

Feathers:

- Advanced trench process technology
- avalanche energy, 100% test
- Fully characterized avalanche voltage and current

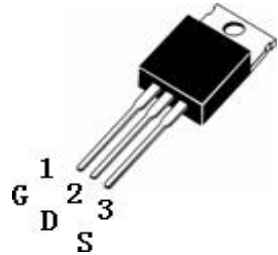
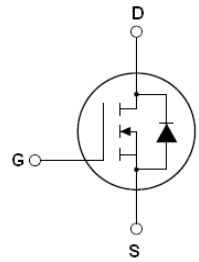
Description:

The SSF6014 is a new generation of middle voltage and high current N-Channel enhancement mode trench power MOSFET. This new technology increases the device reliability and electrical parameter repeatability. SSF6014 is assembled in high reliability and qualified assembly house.

Application:

- Power switching application

ID =60A
BV=60V
Rdson=14mΩ(max.)


SSF6014 TOP View (TO220)
Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D@T_c=25\text{ }^\circ\text{C}$	Continuous drain current, VGS@10V	60	A
$I_D@T_c=100^\circ\text{C}$	Continuous drain current, VGS@10V	42	
I_{DM}	Pulsed drain current ①	240	
$P_D@T_c=25^\circ\text{C}$	Power dissipation	115	W
	Linear derating factor	0.74	W/ C
V_{GS}	Gate-to-Source voltage	± 20	V
E_{AS}	Single pulse avalanche energy ②	235	mJ
E_{AR}	Repetitive avalanche energy	TBD	
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +175	$^\circ\text{C}$

Thermal Resistance

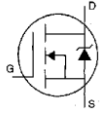
	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case	—	1.31	—	C/W
$R_{\theta JA}$	Junction-to-ambient	—	—	62	

Electrical Characteristics @TJ=25 °C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-Source breakdown voltage	60	—	—	V	$V_{GS}=0V, I_D=250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	12	14	mΩ	$V_{GS}=10V, I_D=30A$
$V_{GS(th)}$	Gate threshold voltage	2.0	—	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
g_{fs}	Forward transconductance	—	60	—	S	$V_{DS}=5V, I_D=30A$
I_{DSS}	Drain-to-Source leakage current	—	—	2	μA	$V_{DS}=60V, V_{GS}=0V$
		—	—	10		$V_{DS}=60V,$ $V_{GS}=0V, T_J=150^\circ\text{C}$
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS}=20V$
	Gate-to-Source reverse leakage	—	—	-100		$V_{GS}=-20V$

Q_g	Total gate charge	—	45	—	nC	$I_D=30A$ $V_{DD}=30V$ $V_{GS}=10V$
Q_{gs}	Gate-to-Source charge	—	4	—		
Q_{gd}	Gate-to-Drain("Miller") charge	—	15	—		
$t_{d(on)}$	Turn-on delay time	—	14.6	—	nS	$V_{DD}=30V$ $I_D=2A, R_L=15\Omega$ $R_G=2.5\Omega$ $V_{GS}=10V$
t_r	Rise time	—	14.2	—		
$t_{d(off)}$	Turn-Off delay time	—	40	—		
t_f	Fall time	—	7.3	—		
C_{iss}	Input capacitance	—	1480	—	pF	$V_{GS}=0V$ $V_{DS}=25V$ $f=1.0MHZ$
C_{oss}	Output capacitance	—	190	—		
C_{rss}	Reverse transfer capacitance	—	135	—		

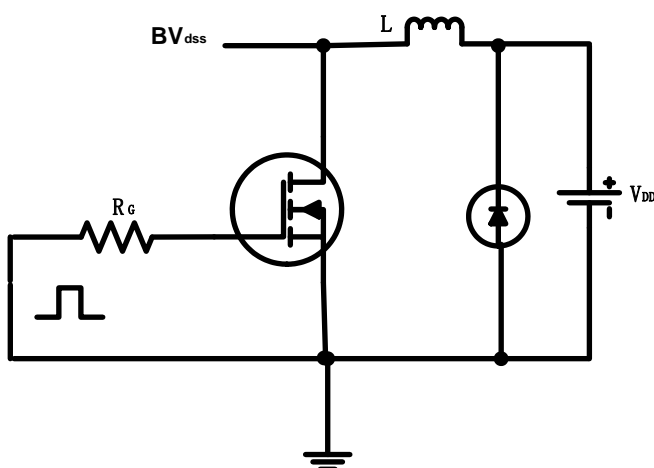
Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	60	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	240		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$T_J=25^\circ C, I_S=40A, V_{GS}=0V$ ③
t_{rr}	Reverse Recovery Time	—	33	—	nS	$T_J=25^\circ C, I_F=60A$ $di/dt=100A/\mu s$ ③
Q_{rr}	Reverse Recovery Charge	—	61	—	nC	
t_{on}	Forward Turn-on Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$)				

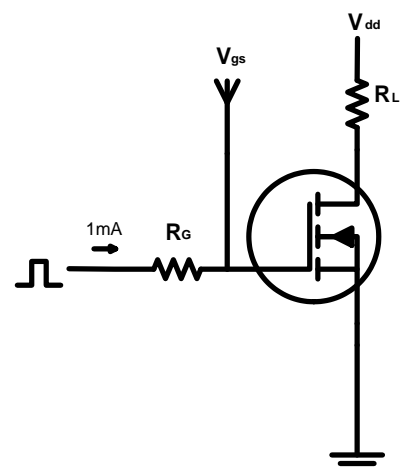
Notes:

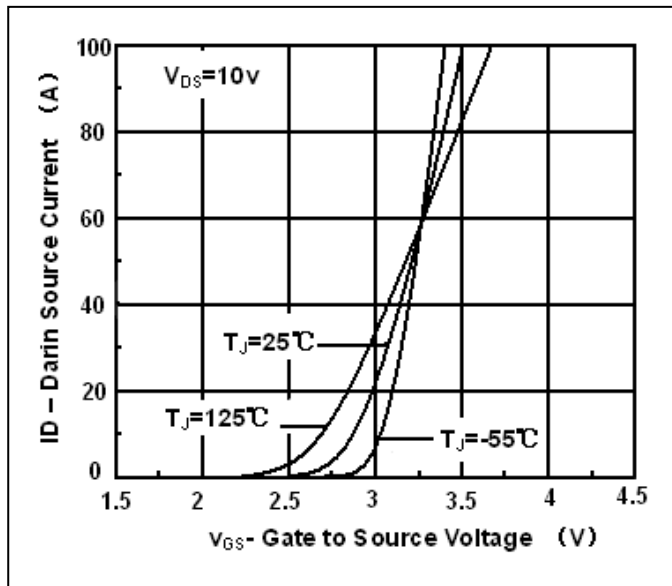
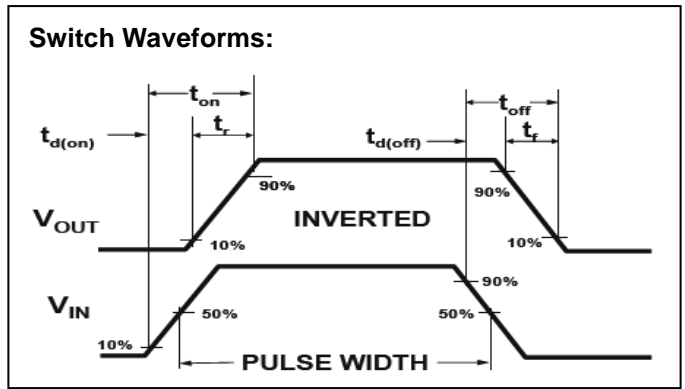
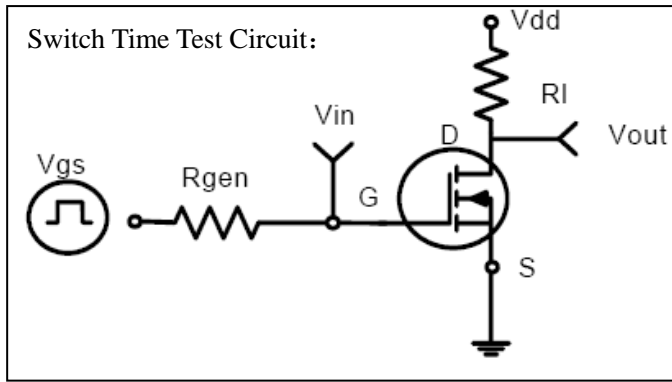
- ① Repetitive rating; pulse width limited by max junction temperature.
- ② Test condition: $L = 0.3mH, V_{DD} = 30V, I_D=37A$
- ③ Pulse width $\leq 300\mu s$, duty cycle $\leq 1.5\%$; $R_G = 25\Omega$ Starting $T_J = 25^\circ C$

EAS test circuit:

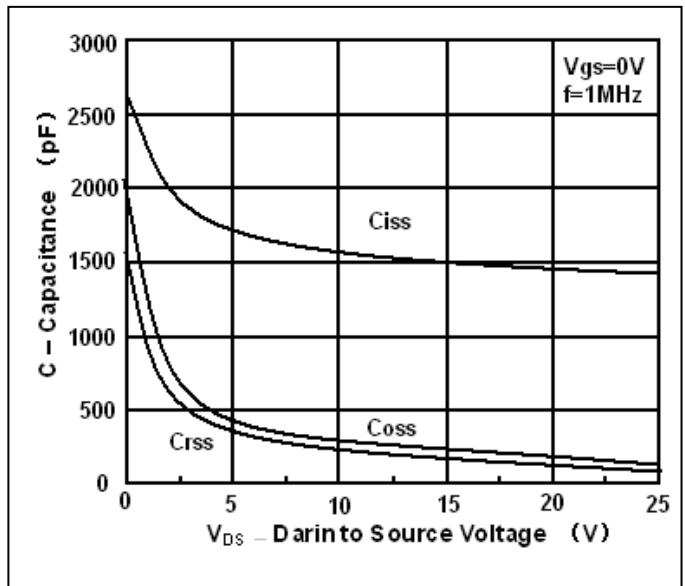


Gate charge test circuit:

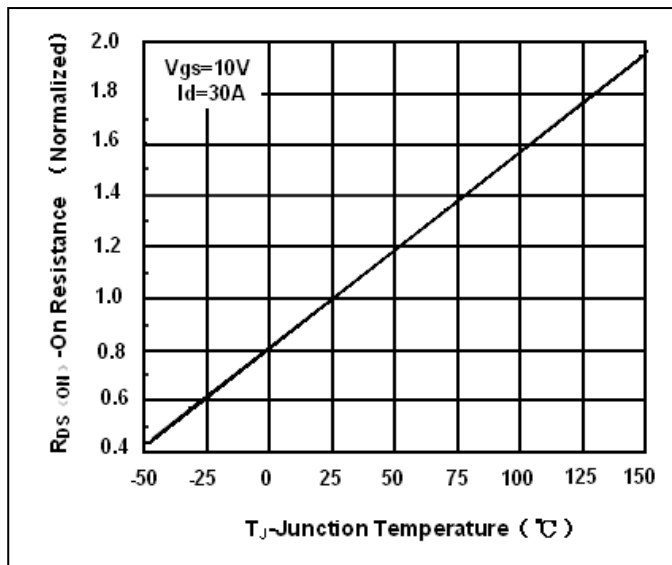




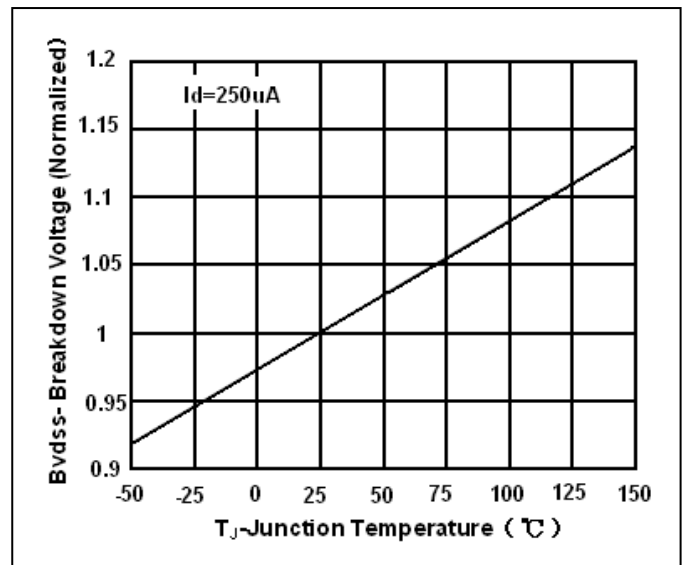
Transfer Characteristic



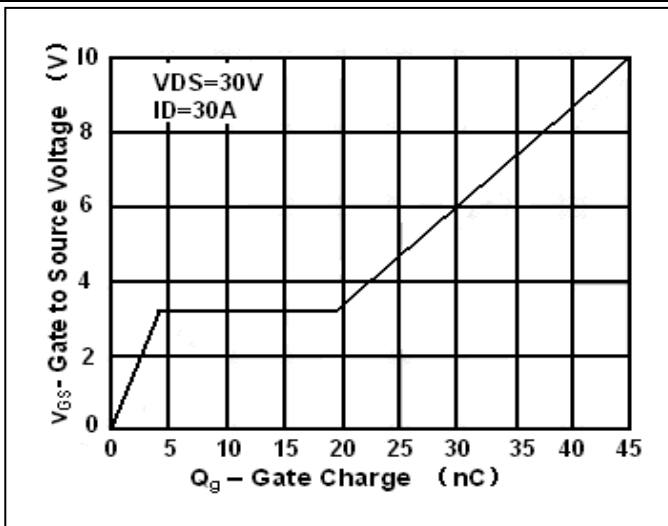
Capacitance



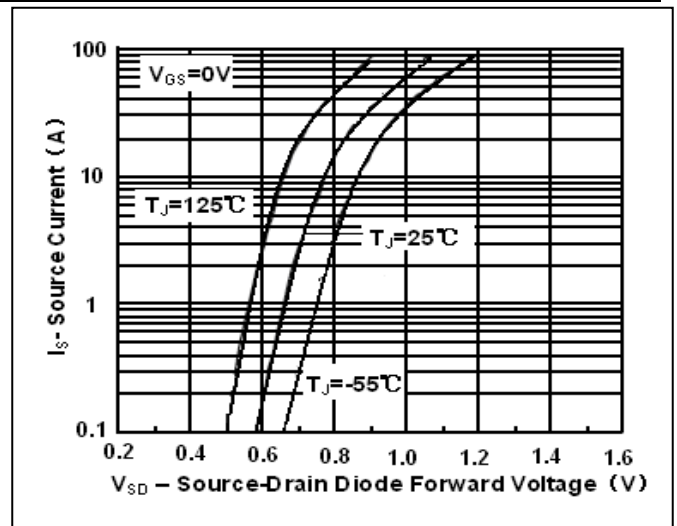
On Resistance vs. Junction Temperature



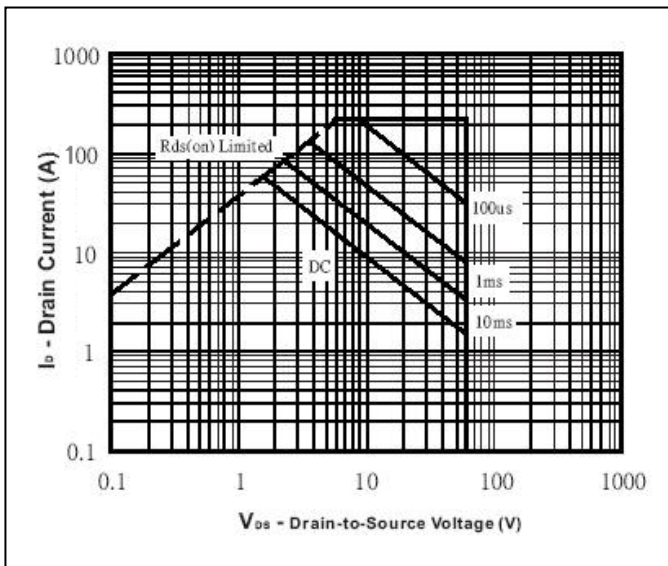
Breakdown Voltage vs. Junction Temperature



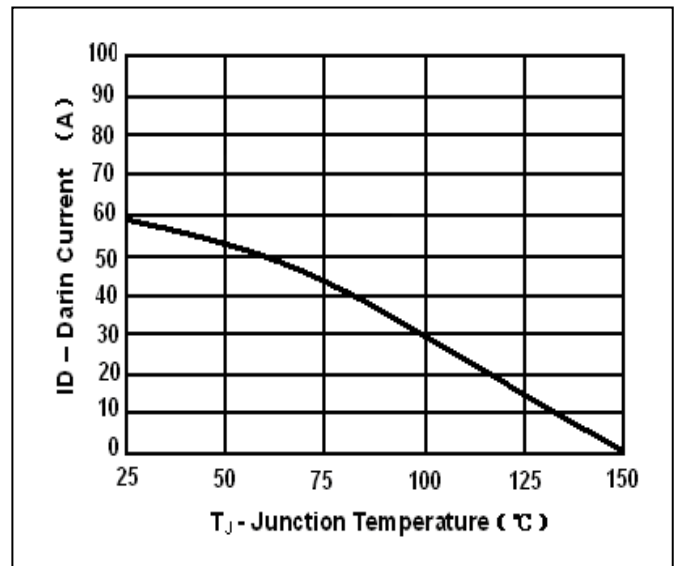
Gate Charge



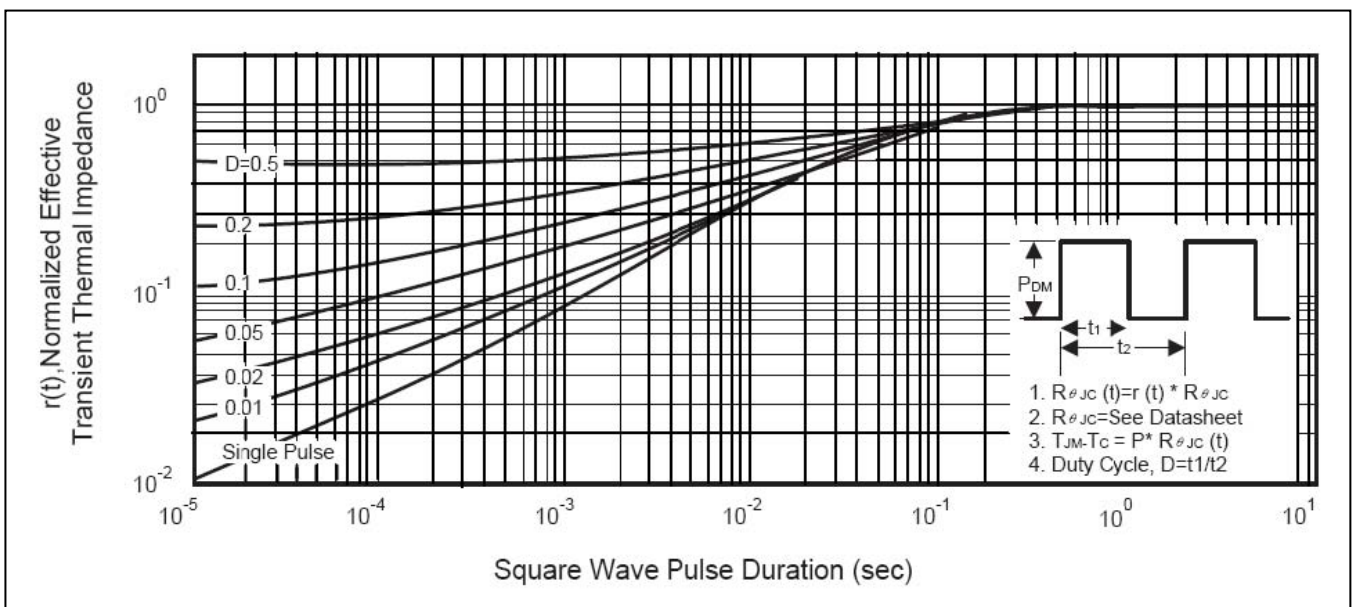
Source-Drain Diode Forward Voltage



Safe Operation Area



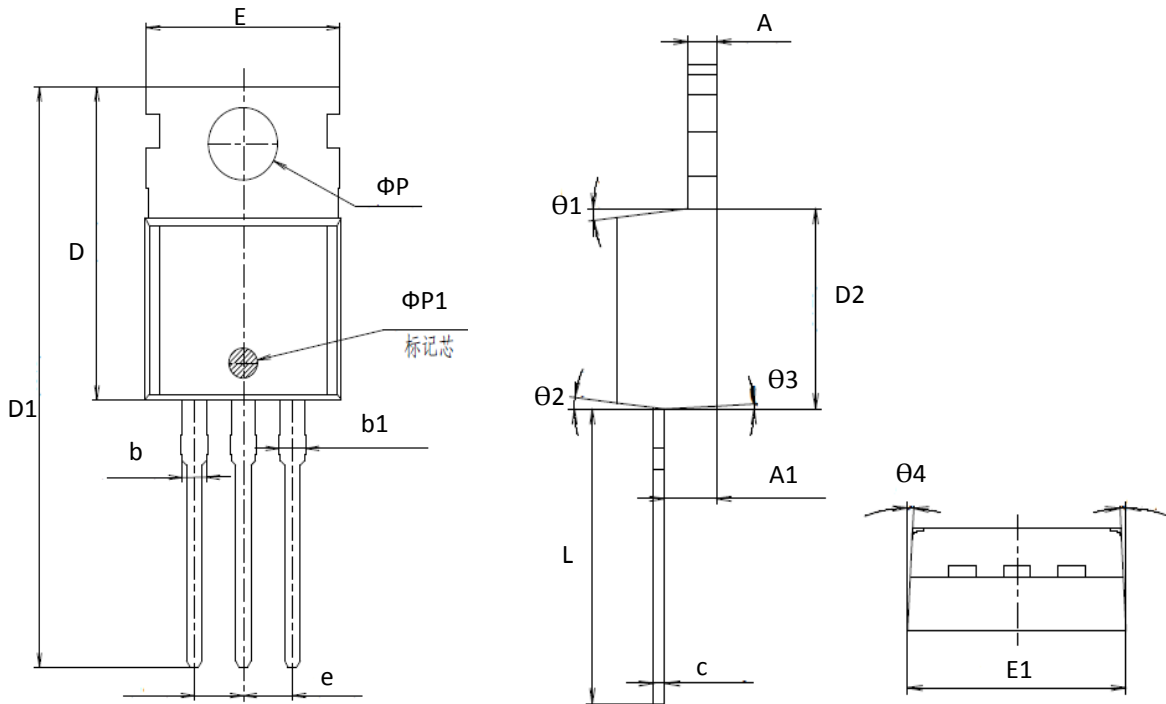
Max Drain Current vs. Junction Temperature



Transient Thermal Impedance Curve

MECHANICAL DATA:

TO220 PACKAGE OUTLINE DIMENSION_GN



Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	-	1.300	-	-	0.051	-
A1	2.200	2.400	2.600	0.087	0.094	0.102
b	-	1.270	-	-	0.050	-
b1	1.270	1.370	1.470	0.050	0.054	0.058
c	-	0.500	-	-	0.020	-
D	-	15.600	-	-	0.614	-
D1	-	28.700	-	-	1.130	-
D2	-	9.150	-	-	0.360	-
E	9.900	10.000	10.100	0.390	0.394	0.398
E1	-	10.160	-	-	0.400	-
ϕP	-	3.600	-	-	0.142	-
$\phi P1$		1.500			0.059	
e	2.54BSC			0.1BSC		
L	12.900	13.100	13.300	0.508	0.516	0.524
$\theta 1$	-	7 ⁰	-	-	7 ⁰	-
$\theta 2$	-	7 ⁰	-	-	7 ⁰	-
$\theta 3$	-	3 ⁰	-	5 ⁰	7 ⁰	9 ⁰
$\theta 4$	-	3 ⁰	-	1 ⁰	3 ⁰	5 ⁰