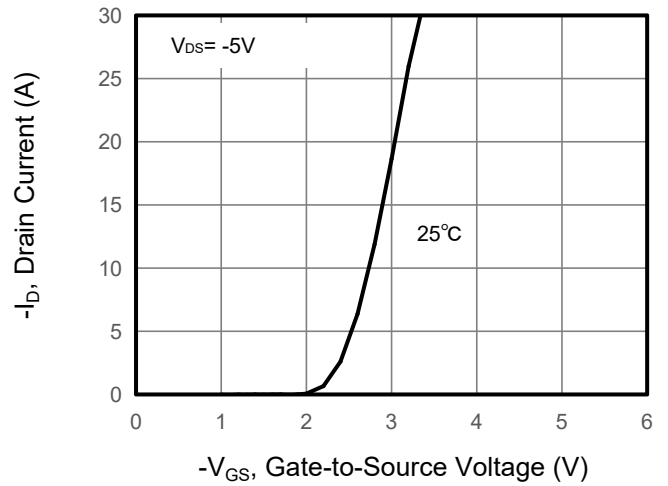


Figure 3. Drain Source On Resistance

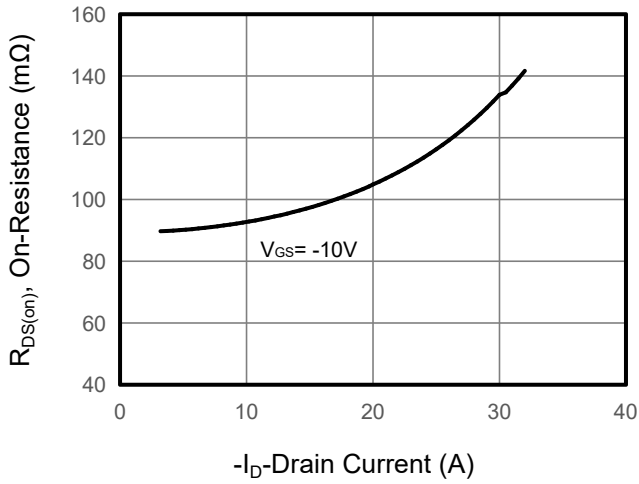


Figure 4. Gate Charge

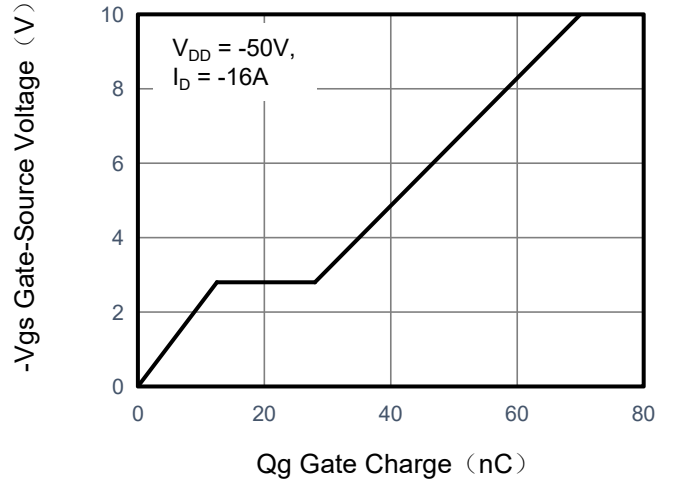


Figure 5. Capacitance

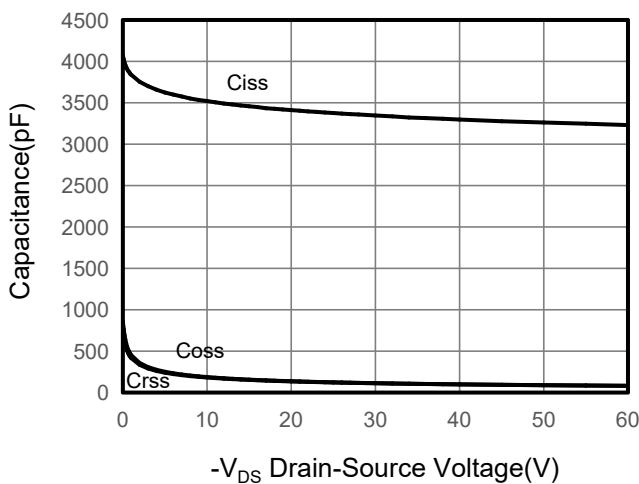
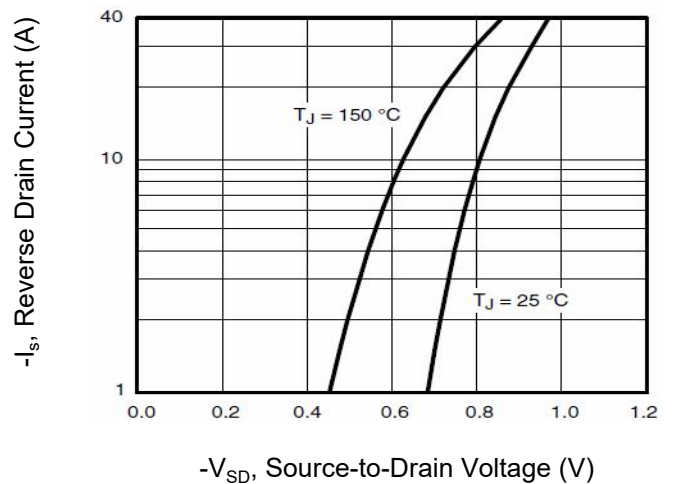


Figure 6. Source-Drain Diode Forward



Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 7. Drain-Source On-Resistance

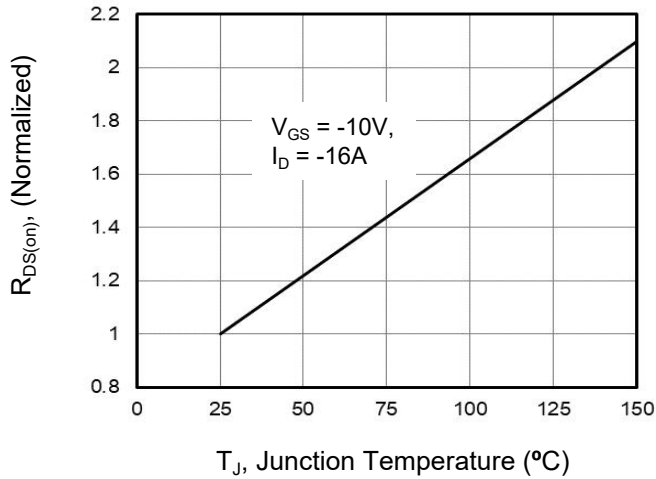


Figure 10. Safe Operation Area

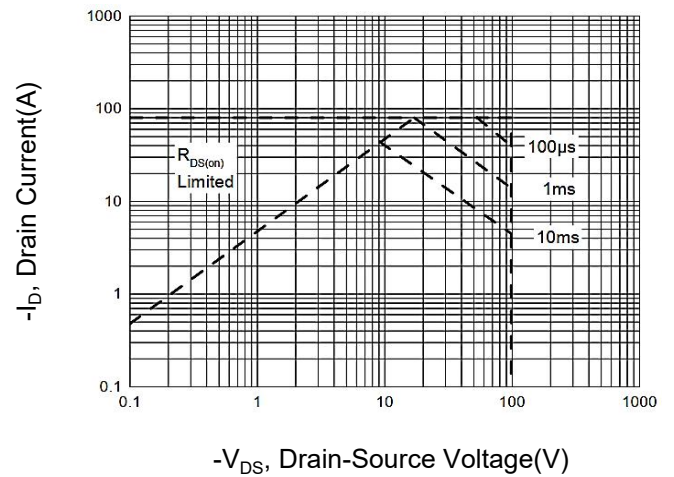
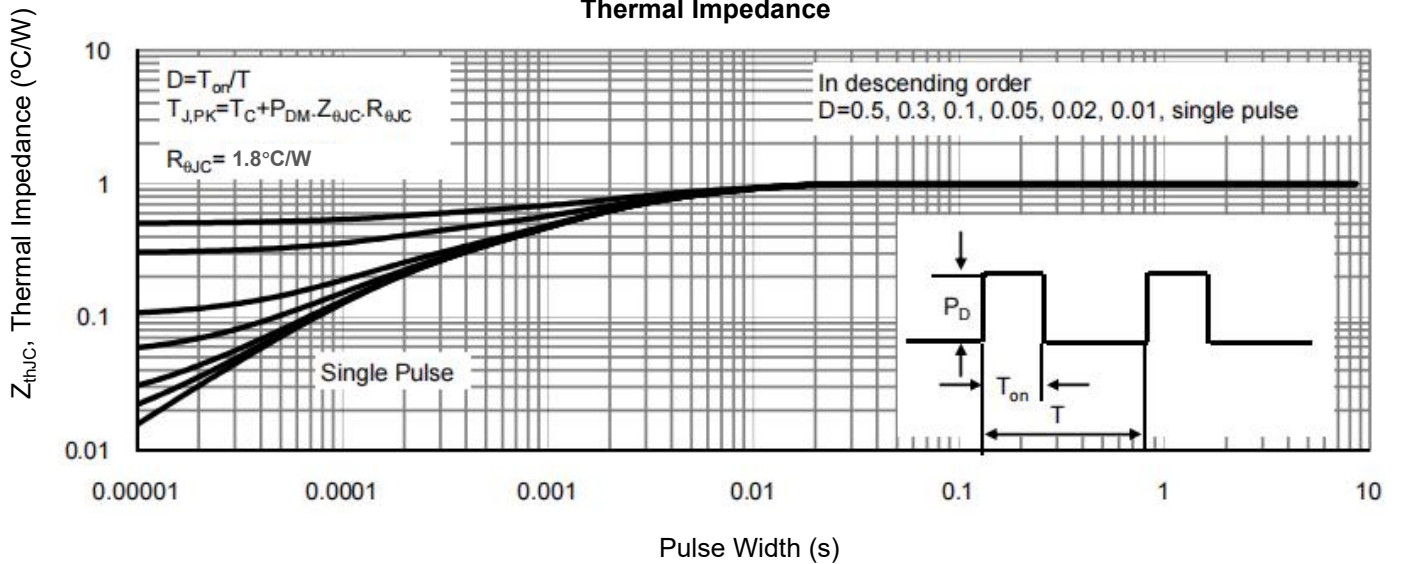
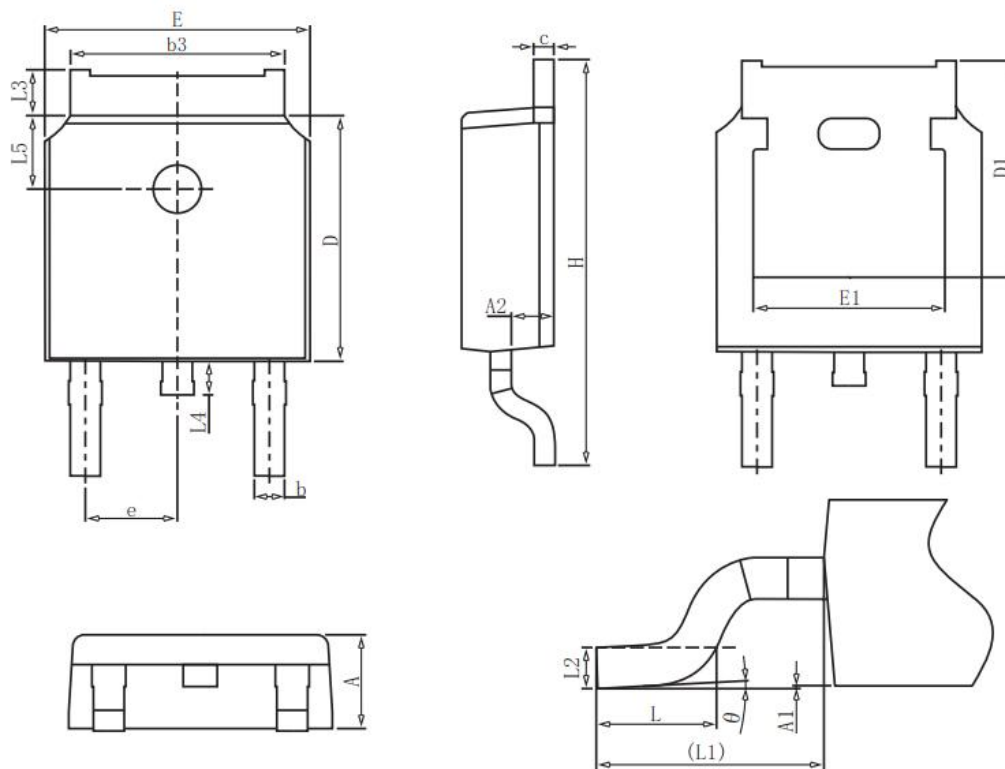


Figure 9. Normalized Maximum Transient Thermal Impedance



## TO-252 Package Mechanical Data



Symbol	Dimensions in Millimeters		
	MIN.	NOM.	MAX.
A	2.2	2.3	2.4
A1	0		0.2
A2	0.97	1.07	1.17
b	0.68	0.78	0.9
b3	5.2	5.33	5.5
c	0.43	0.53	0.63
D	5.98	6.1	6.22
D1	5.30REF		
E	6.4	6.6	6.8
E1	4.63		
e	2.286BSC		
H	9.4	10.1	10.5
L	1.38	1.5	1.75
L1	2.90REF		
L2	0.51BSC		
L3	0.88		1.28
L4	0.5		1
L5	1.65	1.8	1.95
θ	0°		8°