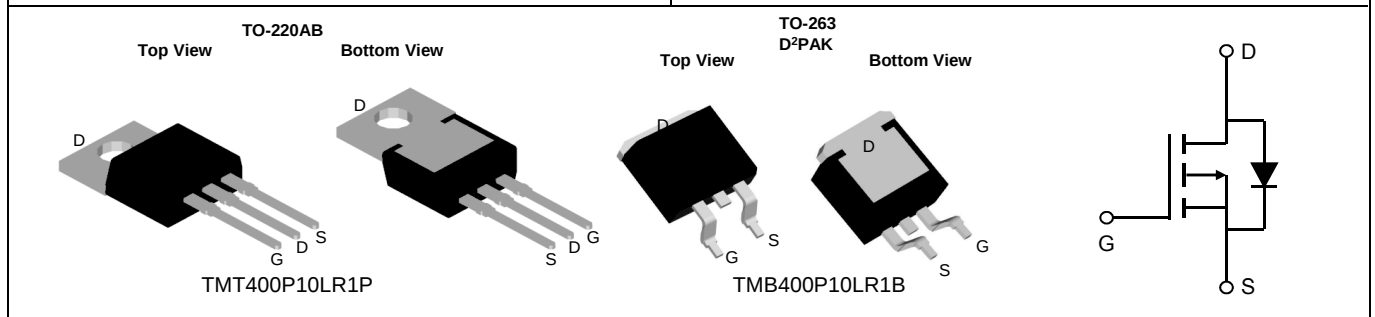




TMT400P10LR1P / TMB400P10LR1B P-CHANNEL POWER MOSFET

General Description ● Portable equipment and battery powered systems ● DC-DC Converters ● Motor control.	Product Summary ● -100V/-40A ● $R_{DS(ON)} = 42m\Omega(\text{typ.}) @ V_{GS} = -10V$ ● $R_{DS(ON)} = 48m\Omega(\text{typ.}) @ V_{GS} = -4.5V$ ● Reliable and Rugged ● Lead Free and Green Devices Available (RoHS Compliant) 100% UIS Tested 100% R_g Tested 
---	--



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Common Ratings ($T_c = 25^\circ\text{C}$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	-100	V
V_{GSS}	Gate-Source Voltage	± 20	V
T_J	Maximum Junction Temperature	175	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
I_S	Source Current-Continuous(Body Diode)	$T_c = 25^\circ\text{C}$	A

Mounted on Large Heat Sink

I_{DM}	Pulsed Drain Current *	$T_c = 25^\circ\text{C}$	-120	A
I_D	Continuous Drain Current	$T_c = 25^\circ\text{C}$	-40	A
		$T_c = 100^\circ\text{C}$	-28.3	A
P_D	Maximum Power Dissipation	$T_c = 25^\circ\text{C}$	100	W
		$T_c = 100^\circ\text{C}$	50	W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		1.5	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient **		110	$^\circ\text{C/W}$
E_{AS}	SinglePulsed-Avalanche Energy ***	$L = 0.3\text{mH}$	270	mJ

Note: * Repetitive rating; pulse width limited by max.junction temperature.

** Surface mounted on 1in2 FR-4 board.

Electrical Characteristics (T_c = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	400P10LR1			Unit
			Min	Typ.	Max	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} = -250μA	-100	-	-	V
I _{DSS}	Drain-to-Source Leakage Current	V _{DS} = -100V, V _{GS} =0V	-	-	-1	μA
		T _J =55°C	-	-	-5	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} = -250μA	-1	-1.8	-3	V
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} = -10V, I _{DS} = -20A	-	42	58	mΩ
		V _{GS} = -4.5V, I _{DS} =-20A	-	48	65	
Diode Characteristics						
V _{SD} *	Diode Forward Voltage	I _{SD} = -20A, V _{GS} =0V	-	-0.8	-1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} =-20A, dI _{SD} /dt=100A/μs	-	27	-	ns
Q _{rr}	Reverse Recovery Charge		-	37	-	nC
Dynamic Characteristics						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	9.8	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V,	-	5402	-	pF
C _{oss}	Output Capacitance	V _{DS} = -25V,	-	188	-	
C _{rss}	Reverse Transfer Capacitance	Frequency=1.0MHz	-	121	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} = -50V, R _G =2.7Ω, I _{DS} = -20A, V _{GS} = -10V	-	11	-	ns
T _r	Turn-on Rise Time		-	36	-	
t _{d(OFF)}	Turn-off Delay Time		-	162	-	
T _f	Turn-off Fall Time		-	68	-	
Gate Charge Characteristics						
Q _g	Total Gate Charge	V _{DS} = -50V, V _{GS} = -10V, I _D = -20A	-	79	-	nC
Q _{gs}	Gate-Source Charge		-	15.6	-	
Q _{gd}	Gate-Drain Charge		-	14.1	-	

Note: *Pulse test, pulse width ≤ 300us, duty cycle ≤ 2%

Typical Operating Characteristics

Figure 1: Power Dissipation

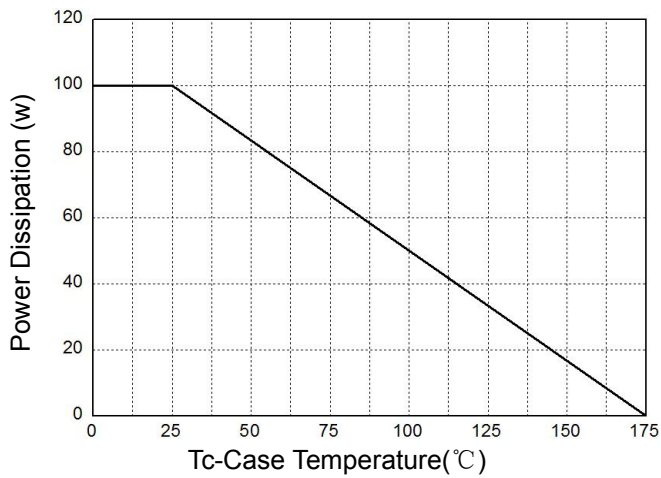


Figure 2: Drain Current

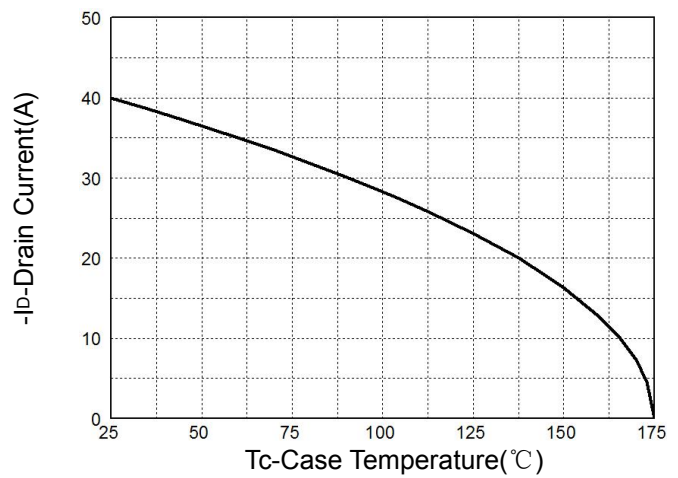


Figure 3: Safe Operation Area

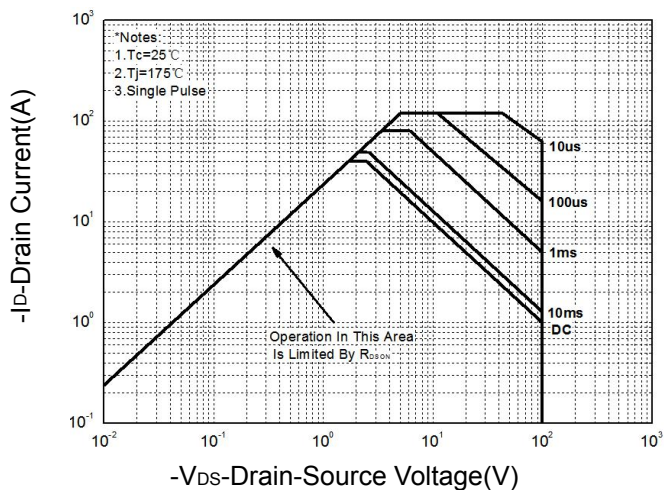


Figure 4: Thermal Transient Impedance

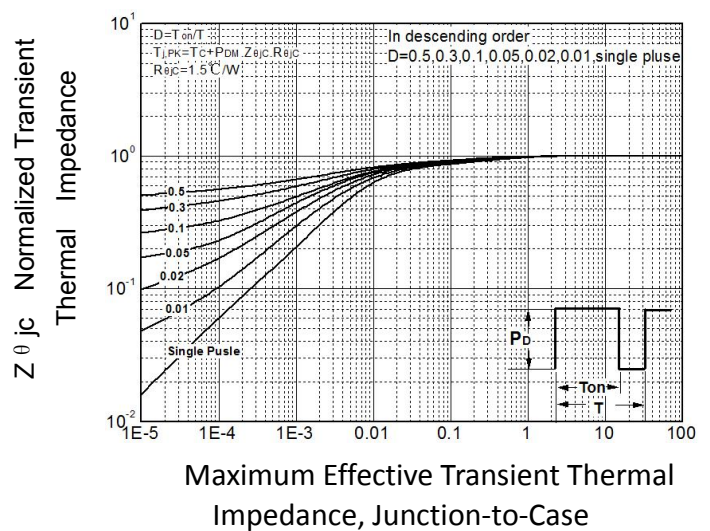


Figure 5: Output Characteristics

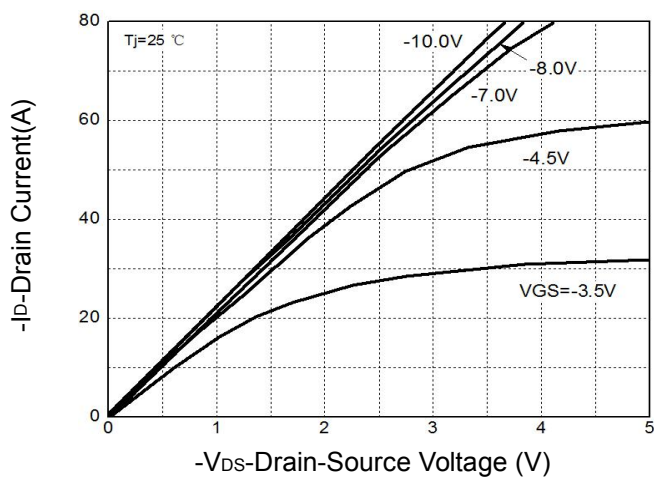
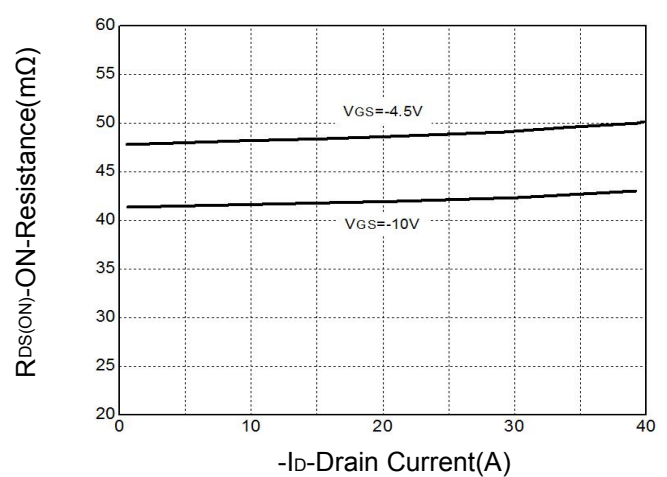


Figure 6: Drain-Source On Resistance



Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

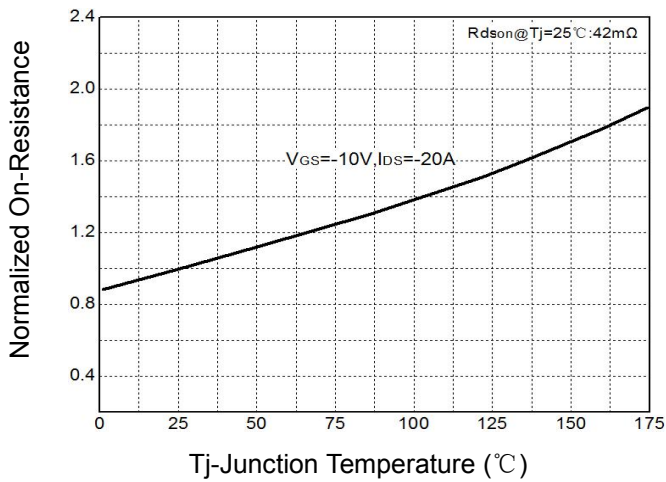


Figure 8: Source-Drain Diode Forward

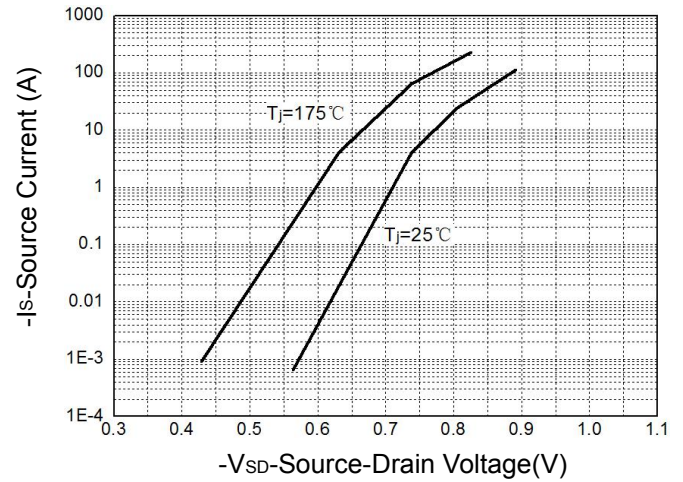


Figure 9: Capacitance Characteristics

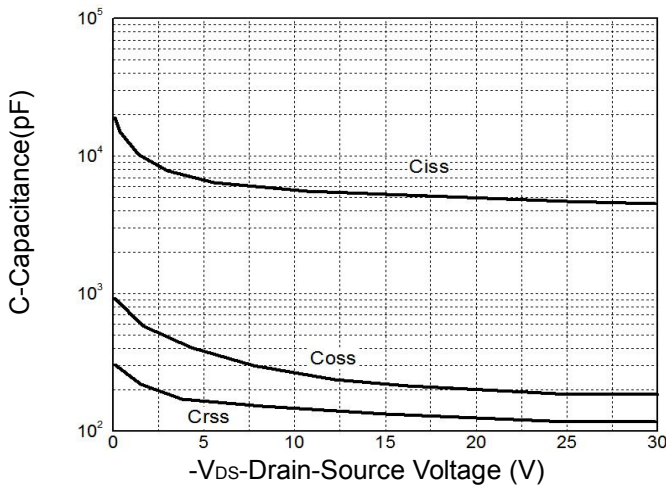
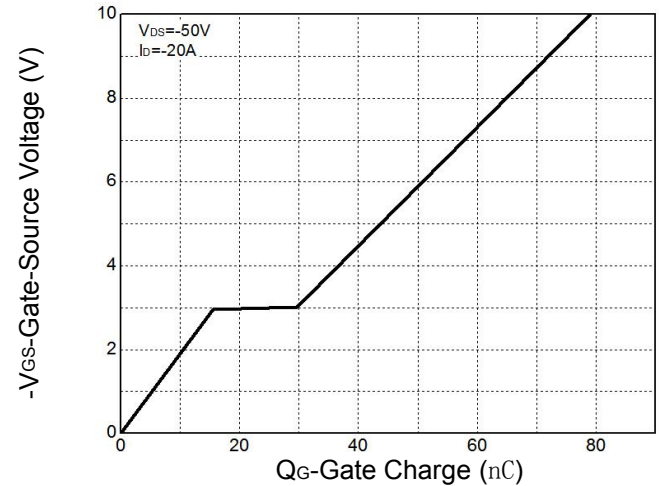
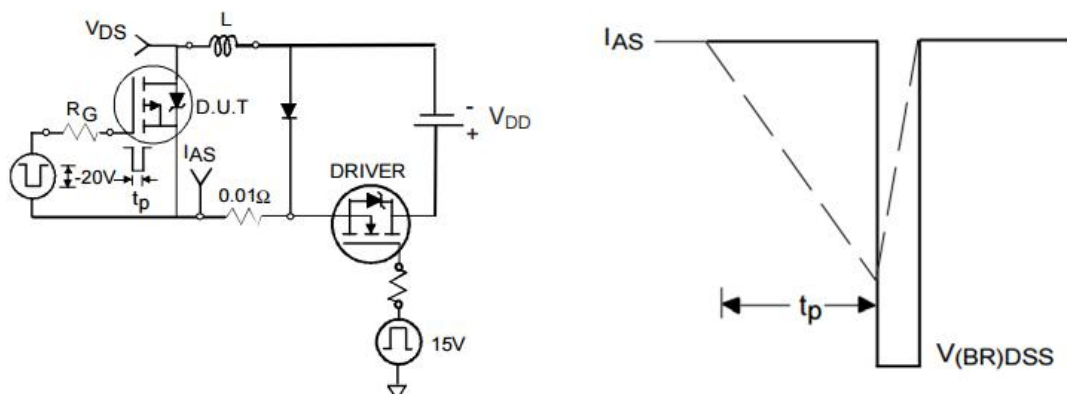


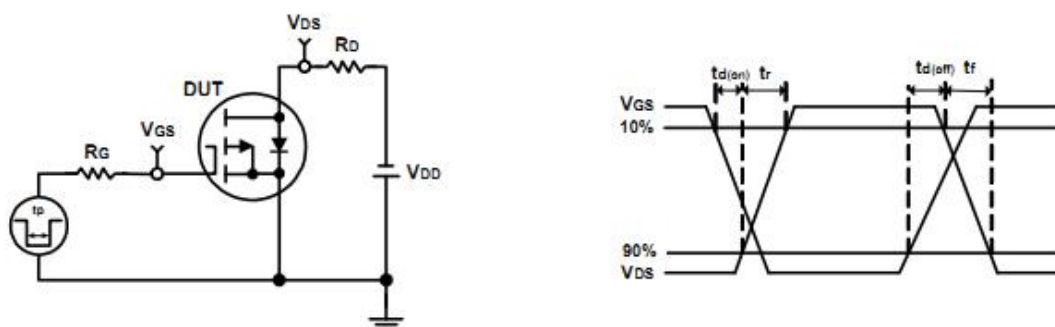
Figure 10: Gate Charge Characteristics



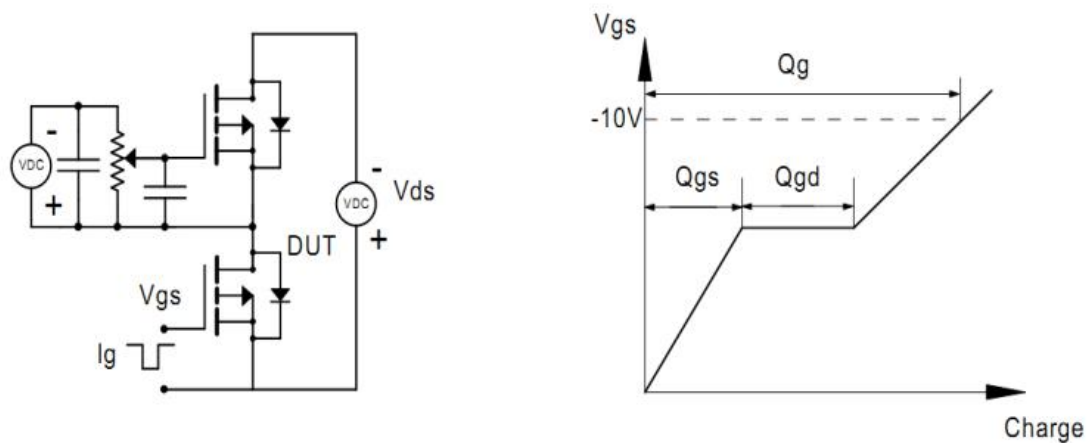
Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms

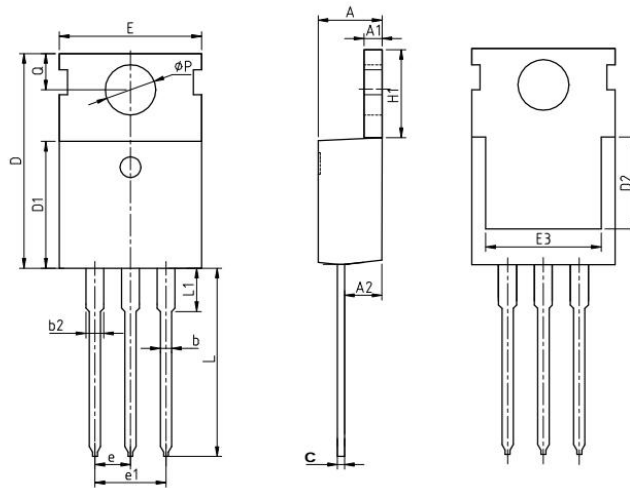


Gate Charge Test Circuit and Waveforms



Package Information

TO-220AB

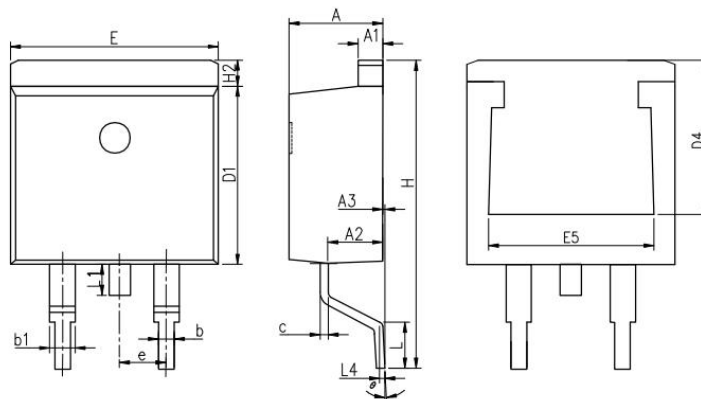


COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.25	1.30	1.45
A2	2.20	2.40	2.60
b	0.70	0.80	0.95
b2	1.17	1.27	1.47
c	0.40	0.50	0.65
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.50	-	-
E	9.70	10.00	10.30
E3	7.00	-	-
e	2.54 BSC		
e1	5.08 BSC		
H1	6.25	6.50	6.85
L	12.75	13.50	13.80
L1	-	3.10	3.40
ΦP	3.40	3.60	3.80
Q	2.60	2.80	3.00

Package Information

TO-263



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
A3	0	0.13	0.25
b	0.7	0.81	0.96
b1	1.17	1.27	1.47
c	0.3	0.38	0.53
D1	8.5	8.7	8.9
D4	6.6	-	-
E	9.86	10.16	10.36
E5	7.06	-	-
e	2.54 BSC		
H	14.7	15.1	15.5
H2	1.07	1.27	1.47
L	2	2.3	2.6
L1	1.4	1.55	1.7
L4	0.25 BSC		
θ	0°	5°	9°