

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☒ Trench Power SGT technology
- ☒ Low Gate Charge
- ☒ Very low on-resistance $R_{DS(ON)}$

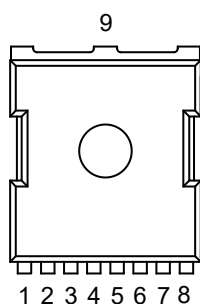
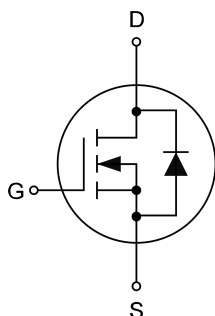
1.2 Applications

- ☒ Power Tool appliances
- ☒ High power inverter system
- ☒ BMS appliances

1.3 Quick reference

- ☒ $BV \geq 45\text{ V}$
- ☒ $P_D \leq 240\text{ W}$
- ☒ $I_D \leq 300\text{ A}$
- ☒ $R_{DS(ON)} \leq 1.15\text{ m}\Omega @V_{GS} = 10\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate	 Top View TOLL-8L	
2,3,4,5,6,7,8	Source		
9	Drain		

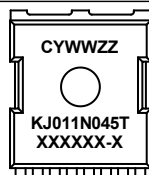
3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_A=25^{\circ}\text{C}$	45	-	V
V_{GS}	Gate-Source Voltage	$T_A=25^{\circ}\text{C}$	-	± 20	V
I_D	Continuous Drain Current	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	300	A
		$T_C=100^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	182	A
I_{DM}	Pulsed Drain Current	$T_A=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	725	A
I_{AS}	Avalanche Current		-	46	A
E_{AS}	Single Pulsed Avalanche Energy	$L=0.5\text{ mH}$	-	780	mJ
P_D	Drain Power Dissipation -Derating Factor	$T_C=25^{\circ}\text{C}$	-	240	W
			-	2	W/ $^{\circ}\text{C}$
T_J, T_{stg}	Operating Junction and Storage Temperature Range		-55	150	$^{\circ}\text{C}$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient, Steady-State		-	50	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case, Steady-State		-	1.0	

Notes:

- * Single pulse width limited by maximum junction temperature.
- ** $T_J=25^{\circ}\text{C}, V_{DD}=25\text{ V}, V_{GS}=10\text{ V}, L=0.5\text{ mH}, R_g=25\ \Omega$.
- *** The power dissipation P_D is based on $T_J(\text{MAX})=150^{\circ}\text{C}$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

4. Marking Information

Product Name	Marking
KJ011N045T	

5. Ordering Code

Product Name	Package	Reel size	Tape width	Quantity (pcs)
KJ011N045T	TOLL-8L	13"	24 mm	2000

Note: KUIJIEXIN defines "Green" as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC/JEDEC J-STD-020C)

6. Electrical Characteristics (T_A=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _{DS} =250 μA	45	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250 μA	1	1.5	2	V
I _{DSS}	Zero Gate Voltage Source Current	V _{DS} =45 V, V _{GS} =0 V, T _J =25℃	-	-	1	μA
		V _{DS} =45 V, V _{GS} =0 V, T _J =100℃	-	-	100	
I _{GSS}	Gate-Body Leakage Current	V _{DS} =0 V, V _{GS} =±20 V	-	-	±100	nA
R _{DS(ON)}	Drain-Source On-Resistance	V _{GS} =10 V, I _{DS} =20 A	-	1.0	1.15	mΩ
		V _{GS} =4.5 V, I _{DS} =20 A	-	1.15	1.35	mΩ
g _{FS}	Forward Transconductance	V _{DS} =10 V, I _D =10 A	-	60	-	S
V _{SD}	Diode Forward Voltage	I _{SD} =20 A, V _{GS} =0 V	-	-	1.2	V
I _S	Maximum Body-Diode Continuous Current		-	-	300	A
Dynamic Characteristics						
C _{iSS}	Input Capacitance	V _{DS} =20 V, V _{GS} =0 V, Frequency=1 MHz	-	7542	-	pF
C _{oSS}	Output Capacitance		-	1176	-	
C _{rSS}	Reverse Transfer Capacitance		-	95	-	
Switching Parameters						
Q _g	Total Gate Charge	V _{DS} =20 V, V _{GS} =10 V, I _{DS} =20 A	-	84	-	nC
Q _{gs}	Gate-Source Charge		-	30	-	
Q _{gd}	Gate-Drain Charge		-	17	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} =15 V, V _{GS} =10 V, R _G =1.6 Ω, I _D =20 A	-	12	-	ns
t _r	Turn-on Rise Time		-	48	-	
t _{d(off)}	Turn-off Delay Time		-	24	-	
t _f	Turn-off Fall Time		-	9.2	-	
t _{rr}	Body Diode Reverse Recovery Time	V _{GS} =0 V, I _F =20 A, dI _{SD} /dt=100 A/μs	-	24	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	44	-	nC

7. Typical Electrical and Thermal Characteristics

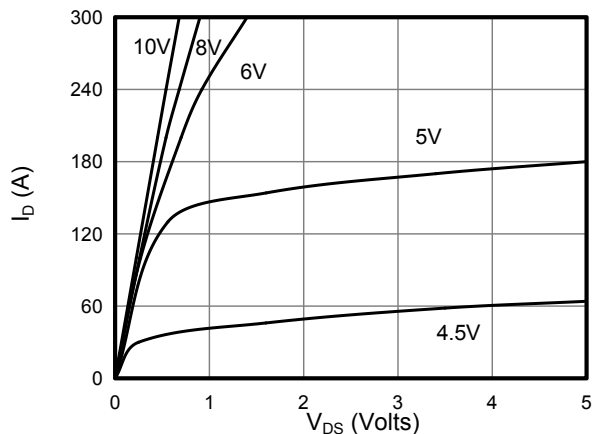


Figure 1: On-Region Characteristics

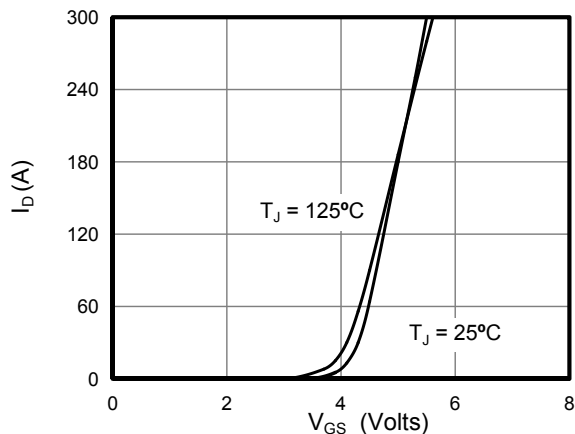


Figure 2: Transfer Characteristics

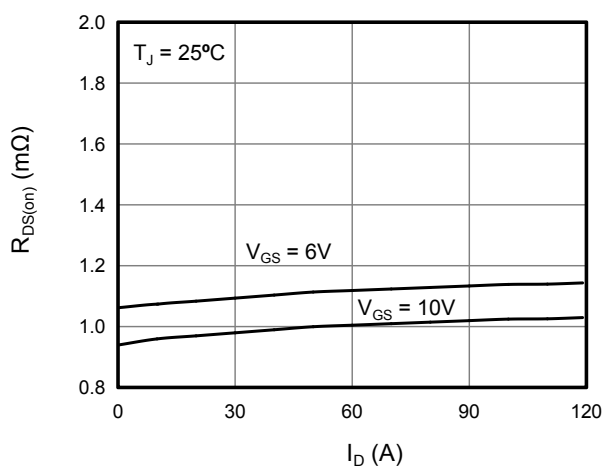


Figure 3: On-Resistance vs. Drain Current

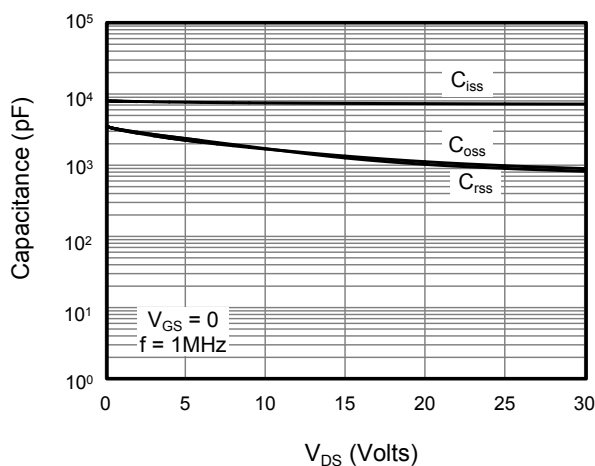


Figure 4: Capacitance Characteristics

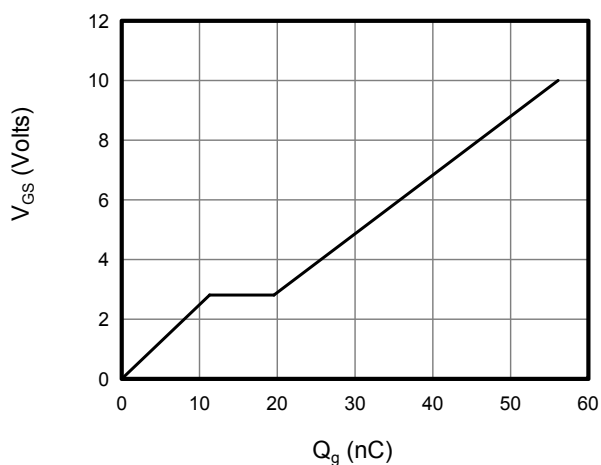


Figure 5: Gate Charge Characteristics

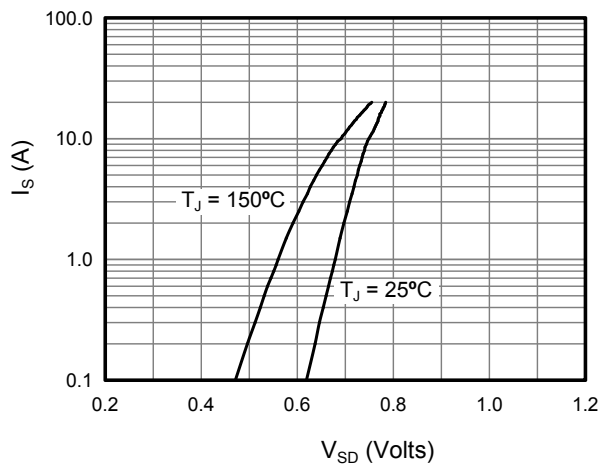


Figure 6: Body Diode Forward Voltage

7. Typical Characteristics(cont.)

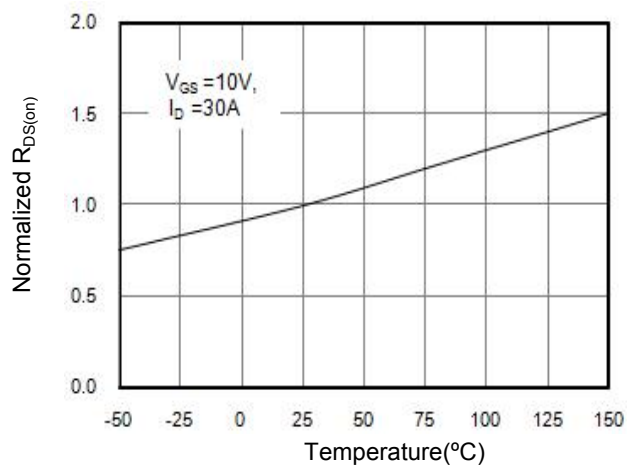


Figure 7: On-Resistance vs. Junction Temperature

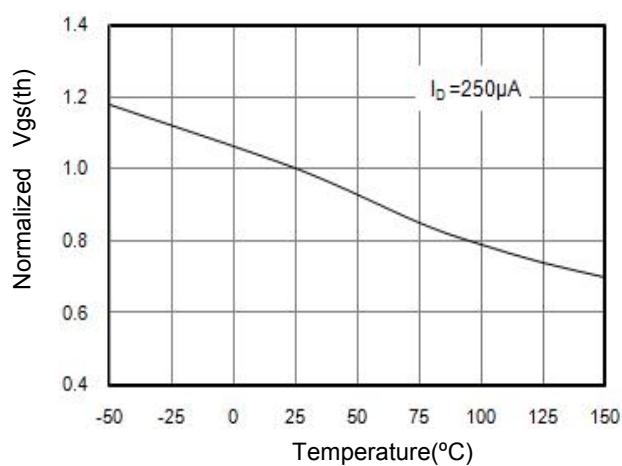


Figure 8: $V_{GS(th)}$ vs. Junction Temperature

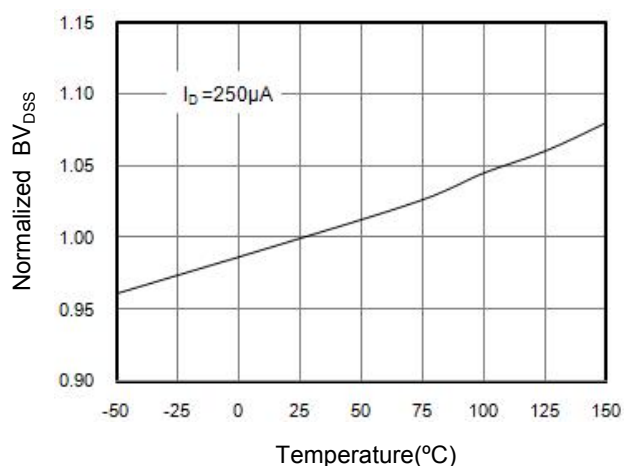


Figure 9: BV_{DS} vs. Junction Temperature

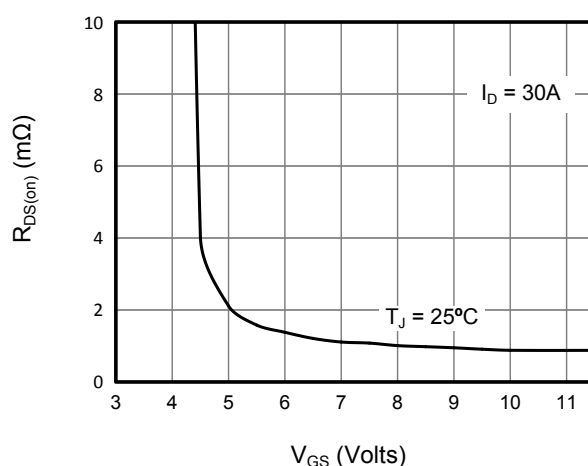


Figure 10: On-Resistance vs. Gate-Source Voltage

Figure A: Gate Charge Test Circuit and Waveforms

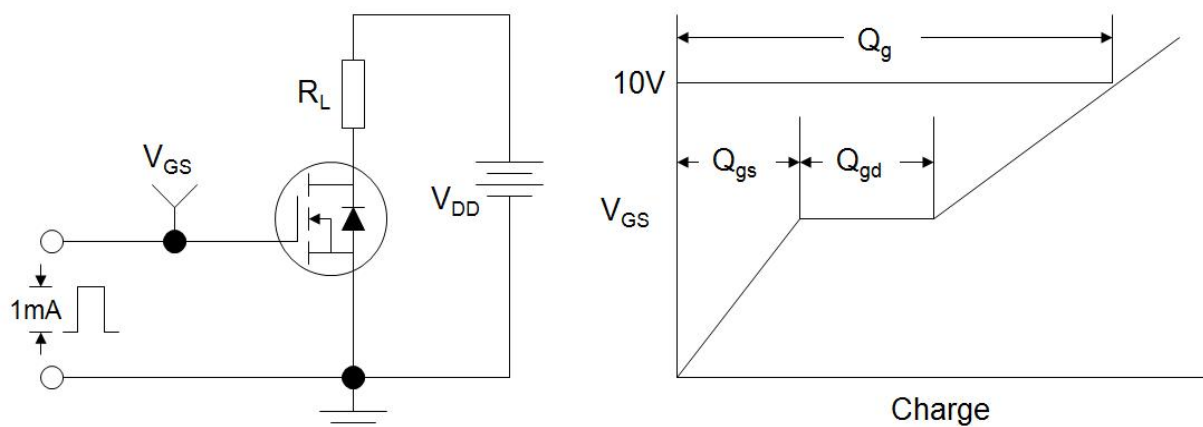


Figure B: Resistive Switching Test Circuit and Waveforms

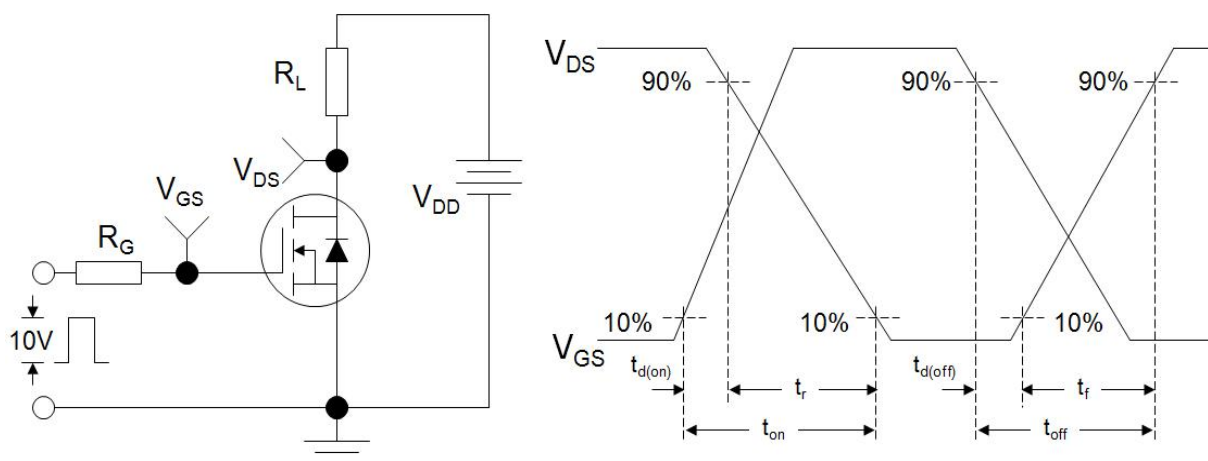
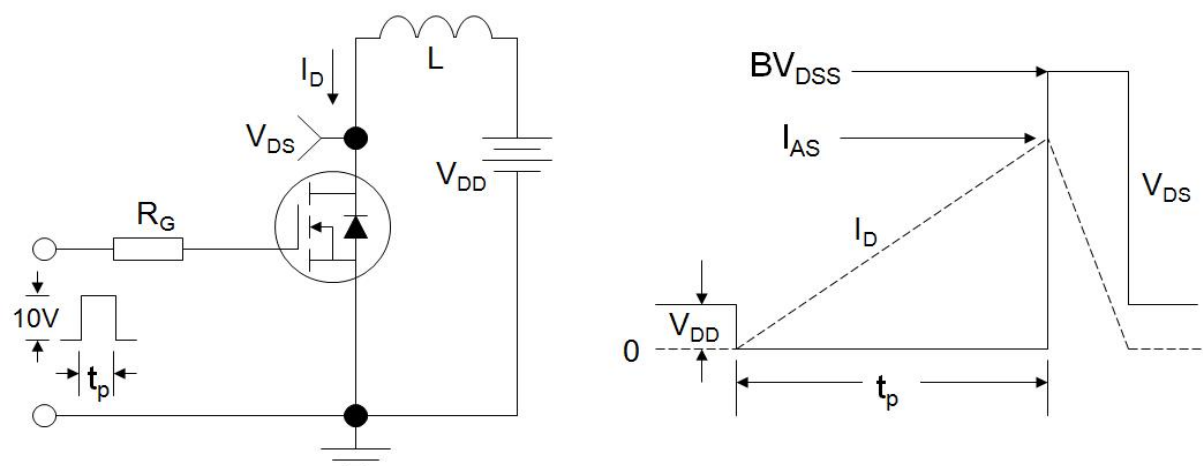
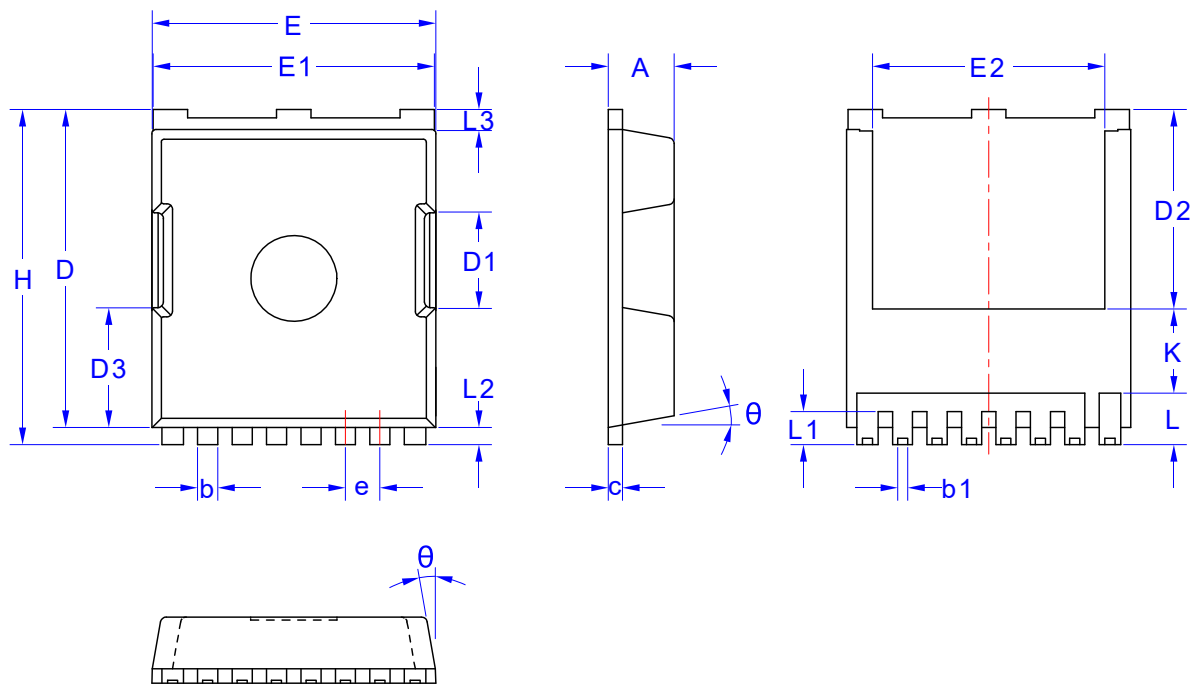


Figure C: Unclamped Inductive Switching (UIS) Test Circuit and Waveforms



8. Package Dimensions

TOLL-8L Package



Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
A	2.20	2.30	2.40
b	0.60	0.70	0.90
b1	0.30		0.50
c	0.40	0.50	0.60
D	10.28	10.38	10.48
D1	3.20	3.30	3.40
D2	6.85	6.95	7.05
D3		4.18 REF	
E	9.80	9.90	10.0
E1	9.70	9.80	9.90

Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
E2	8.00	8.10	8.20
e		1.20 BSC	
H	11.48	11.68	11.88
L	1.60	1.80	2.10
L1	1.00	1.15	1.30
L2		0.60 TYPE	
L3		0.60 TYPE	
K		2.90 TYPE	
θ	8°	10°	12°