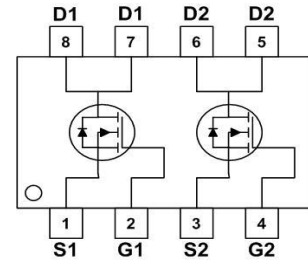




Dual N-Channel Enhancement Mode Power MOSFET

Description

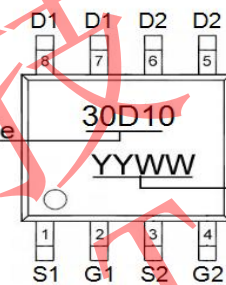
The MX30D10 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications.



General Features

- ◆ $V_{DS} = 30V$, $I_D = 10A$
- ◆ $R_{DS(ON)}(Typ.) 11.5m\Omega @ V_{GS}=10V$
- ◆ $R_{DS(ON)}(Typ.) 14.5m\Omega @ V_{GS}=4.5V$
- ◆ High density cell design for ultra low Rds on
- ◆ Fully characterized Avalanche voltage and current

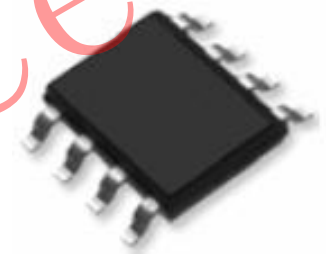
Schematic diagram



Marking and pin assignment

Application

Power switching application
Hard Switched and High Frequency Circuits
Uninterruptible Power Supply



SOP-8 top view

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--------------------------------------------------|-------------------|------------|------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous | I_D | 10 | A |
| Drain Current-Continuous($T_C=70^\circ C$) | $I_D(70^\circ C)$ | 8 | A |
| Pulsed Drain Current | I_{DM} | 36 | A |
| Maximum Power Dissipation | P_D | 1.5 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | $^\circ C$ |

Thermal Characteristic

| | | | |
|-------------------------------------------------|-----------------|----|--------------|
| Thermal Resistance, Junction-to-Ambient(Note 2) | $R_{\theta JA}$ | 85 | $^\circ C/W$ |
|-------------------------------------------------|-----------------|----|--------------|



Electrical Characteristics (TA=25°C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|-------------------------------------------|--------------|-------------------------------------------------------|-----|------|-----------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 30 | - | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=24V, V_{GS}=0V$ | - | - | 1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.2 | 1.8 | 2.5 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=8A$ | - | 11.5 | 13 | m Ω |
| | | $V_{GS}=4.5V, I_D=6A$ | - | 14.5 | 18 | |
| Forward Transconductance | g_{FS} | $V_{DS}=5V, I_D=8A$ | - | 24 | - | S |
| Dynamic Characteristics (Note4) | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$ | - | 940 | - | PF |
| Output Capacitance | C_{oss} | | - | 131 | - | PF |
| Reverse Transfer Capacitance | C_{rss} | | - | 109 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=15V, I_D=8A$ $V_{GEN}=4.5V, R_G=1.5\Omega$ | - | 4.2 | - | nS |
| Turn-on Rise Time | t_r | | - | 8.2 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 31 | - | nS |
| Turn-Off Fall Time | t_f | | - | 4 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=15V, I_D=8A,$ $V_{GS}=4.5V$ | - | 9.63 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 3.88 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 3.44 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V_{SD} | $V_{GS}=0V, I_S=1A$ | - | - | 1 | V |
| Diode Forward Current (Note 2) | I_S | | - | - | 9 | A |

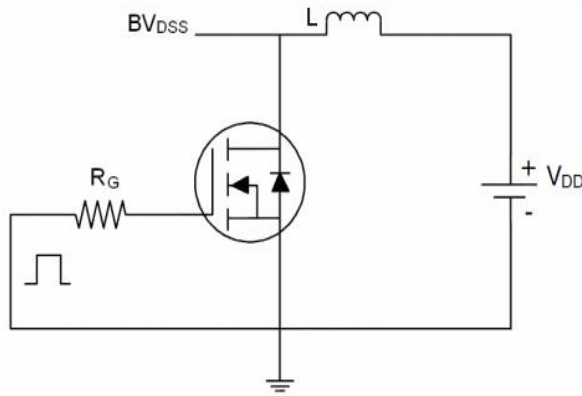
Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

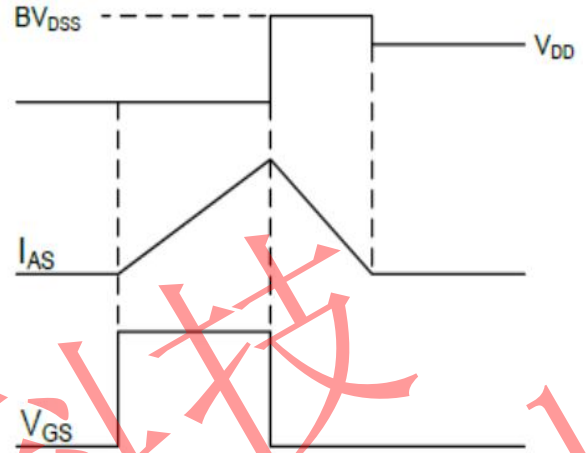


Test Circuit

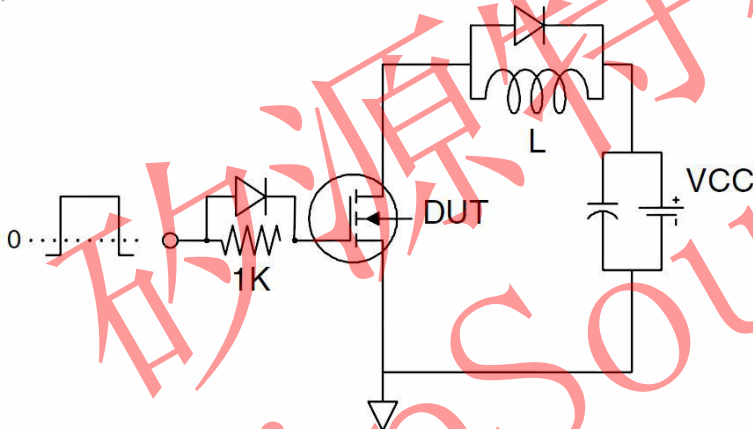
1) E_{AS} test Circuits and waveform:



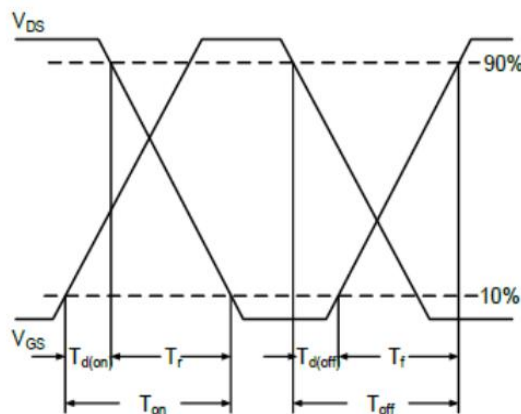
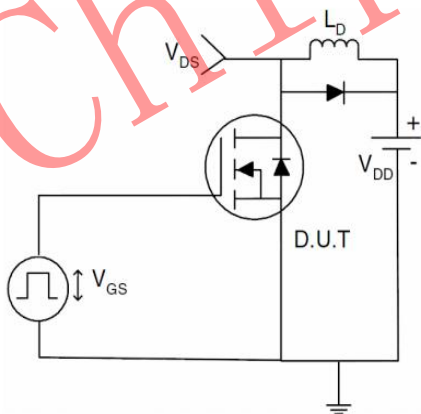
$$E_{AS} = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



2) Gate Charge Test Circuit:

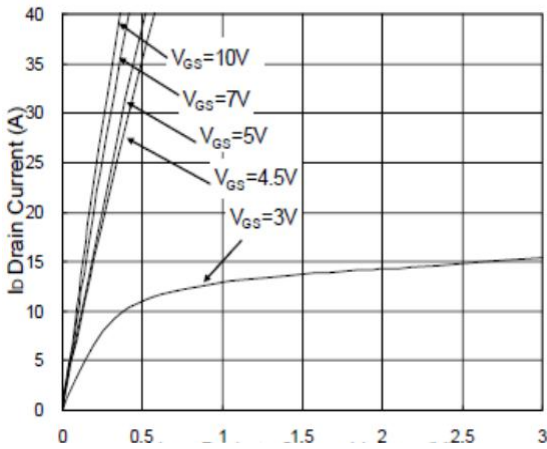


3) Switch Time Test Circuit:

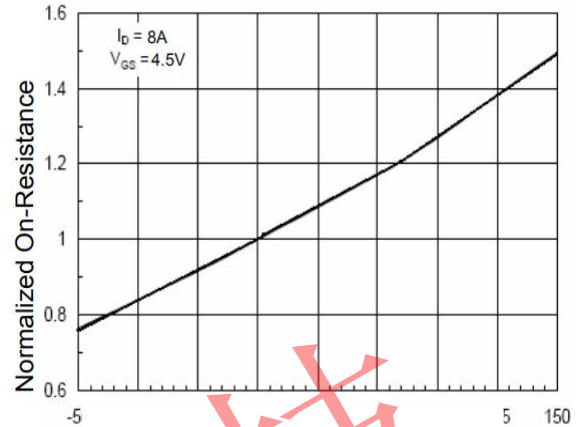




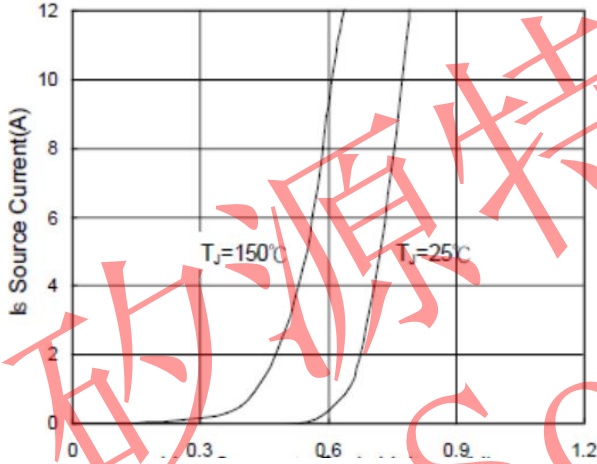
Typical Electrical and Thermal Characteristics (Curves)



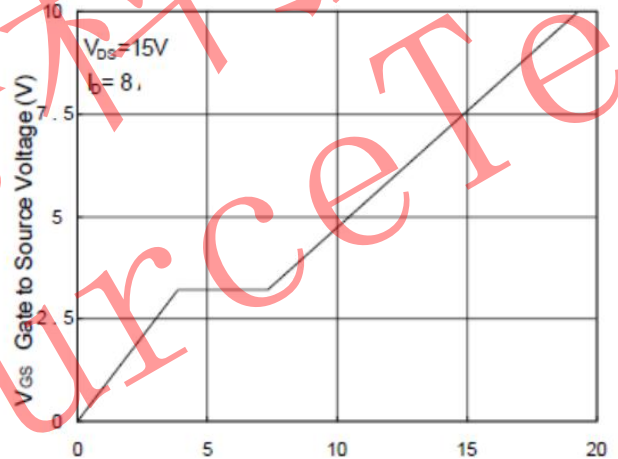
V_{DS} Drain-Source Voltage (V)
Figure 1 Output Characteristics



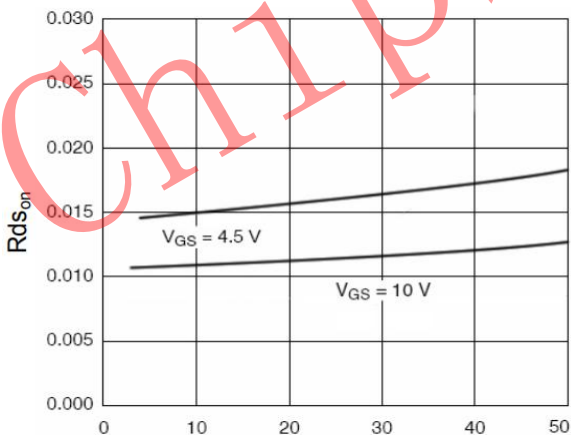
T_J -Junction Temperature($^{\circ}C$)
Figure 4 Rds(on)-Junction Temperature



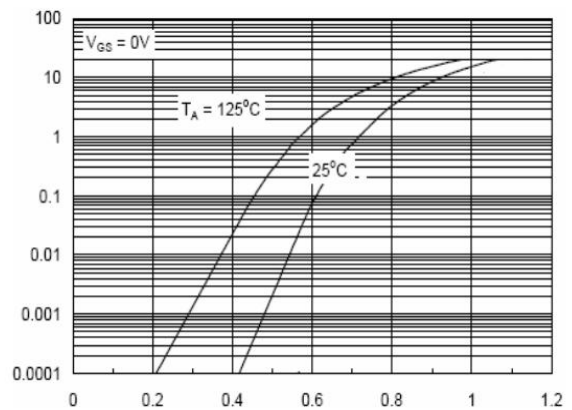
V_{GS} Gate-Source Voltage (V)
Figure 2 Transfer Characteristics



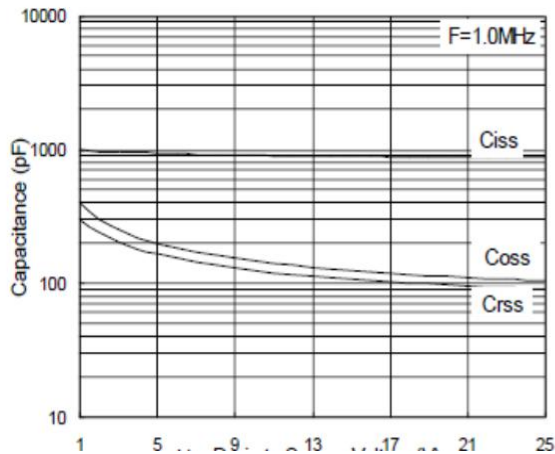
Q_g Gate Charge (nC)
Figure 5 Gate Charge



I_D - Drain Current(A)
Figure 3 Rds(on)- Drain Current

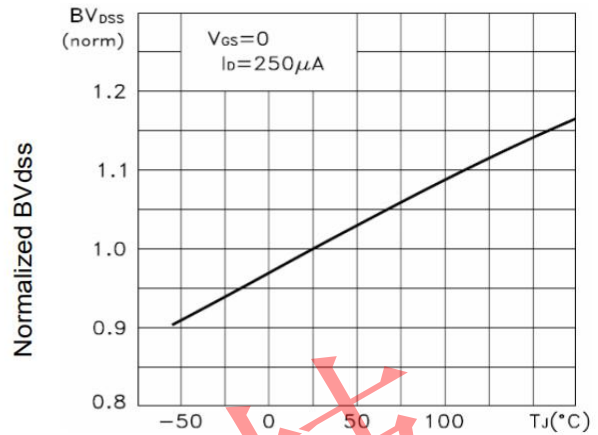


V_{SD} Source-Drain Voltage (v)
Figure 6 Source- Drain Diode Forward



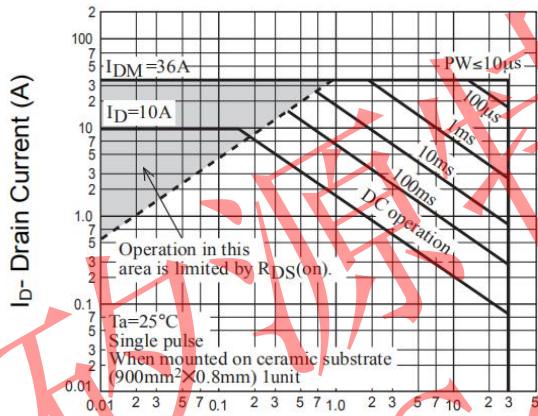
Vds Drain-Source Voltage (V)

Figure 7 Capacitance vs Vds



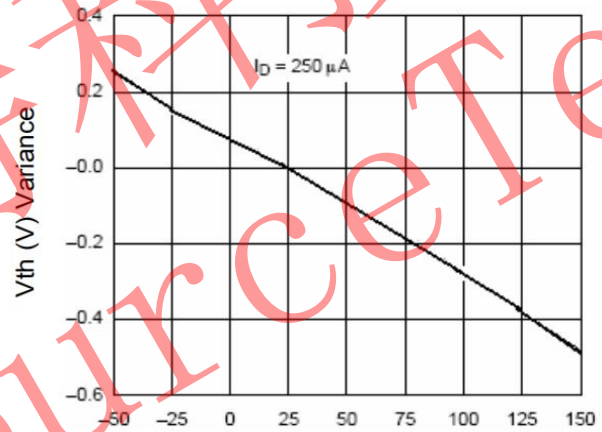
Tj-Junction Temperature(°C)

Figure 9 BVdss vs Junction Temperature



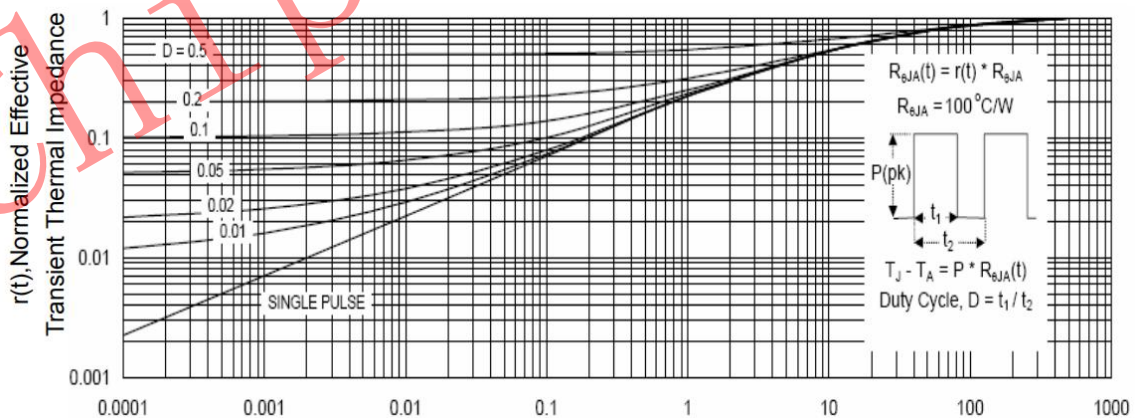
Vds Drain-Source Voltage (V)

Figure 8 Safe Operation Area



Tj-Junction Temperature(°C)

Figure 10 Vgs(th) vs Junction Temperature

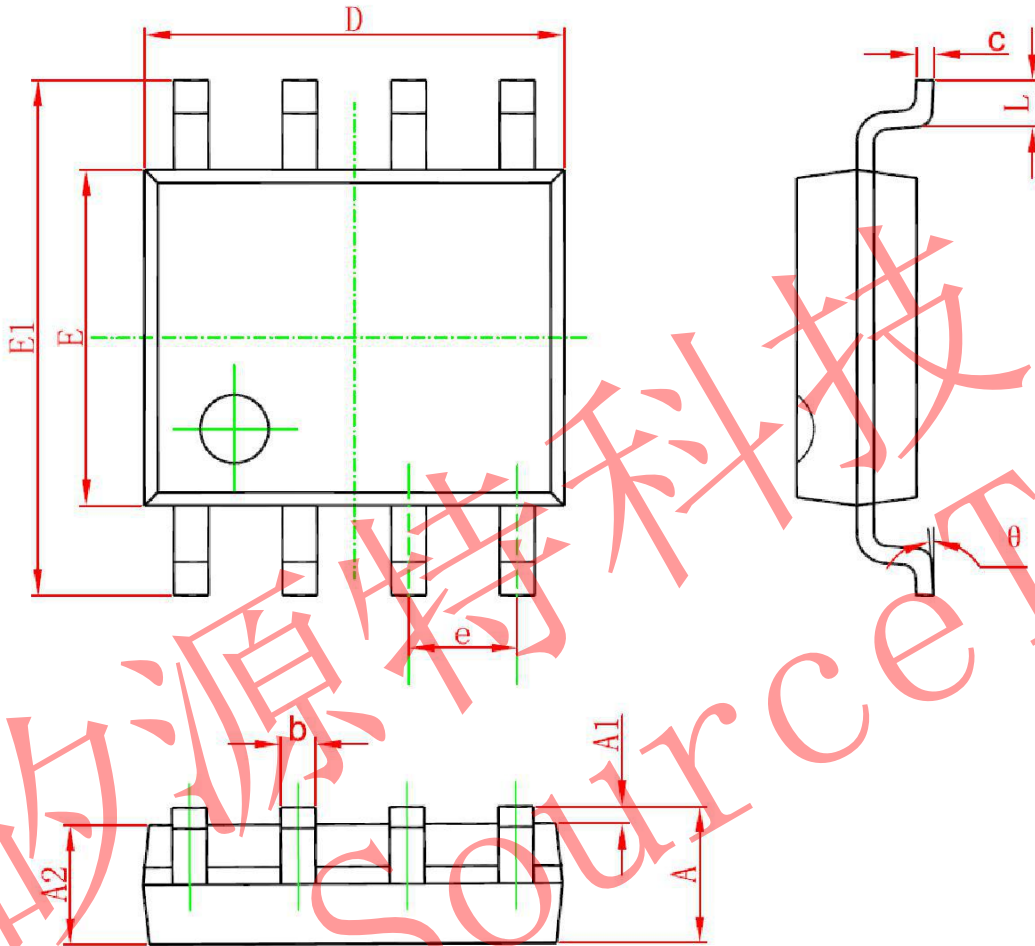


Square Wave Pluse Duration(sec)

Figure 11 Normalized Maximum Transient Thermal Impedance



SOP-8 Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.006 | 0.010 |
| D | 4.700 | 5.100 | 0.185 | 0.200 |
| E | 3.800 | 4.000 | 0.150 | 0.157 |
| E1 | 5.800 | 6.200 | 0.228 | 0.244 |
| e | 1.270 (BSC) | | 0.050 (BSC) | |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |