

45V N-Ch Power MOSFET

Feature

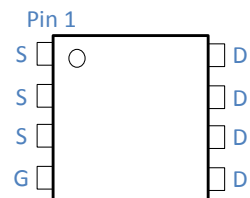
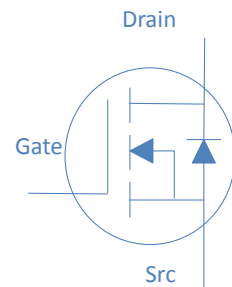
- ◇ High Speed Power Switching, Logic Level
- ◇ Enhanced Body diode dv/dt capability
- ◇ Enhanced Avalanche Ruggedness
- ◇ 100% UIS Tested, 100% Rg Tested
- ◇ Lead Free, Halogen Free

V_{DS}		45	V
$R_{DS(on),typ}$	$V_{GS}=10V$	7.0	mΩ
$R_{DS(on),typ}$	$V_{GS}=4.5V$	9.6	mΩ
I_D (Silicon Limited)		37	A
I_D (Package Limited)		26	A

Application

- ◇ Synchronous Rectification in SMPS
- ◇ Hard Switching and High Speed Circuit
- ◇ DC/DC in Telecoms and Industrial

DFN3x3



Part Number	Package	Marking
HGM095NE4SL	DFN3*3	GM095NE4L

Absolute Maximum Ratings at $T_J=25^{\circ}C$ (unless otherwise specified)

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current (Silicon Limited)	I_D	$T_C=25^{\circ}C$	37	A
		$T_C=100^{\circ}C$	23	
		$T_C=25^{\circ}C$	26	
Continuous Drain Current (Package Limited)				
Drain to Source Voltage	V_{DS}	-	45	V
Gate to Source Voltage	V_{GS}	-	± 20	V
Pulsed Drain Current	I_{DM}	-	100	A
Avalanche Energy, Single Pulse	E_{AS}	$L=0.4mH, T_C=25^{\circ}C$	20	mJ
Power Dissipation	P_D	$T_C=25^{\circ}C$	25	W
Operating and Storage Temperature	T_J, T_{stg}	-	-55 to 150	$^{\circ}C$

Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	55	$^{\circ}C/W$
Thermal Resistance Junction-Case	$R_{\theta JC}$	5	$^{\circ}C/W$

Electrical Characteristics at $T_J=25^{\circ}\text{C}$ (unless otherwise specified)
Static Characteristics

Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	45	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.55	2.2	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V, V_{DS}=45V, T_J=25^{\circ}\text{C}$	-	-	1	μA
		$V_{GS}=0V, V_{DS}=45V, T_J=100^{\circ}\text{C}$	-	-	100	
Gate to Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=15A$	-	7	9.5	m Ω
		$V_{GS}=4.5V, I_D=8A$	-	9.6	14	
Transconductance	g_{fs}	$V_{DS}=5V, I_D=15A$	-	25	-	S
Gate Resistance	R_G	$V_{GS}=0V, V_{DS}$ Open, $f=1\text{MHz}$	-	1.5	-	Ω

Dynamic Characteristics

Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=20V, f=1\text{MHz}$	-	942	-	pF
Output Capacitance	C_{oss}		-	309	-	
Reverse Transfer Capacitance	C_{rss}		-	29	-	
Total Gate Charge	$Q_g(10V)$	$V_{DD}=20V, I_D=10A, V_{GS}=10V$	-	14.5	-	nC
Total Gate Charge	$Q_g(4.5V)$		-	7	-	
Gate to Source Charge	Q_{gs}		-	2	-	
Gate to Drain (Miller) Charge	Q_{gd}		-	2.5	-	
Turn on Delay Time	$t_{d(on)}$	$V_{DD}=20V, I_D=10A, V_{GS}=10V, R_G=10\Omega,$	-	6	-	ns
Rise time	t_r		-	5	-	
Turn off Delay Time	$t_{d(off)}$		-	21	-	
Fall Time	t_f		-	5	-	

Reverse Diode Characteristics

Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_F=20A$	-	0.9	1.2	V
Reverse Recovery Time	t_{rr}	$V_R=20V, I_F=10A, dI_F/dt=200A/\mu s$	-	24	-	ns
Reverse Recovery Charge	Q_{rr}		-	19	-	nC

Fig 1. Typical Output Characteristics

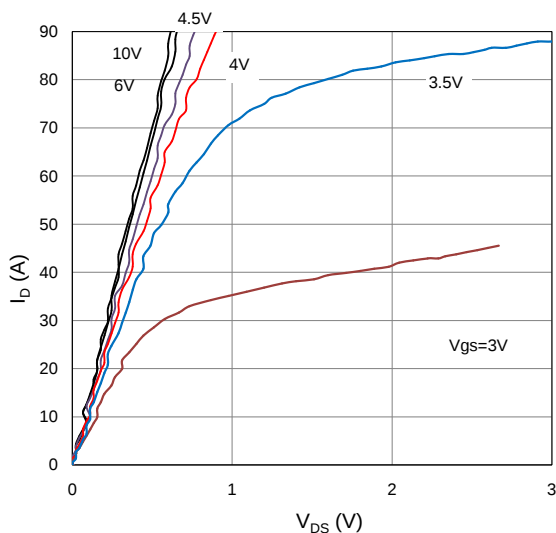


Figure 2. On-Resistance vs. Gate-Source Voltage

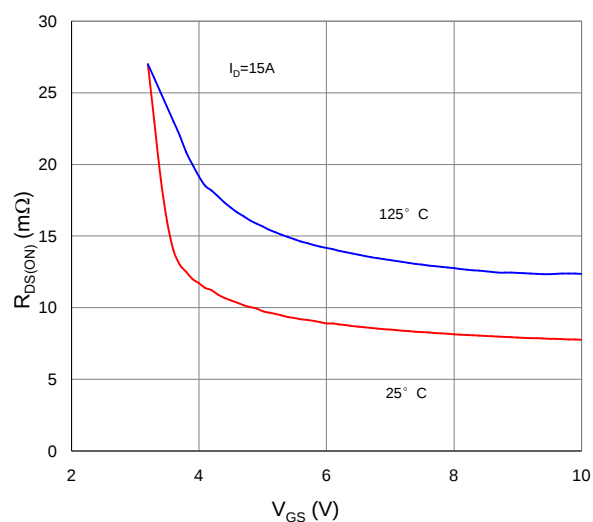


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

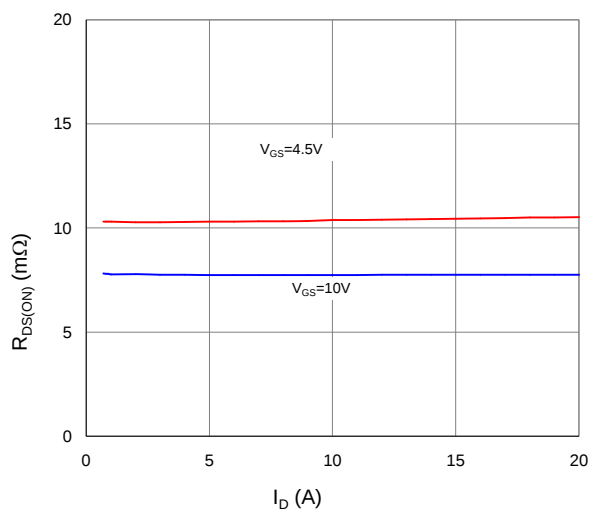


Figure 4. Normalized On-Resistance vs. Junction Temperature

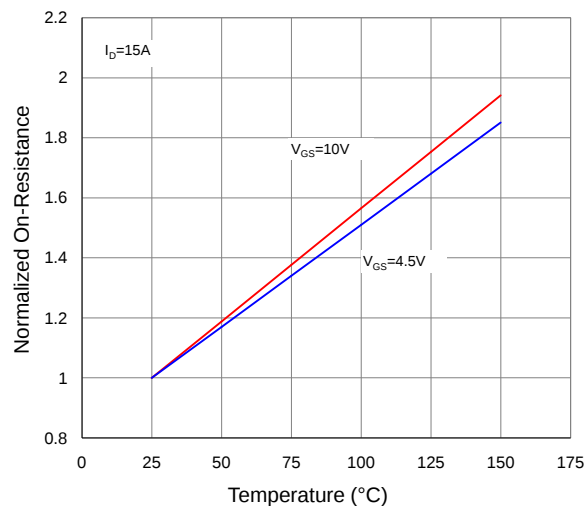


Figure 5. Typical Transfer Characteristics

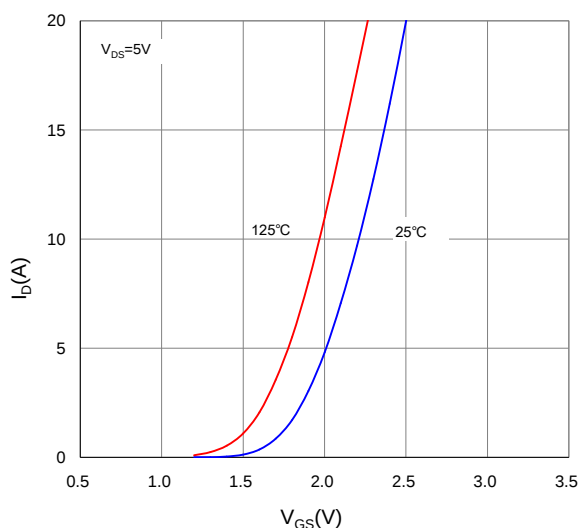


Figure 6. Typical Source-Drain Diode Forward Voltage

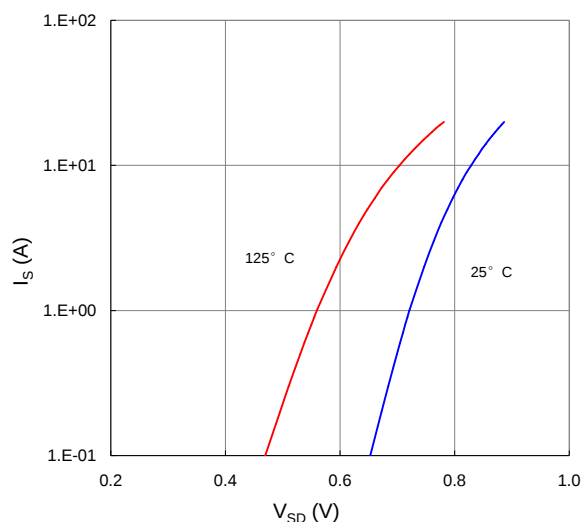


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

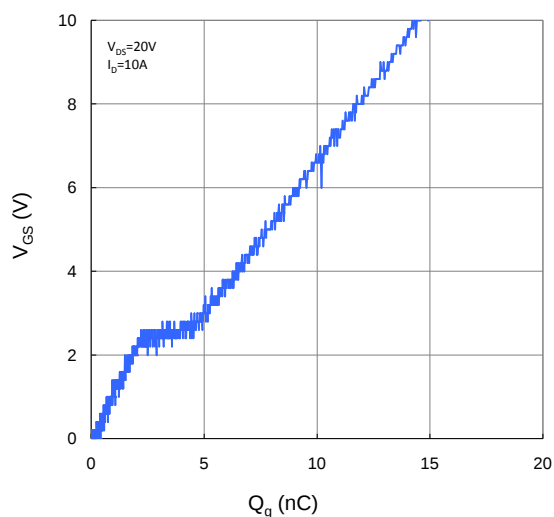


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

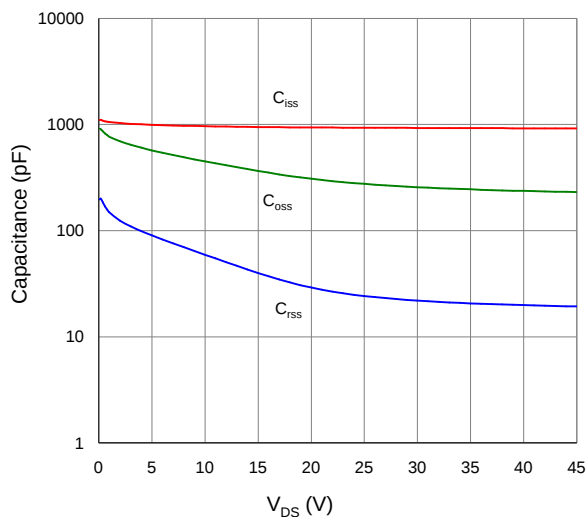


Figure 9. Maximum Safe Operating Area

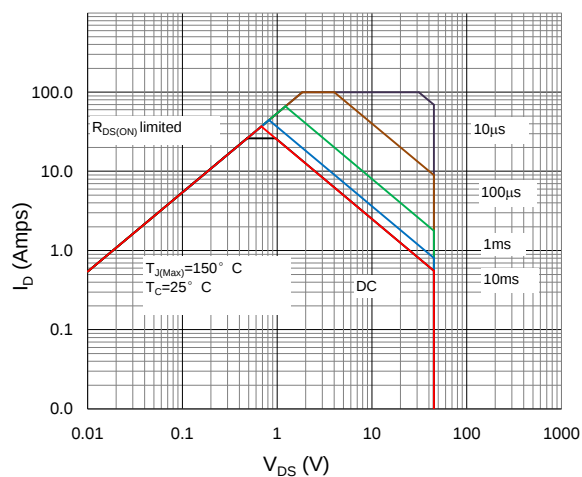


Figure 10. Maximum Drain Current vs. Case Temperature

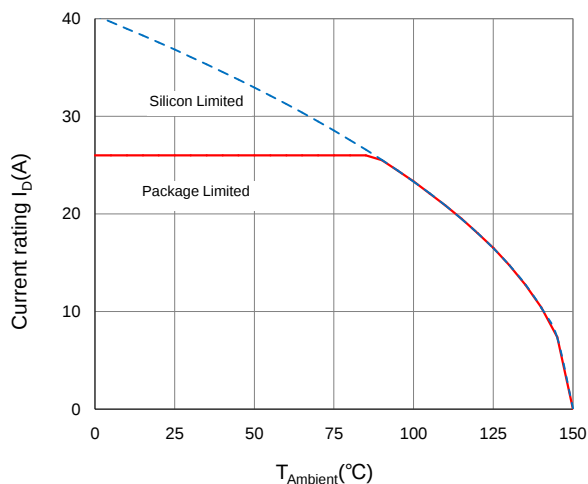
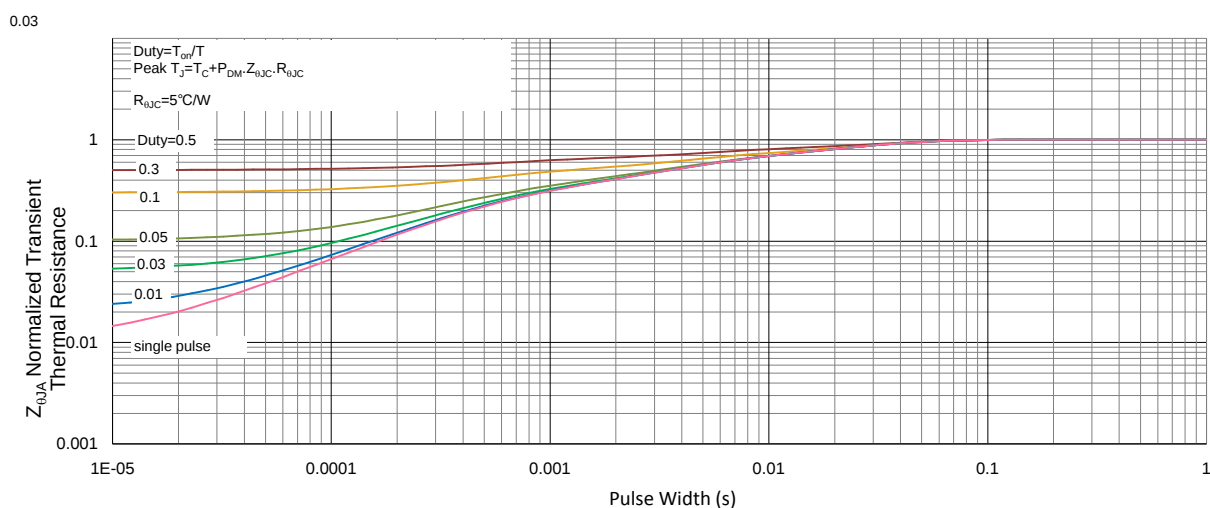
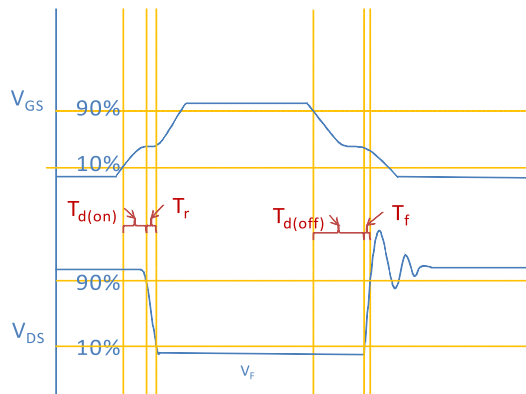
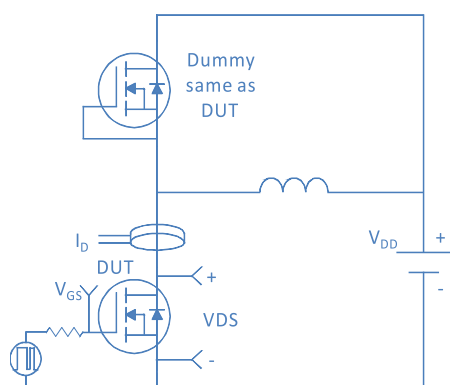


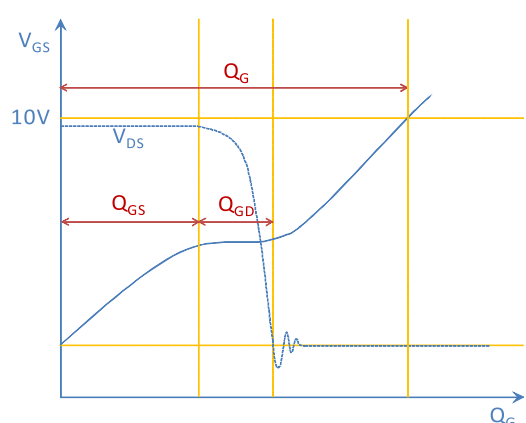
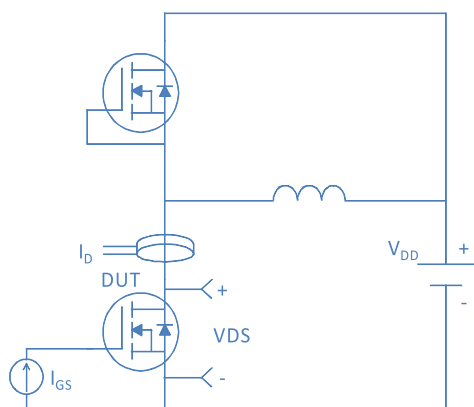
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



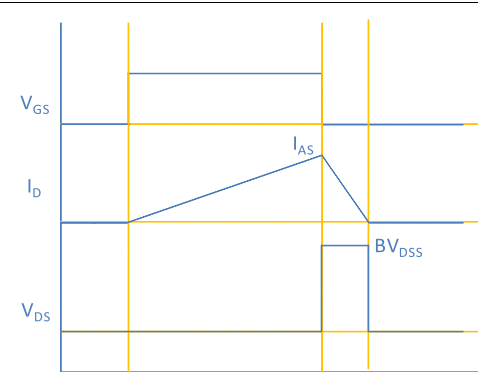
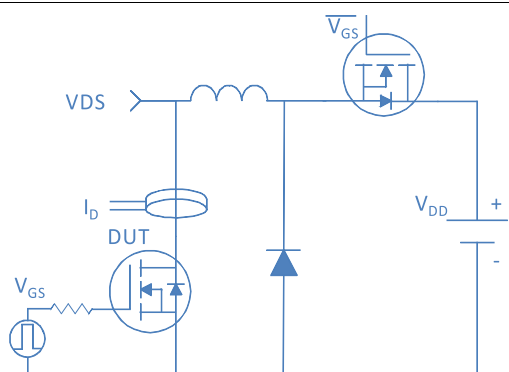
Inductive switching Test



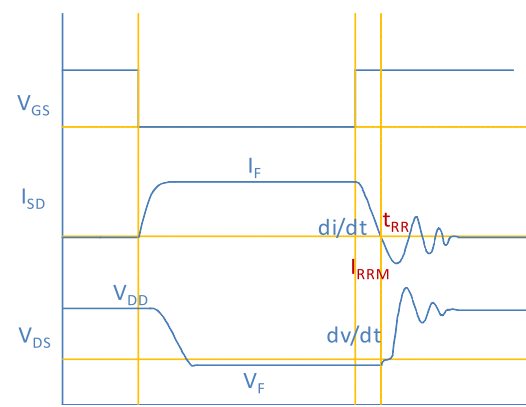
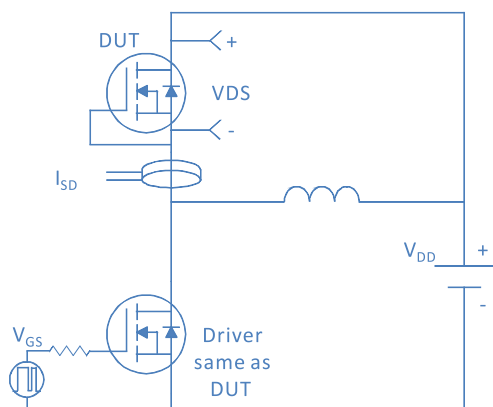
Gate Charge Test



Uclamped Inductive Switching (UIS) Test

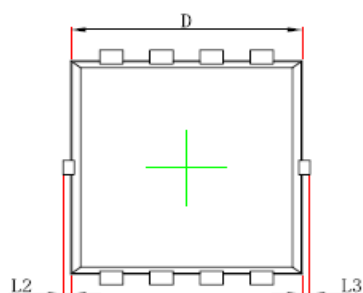


Diode Recovery Test

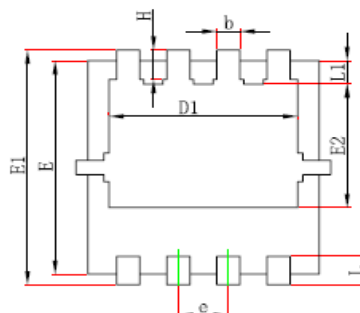


Package Outline

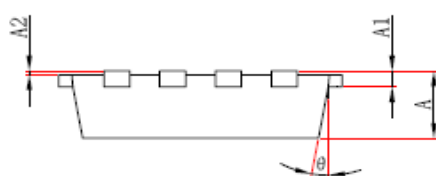
DFN3*3_P, 8 Leads



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°