

P-Channel 30V(D-S) MOSFET

Product summary		
V_{DS}	-30	V
$R_{DS(ON)}$ (at $V_{GS}=-10V$) Typ.	16	m Ω
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$) Typ.	26	m Ω
$I_D(T_C=25^{\circ}C)$	-12	A

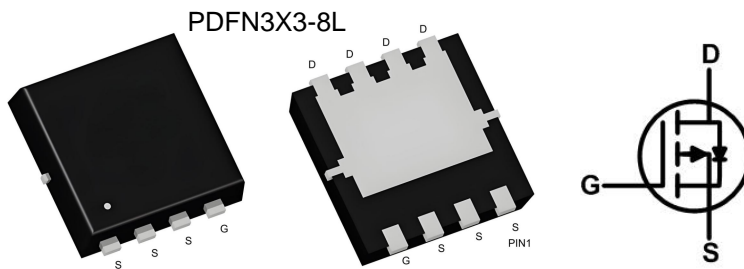
Features

- Advanced Trench technology
- Low Gate Charge

Applications

- Load switching
- PWM Applications
- Power Management

Pin Configuration



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECAL12P03A	PDFN3X3-8L	13"	5000pcs

Absolute Maximum Ratings (at $T_A=25^{\circ}C$ Unless Otherwise Noted)

Symbol	Parameter		Rating	Units
V _{DS}	Drain-Source Voltage		-30	V
V _{GS}	Gate-Source Voltage		±20	V
I _D	Continuous Drain Current	T _C =25°C	-12	A
		T _C =100°C	-7.6	A
I _{DM}	Pulse Drain Current Tested ^A		-48	A
E _{AS}	Single Pulse Avalanche Energy ^B		25	mJ
P _D	Power Dissipation	T _C =25°C	4.8	W
T _J ,T _{STG}	Junciton and Storage Temperature Range		-55 to +150	°C

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JC}$	Thermal Resistance-Junction to case max	26	$^{\circ}C/W$

Electrical Characteristics (at $T_J = 25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-30V, V_{GS}=0V$	--	--	-1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	--	--	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.5	-2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance ^C	$V_{GS}=-10V, I_D=-10A$	--	16	21	m Ω
		$V_{GS}=-4.5V, I_D=-5A$	--	26	36	m Ω
V_{SD}	Diode Forward Voltage	$I_S=-1A, V_{GS}=0V$	--	--	-1.2	V
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	--	--	-12	A
Dynamic Parameters ^D						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=-15V$ $f=1\text{MHz}$	--	1610	--	pF
C_{oss}	Output Capacitance		--	195	--	pF
C_{rss}	Reverse Transfer Capacitance		--	166	--	pF
Q_g	Total Gate Charge	$V_{DS}=-15V, I_D=-9.1A$ $V_{GS}=-10V$	--	30	--	nC
Q_{gs}	Gate-Source Charge		--	5.3	--	nC
Q_{gd}	Gate-Drain Charge		--	7.6	--	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DD}=-15V$ $I_D=-6A, V_{GS}=-10V$, $R_{GEN}=2.5\Omega$	--	14	--	ns
t_r	Turn-on Rise Time		--	20	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	95	--	ns
t_f	Turn-off Fall Time		--	65	--	ns

Note:

- A. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
- B. The EAS data shows Max. rating . The test condition is $V_{DD}=-15V, V_{GS}=-10V, L=0.5\text{mH}, I_{AS}=-10A, R_g=25\Omega, T_J=25^{\circ}\text{C}$.
- C. .Pulse Test: Pulse Width $\leq 300\mu s$, Duty cycle $\leq 2\%$.
- D. Guaranteed by design, not subject to production testing.

Typical Characteristics

Figure1: Output Characteristics

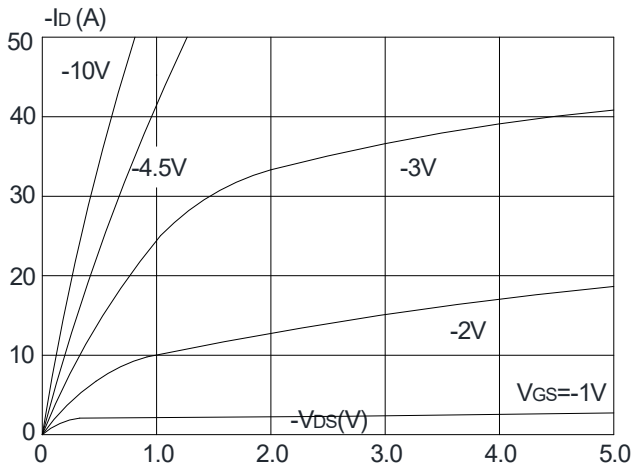


Figure 2: Typical Transfer Characteristics

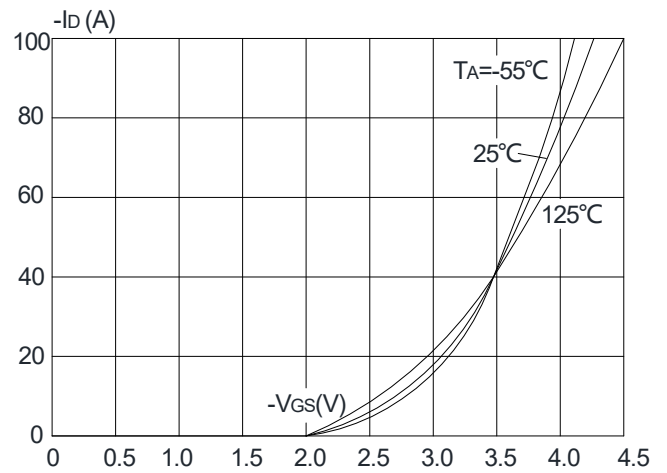


Figure 3: On-resistance vs. Drain Current

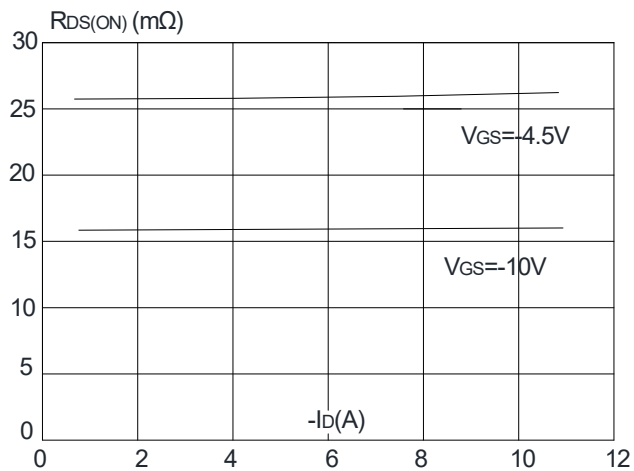


Figure 4: Body Diode Characteristics

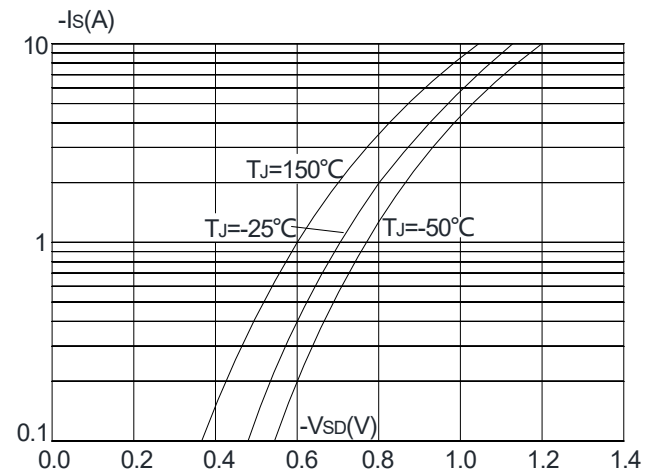


Figure 5: Gate Charge Characteristics

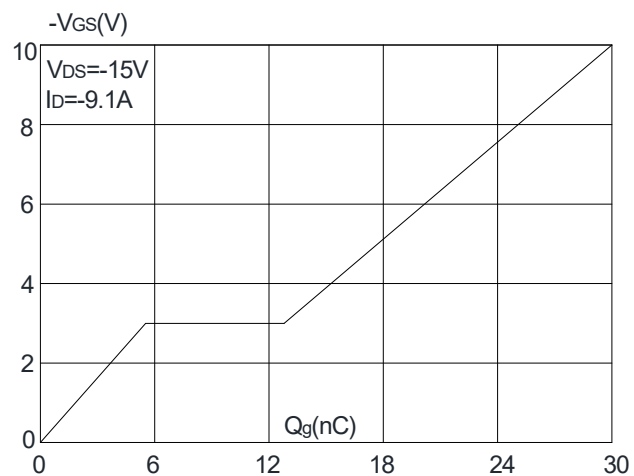
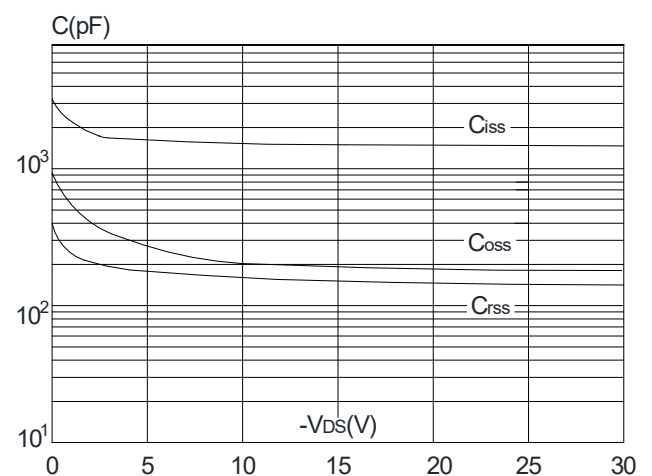


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

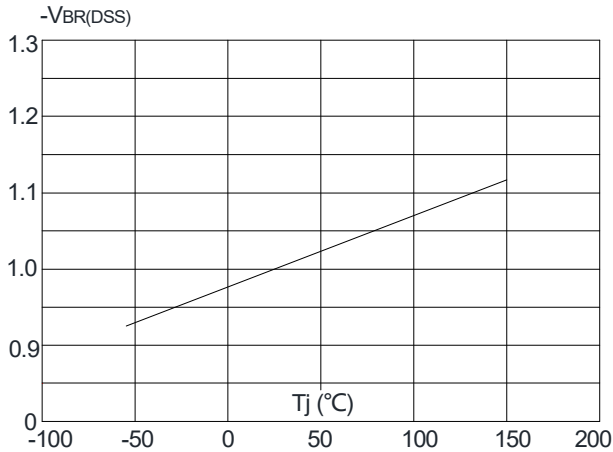


Figure 8: Normalized on Resistance vs. Junction Temperature

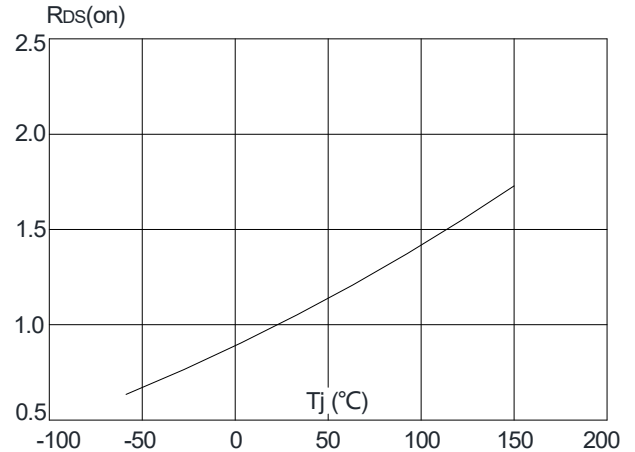


Figure 9: Maximum Safe Operating Area

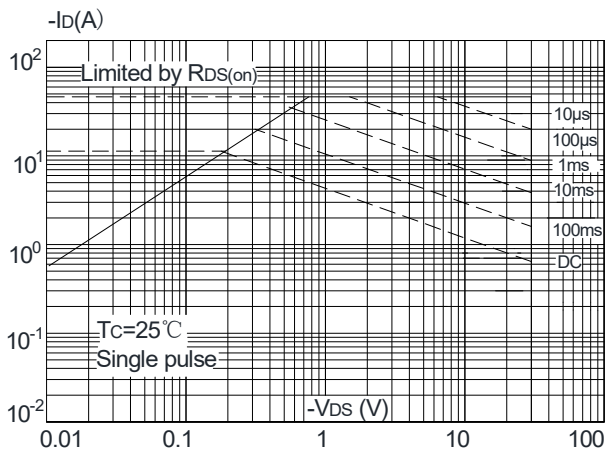


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

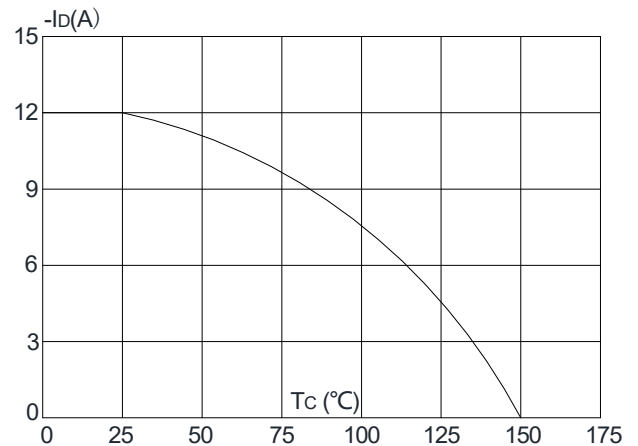
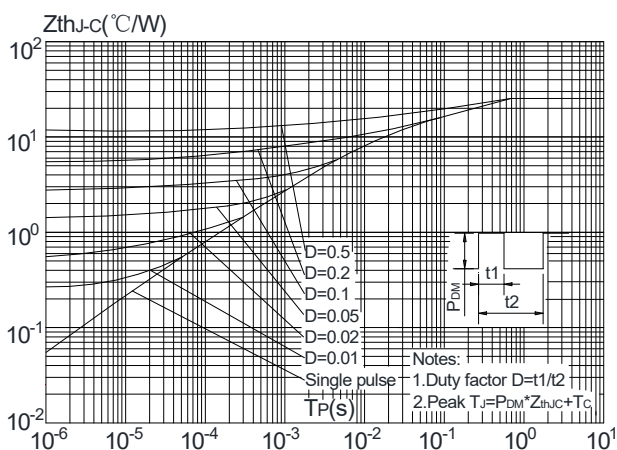
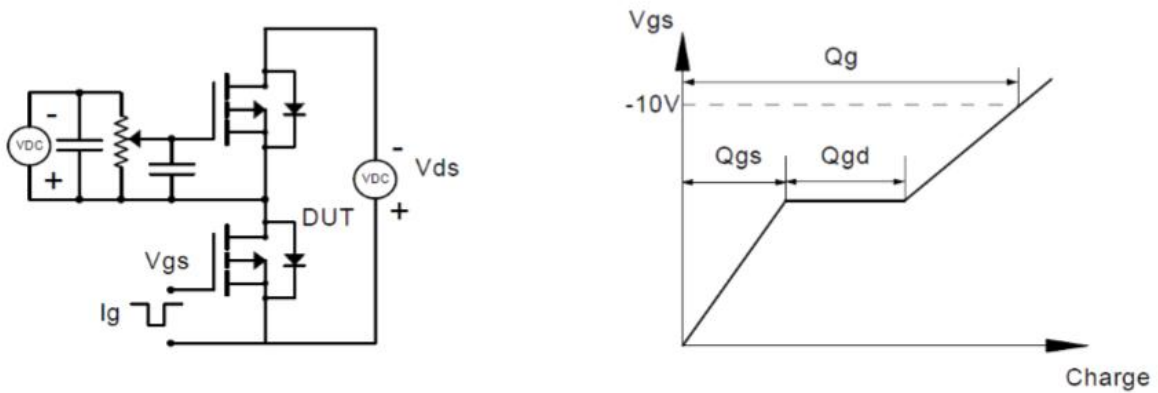


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

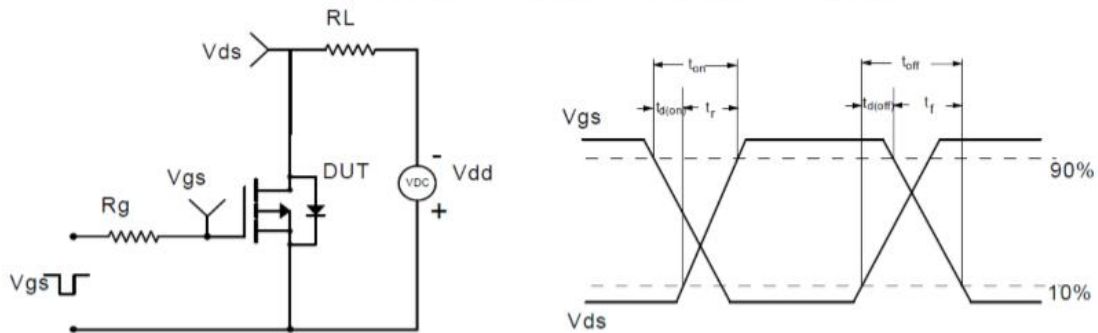


Test Circuit

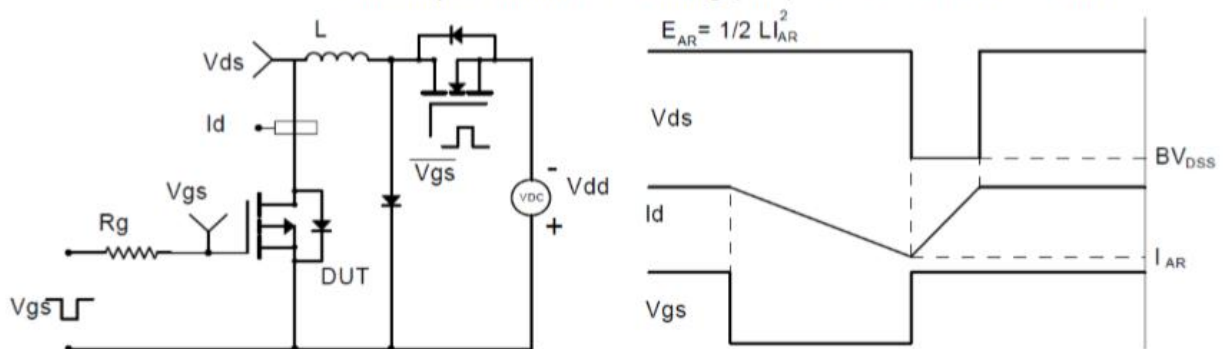
Gate Charge Test Circuit & Waveform



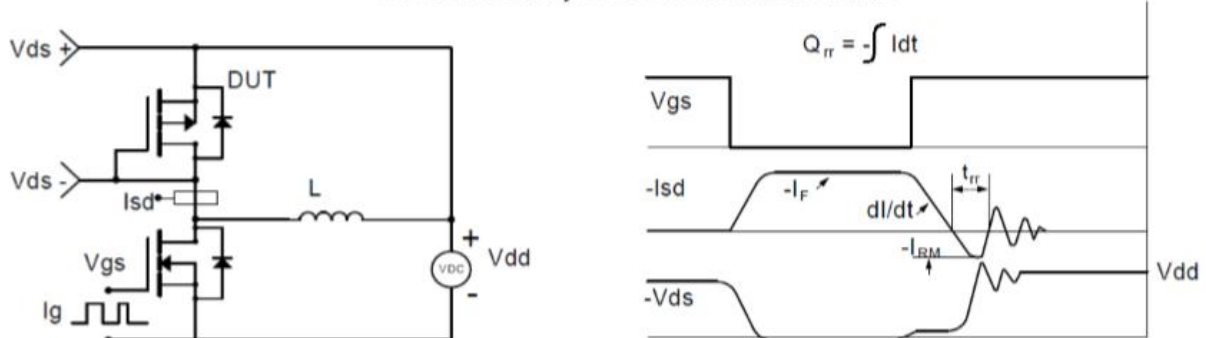
Resistive Switching Test Circuit & Waveforms



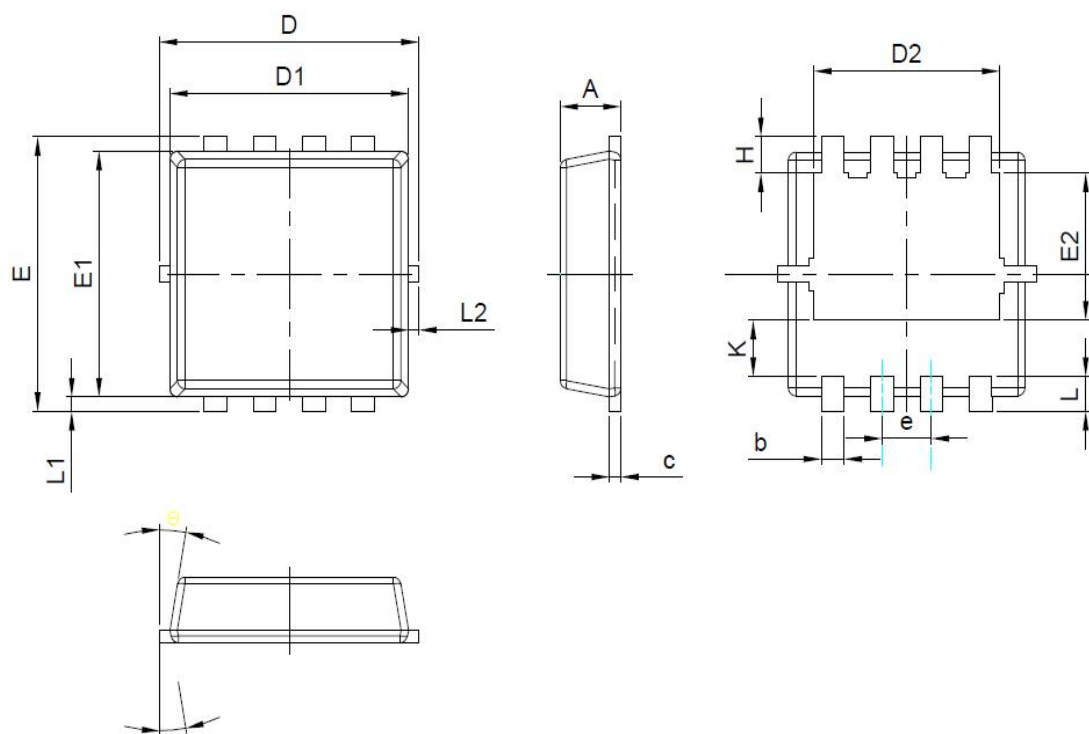
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



PDFN3X3-8L Package Information



SYMBOL	MIN	NOM	MAX
A	0.70	0.80	0.90
b	0.25	0.30	0.39
c	0.14	0.15	0.25
D	3.20	3.30	3.40
D1	3.00	3.15	3.30
D2	2.35	2.45	2.55
e	0.65 BSC		
E	3.25	3.35	3.45
E1	2.85	3.00	3.15
E2	1.635	1.735	1.835
H	0.33	0.48	0.63
K	0.585	0.685	0.785
L	0.30	0.40	0.50
L1	0.05	0.15	0.25
L2	-	-	0.15
Θ	8°	10°	12°