

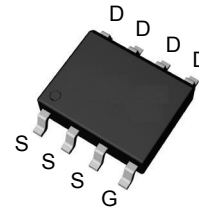
### Features

- -60V/-7.5A ,  
 $R_{DS(ON)} = 28m\Omega (typ.) @ V_{GS} = -10V$   
 $R_{DS(ON)} = 42m\Omega (typ.) @ V_{GS} = -4.5V$
- 100% UIS +  $R_g$  Tested
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

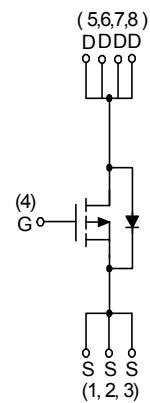
### Applications

- DC/DC Converter.
- Power Management.
- Load Switch.
- For Motor Drive Application.

### Pin Description



Top View of SOP8



P-Channel MOSFET

## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Symbol                        | Parameter                              |                      | Rating     | Unit |
|-------------------------------|----------------------------------------|----------------------|------------|------|
| Common Ratings                |                                        |                      |            |      |
| V <sub>DSS</sub>              | Drain-Source Voltage                   |                      | -60        | V    |
| V <sub>GSS</sub>              | Gate-Source Voltage                    |                      | ±20        |      |
| T <sub>J</sub>                | Maximum Junction Temperature           |                      | 150        | °C   |
| T <sub>STG</sub>              | Storage Temperature Range              |                      | -55 to 150 |      |
| I <sub>S</sub>                | Diode Continuous Forward Current       | T <sub>A</sub> =25°C | -7.5       | A    |
| I <sub>D</sub>                | Continuous Drain Current               | T <sub>A</sub> =25°C | -7.5       | A    |
|                               |                                        | T <sub>A</sub> =70°C | -5.7       |      |
| I <sub>DM</sub> <sup>a</sup>  | Pulsed Drain Current                   | T <sub>C</sub> =25°C | -22.5      |      |
| P <sub>D</sub>                | Maximum Power Dissipation              | T <sub>A</sub> =25°C | 1.56       | W    |
|                               |                                        | T <sub>A</sub> =70°C | 1          |      |
| R <sub>θJA</sub> <sup>b</sup> | Thermal Resistance-Junction to Ambient |                      | 80         | °C/W |
| I <sub>AS</sub> <sup>c</sup>  | Avalanche Current, Single pulse        | L=0.5mH              | -17        | A    |
| E <sub>AS</sub> <sup>c</sup>  | Avalanche Energy, Single pulse         | L=0.5mH              | 72         | mJ   |

Note a : Pulse width limited by max. junction temperature.

Note b : Surface Mounted on  $1\text{in}^2$  pad area.

Note c : UIS tested and pulse width limited by maximum junction temperature  $150^\circ\text{C}$  (initial temperature  $T_J=25^\circ\text{C}$ ).

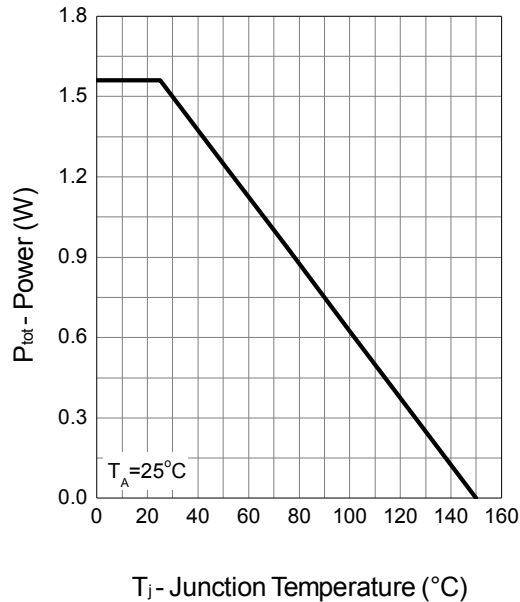
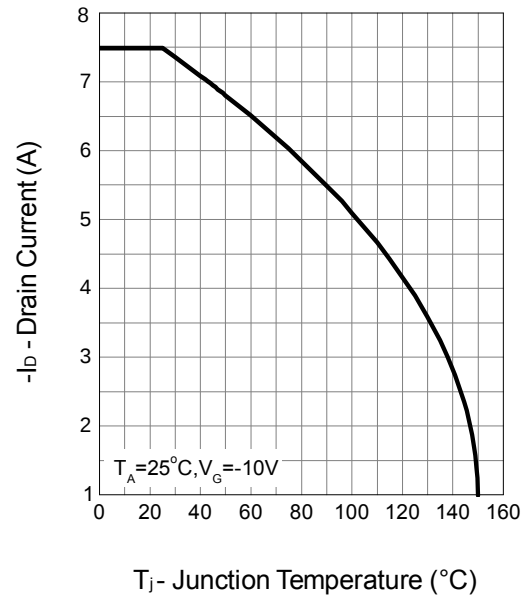
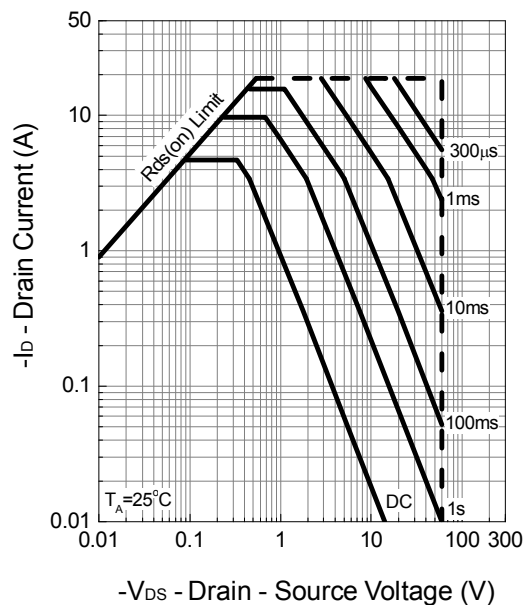
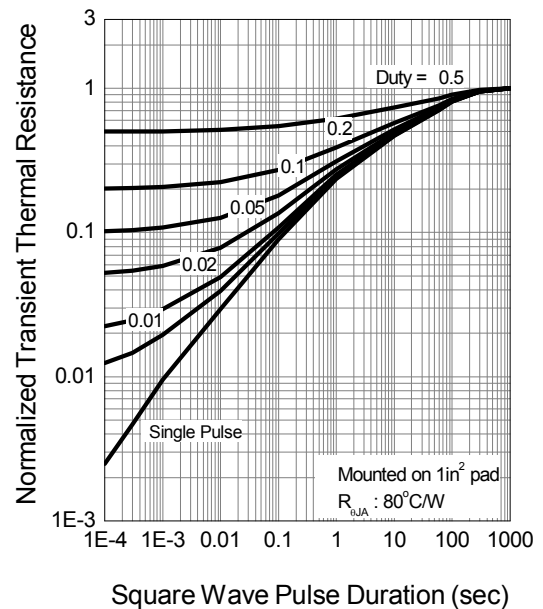
## Electrical Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

| Symbol                                   | Parameter                        | Test Condition                                                                                                    | Min.   | Typ.     | Max.      | Unit     |
|------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------|--------|----------|-----------|----------|
| Static Characteristics                   |                                  |                                                                                                                   |        |          |           |          |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =-250μA                                                                      | -60    | -        | -         | V        |
| I <sub>DSS</sub>                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =-48V, V <sub>GS</sub> =0V<br>T <sub>J</sub> =85°C                                                | -      | -        | -1<br>-30 | μA       |
| V <sub>GS(th)</sub>                      | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250μA                                                        | -1.3   | -1.8     | -2.3      | V        |
| I <sub>GSS</sub>                         | Gate Leakage Current             | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                                                        | -      | -        | ±100      | nA       |
| R <sub>DS(ON)</sub> <sup>d</sup>         | Drain-Source On-state Resistance | V <sub>GS</sub> =-10V, I <sub>DS</sub> =-4A<br>V <sub>GS</sub> =-4.5V, I <sub>DS</sub> =-3A                       | -<br>- | 28<br>42 | 33<br>47  | mΩ<br>mΩ |
| Diode Characteristics                    |                                  |                                                                                                                   |        |          |           |          |
| V <sub>SD</sub> <sup>d</sup>             | Diode Forward Voltage            | I <sub>SD</sub> =-1A, V <sub>GS</sub> =0V                                                                         | -      | -0.7     | -1.1      | V        |
| t <sub>rr</sub>                          | Reverse Recovery Time            | I <sub>SD</sub> =-4A, dI <sub>SD</sub> /dt=100A/μs                                                                | -      | 26       | -         | ns       |
| Q <sub>rr</sub>                          | Reverse Recovery Charge          |                                                                                                                   | -      | 33       | -         | nC       |
| Dynamic Characteristics <sup>e</sup>     |                                  |                                                                                                                   |        |          |           |          |
| R <sub>G</sub>                           | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                                                  | -      | 8        | 16        | Ω        |
| C <sub>iss</sub>                         | Input Capacitance                | V <sub>GS</sub> =0V,<br>V <sub>DS</sub> =-30V,<br>Frequency=1.0MHz                                                | -      | 1416     | 1840      | pF       |
| C <sub>oss</sub>                         | Output Capacitance               |                                                                                                                   | -      | 142      | -         |          |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance     |                                                                                                                   | -      | 85       | -         |          |
| t <sub>d(ON)</sub>                       | Turn-on Delay Time               | V <sub>DD</sub> =-30V, R <sub>L</sub> =30Ω,<br>I <sub>DS</sub> =-1A, V <sub>GEN</sub> =10V,<br>R <sub>G</sub> =6Ω | -      | 10       | 18        | ns       |
| t <sub>r</sub>                           | Turn-on Rise Time                |                                                                                                                   | -      | 9        | 16        |          |
| t <sub>d(OFF)</sub>                      | Turn-off Delay Time              |                                                                                                                   | -      | 88       | 158       |          |
| t <sub>f</sub>                           | Turn-off Fall Time               |                                                                                                                   | -      | 42       | 76        |          |
| Gate Charge Characteristics <sup>e</sup> |                                  |                                                                                                                   |        |          |           |          |
| Q <sub>g</sub>                           | Total Gate Charge                | V <sub>DS</sub> =-30V, V <sub>GS</sub> =-4.5V,<br>I <sub>DS</sub> =-4A                                            | -      | 15.6     | -         | nC       |
| Q <sub>g</sub>                           | Total Gate Charge                | V <sub>DS</sub> =-30V, V <sub>GS</sub> =-10V,<br>I <sub>DS</sub> =-4A                                             | -      | 32       | 45        |          |
| Q <sub>gs</sub>                          | Gate-Source Charge               |                                                                                                                   | -      | 5.2      | -         |          |
| Q <sub>gd</sub>                          | Gate-Drain Charge                |                                                                                                                   | -      | 6.8      | -         |          |

Note d : Pulse test; pulse width≤300μs, duty cycle≤2%.

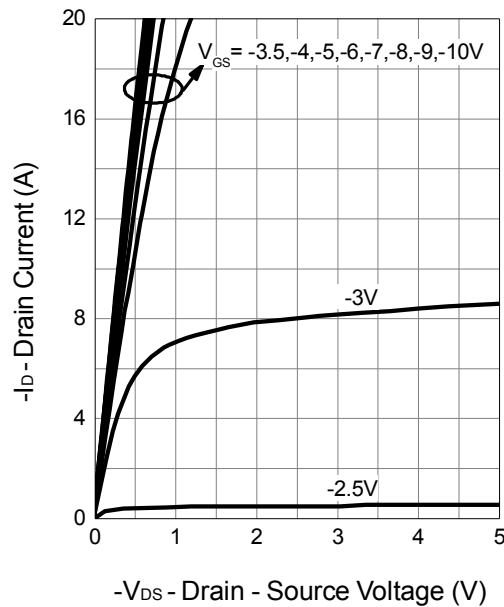
Note e : Guaranteed by design, not subject to production testing.

## Typical Characteristics

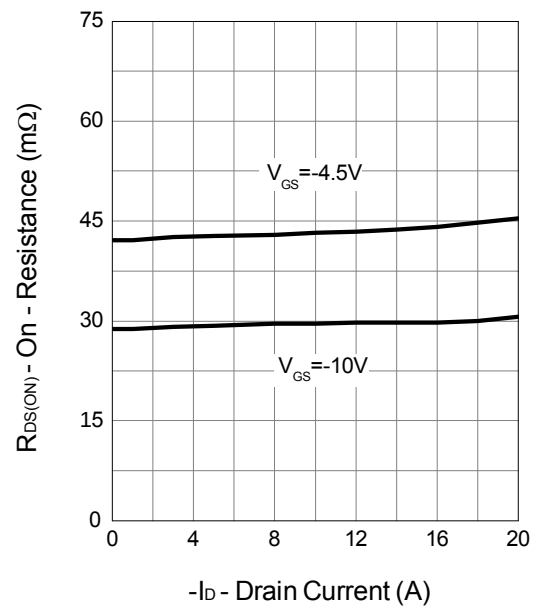
**Power Dissipation**

**Drain Current**

**Safe Operation Area**

**Thermal Transient Impedance**


## Typical Characteristics (Cont.)

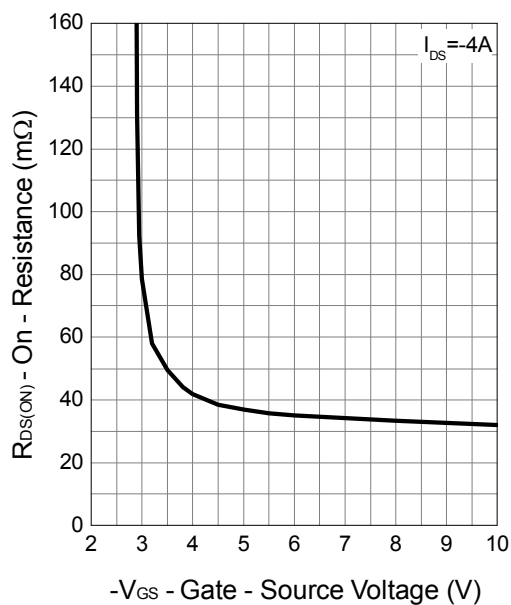
Output Characteristics



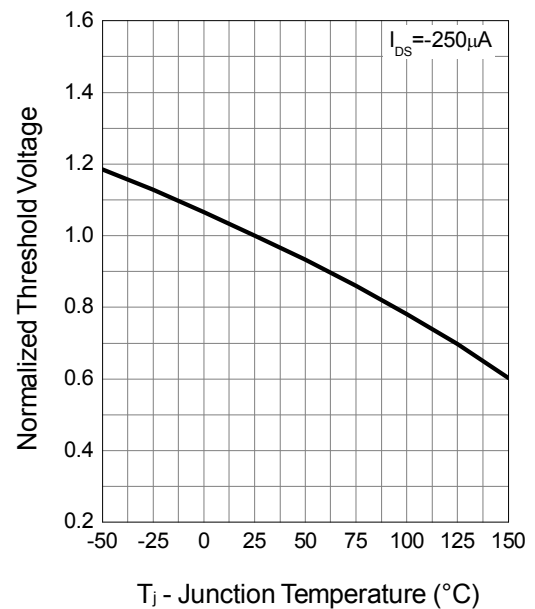
Drain-Source On Resistance



Gate-Source On Resistance

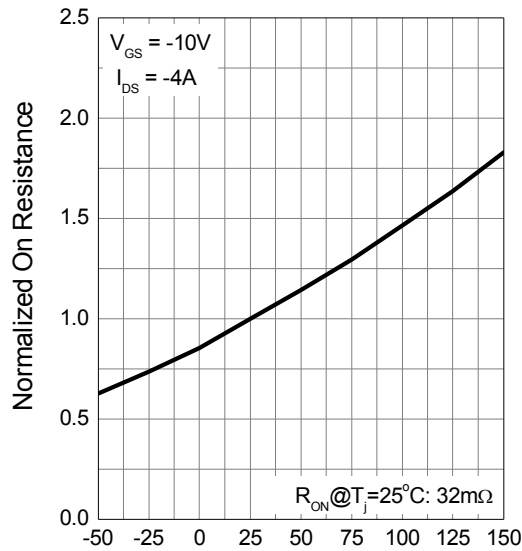


Gate Threshold Voltage



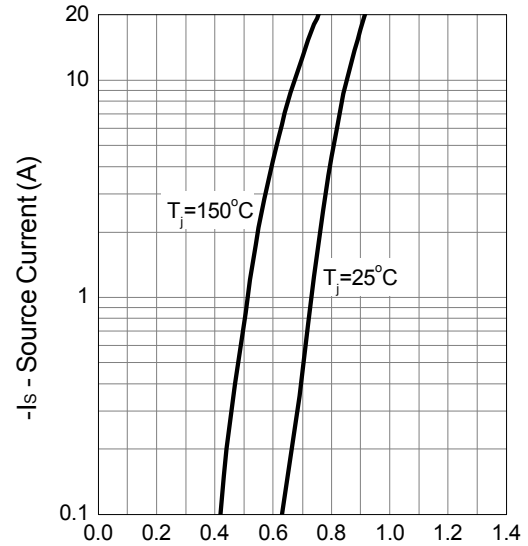
## Typical Characteristics (Cont.)

Drain-Source On Resistance



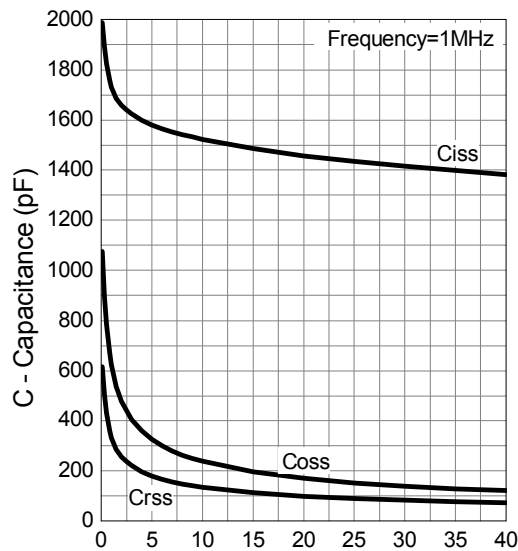
$T_j$  - Junction Temperature ( $^{\circ}\text{C}$ )

Source-Drain Diode Forward



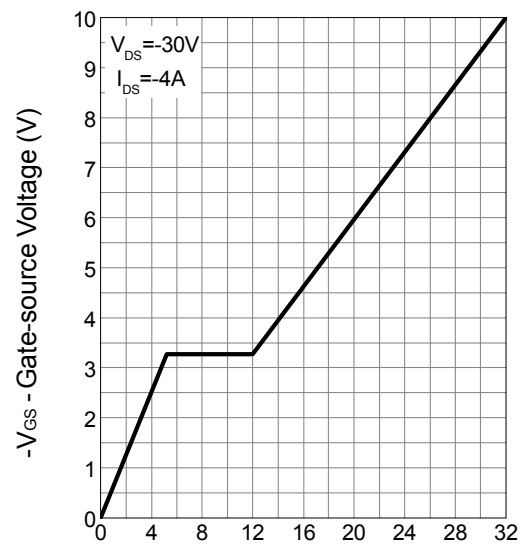
$-V_{SD}$  - Source - Drain Voltage (V)

Capacitance



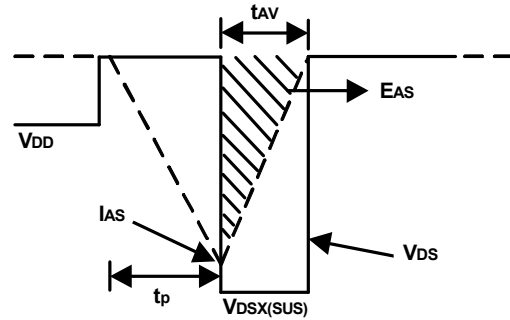
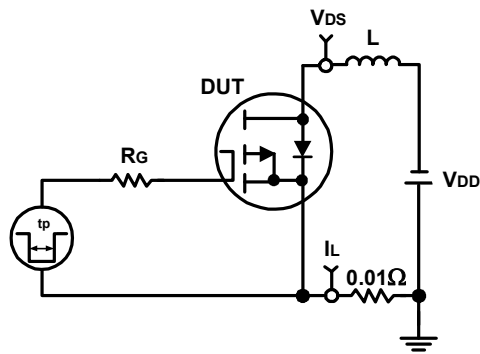
$-V_{DS}$  - Drain - Source Voltage (V)

Gate Charge

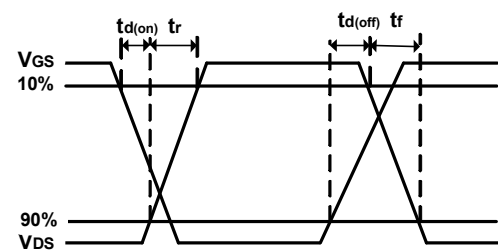
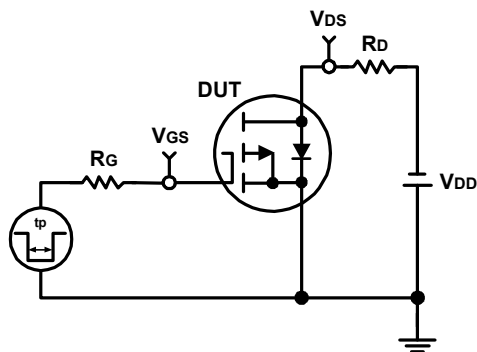


$Q_G$  - Gate Charge (nC)

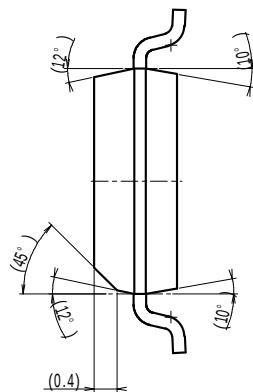
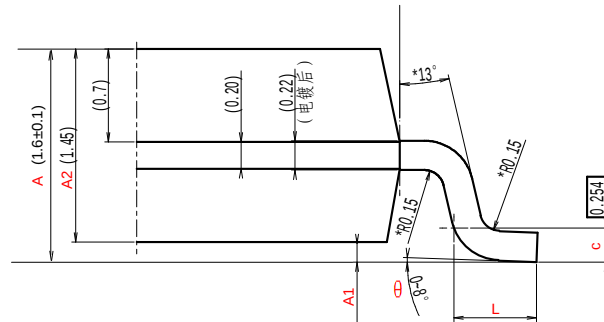
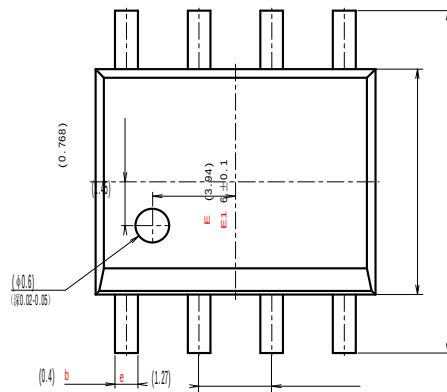
## Avalanche Test Circuit and Waveforms



## Switching Time Test Circuit and Waveforms



## SOP8 PACKAGE OUTLINE



| 字符 | Dimension millimeters |            |       |
|----|-----------------------|------------|-------|
|    | Min                   | Standard   | Max   |
| A  | 1.500                 | 1.600      | 1.700 |
| A1 | 0.040                 | 0.080      | 0.150 |
| A2 | 1.350                 | 1.450      | 1.550 |
| b  | 0.300                 | 0.400      | 0.500 |
| c  | 0.220                 | 0.254      | 0.280 |
| D  | 4.800                 | 4.900      | 5.000 |
| E  | 3.840                 | 3.940      | 4.040 |
| E1 | 5.900                 | 6.000      | 6.100 |
| e  |                       | 1.27 (BSC) |       |
| L  | 0.400                 | 0.550      | 0.700 |
| θ  | 0°                    |            | 8°    |

